

BIODIVERSITY FROM CAVES AND OTHER SUBTERRANEAN HABITATS OF GEORGIA, USA

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Abstract

We provide an annotated checklist of species recorded from caves and other subterranean habitats in the state of Georgia, USA. We report 281 species (228 invertebrates and 53 vertebrates), including 51 troglobionts (cave-obligate species), from more than 150 sites (caves, springs, and wells). Endemism is high; of the troglobionts, 17 (33 % of those known from the state) are endemic to Georgia and seven (14 %) are known from a single cave. We identified three biogeographic clusters of troglobionts. Two clusters are located in the northwestern part of the state, west of Lookout Mountain in Lookout Valley and east of Lookout Mountain in the Valley and Ridge. In addition, there is a group of troglobionts found only in the southwestern corner of the state and associated with the Upper Floridan Aquifer. At least two dozen potentially undescribed species have been collected from caves; clarifying the taxonomic status of these organisms would improve our understanding of cave biodiversity in the state. Conservation concerns related to species found in Georgia caves are significant, with fourteen species (including 13 vertebrates) considered “High Priority Species” under the Georgia State Wildlife Action Plan, many of these species have additional state or federal protections. In addition, 17 invertebrate troglobionts (33 % of those known in the state) are considered “Critically Imperiled” by NatureServe. Several biologically important caves are not protected, these are an important conservation concern. However, remarkably, around one third of all caves in the state are on protected lands, including seven of the eight caves known to host ten or more troglobionts.

Introduction

Caves and karst in Georgia are limited to two geologically distinct and disconnected regions in the northwestern and the southwestern corners of the state (Culver et al., 2003; Hobbs, 2012). In northwestern Georgia, caves occur in the Appalachian Valley and Ridge physiographic province and along the escarpments of Sand Mountain and Lookout Mountain of the Cumberland Plateau. Caves in the northwest formed in carbonate sedimentary rock units that date to the Paleozoic era (i.e., Cambrian to Mississippian periods, from 400 to 350 million years old). These units have been folded and faulted during mountain building episodes associated with the southern Appalachian Mountains. In Georgia, Lookout Mountain divides the caves of Appalachian Valley and Ridge into two distinct groups – those west of Lookout Mountain in Lookout Valley, and those east of Lookout Mountain. In southwestern Georgia, caves are known from the Dougherty Plain, also known as the Lime Sink region of the Coastal Plain province, in Eocene- to Oligocene-aged (about 25 million years old) carbonate rocks that lie above the underlying Upper Floridan Aquifer. In total, 670 caves have been documented in Georgia (Georgia Speleological Survey, 2018). Twenty-six caves are more than 1 km in length, and four caves are more than 5 km long (Georgia Speleological Survey, 2018). The highest cave density occurs in the northwestern part of the state, with 247 and 186 caves known from Walker and Dade counties, respectively. No other county has more than 40 documented caves (Georgia Speleological Survey, 2018).

The first review of subterranean biodiversity in Georgia reported 130 species of invertebrates from 29 caves (Holsinger and Peck, 1971). Twenty-seven of those caves were in northwestern Georgia, and two caves were in the Gulf Coastal Plain. Franz et al. (1994) reviewed cave biodiversity in Florida, including records for a handful of sites in southwestern Georgia. A second major review of cave biodiversity in Georgia (Reeves et al., 2000) identified 173 invertebrate taxa from 47 caves. As more caves have been biologically investigated, the number of troglobionts (cave-obligate species) known from Georgia has increased from 24 to 27 (Holsinger and Peck, 1971) to 50 (Niemiller et al., 2019).

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Since the Reeves et al. (2000) review, numerous studies have added to our knowledge of subterranean biodiversity in Georgia. Biological surveys of Georgia caves have continued (Buhlmann et al., 2001; Reeves and McCreadie, 2001; Campbell et al., 2011, 2012; Jensen and Ozier, unpublished). Phylogeographic studies and taxonomic revisions have included taxa from Georgia caves (e.g., Niemiller et al., 2008, 2011; Shear, 2010; Ledford et al., 2011; Leray et al., 2019). Additional studies have reported behavioral information for species found in caves (Camp and Jensen, 2007; Disney and Campbell, 2011; Carver et al., 2016), and others have improved our understanding of the distribution of specific troglobionts in Georgia, such as the Southern Cavefish (*Typhlichthys subterraneus*; Niemiller et al., 2016) and the Dougherty Plain Cave Crayfish (*Cambarus cryptodytes*; Fenolio et al., 2017). This wealth of new information, as well as the results of our work in caves and wells in Georgia, encouraged us to review biodiversity of caves and other subterranean habitats across the state.

Methods

We conducted faunal bioinventories of caves and wells in nine counties of Georgia on more than 350 visits between 2000 and 2019. Many of these caves had never been bioinventoried. Bioinventories primarily consisted of visual encounter surveys for cave life in terrestrial, riparian, and aquatic habitats. Searched areas of caves included entrance areas starting at the drip line, accessible walls and ceilings, ledges, mud banks, rimstone pools, streams, and talus slopes. These surveys systematically traversed the cave, from the entrance to the farthest extent of the cave explorable by the research team. Search effort included examining and overturning rocks, detritus, organic debris, and other cover, as well as searching through stream cobble. At some sites we supplemented visual encounter surveys with baited traps and bulk samples of organic debris (including leaf litter, guano, and rodent nests) that were brought to the laboratory and placed on Berlese-Tullgren funnels to extract invertebrates.

We only field-identified common, more tractable invertebrate species. In all other cases, we collected invertebrate specimens and identified them in the laboratory using available taxonomic literature. We outsourced identification to experts for taxa with which we had insufficient taxonomic knowledge. For birds and mammals, we field-identified taxa by direct observation of individuals by sight or sound without capture or through taxonomically reliable indirect observations, such as visual identification of mammal scat or footprints left in mud. Where possible, we took voucher photographs of birds and mammals. For amphibians, fishes, and reptiles, we made a concerted effort to capture each observed individual to confirm its identification and obtain a voucher photograph with the specimen in hand. For some vertebrates, we collected tissue samples and voucher specimens. Depending on the extent of the cave system, surveys were done by two to five surveyors, with a search effort of two to 12 person-hours per cave visit.

We searched for additional records of Georgia subterranean fauna in the scientific literature, biodiversity databases, unpublished government reports, unpublished technical reports, unpublished specimen identification catalogs of taxonomists, and museum accession records. Scientific literature sources included peer-reviewed journals, books, proceedings, theses, and dissertations. We also reviewed caving organization newsletters. Biodiversity database sources we directly queried included the Georgia Department of Natural Resources biodiversity database and the Bat Population Data Project (<https://my.usgs.gov/bpd/>). We queried all records for Animalia from the Global Biodiversity Information Facility (GBIF, <https://gbif.org>), a data aggregator of specimen databases and museum collections (including VertNet, <http://www.vertnet.org>). Our GBIF search comprised 214,566 unique records from 272 datasets hosted in 20 countries of preserved animal specimens from a geographic polygon containing Georgia (<http://www.GBIF.org>, 2019). We parsed the downloaded data through iterative searches for all taxa having specimen collections from subterranean features (e.g., caves, mines, springs, and wells) (Supplementary Text S1), georeferenced each record to confirm its location within the state, and reviewed each record to confirm that it was found in a subterranean feature, as opposed to on the surface in the vicinity of a subterranean feature.

Cave data—including descriptions, locations, and maps—are maintained by the Georgia Speleological Survey (GSS; <http://gss.io.caves.org/>). For each cave we report the cave name and alphanumeric code ('cave number') in current use by GSS. Associating a record from the literature with a cave in the GSS database was generally straightforward, even in cases where a single cave has been referred to by more than one name in the past. In cases where we could not confidently identify the cave associated with an occurrence record, we included these data in the list of records (Supplementary Table S2) but excluded them from georeferencing. Due to the sensitivity of cave data, we refer to caves only by their cave number, cave name, and county. We recommend readers contact GSS or the corresponding author for information on particular cave systems. Locality and name data for springs in Georgia are in the public domain and maintained in a searchable database (USGS, 2019).

The annotated list includes the scientific name, authority, ecological classification, common name, and conservation status for each species. Taxonomic nomenclature primarily followed the Integrated Taxonomic Information System (<https://itis.gov/>), supplemented by taxon-specific sources such as the World Spider Catalog (<https://wsc.nmbe.ch/>),

Bellinger et al. (1996-2019), and Harvey (1990, 2013). Where available we included common names. Ecological classifications of subterranean organisms (cavernicoles) have been proposed by several authors (e.g., Barr, 1968; Sket, 2008; Culver and Pipan, 2009). Following Niemiller et al. (2016), we used terminology from Barr (1968) with clarification from Sket (2008) and Culver and Pipan (2009) to indicate species found in terrestrial (trogl-) versus aquatic (stygo-) habitats. Four primary ecological categories were used: troglobiont (TB) or stygobiont (SB) (synonyms: troglobite or stygobite, respectively), troglophile (TP) or stygophile (SP) (synonym: eutroglophile), troglaxene or stygoxene (TX or SX) (synonym: subtroglophile), and accidental (AC) (synonym: troglaxene, *sensu* Sket, 2008). We also used two secondary ecological categories: edaphic (ED) for soil-dwelling animals not typically considered cavernicoles, and symbiont (SY) for commensals and parasites. Troglobionts and stygobionts are obligate cavernicoles that typically exhibit morphological, physiological, and behavioral adaptations for living in subterranean habitats and that have few or no records from surface habitats. Troglophiles and stygophiles frequent subterranean habitats and can complete their life cycles within caves but also may occur in surface habitats. Troglaxenes and stygoxenes use subterranean habitats seasonally, or for only a portion of their life cycles, but also rely significantly on surface habitats. Accidentals are species found in caves only by accident, such as by falling into a pit or being washed into a cave during a flood. When available, we relied on ecological categories assigned to taxa by earlier authors (e.g., Holsinger and Peck, 1971; Reeves et al., 2000; Buhlmann, 2001; Niemiller et al., 2016). With many species, these categories have necessarily been subjectively inferred by previous authors due to lacking or nonexistent natural history data, which is especially true with invertebrates. We altered categories in cases where it was justified by new ecological or morphological data.

When available, the conservation status of each species, based on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (<http://www.iucnredlist.org/> [accessed January 12, 2019]) and NatureServe (<http://www.natureserve.org/> [accessed January 12, 2019]), is included to provide a better understanding of the distribution and biogeography of subterranean organisms in Georgia, and to aid in the future conservation and management of this unique fauna. The status of a species according to the U.S. list of threatened and endangered species under the Endangered Species Act is included (<http://www.fws.gov/endangered>), as well as if a species is included on the list of rare animals in Georgia (https://georgiabiodiversity.org/natels/element_lists.html). Seven IUCN (International Union for the Conservation of Nature, 2012) Red List categories are recognized on a continuum of increasing extinction risk: Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, and Extinct. Critically Endangered, Endangered, and Vulnerable are considered Threatened categories. NatureServe conservation status ranks are based on a one to five scale, from most to least at risk of extinction (Faber-Langendoen et al., 2012): 1 (Critically Imperiled), 2 (Imperiled), 3 (Vulnerable), 4 (Apparently Secure), and 5 (Secure). Two additional ranks associated with extinction exist: H (Possibly Extinct) and X (Presumed Extinct). Status ranks are assessed at three geographic scales: global (G1–5), national (N1–5), and state (S1–5). At the global scale, a Questionable rank qualifier (Q) can be used to denote uncertainty in the conservation status rank (e.g., G2Q). Taxa not ranked at the Global or State levels were noted as “GNR” or “SNR”, respectively. Ranks at the global and state scales are given in the text when available, and in Tables 1, 2, and S3.

Results

Our annotated list includes records from 142 georeferenced sites in Georgia (121 caves and 21 wells or springs) and several non-georeferenced sites, totaling 281 described species (228 invertebrates and 53 vertebrates). Of these, 51 are troglobionts. In addition to the many new records we report here, we also provide a summary of all confirmed records of subterranean faunal biodiversity in Georgia. Our summary includes the first review of vertebrates in caves in Georgia and new occurrence records for many invertebrate species. We also highlight potentially new, as yet undescribed species that have been reported in literature or that we collected. With these data, we discuss conservation issues related to cave biodiversity in Georgia. Note that, in this paper, we limit our discussion to fauna (i.e., Kingdom Animalia); data on cellular slime molds and fungi from Georgia caves are presented in Reeves et al. (2000).

The Annotated List summarizes Tables S2 and S3 and, for many species, adds additional commentary on ecology, distribution, and systematics. The source for each record reported in the Annotated List is indicated in Table S2. With a few exceptions, we omitted records not identified to the genus or species level from the annotated list, although those records are included in Table S2. In cases where two or more studies reported a particular genus from a cave, but not all studies identified those specimens to the species level, we only included the more specific record in the Annotated List. Not all records could be identified to species level. Those at coarser taxonomic resolution were due to lack of available taxonomic expertise, lack of specimens of required maturity or sex necessary for identification, or, in some cases, may represent undescribed species. Further commentary related to many of these taxa can be found in Holsinger and Peck (1971), Reeves et al. (2000), and Buhlmann (2001). New records reported in the literature for the first time are indicated with an asterisk.

Annotated List of Fauna from Caves and other Subterranean Habitats of Georgia

Phylum Annelida

Class Clitellata

Order Branchiobdellida

Family Branchiobdellidae

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62); Washington Co.: Tennile Caves (GWS20); Decatur Co.: Climax Cave (GDC36).

Comments: These were collected as ectoparasites on crayfish (Holt, 1973; Reeves and Reynolds, 1999).

Order Opisthopora

Family Lumbricidae

Genus *Aporrectodea*

Aporrectodea trapezoides (Dugés, 1828) (ED) Southern Worm

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Morrison Cave (GDD86); Walker Co.: Horseshoe Cave (GWK12).

Comments: This species has been reported from caves in Georgia, Illinois, Missouri, and North Carolina (Peck and Lewis, 1978; Reynolds, 1994; Reeves and Reynolds, 1999; Reeves et al., 2000).

Aporrectodea sp. (ED) An Earthworm

Localities: Walker Co.: Spooky Cave (GWK494).

Comments: This may be *A. trapezoides* or another species.

Genus *Bimastos*

Bimastos tumidus (Eisen, 1874) (ED) An Earthworm

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Comments: This species was collected on woody debris by Reeves and Reynolds (1999). It has also been reported from caves in Alabama, Tennessee, and Virginia (Peck, 1989; Reynolds, 1994).

Bimastos zeteki (Smith & Gittins, 1915) (ED) An Earthworm

Localities: Dade Co.: Cemetery Pit (GDD64).

Comments: This species was found in the soil at the bottom of the entrance pit at Cemetery Cave (Reeves and Reynolds, 1999).

Genus *Dendrobaena*

Dendrobaena octaedra (Savigny, 1826) (ED) Octagonal-tail Worm

Localities: Dade Co.: Cemetery Pit (GDD64).

Comments: This species has been reported from caves in Georgia and North Carolina (Reynolds, 1994; Reeves and Reynolds, 1999).

Genus *Dendrodrilus*

Dendrodrilus rubidus (Savigny, 1826) (TP) European Barkworm

Localities: Chattooga Co.: Parkers Cave (GKH119)*; Dade Co.: Boxcar Cave (GDD69)*, Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62); Decatur Co.: Climax Cave (GDC36); Gordon Co.: Rusty Cable Cave (GGO297)*; Grady Co.: Maloys Waterfall Cave (GGR27)*; Walker Co.: Goat Cave (GWK184), Horseshoe Cave (GWK12).

Comments: This species has also been reported from several caves in Georgia, Illinois, Missouri, North Carolina, Tennessee, and New Brunswick, Canada (McAlpine and Reynolds, 1977; Peck and Lewis, 1978; Reynolds, 1994; Reeves and Reynolds, 1999; Reeves et al., 2000).

Genus *Lumbricus*

Lumbricus rubellus Hoffmeister, 1843 (ED) Nightcrawler

Localities: Bartow Co.: Anthonys Cave (GBT175); Dade Co.: Howards Waterfall Cave (GDD34); Walker Co.: Horseshoe Cave (GWK12).

Comments: This species has been reported from caves in Georgia, Illinois, and North Carolina (Peck and Lewis, 1978; Reynolds, 1994; Reeves et al., 2000).

Genus *Octolasion*

Octolasion tyrtaeum (Savigny, 1826) (ED) Woodland White Worm

Localities: Dade Co.: Johnsons Crook Cave (GDD17).

Comments: This species has been reported from caves in Georgia, Illinois, North Carolina, and Tennessee (Holsinger and Peck, 1971; Peck and Lewis, 1978; Reynolds, 1994; Reeves, 2000; Lewis, 2005).

Family Megascolecidae

Genus *Amyntas*

Amyntas minimus (Horst, 1893) (ED) An Earthworm

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Comments: This species was collected in soil with woody debris below a drip pool (Reeves and Reynolds, 1999).

Family Sparganophilidae

Genus *Sparganophilus*

Sparganophilus tamesis Benham, 1892 (SX/AC) An Aquatic Worm

Localities: Dade Co.: Boxcar Cave (GDD69)*.

Comments: This species is common in mud sediments next to streams.

Order Tubificida

Family Naididae

Genus *Arcteonais*

Arcteonais lomondi Martin, 1907 (SP) An Aquatic Worm

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: This aquatic worm was collected from mammal feces in a drip pool (Reeves et al., 2000).

Phylum Arthropoda

Subphylum Chelicerata

Class Arachnida

Order Araneae

Family Agelenidae

Genus *Coras*

Coras cf. *juvenilis* (Keyserling, 1881) (TX?) A Funnel Weaver Spider

Localities: Walker Co.: Fricks Cave (GWK14).

Comments: Questionable identification; large southern range expansion if validated.

Coras sp. (TX?) A Funnel Weaver Spider

Localities: Dade Co.: Byers Cave (GDD66).

Family Araneidae

Genus *Araniella*

Araniella sp. (TX/AC) An Orbweaver Spider

Localities: Walker Co.: Harrisburg Cave (GWK85).

Genus *Tegenaria*

Tegenaria domestica (Clerck, 1757) (TP/TX) Barn Funnel Weaver

Localities: Walker Co.: Hickman Gulf Cave.

Genus *Wadotes*

Wadotes cf. *calcaratus* (Keyserling, 1887) (AC) A Hacklemesh Weaver Spider

Localities: Dade Co.: Johnsons Crook Cave (GDD17).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: Questionable identification; large southern range expansion if true.

Wadotes saturnus Bennett, 1987 (TX?) A Hacklemesh Weaver Spider

Localities: Dade Co.: Sittons Cave (GDD9)*.

Family Antrodiaetidae

Genus *Antrodiaetus*

Antrodiaetus unicolor (Hentz, 1842) (TP) Folding-Door Spider

Localities: Dade Co.: Howards Waterfall Cave (GDD34); Walker Co.: Fricks Cave (GWK14).

Family Clubionidae

Genus *Elaver*

Elaver excepta (L. Koch, 1866) (TP) Spiny Sac Spider

Localities: Chattooga Co.: Parkers Cave (GKH119)*; Dade Co.: Upper Valley Cave (GDD135).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Family Ctenidae

Genus Anahita

Anahita punctulata (Hentz, 1844) (AC) Southeastern Wandering Spider

Localities: Dade Co.: Hurricane Cave (GDD62)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Family Cybaeidae

Genus Calymmaria

Calymmaria persica (Hentz, 1847) (TP/TX) A Dwarf Sheet Spider

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Byers Cave (GDD66), Rusty's Cave (GDD70); Walker Co.: Bible Springs Cave (GWK74), Four Kings Cave (GWK77)*, Mountain Cove Farm Cave No. 1 (GWK73).

Calymmaria sp. (TP/TX) A Dwarf Sheet Spider

Localities: Dade Co.: Boxcar Cave (GDD69)*; Walker Co.: Bee Rock Cave (GWK123)*, Nash Waterfall Cave (GWK72).

Comments: This may be *C. persica* or another species.

Family Desidae

Genus Metaltella

Metaltella simoni (Keyserling, 1878) (AC) Hacklemesh Weaver

Localities: Grady Co.: Glory Hole Cave (GGR56)*.

Comments: This species is native to South America and introduced into the United States.

Family Hahniidae

Genus Cicurina

Cicurina arcuata Keyserling, 1887 (TP/AC) Curved Meshweaver

Localities: Floyd Co.: Cave Springs Cave (GFL18).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Cicurina pallida Keyserling, 1887 (TP/TX) Pallid Funnel-web Spider

Localities: Randolph Co.: Griers Cave (GRA40).

Comments: Questionable identification; large southern range expansion if true.

Cicurina sp. (TP/TX) A Meshweaver Spider

Localities: Dade Co.: Byers Cave (GDD66).

Family Halonoproctidae

Genus Cyclocosmia

Cyclocosmia truncata (Hentz, 1841) (ED) Ravine Trapdoor Spider

Localities: Walker Co.: Missing Evan Well Cave (GWK488)*.

Family Hypochilidae

Genus Hypochilus

Hypochilus thorelli Marx, 1888 (TX) Thorell's Lampshade-web Spider

Localities: Dade Co.: Boxcar Cave (GDD69), Byers Cave (GDD66), Sittons Cave (GDD9).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Comments: These spiders can be found near cave entrances where they build webs on rocky substrates. The species ranges from north-east Alabama to southeastern Kentucky (Hedin, 2001).

Family Leptonetidae

Genus Appaleptoneta

Appaleptoneta fiskei (Gertsch, 1974) (TB)

Localities: Walker Co.: Harrisburg Cave (GWK85), Pettijohns Cave (GWK29).

Comments: Endemic to Georgia and known only from these sites in Walker County (Ledford et al., 2011).

Genus Ozarkia

Ozarkia georgia (Gertsch, 1974) (TB)

Localities: Dade Co.: Byers Cave (GDD66), Kilpatrick Cave (GDD67), Rusty's Cave (GDD70).

Comments: Endemic to Georgia and known only from these sites in Dade County (Ledford et al., 2011).

Family Linyphiidae

Genus Anibontes

Anibontes sp. (TX/AC) A Sheetweb Spider

Localities: Chattooga Co.: Parkers Cave (GKH119)*.

Genus Anthrobia

Anthrobia sp. (TP/TX) A Sheetweb Spider

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Genus Bathyphantes

Bathyphantes pallidus (Banks, 1892) (TX) Pale Sheetweb Weaver

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus Centromerus

Centromerus denticulatus (Emerton, 1909) (TP) Toothy Spurred Sheetweaver

Localities: Walker Co.: Horseshoe Cave (GWK12).

Comments: This record from Holsinger and Peck (1971) is likely incorrect.

Centromerus latidens (Emerton, 1882) (TX) Elephant Spurred Sheetweaver

Localities: Bartow Co.: Davis Farm Cave (GBT222)*; Chattooga Co.: Parkers Cave (GKH119)*; Grady Co.: Maloys Waterfall Cave (GGR27)*; Polk Co.: White River Cave (GPO7)*; Walker Co.: Screech Owl Cave (GWK205)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus Mermessus

Mermessus maculatus (Banks, 1892) (TP) Spotted Harvester Money Spider

Localities: Bartow Co.: Busch Cave (GBT611), Davis Farm Cave (GBT222)*; Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27).

Genus Neriene

Neriene radiata (Walckenaer, 1841) (AC) Filmy Dome Spider

Localities: Gordon Co.: Jack Crider Cave (GGO298)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus Phanetta

Phanetta subterranea (Emerton, 1875) (TB) Subterranean Sheetweb Spider

Localities: Dade Co.: Byers Cave (GDD66), Caboose Cave (GDD475)*, Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Morrison Cave (GDD86), Sittons Cave (GDD9); Floyd Co.: Cave Springs Cave (GFL18); Walker Co.: Cave Spring Cave (GWK94), Fricks Cave (GWK14), Harrisburg Cave (GWK85), Mouldy Bat Pit (GWK257)*, Pigeon Cave (GWK57).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: Widespread and common in caves across the Appalachians and Interior Low Plateaus (Miller, 2005). This species is known from more counties than any other troglobiont in eastern North America (Christman and Culver, 2001).

Genus Porrhomma

Porrhomma cavernicola (Keyserling, 1886) (TB) Appalachian Cave Spider

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: Widespread in caves of the southern Appalachians, extending to Indiana and Illinois. It is more common in caves in West Virginia and Virginia, and only occasionally encountered in caves in Tennessee, Alabama, and Georgia (Miller, 2005).

Family Lycosidae

Genus Pirata

Pirata alachuus Gertsch & Wallace, 1935 (AC) A Pirate Wolf Spider

Localities: Dade Co.: Wild Bills Dakota Cave (GDD596)*.

***Pirata* sp. (AC) A Pirate Wolf Spider**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Genus *Piratula*

***Piratula insularis* Emerton, 1885 (AC) Lonely Wolf Spider**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27).

Family Mysmenidae

Genus *Maymena*

***Maymena ambita* (Barrows, 1940) (TP) Minute Cave Spider**

Localities: Walker Co.: Ellisons Cave (GWK51), Horseshoe Cave (GWK12).

Family Nesticidae

Genus *Eidmannella*

***Eidmannella pallida* (Emerton, 1875) (TP) Pallid Cobweb Spider**

Localities: Catoosa Co.: Crane Cave (GCZ80)*; Chattooga Co.: Subligna Cave (GKH145)*; Dade Co.: Howards Waterfall Cave (GDD34); Decatur Co.: Climax Cave (GDC36); Floyd Co.: Cave Springs Cave (GFL18); Grady Co.: Maloys Waterfall Cave (GGR27)*; Randolph Co.: Griens Cave (GRA40).

Comments: This troglomorphic species is widespread in North America, Central America, and the Caribbean (Gertsch, 1984).

Genus *Gaucelmus*

***Gaucelmus augustinus* Keyserling, 1884 (TP) A Cave Cobweb Spider**

Localities: Decatur Co.: Climax Cave (GDC36); Houston Co.: Limerock Cave; Washington Co.: Tennile Caves (GWS20).

Conservation status: IUCN: Not Evaluated; NatureServe: G3G4 (SNR in Georgia).

Comments: This species is a troglophile and is common in caves from Florida to Texas, through Central America to Panama, and parts of the Caribbean (Gertsch, 1984).

Genus *Nesticus*

***Nesticus georgia* Gertsch, 1984 (TB) Georgia Cave Spider**

Localities: Dade Co.: Case Cavern (GDD1), Sittons Cave (GDD9), unnamed cave near Trenton.

Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).

Comments: This eyeless spider is endemic to Georgia and is a member of the southern Appalachian radiation of *Nesticus* that includes numerous troglomorphic species (Gertsch, 1984; Hedin, 1997). Some information regarding feeding and reproduction has been reported (Reeves, 1999; Carver et al., 2016).

