

Climate Change Vulnerability Index

Plant Species Assessment

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Name: *Botrychium paradoxum*

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 – 60% of occurrences fall within the -0.097 - -0.119 moisture metric category; 35% fall within the < -0.119 category; 5% fall within the -0.074 - -0.096 category.

Climate: Indirect

- 1) Exposure to sea level rise - Neutral
- 2) Distribution relative to barriers
 - a. Natural barriers - Neutral
 - b. Anthropogenic barriers - Neutral
- 3) Predicted impact of land use changes resulting from human responses to climate change - Neutral

Species-Specific Factors:

- 1) Dispersal and movements - Neutral. One could potentially assign 'somewhat decrease' to this factor. However, although some spores may travel significant distances, it is thought that a majority land within a few meters or tens of meters from the plant of origin.
- 2) Predicted sensitivity to temperature and moisture changes
 - a. Predicted sensitivity to changes in temperature
 - i. historical thermal niche - Neutral. Species has experienced average temperature variation of 57.1⁰ - 77⁰ F over the last 50 years.
 - ii. physiological thermal niche - Neutral
 - b. Predicted sensitivity to changes in precipitation, hydrology, or moisture regime
 - i. historical hydrological niche - Neutral. Most occurrences of the species have experienced average precipitation variation in the last 50 years (21-40 inches). Two have experienced greater variation, so one could score this variable as 'somewhat decrease vulnerability.'
 - ii. physiological hydrological niche - Neutral
 - c. Dependence on a specific disturbance regime likely to be impacted by climate change - Unknown. Increased fire may be beneficial by reducing tree encroachment. But it might also lead to changes in other herbaceous vegetation that would be in direct competition.
 - d. Dependence on ice, ice-edge, or snow-cover habitats - Slightly increase. Species occurs where snowpack develops; snowpack is expected to decrease.
- 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) - Neutral
 - 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 - Neutral. Although genetic variation appears to be low (by comparison) throughout the genus, it may not be that important within ferns/fern allies.
 - 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