

# An Annotated Checklist of the Caddisflies (Insecta: Trichoptera) of Kentucky

Michael A. Floyd<sup>1</sup>

U.S. Fish and Wildlife Service, Kentucky Ecological Services Field Office, 330 West Broadway, Suite 265, Frankfort, Kentucky 40601

John K. Moulton

Department of Entomology and Plant Pathology, 2431 Joe Johnson Drive, 205 Ellington Plant Sciences Bldg, The University of Tennessee, Knoxville, Tennessee 37996

Guenter A. Schuster

305 Boone Way, Richmond, Kentucky 40475

Charles R. Parker

U.S. Geological Survey, U.S. Geological Survey, 1316 Cherokee Orchard Road, Gatlinburg, Tennessee 37738

and

Jason Robinson

Illinois Natural History Survey, 1816 South Oak Street, MC 652, Champaign, Illinois 61820

## ABSTRACT

Distributional records for 293 caddisfly species representing 22 families and 68 genera are reported from Kentucky along with information on taxonomy, flight period, habitat, and conservation status. Sixty-nine species represent new records for the Commonwealth. Kentucky's geographic regions are compared with respect to species richness. Distributions are summarized for all species; detailed occurrence data are provided for new records, species with limited distributions, and those representing substantial range extensions. A total of 69 species (24% of the fauna) are identified as imperiled or vulnerable within Kentucky.

## INTRODUCTION

One of the largest and most diverse groups of aquatic insects is the order Trichoptera, commonly known as caddisflies. At least 13,574 species have been described worldwide (Morse 2011), including over 1600 species from North America (Morse 1993). Adult caddisflies are small- to medium-sized (2–30 mm), holometabolous insects that resemble moths in general appearance (Ross 1944). The majority of adults tend to be cryptically-colored (shades of gray or brown), but a few species exhibit bright colors and elaborate wing patterns. The adults are generally inactive during the day, concealing themselves in crevices or foliage, but they

become very active at dusk, sometimes producing large, synchronous emergences.

With few exceptions, the caterpillar-like larvae are strictly aquatic and occupy a wide variety of lentic and lotic habitats. Some species are free-living predators, others construct and occupy silken tubes that are used to filter organic particles from the water column, and others construct and occupy tubular, portable cases composed of plant or mineral fragments. Most case-making larvae graze on diatoms or fine organic particles attached to rock or plant surfaces while others shred dead plant material (leaves and small wood fragments) supporting growths of fungi and bacteria (Wiggins 1996).

As a result of their varied feeding strategies, caddisfly larvae play an important ecological role in the cycling of nutrients in aquatic systems, especially in lotic environments

<sup>1</sup> To whom correspondence should be addressed.  
Email: mike\_floyd@fws.gov.

(Wiggins and MacKay 1978; Benke and Wallace 1980; Ross and Wallace 1983). Larvae and adults also serve as prey items for a variety of other organisms, including fishes (Lotrich 1973); amphibians (Petranka 1998; Davic and Welsh 2004), birds (Crichton 1959; Todd et al. 1998), and bats (Brack and LaVal 1985; Kurta and Whitaker 1998). Larval caddisflies have become an important component of biological assessment programs due to their sensitivity to water quality and habitat degradation (Rosenberg and Resh 1993), and some species have been recognized by state and federal agencies as rare or at-risk species of conservation interest (Harris 1990; Rasmussen 2008; KSNPC 2010). With regard to public interest, caddisflies are most familiar to trout fishermen and other anglers, who have spent considerable time and effort in duplicating the appearance of caddisfly larvae, pupae, and adults and mimicking their behaviors in lure presentations. Numerous books have been published instructing anglers on caddisfly identification, behavior, and imitations (La-Fontaine 1981; Pobst and Richards 1998).

Faunistic surveys such as the present study are valuable to water quality managers, resource agencies, and other scientists because (i) they provide baseline data that can be used in monitoring temporal changes in environmental quality (Resh 1975); (ii) they provide new distributional information that can be used to strengthen biomonitoring indices (Rosenberg and Resh 1993); (iii) they allow for the evaluation of distribution patterns and formulation of speciation hypotheses (Rosenberg and Resh 1993); (iv) they document regional biodiversity, including the presence of rare or at-risk species (Houghton et al. 2001; DeWalt et al. 2005); and (v) they provide baseline data that resource agencies can use to evaluate the conservation status of imperiled species.