***Nesticus* sp. (TB/TP) A Cave Cobweb Spider**

Localities: Dade Co.: Rusty's Cave (GDD70)*; Walker Co.: Anderson Spring Cave (GWK46), Fingerhole Cave (GWK259)*, Matthews Sink (GWK133)*, Mouldy Bat Pit (GWK257)*, Pigeon Cave (GWK57), Bee Rock Cave (GWK123)*, Lula Falls Cave (GWK617)*.

Comments: These records represent at least two undescribed species. Records from Pigeon Mountain (Anderson Spring Cave, Matthews Sink and Pigeon Cave) are an undescribed eyeless species. Additional records from Pigeon Mountain (Fingerhole Cave and Mouldy Bat Pit) may also correspond to this species. The specimens from Lookout Mountain (Lula Falls Cave) have eyes and likely represent a second undescribed species. The affinity of the Rusty's Cave record is unclear.

Family Pholcidae

Genus *Pholcus*

***Pholcus dade* Huber, 2011 (TP) A Cellar Spider**

Localities: Dade Co.: Byers Cave (GDD66), Sittons Cave (GDD9); Walker Co.: Fricks Cave (GWK14), Spooky Cave (GWK494).

Comments: Huber (2011) notes the Byers Cave specimen is tentatively assigned to this species.

***Pholcus lanieri* Huber, 2011 (TP) Lanier's Cellar Spider**

Localities: Dade Co.: Hurricane Cave (GDD62).

Comments: Known only from Hurricane Cave, the type locality (Huber, 2011).

***Pholcus* sp. (TP/TX) A Cellar Spider**

Localities: Bartow Co.: Ladds Lime Cave (GBT384-GBT389); Catoosa Co.: Chapmans Cave (GCZ25)*; Dade Co.: Little Nicka Cave (GDD121)*, SSS Cave (GDD229)*; Floyd Co.: Cave Springs Cave (GFL18); Walker Co.: Zahnd Cave (GWK641)*.

Comments: Huber (2011) describes several new *Pholcus* species from Georgia.

Family Salticidae

Genus *Maevia*

***Maevia inclemens* (Walckenaer, 1837) (AC) Dimorphic Jumper**

Localities: Walker Co.: Hickman Gulf Cave.

Family Tetragnathidae

Genus *Meta*

***Meta ovalis* (Gertsch, 1933) (TP) Cave Orbweaver**

Localities: Dade Co.: Byers Cave (GDD66), Caboose Cave (GDD475)*, Goat Cave (GWK184), Howards Waterfall Cave (GDD34), Morrison Cave (GDD86), Sittons Cave (GDD9); Walker Co.: Fingerhole Cave (GWK259)*, Four Kings Cave (GWK77)*, Fricks Cave (GWK14), Harrisburg Cave (GWK85), Mountain Cove Farm Cave No. 1 (GWK73), Nash Waterfall Cave (GWK72), Pigeon Cave (GWK57), Rocky Cave (GWK496)*, Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is widely distributed and found in many caves in the central and eastern United States.

Family Theridiidae

Genus *Achaeearanea*

***Achaeearanea* sp. (?) A Cobweb Spider**

Localities: Dade Co.: Byers Cave (GDD66).

Genus *Cryptachaea*

***Cryptachaea porteri* (Banks, 1896) (TX) A Cobweb Spider**

Localities: Dade Co.: Hooker Cave (GDD90)*; Walker Co.: Fricks Cave (GWK14).

Genus *Parasteatoda*

***Parasteatoda tepidariorum* (Koch, 1841) (TP) Common House Spider**

Localities: Bartow Co.: Ladds Lime Cave (GBT384-GBT389); Catoosa Co.: Chapmans Cave (GCZ25)*; Dade Co.: Sittons Cave (GDD9); Gordon Co.: Roberts Cave (GGO147); Polk Co.: White River Cave (GPO7); Walker Co.: Bible Springs Cave (GWK74).

***Parasteatoda* sp. (TP/TX) A Tangle Web Spider**

Localities: Bartow Co.: Anthonys Cave (GBT175), Davis Farm Cave (GBT222)*; Walker Co.: Lofton Cave (GWK281)*.

Comments: This may be *P. tepidariorum* or another species.

Family Theridiosomatidae

Genus *Theridiosoma*

***Theridiosoma gemmosum* (Koch, 1877) (TX) Common Eastern Ray Spider**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Family Zoropsidae

Genus *Liocranoides*

***Liocranoides gertschi* Platnick, 1999 (TP) Gertsch's Two-clawed Cave Spider**

Localities: Dade Co.: Byers Cave (GDD66), Hurricane Cave (GDD62), Sittons Cave (GDD9); Walker Co.: Horseshoe Cave (GWK12).

Comments: The range of *L. gertschi* extends to northern Alabama (Platnick, 1999). Yancey et al. (2018) described egg sacs for *Liocranoides* from Tennessee.

***Liocranoides unicolor* Keyserling, 1881 (TB) A Two-clawed Cave Spider**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Byers Cave (GDD66), Morrison Cave (GDD86); Walker Co.: Bible Springs Cave (GWK74), Hickman Gulf Cave, Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: Platnick (1999) indicated that *L. unicolor* ranges no further south than central Tennessee; these records may correspond to *L. gertschi* or an undescribed species.

***Liocranoides* sp. (TB/TP) A Two-clawed Cave Spider**

Localities: Bartow Co.: Davis Farm Cave (GBT222)*; Chattooga Co.: Parkers Cave (GKH119)*; Dade Co.: Case Cavern (GDD1)*, Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34)*, Kirchmeyer Cave (GDD196)*, Rusty's Cave (GDD70)*, SSS Cave (GDD229)*; Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51)*, Fricks Cave (GWK14)*, Lofton Cave (GWK281)*, Pettijohns Cave (GWK29), Smartt Farm Cave (GWK124)*.

Comments: These records may be *L. gertschi* or an undescribed species.

Order Opiliones**Family Phalangodidae****Genus *Bishopella******Bishopella laciniosa* (Crosby and Bishop, 1924) (TP) Bishop's Harvestman**

Localities: Bartow Co.: Busch Cave (GBT611); Catoosa Co.: Crane Cave (GCZ80)*; Chattooga Co.: Blowing Springs Cave (GKH54), Parkers Cave (GKH119)*, Scoggins II Cave (GKH405)*, Subligina Cave (GKH145)*; Dade Co.: Byers Cave (GDD66), Caboose Cave (GDD475)*, Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62), Kirchmeyer Cave (GDD196)*, Limestone Caverns (GDD140)*, Lower Valley Cave (GDD136)*, Rusty's Cave (GDD70)*, Sittons Cave (GDD9); Floyd Co.: Cave Springs Cave (GFL18); Gordon Co.: Plainville Cave (GGO83)*; Polk Co.: White River Cave (GPO7); Walker Co.: Anderson Spring Cave (GWK46), Bee Rock Cave (GWK123)*, Bible Springs Cave (GWK74), Ellisons Cave (GWK51)*, Fricks Cave (GWK14)*, Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), LittleJohn Cave (GWK280)*, Pettijohns Cave (GWK29), Smartt Farm Cave (GWK124)*.

Comments: This species is known from surface and cave habitats across the southern Appalachians (Hedin and Thomas, 2010).

***Bishopella* sp. (TP/TX)**

Localities: Bartow Co.: Anthonys Cave (GBT175); Dade Co.: Case Cavern (GDD1), Sittons Cave (GDD9); Walker Co.: Ellisons Cave (GWK51), Nash Waterfall Cave (GWK72), Pigeon Cave (GWK57).

Comments: These records may be *B. laciniosa* or an undescribed species.

Genus *Crosbyella****Crosbyella spinturnix* (Crosby and Bishop, 1924) (TP) A Harvestman**

Localities: Decatur Co.: Climax Cave (GDC36); Gordon Co.: Rusty Cable Cave (GGO297)*; Grady Co.: Glory Hole Cave (GGR56)*, Maloys Waterfall Cave (GGR27).

Comments: This troglophile has been reported from caves in Alabama, Arkansas, Florida, and Georgia (Crosby and Bishop, 1924; Goodnight and Goodnight, 1942; Peck, 1970; Holsinger and Peck, 1971; Peck, 1989; Graening et al., 2011).

Family Sabaconidae**Genus *Sabacon******Sabacon* sp. (TP/TX) A Harvestman**

Localities: Walker Co.: Goat Cave (GWK184).

Comments: This record may represent an undescribed species or one of two described species: *S. cavicolens* or *S. jonesi*. *Sabacon cavicolens* primarily occurs in rocky and forested cool surface habitat across the central and northeastern USA and in southeastern Canada (Koponen, 1995; Shear, 1975), but has also been reported from caves across its distribution, with confirmed records from Ontario, Canada (Peck, 1988), Arkansas (Shear, 1975; Peck and Peck, 1982), and Ten-

nessee (Niemiller et al., unpublished data). *Sabacon jonesi* is known only from one cave in Madison County, Alabama (Goodnight and Goodnight, 1942). If our record from Goat Cave represents either of the previously described species, then it will represent a range extension and new state record.

Family Sclerosomatidae**Genus *Leiobunum******Leiobunum* sp. (TX) A Harvestman**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: Several species of *Leiobunum* are known to use subterranean features to seek shelter. They often aggregate in large clusters of individuals (>100), either as overwintering populations, or presumably to seek daytime shelter during hot dry summer weather (e.g., Holmberg et al., 1984). Aggregations of *Leiobunum* are typically only found in shallow karst features or in the transition or entrance zones of caves. This clustering behavior has yet to be reported from a Georgia cave. Reeves et al. (2000) reported a single immature specimen collected from Anthonys Cave in May 1999, but did not note whether an aggregation of individuals was observed.

Order Pseudoscorpiones**Family Chernetidae****Genus *Hesperocheles******Hesperocheles mirabilis* (Banks, 1895) (TB) Southeastern Cave Pseudoscorpion**

Localities: Catoosa Co.: Chickamauga Cave (GCZ106)*, Crane Cave (GCZ80); Chattooga Co.: Parker Cave (GKH119), Scoggins II Cave (GKH405)*; Dade Co.: Howards Waterfall Cave (GDD34), Johnsons Crook Cave No. 2 (GDD19), Kirchmeyer Cave (GDD196)*, Morrison Cave (GDD86), Morrison Spring Cave (GDD110), SSS Cave (GDD229)*; Murray Co.: Major Pullims Cave (GMA3)*; Walker Co.: Battlefield Cave Spring (GWK203), Fricks Cave (GWK14), Hickman Gulf Cave (GWK204), Mountain Cove Farm Cave No. 1 (GWK73), Pigeon Cave (GWK57)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is distributed widely in northern Georgia caves. It is typically associated with bat guano, active rodent nests, and scat. Holsinger and Peck's (1971) record from Johnsons Crook Cave (GDD17) was in error and repeated by Reeves et al. (2000); this record was based on specimen WM1347.01 in W.B. Muchmore's collection, with original collection label "Johnson Crook Cave #2, 4.5 mi NE Rising Fawn" (Muchmore, unpublished data). A bioinventory of Johnsons Crook Cave (GDD17) on 25 June 2016 did not recover this species or find its typical habitat. The record from Battlefield Cave Spring (GWK203) was previously reported as "Cave Spring" and "Cave Spring Cave" (Holsinger and Peck, 1971; Reeves et al., 2000). Holsinger and Peck's (1971) records for *Pseudozoaona* sp. are here relegated to this species; *Chelifer mirabilis* Banks, 1895 was transferred by Hoff (1946) to *Pseudozoaona* and then by Muchmore (1974) to *Hesperocheles*. Records in W.B. Muchmore's catalog (unpublished data) identified as "*Hesperocheles* sp." are here placed in *H. mirabilis* on the basis of ongoing work with this genus (Stephen, unpublished data). The last known collection in Georgia was in 2015 (this study); previously, the last published record from the state was collected in 1998 (Muchmore, unpublished data; Reeves et al., 2000).

Family Chthoniidae**Genus *Aphrastochthonius******Aphrastochthonius* sp. (?) A Pseudoscorpion**

Localities: Dade Co.: Byers Cave (GDD66), Longs Rock Wall Cave (GDD101)*.

Comments: These records appear to represent undescribed species (Stephen, unpublished data). No described species of this genus are known to occur in Georgia.

Genus *Apochthonius****Apochthonius minor* Muchmore, 1976 (TX?) A Pseudoscorpion**

Localities: Chattooga Co.: Parker Cave (GKH119); Dade Co.: Morrison Cave (GDD86).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SNR in Georgia).

Comments: This species is only definitively known from organic debris in entrance zones of one cave and one karst feature in Georgia. A se-

ries of females and nymphs (catalog number WM8548.01) that W.B. Muchmore (unpublished data) tentatively identified as "*Apochthonius minor*?" was reported by Lewis (2005) as *A. minor* from a cave in Van Buren County, Tennessee; this record may be *A. minor* or a species not yet described. All confirmed occurrences of this species are from the type series in Parker Cave and Morrison Cave that were collected in summer 1967 (Muchmore, 1976, unpublished data).

***Apochthonius* sp. (TX?) A Pseudoscorpion**

Localities: Chattooga Co.: Parker Cave (GKH119).

Comments: From the same 1967 collections in the entrance of Parker Cave that recovered types for *A. minor*, Muchmore (1976, unpublished data) also identified two larger adult specimens to the genus *Apochthonius* (catalog numbers WM1270.01 and WM1275.01). These may represent undescribed species.

Genus *Chthonius*

***Chthonius* sp. (?) A Pseudoscorpion**

Localities: Walker Co.: Horseshoe Cave (GWK12); Dade Co.: Howards Waterfall Cave (GDD34).

Comments: Of this globally distributed, diverse genus (264 species in Harvey (2013)), in eastern North America four species are known, of which two are native: *C. paludis* and *C. virginicus*. These records were reported by Reeves et al. (2000) from collections made in 1998, and are the only published occurrences of *Chthonius* in Georgia. They also appear to represent the first observations of this genus from a North American cave (Harvey, 2013; GBIF.org, 2019; Muchmore, unpublished data). Reeves et al. (2000) reported the records as *C. paludis* from Horseshoe Cave and *C. virginicus* from Howards Waterfall Cave. Both were identified by W.B. Muchmore, but in his catalog (unpublished data) he gave only tentative specific identifications. The Horseshoe Cave "*C. paludis*?" identification was based on a single female (catalog number WM8265.01) that Muchmore noted to be abnormally slender for this species. The "*C. virginicus*?" identification from Howards Waterfall Cave was based on a single nymph (catalog number WM8267.01). If these tentative identifications are correct, then each would represent large range extensions, new records of both species in Georgia, and new records of both species from caves.

Genus *Kleptochthonius*

***Kleptochthonius magnus* Muchmore, 1966 (TB) A Cave Pseudoscorpion**

Localities: Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SNR in Georgia).

Comments: This species is known from four caves located in southeastern Tennessee, northeastern Alabama, and northwestern Georgia. The type locality is in Tennessee. It is a small, pale species, with two pairs of eyes. The last known collection in Georgia was in 1967 (Holsinger and Peck, 1971; Muchmore, unpublished data).

***Kleptochthonius* sp. (?) A Pseudoscorpion**

Localities: Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73)*; Walker Co.: Rumble Rock Canyon Cave (GWK627)*.

Comments: Subterranean species of *Kleptochthonius* tend to have geographically constrained distributions, sometimes restricted to a single cave. Each of these records may represent an undescribed species.

Genus *Mundochthonius*

***Mundochthonius* sp. (?) A Pseudoscorpion**

Localities: Chattooga Co.: Parker Cave (GKH119)*.

Comments: In North America, there are nine *Mundochthonius* species, of which three occur in caves (Harvey, 1990, 2013). This is the first record of *Mundochthonius* in Georgia. Our sampling efforts across northwestern and southwestern Georgia in caves and on the surface (sampling leaf litter, deadwood, and under live tree bark) did not recover *Mundochthonius* (Stephen, unpublished data). In June 1967, along with *Hesperochernes* pseudoscorpions and *Miktoniscus* isopods, several specimens of *Mundochthonius* were collected from a Berlese extraction of debris near the entrance of Parker Cave. These were identified by W.B. Muchmore (catalog number WM2367.01, unpublished data). These specimens may represent range extensions of surface species or undescribed subterranean diversity.

Family Neobisiidae

Genus *Lissocreagris*

***Lissocreagris subatlantica* (Chamberlin, 1962) (TX) A Pseudoscorpion**

Localities: Chattooga Co.: Parker Cave (GKH119).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G4 (SNR in Georgia).

Comments: This species is known from five collection events, of which four are from within caves or in the entrance area of a cave. In Georgia it was collected from organic debris in the entrance of Parker Cave (Muchmore, 1969). It is a small, pale species, with two pairs of reduced eyes (Chamberlin, 1962). The last known collection in Georgia was in 1967 (Muchmore 1969, unpublished data).

***Lissocreagris* sp. (TB/TP) A Pseudoscorpion**

Localities: Walker Co.: Pettijohns Cave (GWK29)*.

Comments: This appears to represent an undescribed species. It was collected by S. Peck and A. Fiske in a pitfall trap active 10-21 June 1967, identified by W.B. Muchmore (unpublished data) as "*Lissocreagris* n. sp.", and listed as *Microcreagris* sp. by Holsinger and Peck (1971). In his catalog, Muchmore (unpublished data) originally identified the genus to *Microcreagris* and later changed this to *Lissocreagris* after this genus was erected by Čurčić (see comments for *Microcreagris*). In his catalog, Muchmore briefly notes that the single adult female (catalog number WM1311.01) was small and eyeless.

Genus *Microcreagris*

***Microcreagris* (sensu lato) sp. (TP/TX) A Pseudoscorpion**

Localities: Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73)*.

Comments: Čurčić (1981, 1984, 1989) and Muchmore and Cokendolpher (1995) transferred all but one species of subterranean North American *Microcreagris* into several genera erected by Čurčić. Holsinger and Peck (1971) listed two records of unidentified *Microcreagris*, from Pettijohns Cave (GWK29) and Johnsons Crook Cave (GDD17), commenting "A single female of this undetermined species was collected". Their pseudoscorpion identifications were done by W.B. Muchmore; in his catalog (unpublished data), he identified a single female "*Lissocreagris* n. sp." collected from Pettijohns Cave in 1967 by S. Peck and A. Fiske (see comments for *Lissocreagris*). There is no mention in Muchmore's catalog of *Microcreagris* (or the replacement genera erected by Čurčić, 1989) from Johnson Crook Cave. The new record from Mountain Cove Farm Cave No. 1 consisted of an isolated pedipalp (catalog number WM2990.02) collected from the stomach contents of a *Eurycea lucifuga* found in the dark zone of the cave. Muchmore tentatively identified it to *Microcreagris*.

***Microcreagris* (sensu lato) sp. A Pseudoscorpion**

Localities: Dade Co.: Hooker Cave (GDD90)*.

Genus *Minicreagris*

***Minicreagris pumila* (Muchmore, 1969) (TX) A Pseudoscorpion**

Localities: Chattooga Co.: Parker Cave (GKH119).

Comments: This species is known from the entrance zone of one cave and one surface locality in Alabama, and from organic debris in the entrance zone of Parker Cave (Muchmore, 1969). It was incorrectly listed as "*Lissocreagris pumila*" by Peck (1989). The species is small and pale, and has one pair of reduced eyes (Muchmore, 1969). The last known collection in Georgia was in 1967 (Holsinger and Peck, 1971; Muchmore, unpublished data). In transferring *Microcreagris pumila* into *Minicreagris*, Čurčić (1989) misquoted Muchmore (1969) by listing an epigeal Tennessee locality: the species is only known from Alabama and Georgia (Muchmore, 1969, unpublished data).

Genus *Novobisium*

***Novobisium carolinense* (Banks, 1895) (AC) A Pseudoscorpion**

Localities: Dade Co.: Johnson Crook Cave (GDD17)*.

Comments: This record represents a range extension and the first report of this species from a cave. The species is widely distributed in the southeastern USA, where it is typically found in leaf litter. The only Georgia records were collected from the bottom of the pit entrance of Johnson Crook Cave in 2016 (this study). A trap set in the sink outside of Johnson Crook Cave in 1967 also collected an unidentified species of *Novobisium* (Muchmore, unpublished data).

Order Ixodida

Family Argasidae

Genus *Ornithodoros*

***Ornithodoros kelleyi* (Cooley and Kohls, 1941) (SY) A Bat Tick**

Localities: Decatur Co.: Climax Cave (GDC36).

Comments: This bat tick was collected in guano piles by Reeves et al. (2000). The likely host was *Myotis austroriparius*.

Family Ixodidae

Genus *Dermacentor*

***Dermacentor variabilis* (Say, 1821) (SY) American Dog Tick**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Comments: This tick is a common ectoparasite of mammals.

Genus *Ixodes*

***Ixodes cookei* Packard 1869 (SY) American Castor Bean Tick**

Localities: Walker Co.: Rocky Cave (GWK496).

Comments: This tick is a common ectoparasite of birds and mammals, including humans.

Order Mesostigmata

Family Laelapidae

Genus *Laelaspis*

***Laelaspis* sp. (TX/AC) A Mite**

Localities: Dade Co.: Case Cavern (GDD1); Walker Co.: Pettijohns Cave (GWK29).

Family Macrochelidae

Genus *Macrocheles*

***Macrocheles* sp. (TX/AC) A Mite**

Localities: Walker Co.: Fricks Cave (GWK14).

Comments: This mite was common on *Myotis grisescens* guano at Fricks Cave (Reeves et al., 2000).

Family Veigaiidae

Genus *Veigaia*

***Veigaia* sp. (TX/AC) A Mite**

Localities: Walker Co.: Nash Waterfall Pit (GWK360).

Comments: Reeves et al. (2000) collected a single specimen in 1995.

Order Sarcoptiformes

Family Acaridae

Genus *Troglocoptes*

***Troglocoptes* sp. (TX/AC) A Mite**

Localities: Walker Co.: Fricks Cave (GWK14).

Comments: Reeves et al. (2000) reported this potentially undescribed mite from *Myotis grisescens* guano.

Order Trombidiformes

Family Rhagidiidae

Genus *Rhagidia*

***Rhagidia* sp. (TB?/TP) A Mite**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Dade Co.: Byers Cave (GDD66), Morrison Cave (GDD86); Walker Co.: Bible Springs Cave (GWK74), Pettijohns Cave (GWK29).

Comments: These records were reported by Holsinger and Peck (1971).

Family Trombiculidae

Genus *Euschoengastia*

***Euschoengastia pipistrelli* Brennan, 1947 (SY) A Chigger**

Localities: Dade Co.: Howards Waterfall Cave (GDD34); Walker Co.: Fricks Cave (GWK14).

Comments: This species is an ectoparasite of *Perimyotis subflavus*.

Genus *Leptotrombidium*

***Leptotrombidium myotis* (Ewing, 1829) (SY) A Chigger**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: This species is an ectoparasite and was reported feeding on *Perimyotis subflavus* by Reeves et al. (2000).

Subphylum Crustacea

Class Branchiopoda

Order Diplostraca

Family Daphniidae

Genus *Daphnia*

***Daphnia* sp. (TX/AC) A Common Water Flea**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: Reeves et al. (2000) collected a single specimen from a drip pool.

Class Malacostraca

Superorder Peracarida

Order Amphipoda

Family Crangonyctidae

Genus *Crangonyx*

***Crangonyx antennatus* Cope and Packard, 1881 (SB) Appalachian Valley Cave Amphipod**

Localities: Catoosa Co.: Crane Cave (GCZ80)*; Chattooga Co.: Chelsea Gulf Cave (GKH54); Dade Co.: Byers Cave (GDD66), Cemetery Pit (GDD64), Chambliss Cave (GDD321), Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17)*, Rusty's Cave (GDD70), Sittons Cave (GDD9), SSS Cave (GDD229)*, Upper Valley Cave (GDD135); Floyd Co.: Cave Springs Cave (GFL18); Walker Co.: Anderson Spring Cave (GWK46), Fricks Cave (GWK14), Gila Monster Cave (GWK379)*, Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73), Pettijohns Cave (GWK29), Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This is a widespread stygobiotic species whose range extends through the Valley and Ridge from southwestern Virginia into northeastern Alabama. It is common in cave streams and pools (Zhang and Holsinger, 2003).

***Crangonyx consimilis* Zhang and Holsinger, 2003 (SX) An Amphipod**

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Comments: This record likely is a misidentification, as this species is not otherwise recorded east of the Cumberland Plateau (Zhang and Holsinger, 2003).

Genus *Stygobromus*

***Stygobromus ackerlyi* Holsinger, 1978 (SB) Ackerly's Cave Amphipod**

Localities: Bartow Co.: Chert Chasm (GBT340); Floyd Co.: Cave Springs Cave (GFL18); Polk Co.: White River Cave (GPO7). Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).

Comments: This stygobite is endemic to Georgia and known only from these sites in the Coosa River drainage.

***Stygobromus dicksoni* Holsinger, 1978 (SB) A Cave Amphipod**

Localities: Chattooga Co.: Chelsea Gulf Cave (GKH54); Dade Co.: Byers Cave (GDD66), Cemetery Pit (GDD64), Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17)*, Rusty's Cave (GDD70); Walker Co.: Pettijohns Cave (GWK29).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: The range of this stygobite extends into adjacent north-eastern Alabama and southern Tennessee (Holsinger, 1978).

***Stygobromus doughertyensis*, Cannizzaro and Sawicki, 2019 (SB) Dougherty Plain Cave Amphipod**

Localities: Dougherty County.: Radium Springs (GDG39).

Comments: This species is also known from Jackson Co., Florida.

***Stygobromus grandis* Holsinger, 1978 (SB) Parkers Cave Amphipod**

Localities: Chattooga Co.: Parkers Cave (GKH119).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SU in Georgia).

Comments: This stygobite is endemic to Georgia and known only from Parkers Cave (Holsinger, 1978).

***Stygobromus minutus* Holsinger, 1978 (SB) Pettijohns Cave Amphipod**

Localities: Walker Co.: Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G3 (SU in Georgia).

Comments: This stygobite is endemic to Georgia and known only from these sites on Pigeon Mountain (Holsinger, 1978).

Stygobromus sp. (SB) A Cave Amphipod

Localities: Dade Co.: Boxcar Cave (GDD69), Caboose Cave (GDD475).
Comments: Reeves et al. (2000) suggest these records represent an undescribed species.

Order Isopoda

Family Armadillidae

Genus Armadillidium

Armadillidium vulgare (Latreille, 1804) (TX) Common Pill-bug

Localities: Walker Co.: Horseshoe Cave (GWK12).
Comments: This common surface species was introduced from Europe and is now widespread in North America.

