# *Physaria pachyphylla* (Thick-leaf Bladderpod)
# Conservation Status Rank Summary

June 12, 2025

For details on assessment and ranking methodology, see: *Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species*

## Rarity and Trends

| Rank Factor | Date Assessed | Value | Score | Data Source | Comments |
|---|---|---|---|---|---|
| **Rarity** | | | | | |
| **Range Extent** | 2024-09-30 | Y: 76.0 km² | 0.000 | MTNHP database | The 25 Species Occurrences occur within a range extent of 76 square kilometers. |
| **Area of Occupancy** | 2024-09-30 | 13 \| 4km² cells | 2.060 | MTNHP database | Of the XX 2x2 square kilometer grid cells that cover Montana, 13 cells are occupied by Physaria pachyphylla Species Occurrences. |
| **Number of Occurrences** | 2025-01-15 | 25 | 2.750 | Pipp, Heidel, and Herman (2025) | 25 Species Occurrences have been mapped in Montana. |
| **Population Size** | 2012-11-05 | | 3.140 | MTNHP Species Rank Data Table | Estimated as precise population data are lacking. \| Methodology: MTNHP (2012) \| Original Score: 2 |
| **# of Occurrences in Good Condition** | 2025-05-27 | [22, 25] | 3.300 | Pipp, Heidel, and Herman (2025) | At least 22 Species Occurrences are assumed to be in good condition based on field surveys that found at least 10 reproductive individuals occuring in places with intact habitats and apparently healthy. |
| **% of Area Occupied in Good Condition** | | | - | | **Factor not used in ranking.** |
| **Environmental Specificity** | 2024-09-30 | Very narrow to narrow | - | Pipp, Heidel, and Herman (2025) | **Factor not used in ranking.** Plants grow in soils derived from limestone and/or diatomaceous earth, often on ridges and upper soles on exposed gravel pavement. |
| Rarity is calculated by averaging weighted factor scores:<br>**( (0.00 × 1) + (2.06 × 2) + (2.75 × 1) + (3.14 × 2) + (3.30 × 2) ) / 8 = 2.47** | | | | | |
| **Trends** | | | | | |
| **Short-term Trend** | 2025-06-03 | | [-0.070, 0.070] | Expert Opinions: S. Mincemoyer and A. Pipp (2025) | Over the past 10 years, the habitat has been stable and it is believed that the population has not drastically changed. |
| **Long-term Trend** | | | - | | **Factor not used in ranking.** |
| Trends score is calculated by summing weighted short and long-term trend scores:<br>**( ([-0.07, 0.07] × 2) ) = [-0.14, 0.14]** | | | | | |

# Threats

| Rank Factor | Date Assessed | Value | Score | Data Source | Comments |
|---|---|---|---|---|---|
| **Threats** | | | | | |
| **Overall Threat Impact** | | High - medium | [1.830, 3.670] | | None |
| Intrinsic Vulnerability | | | - | | Factor not used in ranking. |
| Threat score is calculated from Overall Threat Impact when available or Intrinsic Vulnerability if not: **( [1.83, 3.67] ) = [1.83, 3.67]** | | | | | |

