

Species: Bog Copper (*Lycaena epixanthe*)
Global Rank: G4G5
State Rank: S2
State Wildlife Action Plan: High Level Concern Species
Climate Change Vulnerability: Extremely Vulnerable
Confidence: Very High

Habitat:

The Bog Copper is typically found in acid bogs with cranberries and other heath family plants, but it is not restricted to bogs. It can also occur in fens and very wet acid sedge meadows with cranberries rather than true bogs. In the New Jersey Pine Barrens it can occur in a variety of acid wet situations, generally with a lot of sphagnum moss including ditches, infrequently mowed wet meadows, and wet burn scars (NatureServe 2008). Habitats may have some trees but are mainly open with permanently wet sunny substrates. It is important that the wetlands soils or sphagnum remain saturated for most or all of the year. Bog Copper caterpillars feed on cranberries (both *Vaccinium macrocarpum* and *V. palustris*), and while cranberries can grow well on less saturated sites, Bog Coppers do not occupy such habitats (NatureServe 2008). *Lycaena epixanthe* is usually excluded from commercial cranberry bogs by insecticides (Glassberg 1999).

Threats:

According to NatureServe (2008), the habitat is subject to peat mining in Maine (Opler, pers. comm.). Additional threats include fire, pesticides, succession, storm floods, and beaver damming which can eradicate local populations (Schweitzer, pers. obs.). These are only serious threats for isolated colonies of Bog Coppers. In fact these disturbances are needed over time to create new habitats. New habitats can be colonized by *Lycaena epixanthe* if there are sufficient populations nearby and at least small intervening 'stepping stone' habitats with hostplant that connect occupied and unoccupied habitats. Populations that occur in isolated bog habitats and are not part of a large wetland complex are vulnerable to localized extinctions without recolonization.

Main factors Contributing to Vulnerability Rank:

The main factors leading to species vulnerability to climate change are: limited dispersal ability, habitat specificity (bogs and other wetlands with cranberry), dependence on other species to create habitat (beaver can both destroy and over the long term create habitat), and hostplant specificity (*Vaccinium macrocarpum* & *V. palustris*). Negative impacts to water quality and hydrology and fragmentation of habitat obstructing colonization movements are expected in light of development of alternative energy, particularly natural gas from the Marcellus shale formation which is especially rich in the core of the Bog Copper's range in the NE corner of Pennsylvania.

Migration and Movements: The Bog Copper is not a migratory species. Adults generally stay in their small core habitats, but they do occasionally move along sunny stream

banks, especially if the foodplant is present in limited amounts along the waterway (NatureServe 2008). *Lycaena epixanthe* can be a good colonizer of new habitats in wetland complexes where suitable habitat is frequently encountered on the landscape. Still most adults are closely tied to their small habitats and two kilometers is expected to separate populations in most cases, at least in the absence of small "stepping stone" habitat patches (NatureServe 2008). In areas where habitats are widely scattered (>10 kilometers apart) and isolated such as certain bogs in Pennsylvania and New Jersey, most seemingly suitable habitats are unoccupied (NatureServe 2008). West Virginia has a disjunct population in one locality that has unable to colonize nearby bogs (Allen 1997). These observations suggest lack of long distance movements.

Literature Cited:

Allen, Thomas. 1997. *The Butterflies of West Virginia and Their Caterpillars*. University of Pittsburgh Press, Pittsburgh.

Glassberg, Jeffrey. 1999. *Butterflies through Binoculars - The East*. Oxford University Press, New York, New York.

Harper, J. A. 2008. The Marcellus Shale – An Old “New” Gas Reservoir in Pennsylvania. *Pennsylvania Geology* 38(1):2-13.

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)

Opler, Malikul. 1992. *Peterson Field Guides, Eastern Butterflies*. Houghton Mifflin Company, New York.