ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Hieracium lachenalii* C. C. Gmelin (*Hieracium vulgatum* Fries)
Common name: common hawkweed
Assessors:

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Date: 1/18/2011
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	Yes
Interior-Boreal	Yes
Arctic-Alpine	Yes

INVASIVENESS RANKING	**Total** (total answered points possible[1])	**Total**
Ecological impact	40 (30)	13
Biological characteristics and dispersal ability	25 (23)	12
Ecological amplitude and distribution	25 (25)	18
Feasibility of control	10 (10)	7
Outcome score	100 (88)[b]	50[a]
Relative maximum score[2]		**57**

[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

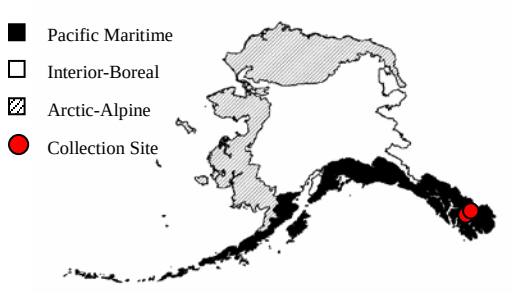
A. CLIMATIC COMPARISON

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: *Hieracium lachenalii* has been documented from the Pacific Maritime ecogeographic region of Alaska (AKEPIC 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: *Hieracium lachenalii* has been documented from Røros, Norway, and from a site 6 km east of Lillehammer, Norway, which have 55% and 44% climatic similarities with Fairbanks and 76% and 49% climatic similarities with Nome, respectively (CLIMEX 1999, Norwegian Species Observation Service 2011, Vascular Plant Herbarium Oslo 2011).

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	10

substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)

e. Unknown U

Score **5**

Documentation: Other *Hieracium* species, such as *H. pilosella* and *H. aurantiacum* have been shown or suggested to significantly alter the nutrient contents of the soils on which it grows (Makepeace et al. 1985, McIntosh et al. 1995, Rinella and Sheley 2002). While, *Hieracium lachenalii* lacks the stoloniferous growth habit of of these species (Strother 2006) and may not affect soil conditions as dramatically, this species can grow at high densities in Alaska (AKEPIC 2011).

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: *Hieracium lachenalii* grew at over 10% ground cover in an anthropogenically disturbed forest on Prince Edward Island, Canada (MacQuarrie and Lacroix 2003), and 14% of infestations recorded in Alaska occur at over 10% ground cover in areas disturbed by fill importation (AKEPIC 2011). It has the potential to increase the density of forb layers in disturbed areas.

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: *Hieracium lachenalii* can grow at 10% to 30% ground cover in disturbed areas (MacQuarrie and Lacroix 2003, AKEPIC 2011) and may therefore reduce population sizes of colonizing 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 **U**

Documentation: *Hieracium* species hybridize with other native and non-native *Hieracium* species (Wilson 2006, Gaskin and Wilson 2007). The impacts of *Hieracium lachenalii* on associated trophic levels are largely unknown.

Total Possible 30
Total **13**

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 **2**

Documentation: *Hieracium lachenalii* reproduces by seeds. Seed production in *Hieracium* species is often asexual, allowing plants to colonize large areas without pollination (Strother 2006, King County 2011).

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 dispersed by wind, making *Hieracium lachenalii* a good colonizer of disturbed areas (Dzwonko and Loster 1992).

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 **2**

Documentation: Seeds can be transported on mowing equipment (King County 2011). *Hieracium lachenalii* is commonly found along gravelly roadsides in Washington (Washington NWCB 2007) and it has spread along roads in southeast Alaska (AKEPIC 2011), suggesting that seeds can be dispersed by the movement of people or vehicles.

2.4. Allelopathic

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

Score **U**

Documentation: No evidence has been documented to suggest that *Hieracium lachenalii* is allelopathic, however other members of the genus (e.g., *H. pilosella*) are allelopathic (Giroday and Baker 2006).

