

Argynnis hesperis ratonensis (Raton Mesa Northwestern Fritillary)



Steve Cary,

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Taxonomy

- **Class:** INSECTA
- **Order:** LEPIDOPTERA
- **Family:** NYMPHALIDAE
- **Genus:** Argynnis
- **Scientific Name:** *Argynnis hesperis ratonensis* (J. Scott, 1981)
- **Common Name:** Raton Mesa Northwestern Fritillary
- **Synonyms:** *Speyeria atlantis* ssp. *ratonensis* J. Scott, 1981
- **Taxonomic Name Source:** Scott, J. A. 1981. New Papilionoidea and Hesperioidea from North America. *Papilio* (New Series) 1:1-12.

Agency Status

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

Description

Northwestern Fritillary is smaller than Nokomis, Aphrodite and Great Spangled. It is bright orange above with bold black marks and slightly thickened, black veins on the forewing from costa to the back margin. Females have paler margins above. Compared to sister species, dorsal median and basal areas are only slightly smudged with dark scales. On the hindwing below, the pale arc in the postmedian area is narrow compared to Great Spangled. Its ventral hindwing white spots are almost always silvered, but an occasional individual with unsilvered white spots has turned up near Raton. Range and Habitat. *Argynnis hesperis* occupies Canadian Zone meadows and open woodlands from Alaska to Newfoundland and south in the Rocky Mountains into extreme northeast New Mexico, generally 7,500 to 9,500? altitude. New Mexico's only representative of this species, *Argynnis hesperis ratonensis* J. A. Scott, was described from the Raton Mesa complex of Colorado and New Mexico (counties: Co,Un), where it maintains its very restricted distribution. There, it can be confused only with Aphrodite, which has amber/tan eyes compared to gray/blue eyes of the Raton Mesa Fritillary. Life History. Larvae eat violets (Violaceae), particularly *Viola canadensis* v. *scopulorum* on Raton Mesa (Co) (Scott 1992). Flight. Adults fly in one mid-summer generation, generally from June

into September, peaking in July. They feed at flowers and wet sand. Comment. Zhang et al. (2020, Tax. Rep. Int. Lepid. Surv. 8(7): 17-19) , fig. 11, elevated *nausicaa* to species level, distinguishing it from *hesperis*.

Description courtesy of Steven J. Cary, [Butterflies of New Mexico](#), 2024

Habitat and Ecology

The Raton Mesa Frillary faces many potential threats in its range. Firstly this butterfly has a very restricted geographic range being found just in the Raton Mesa complex. This small range and small population size that goes with it as a mesa top taxa means that small natural or human impacts can have a very large impact on the remaining populations. The Capulin Mountain Arctic (*Oeneis alberta capulinensis*) another endemic to the Raton Mesa complex was extirpated from Raton mesa by a hail storm for example (Cary et al. 2004). However, besides weather events this could also include loss of larval host plants due to development or replacement by invasive species. In other places it has been shown in other areas that *Argynnis* species have undergone declines due to invasive species outcompeting host violets and due to overgrazing of deer and cattle which may overexploit host violets and reduce their abundance or result directly in larvae mortality (Sims 2017). Another major threat to this butterfly is fire as it is restricted to these mesa tops one fire could easily burn over an entire subpopulation on a mesa wiping out a large percentage of what's left of this taxa.

However, as a pleistocene relict left behind as temperatures have warmed and now sitting at the southern extreme of its range, the primary threat to this butterfly is climate change (Scott 1981, Ferris 1983, Dunford 2009). Many butterflies respond to climate change by moving to higher elevations or latitudes however, as this butterfly is already restricted to mesa tops this is not an option for this taxa where there are no higher elevation habitats to shift to and as a result just a small amount of warming could push this taxa into thin air driving it to extinction (Forister et al. 2010, Holland 2010, RÅ¶dder et al. 2021). As such the likelihood that this butterfly survives until 2100 is very poor as the western United States is expected to continue to get hotter and drier over the next century (Cook et al. 2009, Holland 2010, Cook et al. 2015, Williams et al. 2022). Phenological mismatch with the host plant or nectar sources is also a potential consequence of climate warming which could easily extirpate one of the two known populations (Singer and Parmesan 2010, Patterson et al. 2019).