Family Asellidae

Genus Caecidotea

Caecidotea cyrtorhynchus (Fleming and Steeves, 1972) (SB) A Cave Isopod

Localities: Walker Co.: Anderson Spring Cave (GWK46), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29).
Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SU in Georgia).
Comments: This stygobite is endemic to Georgia and known only from sites on Pigeon Mountain. The type locality is Pettijohns Cave.

Caecidotea hobbsi (Maloney, 1939) (SB) Hobbs Cave Isopod

Localities: DeKalb Co.: Spring on Walter Chandler Estate at Emory University.
Conservation status: IUCN: Not Evaluated; NatureServe: G2G3 (SNR in Georgia).
Comments: This stygobite is only reported from one site in Georgia. It is more commonly known from Florida (Steeves, 1964). This record may be in error, and likely represents *C. putea* instead (J. Lewis, pers. comm).

Caecidotea nickajackensis Packard, 1881 (SB) Nickajack Cave Isopod

Localities: Dade Co.: Johnsons Crook Cave (GDD17)*.
Conservation status: IUCN: Not Evaluated; NatureServe: GH (SNR in Georgia).
Comments: This species was presumed extinct after the flooding of Nickajack Cave in Marion County, Tennessee in the 1960s (Lewis, 2009) but was rediscovered in two caves near the junction of Tennessee, Alabama, and Georgia (Coleman and Zigler, 2015). This is the first record of the species in Georgia.

Caecidotea putea Lewis, 2009 (SB) Econfina Springs Cave Isopod

Localities: Cobb Co.: road cut spring, Kennesaw; Thomas Co.: Wells at Experimental Station, Metcalf.
Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).
Comments: This stygobite is known from only three widely-dispersed sites, including one in Washington County, Florida (Lewis, 2009).

Caecidotea richardsonae Hay, 1901 (SB) Tennessee Valley Cave Isopod

Localities: Bartow Co.: seep 1 mi NE of Adairsville; Chattooga Co.: Blowing Springs Cave (GKH54), Chelsea Gulf Cave (GKH54); Dade Co.: Byers Cave (GDD66), Cemetery Pit (GDD64)*, Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17), Lower Valley Cave (GDD136)*, Rusty's Cave (GDD70), Sittons Cave (GDD9)*, SSS Cave (GDD229)*; Floyd Co.: Cave Springs Cave (GFL18); Walker Co.: Blowing Springs Cave No. 1 (GWK41), Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).
Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).
Comments: Widespread species whose range extends through the Valley and Ridge from southwest Virginia to northeast Alabama (Lewis, 2009). Common in cave streams and pools.

Caecidotea sp. (SB) A Cave Isopod

Localities: Catoota Co.: Chapmans Cave (GCZ25)*; Dade Co.: Longs Rock Wall Cave (GDD101)*; Mitchell Co.: USGS Well 11J012; Walker Co.: Elisons Cave (GWK51).
Comments: The record from a well in Mitchell County was a female in the *hobbsi* species group (Fenolio et al. 2017).

Genus Lirceus

Lirceus sp. (SP/SX) An Isopod

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Howards Waterfall Cave (GDD34)*; Walker Co.: Nash Waterfall Cave (GWK72).
Comments: These records are eyed, pigmented specimens. They are a species from the *L. hargeri* group that also occurs in Tennessee and Virginia (J. Lewis, pers. comm.).

Family Cylisticidae

Genus Cylisticus

Cylisticus convexus (De Geer, 1778) (TX) Curly Woodlouse

Localities: Bartow Co.: Anthonys Cave (GBT175); Dade Co.: Howards Waterfall Cave (GDD34), Morrison Cave (GDD86); Floyd Co.: Cave Springs Cave (GFL18); Walker Co.: Bible Springs Cave (GWK74), Cave Spring Cave, Horseshoe Cave (GWK12).
Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).
Comments: This species is common and known from caves ranging from Indiana to Virginia and Texas (Schultz, 1970).

Family Ligiidae

Genus Ligidium

Ligidium elrodii (Packard, 1873) (TX) A Woodlouse

Localities: Dade Co.: Limestone Caverns (GDD140)*; Walker Co.: Elisons Cave (GWK51), Pigeon Cave (GWK57); Chattooga Co.: Chelsea Gulf Cave (GKH54).
Conservation status: IUCN: Not Evaluated; NatureServe: G4G5 (SNR in Georgia).
Comments: This species is widespread in eastern North America. A subspecies (*Ligidium elrodii chattoogaensis*) was described from Chelsea Gulf Cave by Schultz (1970).

Family Trichoniscidae

Genus Amerigoniscus

Amerigoniscus curvatus Vandel, 1978 (TB) A Terrestrial Cave Isopod

Localities: Walker Co.: Horseshoe Cave (GWK12).
Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SU in Georgia).
Comments: This troglobite is endemic to Georgia and known only from this site.

Amerigoniscus georgiensis Vandel, 1978 (TB) Georgia Cave Isopod

Localities: Walker Co.: Pettijohns Cave (GWK29).
Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SU in Georgia).
Comments: This troglobite is endemic to Georgia and known only from this site.

Amerigoniscus proximus Vandel, 1978 (TB) A Terrestrial Cave Isopod

Localities: Chattooga Co.: Chelsea Gulf Cave (GKH54); Dade Co.: Byers Cave (GDD66).
Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).
Comments: This troglobite is endemic to Georgia and known only from these sites.

Amerigoniscus sp. (TB) A Terrestrial Cave Isopod

Localities: Dade Co.: Case Cavern (GDD1), Johnsons Crook Cave (GDD17)*, Sittons Cave (GDD9). Walker Co.: Bible Springs Cave (GWK74), Mountain Cove Farm Cave No. 1 (GWK73).
Comments: These records may represent one of the described *Amerigoniscus* from Georgia or an undescribed species.

Genus *Miktoniscus****Miktoniscus* sp. (TB/TP) A Terrestrial Isopod**

Localities: Bartow Co.: Anthonys Cave (GBT175); Chattooga Co.: Blowing Springs Cave (GKH54), Parkers Cave (GKH119); Dade Co.: Howards Waterfall Cave (GDD34), Sittons Cave (GDD9); Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27)*; Randolph Co.: Griers Cave (GRA40); Walker Co.: Horseshoe Cave (GWK12), Pigeon Cave (GWK57), Spooky Cave (GWK494).

Comments: Several of these records are from Reeves et al. (2000), who considered them to be troglobites and possibly an undescribed species.

Superorder Eucarida**Order Decapoda****Family Cambaridae****Genus *Cambarus******Cambarus bartonii* (Fabricius, 1798) (SP) Appalachian Brook Crayfish**

Localities: Dade Co.: Hurricane Cave (GDD62)*, Twin Snakes Cave (GDD140).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is common in caves in the Appalachian Valley and Ridge (Fong et al., 2012).

***Cambarus cryptodytes* Hobbs, 1941 (SB) Dougherty Plain Cave Crayfish**

Localities: Baker Co.: Double Springs, USGS Well 10H009, USGS Well 12K014; Calhoun Co.: Chickasawhatchee Swamp WMA Well #18, Chickasawhatchee Swamp WMA Well #6, Chickasawhatchee Swamp WMA Well #7; Calhoun Co.: USGS Well 10K005; Decatur Co.: Climax Cave (GDC36), USGS Well 09F520; Dougherty Co.: Albany Field Well #8, Chameleon Springs, Radium Springs (GDG39), USGS Well 13L012; Early Co.: USGS Well 08K001; Miller Co.: USGS Well 08G001; Mitchell Co.: USGS Well 10G313; Seminole Co.: USGS Well 06F001.

Conservation status: IUCN: Least Concern; NatureServe: G2G3 (S2 in Georgia); listed as Threatened and considered a Species of Greatest Conservation Need in Georgia.

Comments: Fenolio et al. (2017) reported nine new records from wells in eight counties in southwestern Georgia. This stygobite also occurs into adjacent northwestern Florida (Hobbs et al., 1977; Franz et al., 1994; Fenolio et al., 2017).

***Cambarus latimanus* (Le Conte, 1856) (TP/TX) Variable Crayfish**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Byers Cave (GDD66), Hurricane Cave (GDD62); Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This is a widely distributed species that is occasionally reported from caves.

***Cambarus striatus* Hay, 1902 (SP) Ambiguous Crayfish**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Walker Co.: Bible Springs Cave (GWK74), Horseshoe Cave (GWK12).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This is a widely distributed species that is occasionally reported from caves.

***Cambarus tenebrosus* Hay, 1902 (SP) Cavespring Crayfish**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62).

Conservation status: IUCN: Least Concern; NatureServe: G5 (SNR in Georgia).

Comments: Reeves et al. (2000) reported this stygophile from these two Georgia caves. This species is common in caves in the Interior Low Plateau and occurs in the extreme northwestern part of the state (Niemiller et al., 2013).

***Cambarus* sp. (SP) A Crayfish**

Localities: Dade Co.: Longs Rock Wall Cave (GDD101)*, Sittons Cave (GDD9); Walker Co.: Anderson Spring Cave (GWK46)*, Ellisons Cave (GWK51), Fricks Cave (GWK14)*, Pigeon Cave (GWK57)*, Roger Branch Cave (GWK204)*.

Comments: The records likely represent one or more of the species listed above.

Class Maxillopoda**Order Cyclopoida****Family Cyclopidae****Genus *Acanthocyclops******Acanthocyclops robustus* (Sars, 1863) (SP) A Copepod**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: This species is common in surface waters but has been collected from caves in Georgia, Indiana, Illinois, Kentucky, and Tennessee (Lewis and Reid, 2007).

***Acanthocyclops vernalis* (Fischer, 1853) (SP) A Copepod**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Comments: This species is also known from cave and surface sites in Indiana, Illinois, Kentucky, and Tennessee (Lewis and Reid, 2007).

Genus *Eucyclops****Eucyclops conrowae* Reid, 1992 (SX) A Copepod**

Localities: Washington Co.: Tennile Caves (GWS20).

Comments: This species is common in surface habitats (Lewis and Reid, 2007).

***Eucyclops elegans* (Herrick, 1884) (SX) A Copepod**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: This primarily surface species has been collected in caves in Georgia, Indiana, Kentucky, and Tennessee (Lewis and Reid, 2007).

Genus *Macrocylops****Macrocylops albidus* (Jurine, 1820) (SP) A Copepod**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Comments: This species is also known from caves in Illinois, Indiana, Kentucky, and Tennessee (Lewis and Reid, 2007).

Genus *Megacyclops****Megacyclops donaldsoni* (Chappuis, 1929) (SB) Donaldson's Cave Copepod**

Localities: Dade Co.: Cemetery Pit (GDD64).

Conservation status: IUCN: Not Evaluated; NatureServe: G3G4 (SNR in Georgia).

Comments: This species was first described from Donaldson Cave in Lawrence Co., Indiana, but has been collected from caves in Kentucky and Tennessee and is considered a strict troglolobiont (Lewis and Reid, 2007).

Order Harpacticoida**Family Canthocamptidae****Genus *Attheyella******Attheyella illinoisensis* (Forbes, 1882) (SX/AC) A Copepod**

Localities: Walker Co.: Goat Cave (GWK184); Washington Co.: Tennile Caves (GWS20).

Comments: This species is also known from caves in Indiana (Lewis and Reid, 2007).

***Attheyella nordenskioldi* (Lilljeborg, 1902) (AC) A Copepod**

Localities: Dade Co.: Howards Waterfall Cave (GDD34); Walker Co.: Horseshoe Cave (GWK12).

Comments: This species is also known from springs and caves in Illinois and Indiana (Lewis and Reid, 2007).

***Attheyella pilosa* Chappuis, 1929 (SX) A Copepod**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54)

Comments: This species is also known from springs and caves in Indiana and Kentucky (Lewis and Reid, 2007).

Genus *Elaphoidella****Elaphoidella bidens* (Schmeil, 1894) (AC) A Copepod**

Localities: Washington Co.: Tennile Caves (GWS20).

Class Ostracoda**Order Podocopida****Family Candonidae****Genus *Pseudocandona******Pseudocandona* sp. (SY) An Ostracod**

Localities: Dade Co.: Rusty's Cave (GDD70).

Comments: Reeves et al. (2000) collected two specimens in the cave stream at Rusty's Cave.

Family Cyprididae

Genus Potamocypris

Potamocypris sp. (SY) An Ostracod

Localities: Walker Co.: Horseshoe Cave (GWK12).

Comments: This record was reported as *Potamocypris* cf. *fulva* by Reeves et al. (2000).

Family Entocytheridae

Genus Uncinocythere

Uncinocythere warreni Hobbs and Walton, 1968 (SB/SY) A Cave Ostracod

Localities: Decatur Co.: Climax Cave (GDC36).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SU in Georgia).

Comments: This species is endemic to Georgia and known only from Climax Cave where it is a commensal on *Cambarus cryptodytes* (Hobbs and Walton, 1968; Hart and Hart, 1974).

Subphylum Hexapoda

Order Collembola

Family Arrhopalitidae

Genus Arrhopalites

Arrhopalites pygmaeus (Wankel, 1860) (TP) A Springtail

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Comments: This widely distributed springtail is known from caves in several states in the eastern United States (Bellinger et al. 1996-2019; Christiansen, 1960, 1966; Christiansen and Bellinger, 1981; Peck, 1995; Lewis, 2005).

Arrhopalites sp. (TP) A Springtail

Localities: Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Comments: This may be *A. pygmaeus* or another species.

Family Entomobryidae

Genus Lepidocyrtus

Lepidocyrtus sp. (TP) A Slender Springtail

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Comments: Reeves et al. (2000) reported this springtail from a drip pool. The status of *Lepidocyrtus* is uncertain and this report may in the future be attributed to a species of *Lepidosira* (Bellinger et al. 1996-2019).

Genus Pseudosinella

Pseudosinella christianseni Salmon, 1964 (TB) Christiansen's Cave Springtail

Localities: Dade Co.: Case Cavern (GDD1), Cemetery Pit (GDD64), Chambliss Cave (GDD321), Ha-Ha Cave (GDD256), Howards Waterfall Cave (GDD34), Sittons Cave (GDD9), Upper Valley Cave (GDD135); Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Fricks Cave (GWK14), Goat Cave (GWK184), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This troglobite is eyeless and white without any trace of pigment (Christiansen and Bellinger, 1998). Its range extends across middle Tennessee to Kentucky and into northeastern Alabama and northwestern Georgia.

Pseudosinella georgia Christiansen and Bellinger, 1998 (TP)

Georgia Cave Springtail

Localities: Walker Co.: Ellisons Cave (GWK51), Fricks Cave (GWK14), Nash Waterfall Cave (GWK72), Pigeon Cave (GWK57).

Comments: This species is endemic to Georgia and known from only four sites (all caves or pits) but has eyes and scattered pigment across head and body (Christiansen and Bellinger, 1998), so it has been considered a troglophile and not a troglobite.

Pseudosinella hirsuta (Delamare Deboutteville, 1949) (TB)

Hirsute Cave Springtail

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Chattooga Co.: Blowing Springs Cave (GKH54), Chelsea Gulf Cave (GKH54);

Dade Co.: Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Morrison Cave (GDD86), Running Water Cave (GDD120), Rusty's Cave (GDD70), Sittons Cave (GDD9); Polk Co.: Deatons Cave (GPO5); Walker Co.: Bible Springs Cave (GWK74), Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74), Pettijohns Cave (GWK29).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This troglobite is usually white and lacks eyes, although some variation is known (Christiansen and Bellinger, 1998). It is widespread in caves across Kentucky, Tennessee, Alabama, and into northwestern Georgia (Christman and Culver, 2001).

Pseudosinella pecki Christiansen and Bellinger, 1980 (TB) Peck's Cave Springtail

Localities: Decatur Co.: Climax Cave (GDC36); Randolph Co.: Griens Cave (GRA40).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G3 (SNR in Georgia).

Comments: This troglobite is eyeless and lacks any trace of pigment. The type locality is in Jackson County, Florida, but it is known from a handful of other caves in Georgia, Alabama, and Tennessee (Christiansen and Bellinger, 1998).

Pseudosinella spinosa (Delamare Deboutteville, 1949) (TB) Spiny Cave Springtail

Localities: Dade Co.: Chapman Cave.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This troglobite is the largest Nearctic *Pseudosinella*. It lacks eyes and pigment (Christiansen and Bellinger, 1998). It is known from just one cave in Georgia but ranges across middle Tennessee and northeastern Alabama.

Pseudosinella sp. (TB) A Cave Springtail

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Byers Cave (GDD66).

Comments: These record are likely one of the species listed above. The Blowing Springs Cave record was from GBIF (2019).

Family Isotomidae

Genus Folsomia

Folsomia candida Willem, 1902 (TP) White Springtail

Localities: Walker Co.: Pettijohns Cave (GWK29).

Comments: This springtail is a widely distributed troglophile.

Family Neelidae

Genus Neelus

Neelus murinus Folsom, 1896 (TP) A Springtail

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Comments: Reeves et al. (2000) collected this springtail from organic debris. It is also known from northwestern Europe (Bellinger et al., 1996-2019).

Family Pogonoceridae

Genus Pogonognathellus

Pogonognathellus bidentatus Folsom, 1913 (TP) Two-toothed Springtail

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Byers Cave (GDD66), Case Cavern (GDD1), Morrison Cave (GDD86); Walker Co.: Bible Springs Cave (GWK74), Ellisons Cave (GWK51), Nash Waterfall Cave (GWK72), Pigeon Cave (GWK57).

Comments: This trogliphilic springtail is common in caves in the eastern United States (Christiansen, 1964).

Pogonognathellus dubius Christiansen, 1964 (TP) A Springtail

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11).

Comments: The taxonomic status of this species is unclear (Felderhoff et al., 2010), but this springtail has been reported from several caves across North America (Christiansen, 1964).

***Pogonognathellus flavescens* Tullberg, 1871 (TP) A Springtail**

Localities: Dade Co.: Johnsons Crook Cave (GDD17); Walker Co.: Cave Springs Cave, Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5? (SNR in Georgia).

Comments: The taxonomic status of this species is unclear (Felderhoff et al., 2010). It is another widely distributed springtail commonly encountered in caves in North America (Christiansen, 1964).

Family Tullbergiidae**Genus *Tullbergia******Tullbergia iowensis* (Mills, 1932) (TP) A Springtail**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Comments: Reeves et al. (2000) collected this springtail from organic debris.

Order Diplura**Family Campodeidae****Genus *Litocampa******Litocampa cookei* (Packard, 1871) (TB) Cooke's Cave Dipluran**

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Family Campodeidae

Localities: Bartow Co.: Chert Chasm (GBT340)*; Chattooga Co.: Blowing Springs Cave (GKH54), Subligna Cave (GKH145)*; Dade Co.: Bible Springs Cave (GWK74), Byers Cave (GDD66), Howards Waterfall Cave (GDD34)*, Johnsons Crook Cave No. 2 (GDD17), Limestone Caverns (GDD140)*, Longs Rock Wall Cave (GDD101)*, Morrison Cave (GDD86), Mountain Cove Farm Cave No. 1 (GWK73); Floyd Co.: Airport Cave (GFL189)*; Walker Co.: Anderson Spring Cave (GWK46)*, Cave Springs Cave, Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Fricks Cave (GWK14), Goat Cave (GWK184)*, Lofton Cave (GWK281)*, Pettijohns Cave (GWK29)*, Pigeon Cave (GWK57)*, Spooky Cave (GWK494).

Comments: Campodeid diplurans are common in Georgia caves but poorly known. These records likely represent multiple undescribed species. Many records are likely in the genus *Litocampa*.

Family Japygidae

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Comments: This is a poorly-known group with occasional records from caves in the eastern United States.

Class Insecta**Order Coleoptera****Family Cantharidae****Genus *Cantharis******Cantharis* sp. (TX) A Soldier Beetle**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Quarry Cave; Gordon Co.: Rusty Cable Cave (GGO297)*; Walker Co.: Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Mt. Cove Farm Cave (GWK73), Pettijohns Cave (GWK29).

Family Carabidae**Genus *Anillinus******Anillinus* sp. (TB?/ED) A Cave Ground Beetle**

Localities: Dade Co.: Hurricane Cave (GDD62), Morrison Cave (GDD86).

Comments: These small, eyeless carabid beetles occur in deep forest leaf litter and in soil. However, troglobites have been reported from several caves in the eastern United States (Sokolov et al., 2004).

Genus *Atranus****Atranus pubescens* (Dejean, 1828) (TP) A Ground Beetle**

Localities: Dade Co.: Upper Valley Cave (GDD135); Decatur Co.: Climax Cave (GDC36); Walker Co.: Bible Springs Cave (GWK74).

Genus *Bembidion****Bembidion lacunarium* (Zimmermann, 1869) (TP) A Ground Beetle**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Upper Valley Cave (GDD135).

Genus *Elaphropus****Elaphropus ferrugineus* (Dejean, 1831) (TP) A Ground Beetle**

Localities: Decatur Co.: Climax Cave (GDC36).

***Elaphropus* sp. (TX/AC) A Ground Beetle**

Localities: Grady Co.: Glory Hole Cave (GGR56)*.

Genus *Harpalus****Harpalus pensylvanicus* (De Geer, 1774) (AC) Pennsylvania Diving Ground Beetle**

Localities: Bartow Co.: Busch Cave (GBT611).

***Harpalus* sp. (TX/AC) A Ground Beetle**

Localities: Dade Co.: Morrison Cave (GDD86); Walker Co.: Bible Springs Cave (GWK74).

Genus *Platynus****Platynus parmarginatus* Hamilton, 1893 (AC) A Ground Beetle**

Localities: Walker Co.: Spooky Cave (GWK494).

Genus *Pseudanophthalmus****Pseudanophthalmus digitus* Valentine, 1932 (TB) A Cave Beetle**

Localities: Dade Co.: Byers Cave (GDD66), Cemetery Pit (GDD64), Johnsons Crook Cave (GDD17).

Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).

Comments: This troglobite is also known from Hamilton Co., Tennessee and is a member of the *hirsutus* species group (Barr, 1981, 2004).

***Pseudanophthalmus fastigatus* Barr, 1981 (TB) Tapered Cave Beetle**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (S1? in Georgia).

Comments: This species is only known from the type locality east of Lookout Mountain. It is a member of the *engelhardti* species group (Barr, 1981, 2004).

***Pseudanophthalmus fulleri* Valentine, 1932 (TB) Fuller's Cave Beetle**

Localities: Dade Co.: Boxcar Cave (GDD69)*, Byers Cave (GDD66), Caboose Cave (GDD475)*, Cemetery Pit (GDD64), Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17), Lower Valley Cave (GDD136)*, Morrison Cave (GDD86), Sittons Cave (GDD9), SSS Cave (GDD229)*, Upper Valley Cave (GDD135).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G3 (SNR in Georgia).

Comments: This species is a member of the *engelhardti* species group (Barr, 1981, 2004).

***Pseudanophthalmus georgiae* Barr, 1981 (TB) Georgian Cave Beetle**

Localities: Chattooga Co.: Chelsea Gulf Cave (GKH54); Walker Co.: Ellisons Cave (GWK51), Mountain Cove Farm Cave No. 1 (GWK73), Pettijohns Cave (GWK29).

Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (S1? in Georgia).

Comments: This troglobite is a Georgia endemic and a member of the *alabamae* species group (Barr, 1981, 2004).

***Pseudanophthalmus* sp. (TB)**

Localities: Chattooga Co.: Parkers Cave (GKH119)*; Walker Co.: Four Kings Cave (GWK77)*.

Comments: The Parkers Cave record was reported as *P. fulleri*, but as all other records for this species are west of Lookout Mountain, this record likely represents *P. georgiae* or *P. fastigatus* instead. The Four Kings Cave record likely represents *P. georgiae*.

Genus *Pterostichus****Pterostichus relictus* (Newman, 1838) (TX) A Ground Beetle**

Localities: Dade Co.: Upper Valley Cave (GDD135).

Genus *Rhadine*

***Rhadine caudata* LeConte, 1863 (TP) A Ground Beetle**

Localities: Dade Co.: Longs Rock Wall Cave (GDD101)*, Rusty's Cave (GDD70)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G3 (SNR in Georgia).

***Rhadine larvalis* LeConte, 1846 (TP) A Ground Beetle**

Localities: Dade Co.: Byers Cave (GDD66).

Genus *Sphaeroderus*

***Sphaeroderus stenostomus* (Weber, 1801) (TX) A Ground Beetle**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus *Tachys*

***Tachys* sp. (TX) A Ground Beetle**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27).

Family Histeridae

Genus *Margarinotus*

***Margarinotus egregius* (Casey, 1916) (AC) A Clown Beetle**

Localities: Walker Co.: Spooky Cave (GWK494).

Family Leiodidae

Genus *Catops*

***Catops graciosus* (Blanchard, 1915) (TP/TX) Round Fungus Beetle**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Johnsons Crook Cave (GDD17), Morrison Cave (GDD86), Johnsons Crook Cave No. 2 (GDD19); Walker Co.: Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Nemadus*

***Nemadus hornii* Hatch, 1933 (TP/TX) A Carrion Beetle**

Localities: Dade Co.: Johnsons Crook Cave (GDD17), Johnsons Crook Cave No. 2 (GDD19); Decatur Co.: Climax Cave (GDC36); Walker Co.: Rocky Cave (GWK496).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SNR in Georgia).

***Nemadus* sp. (TP/TX) A Carrion Beetle**

Localities: Dade Co.: Morrison Cave (GDD86); Walker Co.: Cave Springs Cave, Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Prionochaeta*

***Prionochaeta opaca* (Say, 1825) (TP/TX) A Carrion Beetle**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Walker Co.: Bible Springs Cave (GWK74), Cave Springs Cave, Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Genus *Ptomaphagus*

***Ptomaphagus cavernicola* Schwarz, 1898 (TP) A Fungus Beetle**

Localities: Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Comments: This species has well-developed eyes and functional flight wings. It ranges from Mexico to Texas, the Ozarks, and the southeastern United States. It has been collected in forests and caves in southwestern Georgia (Peck, 1973, 1982).

***Ptomaphagus fiskei* Peck, 1973 (TB) A Cave Fungus Beetle**

Localities: Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Kinda Pretty Cave (GWK258)*, Missing Evan Well Cave (GWK488)*, Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Spooky Too Cave (GWK496).

Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).

Comments: This troglobite is endemic to Georgia. It has greatly reduced eyes and lacks flight wings. It is the only troglobitic *Ptomaphagus*

known from east of Lookout Mountain in Georgia and is limited to caves along Lookout Mountain and Pigeon Mountain in Walker County (Peck, 1973; Leray et al., 2019).

