

Species: Stellmack's Cave Amphipod (*Stygobromus stellmacki*)

Global Rank: G1G2

State Rank: S1

State Wildlife Action Plan: Immediate Concern Species - Responsibility Species

Climate Change Vulnerability: Not Vulnerable/Presumed Stable

Confidence: Very High

Habitat (adapted from NatureServe 2008):

Stellmack's cave amphipod is a stygobitic species (restricted to subterranean groundwater habitats) endemic to three cave systems in central Pennsylvania. Current limited survey information indicates that it inhabits three aquifers with one collection point for each watershed. The extent of this crustacean's distribution within these aquifers is unknown, though the species is not expected have a much expanded range. Stellmack's cave amphipod utilizes small streams, pools, and springs associated with limestone solution caves (Holsinger 1978). Adults and immatures are detritivores and scavengers, probably feeding upon bacteria, detritus, and carrion (Thorp and Covich 1991). Seasonality of this species' behavior or life-cycle may be based upon slight water temperature fluctuations.

Current Threats (adapted from NatureServe 2008):

This species is stygobitic and highly specialized to limestone caves within a small region of central PA. It is unlikely that many new sites will be discovered. The region where these populations are located is experiencing rapid agricultural, urban, and industrial growth. Protecting the groundwater is the key ingredient to long term viability of these populations. Potential threats to groundwater quality and quantity include pollution by agricultural fertilizers and pesticides, siltation, pumping of water from the aquifer for domestic and industrial uses, and industrial chemical spills. Upslope of the aquifers some potential exists for pollution from forestry practices and capture of surface run-off which might limit water reaching subterranean habitats. Limestone mining near the caves and/or aquifers would also be a serious threat.

Main factors Contributing to Vulnerability:

The key factors found to increase the vulnerability of Stellmack's cave amphipod to climate change are minimal ability to disperse outside of occupied cave systems, highly restricted range, specialized limestone cave habitat, increased groundwater demand and surface water capture expected due to increased frequency and duration of summer droughts. This cold-water amphipod is likely sensitive to changes in the seasonal hydrology and temperatures of the aquifer. However, a groundwater system should be able to moderate climatic changes to some degree.

In the CCVI version 2.0, obligate cave species were automatically given a higher resistance rating to climate change impacts. According to the CCVI guidelines (NatureServe 2010) and the West Virginia Climate Change Vulnerability Assessment Report (Byers and Norris 2011), cave species are expected to better survive climate changes in their buffered underground habitats.

Protecting water quality and quantity in occupied watersheds by increasing forest cover, prohibiting mining activities, implementing best management practices for agriculture, and limiting the addition of impervious surfaces and further water withdrawal or storage can provide important protection against current and future threats.

References:

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Holsinger, J.R., 1978. Systematics of the subterranean amphipod genus *Stygobromus* (Crangonyctidae), Part II: Species of the eastern United States. Smithsonian Contributions to Zoology 266:1-144.

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: July 17, 2008)

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