Erebia magdalena magdalena (Southern Rocky Mountains Magdalena Alpine)

Steve Cary,

Taxonomy

- **Class**: INSECTA
- **Order**: LEPIDOPTERA
- **Family**: NYMPHALIDAE
- **Genus**: Erebia
- **Scientific Name**: *Erebia magdalena magdalena* Strecker, 1880
- **Common Name**: Southern Rocky Mountains Magdalena Alpine
- **Synonyms**:
- **Taxonomic Name Source**:Pelham, J. P. 2008. A catalogue of the butterflies of the United States and Canada with a complete bibliography of the descriptive and systematic literature. The Journal of Research on the Lepidoptera. Volume 40. 658 pp. Revised 14 February, 2012.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: TNR
- **NHNM State**: S1
- **NM Endemic**:NO

Description

Magdalena is flat black-brown, everywhere. It is so black that it is hard to photograph; it absorbs so much light that normally exposed film just shows a void where the butterfly would be!

Description courtesy of Steven J. Cary, Butterflies of New Mexico, 2024

Habitat and Ecology

This species is found in rocky alpine areas, namely rockslides and rocky ridges near grassy areas (Scott 1986,

Glassberg 2001, Cary and Toliver 2024, Montana Natural Heritage Program 2024). In the southernmost part of the range, this butterfly exists above the tree line. It occurs up to 3,505 m (11,500 ft) in New Mexico and up to 4,200 m (13,780 feet) in Colorado (Brown 1957, Scott and Scott 1978, Cary and Toliver 2024, Montana Natural Heritage Program 2024).

As larvae, the diet is thought to consist of alpine grasses, such as Sedges (*Carex* spp.), Festuca, Rushes (*Juncus* spp.), Woodrushes (*Luzula* spp.), and Meadow-Grasses (*Poa* spp.) (Scott 1986, 1992, 2006; Montana Natural Heritage Program 2024). As adults, they are known to nectar on Alpine Forget-Me-Nots (*Myosotis alpestris*), Phlox, Dryas, Fleabane (*Erigeron*), *Haplopappus* spp.*,* and Catchflies (*Silene* spp.) flowers (Opler and Wright 1999, Glassberg 2001, Scott 2014, Montana Natural Heritage Program 2024).

The subspecies flies from late June to August with just one flight. New Mexico records stretch from July 2 to July 24 (Scott 1986, Opler and Wright 1999, Cary and Toliver 2024). During flight males spend all day patrolling for females above depressions and over rockslides (Scott 1986). The host plant is unknown but females lay eggs on rocks near Rushes (Juncaceae), Grasses (Gramineae), and Sedges (Cyperaceae)(Scott 1986). There are also records of females laying eggs directly on Sedges (*Carex* spp.) (Scott and Scott 1978; Scott 1986, 1992, 2006; Guppy and Shepard 2001; Montana Natural Heritage Program 2024). The larvae are thought to be biennial hibernators, overwintering their first winter as L2 or L3 instars (Scott and Scott 1978; Scott 1986, 1992, 2006; Opler and Wright 1999; Guppy and Shepard 2001; Montana Natural Heritage Program 2024).

Geographic Range:

The Southern Rockies Magdalena Alpine is the southern Rocky Mountains subspecies of the Magdalena Alpine (*Erebia magdalena*). It occurs in the mountains of Colorado, southern Montana, northern New Mexico, northeastern Utah, and western Wyoming (Lotts and Naberhaus 2023, Cary and Toliver 2024, Pelham 2024). In Montana this butterfly has historically been reported in Carbon County and was reported in Park County in 2011 (Montana National Heritage 2024). It is found in isolated populations, living exclusively on top of mountain peaks. At the southern extreme of its range in New Mexico, this butterfly has been reported on Wheeler Peak and State Line Peak (Cary and Toliver 2024). In the last 20 years, the butterfly has only been recorded in five mountain ranges, including Montana's Beartooth Mountains, the southern portion of Wyoming's Wind River range, Utah's Uinta Mountains, the north central portion of the Colorado Rockies, and in Colorado/New Mexico's Sangre de Cristo Mountains (GBIF.org 2024).

Conservation Considerations:

There are conservations actions in place for this butterfly. The subspecies is currently being considered for inclusion as a Species of Greatest Conservation Need in the New Mexico State Wildlife Action Plan 2025 revision, based on its adversity to climate change, low population numbers, and limited range (New Mexico Department of Game and Fish 2024). Additional, research is needed on the distribution, population size and trend, habitats and ecology, and threats. In particular, determination of host plant would aid greatly in our understanding of this species and its conservation needs.

