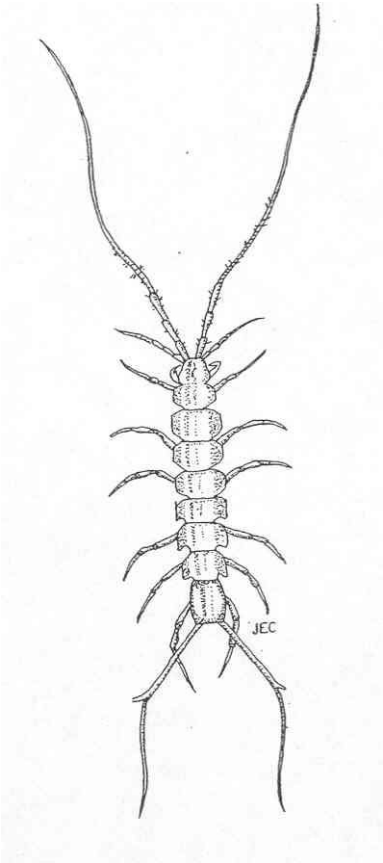
Conservation Assessment
for
Cannulate Cave Isopod (Caecidotea Cannulus)



(Franz and Slifer, 1971)

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This Conservation Assessment was prepared to compile the published and unpublished information on Caecidotea cannulus. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community and associated taxa, please contact the Eastern Region of the Forest Service Threatened and Endangered Species Program at 310 Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

The Cannulate cave isopod is designated as a Regional Forester Sensitive Species on the Monongahela National Forest in the Eastern Region of the Forest Service. The purpose of this document is to provide the background information necessary to prepare a Conservation Strategy, which will include management actions to conserve the species.

Caecidotea cannulus is a rare cave isopod known only from parts of Tucker and Randolph counties, West Virginia.

NOMENCLATURE AND TAXONOMY

Classification:	Class Crustacea
	Order Isopoda
	Family Asellidae
Scientific name:	Caecidotea cannulus
Common name:	Cannulate cave isopod
Synonyms:	Asellus cannulus
	Conasellus cannulus

This species was described by Steeves (1963) as Asellus cannulus. By present standards the description was superficial, but serves to allow identification of the species. From the description little can be said for its relationship to other species or within the Family Asellidae; the species is in need of a thorough redescription. Steeves (1965) created the Cannulus species group and eventually placed eight species in it (Steeves, 1969). Henry and Magniez (1970) moved most of the North American asellids from the genus Asellus to Conasellus. Bowman (1975) followed this move, but pointed out the priority of the name Caecidotea, which was followed by Lewis (1980).

DESCRIPTION OF SPECIES

This isopod crustacean is a small, eyeless, unpigmented cavernicole described by Steeves (1963) at 5 millimeters in length. Typifying the Cannulus Species Group, the male second pleopod endopodite tip possesses a single terminal process that tapers to a thread-like terminus. Identification of this species requires laboratory dissection and examination of slide-mounted appendages under a compound microscope by a specialist in isopod taxonomy.

LIFE HISTORY

Nothing is known of the life history of this species.

HABITAT

This species is usually found under flat rocks in small cave streams (Holsinger, et. al., 1976).

DISTRIBUTION AND ABUNDANCE

Caecidotea cannulus was reported to be restricted to southern Tucker and northern Randolph counties in West Virginia (Holsinger, et. al., 1976).

RANGEWIDE STATUS

Global Rank: G2 imperiled; A global rank of G2 is given to a species that has been reported from between 6-20 localities. Holsinger, et. al. (1976) reported this species from6 caves, which would place it in on the borderline of the G1/G2 range.

West Virginia State Rank: S2 imperiled; A state rank of S2 is given to a species reported from between 6-20 localities in West Virginia. All of the 6 known localities of Caecidotea cannulus are within West Virginia.

POPULATION BIOLOGY AND VIABILITY

At one location (Bowden Cave) Caecidotea cannulus was found to occur syntopically with Caecidotea holsingeri. The co-occurrence is in a small tributary stream where C. holsingeri outnumbers C. cannulus by a ratio of about 3 to 1 (Holsinger, et. al., 1976).