The primary objective of our study was to compile an updated and accurate list of Kentucky's caddisflies by surveying sites across the Commonwealth and concentrating our efforts in areas not previously sampled. We also wanted to document new Kentucky records, establish general distributional patterns for all species, and contribute ecological information (e.g., habitat preference, flight period) that is lacking for many species.

Finally, we wanted to evaluate the conservation status of Kentucky's caddisflies and develop a new, updated list of imperiled or vulnerable taxa.

## HISTORICAL COLLECTIONS

In his classic work on the caddisflies of Illinois, Ross (1944) provided Kentucky distributional records for 46 species. Following his publication, species descriptions and ecological studies by Ross (1959), Minckley (1963), Minshall (1968), Ross and Yamamoto (1965), Etnier (1973), Resh and Haag (1973), and Resh (1974) yielded an additional 42 Kentucky records.

Resh (1975) published the first and only checklist of Kentucky Trichoptera, providing records for 158 species. About one-third of these species were obtained during biological investigations for a proposed reservoir (Taylorsville Lake) in the Salt River basin of central Kentucky (Resh 1975; Neff and Krumholz 1973). Other records came from surveys by the Water Resources Laboratory (WRL) at the University of Louisville and examination of entomological collections from the University of Louisville, University of Kentucky, The University of Tennessee, and the Illinois Natural History Survey. Collection records were concentrated in five general areas: the eastern edge of Land Between the Lakes National Recreation Area (LBL) in western Kentucky (Christian, Lyon, and Trigg counties), the Daniel Boone National Forest (DBNF) and Lake Cumberland region in south-central Kentucky (McCreary and Wayne counties), the Lexington area in central Kentucky (Fayette and Jessamine counties), the Robinson Forest area in eastern Kentucky (Breathitt County), and the Levisa Fork basin near Kentucky's eastern border with West Virginia (Johnson County). Caddisfly records from other large, biologically significant areas of the Commonwealth (e.g., Green River basin, Licking River basin, and western Kentucky) were lacking. Resh (1975) commented that these gaps would need to be filled before the distribution of Kentucky caddisflies could be described accurately.

Over the last 35 years, some of these gaps were addressed by Picazo and DeMoss (1980), Thoeny and Batch (1983), Haag and Hill (1983), Haag et al. (1984), Parker and Wiggins

(1987), Phillippi and Schuster (1987), Floyd and Schuster (1990), Floyd (1992), Houp and Schuster (1997), Houp et al. (1998), Houp (1999), Etnier et al. (2006), and Etnier et al. (2010), who added 66 species to Kentucky's fauna. Unfortunately, most of these studies covered only limited portions of the state and did not fully address the data gaps noted by Resh (1975).

Kentucky's previously reported fauna of 224 species is comparable to that of Arkansas, 176 species (Bowles and Mathis 1989; Moulton and Stewart 1996); Indiana, 190 (Waltz and McCafferty 1983); Illinois, 183 (Ross 1944); Missouri, 155 (Mathis and Bowles 1992; Moulton and Stewart 1996); and West Virginia, 193 (Tarter 1990; Tarter et al. 1999); however, the fauna is considerably smaller than Ohio's 270 species (Huryn and Foote 1983; Usis and Foote 1989; Armitage et al. 2011); Tennessee's 352 species (Etnier et al. 1998; DeWalt and Heinold 2005; Etnier et al. 2006); and Virginia's 361 species (Parker and Voshell 1981; Flint et al. 2004; Flint et al. 2008; Flint et al. 2009). Based on the larger faunas reported from these states, the lack of distributional records from some river basins such as the Green River, and our overall fragmentary knowledge of the group within Kentucky, we concluded that additional survey efforts were warranted.