Threats:

This butterfly is a cold-adapted Pleistocene ice age relict, now only residing on high mountain peaks (Scott 1986, Cary and Toliver 2024). The Western United States is becoming increasingly hot and dry as the climate warms (Cook *et al.* 2009, Cook *et al.* 2015, Williams *et al.* 2022) and warming trends are predicted to be more pronounced at higher elevations (Mountain Research Initiative EDW Working Group 2015). Many organisms, including butterflies, respond to

climate change by shifting to higher elevations or latitudes (Forister *et al.* 2010, Holland 2010, Rödder *et al.* 2021). If this subspecies responds to climate warming in this way, it would soon run out of habitat to shift into, as it already occurs near the top of mountains.

Inbreeding depression may also be a major threat to this butterfly as populations are small and isolated. Inbreeding depression results when slightly deleterious alleles accumulate in a small population, reducing the likelihood of population persistence (Hedrick 1994, Lynch *et al.* 1995). The accumulation of deleterious alleles and reduction in heterozygosity have been shown to reduce survival rates at several important life stages in butterflies, including those that have an effect on population stability and persistence, even after just one generation of mating between full-siblings (Saccheri *et al.* 1998, Nieminen *et al.* 2001).

This species is biennial, and therefore takes two years to develop. Spending two years as larvae with limited mobility, leaves butterflies more vulnerable to environmental stochastic events such as extreme weather, wildfires, and predation (Scott 1986, Montana Natural Heritage Program 2024).

As a result of its biennial life history and because its range has experienced drastic changes in climate in the last three decades, the parent species of this butterfly has been identified as one of the most imperiled butterflies in the western United States (Forister *et al.* 2023).

Population:

The population size and trend are not known for this subspecies. It is rarely recorded and is reportedly quite rare (Glassberg 2001, Montana Natural Heritage Program 2024). In the last 10 years, there have been just 30 recorded observations (GBIF.org 2024), though one must high to high altitudes to find the species. Determination of population size and monitoring of population trends is necessary to ensure the population is stable, especially as several widespread, relatively common species of butterfly are in decline across the western United States (Forister *et al.* 2021).

References:

- Scott, J.A.. 1992. Hostplant records for butterflies and skippers (mostly from Colorado) 1959-1992, with new life histories and notes on oviposition, immatures, and ecology.. *Papilio new series* 6.
- Cook, B.I., Ault, T.R. and Smerdon, J.E.. 2015. Unprecedented 21st century drought risk in the American Southwest and Central Plains.. *Science Advances* 1. https://doi.org/10.1126/sciadv.1400082
- Pelham, J.P.. 2023. A catalogue of the butterflies of the United States and Canada. Revised 15 February 2023. http://butterfliesofamerica.com/US-Can-Cat.htm
- Glassberg, J.. 2001. Butterflies through Binoculars: The West. Oxford University Press, New York .
- Montana Natural Heritage Program . 2024. Magdalena Alpine - Erebia magdalena. Montana Field Guide. https://FieldGuide.mt.gov/speciesDetail.aspx?elcode=IILEPN8040
- Hedrick, P.W.. 1994. Purging inbreeding depression and the probability of extinction: full-sib mating. *Heredity* 73: (363-372).
- Nieminen, M., Singer, M.C., Fortelius, W., Schlops, K. and Hanski, I.. 2001. Confirmation that inbreeding depression increases extinction risk in butterfly populations. *The American Naturalist* 157: (237-244).
- Saccheri, I., Kuussaari, M., Kankare, M., Vikman, P., Fortelius, W. and Hanski, I. . 1998. Inbreeding and extinction in a butterfly metapopulation. *Nature* 392: (491-494).
- Forister, M.L., Halsch, C.A., Nice, C.C., Fordyce, J.A., Dilts, T.E., Oliver, J.C., Prudic, K.L., Shapiro, A.M., Wilson, J.K. and Glassberg, J. . 2021. Fewer butterflies seen by community scientists across the warming and

