

Climate Change Vulnerability Index

Plant Species Assessment

Completed by John Gamon, Washington Natural Heritage Program

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Name: *Astragalus sinuatus*

Index Result: Not Vulnerable / Presumed Stable

Exposure to Climate Change:

- 1) Temperature – All occurrences fall within the same temperature category (3.9-4.4⁰ F warmer).
- 2) Moisture – All occurrences fall within the same moisture metric category (-0.028 - -0.050). However, it approaches the upper (lower?) end of this category, at -0.049.

Climate: Indirect

- 1) Exposure to sea level rise – Neutral
- 2) Distribution relative to barriers
 - a. Natural barriers – Selected 'Neutral' although it is difficult to understand barriers without a better understanding of what currently limits the species.
 - b. Anthropogenic barriers – Selected 'Somewhat increase' vulnerability. Some conversion of habitat has occurred, and other lands have been degraded and are currently dominated by weedy species.
- 3) Predicted impact of land use changes resulting from human responses to climate change - Neutral

Species-Specific Factors:

- 1) Dispersal and movements – Selected 'Somewhat increase' vulnerability on assumption that at least 5% of seeds disperse at least 10 meters but not more than 100 meters.
- 2) Predicted sensitivity to temperature and moisture changes
 - a. Predicted sensitivity to changes in temperature
 - i. historical thermal niche - Neutral. The species has experienced average temperature variation in the last 50 years (ca. 61⁰ F).
 - ii. physiological thermal niche – Selected 'Somewhat decrease' vulnerability; species occurs on south and southeasterly facing slopes, which, within the narrow range of the species, are the warmer microenvironments.
 - b. Predicted sensitivity to changes in precipitation, hydrology, or moisture regime
 - i. historical hydrological niche – Selected 'Somewhat increase' vulnerability. The species has experienced a lower than average range of mean annual precipitation (9.5 – 10.5 inches), which actually spans the categorical break between 'Somewhat increase' and 'Increase' vulnerability.
 - ii. physiological hydrological niche - Neutral
 - c. Dependence on a specific disturbance regime likely to be impacted by climate change – Selected 'Somewhat increase' vulnerability. If fire frequency increases, as projected, impacts are likely to be negative, given current pervasiveness of weedy species.
 - d. Dependence on ice, ice-edge, or snow-cover habitats - Neutral
- 3) Restriction to uncommon geological features or derivatives - Neutral
- 4) Reliance on interspecific interactions
 - a. Dependence on other species to generate habitat - Neutral
 - b. Dietary versatility (animals only)
 - c. Pollinator versatility (plants only) – Selected 'Somewhat increase' vulnerability. A limited variety of potential pollinators has been observed visiting flowers, but more research is needed.
 - d. Dependence on other species for propagule dispersal – Neutral.
 - e. Forms part of an interspecific interaction not covered by 4a-d
- 5) Genetic factors
 - a. Measured genetic variation - Unknown
 - b. Occurrence of bottlenecks in recent evolutionary history (*use only if 5a is "unknown"*)
- 6) Phenological response to changing seasonal temperature and precipitation dynamics - Unknown