This taxa also has a single host plant and host specificity has been shown to be a key indicator of extinction risk in butterflies as with only one host plant any declines or threats facing the host plant will also result in butterfly declines (Kotiaho et al. 2005, Palash et al. 2022, Forister et al. 2023). On top of that this subspecies is univoltine which puts it at a higher risk of extinction as it reduces the subspecies dispersal range and increases its risk of phenological mismatch making the taxa less adaptable to and more threatened by climate change (Eskildsen et al. 2015, Patterson et al. 2019, Forister et al. 2023, USFS 2023).

This butterfly also likely has a small population size as it lives in a small geographic area and authors have previously noted large variations in morphology with this population which may be the result of inbreeding depression resulting in more recessive phenotypes (Ferris 1983). Ferris (1983) also stated that he believed this subspecies to be essentially isolated from any other subspecies of *A. hesperis* although he admitted there may be rare intergradation in the Sangre de Cristo mountains (Ferris 1983, Scott et al. 1998). Many fritillaries are strong fliers and so there is likely genetic mixing between the mesa tops which may act as a sort of metapopulation. However, as a whole this butterfly is very isolated from other *A. hesperis* and this prolonged isolation may be very dangerous to the taxa as slightly deleterious alleles can accumulate in small isolated populations, reducing the likelihood of population persistence (Hedrick 1994, Lynch et al. 1995). The accumulation of deleterious alleles and a reduction in heterozygosity have been shown to reduce survival rates as well as population stability and persistence in a relatively short amount of time (Saccheri et al. 1998, Nieminen et al. 2001). Nieminen et al. (2001) also suggests that inbreeding depression may pose an even greater problem in populations currently experiencing rapid habitat fragmentation but with minimal inbreeding in the past. A reduction in fitness resulting from the loss of genetic diversity significantly increases the risk of extinction when populations are subject to environmental stress and as such could compound the risks of climate change to this

butterfly.

Geographic Range:

This butterfly has a very restricted range. It is limited to the Raton Mesa complex in northeastern New Mexico, in Colfax and Union Counties, as well as in adjacent Colorado, in Las Animas County (Scott 1981, Ferris 1983, Scott 1986, Dunford 2009, Cary and Toliver 2024). This butterfly generally lives on the high mesa tops, between 2,285 and 2,743 meters (7,500 and 9,000 feet) in elevation (Cary and Toliver 2024). It is thought that this butterfly is likely a Pleistocene relict, which resided in mixed grasslands and aspen forests of the Southern Plains. As the Pleistocene ended and temperatures warmed, the species moved north to Canada, becoming *A. h. helena*, or shifted to higher elevations becoming *A. h. ratonensis* (Scott 1981, Ferris 1983, Dunford 2009).

Conservation Considerations:

Due to this subspecies limited range, seemingly small population size, and the large threats affecting this subspecies direct conservation action is likely needed in order to ensure this subspecies survival otherwise the likelihood this butterfly continues to survive until the end of the century is unlikely. First off all known populations should be protected and efforts should be made to identify any more populations that we currently don't know about. This is a very important step as the raton mesa complex is a series of volcanic peaks and mesas that spreads across much public and private land. As a result, little or nothing may be known about populations on more remote mesas or those on private lands. Additionally, determination of population size and trends will be crucial for the taxon's long term survival and not only surveying numbers but trying to potentially gauge the genetic health of this butterfly in order to accurately gauge the risk of inbreeding depression. More research is also needed on the habitat conditions that this butterfly requires and the trends in that habitat. If the habitat for this butterfly is continuing to decrease then habitat restoration may be needed. A crucial part of this will be host plant identification. This research will be crucial in order to properly recommend further conservation actions to help this butterfly.

Threats:

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Population:

The population size and trend are not known for this subspecies. Due to the limited distribution, monitoring of population trends is necessary to ensure the population is stable.

References:

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More Information

