Capnia zukeli (Hanson 1943)
Idaho snowfly
Plecoptera: Capniidae

Profile prepared by Celeste Mazzacano, The Xerces Society for Invertebrate Conservation

SUMMARY

Capnia zukeli is endemic to northern Idaho and is known only from seven locations in Latah county, including Little Boulder Creek, Potlach River in the Moscow Mountains, Palouse River, Troy Creek, and Spring Valley Creek. This species' limited habitat may be threatened with degradation from extensive recreational use in the region from which it is known. Research should focus on determining the true distribution of this species, the status and size of existing populations, and the potential presence of additional populations at suitable habitat in the region. Assessing and strengthening current management practices for known habitat would also be beneficial.

CONSERVATION STATUS

Rankings:
Canada – Species at Risk Act: N/A
Canada – provincial status: N/A
Mexico: N/A
USA – Endangered Species Act: N/A
USA – state status: Idaho S1 Critically imperiled
NatureServe: G2 Imperiled
IUCN Red List: N/A

SPECIES PROFILE

DESCRIPTION

Capnia zukeli is a stonefly in the family Capniidae (small winter stoneflies). Adults have unusual features compared to other species in this genus, including an extremely long male epiproct (intromittent organ), which is almost 30 times as long as it is wide, lack of knobs or protrusions on the dorsal (top) surface of abdominal segments, and extremely reduced wings (brachyptery) in males (Nelson & Baumann 1989).

Females are 9 mm (0.35 in) long, with forewings that are 7.8 mm (0.31 in.) long. They lack a medial bridge between abdominal segments 7 and 8, a characteristic that can be used to distinguish them from females of some other closely related species in this genus.

Nymphs have only been described for a few of the North American species in this genus, but *Capnia* nymphs differ from other Capniidae in having notches halfway along the inner margins of the hind wingpads, and they lack the deep serrations at the base of the ventral tooth of the right mandible seen in other genera in this family (Stewart & Stark, 2002).

TAXONOMIC STATUS

Capnia zukeli Hanson 1943. The taxonomic status of this species is accepted as valid. *Capnia zukeli* and *C. lineata* (straight stonefly) were once thought to be synonyms (Baumann *et al*. 1977), as the original descriptions and accompanying figures of female specimens were not adequate for separating the two species. Also, it is not uncommon for members of these two species to be collected at the same sites. However, following examination of additional female and male specimens collected at later dates, distinguishing characteristics were identified that confirmed these taxa as two distinct species (Nelson & Baumann, 1989).

LIFE HISTORY

Little is known about the life history and ecology of this species. No habitat information is available for nymphs, but members of this genus generally prefer small streams and springs. Species in this family require cool temperatures for development. Young nymphs hatch in early spring; as the water temperatures rise they move into the hyporheic zone (a zone of loose rocky substrate under the stream saturated with water) and undergo diapause, becoming inactive until the water cools in late fall and winter, at time they feed and grow rapidly to maturity. Specific feeding behavior of *C. zukeli* nymphs has not been observed, but most species in this family feed by shredding detritus (Merritt *et al*. 2008).

As the common name for this family implies, adult capniids emerge during the late winter or early spring. Adult *C. zukeli* have been captured in late April (Nelson & Baumann 1989), but their flight date range is not known. Species in this family are usually univoltine, with one generation per year.

DISTRIBUTION

Capnia zukeli is endemic to northern Idaho and is known from only seven different locations in Latah County (Nelson and Baumann 1989). Sites from which it is known include Little Boulder Creek in Little Boulder Creek Campground, Potlach River in the Moscow Mountains, Palouse River, Troy Creek, and Spring Valley Creek.

THREATS

Capnia zukeli is a rare endemic species with restricted habitat, limited populations, and unknown dispersal ability. This species is restricted to a handful of streams in a single county in northern Idaho. One of those streams, Little Boulder Creek, is on the EPA list of impaired (303(d)) waters from source to mouth, due to sediment and siltation. Sedimentation could lower water quality and clog the spaces in the hyporheic zone where young larvae diapause during warm weather, increasing larval mortality. Habitat quality could also be impaired by extensive recreational use, as mountain biking, hiking, camping, fishing, ORV usage, and scenic driving are popular activities in the area.

Capnia zukeli was mentioned as a species that could be negatively impacted by a proposed highway extension (Thorncreek Road to Moscow Project) that would change an existing undivided 2-lane road into a divided 4-lane highway. This project will affect several streams, drainages wetlands that are potential *C. zukeli* habitat. The environmental assessment associated with the project stated that the cumulative impacts on *C. zukeli* would be negligible (Idaho Fish and Game 2006).

Additional potential threats such as the effects of disease and predation have not been assessed. However, such small isolated populations are extremely vulnerable to stochastic events, and are generally at greater risk of extirpation from normal population fluctuations due to predation, disease, and changing food supply, as well as from natural disasters such as floods or droughts. They may also experience a loss of genetic variability and reduced fitness due to the unavoidable inbreeding that occurs in such small populations.

CONSERVATION STATUS

Capnia zukeli currently receives no federal protection. It is considered a Species of Greatest Conservation Need (SGN) by the Idaho Natural Heritage Program.

CONSERVATION NEEDS

The Idaho Comprehensive Wildlife Conservation Strategy (2005) states that data regarding population trends is not available for this species. Additional surveys to establish these parameters would be beneficial. Necessary actions include monitoring known populations and searching for new ones, and protecting habitat in regions where the species is known to occur.

RESEARCH NEEDS

Little is known about the biology or dispersal ability of this species. Research into life history and habitat management in the area would be valuable.

RESOURCES

CONTACTS

Richard W. Baumann (?), currently professor emeritus and insect curator at BYU in Provo Utah, Richard_Baumann@byu.edu, 801- 422-5492; not yet contacted

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