***Ptomaphagus whiteselli* Barr, 1963 (TB) A Cave Fungus Beetle**

Localities: Dade Co.: Byers Cave (GDD66), Case Cavern (GDD1), Cemetery Pit (GDD64), Hurricane Cave (GDD62), Limestone Caverns (GDD140), Morrison Cave (GDD86), Rusty's Cave (GDD70), Sittons Cave (GDD9).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G3 (SNR in Georgia).

Comments: This species has greatly reduced eyes and lacks flight wings. It is limited to caves in Lookout Valley in Dade County and adjacent DeKalb Co., Alabama (Peck, 1973; Leray et al., 2019).

***Ptomaphagus* sp. (TB) A Cave Fungus Beetle**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19), Morrison Cave (GDD86); Walker Co.: Smartt Farm Cave (GWK124)*.

Comments: The records from Dade Co. are likely *P. whiteselli*; the record from Walker Co. is likely *P. fiskei*.

Genus *Sciodrepoides*

***Sciodrepoides terminans* (LeConte, 1850) (TX/AC) A Fungus Beetle**

Localities: Walker Co.: Cave Springs Cave.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Family Staphylinidae

Genus *Atheta*

***Atheta annexa* Casey, 1910 (TP) A Rove Beetle**

Localities: Bartow Co.: Yarbrough Cave (GBT30); Dade Co.: Morrison Cave (GDD86); Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27); Walker Co.: Chickamagua Cave Spring Cave, Horseshoe Cave (GWK12), Mountain Cove Cave (GDD64).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

***Atheta klagesi* Bernhauer, 1909 (TP) A Rove Beetle**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34).

***Atheta lucifuga* Klimaszewski and Peck, 1986 (TP) Light Shunning Rove Beetle**

Localities: Walker Co.: Mountain Cove Cave (GDD64).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

***Atheta trogliphila* Klimaszewski and Peck, 1986 (TP) A Rove Beetle**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34); Walker Co.: Mountain Cove Cave (GDD64).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

***Atheta* sp. (TP) A Rove Beetle**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54), Parkers Cave (GKH119); Dade Co.: Byers Cave (GDD66), Johnsons Crook Cave (GDD17), Morrison Cave (GDD86); Walker Co.: Bible Springs Cave (GWK74), Cave Springs Cave, Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73), Pettijohns Cave (GWK29).

Genus *Batriasymmodes*

***Batriasymmodes spelaeus* (Park, 1951) (TB) A Cave Ant-loving Beetle**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54), Chelsea Gulf Cave (GKH54); Dade Co.: Kirchmeyer Cave (GDD196)*; Walker Co.: Mountain Cove Farm Cave No. 2 (GWK74).

Conservation status: IUCN: Not Evaluated; NatureServe: G3G4 (SNR in Georgia).

Comments: This species is also known from caves in northeastern Alabama and central and eastern Tennessee. Although eyed, it was considered a troglobiont by Park (1960) and others, but a troglophile by Holsinger and Peck (1971).

Batriasymmodes sp. (TB/TP) An Ant-loving Beetle

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Genus *Batrisodes*

***Batrisodes lineaticollis* (Aubé, 1833) (TP) An Ant-loving Beetle**

Localities: Decatur Co.: Climax Cave (GDC36).

Comments: This species is widely distributed in eastern North America.

***Batrisodes* sp. (TP/TX) An Ant-loving Beetle**

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*, Limestone Caverns (GDD140)*; Walker Co.: Pigeon Cave (GWK57).

Genus *Creophilus*

***Creophilus maxillosus* (Linnaeus, 1758) (TP) Hairy Rove Beetle**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus *Geodromicus*

***Geodromicus brunneus* (Say, 1823) (TX/AC) A Rove Beetle**

Localities: Walker Co.: Bible Springs Cave (GWK74), Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Lesteva*

***Lesteva pallipes* LeConte, 1863 (TP) A Rove Beetle**

Localities: Bartow Co.: Chert Chasm (GBT340); Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Hurricane Cave (GDD62) | Walker Co.: Bible Springs Cave (GWK74), Mountain Cove Farm Cave No. 1 (GWK73), Rocky Cave (GWK496).

***Lesteva* sp. (TX) A Rove Beetle**

Localities: Dade Co.: Byers Cave (GDD66).

Genus *Oxypoda*

***Oxypoda* sp. (TX/AC) A Rove Beetle**

Localities: Bartow Co.: Yarbrough Cave (GBT30); Dade Co.: Byers Cave (GDD66).

Genus *Philonthus*

***Philonthus cyanipennis* (Fabricius, 1792) (AC) A Rove Beetle**

Localities: Walker Co.: Pettijohns Cave (GWK29).

***Philonthus* sp. (AC) A Rove Beetle**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27); Walker Co.: Bible Springs Cave (GWK74).

Genus *Quedius*

***Quedius erythrogaster* Mannerheim, 1852 (TP) A Rove Beetle**

Localities: Dade Co.: Morrison Cave (GDD86); Walker Co.: Harrisburg Cave (GWK85), Hickman Gulf Cave, Pettijohns Cave (GWK29).

***Quedius fulgidus* (Fabricius, 1793) (TP) A Rove Beetle**

Localities: Polk Co.: White River Cave (GPO7).

***Quedius* sp. (TP) A Rove Beetle**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Genus *Sepedophilus*

***Sepedophilus littoreus* (Linnaeus, 1758) (TP) A Rove Beetle**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Genus *Speleochus*

***Speleochus* sp. (TB) A Cave Rove Beetle**

Localities: Dade Co.: Limestone Caverns (GDD140)*; Walker Co.: Pigeon Cave (GWK57).

Genus *Subterrochus*

***Subterrochus* sp. (TB) A Cave Rove Beetle**

Localities: Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Tachinus*

***Tachinus fimbriatus* Gravenhorst, 1802 (TX/AC) A Rove Beetle**

Localities: Walker Co.: Pettijohns Cave (GWK29).

Genus *Xenota*

***Xenota* sp. (TP/TX) A Rove Beetle**

Localities: Dade Co.: Deans Pit (GDD273), Johnsons Crook Cave (GDD17); Walker Co.: Horseshoe Cave (GWK12), Pettijohns Cave (GWK29).

Family Trogidae

Genus *Trox*

***Trox aequalis* Say, 1832 (TX) A Hide Beetle**

Localities: Walker Co.: Fricks Cave (GWK14).

Order Diptera

Family Calliphoridae

Genus *Calliphora*

***Calliphora vicina* Robineau-Desvoidy, 1830 (TX) Blue Blow Fly**

Localities: Dade Co.: Deans Pit (GDD273), Howards Waterfall Cave (GDD34); Walker Co.: Horseshoe Cave (GWK12).

***Calliphora vomitoria* (Linnaeus, 1758) (TX) Blue Bottle Fly**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34); Walker Co.: Harrisburg Cave (GWK85).

Genus *Lucilia*

***Lucilia* sp. (TX/AC) A Blow Fly**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Family Cecidomyiidae

Genus *Bremia*

***Bremia* sp. (TX/AC) A Gall Midge**

Localities: Dade Co.: Sittons Cave (GDD9).

Family Chironomidae

Genus *Chironomus*

***Chironomus decorus* Johannsen, 1905 (AC) A Non-biting Midge**

Localities: Washington Co.: Tennile Caves (GWS20).

Genus *Procladius*

***Procladius bellus* (Loew, 1866) (TX) A Midge**

Localities: Bartow Co.: Busch Cave (GBT611).

Genus *Tanytarsus*

***Tanytarsus* sp. (TX) A Non-biting Midge**

Localities: Bartow Co.: Busch Cave (GBT611).

Comments: This record was identified as *Tanytarsus* nr. *recurvatus* by Reeves et al. (2000).

Family Culicidae

Genus *Anopheles*

***Anopheles punctipennis* (Say, 1823) (TX) Spot-winged Malaria Mosquito**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62); Walker Co.: Fricks Cave (GWK14), Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Genus *Culex*

***Culex territans* Walker, 1856 (TX) Northern Frog-biting Mosquito**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

***Culex* sp. (TX) A Mosquito**

Localities: Dade Co.: SSS Cave (GDD229)*.

Family Dolichopodidae

Genus *Lianculus*

***Lianculus genualis* Loew, 1861 (TX) A Long-legged Fly**

Localities: Bartow Co.: Yarbrough Cave (GBT30).

Genus *Neurigonella*

***Neurigonella sombrea* (Harmston and Knowlton, 1945) (TX/AC) A Long-legged Fly**

Localities: Dade Co.: Upper Valley Cave (GDD135).

Family Drosophilidae

Genus *Drosophila*

***Drosophila* sp. (TX/AC) A Fruit Fly**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Family Heleomyzidae

Genus *Amoebaleria*

***Amoebaleria defessa* (Osten-Sacken, 1877) (TX) A Sun Fly**

Localities: Bartow Co.: Busch Cave (GBT611), Kingston Saltpeter Cave (GBT11); Catoosa Co.: Crane Cave (GCZ80)*; Chattooga Co.: Parkers Cave (GKH119)*, Scoggins II Cave (GKH405)*; Dade Co.: Byers Cave (GDD66), Caboose Cave (GDD475)*, Cemetery Pit (GDD64), Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62), Johnsons Crook Cave (GDD17)*, Kirchmeyer Cave (GDD196)*, Limestone Caverns (GDD140)*, Longs Rock Wall Cave (GDD101)*, Lower Valley Cave (GDD136)*, Morrison Cave (GDD86), Running Water Cave (GDD120), Rusty's Cave (GDD70), Sittons Cave (GDD9), SSS Cave (GDD229)*, Upper Valley Cave (GDD135), Wild Bills Dakota Cave (GDD596)*; Floyd Co.: Airport Cave (GFL189)*, Cave Springs Cave (GFL18)*; Polk Co.: White River Cave (GPO7)*; Walker Co.: Anderson Spring Cave (GWK46), Bee Rock Cave (GWK123)*, Ellisons Cave (GWK51), Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), LittleJohn Cave (GWK280)*, Mountain Cove Farm Cave No. 1 (GWK73), Pettijohns Cave (GWK29), Screech Owl Cave (GWK205)*, Smartt Farm Cave (GWK124)*.

Comments: This sunfly is common in caves of the eastern United States (e.g., Peck, 1995; Reeves et al., 2000; Lewis, 2005).

Genus *Heleomyza*

***Heleomyza brachypterna* (Loew, 1873) (TX) A Sun Fly**

Localities: Walker Co.: Harrisburg Cave (GWK85), Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Oecothea*

***Oecothea specus* (Aldrich, 1897) (TX) A Sun Fly**

Localities: Bartow Co.: Busch Cave (GBT611), Kingston Saltpeter Cave (GBT11); Catoosa Co.: Chapmans Cave (GCZ25)*; Chattooga Co.: Parkers Cave (GKH119)*, Scoggins II Cave (GKH405)*; Dade Co.: Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34)*, Johnsons Crook Cave (GDD17), Limestone Caverns (GDD140)*, Longs Rock Wall Cave (GDD101)*, Sittons Cave (GDD9), SSS Cave (GDD229)*, Wild Bills Dakota Cave (GDD596)*; Gordon Co.: Jack Crider Cave (GGO298)*; Polk Co.: White River Cave (GPO7); Walker Co.: Bible Springs Cave (GWK74), Cave Springs Cave, Horseshoe Cave (GWK12), LittleJohn Cave (GWK280)*, Lofton Cave (GWK281)*, Mountain Cove Farm Cave No. 1 (GWK73)*, Mountain Cove Farm Cave No. 2 (GWK74), Smartt Farm Cave (GWK124)*.

Comments: Like *Amoebaleria defessa*, this species is also common in caves of the eastern United States (e.g., Peck, 1995; Reeves et al., 2000; Lewis, 2005).

Family Muscidae

Genus *Chaetogenia*

***Chaetogenia* sp. (TX/AC) A House Fly**

Localities: Bartow Co.: Yarbrough Cave (GBT30).

Genus *Muscina*

***Muscina prolapsa* (Harris, 1780) (TX) A House Fly**

Localities: Dade Co.: Sittons Cave (GDD9); Walker Co.: Horseshoe Cave (GWK12).

Family Mycetophilidae

Genus *Leia*

***Leia* sp. (TP/TX) A Fungus Gnat**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34).

Genus *Rymosa*

***Rymosa* sp. (TP/TX) A Fungus Gnat**

Localities: Dade Co.: Sittons Cave (GDD9).

Family Phoridae

Genus *Megaselia*

***Megaselia breviterga* (Lundback, 1921) (TX) A Scuttle Fly**

Localities: Dade Co.: Byers Cave (GDD66), Deans Pit (GDD273), Howards Waterfall Cave (GDD34), Rock Shelter Pit (GDD209); Walker Co.:

Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Missing Evan Well Cave (GWK488)*, Pettijohns Cave (GWK29).

Comments: This species was collected in large numbers at baited traps near cave entrances in northwestern Georgia (Campbell et al., 2011; Disney and Campbell, 2011). Disney and Campbell (2011) indicate *M. spelunciphila* is a synonym for *M. breviterga*.

***Megaselia cavernicola* (Brues, 1906) (TP) Cave Scuttle Fly**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Johnsons Crook Cave No. 2 (GDD19); Gordon Co.: Rusty Cable Cave (GGO297)*; Walker Co.: Anderson Spring Cave (GWK46), Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Pettijohns Cave (GWK29).

Comments: This species was collected in large numbers at baited traps in caves in northwestern Georgia (Campbell et al., 2011; Disney and Campbell, 2011). When comparing *M. breviterga*, *M. cavernicola*, and *M. taylori*, Disney and Campbell (2011) noted that *M. cavernicola* was more common further from cave entrances than the other two species.

***Megaselia taylori* Disney, 2010 (TX) A Scuttle Fly**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34); Walker Co.: Harrisburg Cave (GWK85), Pettijohns Cave (GWK29).

Comments: This species was collected in large numbers at baited traps near cave entrances in northwestern Georgia (Campbell et al., 2011; Disney and Campbell, 2011).

***Megaselia* sp. (TP/TX) A Scuttle Fly**

Localities: Bartow Co.: Yarbrough Cave (GBT30); Chattooga Co.: Blow Springs Cave (GKH54), Parkers Cave (GKH119); Dade Co.: Morrison Cave (GDD86); Polk Co.: White River Cave (GPO7); Walker Co.: Cave Springs Cave, Mountain Cove Farm Cave No. 1 (GWK73).

Genus *Puliciphora*

***Puliciphora virginienensis* Malloch, 1912 (TP) A Scuttle Fly**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Family Psychodidae

Genus *Psychoda*

***Psychoda pusilla* Tonnoir, 1922 (TP) A Moth Fly**

Localities: Walker Co.: Horseshoe Cave (GWK12).

***Psychoda reevesi* Quate, 2000 (TP) Reeves' Moth Fly**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19).

***Psychoda* sp. (TP) A Moth Fly**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34); Walker Co.: Harrisburg Cave (GWK85), Pettijohns Cave (GWK29).

Family Sciaridae

Genus *Bradysia*

***Bradysia forficulata* (Bezzi, 1914) (TP/TX) A Fungus Gnat**

Localities: Dade Co.: Johnsons Crook Cave (GDD17)*, Johnsons Crook Cave No. 2 (GDD19).

***Bradysia* sp. (TP/TX) A Fungus Gnat**

Localities: Dade Co.: Howards Waterfall Cave (GDD34); Walker Co.: Harrisburg Cave (GWK85).

Genus *Corynoptera*

***Corynoptera* sp. (TP/TX) A Fungus Gnat**

Localities: Chattooga Co.: Parkers Cave (GKH119)*; Dade Co.: Upper Valley Cave (GDD135); Walker Co.: Horseshoe Cave (GWK12).

Genus *Lycoriella*

***Lycoriella* sp. (TP/TX) A Fungus Gnat**

Localities: Bartow Co.: Anthonys Cave (GBT175); Dade Co.: Deans Pit (GDD273), Johnsons Crook Cave No. 2 (GDD19); Walker Co.: Horseshoe Cave (GWK12), Pettijohns Cave (GWK29).

Genus *Sciara*

***Sciara* sp. (TP/TX) A Fungus Gnat**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Dade Co.: Byers Cave (GDD66), Johnsons Crook Cave (GDD17); Polk Co.: White River Cave (GPO7); Walker Co.: Mountain Cove Farm Cave No. 1 (GWK73).

Family Simuliidae

Genus Prosimulium

***Prosimulium saltus* Stone and Jamnback, 1955 (TX) A Black Fly**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19).

Genus Simulium

***Simulium parnassum* Malloch, 1914 (TX) Dark Black Fly**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19).

Family Sphaeroceridae

Genus Leptocera

***Leptocera caenosa* (Rondani, 1880) (TP) A Lesser Dung Fly**

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*, Johnsons Crook Cave No. 2 (GDD19); Walker Co.: Fricks Cave (GWK14)*, Pettijohns Cave (GWK29).

***Leptocera* sp. (TP/TX) A Lesser Dung Fly**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Byers Cave (GDD66), Johnsons Crook Cave (GDD17); Walker Co.: Bible Springs Cave (GWK74), Mountain Cove Farm Cave No. 1 (GWK73).

Genus Spelobia

***Spelobia tenebrarum* (Aldrich, 1897) (TB) Cave Dung Fly**

Localities: Chattooga Co.: Chelsea Gulf Cave (GKH54); Dade Co.: Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Limestone Caverns (GDD140)*, Rising Fawn Exit Cave (GDD397), SSS Cave (GDD229)*, Wild Bills Dakota Cave (GDD596)*; Walker Co.: Horseshoe Cave (GWK12)*, Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74)*, Pettijohns Cave (GWK29). Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This dung fly is common on scat in caves across the southern Appalachians and Interior Low Plateau. Eyes are present but reduced in size relative to surface species of *Spelobia* (Marshall and Peck, 1985a, 1985b).

Family Syrphidae

Genus Copestylum

***Copestylum vesicularium* (Curran, 1947) (TX/AC) Iridescent Bromeliad Fly**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27).

Family Tipulidae

Genus Dolichopeza

***Dolichopeza tridenticulata* Alexander, 1931 (TX) A Crane Fly**

Localities: Dade Co.: Sittons Cave (GDD9).

***Dolichopeza walleyi* (Johnson, 1931) (TX) A Crane Fly**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Genus Tipula

***Tipula abdominalis* (Say, 1823) (TX) Giant Crane Fly**

Localities: Walker Co.: Ellisons Cave (GWK51).

Family Trichoceridae

Genus Trichocera

***Trichocera fattigiana* Alexander, 1952 (TX) A Winter Crane Fly**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62); Walker Co.: Anderson Spring Cave (GWK46).

***Trichocera* sp. (TX) A Winter Crane Fly**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Order Hemiptera

Family Cicadidae

Genus Magicicada

***Magicicada* sp. (AC) A Periodical Cicada**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Comments: This genus is common in the southeastern USA, where it is edaphic as a nymph; this record represents a surface species.

Family Veliidae

Genus Microvelia

***Microvelia americana* (Uhler, 1884) (AC) A Water Strider**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Order Hymenoptera

Family Braconidae

Genus Aspilota

***Aspilota* sp. (TX/AC) A Parasitoid Wasp**

Localities: Bartow Co.: Yarbrough Cave (GBT30); Dade Co.: Byers Cave (GDD66), Deans Pit (GDD273), Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Rock Shelter Pit (GDD209), Sittons Cave (GDD9), Upper Valley Cave (GDD135); Walker Co.: Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73).

Family Formicidae

Genus Myrmecina

***Myrmecina americana* Emery, 1895 (TX) American Little Ant**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Order Lepidoptera

Family Erebidae

Genus Scoliopteryx

***Scoliopteryx libatrix* (Linnaeus, 1758) (TX) Herald Moth**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Johnsons Crook Cave No. 2 (GDD19); Walker Co.: Anderson Spring Cave (GWK46)*, Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This moth commonly overwinters in caves in the eastern United States.

Family Noctuidae

Genus Lophoterges

***Lophoterges* sp. (TX/AC) An Owlet Moth**

Localities: Walker Co.: Fricks Cave (GWK14)*.

Order Megaloptera

Family Corydalidae

Genus Corydalis

***Corydalis cornutus* ((Linnaeus, 1758) (AC) Eastern Dobsonfly**

Localities: DeKalb Co.: Nice Gneiss Cave (GDK329)*.

Order Odonata

Family Cordulegastridae

Genus Cordulegaster

***Cordulegaster* sp. (AC) A Goldenring Dragonfly**

Localities: Washington Co.: Tennile Caves (GWS20).

Family Gomphidae

Genus Progomphus

***Progomphus obscurus* (Rambur, 1842) (AC) Common Sanddragon**

Localities: Washington Co.: Tennile Caves (GWS20).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Order Orthoptera

Family Gryllidae

Genus Eunemobius

***Eunemobius* sp. (TX/AC) A Ground Cricket**

Localities: Chattooga Co.: Subligna Cave (GKH145)*.

Family Rhabdiphoridae

Genus Ceuthophilus

***Ceuthophilus ensifer* Packer, 1881 (TX) A Camel Cricket**

Localities: Dade Co.: Byers Cave (GDD66), Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Morrison Cave (GDD86), Morrison Spring Cave (GDD110).

Comments: This camel cricket is a forest species that has been collected in a few caves (Hubbell, 1936; Lewis, 2005). Within Georgia, it is apparently limited to Dade County.

***Ceuthophilus gracilipes* (Haldeman, 1850) (TX) Slender-legged Camel Cricket**

Localities: Bartow Co.: Chert Chasm (GBT340)*, Davis Farm Cave (GBT222)*, Yarbrough Cave (GBT30); Dade Co.: Boxcar Cave (GDD69)*, Byers Cave (GDD66), Caboose Cave (GDD475)*, Case Cavern (GDD1), Hooker Cave (GDD90)*, Morrison Cave (GDD86), Morrison Spring Cave (GDD110), Sittons Cave (GDD9), Wild Bills Dakota Cave (GDD596)*; Gordon Co.: Jack Crider Cave (GGO298)*, Roberts Cave (GGO147), Rusty Cable Cave (GGO297)*, Steep Cave (GGO326)*; Walker Co.: Anderson Spring Cave (GWK46), Bible Springs Cave (GWK74), Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Fricks Cave (GWK14), LittleJohn Cave (GWK280)*, Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Rocky Cave (GWK496)*, Smartt Farm Cave (GWK124)*.

Comments: This camel cricket is a forest species that enters caves. It ranges from New York to Florida (Hubbell, 1936).

***Ceuthophilus* sp. (TX) A Cave Cricket**

Localities: Walker Co.: Mountain Cove Farm Cave No. 2 (GWK74)*.

Comments: This record may be *C. ensifer* or *C. gracilipes*.

Genus *Diestrammena*

***Diestrammena asynamora* Adelung, 1902 (TX) Greenhouse Camel Cricket**

Localities: Catoosa Co.: Chapmans Cave (GCZ25)*.

Comments: This species was introduced from Asia and recently reported to be common in and around homes in the eastern United States (Epps et al., 2014). This is the first report of the species in a cave in North America. Chapmans Cave is <100 m from homes in a housing development, which may explain the presence of these crickets in the cave. Lavoie et al. (2019) reported an unknown cricket species with affinities to *Diestrammena* from a cave in Pennsylvania, which highlights the need for monitoring of cricket populations to identify the spread of exotic species into cave habitats.

Genus *Euhadenoecus*

***Euhadenoecus puteanus* (Scudder, 1877) (TX) Puteanus Camel Cricket**

Localities: Bartow Co.: Davis Farm Cave (GBT222)*; Dade Co.: Boxcar Cave (GDD69)*, Byers Cave (GDD66), Caboose Cave (GDD475)*, Case Cavern (GDD1), Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34), Johnsons Crook Cave (GDD17), Morrison Spring Cave (GDD110), Sittons Cave (GDD9), SSS Cave (GDD229)*, Wild Bills Dakota Cave (GDD596)*; Gordon Co.: Jack Crider Cave (GGO298)*, Roberts Cave (GGO147), Rusty Cable Cave (GGO297)*; Polk Co.: White River Cave (GPO7); Walker Co.: Anderson Spring Cave (GWK46), Bible Springs Cave (GWK74), Cherokee Cave (GWK94), Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Fricks Cave (GWK14), Mountain Cove Farm Cave No. 1 (GWK73), Pigeon Cave (GWK57).

Comments: This camel cricket is widespread across the Appalachians and portions of the Interior Low Plateau. It is a surface species that enters caves but generally does not penetrate to deep cave environments (Hubbell and Norton, 1978).

Order Psocodea

Family Liposcelididae

Genus *Liposcelis*

***Liposcelis decolor* (Pearman, 1925) (TP) A Booklouse**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Walker Co.: Ellisons Cave (GWK51).

Family Psyllipsocidae

Genus *Psyllipsocus*

***Psyllipsocus ramburii* Selys-Longchamps, 1872 (TP) A Barklouse**

Localities: Bartow Co.: Yarbrough Cave (GBT30)*; Walker Co.: Cave Springs Cave, Harrisburg Cave (GWK85).

Order Siphonaptera

Family Hystrichopsyllidae

Genus *Ctenophthalmus*

***Ctenophthalmus pseudagartyes* Baker, 1904 (SY) A Flea**

Localities: Walker Co.: Pettijohns Cave (GWK29).

Order Trichoptera

Family Hydropsychidae

Genus *Diplectrona*

***Diplectrona marianae* Reeves, 1999 (TX) A Caddisfly**

Localities: Dade Co.: Johnsons Crook Cave No. 2 (GDD19).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SNR in Georgia).

Comments: This species was described in Reeves and Paysen (1999); it is endemic to Georgia and known only from the type locality, which was reported with the alternate name "Newsome Gap Spring Cave" (Reeves and Paysen 1999).

Order Zygentoma

Family Nicoletiidae

Genus *Nicoletia*

***Nicoletia* sp. (ED) A Silverfish**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Comments: Holsinger and Peck (1971) suggested this may be an undescribed edaphic species.

Subphylum Myriapoda

Class Chilopoda

Order Geophilomorpha

Family Geophilidae

Genus *Arenophilus*

***Arenophilus bipuncticeps* Wood, 1862 (TX/AC) Northern Short-clawed Centipede**

Localities: Chattooga Co.: Blowing Springs Cave (GKH54).

Order Lithobiomorpha

Family Lithobiidae

Genus *Lithobius*

***Lithobius atkinsoni* Bollman, 1887 (TP) A Centipede**

Localities: Randolph Co.: Griers Cave (GRA40).

Genus *Neolithobius*

***Neolithobius voracior* Chamberlin, 1912 (TP) A Centipede**

Localities: Decatur Co.: Climax Cave (GDC36).