### Individual Threats Data

| Threat Category | Date Assessed | Impact Score | Scope | Severity | Immediacy | Comments |
|---|---|---|---|---|---|---|
| **Energy Production & Mining** | 2025-06-03 | Medium - Low | Large | Moderate-Slight | High-Moderate | Reported threats of proposed mining and quarrying, inlcuding exploration, mitigation to reduce radiation contamination at abandoned uranium mines (to improve public safety), and associated ground-disturbing activities, applies to at least 9 of 25 Species Occurrences (SO). However, mitigation measures to protect plants from trampling are proposed at about 8 SOs while plants at 1 SO may need to be removed due to potential radiation contamination. |
| **Human Intrusions & Disturbance** | 2025-06-04 | Low | Small | Slight | High-Moderate | Reported threats of off-road vehicle use occurs in at least 3 out of 25 Species Occurrence (SO). Unauthorized motorized use is occurring at one SO of which the BLM is addressing with barriers and signs. |
| **Invasive & Other Problematic Species, Genes & Diseases** | 2025-06-04 | Low | Restricted | Slight | High-Moderate | Non-native species of Malcolmia africana and Bromus tectorum occur in or very close to at least 4 of 25 Species Occurrences. Monitoring is needed to determine actual impacts. |
| **Other Threats** | 2025-06-12 | High - Low | Large | Serious-Slight | High-Low | A threat from a 'lack of formal federal protection' for East Pryor Mountain ACEC and Pryor Mountain Foothills RNA/ACEC' applies to portions of 8 Species Occurrence. The ACECs were identified in the 2015 MT/Dakotas BLM Billings Field Office Approved Resource Management Plan as recommended for withdrawal from locatable mineral, mineral entry, and other stipulations, but formal approval by the US Congress or Secretary of Interior has not been granted as of 2025. If completed, the formal withdrawal would only apply |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | to new claim applications for subsurface mining. |
| Threat Tally: 0 - Very High, 0 - High, [0,2] - Medium, [2,4] - Low<br>Overall Threat Impact* = High - medium | | | | | | |

*See Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species for calculation of Overall Threat Impact based on the number and impact of individual threats.

## Conservation Status Rank Calculation

**Raw score**

Rarity: (2.47 × 70%) + Threats: ([1.83, 3.67] × 30%) + Trends: ([-0.14, 0.14]) = [2.14, 2.97]

Calculated Rank: S2S3

| | |
|---|---|
| **Accepted Rank** | S2S3 |
| **Date Approved** | 2025-06-04 |
| **Approval Authority** | Andrea Pipp |
| **Rank Justification** | *Physaria pachyphylla* is a local endemic of the Pryor Mountain foothills and desert that crosses the Montana – Wyoming state boundary (Pipp, Heidel, and Herman 2025). *Physaria pachyphylla* was formally recognized as a 'new' species in 2007. Plants occupy a restricted habitat composed of dry, sparsely vegetated, and stony soil, derived from limestone and/or diatomaceous earth (Grady and O'Kane 2007). Where habitat is appropriate, plants may be abundant. Where *Physaria pachyphylla* and *P. spatulata* overlap, a few individuals of intermediate morphology have been found, suggesting that there is possible introgression between the species. *Physaria pachyphylla* populations are at-risk to loss from the introduction of non-native plants (*Bromus tectorum* and *Malcolmia africana*), ground disturbing activities from potential gypsum mining and related mining activities, and off-road vehicle use. A 2025 review of *Physaria pachyphylla* retains an S2S3 rank in Montana. Monitoring data that assesses population trends in places with and without recognized or potential threats is needed. |

## Supplementary Information

Montana Natural Heritage Program. 2021. Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species. 18 p.
https://mtnhp.mt.gov/docs/Montana_State_Rank_Criteria_20211201.pdf

Montana Field Guide Species Account:
https://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDBRA22120

Predicted Suitable Habitat Model:
https://mtnhp.mt.gov/resources/models/?elcode=PDBRA22120

# Information Needs

Information needs are assessed by considering the availability of factors used to assess species status as well as the quality of these assessments. Current information availability and quality to inform Conservation Status Rank for this species are highlighted.