## METHODS

**Study area.** Kentucky encompasses over 104,000 km<sup>2</sup> and spans a west to east distance of approximately 676 km from the Mississippi River in the west to its eastern border in Pike County (Burr and Warren 1986). It is bordered on the north and east by the Ohio River and Big Sandy Rivers, to the south by the state of Tennessee, and to the southeast by the Commonwealth of Virginia. Elevations range from a low of 79 m along the Mississippi River in Fulton County to a high of 1265 m on the summit of Black Mountain in Harlan County (Burr and Warren 1986).

Recognition of Kentucky's diverse geology, topography, and natural communities has resulted in the identification of numerous physiographic and natural regions for the Commonwealth (Fenneman 1938; Quartermann and Powell 1978; Burr and Warren 1986; Ulack et al. 1998; USEPA 2002; Woods

et al. 2002; Taylor and Schuster 2004; Abernathy et al. 2010). In the following discussion, we follow the classification scheme of USEPA (2002) to describe the diversity of Kentucky's distinct physiographic and natural regions; however, we also identify and incorporate several distinct subregions (Burr and Warren 1986; Ulack et al. 1998; Abernathy et al. 2010) based on their unique geology, topography, and biological characteristics (Figure 1).

The eastern one-third of Kentucky is comprised of the Central Appalachians, Western Alleghany Plateau, and Southwestern Appalachians ecoregions, a region collectively referred to as the "Eastern Coalfield." This mountainous region is characterized by deeply eroded plateaus, steep hills, sharp ridges, and narrow stream valleys in the north and west (i.e., Red River Gorge Geological Area and Big South Fork National River and Recreation Area) and by uplifted mountains and ridges in the southeast. The southeastern corner of the region contains the highest elevations in the state, specifically Pine, Cumberland, and Black mountains. The entire Eastern Coalfield region is underlain by Pennsylvanian-age sandstones, shale, and some coal-bearing deposits. Kentucky's two most significant areas of old-growth forest, Lilley Cornett Woods (Letcher County) and Blanton Forest State Nature Preserve (Harlan County), occur here. Four major rivers (Big Sandy, Licking, Kentucky, and Cumberland) originate within the region. Smaller streams of the region are typically cool with moderate to high-gradients, cobble or boulder substrates, and low nutrient and ionic concentrations. Activities associated with natural resource extraction (surface coal mining and logging) have altered water quality and physical habitats of many stream systems in the Eastern Coalfield (Abernathy et al. 2010).

The Interior Plateau is a diverse ecoregion composed of a series of plateaus, basins, and domes, often separated by distinct escarpments. The north-central portion of the region, commonly referred to as the "Bluegrass," is a broad upland area that developed on Ordovician-age limestone and shale. The topography of the Bluegrass varies from gently rolling uplands in the interior to more pronounced, steep-sided hills at the periphery. The region is crossed by three major rivers: the Kentucky, Licking, and Salt. The