Genus *Paitobius*

***Paitobius* sp. (TX/AC) A Centipede**

Localities: Dade Co.: Morrison Spring Cave (GDD110).

Genus *Pampibius*

***Pampibius* sp. (TX/AC) A Centipede**

Localities: Walker Co.: Cave Springs Cave.

Genus *Typhlobius*

***Typhlobius caecus* Bollman, 1888 (TX/AC) A Centipede**

Localities: Walker Co.: Fricks Cave (GWK14).

Order Scolopendromorpha

Family Cryptopidae

Genus *Scolopocryptops*

***Scolopocryptops sexspinosus* (Say, 1821) (TX/AC) A Centipede**

Localities: Dade Co.: Johnsons Crook Cave (GDD17), Morrison Cave (GDD86); Walker Co.: Pettijohns Cave (GWK29).

Class Diplopoda

Order Callipodida

Family Abacionidae

Genus *Abacion*

***Abacion magnum* (Loomis, 1943) (TX) A Crested Millipede**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Davis Farm Cave (GBT222)*; Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Byers Cave (GDD66); Polk Co.: White River Cave (GPO7).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: The record from Kingston Saltpeter Cave was reported as *A. lactarium* (Chamberlin, 1946), a species known from the Piedmont and Coastal Plain of the eastern United States, and likely represents a misidentification (Holsinger and Peck, 1971). The record from Davis Farm Cave, also known as Crystal Cave, was also reported as *A. lactarium* in GBIF (2019). We presume this record to be a misidentification of *A. magnum*.

Order Chordeumatida**Family Cleidogonidae****Genus *Pseudotremia******Pseudotremia aecus* Shear, 1972 (TB) A Cave Millipede**

Localities: Dade Co.: Byers Cave (GDD66), Hurricane Cave (GDD62); Walker Co.: Pigeon Cave (GWK57).

Conservation status: IUCN: Not Evaluated; NatureServe: G1G2 (SNR in Georgia).

Comments: With the exception of the record from Pigeon Cave (in Walker County, east of Lookout Mountain), all known sites are west of Lookout Mountain in Dade County (plus one unpublished record from adjacent DeKalb County, Alabama). The Pigeon Cave record may have been confused with *P. eburnea*, which is known from Pigeon Mountain.

***Pseudotremia eburnea* Loomis, 1939 (TB) A Cave Millipede**

Localities: Dade Co.: Byers Cave (GDD66), Case Cavern (GDD1), Cemetery Pit (GDD64), Cricket Cave, Howards Waterfall Cave (GDD34), Hurricane Cave (GDD62), Johnsons Crook Cave (GDD17), SSS Cave (GDD229)*, Upper Valley Cave (GDD135). Walker Co.: Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Hickman Gulf Cave, Mountain Cove Farm Cave No. 1 (GWK73), Pettijohns Cave (GWK29), Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G4 (SNR in Georgia).

Comments: Most records are from caves on the escarpments of Lookout Mountain in Walker and Dade counties. Two additional records (Nickajack Cave in Marion Co., Tennessee and Davidson Cave in Marshall Co., Alabama) are further west along the Tennessee River.

***Pseudotremia fracta* Chamberlin, 1951 (TP) A Millipede**

Localities: Walker Co.: Bee Rock Cave (GWK123)*.

Comments: This species is known from surface and cave sites in eastern Tennessee and western North Carolina (Hoffman, 1981). This is the first record of the species in Georgia.

***Pseudotremia* sp. (TB/TP) A Millipede**

Localities: Dade Co.: Howards Waterfall Cave (GDD34)*, Hooker Cave (GDD90)*, Morrison Cave (GDD86), Morrison Spring Cave (GDD110), Running Water Cave (GDD120), Sittons Cave (GDD9); Walker Co.: Bible Springs Cave (GWK74), Harrisburg Cave (GWK85), Nash Waterfall Cave (GWK72), Pigeon Cave (GWK57)*.

Comments: These records include at least two undescribed species. Specimens from Howards Waterfall Cave are an undescribed species, and those from Hooker Cave represent a second undescribed species (W. Shear, pers. comm.). Buhlmann (2001) mentions other possibly undescribed populations of *Pseudotremia*.

Family Striariidae**Genus *Striaria******Striaria* sp. (TX) A Millipede**

Localities: Chattooga Co.: Parkers Cave (GKH119).

Comments: Troglitic species in the genus are known but none from Georgia.

Family Trichopetalidae**Genus *Scoterpes******Scoterpes austrinus* Loomis, 1946 (TB) A Cave Millipede**

Localities: Bartow Co.: Busch Cave (GBT611); Chattooga Co.: Chelsea Gulf Cave (GKH54); Dade Co.: Cemetery Pit (GDD64), Johnsons Crook Cave (GDD17), Morrison Cave (GDD86), Sittons Cave (GDD9), Upper Valley Cave (GDD135); Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Goat Cave (GWK184), Harrisburg Cave (GWK85), Horseshoe Cave (GWK12), Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Spooky Cave (GPO5).

Conservation status: IUCN: Not Evaluated; NatureServe: G3G4 (SNR in Georgia).

Comments: This troglitic species is known from sites east and west of Lookout Mountain in northwestern Georgia and adjacent regions of northeastern Alabama (Shear, 2010). The record from Busch Cave (Bartow County) likely represents *S. nudus*, which Shear (2010) raised to species status after the record was reported by Reeves et al. (2000).

***Scoterpes nudus* Chamberlin, 1946 (TB) A Cave Millipede**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7).

Conservation status: IUCN: Not Evaluated; NatureServe: G3G4T1T2 (SNR in Georgia).

Comments: The troglitic species is endemic to Georgia. It is geographically isolated from all other *Scoterpes* species and is known from three caves in the Etowah River Valley of Bartow and Polk counties (Shear, 2010). A record of *S. austrinus* from Busch Cave (Bartow Co.) is likely *S. nudus*.

***Scoterpes willreevesi* Shear, 2010 (TB) Reeves' Cave Millipede**

Localities: Dade Co.: Byers Cave (GDD66), Cemetery Pit (GDD64).

Comments: This species is known from a few sites in Dade County, Georgia, and adjacent DeKalb County, Alabama (Shear, 2010).

***Scoterpes* sp. (TB) A Cave Millipede**

Localities: Chattooga Co.: Scoggins II Cave (GKH405)*; Dade Co.: Case Cavern (GDD1), Howards Waterfall Cave (GDD34), Longs Rock Wall Cave (GDD101)*, "Saw Mill Cave, Rising Fawn"; Walker Co.: Bee Rock Cave (GWK123)*, Fricks Cave (GWK14), Pigeon Cave (GWK57), Smartt Farm Cave (GWK124)*.

Comments: These records represent females or juveniles that could not be identified to species.

Order Julida**Family Blaniulidae****Genus *Blaniulus******Blaniulus guttulatus* (Fabricius, 1798) (ED) Spotted Snake Millipede**

Localities: Dade Co.: Howards Waterfall Cave (GDD34), Morrison Cave (GDD86).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This is a soil-inhabiting species that was introduced from Europe. The name of this species is problematic as there is an unresolved homonymy with the species *Julus guttulatus* Bosc, 1792, which has also been placed in *Blaniulus*.

Family Zosteractinidae**Genus *Ameractis******Ameractis satis* Causey, 1959 (TB) A Cave Millipede**

Localities: Dade Co.: Morrison Cave (GDD86).

Conservation status: IUCN: Not Evaluated; NatureServe: G2G4 (SNR in Georgia).

Comments: Holsinger and Peck (1971) reported this troglitic from Georgia, but no new collections have been reported since then.

Order Platydesmida**Family Andrognathidae****Genus *Andrognathus******Andrognathus corticarius* Cope, 1869 (TX) Cope's Noodle Millipede**

Localities: Floyd Co.: Cave Springs Cave (GFL18).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Order Polydesmida**Family Paradoxomatidae****Genus *Oxidus******Oxidus gracilis* (Koch, 1847) (TP) Greenhouse Millipede**

Localities: Bartow Co.: Ladds Lime Cave (GBT384-GBT389); Catoosa Co.: Chapmans Cave (GCZ25)*, Crane Cave (GCZ80)*; Chattooga Co.: Scoggins II Cave (GKH405)*, Subligna Cave (GKH145)*; Dade Co.: Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34), Limestone Caverns (GDD140)*, Wild Bills Dakota Cave (GDD596)*; Decatur Co.: Climax Cave (GDC36); Floyd Co.: Cave Springs Cave (GFL18); Grady Co.: Maloys Waterfall Cave (GGR27); Polk Co.: White River Cave (GPO7)*; Washington Co.: Tennile Caves (GWS20); Walker Co.: LittleJohn Cave (GWK280)*, Mountain Cove Farm Cave No. 2 (GWK74)*, Smartt Farm Cave (GWK124)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This is an exotic species native to Japan and is now commonly encountered in caves.

Family Polydesmidae

Genus *Polydesmus*

***Polydesmus* sp. (TX/AC) A Flatback Millipede**

Localities: Dade Co.: Creek Bed Cave.

Family Xystodesmidae

Genus *Cherokia*

***Cherokia georgiana* (Bollman, 1889) (AC) Georgia Flat-backed Millipede**

Localities: Walker Co.: Pigeon Cave (GWK57).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Order Spirostreptida

Family Cambalidae

Genus *Cambala*

***Cambala annulata* (Say, 1821) (TP) A Millipede**

Localities: Bartow Co.: Anthonys Cave (GBT175); Chattooga Co.: Scoggins II Cave (GKH405)*, Subligna Cave (GKH145)*; Dade Co.: Hurricane Cave (GDD62), Longs Rock Wall Cave (GDD101)*, Rusty's Cave (GDD70); Randolph Co.: Griens Cave (GRA40).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species ranges from Pennsylvania and Indiana to Florida and is commonly encountered in caves (Shelley, 1979).

***Cambala hubrichti* Hoffman, 1958 (TP) A Millipede**

Localities: Catoosa Co.: Chickamauga Cave (GCZ106)*; Grady Co.: Maloys Waterfall Cave (GGR27)*; Walker Co.: Fricks Cave (GWK14), Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is also known from caves in North Carolina (Hertl, 1981). The record from Grady County, Georgia represents a range extension (Shelley, 1979).

***Cambala minor* Bollman, 1888 (TP) A Millipede**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Morrison Cave (GDD86); Walker Co.: Horseshoe Cave (GWK12), Pettijohns Cave (GWK29).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is known from surface and cave collections across the Tennessee Valley, the Ozarks, and adjacent regions (Shelley, 1979).

***Cambala ochra* Chamberlin, 1942 (TP) A Millipede**

Localities: Bartow Co.: Chert Chasm (GBT340); Walker Co.: Horseshoe Cave (GWK12), Rocky Cave (GWK496).

Comments: This species is known from surface and cave records across the Tennessee River Valley and adjacent regions (Shelley, 1979).

***Cambala* sp. (TP) A Millipede**

Localities: Catoosa Co.: Chapmans Cave (GCZ25)*; Chattooga Co.: Blowing Springs Cave (GKH54); Dade Co.: Limestone Caverns (GDD140)*; Floyd Co.: Airport Cave (GFL189)*, Cave Springs Cave (GFL18); Walker Co.: Anderson Spring Cave (GWK46)*, Mountain Cove Farm Cave No. 2 (GWK74)*; Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7).

Comments: Most of these records represent juveniles that likely are one of the four species listed above.

Class Symphyla

Family Scutigereidae

Genus *Scutigereella*

***Scutigereella* sp. (ED) A Garden Centipede**

Localities: Dade Co.: Johnsons Crook Cave (GDD17), Sittons Cave (GDD9); Walker Co.: Harrisburg Cave (GWK85).

Comments: These soil-inhabiting arthropods are not well-represented from caves.

Phylum Nematomorpha

Order Gordioidea

Family Gordiidae

Genus *Gordius*

***Gordius* sp. (SY) A Horsehair Worm**

Localities: Polk Co.: White River Cave (GPO7).

Comments: Horsehair worms are common parasites of cave crickets (Studier et al., 1991).

Phylum Nemertea

Class Enopla

Order Hoplonemertea

Family Tetrastemmatidae

Genus *Prostoma*

***Prostoma* sp. (SX/AC?) A Ribbon Worm**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Comments: The occurrence from Howards Waterfall Cave was reported as *Prostoma* cf. *gracense* by Reeves et al. (2000).

Phylum Mollusca

Class Gastropoda

Order Basommatophora

Family Physidae

Genus *Physella*

***Physella gyrina* (Say, 1821) (TX) Tadpole Physa**

Localities: Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Order Neotaenioglossa

Family Pleuroceridae

Genus *Elimia*

***Elimia proxima* (Say, 1825) (TX) Sprite Elimia**

Localities: Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (SNR in Georgia).

Order Stylommatophora

Family Gastrodontiidae

Genus *Gastrodonta*

***Gastrodonta interna* (Say, 1822) (TX) Brown Bellytooth**

Localities: Walker Co.: Blowing Springs Cave (GWK41).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is usually found in damp leaf litter and among woody detritus (Hubricht, 1985). It is known from several caves in Tennessee (Lewis, 2005).

Genus *Ventridens*

***Ventridens gularis* (Say, 1822) (TX) Throaty Dome**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is found in a variety of habitats, from floodplains and damp hillsides to limestone outcrops. It has been reported from several caves (Lewis, 2005).

***Ventridens ligera* (Say, 1821) (AC) Globose Dome**

Localities: Dade Co.: Kirchmeyer Cave (GDD196)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is a habitat generalist, though often found in successional forest habitat and in disturbed areas (Hubricht, 1985; Dourson, 2010).

***Ventridens* sp. (TX/AC) A Dome Snail**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Genus *Zonitoides****Zonitoides arboreus* (Say, 1816) (TP/TX) Quick Gloss**

Localities: Dade Co.: Longs Rock Wall Cave (GDD101)*; Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27); Walker Co.: Blowing Springs Cave (GWK41), Pettijohns Cave (GWK29).
Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is one of the most common and widespread land snails in North America. It is found in a variety of habitats, including several caves (Hubricht, 1964, 1985; Lewis, 2005)

Family Helicodiscidae**Genus *Helicodiscus******Helicodiscus barri* Hubricht, 1962 (TB) Raccoon Coil**

Localities: Walker Co.: Smartt Farm Cave (GWK124)*; Chattooga Co.: Parkers Cave (GKH119).

Conservation status: IUCN: Least Concern (Gladstone et al., 2018); NatureServe: G3 (SNR in Georgia).

Comments: This troglobiont is often found on woody detritus in damp cave environments (Hubricht, 1962, 1964, 1985; Gladstone et al., 2018). It is distributed throughout the Valley and Ridge and Interior Low Plateau. A single surface locality has been reported, but all other occurrences are from caves. Molecular analyses suggest this species might represent a cryptic species complex (Gladstone et al., 2019).

***Helicodiscus inermis* Baker, 1929 (TX) Oldfield Coil**

Localities: Polk Co.: White River Cave (GPO7); Walker Co.: Blowing Springs Cave (GWK41).

Comments: This calciphilic species is often found around rocky outcrops and limestone-rich environments (Hubricht, 1985; Dourson, 2010)

***Helicodiscus notius* Hubricht, 1962 (TX) Tight Coil**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5Q (SNR in Georgia).

Comments: This calciphilic species is often found around rocky outcrops and limestone-rich environments (Hubricht, 1985; Dourson, 2010). It has been reported from several caves (Hubricht, 1964; Lewis, 2005).

***Helicodiscus parallelus* (Say, 1817) (TX) Compound Coil**

Localities: Decatur Co.: Climax Cave (GDC36).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This calciphilic species is often found around rocky outcrops and limestone-rich environments (Hubricht, 1985; Dourson, 2010). It has been reported from several caves (Hubricht, 1964; Lewis, 2005).

Family Oxychilidae**Genus *Glyphyalinia******Glyphyalinia cryptomphala* (Clapp, 1915) (TX) Thin Glyph**

Localities: Chattooga Co.: Parkers Cave (GKH119)*; Dade Co.: Upper Valley Cave (GDD135).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010).

***Glyphyalinia indentata* (Say, 1823) (TX) Carved Glyph**

Localities: Walker Co.: Harrisburg Cave (GWK85).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010) and known from several caves (Lewis, 2005).

***Glyphyalinia praecox* (Baker, 1930) (TX) Brilliant Glyph**

Localities: Bartow Co.: Anthonys Cave (GBT175).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010) and known from several caves (Lewis, 2005).

***Glyphyalinia rhoadsi* (Pilsbry, 1899) (TX) Sculpted Glyph**

Localities: Washington Co.: Tennile Caves (GWS20).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010) and known from several caves (Lewis, 2005).

***Glyphyalinia sculptilis* (Bland, 1858) (TX) Suborb Glyph**

Localities: Bartow Co.: Busch Cave (GBT611); Chattooga Co.: Parkers Cave (GKH119)*; Walker Co.: Bible Springs Cave (GWK74), Rocky Cave (GWK496), Spooky Cave (GWK494).

Conservation status: IUCN: Not Evaluated; NatureServe: G4 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010) and known from several caves (Lewis, 2005).

***Glyphyalinia specus* Hubricht, 1965 (TB) Hollow Glyph**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Morrison Cave (GDD86); Walker Co.: Cave Springs Cave, Cherokee Cave (GWK94), Mount Cove Farm Cave, Pettijohns Cave (GWK29).

Conservation status: IUCN: Least Concern (Gladstone et al. 2018); NatureServe: G3 (SNR in Georgia).

Comments: This is a wide-ranging troglobiont found in dry leaf litter and on cave walls. Its distribution is suggestive of greater occurrence throughout Valley and Ridge (Gladstone et al., 2018).

***Glyphyalinia wheatleyi* (Bland, 1883) (TP/TX) Bright Glyph**

Localities: Floyd Co.: Cave Springs Cave (GFL18)*; Grady Co.: Maloys Waterfall Cave (GGR27)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This common forest snail is often found in damp leaf litter or along weedy forests (Hubricht, 1985). It is associated with limestone-rich environments (Dourson, 2010) and known from several caves (Lewis, 2005).

Family Philomycidae**Genus *Pallifera******Pallifera* sp. (TX/AC) A Mantleslug**

Localities: Dade Co.: Johnsons Crook Cave (GDD17)*.

Family Polygyridae**Genus *Inflectarius******Inflectarius rugeli* (Shuttleworth, 1852) (TX) Deep-tooth Shagreen**

Localities: Chattooga Co.: Parkers Cave (GKH119)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is primarily found in leaf litter, under logs, or in shaded mesic forest habitat, but can also be found in caves (Niemiller et al., unpublished).

Genus *Mesodon****Mesodon* sp. (TX/AC) A Globe Snail**

Localities: Walker Co.: Anderson Spring Cave (GWK46).

Comments: Most *Mesodon* species can be found in forest habitats, under logs or in dense leaf litter. Some species (e.g., *M. appressus*, *M. edentatus*, *M. sargentianus*) are considered calciphiles, and are common near cave entrances (Hubricht, 1985; Niemiller et al., unpublished).

Genus *Patera****Patera appressa* (Say, 1821) (TP/TX) Flat Bladetooth**

Localities: Dade Co.: Hooker Cave (GDD90)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is associated with rocky outcrops, forest ravines, disturbed habitats along roadsides, and limestone-rich environments. It is a common constituent of cave environments, though not limited to subterranean habitat (Hubricht, 1964, 1985; Lewis, 2005; Dourson, 2010).

***Patera perigrapta* (Pilsbry, 1894) (TP/TX) Engraved Bladetooth**

Localities: Chattooga Co.: Parkers Cave (GKH119); Dade Co.: Byers Cave (GDD66).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is associated with rocky outcrops, forest ravines, disturbed habitats along roadsides, and limestone-rich environments. It also is a common constituent of cave environments, though not limited to subterranean habitat (Hubricht, 1964, 1985; Lewis, 2005; Dourson, 2010).

Genus *Triodopsis*

***Triodopsis* sp. (TX/AC) A Threetooth Snail**

Localities: Dade Co.: Wild Bills Dakota Cave (GDD596)*.

Comments: *Triodopsis* snails occupy a diverse array of habitats, including mesic forest leaf litter, rock outcrops, and urban areas (Hubricht, 1985). This genus has also been reported from several caves (Niemiller et al., unpublished).

Family Pristilomatidae

Genus *Hawaiia*

***Hawaiia minuscula* (Binney, 1841) (TX) Minute Gem**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is a habitat generalist, though often found in disturbed habitats, such as greenhouses and gardens (Hubricht, 1985; Dourson, 2010). It has been reported from several caves (Lewis, 2005; Niemiller et al., unpublished).

Family Strobilopsidae

Genus *Strobilops*

***Strobilops texasianus* Pilsbry and Ferriss, 1906 (AC) Southern Pinecone**

Localities: Decatur Co.: Climax Cave (GDC36)*.

Conservation status: IUCN: Not Evaluated; NatureServe: G5 (SNR in Georgia).

Comments: This species is associated with leaf litter and woody detritus forested habitat (Hubricht, 1985). This is the first record from a cave.

Phylum Platyhelminthes

Class Trepanoxemata

Order Neophora

Family Kenkiidae

Genus *Sphalloplana*

***Sphalloplana georgiana* Hyman, 1954 (SB) Georgia Cave Planarian**

Localities: Dade Co.: Howards Waterfall Cave (GDD34).

Conservation status: IUCN: Not Evaluated; NatureServe: G1 (SNR in Georgia).

Comments: This species is known only from the type locality at Howards Waterfall Cave (Hyman, 1954; Kenk, 1977).

***Sphalloplana* sp. (SB) A Cave Planarian**

Localities: Dade Co.: Hurricane Cave (GDD62); Walker Co.: Anderson Spring Cave (GWK46), Pettijohns Cave (GWK29).

Comments: These records may represent other sites for *S. georgiana* or possibly undescribed species.

Phylum Chordata

Class Actinopterygii

Order Percopsiformes

Family Amblyopsidae

Genus *Typhlichthys*

***Typhlichthys subterraneus* Girard, 1859 (SB) Southern Cavefish**

Localities: Catoosa Co.: Crane Cave (GCZ80); Dade Co.: Case Cavern (GDD1), Limestone Caverns (GDD140), Longs Rock Wall Cave (GDD101), Sittons Cave (GDD9).

Conservation status: IUCN: Vulnerable; NatureServe: G4 (S1 in Georgia); listed as Endangered and considered a Species of Greatest Conservation Need in Georgia.

Comments: The record from Crane Cave is the first occurrence of this species from the Appalachians karst region (Niemiller et al., 2016). *Typhlichthys subterraneus* is a cryptic species complex (Niemiller et al., 2012), and populations from Georgia along with a few populations in Marion Co., Tennessee, are likely a distinct species.

Order Scorpaeniformes

Family Cottidae

Genus *Cottus*

***Cottus bairdii* Girard, 1850 (SP) Mottled Sculpin**

Localities: Walker Co.: Fricks Cave (GWK14).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This species is thought to be common in caves (Dearolf, 1956; Poly, 2001), and cave records exist from the TAG region (Buhlmann, 2001; Huntsman et al., 2011; Venarsky et al., 2012). Some records of *C. carolinae* may actually represent this species, as both species are very similar morphologically.

***Cottus carolinae* (Gill, 1861) (SP) Banded Sculpin**

Localities: Dade Co.: Longs Rock Wall Cave (GDD101)*; Walker Co.: Fricks Cave (GWK14)*, Mountain Cove Farm Cave No. 2 (GWK74), Roger Branch Cave (GWK204)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This species is the most commonly reported fish in caves of the Interior Plateau and Appalachians karst regions (e.g., Cope and Packard, 1881; Dearolf, 1956; Poly and Boucher, 1996; Niemiller et al., 2006, 2016). Several populations are thought to live year-round in caves, with some exhibiting some degree of troglomorphy (Espinasa and Jeffery, 2003; Espinasa et al., 2013).

***Cottus* sp. (SP) A Sculpin**

Localities: Catoosa Co.: Crane Cave (GCZ80)*; Walker Co.: Horseshoe Cave (GWK12)*.

Comments: These records may be *C. bairdii* or *C. carolinae*.

Order Siluriformes

Family Ictaluridae

Genus *Ameiurus*

***Ameiurus nebulosus* (Lesueur, 1819) (SX/AC) Brown Bullhead**

Localities: Walker Co.: Horseshoe Cave (GWK12).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species has been reported previously from caves in Florida and West Virginia (Franz et al., 1994; Hale and Streever, 1994; Pruitt, 1995; Poly and Boucher, 1996; Poly, 2001).

Class Amphibia

Order Anura

Family Bufonidae

Genus *Anaxyrus*

***Anaxyrus fowleri* (Hinckley, 1882) (AC) Fowler's Toad**

Localities: Dade Co.: Case Caverns (GDD1)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This toad has been reported infrequently from caves in eastern Tennessee (Dodd et al., 2001; Niemiller et al., 2016).

***Anaxyrus terrestris* (Bonnaterre, 1789) (AC) Southern Toad**

Localities: Burke Co.: Utleys Cave*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Pleistocene remains of this species have been found in a cave in Citrus Co., Florida (Holman, 1958).

Family Hylidae**Genus *Hyla******Hyla chrysoscelis* Cope, 1880 (TX/AC) Cope's Gray Treefrog**

Localities: Walker Co.: Pettijohns Cave (GWK29)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This treefrog may use caves for shelter during periods of drought, although most records are thought to be accidental occurrences. It has been reported from a few caves in Alabama and Tennessee (Lewis, 2005; Godwin, 2008; Niemiller and Miller, 2009).

***Hyla gratiosa* LeConte, 1856 (AC) Barking Treefrog**

Localities: Walker Co.: Drag Fold Cave (GWK79)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Genus *Pseudacris****Pseudacris crucifer* (Wied-Neuwied, 1838) (TX/AC) Spring Peeper**

Localities: Dade Co.: Boxcar Cave (GDD69)*; Walker Co.: Pettijohn Cave (GWK29)*, Screech Owl Cave (GWK205)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This frog has been reported infrequently from caves (Black, 1971; Prather and Briggler, 2001; Godwin, 2008; Niemiller and Miller, 2009; Niemiller et al., 2016). It may seek refuge in caves during prolonged drought (Prather and Briggler, 2001).

***Pseudacris feriarum* (Baird, 1854) (AC) Upland Chorus Frog**

Localities: Grady Co.: Waterfall Cave (GGR27)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This frog has been reported infrequently from caves (Black, 1971; Osbourn, 2005; Godwin, 2008; Niemiller and Miller, 2009; Niemiller et al., 2016).

