The Nature Conservancy's Planning for Subterranean Invertebrates of the Interior Low Plateaus

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Abstract

The Nature Conservancy is developing a series of large-scale conservation plans based on eco-regional boundaries for the entire U.S. These plans are designed to identify the best remaining occurrences of globally rare species and communities within and among ecological regions. During the planning process for the Interior Low Plateaus Ecological Region, subterranean invertebrates became a primary focus. Since in some cases these animals are poorly known they presented particular challenges for conservation planning.

To address the lack of centralized knowledge regarding the distribution of subterranean organisms a systematic approach was developed wherein the Interior Low Plateaus was subdivided into faunal units based in part on endemism. Nine major subdivisions were created, three containing additional subunits. For most of these faunal areas a comprehensive subterranean species inventory does not exist. For others, for example the Mammoth Cave fauna of Kentucky, Blue River fauna of Indiana, and Huntsville fauna of Alabama, the fauna is better known. Where the fauna was generally well documented, three sites for each globally rare invertebrate were identified for conservation. For poorly known areas, general guidelines were put forth to conserve a set of subterranean communities representative of the area in hope of securing protection for fauna that is not yet well known. In the end, sites containing over 300 species of globally rare cave invertebrates were recommended for conservation status.

The Nature Conservancy is developing a series of large-scale conservation plans based on ecoregional boundaries for the entire U.S. These plans are designed to identify the best remaining occurrences of globally rare species and communities within and among ecological regions. During the planning process for the Interior Low Plateaus Ecological Region, subterranean invertebrates became a primary focus. The Interior Low Plateaus includes northern Alabama, central Tennessee and Kentucky, southern Indiana, southern Illinois and the southwestern corner of Ohio. Dozens of troglobitic species have been described from this region, which includes well known caves like Cumberland Caverns (Tennessee), Mammoth Cave (Kentucky) and Wyandotte Cave (Indiana). In some cases these animals are poorly known, with the possibility of hundreds of species remaining undescribed. Thus, the subterranean invertebrates of the Interior Low Plateaus presented particular challenges for conservation planning.

To address the lack of centralized knowledge regarding the distribution of subterranean organisms a systematic approach was developed wherein the Interior Low Plateaus was subdivided into faunal units based in part on endemism. The following list includes nine major faunas, of which four contain smaller faunal subunits. This analysis is based on the zoogeographic works of Barr (1968), Peck (1989), Peck & Lewis (1978), and Lewis (1983).

In each area examples are given of endemic troglobites. The examples were taken from the works of Barr (1959, 1960, 1962a, 1962b, 1979,

1980; & Peck 1966), Causey (1959), Cooper, *et al*. (1974, 1997), Christiansen & Bellinger (1998), Ferguson (1981), Hobbs, Jr. *et al*.(1972, 1977), Hoffman (1956; & Lewis 1997), Lewis, (1982a, 1982b, & Bowman 1981), Loomis (1939, 1943), Malcolm & Chamberlin (1961), Muchmore (1965, 1976, 194, 1995, 1996), Peck (1973, 1974, 1984), and Shear (1973).

(1) Pennyroyal Fauna - Pennyroyal Plateau of central and western Kentucky, as well as the extensions north of the Ohio River in Illinois (Shawnee Hills) and Indiana (Mitchell Plain); the Muscatatuck region included in the Bluegrass by Barr (1968) is switched into the Pennyroyal section here due to the Muscatatuck's faunal affinities with the Mitchell Plain.

Bedford Fauna - Indiana, Monroe County south to central Orange County
Endemic: *Pseudanophthalmus leonae, Apochthonius indianae, Arrhopalites bimus*

Blue River Fauna - south central Indiana, including Harrison, Crawford, Washington, and southern Orange County
Endemic: *Pseudanophthalmus eremita, Pseudotremia indianae, Rheocyclops indiana*

Muscatatuck Fauna - southeastern Indiana, Clark to Decatur counties
Endemic: *Pseudanophthalmus barri, Pseudotremia nefanda, Hesperochernes holsingeri*