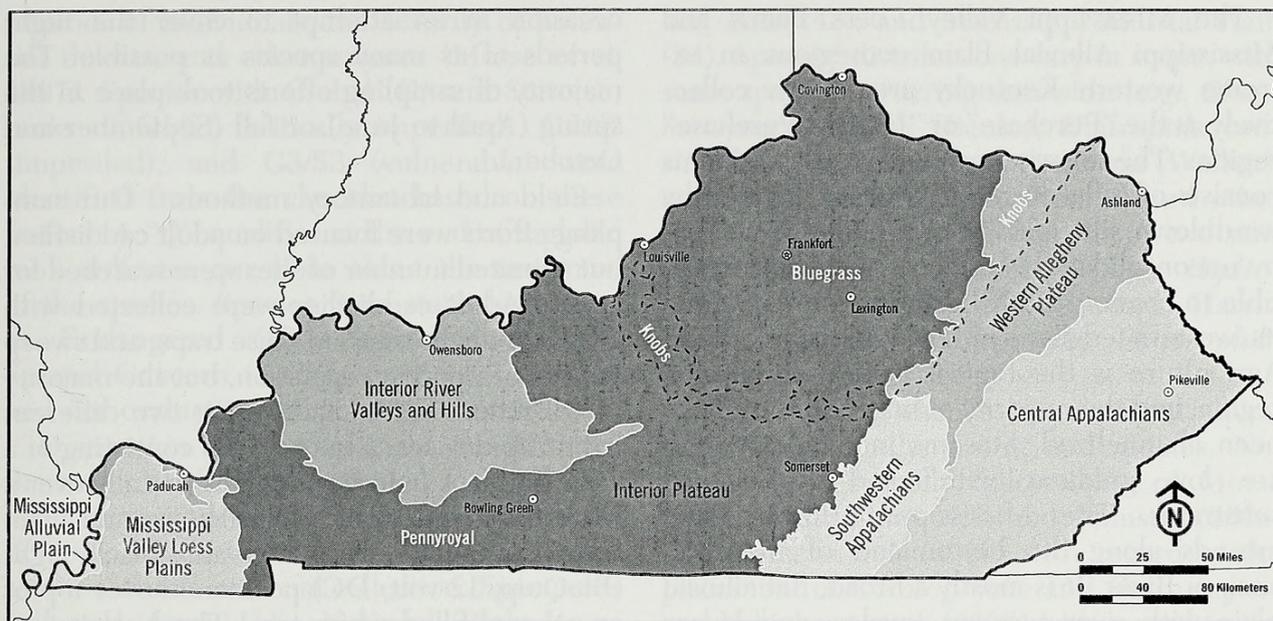


Figure 1. USEPA Level III Ecoregions of Kentucky (select subregions are labeled in white; the Knobs subregion is delineated with dashed lines) (USEPA 2002).

Kentucky River has carved a deep, sinuous gorge through the inner part of the region (the “Palisades”), exposing Kentucky’s oldest rock strata along the edges of the valley. Streams cutting through the Palisades region have steep gradients and typically exhibit greater insect diversity than other Bluegrass streams. Upland streams in the Bluegrass can be intermittent or perennial but tend to have low to moderate gradients, coarse substrates, and relatively high nutrient and ionic concentrations.

The Bluegrass is bordered on the west, south, and east by a series of well-defined, cone-shaped hills and ridge systems referred to as the “Knobs.” This narrow, semicircular band of hills is characterized by high gradient headwater streams and broad, often wet valleys. The Knobs are underlain primarily by Mississippian and Devonian-age shales, siltstones, and sandstones. The remainder of the Interior Plateau, often referred to as the “Pennyroyal” region, consists of a physiographically diverse, horseshoe-shaped area that extends from the Knobs to the western edge of the Tennessee River basin. The central portion of this region includes the well-known Mammoth Cave system, an area characterized by resistant, Mississippian-age sandstone ridges and bluffs overlying deep limestones in which extensive cave systems have developed. The balance of the region is less rugged, consisting of an extensive limestone upland

characterized by karst topography and the development of subterranean drainage through caverns and sinkhole plains. Two interesting aquatic habitats, springs and sinkhole ponds, occur here, and often support diverse and unique aquatic communities. The biologically diverse Green River originates within this region, as do many of its tributaries (i.e., Barren, Little Barren, Nolin, and Pond). Smaller streams in this region are highly variable with respect to gradient and substrate, but nutrient and ionic concentrations tend to be higher than in the Eastern Coalfields.

The Interior River Valleys and Hills, or “Western Coalfield,” is composed of hills and aggraded lowlands developed primarily on Pennsylvanian-age (coal-bearing) sandstones. The hills range from rugged, steep cliffs adjacent to streams and rivers to lower hills developed on shale or buried under Pleistocene-age loess deposits. The aggraded lowlands extend along the mainstem and tributaries of the Tradewater, Green, and Ohio rivers, and these lowlands contain some of Kentucky’s largest and most numerous oxbows, sloughs, and wetlands. Upland streams tend to have rocky substrates, while lowland streams are typically dominated by silt and sand substrates. Extensive surface and underground coal mining activities in the region have altered the water quality and habitat conditions of many streams.

