Species: Stellmack's Cave Amphipod (*Stygobromus stellmacki*)
Global Rank: G1G2
State Rank: S1
State Wildlife Action Plan: Immediate Concern Responsibility Species
Climate Change Vulnerability: Extremely Vulnerable
Confidence: Very High

Habitat (adapted from NatureServe 2008):

Stellmack's Cave Amphipod is a **s**tygobitic 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 in these aquifers is unknown, though the species is not expected have a much expanded range. *Stygobromus stellmacki* utilizes small streams, pools, and springs associated with limestone solution caves. Adults and immatures are detritivores and scavengers, probably feeding upon bacteria, detritus and carrion. Seasonality of this species behavior or life-cycle, if present, might be based upon slight water temperature fluctuations.

Threats (adapted from NatureServe 2008):

The region where these populations are located are experiencing rapid agricultural, urban, and industrial growth. 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. 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 Rank:

The key factors found to increase the vulnerability of Stellmack's Cave Amphipod to climate change are: minimal ability to disperse, highly restricted range, specialized limestone cave habitat, increased groundwater demand and surface water capture expected due to increased frequency and duration of summer droughts. The agricultural heritage of the valleys in central Pennsylvania and the proximity to Penn State University increases the likelihood of increased agriculture for research and production of biofuels. While this species is also expected to be sensitive to changes in the seasonal patterns and temperatures of the aquifer, there is not enough information to determine whether these changes would have a positive, negative, or neutral effect on the species.

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 withdraw or storage, etc. can provide important protection against current and future threats.

Migration and Movements: This species has a minimal ability to disperse and its range is limited to limestone caves within a few aquifers in central PA. Additional information is needed to determine if the fall collections that were taken of this species at the outflow of a spring represents dispersal (NatureServe 2008).

Literature Cited:

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)

Thorp, J.H. and A.P. Covich (eds). 1991. Ecology and classification of North American freshwater invertebrates. Academic Press, Inc., Boston, MA. 911pp.