Glaucopsyche lygdamus erico (Raton Mesa Silvery Blue)

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Taxonomy

- **Class**: INSECTA
- **Order**: LEPIDOPTERA
- **Family**: LYCAENIDAE
- **Genus**: Glaucopsyche
- **Scientific Name**: *Glaucopsyche lygdamus erico* R. Holland, 2011
- **Common Name**: Raton Mesa Silvery Blue
- **Synonyms**:
- **Taxonomic Name Source**:Holland, R. 2011. Lepidoptera of North America 10. Review of *Plebejus icarioides* and *Glaucopsyche lygdamus* in New Mexico with four new subspecies (Lycaenidae, Lycaeninae, Polyommatini). Contributions of the C.P. Gillette Museum of Arthropod Diversity Colorado State University, Fort Collins, Colorado. 29 pp.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: TNR
- **NHNM State**: S2
- **NM Endemic**:NO

Description

Glaucopsyche lygdamus is unmarked glossy blue on the upperside, one of our more beautiful blues. On females, the blue is reduced to the basal area, leaving the distal area dark gray. Prominent postmedian bands of white-ringed black spots decorate the undersides against a pale, grey-tan background. **Comments.** New Mexico has four named subspecies of which the two best known are Rocky Mountain subspecies Glaucopsyche lygdamus oro (Scudder 1876) in north-central New Mexico and Mogollon Rim subspecies Glaucopsyche lygdamus arizonensis McDunnough 1936 in southwest New Mexico mountains. Richard Holland (2011) described Sacramento Mountains and Sierra Blanca (Li,Ot) subspecies Glaucopsyche lygdamus ruidoso (R. Holland 2011). He also described the race from the volcanic uplands of the Raton Mesa complex (Co,Un) as Glaucopsyche lygdamus erico (R. Holland 2011).

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

Habitat and Ecology

The parent species the Silvery Blue lives mostly in boreal North America with populations from northern Alaska ranging south to the Sacramento Mountains (Cary and Toliver 2024). In the Raton Mesa Complex this butterfly sits towards the southern extreme of the parent species range as a result this butterfly uses high elevation montane meadows and savannahs as its habitat existing on the windswept mesa tops and volcanic peaks in the Raton Mesa Complex (Holland 2011, Cary and Toliver 2024). Many of the subspecies specific life history information is still unknown however, the Silvery Blue is known to mostly use Legumes (*Fabaceae*) as its host plant including plants such as Silvery Lupine (*Lupinus argenteus*), Purple Locoweed (*Oxytropis lamberti*), Spreadfruit Goldenbanner (*Thermopsis divaricarpa*), and Milkvetch (*Astragalus spp.*) (Cary and Toliver 2024). It is unknown specifically which of these or which taxa are being utilized as host plants by this subspecies and more research is needed on this topic. Silvery Blues are broadly univoltine across New Mexico with extreme flight dates in New Mexico stretching from March 22nd to July 27th however, this flight time changes based on elevation, likely this population flies mostly in June based on its latitude and elevation (Cary and Toliver 2024).

Geographic Range:

The Raton Mesa Silvery Blue Butterfly is endemic to the Raton Mesa Complex, in northeastern New Mexico (Colfax and Union Counties) and adjacent Colorado (Las Animas County) (Holland 2011, Cary and Toliver 2024). The Raton Mesa Complex is a group of high mesa and volcanic peaks, isolated from other high elevation habitats. As a result, it has become an area of high endemism, with several endemic butterflies only being found in this area; such taxa include the Raton Mesa Northwestern Fritillary (*Argynnis nausicaa ratonensis*), Raton Mesa Boisduval's Blue (*Icaricia icarioides nigrafem*), Western Hobomok Skipper (*Lon hobomok wetona*), and Capulin Mountain Alberta Arctic (*Oeneis alberta capulinensis*) (Holland 2011).

One record of this butterfly exists as far away as Mora County, southwest of Raton Mesa. However, this is a historical observation and it has not been seen there since (Holland 2011). Otherwise the butterfly exists in the central mesa complex around Bartlett and Horseshoe mesas, around Dale Mountain west of Raton, and at Tollgate Canyon. There is also one observation in Colorado, from the mesas near Trinidad.

