

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Leontodon autumnalis* L.

Common name: fall dandelion

Assessors:

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Date: 10/19/2010

Date of previous ranking, if any: 6T

OUTCOME SCORE:

CLIMATIC COMPARISON

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

Pacific Maritime	<u>Yes</u>
Interior-Boreal	<u>Yes</u>
Arctic-Alpine	<u>Yes</u>

INVASIVENESS RANKING

	Total (total answered points possible ¹)	Total
Ecological impact	40 (<u>40</u>)	<u>16</u>
Biological characteristics and dispersal ability	25 (<u>25</u>)	<u>14</u>

Ecological amplitude and distribution	25 (25)	16
Feasibility of control	10 (7)	3
Outcome score	100 (97) ^b	49 ^a
Relative maximum score ²		51

¹ For questions answered “unknown” do not include point value for the question in parentheses for “total answered points possible.”

² Calculated as $a/b \times 100$

A. CLIMATIC COMPARISON

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

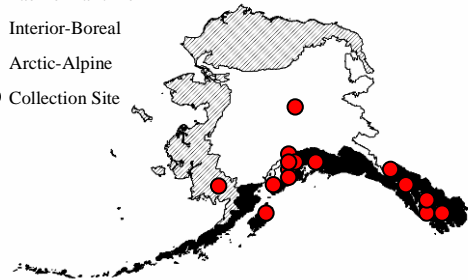
- Yes - continue to 1.2
 No - continue to 2.1

1.2. From which eco-geographic region has it been collected or documented (see inset map)?

Proceed to Section B. INVASIVENESS RANKING

- Pacific Maritime
 Interior-Boreal
 Arctic-Alpine

- Pacific Maritime
□ Interior-Boreal
▨ Arctic-Alpine
● Collection Site



Documentation: *Leontodon autumnalis* has been documented from all three ecogeographic regions of Alaska (Hultén 1968, AKEPIC 2010, UAM 2010).

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:

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: While little literature is available on the ecological impacts of *Leontodon autumnalis*, this species reduces resources available to co-occurring species when growing in repeatedly disturbed sites (see Kravchenko 2009). *Leontodon autumnalis* can achieve high densities in hayfields and roadsides in Alaska and thus presumably reduces available nutrients and moisture (Carlson pers. obs.).

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 3

Documentation: *Leontodon autumnalis* grows primarily in disturbed areas, pastures, cultivated areas, roadsides, and open fields (Bogler 2006, Klinkenberg 2010). It appears to increase the density of ruderal species growing in disturbed areas in Alaska.

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 3

Documentation: *Leontodon autumnalis* appears to be strongly competitive in hayfields in Alaska (Spellman pers. comm.) and may affect the population sizes of native species.

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 7

Documentation: Rabbits, insects, and mollusks feed on *Leontodon autumnnalis* (Edwards and Crawley 1999). The presence of *Leontodon autumnnalis* likely affects native plant-pollinator interactions (Conn pers. obs.).

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/m²] and not able to reproduce vegetatively). 0
 - b. Somewhat aggressive (reproduces by seed only [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 (extensive vegetative spread and/or many seeded [>1,000/m²]) 3
 - e. Unknown U
- Score 2

Documentation: *Leontodon autumnnalis* reproduces by seeds; vegetative reproduction is rare (Kravchenko 2009, Emorsgate Seeds 2010). This species produces an average of 779 seeds per plant (Sheldon and Burrows 1973). In a mesic grassland in Germany, the average seed density in the soil was 778 seeds per square meter with a maximum seed density of 5,106 seeds per square meter (Wellstein et al. 2007).

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: Each seed has a pappus composed of feathery bristles, which facilitate wind dispersal (Bogler 2006). Despite this adaptation for wind dispersal, mean dispersal of seeds was

estimated at only 1.64 m in a 16.41 km/h wind (Sheldon and Burrows 1973); however, less common long-distance dispersal events are still expected for this species.