The Mississippi Valley Loess Plains and Mississippi Alluvial Plain ecoregions in extreme western Kentucky are known collectively as the "Purchase" or "Jackson Purchase" region. The Mississippi Valley Loess Plains consists of a flat to rolling upland covered by windblown silt (loess) deposits and underlain by unconsolidated sediments that are susceptible to erosion. Bluff hills are common along its western edge near the Mississippi River. Agriculture is the typical land cover in the region, and the majority of major streams have been channelized. Streams in this ecoregion are low gradient with sand and gravel substrates. The Mississippi Alluvial Plain extends along the bottomland of the Mississippi River. It is mostly a broad, flat alluvial plain with river terraces, swales, and levees providing the main elements of relief. Unique lentic habitats such as abandoned channels, oxbow lakes, and cypress wetlands occur here. Bottomland deciduous forests covered the region before much of it was cleared for cultivation. Presently, most of the region is in agricultural production and most streams have been channelized. Streams in this ecoregion are low-gradient with sand and silt substrates.

**Literature review and site selection.** We compiled a baseline list of Kentucky caddisflies through reviews of all the published literature containing Kentucky records, reviews of several unpublished student theses, and an extensive search of the Kentucky Division of Water's (KDOW) macroinvertebrate database (Ecological Data Application System). Over the past 25 years, KDOW biologists have sampled in all of Kentucky's counties and major watersheds, producing thousands of taxa records. The majority of KDOW's collections were based on larvae, so species identifications could not be made for those families lacking larval keys (e.g., Hydroptilidae). Based on distributional information obtained from all of these sources, we focused our sampling efforts in areas not previously surveyed or in areas with unique natural or biological features (e.g., outstanding state resource waters [OSRW], state nature preserves [SNP], natural wetlands, sinkhole ponds, and springs). Over a seven-year period (2005–2011), we visited 150 sites across the Commonwealth, and approximately 20% of these sites were sampled on more than one

occasion in an attempt to cover the flight periods of as many species as possible. The majority of sampling efforts took place in the spring (April to June) or fall (September and October).

**Field and laboratory methods.** Our sampling efforts were focused on adult caddisflies, but a limited number of sites were searched for larvae. Adult caddisflies were collected with ultraviolet light traps, Malaise traps, and sweep netting of riparian vegetation, but the majority of collections were made using two different light trap devices: a bucket trap consisting of a 15-watt, black light positioned vertically over a bucket, funnel, and alcohol-filled jar, and a pan trap consisting of a 15-watt, black light (BioQuip, 12-volt, DC) positioned over top of an ethanol-filled white tray. The bucket trap was equipped with a digital timer that allowed us to set the trap at any time of day and retrieve it the following day. Both traps were powered by small, portable, 12-volt batteries. Sampling was conducted at dusk, beginning about 30 minutes prior to sunset and lasting for approximately 1–2 h. Adult caddisflies and other aquatic insects were attracted to the light, fell into the alcohol, and were preserved for future study. Larval caddisflies were collected with sweep nets, kick nets, or by hand-picking from rocks or other substrates. All collected organisms were placed in labeled jars and returned to the laboratory for sorting and identification. Caddisflies were sorted and identified to species level when possible (some female specimens were left at genus); remaining aquatic insects (e.g., stoneflies) were placed in ethanol-filled vials for future study. The abdomen of some specimens (whole body for Hydroptilidae) was removed and cleared in 10% KOH prior to examination.

**Data analyses.** Previous and current collection records were organized by family and combined to produce a new annotated checklist for the Commonwealth. The new checklist was evaluated to determine the total species richness, the number of new records, the species richness for each ecoregion, and other general distributional patterns. Imperiled or vulnerable taxa were identified using the natural heritage methodology employed by NatureServe (2012) and KSNPC (2011). Species were ranked based on the number of known occurrences (populations), the

number of individuals, the severity of potential threats, and other sources (Morse et al. 1997). Species with Global (G) and State (S) ranks of G1/S1 (critically imperiled), G2/S2 (imperiled), and G3/S3 (vulnerable) were identified from the checklist based on these factors. A “Q” qualifier at the end of a global rank indicates questions about the taxonomy of the species. Species were state-designated as Endangered (E), Threatened (T), or Special Concern (S) based on state rankings and our evaluations of potential threats.