Family Ranidae**Genus *Rana******Rana catesbeiana* Shaw, 1802 (TX) American Bullfrog**

Localities: Dade Co.: Boxcar Cave (GDD69)*, Rusty's Cave (GDD70)*; Walker Co.: Anderson Spring Cave (GWK46)*, Pettijohns Cave (GWK29)*; Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is occasionally reported from caves with substantial aquatic habitat, particularly near entrances and the twilight zone (Barr, 1953; Niemiller and Miller, 2009; Niemiller et al., 2016).

***Rana clamitans* Latreille, 1801 (TX) Green Frog**

Localities: Dade Co.: Longs Rock Wall Cave (GDD101)*; Decatur Co.: Climax Cave (GDC36)*; Grady Co.: Waterfall Cave (GGR27)*; Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Screech Owl Cave (GWK205)*; Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is occasionally reported from caves (Barr, 1953; Buhlmann, 2001; Dodd et al., 2001; Camp and Jensen, 2007; Niemiller and Miller, 2009; Niemiller et al., 2016).

***Rana palustris* (LeConte, 1825) (TX) Pickerel Frog**

Localities: Dade Co.: Hurricane Cave (GDD62)*, Longs Rock Wall Cave (GDD101)*, Sittons Cave (GDD9), Trenton Waterfall Cave; Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29)*, Pigeon Cave (GWK57), Roger Branch Cave (GWK204)*, Screech Owl Cave (GWK205)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This species is regularly reported from caves near entrances and in the twilight zone (Cliburn and Middleton, 1983; Buhlmann, 2001; Camp and Jensen, 2007; Niemiller and Miller, 2009; Niemiller et al., 2016). The record for "Trenton Waterfall Cave" likely represents Howards Waterfall Cave.

***Rana sphenocephala* Cope, 1886 (TX/AC) Southern Leopard Frog**

Localities: Grady Co.: Maloys Waterfall Cave (GGR27)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Unlike other ranid frogs, this species is encountered infrequently in caves, but cave records exist from Tennessee (Lewis, 2005; Niemiller and Miller, 2009).

Order Caudata**Family Ambystomatidae****Genus *Ambystoma******Ambystoma tigrinum* (Green, 1825) (AC) Eastern Tiger Salamander**

Localities: Walker Co.: Drag Fold Cave (GWK79)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S3S4 in Georgia); considered a Species of Greatest Conservation Need in Georgia.

Comments: Although this mole salamander spends much of its life underground in burrows, it is not associated with caves and karst.

Family Plethodontidae**Genus *Aneides******Aneides aeneus* (Cope and Packard, 1881) (TX) Green Salamander**

Localities: Dade Co.: Byers Cave (GDD66)*, Case Caverns (GDD1)*, Howards Waterfall Cave (GDD34)*, Sittons Cave (GDD9)*; Walker Co.: Fricks Cave (GWK14), Lula Falls Cave (GWK617)*, Lula Falls Talus Cave*, Nash Waterfall Cave (GWK72).

Conservation status: IUCN: Near Threatened; NatureServe: G3G4 (S3 in Georgia); listed as Rare and considered a Species of Greatest Conservation Need in Georgia.

Comments: This species is occasionally reported around entrances of caves along the escarpments of the Cumberland Plateau, including Lookout Mountain and Pigeon Mountain. The type locality is "near the mouth" of Nickajack Cave in Marion Co., Tennessee.

Genus *Desmognathus****Desmognathus conanti* Rossman, 1958 (AC) Spotted Dusky Salamander**

Localities: Dade Co.: Hurricane Cave (GDD62)*; Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Mountain Cove Farm Cave No. 2 (GWK74), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57); Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species has been reported infrequently in and around entrances of spring entrances and is rarely observed in the dark zone (Himes et al., 2004; Niemiller and Miller, 2009; Niemiller et al., 2016).

***Desmognathus ocoee* Nicholls, 1949 (AC) Ocoee Salamander**

Localities: Habersham Co.: La Guarida del Diablo*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Genus *Eurycea****Eurycea cirrigera* (Gre0en, 1831) (TX) Southern Two-lined Salamander**

Localities: Decatur Co.: Climax Cave (GDC36)*; Polk Co.: White River Cave (GPO7)*; Walker Co.: Anderson Spring Cave (GWK46), Nash Waterfall Cave (GWK72)*, Pigeon Cave (GWK57); Washington Co.: Tennile Caves (GWS20).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species has been reported infrequently from caves (Himes et al., 2004; Lewis, 2005; Camp and Jensen, 2007; Niemiller and Miller, 2009; Niemiller et al., 2016), although a population from Cannon County, Tennessee, has been documented breeding in a cave (Niemiller and Miller, 2007).

***Eurycea guttolineata* (Holbrook, 1838) (TX) Three-lined Salamander**

Localities: DeKalb Co.: Nice Gneiss Cave (GDK329)*; Washington Co.: Tennile Caves (GWS20)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4S5 in Georgia).

Comments: This species also has been reported from caves in Alabama and Mississippi (Cooper and Cooper, 1968; Himes et al., 2004).

***Eurycea longicauda* (Green, 1818) (TP/TX) Long-tailed Salamander**

Localities: Chattooga Co.: Scoggins II Cave (GKH405)*, Subligna Cave (GKH145)*; Dade Co.: Hurricane Cave (GDD62)*, Longs Creekside Cave (GDD45)*, Lookout Mountain Spring Cave*, Sittons Cave (GDD9); Walker Co.: Anderson Spring Cave (GWK46), Bible Springs Cave (GWK74)*, Fricks Cave (GWK14), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), "small cave in rock quarry along Georgia Highway 136; 1.65 Highway miles West of Cooper Heights."

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This species is regularly observed in caves in the Appalachians and Interior Plateau karst regions (Buhlmann, 2001; Dodd et al., 2001; Lewis, 2005; Osbourn, 2005; Taylor and Mays, 2006; Camp and Jensen, 2007; Niemiller and Miller, 2009; Niemiller et al., 2016), although not as frequently as *E. lucifuga*.

***Eurycea lucifuga* Rafinesque, 1822 (TP) Cave Salamander**

Localities: Bartow Co.: Anthonys Cave (GBT175)*, Chert Chasm (GBT340)*; Catoosa Co.: Chapmans Cave (GCZ25)*, Crane Cave (GCZ80)*; Chattooga Co.: Blowing Spring Cave (GKH54)*, Parkers Cave (GKH119)*, Scoggins II Cave (GKH405)*; Dade Co.: Boxcar Cave (GDD69)*, Caboose Cave (GDD475)*, Case Cavern (GDD1), Cemetery Pit (GDD64)*, Chambliss Cave (GDD321), Hooker Cave (GDD90)*, Jeff's Hole Cave (GDD400)*, Johnsons Crook Cave (GDD17)*, Limestone Caverns (GDD140)*, Longs Rock Wall Cave (GDD101)*, Lower Valley Cave (GDD136)*, Morrison Cave (GDD86)*, Sittons Cave (GDD9), SSS Cave (GDD229)*, Trenton caves, Upper Valley Cave (GDD135)*, Wild Bills Dakota Cave (GDD596)*; Floyd Co.: Airport Cave (GFL189)*; Gordon Co.: caves near junction of Hwy.411 and Hwy.156 7.0 mi. N of Fairmount*, Ford Roberts Cave (GGO147)*; Murray Co.: Fincher Bluff Cave (GMA291)*; Polk Co.: Wise Cave (GPO6)*; Walker Co.: Anderson Spring Cave (GWK46), Bee Rock Cave (GWK123)*, Bible Spring Cave (GWK74)*, Cave Spring Cave*, Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Goat Cave (GWK184)*, Harrisburg Cave (GWK85), Horseshoe Cave (GWK12)*, Kinda Pretty Cave (GWK258)*, LittleJohn Cave (GWK280)*, Missing Evan Well Cave (GWK488)*, Mouldy Bat Pit (GWK257)*, Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Roger Branch Cave (GWK204)*, Screech Owl Cave (GWK205), Smartt Farm Cave (GWK124)*, Spooky Cave (GWK494)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This is the most commonly observed salamander in caves in the Appalachians and Interior Plateau karst regions (Hutchinson, 1966; Buhlmann, 2001; Lewis, 2005; Niemiller and Miller, 2009; Camp and Jensen, 2015; Niemiller et al., 2016).

***Eurycea wallacei* (Carr, 1939) (SB) Georgia Blind Salamander**

Localities: Decatur Co.: Climax Cave (GDC36); Dougherty Co.: Deep well in Albany, Radium Springs (GDG39).

Conservation status: IUCN: Vulnerable; NatureServe: G2 (S1 in Georgia); listed as Threatened and considered a Species of Greatest Conservation Need in Georgia.

Comments: The type locality for this neotenic stygobite is a well near Albany in Dougherty County. It is found in subterranean waters of the Upper Floridan Aquifer in the Dougherty Plain of southeastern Georgia and adjacent northwestern Florida. *Eurycea wallacei* has been reported from seven sites, but only confirmed from Climax Cave in Decatur County and Radium Springs along the Flint River in Dougherty County (Means, 2005; Fenolio et al., 2013). There is an unconfirmed report from a spring cave in Baker County (Ben Martinez, pers. comm.).

Genus *Gyrinophilus*

***Gyrinophilus palleucus* McCrady, 1954 (SB) Tennessee Cave Salamander**

Localities: Walker Co.: Fricks Cave (GWK14), Harrisburg Cave (GWK85).

Conservation status: IUCN: Vulnerable; NatureServe: G2G3 (S1 in Georgia); listed as Threatened and considered a Species of Greatest Conservation Need in Georgia.

Comments: Although wide-ranging throughout south-central Tennessee and northern Alabama (Godwin, 2000; Miller and Niemiller, 2008,

2012), this neotenic stygobite is known from only two caves in Georgia (Buhlmann, 2001; Godwin, 2008; Miller and Niemiller, 2012).

***Gyrinophilus porphyriticus* (Green, 1827) (TP) Spring Salamander**

Localities: Dade Co.: Boxcar Cave (GDD69)*, Byers Cave (GDD66), Howards Waterfall Cave (GDD34)*, Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17), Limestone Caverns (GDD140)*, Longs Rock Wall Cave (GDD101)*, Sittons Cave (GDD9), SSS Cave (GDD229)*, Wild Bills Dakota Cave (GDD596)*; Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Gila Monster Cave (GWK379)*, Harrisburg Cave (GWK85), Mountain Cove Farm Cave No. 1 (GWK73), Mountain Cove Farm Cave No. 2 (GWK74), Nash Waterfall Cave (GWK72)*, Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Spooky Cave (GWK494)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4 in Georgia).

Comments: This species is common in caves throughout its range (Brandon, 1966; Cooper and Cooper, 1968; Miller and Niemiller, 2008), including several caves in Georgia (Buhlmann, 2001; Camp and Jensen, 2007).

Genus *Plethodon*

***Plethodon glutinosus* (Green, 1818) (TP) Northern Slimy Salamander**

Localities: Bartow Co.: Busch Cave (GBT611)*; Catoosa Co.: Crane Cave (GCZ80)*; Chattooga Co.: Parkers Cave (GKH119)*, Scoggins II Cave (GKH405)*; Dade Co.: Case Cavern (GDD1), Cemetery Pit (GDD64)*, Chambliss Cave (GDD321), Daniel Cave, Hooker Cave (GDD90)*, Howards Waterfall Cave (GDD34)*, Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17)*, Limestone Caverns (GDD140)*, Longs Creekside Cave (GDD45)*, Longs Rock Wall Cave (GDD101)*, Lower Valley Cave (GDD136)*, Morrison Spring Cave (GDD110)*, Sittons Cave (GDD9), SSS Cave (GDD229)*, Upper Valley Cave (GDD135)*, Wild Bills Dakota Cave (GDD596)*; Floyd Co.: Airport Cave (GFL189)*, Cave Springs Cave (GFL18)*, "Bear Bone Cave" (probably Silver Creek Cave) (GFL173)*; Polk Co.: White River Cave (GPO7)*; Walker Co.: Anderson Spring Cave (GWK46), Bible Spring Cave (GWK74)*, Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Gila Monster Cave (GWK379)*, Horseshoe Cave (GWK12)*, Kinda Pretty Cave (GWK258)*, LittleJohn Cave (GWK280)*, Lofton Cave (GWK281)*, Missing Evan Well Cave (GWK488)*, Mountain Cove Farm Cave No. 2 (GWK74), Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Roger Branch Cave (GWK204)*, Screech Owl Cave (GWK205), Slimy Slot Cave (GWK529)*, Smartt Farm Cave (GWK124)*, Spooky Cave (GWK494)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is a common inhabitant of caves throughout its range (Dodd et al., 2001; Lewis, 2005; Godwin, 2008; Niemiller and Miller, 2009; Niemiller et al., 2016), including Georgia (Buhlmann, 2001; Camp and Jensen, 2007).

***Plethodon petraeus* Wynn et al., 1988 (TP/TX) Pigeon Mountain Salamander**

Localities: Walker Co.: Harrisburg Cave (GWK85), Nash Waterfall Cave (GWK72)*, Pettijohns Cave (GWK29), Screech Owl Cave (GWK205).

Conservation status: IUCN: Vulnerable; NatureServe: G2 (S2 in Georgia); listed as Rare and considered a Species of Greatest Conservation Need in Georgia.

Comments: This species is endemic to Georgia, specifically on the eastern slope of Pigeon Mountain in Walker County. Although primarily associated with rock outcrops and exposures in hardwood forest, *P. petraeus* can be found around the entrances of some caves (Wynn et al., 1988; Camp and Jensen, 2007).

***Plethodon serratus* Grobman, 1944 (TX) Southern Red-backed Salamander**

Localities: Walker Co.: Anderson Spring Cave (GWK46), Fingerhole Cave (GWK259)*, Mouldy Bat Pit (GWK257)*, Pettijohns Cave (GWK29).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Unlike some other *Plethodon* salamanders, this species has rarely been reported from caves (Buhlmann, 2001).

***Plethodon ventralis* Highton, 1997 (TP/TX) Zigzag Salamander complex**

Localities: Dade Co.: Caboose Cave (GDD475)*, Case Caverns (GDD1)*, Daniel Cave, Hurricane Cave (GDD62)*, Howards Waterfall Cave (GDD34)*, Morrison Cave (GDD86)*, Rusty's Cave (GDD70)*, Sittons Cave (GDD9); Walker Co.: Anderson Spring Cave (GWK46)*, Harrisburg Cave (GWK85), Hogjowl Cave*, Horseshoe Cave (GWK12)*, Pettijohns Cave (GWK29), Screech Owl Cave (GWK205).

Conservation status: *Plethodon ventralis* - IUCN: Least Concern; NatureServe: G4 (S4 in Georgia); *P. dorsalis* - IUCN: Least Concern; NatureServe: G5 (SNR in Georgia);

Comments: *Plethodon dorsalis* and *P. ventralis* are closely related and difficult to distinguish morphologically. Some authors treat all populations in Georgia as *P. ventralis* (e.g., Camp, 2008); however, the contact zones between these two species have not been adequately delineated. Regardless, this complex is encountered regularly in caves (Buhlmann, 2001; Lewis, 2005; Camp and Jensen, 2007; Godwin, 2008; Niemiller and Miller, 2009).

**Genus *Pseudotriton*
Pseudotriton ruber (Sonnini de Manoncourt and Latreille, 1801) (TP) Red Salamander**

Localities: Dade Co.: Rusty's Cave (GDD70); Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Fricks Cave (GWK14)*, Harrisburg Cave (GWK85), Mountain Cove Farm Cave No. 2 (GWK74), Pigeon Cave (GWK57), Roger Branch Cave (GWK204)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is found frequently in the twilight zone and entrances of spring caves throughout the Interior Plateau and Appalachian karst regions (Buhlmann, 2001; Osbourn, 2005; Camp and Jensen, 2007; Miller et al., 2008; Niemiller and Miller, 2009; Niemiller et al., 2016). Reproduction in the dark zone of cave streams has been documented (Miller and Niemiller, 2005; Miller et al., 2008), including at Anderson Spring Cave in Walker County (Niemiller et al., 2006).

Family Salamandridae**Genus *Notophthalmus******Notophthalmus viridescens* (Rafinesque, 1820) (AC) Eastern Newt**

Localities: Dade Co.: Lower Valley Cave (GDD136)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Additional records of this species exist from caves in Alabama and Tennessee (Godwin, 2008; Niemiller and Miller, 2009).

Class Aves**Order Accipitriformes****Family Cathartidae****Genus *Cathartes******Cathartes aura* (Linnaeus, 1758) (TX/AC) Turkey Vulture**

Localities: Floyd Co.: Airport Cave (GFL189)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species nests on occasion at the entrances and within the twilight zones of caves (Coles, 1944; Lewis, 2005; Niemiller et al., 2016).

Order Passeriformes**Family Tyrannidae****Genus *Sayornis******Sayornis phoebe* (Latham, 1790) (TX) Eastern Phoebe**

Localities: Catoosa Co.: Chapmans Cave (GCZ25)*; Chattooga Co.: Subligna Cave (GKH145)*; Dade Co.: Sittons Cave (GDD9)*; Walker Co.: Mountain Cove Farm Cave #2 (GWK74)*, Anderson Springs Cave (GWK46)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species commonly nests in the entrances and twilight zones of caves in the TAG region (Lewis, 2005; Godwin, 2008; Niemiller et al., 2013, 2016).

Class Mammalia**Order Carnivora****Family Mustelidae****Genus *Neovision******Neovision vison* (Schreber, 1777) (AC) American Mink**

Localities: Walker Co.: Roger Branch Cave (GWK204)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This mustelid also has been observed near cave entrances infrequently in Tennessee (MLN, personal observation).

Family Procyonidae**Genus *Procyon******Procyon lotor* (Linnaeus, 1758) (TX) Raccoon**

Localities: Catoosa Co.: Chapmans Cave (GCZ25)*, Crane Cave (GCZ80)*; Chattooga Co.: Subligna Cave (GKH145)*; Dade Co.: Chambliss Cave (GDD321), Ha-ha Cave (GDD256), Trenton Bone Cave (GDD16)*; Lapp Hole; Floyd Co.: Cave Springs Cave (GFL18)*; Walker Co.: Bee Rock Cave (GWK123)*, Fricks Cave (GWK14)*, Horseshoe Cave (GWK12)*, Smartt Farm Cave (GWK124)*, Spooky Cave (GWK494)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Evidence of this species (tracks and scat) is common in caves throughout the central and eastern United States.

Order Chiroptera**Family Vespertilionidae*****Corynorhinus rafinesquii* (Lesson, 1827) (TX) Rafinesque's Big-eared Bat**

Localities: Rabun Co.: Bascoms Cave.

Conservation status: IUCN: Least Concern; NatureServe: G3G4 (S3 in Georgia); listed as Rare and considered a Species of Greatest Conservation Need in Georgia.

Comments: This bat is considered rare in Georgia and has only been documented at one cave in the state.

Genus *Eptesicus****Eptesicus fuscus* (Palisot de Beauvois, 1796) (TX) Big Brown Bat**

Localities: Floyd Co.: Osborn Cave (GFL220)*; Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7); Walker Co.: Fricks Cave (GWK14)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This species is observed frequently in TAG caves (Holliday, 2012; Flock, 2013, 2014; Niemiller et al., 2016), particularly in winter, but few records are known from caves in Georgia.

Genus *Lasiurus****Lasiurus borealis* Müller, 1776 (AC) Eastern Red Bat**

Localities: Dade Co.: Byers Cave (GDD66); Polk Co.: Deatons Cave (GPO5).

Conservation status: IUCN: Least Concern; NatureServe: G3G4 (S5 in Georgia).

Comments: This forest-dwelling bat has been reported from caves infrequently (Mohr, 1952; Myers, 1960; Niemiller et al., 2016).

Genus *Myotis****Myotis austroriparius* (Rhoads, 1897) (TX) Southeastern Myotis**

Localities: Decatur Co.: Climax Cave (GDC36); Grady Co.: Maloys Waterfall Cave (GGR27); Lee Co.: Choakee Cave (GLE575); Washington Co.: Sandersville Cave (GWS399).

Conservation status: IUCN: Least Concern; NatureServe: G4 (S3 in Georgia); considered a Species of Greatest Conservation Need in Georgia.

Comments: This is the most common *Myotis* species in caves of southwestern Georgia.

***Myotis grisescens* Howell, 1909 (TX) Gray Bat**

Localities: Catoosa Co.: Chickamauga Cave (GCZ106); Chattooga Co.: Welcome Hill Cave (GKH163), Lowry Cave (GKH206); Dade Co.: Sittons Cave (GDD9); Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7); Walker Co.: Anderson Spring Cave (GWK46), Fricks Cave (GWK14).

Conservation status: IUCN: vulnerable; NatureServe: G4 (S1 in Georgia); listed as Endangered under the U.S. Endangered Species Act; listed as Endangered and considered a Species of Greatest Conservation Need in Georgia.

Comments: In summer, this federally endangered bat is known to roost in just three caves in Chattooga, Walker, and Catoosa counties (Mar-

tin, 2007), although several additional occurrences exist. Unlike several *Myotis* species, *M. grisescens* does not appear to be nearly as susceptible to White-nose Syndrome.

***Myotis leibii* (Audubon and Bachman, 1842) (TX) Eastern Small-footed Bat**

Localities: Dade Co.: Case Cavern (GDD1), Howards Waterfall Cave (GDD34); Union Co.: cave near Young Harris.

Conservation status: IUCN: Endangered; NatureServe: G4 (S1 in Georgia).

Comments: This small bat is rarely observed in Georgia caves.

***Myotis lucifugus* (LeConte, 1831) (TX) Little Brown Bat**

Localities: Bartow Co.: Kingston Saltpeter Cave (GBT11); Dade Co.: Byers Cave (GDD66), Case Cavern (GDD1), Howards Waterfall Cave (GDD34), Sittons Cave (GDD9); Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7); Walker Co.: Anderson Spring Cave (GWK46), Ellisons Cave (GWK51), Fricks Cave (GWK14)*.

Conservation status: IUCN: Endangered; NatureServe: G3 (S3 in Georgia); considered a Species of Greatest Conservation Need in Georgia. Comments: This bat is encountered infrequently in Georgia caves during winter. Populations have sustained declines throughout its wide distribution in North America due to White-nose Syndrome. This species has not been observed during recent winter cave hibernacula surveys in Georgia (Morris and Ferrall, 2018).

***Myotis septentrionalis* (Trovessart, 1897) (TX) Northern Long-eared Bat**

Localities: Bartow Co.: Davis Farm Cave (GBT222)*, Kingston Saltpeter Cave (GBT11); Dade Co.: Byers Cave (GDD66), Case Cavern (GDD1), Johnsons Crook Cave (GDD17)*, Sittons Cave (GDD9); Pickens Co.: Long Swamp Creek Cave; Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7), Rabun Co.: Black Diamond Tunnel Cave; Walker Co.: Anderson Spring Cave (GWK46), Kinda Pretty Cave (GWK258)*, Nash Waterfall Cave (GWK72)*.

Conservation status: IUCN: Near Threatened; NatureServe: G1G2 (S1S3 in Georgia); listed as Threatened under the U.S. Endangered Species Act; listed as Threatened and considered a Species of Greatest Conservation Need in Georgia.

Comments: This species can be found in low numbers in Georgia caves during winter. However, it is one of the bat species most impacted by White-nose Syndrome. It is now listed as Threatened under the U.S. Endangered Species Act as of 2015. This species has not been observed during recent winter cave hibernacula surveys in Georgia (Morris and Ferrall, 2018).

***Myotis sodalis* Miller and Allen, 1928 (TX) Indiana Bat**

Localities: Chattooga Co.: Lowry Cave (GKH206); Dade Co.: Case Cavern (GDD1), Cave 4 mi W of Trenton, Sittons Cave (GDD9).

Conservation status: IUCN: Near Threatened; NatureServe: G2 (S1 in Georgia); listed as Endangered under the U.S. Endangered Species Act; listed as Endangered and considered a Species of Greatest Conservation Need in Georgia.

Comments: This bat is not commonly encountered in Georgia caves. Case Cavern and Sittons Cave are Priority 4 sites for this federally endangered species.

***Myotis* sp. (TX) A Bat**

Localities: Chattooga Co.: Subigna Cave (GKH145)*.

Comments: This record is probably *M. grisescens* but identification could not be confirmed.

Genus *Perimyotis*

***Perimyotis subflavus* (Cuvier, 1832) (TX) Tri-Colored Bat**

Localities: Bartow Co.: Alford's Cave, Anthonys Cave (GBT175)*, Chert Chasm (GBT340)*, Jolley Cave (GBT187), Kingston Saltpeter Cave (GBT11), Ladds Lime Cave (GBT384 to GBT389); Bleckley Co.: Whistling Cave/Taylor Cave (GBL460/GBL461); Catoosa Co.: Chapmans Cave (GCZ25), Chickamauga Cave (GCZ106)*, Welcome Hill Cave (GKH163), Lowry Cave (GKH206), Parkers Cave (GKH119), Smiths Cave, Subigna Cave (GKH145), Trion Dam Cave (GKH158); Dade Co.: Trenton Bone Cave (GDD16), Alabama-Georgia Cave (GDD511), Boxcar Cave (GDD69)*, Byers Cave (GDD66), Caboose Cave (GDD475)*, Case Cavern (GDD1), Cave 4 mi W of Trenton, Cemetery Pit (GDD64)*, Chambliss Cave (GDD321), Dead Horse Cave (GDD111), Gypsy Cave

(GDD32), Ha-ha Cave (GDD256), Howards Waterfall Cave (GDD34)*, Hurricane Cave (GDD62)*, Johnsons Crook Cave (GDD17)*, Lapp Hole, Longs Rock Wall Cave (GDD101)*, Lower Valley Cave (GDD136)*, Rising Fawn Exit Cave (GDD397), Rusty's Cave (GDD70)*, Sittons Cave (GDD9), SSS Cave (GDD229)*, Upper Valley Cave (GDD135)*; Decatur Co.: "Bainbridge in Powell Hill Cave", Climax Cave (GDC36)*; Floyd Co.: Cave Spring Cave (GFL18), Osborn Cave (GFL220), Spout Springs Cave (GFL150); Gordon Co.: Rusty Cable Cave (GGO297)*; Grady Co.: Biscuits and Gravy Cave (GGR602), Glory Hole (GGR56)*, Maloys Waterfall Cave (GGR27)*, Long Swamp Creek Cave; Polk Co.: Deatons Cave (GPO5), White River Cave (GPO7)*; Randolph Co.: Griens Cave (GRA40); Union Co.: "Young Harris Bat Caves" (GUN28, GUN391 & GUN392); Walker Co.: Allen Springs Cave (GWK318), Anderson Spring Cave (GWK46), Dry Creek, Ellisons Cave (GWK51), Fricks Cave (GWK14), Goat Cave (GWK184)*, Harris Cave, Horseshoe Cave (GWK12)*, Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Roger Branch Cave (GWK204)*, Shook Cave (GWK190), Spooky Cave (GWK494)*; Randolph Co.: J C Jones Cave (GRA207)*; Whitfield Co.: Ketchums Cave (GWT13).

