Capnia caryi (Mogollon Snowfly)

No Photo Available

Taxonomy

- **Class**: INSECTA
- **Order**: PLECOPTERA
- **Family**: CAPNIIDAE
- **Genus**: Capnia
- **Scientific Name**: *Capnia caryi* Baumann and Jacobi, 2002
- **Common Name**: Mogollon Snowfly
- **Synonyms**:
- **Taxonomic Name Source**:Baumann, R.W. and G.Z. Jacobi. 2002. *Capnia caryi*, an interesting new species of winter stonefly from the American southwest (Plecoptera: Capniidae). Western North American Naturalist 62(4):484-486.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: G1
- **NHNM State**: S1
- **NM Endemic**:NO

Description

Males of this species are brachypterous, and the length of the forewings is about 3.4-4 mm. The body is 5-6 mm in length and both the body and appendages are dark brown. The wings are slightly fumose (smoky). The females are macropterous, having full leng

Habitat and Ecology

The species is known from just two localities in Arizona and New Mexico. The stonefly uses montane streams during the early stages of their lifecycle before emerging as adults. It has been found between elevations of 2,400 and 2,650 m (Baumann and Jacobi 2002). A 1979-1995 survey failed to collect the Mogollon Stonefly, though this occurred before the species was described. The species is known to occur in Iron Creek which is characterized as steep and high velocity, with rocky substrate that forms with melting snow as habitat (Jacobi and Cary 1996). During a mid-July visit, the creek was low in flow. When the type specimens were collected in February of 1999, the creek had a similarly low flow and surface stream flow ceased 100 m up stream of the collection locality. The substrate consisted of scattered boulders and a mixture of cobble with gravels; the gradient was 3%, the water was clear and cool, with low amounts of dissolved materials and low non-filterable residue (Baumann and Jacobi 2002)

Little is known about the ecology of the Mogollon Snowfly, though as a member of the family Capniidae, it is known as a Winter Stonefly. The family emerges in late winter after spending spring to fall in diapause. As a whole the family is known to be detritivores as juveniles but will eat plant material as adults (BugGuide 2024). The exact emergence date is not known but all occurrences have been taken in February and March (Baumann and Jacobi 2002). More research is needed on the ecology of this species.

Geographic Range:

The Mogollon Snowfly occurs in the Gila River watershed in Arizona and New Mexico, in the southwestern United States. It is found between elevations of 2,400 and 2,650 m (Baumann and Jacobi 2002). There is just one locality known in Arizona, in Mamie Creek, and one locality in New Mexico, in Upper Iron Creek (Baumann and Jacobi 2002, GBIF.org 2024). Both of these creeks are very near the border between Arizona and New Mexico. Iron Creek is a small tributary of the Middle Fork of the Gila River, southeast of Reserve in the Gila National Forest and Mamie Creek, is at the base of Escudilla Peak southeast of Springerville, and it is part of the Little Colorado River drainage in the Apache National Forest. It is unknown whether this species might occur in other suitable habitats in the Mogollon Rim (Baumann and Jacobi 2002).

Conservation Considerations:

There are no known conservation actions in place for this stonefly. The species was included as a Species of Greatest Conservation Need in the New Mexico Department of Game and Fish 2005 Comprehensive Wildlife Conservation Strategy for New Mexico, though it has since been dropped from the list as the state does not have authority to manage most invertebrates species (NMDGF 2006). Research is needed to determine if this species remains extant, where it is distributed, population size and trend, and threats.

Threats:

The threats to this species are not well understood, as little research has been done. However, given this species relies on cool, clear, clean montane surface waters in the southwestern U.S., it is likely the species is threatened by climate change, overgrazing, and forest fires.

This species depends on reliable stream flows at particular times of year to complete the juvenile stages of its lifecycle (Blinn and Ruiter 2006). In the western U.S., rising temperatures and less predictable patterns of precipitation due to climate change, are leading to reduced total snowpacks and earlier onset of snowmelt (Mote *et al.* 2018, Harpold *et al*. 2012). This in turn leads to reduced overall stream flows and groundwater recharge rates (Barnhart *et al.* 2016, Zaremehrjardy *et al*. 2022). The southwestern United States also saw its driest 22-year period from 2000 to 2021 since at least 800 CE (Williams *et al*. 2022) and droughts are projected to become more prolonged, severe, and common in the region under future climate change scenarios (USGCRP 2018). This may also adversely impact streamflow regimes for this species. Furthermore, low flows due to drought and increased water use in the Lower Colorado River Basin, near the range of this species, have been shown to result in altered salinity concentration fluxes in surface waters (Putman *et al*. 2024), which may impact the water quality parameters required by this species.

Riparian habitats in the range of the species may be further threatened by damage due to cattle grazing, and increased severity and incidence of forest fires. One study documented the immediate effects of wildfire on macroinvertebrate populations in three headwater streams of the Tonto National Forest, Arizona. They found populations declined to near zero within a month after the fire, recovering to just 25-30% of pre-fire diversity one year later (Rinne 1996). While populations may recover long-term, wildfire may still be detrimental if this species happens to be found in low numbers or in few sites without rescue potential from neighboring populations. Overgrazing may also impact this species as it can lead to changes in flow regimes and channel morphology (Knapp and Matthews 1996). Grazing is also associated with changes to riparian plant communities, which are crucial for maintaining water quality, soil health, channel morphology, and biotic diversity (Kauffman *et al.* 1983, Kondolf *et al.* 1996). As riparian vegetation is lost, stream temperatures rise, organic matter inputs lessen, and hydrologic processes are disrupted (Beschta 1997, Kauffman *et al.* 2004).

Population:

The population size and trend are not known for this species. Determination of population size and monitoring of population trends is necessary to ensure the population is stable.

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