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

Documentation: *Leontodon autumnalis* has been germinated from both locally-produced and imported straw, which is sometimes used by mushers as dog bedding in Alaska (Conn et al. 2006). Infestations in Alaska have primarily spread along roadways (AKEPIC 2010).

2.4. *Allelopathic*

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

Score

Documentation: No evidence has been documented to suggest that *Leontodon autumnalis* 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

Documentation: *Leontodon autumnalis* is primarily competitive with surrounding vegetation when the competitive ability of the surrounding vegetation is suppressed by disturbances or cutting (Hofmann and Isselstein 2004).

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

Documentation: No evidence suggests that *Leontodon autumnalis* forms dense thickets or has a climbing or smothering growth habit.

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: A study conducted in a German grassland showed that seeds germinate best when competition from surrounding species is low, and seedling emergence improves with increasing disturbance (Hofmann and Isselstein 2004). Infestations documented in Alaska are in disturbed areas (AKEPIC 2010); however, this species is able to establish in heavily vegetated hayfields in Alaska.

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

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

3

Documentation: *Leontodon hispidus* and *L. saxatilis* ssp. *saxatilis* are both known or suspected to occur as non-native species in Alaska (AKEPIC 2010). *L. saxatilis* ssp. *saxatilis* is a weed in California (DiTomaso and Healy 2007).

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

0

Documentation: *Leontodon autumnalis* has not been documented growing in riparian or wetland environments (Bogler 2006, Klinkenberg 2010).

Total Possible

25

Total

14

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: *Leontodon autumnalis* is an occasional agricultural weed in grain fields in Russia and pastures in Russia, Finland, and North America. It has been documented as a weed in forage crops in Alaska (Jutila 1999, Bogler 2006, Kravchenko 2009, Quarberg et al. 2009, Klinkenberg 2010).

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

Documentation: *Leontodon autumnnalis* is often a ruderal species in its native range, commonly colonizing disturbed, mesic grasslands (Hofmann and Isselstein 2004, Wellstein et al. 2007, Kravchenko 2009). We are unaware of documented ecological impacts in natural areas.

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

Documentation: Seedling survival is favored by the removal of surrounding vegetation, frequent cutting of surrounding vegetation, or frequent disturbance (Hofmann and Isselstein 2004). The frequency of occurrence of *Leontodon autumnnalis* was found to be much higher in grazed coastal meadows than in ungrazed coastal meadows in Finland (Jutila 1999). *Leontodon autumnnalis* can establish in naturally disturbed beaches and commonly grows in waste places, fallow land, gardens, roadsides, and pastures in subarctic regions (NatureGate 2010, Kravchenko 2009). In North America, it grows in pastures, open fields, and roadsides (Bogler 2006, Klinkenberg 2010). In Alaska, 81% of recorded populations are associated with fill importation. All other infestations are associated with other types of disturbances or are located near towns or along roads (Hultén 1968, AKEPIC 2010, UAM 2010). *Leontodon autumnnalis* spreads aggressively in hay fields in Homer, Alaska (Spellman, pers. comm.).

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

Documentation: *Leontodon autumnnalis* is native to Eurasia (Bogler 2006) and has been introduced to New Zealand and North America (GBIF New Zealand 2010, USDA 2010). This

species grows in the arctic regions of Russia and Norway (Kravchenko and Budrevskaya 2005, Vascular Plant Herbarium Oslo 2010).

- 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: *Leontodon autumnalis* has been documented in 27 states of the U.S. (USDA 2010).

Total Possible	25
Total	16

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

U

Documentation: The amount of time for which seeds remain viable in soil has not been documented.

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: *Leontodon autumnalis* has rhizomes (Kravchenko 2009), but rarely resprouts following the removal of the aboveground growth (Emorsgate Seeds 2010).

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

2

Documentation: Herbicide applications combined with manual methods have successfully controlled infestations in agricultural fields in Russia. Mowing or cutting the stems before they fruit can prevent the spread of populations (Kravchenko 2009). If mown or cut, infestations should be revisited during the same growing season to control resprouting plants (Jantunen et al. 2007).

Total Possible	7
Total	3

Total for four sections possible	97
Total for four sections	49

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