Conservation status: IUCN: Vulnerable; NatureServe: G2G3 (S2 in Georgia); considered a Species of Greatest Conservation Need in Georgia.

Comments: This species is the most common bat observed in Georgia caves during winter where it can be found hibernating individually or in small clusters on cave walls and ceilings. Like several *Myotis* species, *P. subflavus* is susceptible to White-nose Syndrome and population declines have been noted for several Georgia caves based on recent winter cave hibernacula surveys (Morris and Ferrall, 2018).

Order Didelphimorphia

Family Didelphidae

Genus *Didelphis*

***Didelphis virginiana* Kerr, 1792 (AC) Virginia Opossum**

Localities: Walker Co.: Rocky Cave (GWK496)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S1 in Georgia).

Comments: Opossums have been reported from a few caves in the eastern United States (Dearolf, 1956; Cliburn and Middleton, 1983; Holter et al., in review).

Order Rodentia

Family Castoridae

Genus *Castor*

***Castor canadensis* Kuhl, 1820 (TX) American Beaver**

Localities: Walker Co.: Mountain Cove Farm Cave #2 (GWK74)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: A collection of beaver-chewn branches was present in the cave. Beavers are known to build lodges inside the entrances of stream caves (e.g., Gore and Baker, 1989; Niemiller et al., 2016).

Family Cricetidae

Genus *Neotoma*

***Neotoma floridana* (Ord, 1818) (TX) Eastern Woodrat**

Localities: Dade Co.: Afterbirth Cave (GDD153)*, Caboose Cave (GDD475)*, Case Cavern (GDD1), Jeff's Hole Cave (GDD400)*, Limestone Caverns (GDD140)*, Lower Valley Cave (GDD136)*, Sittons Cave (GDD9), SSS Cave (GDD229)*; Walker Co.: Anderson Spring Cave (GWK46), Bee Rock Cave (GWK123)*, Ellisons Cave (GWK51), Fingerhole Cave (GWK259)*, Fricks Cave (GWK14), Horseshoe Cave (GWK12)*, Kinda Pretty Cave (GWK258)*, Mouldy Bat Pit (GWK257)*, Mountain Cove Farm Cave #2 (GWK74)*, Nash Waterfall Cave (GWK72), Pettijohns Cave (GWK29), Pigeon Cave (GWK57), Rocky Cave (GWK496)*, Spooky Cave (GWK494)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Both *Neotoma floridana* and *N. magister* (Allegheny Woodrat) occur in Georgia, although the contact zone in Georgia is unclear. Here we treat all records as *N. floridana*, but note that some occurrences may represent *N. magister*. Several records are based on indirect evidence of inhabitation, such as the presence of latrines, caches, and nests.

Class Reptilia**Order Squamata****Family Colubridae****Genus *Carphophis******Carphophis amoenus* (Say, 1825) (AC) Eastern Worm Snake**

Localities: Walker Co.: Flowing Stone Cave (GWK524)*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: This accidental also has been reported from caves and mines in West Virginia (Pauley, 1993; Osbourn, 2005).

Genus *Cemophora****Cemophora coccinea* (Blumenbach, 1788) (AC) Scarlet Snake**

Localities: Greene Co.: Parrott Cave*.

Conservation status: IUCN: Least Concern; NatureServe: G5 (S4S5 in Georgia).

Comments: To our knowledge, this is the first report of this species from a cave.

Genus *Diadophis****Diadophis punctatus* (Linnaeus, 1766) (AC) Ringneck Snake**

Localities: Walker Co.: Screech Owl Cave (GWK205)*, Kinda Pretty Cave (GWK258).

Conservation status: IUCN: Least Concern; NatureServe: G5 (S5 in Georgia).

Comments: Records from caves likely represent individuals washed into caves during flood events or that fall into pits (e.g., Osbourn, 2005; Niemiller et al., 2016).

Genus *Nerodia****Nerodia sipedon* (Linnaeus, 1758) (AC) Northern Water Snake**

Localities: Walker Co.: Anderson Springs Cave (GWK46)*.

Comments: This species also has been reported from caves in West Virginia (Osbourn, 2005).

Order Testudines**Family Emydidae****Genus *Terrapene******Terrapene carolina* (Linnaeus, 1758) (AC) Eastern Box Turtle**

Localities: Dade Co.: Boxcar Cave (GDD69).

Conservation status: IUCN: Vulnerable; NatureServe: G5 (S5 in Georgia).

Comments: This species commonly falls into pits or washes into caves during flood events (e.g., Osbourn, 2005; Niemiller et al., 2016).

Discussion

Summary of biological records

Our review of biodiversity in Georgia caves and other subterranean habitats identified 281 species, including 228 invertebrates and 53 vertebrates (Table S3) represented by more than 1200 occurrence records. There are ~350 additional records of taxa that have not been identified to species (Table S2). Of the taxa identified to species, five phyla (Annelida, Arthropoda, Chordata, Mollusca, and Platyhelminthes) are represented. The arthropods are the most diverse group documented with 195 species, including 50 arachnids, 34 crustaceans, and 78 insects. Fifty-one cave-obligate species (34 troglobites and 17 stygobites) have been reported from Georgia, and as many as a dozen additional troglobionts have been mentioned in the literature but are undescribed.

The biodiversity of a few caves has been studied using baits and repeated visits (e.g., Reeves and McCreadie, 2001; Campbell et al., 2011, 2012; Disney and Campbell, 2011). The application of such approaches in Howards Waterfall Cave (Dade County, with 88 total records), Horseshoe Cave (Walker County, 68 records), Pettijohns Cave (Walker County, 64 records), and Byers Cave (Dade County, 61 records) have provided the broadest picture of Georgia cave biodiversity.

Vertebrates

Fifty-three species of vertebrates have been reported from Georgia caves, including four fishes, 27 amphibians, five reptiles, two birds, and 15 mammals (Table 1). Mammal diversity was predominantly bats, with ten species. Most vertebrates reported from Georgia caves are accidental or occasional visitors, but several species of salamanders are common in caves, such as *Eurycea lucifuga* and *Gyrinophilus porphyriticus*, as are several cave-roosting bats and woodrats. Three vertebrate species are considered cave-obligates: the cavefish *Typhlichthys subterraneus* and the salamanders *Eurycea wallacei* and *Gyrinophilus palleucus*. All three species are known from few (≤ 5) verified occurrences in the state, but also occur in adjacent states. The salamander *Plethodon petraeus* is endemic to Pigeon Mountain in Walker County. All the other vertebrates have been reported from caves in other states (Lewis, 2005; Godwin, 2008; Niemiller et al., 2016).

Bats

Ten species of bats have been reported from caves across Georgia, and the Tri-Colored Bat (*Perimyotis subflavus*) is known from more caves (67) in more counties (16) than any other animal in the state (Table 1). However, most bats are known from few caves, and cave-dwelling bats, in general, are of great conservation interest. Seven are “High Priority Species” in the current State Wildlife Action Plan (Georgia Department of Natural Resources; 2015) (Table 1). In addition, Rafinesque’s Big-eared Bat (*Corynorhinus rafinesquii*) is designated “Rare” by Georgia, the Northern Long-eared Bat (*Myotis septentrionalis*) is listed as “Threatened” under the U.S. Endangered Species Act and by the state of Georgia, and the Gray Bat (*Myotis grisescens*) and the Indiana Bat (*Myotis sodalis*) are both listed as “Endangered” under the U.S. Endangered Species Act and by the state of Georgia. Critical population centers for bats in Georgia include Fricks Cave in Walker County, which hosts a bachelor colony of Gray Bats during the summer, and Climax Cave in Decatur County, a major site for Southeastern Myotis (*Myotis austroriparius*). Fricks Cave is owned by the Southeastern Cave Conservancy, Inc. and is generally closed to visitation (currently it is open just one day a year during the winter).

Table 1. Ecological classification, conservation status, and number of Georgia caves and counties from which vertebrate species have been documented. .

Species	Ecological classification	IUCN Red List ^a	NatureServe status	Government status ^b	Caves/Wells ^c	Counties ^c	Georgia endemic?
Fishes							
<i>Ameiurus nebulosus</i>	SX/AC	LC	G5, S5		1	1	
<i>Cottus bairdii</i>	SP	LC	G5, S4		1	1	
<i>Cottus carolinae</i>	SP	LC	G5, S4		4	2	
<i>Typhlichthys subterraneus</i>	SB	VU	G4, S1	SE, SGCN	5	2	
Amphibians (Frogs and Toads)							
<i>Anaxyrus fowleri</i>	AC	LC	G5, S5		1	1	
<i>Anaxyrus terrestris</i>	AC	LC	G5, S5		1	1	
<i>Hyla chrysoceles</i>	TX/AC	LC	G5, S5		1	1	
<i>Hyla gratiosa</i>	AC	LC	G5, S5		1	1	
<i>Rana catesbeiana</i>	TX	LC	G5, S5		5	3	
<i>Rana clamitans</i>	TX	LC	G5, S5		9	5	
<i>Rana palustris</i>	TX	LC	G5, S4		11	2	
<i>Rana sphenoccephala</i>	TX/AC	LC	G5, S5		1	1	
<i>Pseudacris crucifer</i>	AC	LC	G5, S5		3	2	
<i>Pseudacris feriarum</i>	AC	LC	G5, S5		1	1	
Amphibians (Salamanders)							
<i>Ambystoma tigrinum</i>	AC	LC	G5, S3S4	SGCN	1	1	
<i>Aneides aeneus</i>	TX	NT	G3G4, S3	SR, SGCN	8	2	
<i>Desmognathus conanti</i>	AC	LC	G5, S5		8	3	
<i>Desmognathus ocoee</i>	AC	LC	G5, S5		1	1	
<i>Eurycea cirrigera</i>	TX	LC	G5, S5		6	4	
<i>Eurycea guttolineata</i>	TX	LC	G5, S4S5		2	2	
<i>Eurycea longicauda</i>	TP/TX	LC	G5, S4		11	3	
<i>Eurycea lucifuga</i>	TP	LC	G5, S4		52	9	
<i>Eurycea wallacei</i>	SB	VU	G2, S1	ST, SGCN	3	2	
<i>Gyrinophilus pallescens</i>	SB	VU	G2G3, S1	ST, SGCN	2	1	
<i>Gyrinophilus porphyriticus</i>	TP	LC	G5, S4		20	2	
<i>Notophthalmus viridescens</i>	AC	LC	G5, S5		1	1	
<i>Plethodon glutinosus</i>	TP	LC	G5, S5		44	7	
<i>Plethodon petraeus</i>	TP/TX	VU	G2, S2	SR, SGCN	4	1	Yes
<i>Plethodon serratus</i>	TX	LC	G5, S5		4	1	
<i>Plethodon ventralis</i>	TP/TX	LC	G4, S4		14	2	
<i>Pseudotriton ruber</i>	TP	LC	G5, S5		8	2	
Reptiles (Snakes)							
<i>Carphophis amoenus</i>	AC	LC	G5, S5		1	1	
<i>Cemophora coccinea</i>	AC	LC	G5, S4S5		1	1	
<i>Diadophis punctatus</i>	AC	LC	G5, S5		2	1	
<i>Nerodia sipedon</i>	AC	LC	G5, S5		1	1	
Reptiles (Turtles)							
<i>Terrapene carolina</i>	AC	VU	G5, S5		1	1	
Birds							
<i>Cathartes aura</i>	TX/AC	LC	G5, S5		1	1	
<i>Sayornis phoebe</i>	TX	LC	G5, S5		4	4	
Mammals (Bats)							
<i>Corynorhinus rafinesquii</i>	TX	LC	G3G4, S3	SR, SGCN	1	1	
<i>Eptesicus fuscus</i>	TX	LC	G5, S5		4	3	

Table 1. (Continued).

Species	Ecological classification	IUCN Red List ^a	NatureServe status	Government status ^b	Caves/Wells ^c	Counties ^c	Georgia endemic?
<i>Lasiurus borealis</i>	AC	LC	G3G4, S5		2	2	
<i>Myotis austroriparius</i>	TX	LC	G4, S3	SGCN	4	4	
<i>Myotis grisescens</i>	TX	VU	G4, S1	FE, SE, SGCN	8	5	
<i>Myotis leibii</i>	TX	EN	G4, S2		3	2	
<i>Myotis lucifugus</i>	TX	EN	G3, S1	SGCN	10	4	
<i>Myotis septentrionalis</i>	TX	NT	G1G2, S2S1	FT, ST, SGCN	13	6	
<i>Myotis sodalis</i>	TX	NT	G2, S1	FE, SE, SGCN	4	2	
<i>Perimyotis subflavus</i>	TX	VU	G2G3, S2	SGCN	67	16	
Mammals (non-Bats)							
<i>Castor canadensis</i>	TX	LC	G5, S5		1	1	
<i>Didelphis virginiana</i>	AC	LC	G5, S5		1	1	
<i>Neovision vison</i>	AC	LC	G5, S5		1	1	
<i>Neotoma floridana</i>	TX	LC	G5, S5		22	2	
<i>Procyon lotor</i>	TX	LC	G5, S5		13	5	

^aIUCN Red List: LC = Least Concern, VU = Vulnerable, NT = Near Threatened, EN = Endangered

^bGovernment Status: FE = Federally Endangered, FT = Federally Threatened, SE = State Endangered, ST = State Threatened, SR = State Rare, SGCN = Species of Greatest Conservation Need (= State Wildlife Action Plan High Priority Species)

^cCaves/Wells and Counties refer to sites in Georgia only

Ecological classifications include: TB = Troglonote, SB = Stygobiont, TP = Troglophile, SP = Stygophile, TX = Troglone, SX = Stygone, and AC = Accidental. IUCN Red List categories include: LC = Least Concern, VU = Vulnerable, NT = Near Threatened, EN = Endangered. Government status categories include: FE = Federally Endangered, FT = Federally Threatened, SE = State Endangered, ST = State Threatened, SR = State Rare, SGCN = Species of Greatest Conservation Need (= State Wildlife Action Plan High Priority Species)

Table 2. Ecological classification, conservation status, and number of Georgia caves and counties from which troglobionts have been documented. Abbreviations are the same as in Table 1, with the addition of SY = Symbiont.

Species	Ecological classification	IUCN Red List ^a	NatureServe status	Government status ^b	Caves/Wells ^c	Counties ^c	Georgia endemic?
Arachnids (pseudoscorpions)							
<i>Apochthonius minor</i>	TB		G1, SNR		2	2	Yes
<i>Hesperochernes mirabilis</i>	TB		G5, SNR		16	5	
<i>Kleptochthonius magnus</i>	TB		G1, SNR		2	2	
Arachnids (spiders)							
<i>Appaleptoneta fiskei</i>	TB		GNR, SNR		2	1	Yes
<i>Liocranoides unicolor</i>	TB		G5, SNR		7	3	
<i>Nesticus georgia</i>	TB		G1G2, SNR		3	1	Yes
<i>Ozarkia georgia</i>	TB		GNR, SNR		3	1	Yes
<i>Phanetta subterranea</i>	TB		G5, SNR		12	3	
<i>Porrhomma cavernicola</i>	TB		G5, SNR		1	1	
Crustaceans (amphipods)							
<i>Crangonyx antennatus</i>	SB		G5, SNR		22	5	
<i>Stygobromus ackerlyi</i>	SB		G1G2, SNR		3	3	Yes
<i>Stygobromus dicksoni</i>	SB		G5, SNR		7	3	
<i>Stygobromus doughertyensis</i>	SB		GNR, SNR		1	1	
<i>Stygobromus grandis</i>	SB		G1, SU		1	1	Yes
<i>Stygobromus minutus</i>	SB		G2G3, SU		2	1	Yes
Crustaceans (copepods)							
<i>Megacyclops donaldsoni</i>	SB		G3G4, SNR		1	1	
Crustaceans (crayfish)							
<i>Cambarus cryptodytes</i>	SB	LC	G2G3, S2	ST, SGCN	17	8	
Crustaceans (isopods)							
<i>Amerigoniscus curvatus</i>	TB		G1, SU		1	1	Yes
<i>Amerigoniscus georgiensis</i>	TB		G1, SU		1	1	Yes
<i>Amerigoniscus proximus</i>	TB		G1G2, SNR		2	2	Yes
<i>Caecidotaea cyrtorhynchus</i>	SB		G1, SU		3	1	Yes
<i>Caecidotaea hobbsi</i>	SB		G2G3, SNR		1	1	

Table 2. (Continued).

Species	Ecological classification	IUCN Red List ^a	NatureServe status	Government status ^b	Caves/Wells ^c	Counties ^c	Georgia endemic?
Crustaceans (isopods)							
<i>Caecidotea nickajackensis</i>	SB		GH, SNR		1	1	
<i>Caecidotea putea</i>	SB		G1G2, SNR		2	2	
<i>Caecidotea richardsonae</i>	SB		G5, SNR		16	5	
Crustaceans (ostracods)							
<i>Uncinocythere warreni</i>	SB/SY		G1, SU		1	1	Yes
Diplurans							
<i>Litocampa cookei</i>	TB		G5, SNR		1	1	
Insects (beetles)							
<i>Batriasymmodes spelaeus</i>	TB/TP		G3G4, SNR		4	3	
<i>Pseudanophthalmus digitus</i>	TB		G1G2, SNR		3	1	
<i>Pseudanophthalmus fastigatus</i>	TB		G1, S1?		1	1	Yes
<i>Pseudanophthalmus fulleri</i>	TB		G2G3, SNR		12	1	
<i>Pseudanophthalmus georgiae</i>	TB		G1G2, S1?		4	2	Yes
<i>Ptomaphagus fiskei</i>	TB		G1G2, SNR		10	1	Yes
<i>Ptomaphagus whiteselli</i>	TB		G2G3, SNR		8	1	
Insects (flies)							
<i>Spelobia tenebrarum</i>	TB		G5, SNR		12	3	
Springtails							
<i>Pseudosinella christianseni</i>	TB		G5, SNR		15	2	
<i>Pseudosinella hirsuta</i>	TB		G5, SNR		15	5	
<i>Pseudosinella pecki</i>	TB		G2G3, SNR		2	2	
<i>Pseudosinella spinosa</i>	TB		G5, SNR		1	1	
Myriapods (millipedes)							
<i>Ameractis satis</i>	TB/TP		G2G4, SNR		1	1	
<i>Pseudotremia aeacus</i>	TB		G1G2, SNR		2	1	
<i>Pseudotremia eburnea</i>	TB		G2G4, SNR		15	2	
<i>Scoterpes austrinus</i>	TB		G3G4, SNR		16	3	
<i>Scoterpes nudus</i>	TB		G3G4T1T2, SNR		3	2	Yes
<i>Scoterpes willreevesi</i>	TB		GNR, SNR		2	1	
Snails							
<i>Glyphyalinia specus</i>	TB	LC ^d	G3, SNR		6	3	
<i>Helicodiscus barri</i>	TB	LC ^d	G3, SNR		2	2	
Flatworms							
<i>Sphalloplana georgiana</i>	SB		G1, SNR		1	1	Yes
Vertebrates (fish, salamanders)							
<i>Eurycea wallacei</i>	SB	VU	G2, S1	ST, SGCN	3	2	
<i>Gyrinophilus palleucus</i>	SB	VU	G2G3, S1	ST, SGCN	2	1	
<i>Typhlichthys subterraneus</i>	SB	VU	G4, S1	ST, SGCN	5	2	

^aIUCN Red List: LC = Least Concern, VU = Vulnerable^bGovernment Status: SE = State Endangered, ST = State Threatened, SGCN = Species of Greatest Conservation Need (= State Wildlife Action Plan High Priority Species)^cA count of the number of occurrences. Caves/Wells and Counties refer to sites in Georgia only^dAfter Gladstone et al. 2018

Many bat populations across eastern North America are in decline as a result of White-nose Syndrome (WNS), which is caused by the fungus *Pseudogymnoascus destructans* (Blehert et al., 2009). First confirmed in northwestern Georgia during the winter of 2012–2013, WNS is now known from many counties in north Georgia (<https://www.white-nosesyndrome.org/spreadmap>). Over the past decade, WNS has impacted some cave-dwelling bats more than others; Tri-Colored Bats, Northern Long-eared Bats, Indiana Bats, and Little Brown Bats (*Myotis lucifugus*) have suffered steep population declines, whereas Gray Bats and Big Brown Bats (*Eptesicus fuscus*) have not (Francl et al., 2012; Campbell, 2017; Morris and Ferrall, 2018). Declines in bat populations, especially over such rapid timescales, will undoubtedly af-

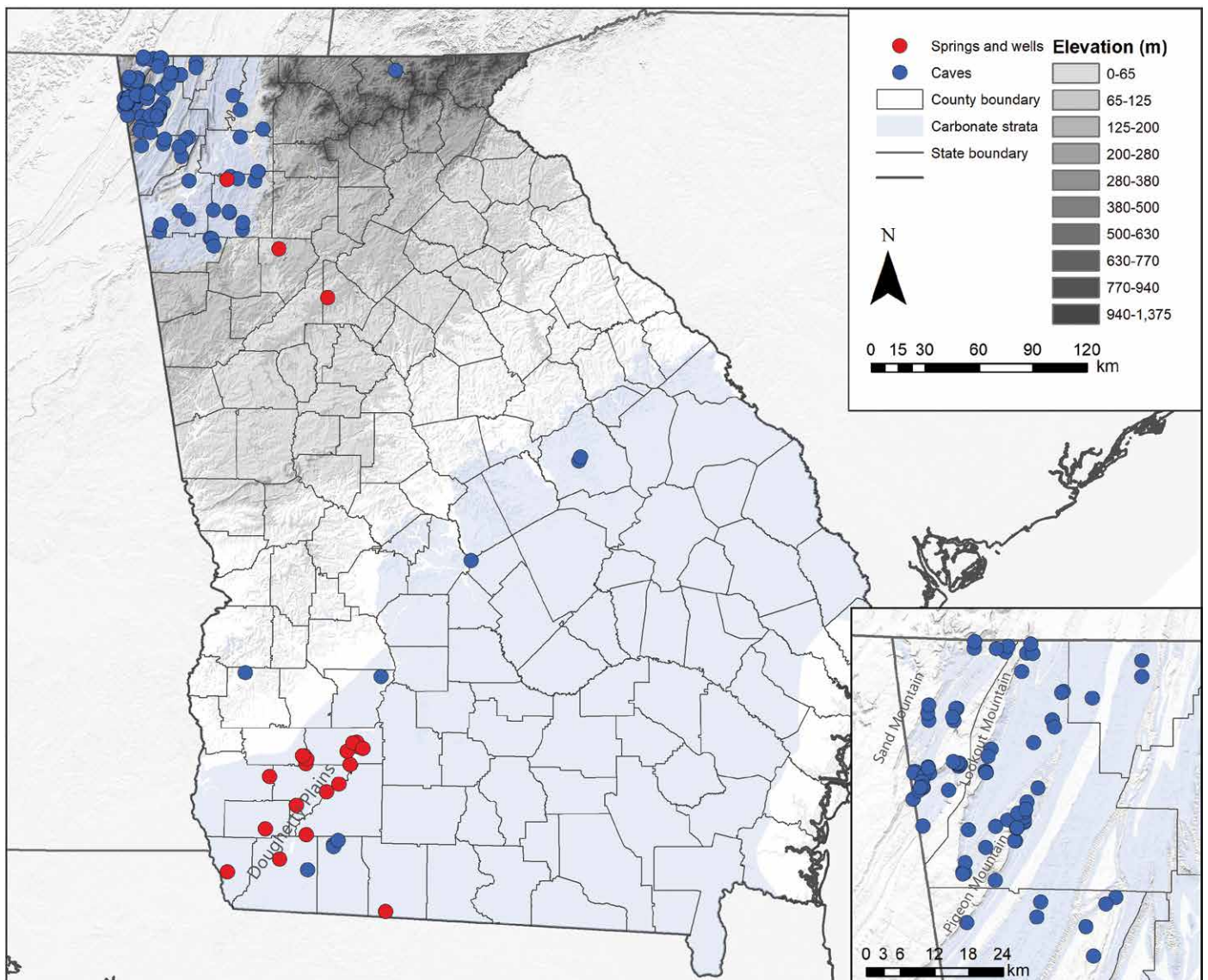


Figure 1. Distribution of the 142 georeferenced subterranean sites with biological records in Georgia. Caves are indicated by blue points, springs and wells by red points. Carbonate (karst) strata are indicated by light blue shading. An enlarged view of northwest Georgia is provided in the inset at the lower right. Geographic features mentioned in the paper are labeled. Cave locality data are from the Georgia Speleological Survey.

fect cave ecosystems because cave-dwelling bats are an important link between surface resources and cave habitats.

Troglobionts

Fifty-one species reported from caves in Georgia are considered troglobionts (34 terrestrial and 17 aquatic). Troglotic diversity includes four phyla (Arthropoda, Mollusca, Platyhelminthes, and Chordata). Troglotic species richness in Georgia is dominated by arthropods (45 species), distributed across the major arthropod subgroups of crustaceans (17 species), hexapods (13), arachnids (9), and myriapods (6). Two snails, one flatworm, and three vertebrates compose the remainder of the described troglotic fauna in the state (Table 2).

Biogeography

Nearly half of the Georgia's troglobionts are found in one of three geographically and hydrogeologically distinct areas: (1) west of Lookout Mountain in Lookout Valley; (2) east of Lookout Mountain, and (3) in the Dougherty Plains (Fig. 1). The taxa composing each group have ranges that do not overlap with members of the other groups.

