

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Senecio sylvaticus* L.

Common name: woodland ragwort

Assessors:

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Date: 10/8/2010

Date of previous ranking, if any: 4T

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>15</u>
Biological characteristics and dispersal ability	25 (<u>25</u>)	<u>12</u>
Ecological amplitude and distribution	25 (<u>25</u>)	<u>12</u>
Feasibility of control	10 (10)	<u>2</u>
Outcome score	100 (<u>100</u>) ^b	<u>41</u> ^a
Relative maximum score ²		<u>41</u>

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: *Senecio sylvaticus* has been documented from the Pacific Maritime eco-geographic region in Alaska (AKEPIC 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: *Senecio sylvaticus* has been documented from a site 28 km south of Lillehammer, Norway, and a site 38 km northwest of Lærdalsøyri, Norway, which have 49% and 45% climatic similarities with Nome, respectively (CLIMEX 1999, Vascular Plant Herbarium Oslo 2010, University Museums of Norway). Lillehammer also has a 44% climatic similarity with Fairbanks (CLIMEX 1999). This species is known to occur in several locations in Finland that have 40% or greater climatic similarities with Fairbanks and Nome (CLIMEX 1999, NatureGate 2010).

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: Populations of *Senecio sylvaticus* are usually displaced by other plants after a few years in woodland clearings (West and Chilcote 1968, Halpern et al. 1997). *Senecio sylvaticus* may alter nutrient and water availability in the soil, but it is not likely to significantly alter or halt any ecological processes.

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 4

Documentation: *Senecio sylvaticus* can grow to densities of 90,000 plants per acre under favorable conditions (West and Chilcote 1968). It can dominate early secondary successional environments in the Pacific Northwest, especially previously logged and slash-burned areas, although its abundance generally declines after 2 years (Halpern et al. 1997). It has the potential to increase the density of vegetation in early secondary successional environments in Alaska. In Anchorage, Alaska, it has been observed growing at lower densities on recently imported fill (Carlson pers. obs.).

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: *Senecio sylvaticus* may compete with native plants and reduce their numbers over short periods of time (West and Chilcote 1968, Halpern et al. 1997).

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 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>5</td></tr></table> | 5 |
| 5 | | | |

Documentation: *Senecio sylvaticus* contains toxic pyrrolizidine alkaloids that can damage the liver in herbivores, resulting in death if enough alkaloids are consumed over several months (Christov and Evstatieva 2003, DiTomaso and Healy 2007).

Total Possible	40
Total	15

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 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>3</td></tr></table> | 3 |
| 3 | | | |

Documentation: *Senecio sylvaticus* reproduces by seed only (Andel and Vera 1977). Data from the Siuslaw National Forest of coastal Oregon indicated that each plant produces an average of 8,564 seeds (West and Chilcote 1968). Seeds can germinate immediately under favorable conditions (DiTomaso and Healy 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

Documentation: *Senecio sylvaticus* seeds achieve wide dispersion (Clément and Touffet 1990). Each seed has a pappus, which facilitates wind dispersal. Seeds are sticky when wet and can be transported by animals (DiTomaso and Healy 2007).

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: *Senecio sylvaticus* seeds are easily spread by human activities. The pappus can stick to people, shoes, clothing, vehicles, or machinery, especially when wet (DiTomaso and Healy 2007). This species appears to be highly associated with timber harvest in the Pacific Northwest (West and Chilcote 1968).

2.4. *Allelopathic*

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

Score

Documentation: *Senecio sylvaticus* has not been demonstrated to be allelopathic, although it is possible that auto-allelopathy helps contribute to the decline of infestations after 2 years (Halpern et al. 1997).

