

**Recommendation for the Designation of
Shale Barren Rock Cress
Boechera serotina (Steele) Windham & Al-Shehbaz
as a Virginia Species of Greatest Conservation Need**

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The Virginia Department of Wildlife Resources, with support from the Virginia Department of Conservation and Recreation-Division of Natural Heritage, recommends the addition of shale barren rock cress (*Boechera serotina* (Steele) Windham & Al-Shehbaz) to Virginia's list of Species of Greatest Conservation Need as a tier II-B species (Appendix 1).

Justification

Species Summary

Boechera serotina (= *Arabis serotina*, *Borodinia serotina*, shale barren rock cress; G2/S2, Fed LE/State LT) (Appendix 2) was listed as Federally Endangered by the U.S. Fish and Wildlife Service in August 1989 due to its limited range, small number of reproductive individuals, and habitat threats (USFWS, 1989). In addition to its federal status, *Boechera serotina* is ranked G2 (imperiled) by NatureServe and the Natural Heritage Network, meaning that it is a high conservation priority on a global scale (NatureServe, 2022). This globally rare mustard is known only from a small region of western Virginia and adjacent West Virginia, where it is restricted to shale barrens and adjacent shale woodland habitats. It is one of the most restricted shale barren endemics (NatureServe, 2022).

Trends

There are over 40 element occurrences of *Boechera serotina* in Virginia, where it is restricted to 8 contiguous counties (VA DCR, 2022). The remaining populations are found in adjacent West Virginia. The very small number of individuals (less than ??? 10? 20?) within many occurrences suggests that their long-term persistence is uncertain (NatureServe, 2022). Since the species is a biennial, populations may contain reproductive plants and rosettes. Making accurate population counts can be difficult due to this staggered life cycle and the inconspicuous nature of the species, but large fluctuations in numbers have been confirmed (NatureServe, 2022). Long-term trends are difficult to discern due to this natural variability. Multi-year observation data exists

but not at the fine level of detail required. In Virginia, inventories for this species have focused heavily on exploring new habitat to fully assess the distribution of the species rather than monitoring existing populations.

Conservation Action

Conservation actions recommended for *Boechea serotina* include prescribed burning, reduction of browsing stress, invasive species removal, prevention of human disturbances, and inventory of new areas. Data also suggests that the application of Dimilin and *Bacillus thuringiensis* (Bt) for spongy moth (formerly known as gypsy moth) control has compromised the pollinators of *Boechea serotina* and impacted its reproductive success (NatureServe, 2022).

The shale ecosystems supporting *Boechea serotina* and other endemics are naturally fire-prone and historically experienced regular burning (Aldrich et al., 2010). Some recent observations suggest prescribed burns can benefit this species, but hard data is lacking (Fred Huber, pers. com.). Browsing appears to negatively impact *Boechea* populations. It is presumed that deer are the primary cause of the herbivory and increases in the deer population could further impact the species. The colonization of *Boechea* habitat by invasive species is another threat, particularly on calcareous shales or lower slopes. Removal of these species would be beneficial. Human activities such as road construction and maintenance also pose threats. Environmental review is crucial to ensure that known populations and potential habitats are not impacted by these projects. The spraying of Dimilin and Bt for spongy moth control presents a significant threat to the insect pollinators of *Boechea serotina*. Because the tree canopy is less dense on shale barrens, insects are maximally exposed to aerial spraying (Dix, 1990).

To date, surveys for *Boechea serotina* (in Virginia?) have focused heavily on public lands. More surveys on private lands are needed. Using aerial imagery and a RandomForest predictive model, shale barrens with potential suitable habitat for *Boechea* have been targeted (Stanley, 2022). Recent spatial data should be incorporated to increase the efficacy of this model and increase the likelihood of finding new populations.

Summary

Boechea serotina (shale barren rock cress) is proposed for inclusion in the Virginia's State Wildlife Action Plan as a tier II-B species due to its small population size, narrow range in just two states, and highly restricted habitat.

This species occurs in the Roanoke Valley-Alleghany and Northern Shenandoah Valley Regional Commissions and the Central Shenandoah Valley Planning District Commission.

References

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