Disposition of specimens. Vouchers for the majority of newly examined material have been deposited in the Branson Museum of Zoology at Eastern Kentucky University or the senior author’s personal collection. Specimens collected from U.S. National Parks (e.g., Cumberland Gap National Historical Park) have been deposited in the collection at Mammoth Cave National Park. Vouchers of new or unpublished distributional records have been deposited in the National Museum of Natural History.

## RESULTS

In this paper, we present distributional records for 293 caddisfly species, including 22 families, 68 genera, and 69 new Kentucky records (see annotated list below). The family Hydroptilidae is represented by the most species (66), followed by the Hydropsychidae (45), Leptoceridae (44), Polycentropodidae (27), Limnephilidae (19), Rhyacophilidae (15), Glossosomatidae (12), and Thremmatidae (10). All other families are represented by fewer than 10 species. The family Sericostomatidae is reported from Kentucky for the first time. Among genera, *Hydroptila* is represented by the most species (31), followed by *Ceraclea* (16), *Cheumatopsyche* (16), *Polycentropus* (16), *Hydropsyche* (15), and *Rhyacophila* (15).

The mountainous region of eastern Kentucky (Eastern Coalfield) is represented by the greatest number of species (228) and also the greatest number of unique records (70). Among ecoregions, the most species have been recorded from the Interior Plateau (215), followed by the Central Appalachians (183), Southwestern Appalachians (176), Western Allegheny Plateau (110), Mississippi Valley Loess Plains (65), Interior River Valleys

and Hills (43), and Mississippi Alluvial Plain (34). Species’ distributions vary in scope, with some species occurring statewide (e.g., *Cheumatopsyche analis* (Banks), *Hydroptila consimilis* Morton, *Oecetis inconspicua* (Walker), and *Rhyacophila lobifera* Betten) and other species being limited to only one or two sites (e.g., *Brachycentrus lateralis* (Say); *Hydroptila keuhnei* Houp, Houp, and Harris; *Fumonta major* (Banks); and *Rhyacophila appalachia* Morse and Ross).

The following checklist is arranged alphabetically by family, genus, and species. Nomenclature generally follows that of Morse (2011). We follow Olah and Johnson (2008) and Geraci et al. (2010) with regard to the placement of *Ceratopsyche* and *Hydropsyche* and Vshivkova et al. (2007) with regard to the placement of *Neophylax*. General notes on taxonomy, biology, and distribution are provided for families and genera. Larvae of all Kentucky genera are keyed and illustrated in Wiggins (1996) and Merritt et al. (2008); however, family placement has changed for some genera. Pupae for most genera can be identified in keys provided by Ross (1944). Adults for all Kentucky families can be identified in keys provided by Merritt et al. (2008); Schmid (1980) and Ross (1944) provide adult keys for most Kentucky genera and some species.

The checklist is a compilation of literature records, KDOW specimens, records from unpublished reports, and our recent collections. Unpublished or new Kentucky records are marked with an asterisk (\*), and imperiled or vulnerable species (species of conservation interest) are marked with a plus symbol (+). All records are based on adults unless otherwise noted. Kentucky distributions are described as statewide, a specific ecoregion or subregion (Figure 1), or a specific locality if the species’ distribution is limited to only a few sites (e.g., stream and county). Locality information is followed by adult flight period and the initial publication date (e.g., Resh 1975) for those species previously reported from Kentucky. For species with limited Kentucky distributions, the global range is summarized. Unless otherwise referenced, global distributions are based on Etnier et al. (1998), Flint et al. (2004, 2006, 2008), Morse (2012), and NatureServe (2012). For

imperiled or vulnerable species, we provide the global (G) (NatureServe 2012) and state (S) conservation ranks (KSNPC 2011), the state status (Threatened [T], Special Concern [S], or Historic [H] - not observed for at least 20 years and possibly extirpated) (KSNPC 2010), where applicable, and any other published designation or status (Morse et al. 1997). For species we believe to be imperiled or vulnerable, but without formally assigned G or S ranks or a state status, we have proposed ranks and statuses based on our own knowledge of the species' global and state range and status. Additional commentary is provided for rare species, new Kentucky records, species with limited Kentucky records, or those species which constitute significant range extensions.

