

## ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

*Botanical name:* *Symphytum officinale* L.

*Common name:* common comfrey

**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 <sup>1</sup> )	Total
Ecological impact	40 (40)	<u>16</u>
Biological characteristics and dispersal ability	25 (25)	<u>12</u>
Ecological amplitude and distribution	25 (25)	<u>13</u>
Feasibility of control	10 (10)	<u>7</u>
Outcome score	100 (100) <sup>b</sup>	<u>48<sup>a</sup></u>
Relative maximum score <sup>2</sup>		<u>48</u>

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

<sup>2</sup> Calculated as  $a/b \times 100$

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## 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:** *Symphytum officinale* has been documented from the Pacific Maritime eco-geographic region of 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:** *Symphytum officinale* has been documented from Little Playgreen Lake, Manitoba. The nearest CLIMEX data point is The Pas, Manitoba, which has a 73% climatic similarity with Fairbanks (CLIMEX 1999, Canadian Museum of Nature Herbarium 2010). This species has been documented from a site 12 km southeast of Lærdalsøyri, Norway, which has a 45% climatic similarity with Nome (CLIMEX 1999, University Museums of Norway 2010). It is known to occur in several locations in Finland that have 40% or greater climatic similarities with Fairbanks and Nome (CLIMEX 1999, NatureGate 2010).

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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:** *Symphytum officinale* grows on moist, fertile soils in disturbed areas or gardens (DiTomaso and Healy 2007). Its extensive root networks stabilize soil and prevent erosion (Teynor et al. 1992). While this species may reduce the nutrients and moisture available for native species, it is unlikely to have any major impacts on ecosystem 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 3

**Documentation:** *Symphytum officinale* grows in thick clumps (DiTomaso and Healy 2007) that may change the density in a forb layer. It appears to contribute to the density of mixed forb-graminoid roadside and lot habitats in Southeast Alaska (AKEPIC 2010).

*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:** Thick clumps of *Symphytum officinale* may reduce the number of individuals of surrounding native species through a combination of increased competition for space, nutrients, water, bees and other pollinating insects, and ants to disperse seeds (Teynor et al. 1992, Goulson et al. 1998, Peters et al. 2003, DiTomaso and Healy 2007).

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
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**Documentation:** *Symphytum officinale* contains pyrrolizidine alkaloids that can cause liver damage in herbivores, resulting in death if enough alkaloids are consumed (DiTomaso and Healy 2007, Medicinal Plants for Livestock 2008). The seeds of *S. officinale* are very attractive to ants in Germany (Peters et al. 2003), and they may change ant-plant interactions in Alaska. The flowers are pollinated by insects, especially long-tongued bees (Goulson et al. 1998, DiTomaso and Healy 2007). Native plant-pollinator relationships could be impacted by the presence of *S. officinale*.

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Total Possible	<table border="1" style="display: inline-table;"><tr><td>40</td></tr></table>	40
40		
Total	<table border="1" style="display: inline-table;"><tr><td>16</td></tr></table>	16
16		

## 2. Biological Characteristics and Dispersal Ability

### 2.1. Mode of reproduction

- |    |  |   |
|----|--|---|
| a. | Not aggressive (produces few seeds per plant [0-10/m <sup>2</sup> ] and not able to reproduce vegetatively). | 0 |
| b. | Somewhat aggressive (reproduces by seed only [11-1,000/m <sup>2</sup> ])                                     | 1 |
| c. | Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed [<1,000/m <sup>2</sup> ]) | 2 |
| d. | Highly aggressive (extensive vegetative spread and/or many seeded [>1,000/m <sup>2</sup> ])                  | 3 |
| e. | Unknown  | U |

Score 

2
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**Documentation:** *Symphytum officinale* reproduces by seeds. It can also reproduce vegetatively from root fragments. Each flower produces 4 seeds, and plants are capable of producing large numbers of flowers. Seeds germinate rapidly in moist soils (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:** Seeds are dispersed by ants (Peters et al. 2003) and by moving water (Moggridge et al. 2009). The seeds have elaiosomes, fleshy-oily protuberances that attract ants (Pemberton and Irving 1990). Common comfrey has spread by seed in Southeast Alaska from planted populations to form new infestations (Rapp 2006).