Lookout Valley, primarily in Dade County, Georgia, is located west of Lookout Mountain and east of Sand Mountain (Fig. 1). This area is the southernmost extension of the Cumberland Plateau. Lookout Valley extends beyond Dade County to the north into Hamilton County, Tennessee, and to the south into DeKalb County, Alabama. At least seven troglobionts appear to be limited to Lookout Valley – the millipedes *Scoterpes willreevesi* and *Pseudotremia aeacus*, the

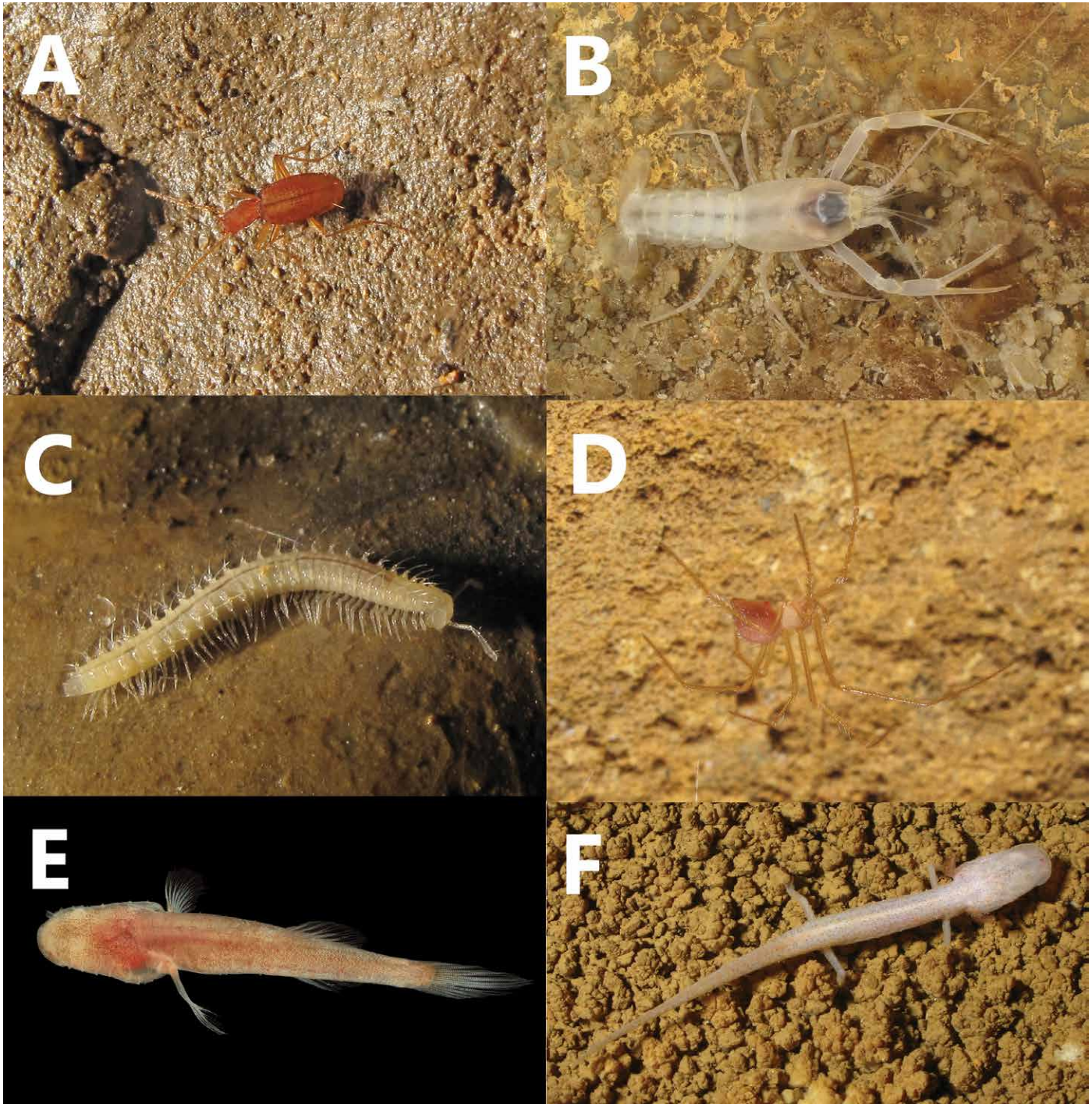


Figure 2. Representative troglobiotic fauna from Georgia caves: A) *Pseudanophthalmus* sp. from Four Kings Cave, Walker County; B) *Cambarus cryptodytes* from Climax Cave, Decatur County; C) *Scoterpes nudus* from White River Cave, Polk County; D) *Nesticus georgia* from Case Cave, Dade County; E) *Typhlichthys subterraneus* from Crane Cave, Catoosa County; and F) *Eurycea wallacei* from Salamander Cave, Jackson County, Florida. Photographs by Alan Cressler.

beetles *Ptomaphagus whiteselli*, *Pseudanophthalmus digitus*, and *Pseudanophthalmus fulleri*, and the spiders *Nesticus georgia* and *Ozarkia georgia*. The single-cave endemic flatworm *Sphalloplana georgiana* is another species known only from Lookout Valley, but unidentified *Sphalloplana* have been reported from Walker County, which may indicate a wider range for the species.

A second biogeographic group is located east of Lookout Mountain in Walker and Chattooga counties (Fig. 1). This group includes the beetles *Ptomaphagus fiskei* and *Pseudanophthalmus georgia*, the isopod *Caecidotea cyrtorhynchus*, the amphipod *Stygobromus minutus*, and the spider *Appaleptoneta fiskei*. In addition, four single-cave endemic

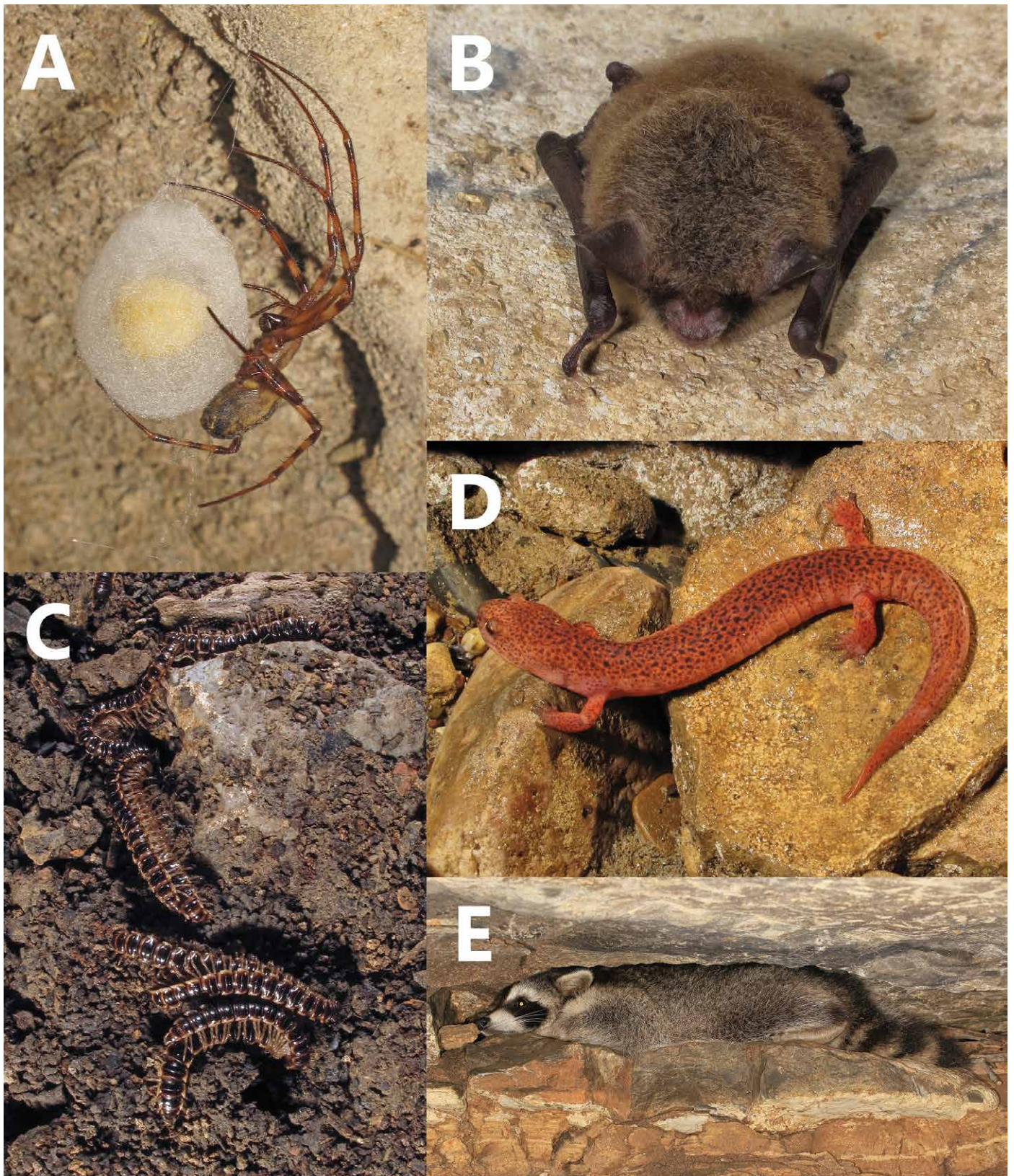


Figure 3. Representative non-troglobiotic fauna from Georgia caves: A) female *Meta ovalis* with egg case from Four Kings Cave, Walker County; B) *Myotis lucifugus* from Fricks Cave, Walker County; C) *Oxidus gracilis* from White River Cave, Polk County; D) *Pseudotriton ruber* from Fricks Cave, Walker County; and E) *Procyon lotor* from Trenton Bone Cave, Dade County. Photographs by Alan Cressler.

species are found in this region: the beetle *Pseudanophthalmus fastigatus*, the amphipod *Stygobromus grandis*, and the isopods *Amerigoniscus curvatus* and *A. georgiensis*. The troglophilic springtail *Pseudosinella georgia* is also known only from this area. Within this group, there is a cluster of troglobionts limited to Pigeon Mountain – *C. cyrtorhynchus*, *S. minutus*, *A. fiskei*, and an undescribed *Nesticus* species. The cave-associated Pigeon Mountain Salamander (*Plethodon petraeus*) is also limited to Pigeon Mountain. Slightly further south, the millipede *Scoterpes nudus* and the amphipod *Stygobromus ackerlyi* are limited to caves in Bartow, Floyd, and Polk counties.

Lastly, several stygobitic taxa are limited to the Floridan aquifer system of the Dougherty Plains in southwestern Georgia near the Georgia-Alabama-Florida state junction (Fig. 1). The Dougherty Plains Cave Crayfish (*Cambarus cryptodytes*) is known from seven counties in Georgia (Fenolio et al., 2017), with a range that extends into Florida. The Georgia Blind Salamander (*Eurycea wallacei*) shares a similar range (Fenolio et al., 2013), as does the amphipod *Stygobromus doughertyensis* (Cannizaro et al., 2019). The single-cave endemic ostracod *Ucinocythere warreni* is known only from its host *C. cryptodytes*.

The remaining half of Georgia's troglobionts are found in one or more of the biogeographic clusters described above, and some have ranges that include much of the southern Appalachians and Interior Low Plateaus. Within these species, at least three patterns are present: (1) two stygobionts, the amphipod *Crangonyx antennatus* and the isopod *Caecidotea richardsonae*, are common throughout the Appalachian Valley and Ridge, ranging from southern Virginia into Alabama; (2) two vertebrates, the Tennessee Cave Salamander (*Gyrinophilus palleucus*) and the Southern Cavefish (*Typhlichthys subterraneus*), are widespread west of the Cumberland Plateau (Niemiller et al., 2008; 2012) and appear to have spread east via the ancestral Tennessee River and associated drainage network into one or a few sites in northwestern Georgia (e.g., Niemiller et al., 2016); and, (3) a few of species are widespread in caves across the southern Appalachians and the Interior Low Plateaus, such as the spiders *Phanetta subterranea* and *Porrhomma cavernicola*, the fly *Spelobia tenebrarum*, the pseudoscorpion *Hesperochnes mirabilis*, and the springtail *Pseudosinella hirsuta* (Christman and Culver, 2001). Some of these taxa may represent cryptic species complexes of morphologically similar, yet genetically distinct, lineages. Cryptic diversity is a common discovery from phylogeographic studies of subterranean organisms (e.g., Bradford et al., 2010; Niemiller et al., 2012; Katz et al., 2018). The remaining troglobionts in Georgia do not fit into the patterns described above. Species from poorly known groups, like pseudoscorpions and springtails, compose many of the remaining taxa. For some species, a lack of records prevents any confident description of their distribution within Georgia and beyond.

Endemism

Troglobionts typically exhibit high rates of endemism (Christman et al., 2005), and we noted this pattern in the Georgia fauna. Seventeen of the 51 (33 %) troglobionts known from Georgia are endemic to the state (Table 2). Thirteen of these species (26 %) are limited to a single county, and six species (12 %) are known from a single cave. These single-cave endemics are the beetle *Pseudanophthalmus fastigatus* (Horseshoe Cave, Walker County), the flatworm *Sphalloplana georgiana* (Howards Waterfall Cave, Dade County), the isopods *Amerigoniscus curvatus* (Horseshoe Cave, Walker County) and *A. georgiensis* (Pettijohns Cave, Walker County), the amphipod *Stygobromus grandis* (Parkers Cave, Chattooga County), and the ostracod *Ucinocythere warreni* (Climax Cave, Decatur County). Several other cave-associated non-troglobionts, such as the Pigeon Mountain Salamander, the springtail *Pseudosinella georgia*, the caddisfly *Diplectrona marianae*, and the spiders *Pholcus dade* and *Pholcus lanieri*, are also endemic to Georgia and have highly restricted ranges.

Hotspots of troglobionts

Troglobionts are not uniformly distributed across Georgia. Of the 670 caves known in the state, only 22 (3.2 %) are known to host five or more troglobionts, with 11 of those caves being in Dade County, nine in Walker County, and two in Chattooga County. Eight caves support ten or more troglobionts, these are: Pettijohns Cave (14 troglobionts), Byers Cave (13), Johnsons Crook Cave (12), Mountain Cove Farm Cave No. 1 (11), Howards Waterfall Cave (11), Cemetery Pit (11), Morrisons Cave (10), and Sittons Cave (10). Of these caves, six are in Dade County and two (Pettijohns Cave and Mountain Cove Farm Cave No. 1) are in Walker County. Maximum troglobiont diversity per cave is not as high in Georgia as in Tennessee, which has 24 troglobionts known from the Wonder/Crystal Cave system in Grundy County, or Alabama, where 24 troglobionts are known from Shelta Cave in Madison County. However, both Pettijohns Cave and Byers Cave would rank in the top ten caves in the state of Tennessee in terms of total troglobionts (Niemiller and Zigler, 2013).

Conservation considerations

The cave fauna of Georgia is diverse and includes numerous species of conservation concern, as well as many species with highly restricted ranges. This review provides background for conservation efforts related to cave biodiversity in Georgia.

Species of conservation concern and threats to subterranean ecosystems. Many of the species found in Georgia caves are at an elevated risk of extinction because of their extremely small ranges. Of the troglobionts, 17 (33 %) are ranked “G1—Critically Imperiled” under NatureServe criteria, and the four troglobionts not ranked by NatureServe would likely be considered “G1” as well (Table 2). All of these species are considered short-range cave endemics (e.g., Niemiller et al., 2017), known from just a few sites within a limited geographic area. In addition, the Southern Cavefish, the Tennessee Cave Salamander, and the Dougherty Plains Cave Crayfish are ranked “S1—Critically Imperiled” in Georgia (Table 2). Although all three species are more wide-ranging in adjacent states, they are intrinsically vulnerable to extinction, as are most troglobionts (Culver et al., 2006; Culver and Pipan, 2009; Niemiller et al., 2018).

Cave communities can be impacted by modification of the surface landscape around caves and cave entrances, by water pollution that enters or moves through caves, or by human disturbance of cave habitats and populations. In the longer term, climate change may impact caves due to changing temperature and precipitation patterns, and indirectly by any changes in forest cover that result. In addition, the emerging infectious disease WNS has been present in Georgia for less than a decade. It appears to be affecting bat populations, in particular those of the Tri-Colored Bat, the most commonly encountered cave bat in Georgia (Morris and Ferrall, 2018). It will be some time before we reach a new steady state for bat population densities and distributions.

Caves on protected lands. Our Annotated List shows that, after half a century of work, there is a good deal known about cave biodiversity in Georgia. There are biological records from 18 % (121 of 670) of Georgia caves, a higher frequency than reported for Tennessee, where 7 % of caves have records of troglobionts (Niemiller and Zigler, 2013). In addition, a remarkably large proportion of the caves in Georgia are on protected lands. According to the records of the Georgia Speleological Survey, 165 caves are on property owned by federal, state, or local government. Government landholdings with significant numbers of caves include Chickamauga and Chattanooga National Military Park, Crockford-Pigeon Mountain Wildlife Management Area, and Cloudland Canyon State Park. At least 60 other caves are located on property owned or managed by land trusts, the Southeastern Cave Conservancy, Inc., or the National Speleological Society. In combination, around one third of all caves in Georgia are located on protected lands. Notably, many caves of particular biological importance are protected. For instance, of the eight caves known to host the ten or more troglobionts, seven are on protected lands. Several of these caves are well known (e.g., Pettijohns Cave, Howards Waterfall Cave), and receive regular visitation, which may be detrimental to cave communities.

Cave biodiversity knowledge shortfalls. Although much is known about cave biodiversity in Georgia, significant knowledge gaps remain, similar to subterranean biodiversity globally (Niemiller et al., 2018; Ficetola et al., 2019; Mammola et al., 2019). Although state-level conservation assessments for vertebrates are almost universally complete, such assessments are almost completely lacking for invertebrates (Tables 1, 2, and S3). Of the 49 invertebrate troglobionts known in Georgia, only one, the Dougherty Plains Cave Crayfish, has a state (“S”) ranking under the NatureServe system, and only six have been ranked using IUCN Red List criteria (Table 2). As many of these invertebrates have highly restricted distributions, state-level conservation assessments are particularly valuable. Most of the species have global (“G”) rankings (Table 2), which should facilitate developing state rankings for the species. As models for how this could be done, recently published conservation assessments for *Bactrurus* cave amphipods (Niemiller and Taylor, 2016) and cave snails of the Interior Low Plateau and Appalachians karst regions (Gladstone et al., 2018) implemented both NatureServe and IUCN Red List assessment criteria, while Hutchins (2018) evaluated the conservation status of Texas groundwater invertebrates using the NatureServe methodology.

For most troglobionts in Georgia, we lack information about population sizes, population trends, and species distributions (i.e., the Prestonian and Wallacean shortfalls; Lomolino, 2004; Cardoso et al., 2011). Of the 17 troglobionts endemic to Georgia, only one is known from more than four sites (Table 2). In many cases, species are known from just one or a few collections, which limits our ability to assess population trends or persistence. As a specific example, the single-cave endemic beetle *Pseudanophthalmus fastigatus* was described from just two specimens collected in 1967 from Horseshoe Cave in Walker County. This species has not been collected since, and recent work in the cave (Reeves and McCreddie, 2001; this study) did not rediscover this population. Recent work on other *Pseudanophthalmus* species in Tennessee has shown that focused efforts often confirm the presence of long-lost populations and uncover new populations (Niemiller et al., 2017). Similar efforts are warranted for the many poorly-known troglobionts in Georgia.

More than two dozen undescribed species have been collected in caves in Georgia (Table 3). About half of these taxa are likely troglobionts, indicating a significant proportion of troglobiotic diversity in Georgia has not yet been described (i.e., the Linnaean shortfall; Brown and Lomolino, 1998). As discussed by Culver et al. (2013), not all of these taxa may turn out to be new species once they have been examined by taxonomic experts, but it is likely that many of them will be formally described. These taxa are dispersed across the major groups of arthropods and across the major karst regions of Georgia. As far as is currently known, many of these taxa could be single-cave endemics, which makes them conservation concerns. A full understanding of Georgia cave biodiversity will require the taxonomic evaluation of these taxa.

Table 3. Undescribed species reported from caves in Georgia.

Taxon	Cave(s)	Comments	References
Arachnids (harvestmen)			
Phalangodidae: <i>Bishopella</i>	Dade County: Howards Waterfall Cave	Described as “potentially troglotic.”	Reeves et al. (2000)
Arachnids (mites)			
Rhagidiidae: <i>hagidia</i>	Bartow County: Kingston Saltpeter Cave; Dade County: Byers Cave, Morrison Cave; Walker County: Bible Springs Cave, Pettijohns Cave		Holsinger and Peck (1971)
Arachnids (pseudoscorpions)			
Chthoniidae: <i>Aphrastochthonius</i>	Dade County: Byers Cave, Longs Rock Wall		Campbell et al. (2012); this study
Chthoniidae: <i>Apochthonius</i>	Chattooga County: Parker Cave	One large female from entrance zone.	this study
Chthoniidae: <i>Chthonius</i>	Walker County: Howards Waterfall Cave, Horseshoe Cave	Two undescribed species represented.	this study
Chthoniidae: <i>Kleptochthonius</i>	Walker County: Rumble Rock Canyon Cave		this study
Chthoniidae: <i>Mundochthonius</i>	Chattooga County: Parker Cave	Many collected from entrance zone.	Muchmore unpublished; this study
Chthoniidae	Walker County: Mt. Cove Farm Cave	From gut of <i>Eurycea lucifuga</i> found in dark zone. Partial specimen of an adult male. “Potentially new” because he did not place it in a genus.	Muchmore unpublished
Neobisiidae: <i>Lissocreagris</i>	Walker County: Pettijohn Cave	Small, eyeless.	Holsinger and Peck (1971); Muchmore unpublished; this study
Neobisiidae: <i>Microcreagris</i> (sensu lato)	Dade County: Johnson Crook Cave	Potentially an error, not in Muchmore’s material. Most Nearctic <i>Microcreagris</i> were transferred to other genera by Čurčić (1981, 1984, 1989).	Holsinger and Peck (1971); Muchmore unpublished; this study
Neobisiidae: <i>Microcreagris</i> (sensu lato)	Dade County: Hooker Cave		this study
Arachnids (spiders)			
Linyphiidae: <i>Anibontes</i>	Chattooga County: Parkers Cave		this study
Nesticidae: <i>Nesticus</i> n. sp. 1	Walker County: Anderson Spring Cave, Matthew Sink, Pigeon Cave (also possibly Mouldy Bat Pit and Fingerhole Cave)	All sites on Pigeon Mountain. Eyeless.	Buhlmann (2001); Jensen and Ozier; this study
Nesticidae: <i>Nesticus</i> n. sp. 2	Walker County: Lula Falls Cave	Eyed.	this study
Pholcidae: <i>Pholcus</i>	Bartow County: Ladds Lime Cave; Dade County: Hurricane Cave, Sittons Cave; Walker County: Fricks Cave, Spooky Cave	Described as “several undescribed species of <i>Pholcus</i> .”	Reeves et al. (2000)
Crustaceans (amphipods)			
Crangonyctidae: <i>Stygobromus</i>	Dade County: Boxcar Cave, Caboose Cave		Jensen and Ozier

Table 3. (Continued).

Taxon	Cave(s)	Comments	References
Crustaceans (isopods)			
Trichoniscidae: <i>Miktoniscus</i>	Bartow County: Anthonys Cave; Chattooga County: Blowing Springs Cave, Parker Cave; Dade County: Howards Waterfall Cave, Sittons Cave; Decatur County: Climax Cave; Randolph County: Griers Cave; Walker County: Horseshoe Cave, Spooky Cave	May represent <i>M. alabamensis</i> or undescribed species.	Holsinger and Peck (1971); Muchmore unpublished; Reeves et al. (2000)
Diplurans			
Campodeidae	Bartow, Chattooga, Dade, Floyd, Walker Counties: 26 total sites	These records likely represent multiple undescribed species.	Holsinger and Peck (1971), Reeves et al. (2000), Buhlmann (2001), this study
Insects (beetles)			
Staphylinidae: <i>Speleochus</i>	Walker County: Pigeon Cave		Buhlmann (2001)
Staphylinidae: <i>Subterrochus</i>	Walker County: Mountain Cove Farm Cave		Holsinger and Peck (1971)
Insects (flies)			
Sciaridae: <i>Lycoriella</i>	Bartow County: Anthonys Cave; Dade County: Deans Pit, Newsome Gap Cave; Walker County: Pettijohns Cave, Horseshoe Cave	Described as "cavernicolous"	Reeves et al. (2000)
Insects (silverfish)			
Nicoletiidae: <i>Nicoletia</i>	Walker County: Horseshoe Cave		Holsinger and Peck (1971)
Myriapods (centipedes)			
Lithobiidae: <i>Pampibius</i>	Walker County: Cave Spring Cave		Holsinger and Peck (1971)
Myriapods (millipedes)			
Cleidogonidae: <i>Pseudotremia</i> n. sp. 1	Dade County: Howards Waterfall Cave	Identified by W. Shear	this study
Cleidogonidae: <i>Pseudotremia</i> n. sp. 2	Dade County: Hooker Cave	Also collected in adjacent Hamilton Co., TN. Identified by W. Shear	this study

Recommendations and Conclusions

Many opportunities to improve our understanding of cave biodiversity in Georgia exist, including addressing the knowledge shortfalls by (1) conducting state-level conservation assessments of cave invertebrates, (2) focusing efforts to increase our knowledge on the ecology and life history of poorly-known and highly endemic troglobionts, and (3) supporting further study of the many undescribed taxa that have been reported. In addition, conservation resources could be focused on caves of biological interest. It is an important observation that many of the most biodiverse caves in Georgia are already on protected lands. Managing these sites for cave biodiversity is particularly important. However, there also are a handful of caves on private lands with important biological diversity that are worthy of further study and protection. Climax Cave in Decatur County is one of the longest caves in the state, and it supports populations of the Georgia Blind Salamander and the Dougherty Plain Cave Crayfish, which are both High Priority Species under the State Wildlife Action Plan, one single-cave endemic species, and is a significant Southeastern Myotis site. Horseshoe Cave in Walker County has the second-most biological records for any cave in the state and supports eight troglobionts, including two single-cave endemics and two potentially undescribed species. The Chelsea Gulf/Blowing Spring Cave system in Chattooga County hosts eight troglobionts, more than any other cave in Chattooga County. Parkers

Cave in Chattooga County supports six troglobionts including one single-cave endemic, as well as three potentially undescribed species. Morrisons Cave in Dade County supports ten troglobionts. Crane Cave in Catoosa County supports the only known Appalachian Valley and Ridge population of the Southern Cavefish. Further protection of any of these sites would greatly support cave biodiversity in Georgia.

Although much attention is given to troglobionts and cave-roosting bats, caves and other subterranean ecosystems contain important habitats for many other non-troglobitic species for reproduction, hibernation, shelter, and other aspects of their life histories. For example, caves are important habitats for many plethodontid salamanders (Niemiller and Miller, 2009; Goricki et al., 2012), including several species in Georgia that use caves for shelter and reproduction (e.g., Buhlmann, 2001; Niemiller et al., 2006; Camp and Jensen, 2007). The importance of caves for other non-troglobitic taxa, particularly invertebrates, has not been well-studied and should be a priority of future research.

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