

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Spergularia rubra* (L.) J. Presl & C. Presl

Common name: red sandspurry

Assessors:

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Date: 2/18/2011

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 (40)	<u>8</u>
Biological characteristics and dispersal ability	25 (22)	<u>6</u>
Ecological amplitude and distribution	25 (25)	<u>15</u>
Feasibility of control	10 (4)	<u>2</u>
Outcome score	100 (91) ^b	<u>31^a</u>
Relative maximum score ²		<u>34</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?

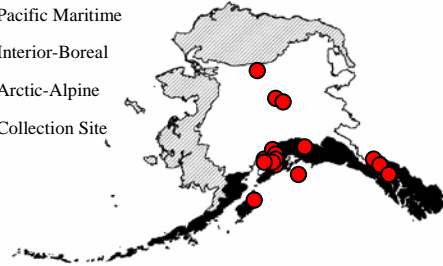
- Yes - continue to 1.2
 No - continue to 2.1

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: *Spargularia rubra* has been documented from the Pacific Maritime and Interior-Boreal ecogeographic regions of Alaska (Hultén 1968, 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: *Spargularia rubra* has been documented from Lillehammer, Norway, Uppsala, Sweden, and Vaasa, Finland, which have 49%, 47%, and 54% climatic similarities with Nome, respectively (CLIMEX 1999, Herbarium of Oskarshamn 2010, NatureGate 2011, Vascular Plant Herbarium Trondheim 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 1

Documentation: *Spergularia rubra* has only minor impacts on soil conditions and rarely occurs outside of anthropogenically disturbed areas (Cody 1996, NatureGate 2011, AKEPIC 2011, UAM 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 3

Documentation: Infestations of *Spergularia rubra* in Alaska have been observed at up to 59% ground cover (AKEPIC 2011), suggesting that this species has the potential to increase the density of low herbaceous layers in disturbed sites.

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: *Spergularia rubra* can grow at high densities in disturbed areas (AKEPIC 2011) and may reduce populations of native 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 1

Documentation: *Spergularia rubra* is self-fertile but can also be pollinated by flies (Plants for a Future 2010).

Total Possible 40
Total 8

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 U

Documentation: *Spergularia rubra* reproduces by seeds only (DiTomaso and Healy 2007). The number of seeds produced per plant has not been quantified.

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 0

Documentation: Seeds are 0.4 to 0.6 mm long and lack specific adaptations for long-distance dispersal (Hartman and Rabeler 2005).

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 1

Documentation: *Spergularia rubra* is likely spread by road graders (Cody 1996).

2.4. Allelopathic

- | | |
|------------|--------------------------------|
| a. No | 0 |
| b. Yes | 2 |
| c. Unknown | U |
| Score | <input type="text" value="0"/> |

Documentation: *Spergularia rubra* is not known to produce allelopathic chemicals.

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 | <input type="text" value="0"/> |

Documentation: *Spergularia rubra* is likely a poor competitor, and several populations in Alaska have been noted as having low or medium 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 | <input type="text" value="1"/> |

Documentation: *Spergularia rubra* can form dense mats (Abrams 1944) but does not overtop surrounding vegetation (Hartman and Rabeler 2005, Klinkenberg 2010).

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 | <input type="text" value="0"/> |

Documentation: *Spergularia rubra* grows in disturbed areas and waste places in British Columbia (Klinkenberg 2010) and along roadsides in Yukon (Cody 1996). All infestations recorded in Alaska are associated with disturbed areas (AKEPIC 2011, UAM 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: *Spergularia bocconii*, *S. media*, *S. platensis*, and *S. villosa* are known to occur as non-native weeds 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

1

Documentation: *Spergularia rubra* has been documented from a site along the Buskin River on Kodiak Island (UAM 2011).

Total Possible

22

Total

6

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: *Spergularia rubra* is known to occur as a weed in wheat crops in Pakistan (Ahmad and Shaikh 2003) and forest nurseries in the Pacific Northwest (Owston and Abrahamson 1984).

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

0

Documentation: No significant impacts on natural areas have been documented for *Spergularia rubra*.

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: *Spergularia rubra* commonly grows in anthropogenically disturbed areas (NatureGate 2011), and most infestations recorded in Alaska are associated with anthropogenically disturbed sites (AKEPIC 2011, UAM 2011). However, this species has also been documented from the tidal zone of the Buskin River on Kodiak Island (UAM 2011). In New Zealand, the ground cover of *Spergularia rubra* increased in grassland plots that were subjected to grazing (Allen et al. 1995).

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: *Spergularia rubra* is native to Europe and Asia. It was introduced to North America before 1870, likely in contaminated ship ballast (Hartman and Rabeler 2005). It has also been introduced to South America, Australia, and New Zealand (Hartman and Rabeler 2005, Landcare Research 2011). This species grows in arctic regions in western Russia (Elven 2007) and as far north as 69.9°N in Norway (Vascular Plant Herbarium Oslo 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: *Spergularia rubra* grows in 31 states of the U.S. and in eastern and western Canada (USDA 2011). It is not considered a noxious weed in any states of the U.S. or provinces of Canada.

Total Possible	25
Total	15

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: *Spergularia rubra* forms persistent seed banks (Calvo et al. 1999), but the amount of time seeds remain viable in the 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

U

Documentation: The ability of *Spergularia rubra* to resprout following the removal of the aboveground growth is unknown.

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: Control methods for *Spergularia rubra* have not been documented. However, spot herbicide treatments have provided effective control in Alaska (AKEPIC 2011).

Total Possible	4
Total	2

Total for four sections possible	91
Total for four sections	31

References:

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