

# Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

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## Saving Holmgren's Milkvetch: A New Approach for Imperiled Species Management

### A Highly Particular Plant

The Mojave Desert near the rapidly expanding city of St. George, Utah, is home to an unusual little plant. Holmgren's milkvetch spends most of the year sleeping underground. It emerges in early spring and produces pretty pink and white pea flowers that develop into sausage-shaped red pods filled with small seeds. As they dry, these pods curl into flattened crescents that scatter seeds as they tumble in the wind. When summer rain hits them, the pods dramatically change shape and release the remaining seeds, preventing dispersal by water into unfavorable wash habitat.

Habitat for this unusual species continues to be diminished by human use and development. Today, the two remaining viable populations are clustered on outwash slopes near rocky hillsides of a single geological formation, and only one of these is on federal land where it has protection. The species was listed as endangered in 2001.

### Establishing Stable Populations

Susan Meyer, a research ecologist with the Rocky Mountain Research Station in Provo, Utah, is working to expand Holmgren's milkvetch's footprint and save it from extinction. To develop methods to establish stable populations, Meyer and colleagues at Utah Valley University have conducted research related to genetics, lifecycle analysis, seed production in cultivation, direct seeding, reproductive output, and habitat suitability. The team's lifecycle analysis benefitted from decades of demographic data collected

by Dr. Renée Van Buren, formerly of Utah Valley University. Much of this research has been published or is in review, with more to come.

### Hope In Sight

"These plants will only grow under specific conditions and on particular terrain," Meyer says, explaining that relatively inexpensive, high-resolution drone imagery analysis along with rangewide population census and intensive on-the-ground reconnaissance have helped to refine an existing habitat suitability model. "Drone-based habitat modeling combined with a comprehensive effort to understand species ecology on the ground is much more powerful than either methodology alone," she says, adding, "We're



*During a 2-year period, the RMRS Shrub Sciences Laboratory in Provo, Utah, produced about 45,000 Holmgren's milkvetch seeds for introduction studies. (Photo credit: Susan Meyer.)*



The unique pea flowers of Holmgren's milkvetch attract large, ground-nesting native bees for pollination. (Photo credit: Syd Houghton.)

## Further Reading

Houghton, S.; Stevens, M.T.; Meyer, S.E. 2020. Pods as sails but not as boats: dispersal ecology of a habitat-restricted desert milkvetch. *American Journal of Botany*. 107(6): 1–12. <https://www.fs.usda.gov/rmrs/publications/pods-sails-not-boats-dispersal-ecology-habitat-restricted-desert-milkvetch>.

Rominger, K.R.; Meyer, S.E.; Van Buren, R.; Searle, A.B. 2019. Phenological patterns in the desert spring ephemeral *Astragalus holmgreniorum* Barneby (Fabaceae). *Western North American Naturalist*. 79(3): 308–322. <https://www.fs.usda.gov/rmrs/publications/phenological-patterns-desert-spring-ephemeral-astragalus-holmgreniorum-barneby-fabaceae>.

Searle, A.B.; Meyer, S.E. 2020. Cattle trampling increases dormant season mortality of a globally endangered desert milkvetch. *Journal for Nature Conservation*. 56: 125868. <https://www.fs.usda.gov/rmrs/publications/cattle-trampling-increases-dormant-season-mortality-globally-endangered-desert>.

now confident that we can establish stable populations through direct seeding on land managed by the Bureau of Land Management in areas less at risk from human activities.”

The team also found that the most effective management action for preservation of existing populations is protection from surface disturbance, whether from cattle or humans. This can improve habitat for native pollinators, protect the seed bank, decrease weed competition, and prevent damage to established plants, particularly during the dormant season.

While Meyer admits that Holmgren's milkvetch is not widespread, she's excited by the prospect of saving a species. “Every species has a function in nature, although you may not find out what that function is until the species has disappeared,” she says, adding, “I'm also hopeful that adding drone-based modeling to more traditional approaches will help us understand and preserve other endangered or threatened plant species.”

## Management Implications

- Determining the best strategy to ensure the survival of an endangered desert plant species near the Utah-Arizona border required combining many approaches including genetic and lifecycle analysis, field experiments, and habitat modeling based on high-resolution drone imagery.
- This research has identified the most promising introduction sites for Holmgren's milkvetch and has recently demonstrated that new populations can be established through direct seeding.
- Recommendations for management of existing populations include seed bank augmentation, annual weed control, and protection from surface disturbance.
- These research and conservation approaches can be applied in other areas to manage species of conservation concern.

## LEAD SCIENTIST

Susan Meyer is a research ecologist for the Rocky Mountain Research Station in Provo, Utah. Her research focuses on shrubland restoration and regeneration biology of native Intermountain shrubs, forbs, and grasses. Connect with Susan at [www.fs.usda.gov/rmrs/people/smeyer](https://www.fs.usda.gov/rmrs/people/smeyer).

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