Breckinridge Fauna - Kentucky from the Hart County Ridge north to the Ohio River at Meade County
Endemic: *Pseudanophthalmus cnephosus, Pseudotremia amphiorax*

Mammoth Cave Fauna - Kentucky from Hart County Ridge south to north-central Tennessee, west to Warren County, Kentucky
Endemic: *Palaemonias ganteri, Antriadesmus fragilis, Pseudanophthalmus striatus*

Hopkinsville Fauna - Warren County, Kentucky, west to the Ohio River, dips into northwest Tennessee
Endemic: *Pseudanophthalmus loganensis, Litocampa jonesi*

Hardin Fauna - southern Illinois east of Hicks Dome fault area, Hardin, eastern Pope, and Saline Counties
Endemic: *Pseudanophthalmus illinoisensis, Pseudotremia* undescribed species

Shawnee Hills Fauna - southern Illinois west of Hicks Dome fault area, Pope, Johnson, Union, and Jackson counties
Endemic: unknown

(2) Central Lowland Fauna - glaciated areas of the Central Lowland Province included here in the Interior Low Plateaus ecoregion, with karst buried under till; subterranean fauna of this area primarily phreatobitic in nature as caves are unavailable as habitats.

Illinois Basin Fauna – central Illinois
Endemic: *Caecidotea beattyi*

Scottsburg Lowland Fauna – south-central Indiana
Endemic: *Caecidotea teresae*

(3) Bluegrass Fauna - north-central Kentucky (Lexington region)
Endemic: *Caecidotea barri, Pseudanophthalmus horni*

(4) Cumberland Plateau (Edge) Fauna - Huntsville, Alabama north through Tennessee to Adams County, Ohio)

Adams Fauna - southeastern Ohio, physiographic extension of western escarpment of Cumberland Plateau
Endemic: *Caecidotea filicispeluncae, Pseudanophthalmus ohioensis*

Carter Fauna - northeast Kentucky in Carter County
Endemic: *Pseudotremia carterensis, Pseudanophthalmus krameri*

Powell Fauna - eastcentral Kentucky in Powell, Jackson, Lee & Estill counties
Endemic: *Pseudanophthalmus exiguus*

Rockcastle Fauna - east central Kentucky south to north east/central Tennessee
Endemic: *Pseudotremia unca, Nelsonites jonesi, Kleptochthonius erebicus*

Caney Fork Fauna - eastern Highland Rim/edge of Cumberland Plateau in Tennessee
Endemic: *Orconectes incomptus, Antriadesmus mollis, Nelsonites walteri*

Huntsville Fauna (east) - southern terminus of edge of the Cumberland Plateau in

Huntsville, Alabama area and adjacent Tennessee

Endemic: *Palaemonias alabamae, Tetracion jonesi, Pseudanophthalmus intermedius*

Huntsville Fauna (west) - transition zone between terminus of Cumberland edge and southern Highland Rim

Endemic: *Procambarus pecki, Batrisodes jonesi, Speoplathyrhinus poulsoni*

(5) Cumberland Saddle Fauna - southcentral Kentucky between eastern and western sinkhole plains

Greensburg Fauna - Greensburg area including parts of Adair, Metcalfe, Green & Hart counties

Endemic: *Pseudotremia merops, Pseudanophthalmus darlingtoni*

Tompkinsville Fauna Tompkinsville area including parts of Barren, Metcalfe, Cumberland, Monroe counties

Endemic: *Pseudanophthalmus cerberus*

(6) Central Basin Fauna - Nashville Basin area of northcentral Tennessee

Endemic: *Pseudanophthalmus insularis, Ptomaphagus barri*

(7) Western Tennessee River Valley Fauna - western Highland Rim/western valley of Tennessee

Endemic: *Pseudanophthalmus occidentalis*

(8) Western Coal Field - western Kentucky and adjacent part of southern Indiana, not karst. No known subterranean fauna in this area

(9) Western Illinois Sinkhole Plain - extension of Ozark Salem Plateau into Illinois, Monroe & Saint Clair Counties

Endemic: *Gammarus acherondytes, Mundochthonius cavernicolus*

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