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: *Senecio sylvaticus* can produce large amounts of seed within the 1st year, but population size normally dwindles in the 3rd year. Although in the short term this species can produce many seeds, it is not expected to compete with native species for more than 2 years. Natural successional processes will most likely result in the replacement of *Senecio sylvaticus* by *Chamerion angustifolium* (Andel and Vera 1977, Halpern et al. 1997). *Senecio sylvaticus* requires nutrient rich-soil and is a poor competitor once nutrient and water availability decline (Clément and Touffet 1990). Interestingly, the consistent patterns of population decline in the 3rd year were not caused by interspecific competition in a study in the Pacific Northwest (Halpern et al. 1997).

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: *Senecio sylvaticus* has the potential to dominate disturbed areas under favorable conditions and can grow to densities of 90,000 plants per acre (West and Chilcote 1968, Halpern et al. 1997).

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

Documentation: *Senecio sylvaticus* primarily grows in disturbed areas, waste places, and roadsides (DiTomaso and Healy 2007). In the Pacific Northwest, *Senecio sylvaticus* grows very well in the early secondary succession stage of logged and slash-burned sites in coniferous forests (West and Chilcote 1968).

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

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

Score

Documentation: *Senecio vulgaris* (invasiveness rank 35) and *S. jacobaea* (invasiveness rank 63) are both tracked and ranked as invasive species in Alaska. Additionally, *S. eremophilus* and *S. viscosus* are known or expected to occur as invasive species in Alaska (AKEPIC 2010). *S. jacobaea*, *S. madagascariensis*, and *S. squalidus* are listed as noxious weeds in several states of the U.S. (USDA 2010).

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

Documentation: *Senecio sylvaticus* does not invade wetland or riparian communities (West and Chilcote 1968).

Total Possible

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 1

Documentation: *Senecio sylvaticus* is not deliberately bred. It is not a common agricultural weed because it grows best on acidic soils, which do not typically make good agricultural soils (DiTomaso and Healy 2007, NatureGate 2010). However, this species is highly associated with timber harvest in the Pacific Northwest (West and Chilcote 1968).

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: *Senecio sylvaticus* is known to dominate early secondary successional environments in the Pacific Northwest, especially environments associated with previously logged and slash-burned areas of coniferous forests (West and Chilcote 1968, Halpern et al. 1997).

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 1

Documentation: The preference of *Senecio sylvaticus* for anthropogenically disturbed sites is well documented in infestations in the Pacific Northwest (West and Chilcote 1968, Andel and Vera 1977, Halpern et al. 1997). This species has the potential to establish in naturally burned areas as well (Clément and Touffet 1990).

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 3

Documentation: *Senecio sylvaticus* has been documented in North America, Europe, Asia, and New Zealand. It is not known from arctic or subarctic regions (Barkley 2006, DiTomaso and Healy 2007, GBIF New Zealand 2010, USDA 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 4

Documentation: *Senecio sylvaticus* is present in 12 states: Alaska, California, Hawaii, Louisiana, Maine, Michigan, Minnesota, New Jersey, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin (NatureServe 2009, USDA 2010).

Total Possible	25
Total	12

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 2

Documentation: Presumably, the seeds of *Senecio sylvaticus* survive for a long time in soil (Clément and Touffet 1990). Viable seeds were present in the seed banks of old growth forests in the Pacific Northwest, even when no germinated plants were present in the observed vegetation. The exact amount of time for which seeds remain viable is unknown (Harmon and Franklin 1995, Halpern et al. 1997).

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 0

Documentation: *Senecio sylvaticus* is an annual, and there is no evidence to suggest that it resprouts after the removal of the aboveground portion (Andel and Vera 1977).

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

0

Documentation: Although in the short term *Senecio sylvaticus* can produce many seeds, it generally does not compete with native species for more than two years. Natural successional processes will most likely result in *Senecio sylvaticus* being replaced by *Chamerion angustifolium*, at least in some areas (Andel and Vera 1977, Halpern et al. 1997).

Total Possible	10
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Total	2
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Total for four sections possible	100
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Total for four sections	41
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References:

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