| Rank Factor | Assessment Category | Value | Criteria |
|---|---|---|---|
| **General Status** | Status Quality | Adequate | Calculated rank has low uncertainty and is represented by a single rank (e.g. S3); accepted rank may be adjusted to a range rank (e.g. S2S3) |
| | | Poor | Rank assessed as SU or calculated rank has notable uncertainty and corresponds to a range rank with 2 or more values (e.g. S2?, S1S3, or S4S5) |
| **Rarity** | Range Quality | Adequate | Range polygon adequately represents area of probable occupancy and does not include substantial unoccupied areas; range may be adequately defined and still include areas of unsuitable habitat (e.g. mountain ranges for plains species) |
| | | Marginal | Range polygon defined, but may include or exclude notable areas where the species may or may not occur on the landscape |
| | | Poor | Range polygon not defined |
| | Habitat Quality | Adequate | Species-habitat relationship is well-defined (e.g. relevant literature or robust habitat model available) |
| | | Marginal | Understanding of species-habitat relationship is adequate among some but not all habitats (e.g. literature covers similar habitats outside of Montana or habitat model performance is only somewhat adequate) |
| | | Poor | Species-habitat relationship is not well understood |
| **Threats** | Threat Quality | Adequate | Threat Impact is a single value (including "Unthreatened") |
| | | Marginal | Threat Impact assessed at more than one value (e.g. "High - Medium") |
| | | Poor | Threat Impact is Unknown but Intrinsic Vulnerability is assessed |
| | | Unknown | Threat Impact is Unknown and Intrinsic Vulnerability is not assessed |
| **Trends** | Recency | Current | Short-term Trend assessment date less than 10 years old |
| | | Out of Date but Adequate | Short-term Trend assessment date is more than 10 years old or Unknown, but species is Unthreatened |
| | | Out of Date | Short-term Trend assessment date more than 10 years old |
| | | Not Available | Short-term Trend data are not available |
| | Trend Quality | Sufficient | Short-term Trend assessed at a single value or multiple values with a minimum trend greater than -10% (stable or increasing) |
| | | Unknown but Sufficient | Short-term Trend is Unknown, but species is Unthreatened |
| | | Poor | Short-term Trend is less than -10% (in decline) with two or more values selected |
| | | Unknown | Short-term Trend is Unknown |

Summary of Information Availability

The 2023-2024 field inventories by a network of people and organizations was instrumental to bring forth current range-wide information.

Summary of Information Needs

Continual need for monitoring, revisit, and population count data at frequent intervals (3-5 years).

# Additional Threat Details

The table below contains the complete threats assessment for this species. While the Conservation Status Rank Calculation is based on cumulative, broadly categorized (Level 1) threats data, threats are assessed and tracked for more specifically categorized (Level 2) threats when available.

| Threat Category | Date Assessed | Assessed By | Data Source | Scope | Severity | Imme-diacy | Comments |
|---|---|---|---|---|---|---|---|
| **Energy Production & Mining - 3.2 - Mining & Quarrying** | 2025-06-03 | Andrea Pipp | Reported by Pipp, Heidel, and Herman (2025). Velman Personal Communication (2025). | Large | Moderate-Slight | High-Moderate | Reported threats of proposed mining and quarrying, inlcuding exploration, mitigation to reduce radiation contamination at abandoned uranium mines (to improve public safety), and associated ground-disturbing activities, applies to at least 9 of 25 Species Occurrences (SO). However, mitigation measures to protect plants from trampling are proposed at about 8 SOs while plants at 1 SO may need to be removed due to potential radiation contamination. |
| **Human Intrusions & Disturbance - 6.1 - Recreational Activities** | 2025-06-04 | Andrea Pipp | Reported by Pipp, Heidel, and Herman (2025). Velman Personal Communication (2025). | Small | Slight | High-Moderate | Reported threats of off-road vehicle use occurs in at least 3 out of 25 Species Occurrence (SO). Unauthorized motorized use is occurring at one SO of which the BLM is addressing with barriers and signs. |
| **Invasive & Other Problematic Species, Genes & Diseases - 8.1 - Invasive Non-Native/Alien Species/Diseases** | 2025-06-04 | Andrea Pipp | Reported by Pipp, Heidel, and Herman (2025) | Restricted | Slight | High-Moderate | Non-native species of Malcolmia africana and Bromus tectorum occur in or very close to at least 4 of 25 Species Occurrences. Monitoring is needed to determine actual impacts. |
| **Other Threats - 12.1 - Other Threat** | 2025-06-12 | Andrea Pipp | Reported by Pipp, Heidel, and Herman (2025). Velman Personal Communication (2025). | Large | Serious-Slight | High-Low | A threat from a 'lack of formal federal protection' for East Pryor Mountain ACEC and Pryor Mountain Foothills RNA/ACEC' applies to portions of 8 Species Occurrence. The ACECs were identified in the 2015 MT/Dakotas BLM Billings Field Office Approved Resource Management Plan as recommended for withdrawal from locatable mineral, mineral entry, and other stipulations, but formal approval by the US Congress or Secretary of Interior has not been granted as of 2025. If completed, the formal withdrawal would only apply to new claim applications for subsurface mining. |