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: The competitive ability of *Hieracium lachenalii* is largely unknown. However, 14% of infestations recorded in Alaska occur at over 10% ground cover, and 20% were recorded as highly aggressive (AKEPIC 2011). *Hieracium lachenalii* also grew at over 10% ground cover in an anthropogenically disturbed forest on Prince Edward Island, Canada (MacQuarrie and Lacroix 2003). This species is at least moderately competitive when growing in anthropogenically disturbed sites.

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: *Hieracium lachenalii* does not form mats (Washington NWCB 2007). It grows from 20 to 80 cm tall with primarily basal leaves (Strother 2006, Klinkenberg 2010) and is therefore unlikely to significantly overtop and outshade surrounding vegetation.

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 **0**

Documentation: In North America, *Hieracium lachenalii* grows in disturbed areas, open sites in thickets, roadsides, gravel riverbeds, pastures, abandoned farmland, logged areas, and forest openings (Strother 2006, Klinkenberg 2010, King County 2011).

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

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

Score **3**

Documentation: All *Hieracium* species are considered noxious weeds in Washington. *Hieracium atratum*, *H. aurantiacum*, *H. caespitosum*, *H. × floribundum*, *H. pilosella*, and *H. piloselloides* are each considered a noxious weed in one or more states of the U.S. or provinces of Canada (Invaders 2011, USDA 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: *Hieracium lachenalii* grows in dry riverbanks (Klinkenberg 2010).

Total Possible 23
Total **12**

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 **2**

Documentation: *Hieracium lachenalii* is an occasional agricultural weed in Canada (Darbyshire 2003). It has not been grown deliberately.

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: Although ecological impacts have not been documented from natural areas, *Hieracium lachenalii* was one of the two most invasive plant species in an anthropogenically disturbed forest on Prince Edward Island, Canada, based on the distance it penetrated beyond the forest edge and the area it covered (MacQuarrie and Lacroix 2003).

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: *Hieracium lachenalii* has only been documented from anthropogenically disturbed sites in Alaska (AKEPIC 2011). However, it grows in gravel riverbeds in British Columbia (Klinkenberg 2010) and mountain meadows in Washington (King County 2011), suggesting that it has the potential to establish in naturally disturbed areas or early successional habitats.

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: *Hieracium lachenalii* is native to much of Europe (Washington NWCB 2007). It has been introduced to North America (USDA 2011) and New Zealand (GBIF 2011). It grows in Greenland and as far north as 69.7°N in Norway (Norwegian Species Observation Service 2011).

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: *Hieracium lachenalii* grows in 16 states of the U.S. and much of Canada (Strother 2006, AKEPIC 2011, USDA 2011). All *Hieracium* species are considered noxious weeds in Washington. *Hieracium lachenalii* is considered a noxious weed in Quebec (Washington NWCB 2007, Invaders 2011, USDA 2011).

Total Possible 25
Total **18**

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 **3**

Documentation: The amount of time seeds remain viable for this species is unknown, but *Hieracium* species often maintain seed viability for seven years (Rinella and Sheley 2002).

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 **2**

Documentation: *Hieracium lachenalii* can resprout from the root crowns (King County 2011).

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: Small populations can be controlled by hand digging. The entire root should be removed to prevent plants from resprouting. Flowering stems should be bagged to prevent seeds from dispersing. Mowing is not an effective control measure because seeds can disperse from cut flower heads and plants will flower again in the same growing season. Selective herbicides have proven successful in controlling *Hieracium lachenalii* (King County 2011). Aminopyralid at 105 grams per hectare and clopyralid at 420 grams per hectare consistently controlled *Hieracium aurantiacum* infestations in southern Alaska and may provide effective control of *Hieracium lachenalii* as well. Aminopyralid is better suited to pasture habitats as it controls a broader spectrum of forbs than clopyralid, while clopyralid is better suited to natural habitats as it will remove less of the native vegetation (Seefeldt and Conn 2010).

Total Possible	10
Total	**7**

Total for four sections possible	88
Total for four sections	**50**

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