POTENTIAL THREATS

Due to the presence of Caecidotea cannulus in the restricted cave environment, it is susceptible to a wide variety of disturbances (Elliott, 1998). Caves are underground drainage conduits for surface runoff, bringing in significant quantities of nutrients for cave communities. Unfortunately, contaminants may be introduced with equal ease, with devastating effects on cave animals. Potential contaminants include (1) sewage or fecal contamination, including sewage plant effluent, septic field waste, campground outhouses, feedlots, grazing pastures or any other source of human or animal waste (Harvey and Skeleton; Quinlan and Rowe, 1977, 1978; Lewis, 1993; Panno, et al 1996, 1997, 1998); (2) pesticides or herbicides used for crops, livestock, trails, roads or other applications; fertilizers used for crops or lawns (Keith and Poulson, 1981; Panno, et al. 1998); (3) hazardous material introductions via accidental spills or deliberate dumping, including road salting (Quinlan and Rowe, 1977, 1978; Lewis, 1993, 1996).

Habitat alteration due to sedimentation is a pervasive threat potentially caused by logging, road or other construction, trail building, farming, or any other kind of development that disturbs groundcover. Sedimentation potentially changes cave habitat, blocks recharge sites, or alters flow volume and velocity. Keith (1988) reported that

pesticides and other harmful compounds like PCB's can adhere to clay and silt particles and be transported via sedimentation.

Impoundments may detrimentally affect cave species. Flooding makes terrestrial habitats unusable and creates changes in stream flow that in turn causes siltation and drastic modification of gravel riffle and pool habitats. Stream back-flooding is also another potential source of introduction of contaminants to cave ecosystems (Duchon and Lisowski, 1980; Keith, 1988).

Smoke is another potential source of airborne particulate contamination and hazardous material introduction to the cave environment. Many caves have active air currents that serve to inhale surface air from one entrance and exhale it from another. Potential smoke sources include campfires built in cave entrances, prescribed burns or trash disposal. Concerning the latter, not only may hazardous chemicals be carried into the cave environment, but the residue serves as another source of groundwater contamination.

Numerous caves have been affected by quarry activities prior to acquisition. Roadcut construction for highways passing through national forest land is a similar blasting activity and has the potential to destroy or seriously modify cave ecosystems. Indirect effects of blasting include potential destabilization of passages, collapse and destruction of stream passages, changes in water table levels and sediment transport (Keith, 1988).

Oil, gas or water exploration and development my encounter cave passages and introduce drilling mud and fluids into cave passages and streams. Brine produced by wells is extremely toxic, containing high concentrations of dissolved heavy metals, halides or hydrogen sulfide. These substances can enter cave ecosystems through breach of drilling pits, corrosion of inactive well casings, or during injection to increase production of adjacent wells (Quinlan and Rowe, 1978).

Cave ecosystems are unfortunately not immune to the introduction of exotic species. Out-competition of native cavernicoles by exotic facultative cavernicoles is becoming more common, with species such as the exotic milliped Oxidus gracilis affecting both terrestrial and aquatic habitats.

With the presence of humans in caves comes an increased risk of vandalism or littering of the habitat, disruption of habitat and trampling of fauna, introduction of microbial flora non-native to the cave or introduction of hazardous materials (e.g., spent carbide, batteries). The construction of roads or trails near cave entrances encourages entry.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Much of the range of this species is within the Monongahela National Forest, including the Cave Hollow-Arbogast System which is owned by the forest.

SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES

There are no species specific activities concerning Caecidotea cannulus.

The existing (1985) Monongahela Land and Resource Management Plan does not provide management direction for caves although they are being considered in the Forest Plan revision currently underway. A Forest Plan Amendment in progress for Threatened and Endangered Species will include management for the caves on the forest.

RESEARCH AND MONITORING

Holsinger, et. al. (1976) reported on a bioinventory of West Virginia cave fauna that encompassed collections from 190 caves in 14 counties. Most of what is known about the distribution of Caecidotea cannulus in the area of the Monongahela National Forest was gathered during that long term project.

RECOMMENDATIONS

Retain on list of Regional Forester Sensitive Species.

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