Conservation Considerations:

There are no known conservation actions being taken for this butterfly and no previous conservation assessments that we know of. Due to the many threats to this butterfly as well as its very small range and the fragile metapopulation dynamics of this butterfly it is unlikely that this subspecies will persist without direct conservation intervention. These efforts should include additional research on this butterfly's life history, ecology, the threats to it and its population size and trend. Additionally, determination of the extent of this subspecies range around the Raton Mesa Complex will be crucially important as if there are more localities and a wider range than currently known this butterfly may need to be reassessed into a lower category. Additionally, habitat restoration focusing on making populations more resilient or reconnecting isolated metapopulations will be crucial for this butterfly's long term survival. In order to combat inbreeding depression of this isolated butterfly, manually crossing genetic lines and breeding isolated metapopulations may also be required.

Threats:

This butterfly is a very narrow and range restricted high elevation endemic as a result climate change is likely the main threat to this butterfly. While there are further south populations of the Silvery Blue; the Raton Mesa Silvery Blue Butterfly still sits towards the south of its parents wide distribution and is probably somewhat heat stressed as a result. It has been documented that many butterfly species respond to climate change by moving to higher elevations or higher latitudes however, as this butterfly is already isolated on mesa tops and the tops of volcanic peaks this is not an option for this butterfly and climate change threats to push this taxa into thin air (Holland 2010, RÃ¶dder *et al.* 2021). As the western United States is expected to continue to get hotter and drier over the next century things are looking dire for this mountaintop resident (Cook *et al.* 2009, Cook *et al.* 2015, Williams *et al.* 2022). Climate change also threatens this subspecies with phenological mismatch with both host and nectar sources which could result in steady declines in population numbers or in the event of an extreme phenological mismatch the extirpation of entire populations which has been observed in other host specific legume feeding blues (Singer and Parmesan 2010, Patterson *et al.* 2019).

This subspecies could also be highly affected by fire either by it or the lack of it. With such small population numbers in such small areas one fire controlled or wild could wipe out a large percentage of what's left of this subspecies and potentially cause its extinction (Cary *et al.* 2004). However, at the same time with no fire these tundra grasslands may grow senescent or be succeeded which will also drive the taxa towards potential extinction (Cary *et al.* 2004). Because the population is so small and it's so restricted drought, and severe weather also pose large challenges to the taxa; hailstorms and late snows during the flight period could kill off a large number of individuals plummeting the genetic diversity of the population (Cary *et al.* 2004).

Another major threat to this butterfly is inbreeding depression which is magnified by the likely metapopulation dynamics of this taxa. This can affect the butterfly in two ways first off in a metapopulation dynamic these mesa top and mountain top colonies frequently go extinct and are recolonized by other populations however, as this butterfly is pushed to higher elevations by climate change and as grasslands in the area begin to fall to succession there is less opportunity for recolonization of these sites extirpated by environmental stochasticity. This butterfly also being univoltine, and having a small wingspan as well as being short lived likely has somewhat limited dispersal capabilities which can further stress this butterfly (Lotts and Naberhaus 2021). Metapopulations are also at additional risk of inbreeding depression as in these small isolated populations deleterious alleles can begin to allele along with a reduction in heterozygosity which has 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).

Determination of the specific host plants for this butterfly is needed in order to more properly analyze the threats to them; however, feasibly replacement by invasive species is likely a threat to this butterfly's host legumes.

Population:

The population size is not known for the Raton Mesa Silvery Blue Butterfly, although there are some signs that the parent species the Silvery Blue (*Glaucopsyche lygdamus*) may be declining across its range. Edwards *et al.* (2024) analyzed count data collected over the last two decades by numerous butterfly monitoring programs, at sites throughout the range of the species. To estimate changes in total abundance, the number of butterflies observed in each survey was summed and data was fit to a generalized additive model. Survey effort was also accounted for. From this model, a reduction of 41.39% was estimated across 129 sites. The count data utilized data across the range of the species coming from many sites, and is therefore likely representative of the entire distribution. One of these sites was within the Raton Mesa Complex which one site is hard to draw conclusions from but as this is such a small geographic area even one site showing a decline over ten years of data is very concerning. In a related effort Forister *et al.* (2021) also found declines in abundance of most of 272 widespread butterfly species. Using Bayesian Poisson regression to model trends in long term butterfly monitoring data across the United States, these declines were estimated to be a continual 1.6% decline in abundance per year. These declines in abundance of butterfly communities were found to be

primarily correlated with warming temperatures during the fall season; the authors hypothesize this may be due to increased physiological stress on both plants and butterflies during this time.

References:

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More Information