drying landscapes of the American West. *Science* 371: (1042-1045).
- Williams, A.P., Cook, B.I. and Smerdon, J.E. . 2022. Rapid intensification of the emerging southwestern North American megadrought in 2020-2021. *Nature Climate Change* 12: (232-234).
- Rödder, D., Schmitt, T., Gros, P., Ulrich, W. and Habel, J.C.. 2021. Climate change drives mountain butterflies towards the summits. *Scientific Reports* 11: (45303).
- Scott, J.A.. 1986. The Butterflies of North America, A Natural History and Field Guide. Stanford University Press, Stanford, California : (583).
- U.S. Fish and Wildlife Service (USFWS), Otero County, The Village of Cloudcroft, and U.S. Forest Service. 2004. Conservation Plan for the Sacramento Mountains Checkerspot Butterfly (*Euphydryas anicia cloudcrofti*). Albuquerque, NM : (80).
- Forister, M.L., McCall, A.C., Sanders, N.J., Fordyce, J.A., Thorne, J.H., O'Brien, J., Waetjen, D.P. and Shapiro, A.M.. 2010. Compounded effects of climate change and habitat alteration shift patterns of butterfly diversity. *Proceedings of the National Academy of Sciences* 107: (2088-2092).
- Lotts, K. and Naberhaus, T.. 2023. Butterflies and Moths of North America. 2023: (Dataset for *Amblyscirtes elissa*).
- Guppy, C.S. and J.H. Shepard.. 2001. Butterflies of British Columbia: Including western Alberta, southern Yukon, the Alaska Panhandle, Washington, northern Oregon, northern Idaho, northwestern Montana.. UBC Press and Royal British Columbia Museum, Vancouver and Victoria .
- New Mexico Department of Game and Fish (NMDGF). 2024. Magdalena Alpine Butterfly. Natural Heritage New Mexico. https://bison-m.org/booklet.aspx?SpeciesID=216490
- Lynch, M., Conery, J. and Burger, R.. 1995. Mutation accumulation and the extinction of small populations. *American Society of Naturalists* 146: (489-518).
- GBIF.org. 2024. GBIF Occurrence Download. https://doi.org/10.15468/dl.p3tpe2
- Cook, E.R., Seager, R., Heim, R.R., Vose, R.S., Herweijer, C. and Woodhouse, C.. 2009. Megadroughts in North America: Placing IPCC projections of hydroclimatic change in a longâ€•term paleoclimate context.. *Journal of Quaternary Science* 25: (48-61). https://doi.org/10.1002/jqs.1303
- Holland, R.. 2010. A New Subspecies of *Satyrium titus* (Lycaenidae: Theclinae) from South Central New Mexico. *The Journal of the Lepidopterists' Society* 64: (166-171). https://doi.org/10.18473/lepi.v64i3.a6
- Warren, A. D., K. J. Davis, E. M. Stangeland, J. P. Pelham, K. R. Willmott & N. V. Grishin. 2024.. 2024. A Catalogue of the Butterflies of the United States and Canada. . https://www.butterfliesofamerica.com/L/intro.htm
- Scott, J.A.. 2006. Butterfly hostplant records, 1992-2005, with a treatise on the evolution of Erynnis, and a note on new terminology for mate-locating behavior. *Papilio new series* 14: (74).
- sRedList. 2024. sRedList Platform - a tool to support Red List assessments (Version 1.1). LifeWatch ERIC. https://doi.org/10.48372/DSKB-JE13
- Scott, J.A. and G.R. Scott. 1978. Ecology and distribution of the butterflies of southern central Colorado. *Journal of Research on the Lepidoptera* 17: (73-128).
- Cary, S.J. and Toliver, M.E. . 2024. Butterflies of New Mexico.. Pajarito Environmental Education Center (PEEC). https://peecnature.org/butterflies-of-new-mexico/
- Scott, J.A.. 2014. Flower visitation by Colorado butterflies (40,615 records) with a review of the literature on pollination of Colorado plants and butterfly attraction (Lepidoptera: Hersperioidea and Papilionoidea).. Contributions of the C.P. Gillette Museum of Arthropod Diversity. Fort Collins, CO: Colorado State University.13: (190).
- Forister, M.L., Grames, E.M., Halsch, C.A., Burls, K.J., Carroll, C.F., Bell, K.L., Jahner, J.P., Bradfod, T., Zhang, J., Cong, Q., Grishin, N.V., Glassberg, K., Shapiro, A.M. and Riecke. T.V.. 2023. Assessing risk for butterflies in the context of climate change, demographic uncertainty, and heterogenous data sources. *Ecological Monographs* 93: (e1584).
- Brown, F.M. . 1957. Colorado Butterflies. Proceedings; Numbers Three through Seven.. Denver Museum of Natural History, Denver Co .

More Information