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:** *Symphytum officinale* is planted by people in Alaska as an ornamental and a medicinal plant. Planted populations in Glacier Bay National Park have caused several infestations in surrounding areas (Rapp 2006).

2.4. *Allelopathic*

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

Score

**Documentation:** *Symphytum officinale* is not allelopathic (DiTomaso and Healy 2007).

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:** *Symphytum officinale* may crowd out other plants because of its rapid and dense growth (Teynor et al. 1992). It is likely to compete with native plants for insect pollinators and ant seed dispersers (Goulson et al. 1998, Peters et al. 2003).

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:** *Symphytum officinale* grows in thick clumps (Teynor et al. 1992, DiTomaso and Healy 2007).

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
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**Documentation:** *Symphytum officinale* requires moist, nutrient rich soil in a disturbed area or a garden for successful germination and establishment (DiTomaso and Healy 2007).

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

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

Score 

3
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**Documentation:** *Symphytum asperum* is present in 14 states and is on the B List in California as a noxious weed (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 

1
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**Documentation:** In England, *Symphytum officinale* grows especially well in riparian environments (Goulson et al. 1998, Moggridge et al. 2009). However, it is not documented as being invasive in riparian environments in the U.S., and it has not invaded any riparian environments in Alaska (DiTomaso and Healy 2007, AKEPIC 2010).

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Total Possible 

25
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Total 

12
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**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
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**Documentation:** *Symphytum officinale* is grown in gardens and other cultivated areas as an ornamental and a medicinal plant (DiTomaso and Healy 2007). It is occasionally grown as a

forage crop (Teynor et al. 1992). In Alaska, it has been planted as an ornamental and a medicinal plant in several locations at Glacier Bay National Park (Rapp 2006).

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:** Studies conducted near Aachen, Germany showed that the seeds of *Symphytum officinale* are very attractive to ants in that region resulting in the seeds being dispersed by ants (Peters et al. 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

**Documentation:** In Alaska, all of the documented infestations except one occur in anthropogenically disturbed site. The exception occurs in a coastal area on private property (AKEPIC 2010). *Symphytum officinale* commonly grows in waste areas, ditches, and on moist, fertile soil (DiTomaso and Healy 2007).

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:** *Symphytum officinale* is documented in North America (USDA 2010), Japan (Ibaraki Nature Museum 2010), Australia (National Herbarium of South Wales 2010), and Europe, where it is native (DiTomaso and Healy 2010). It is not known from arctic or subarctic regions.

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
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**Documentation:** *Symphytum officinale* is documented in 36 of the U.S. states (USDA 2010). It is listed as a noxious weed in Quebec (Invaders 2010).

Total Possible 

25
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Total 

13
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#### 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
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**Documentation:** Seeds remain viable in soil for several years although the exact amount of time is unknown (Crop Compendium 2010).

##### 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
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**Documentation:** New plants regenerate from root fragments from the parent plant’s extensive taproot (DiTomaso and Healy 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
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**Documentation:** *Symphytum officinale* can be difficult to remove because of the vegetative regeneration of root fragments. Digging is required to remove the plant and the large network of roots. Populations in Glacier Bay National Park persisted after multiple years of manual removal efforts. Mowing plants before they produce seeds can prevent populations from spreading (Rapp 2006, DiTomaso and Healy 2007).

Total Possible	10
Total	7

Total for four sections possible	100
Total for four sections	48

## References:

- AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2010. Available: <http://akweeds.uaa.alaska.edu/>
- Canadian Museum of Nature Herbarium. 2010. Accessed through GBIF (Global Biodiversity Information Facility) data portal (<http://data.gbif.org/datasets/resource/123>, 2011-01-19). The National Herbarium of Canada. Ottawa, ON.
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