Standard abbreviations are used for states and provinces (e.g., KY, TN, and WV). Other abbreviations are used as follows: Abraham Lincoln Birthplace National Historic Site (ABLI), Big South Fork National River and Recreation Area (BISO), Blue Grass Army Depot (BGAD), Branch (Br), County (Co), Creek (Crk), Cumberland Gap National Historical Park (CUGA), Daniel Boone National Forest (DBNF), Fork (Frk), Fort Campbell Military Reservation (Fort Campbell), Fort Knox Military Reservation (Fort Knox), Land Between the Lakes National Recreation Area (LBL), Kentucky Department of Fish and Wildlife Resources (KDFWR), Kentucky State Nature Preserves Commission (KSNPC), Mammoth Cave National Park (MACA), Outstanding State Resource Water (OSRW), State Nature Preserve (SNP), tributary (trib), United States (US), and wildlife management area (WMA).

### Annotated Checklist

#### Family Apataniidae

Formerly a member of the Family Limnephilidae (Wiggins 1996; Gall 1997), the family Apataniidae contains 5 North American genera and 17 species (Wiggins 1996; Flint et al. 2008). A single genus, *Manophylax*, occurs in KY. *Manophylax* larvae generally occupy hygropetric habitats (a thin film of water flowing over inclined rock surfaces in small spring seeps), and the adults are poor fliers (Wiggins 1996; Schuster 1997).

Genus *Manophylax*. The single Kentucky species, *M. butleri* Schuster, has a four-year life cycle, six larval instars, and the larvae are restricted to vertical sandstone rock faces that are wet for only a portion of the year. During dry periods, the larvae place a silk closure across the front of the case and go into a period of quiescence. The larvae remain inactive until rain causes the walls to become wet and the rock walls stay wet for some time. The adults are poor fliers and tend to remain on the walls from which they emerge. Its sister species, *M. altus* (Huryn and Wallace), is restricted to high elevation sites in three NC counties. Larval, pupal, and adult characters for *M. butleri* are provided in Schuster (1997) and Jones (2000).

+*Manophylax butleri* Schuster. Shillalah Crk WMA, Bell Co; DBNF, Carter Co; Cumberland Falls State Resort Park and DBNF, McCreary Co; Red River Gorge (DBNF), Wolfe Co; March–April (Schuster 1997). Range: KY, TN, and WV. Rank: G2, S2. KY Status: S. During this study, we discovered unknown populations at Shillalah Crk WMA (KDFWR), adjacent to CUGA in Bell Co and on rock outcrops overlooking Big South Frk Cumberland River (BISO) in Scott Co, TN near the KY/TN border. The Tennessee collection represents a new distributional record for that state. Our new records expand the species' range to the south and southeast; however, *M. butleri* remains vulnerable to extirpation due to its localized distribution and poor dispersal ability.

#### Family Brachycentridae

The Family Brachycentridae contains five North American genera, two of which occur in Kentucky: *Brachycentrus* and *Micrasema*. The larvae occur in lotic habitats and construct cases composed primarily of plant material.

Genus *Brachycentrus*. Three of the 14 North American species of *Brachycentrus* occur in KY. The larvae occupy medium-sized streams to large rivers, where they attach their cases to rocks, stationary wood, or aquatic vegetation. Keys, descriptions, and distributional information for larvae and adults of eastern species are provided in Flint (1984).

*Brachycentrus lateralis* (Say). Ohio River, Jefferson Co; May (Resh 1975). Range: widely distributed in eastern U.S. and Canada (ON and QC) but only one KY locality.

+*Brachycentrus nigrosoma* (Banks). Yellow Crk, Bell Co (larvae); Buck Crk, Pulaski Co; Rockcastle River, Laurel Co (larvae); April–May (Floyd and Schuster 1990). Range: widely distributed in eastern U.S. (AL, GA, KY, MD, ME, NC, NY, PA, SC, TN, VA, and WV). Rank: G5. Proposed KY rank and status: S2S3, S. We observed thousands of larvae attached to boulders in the Rockcastle River, but adult records are limited to one KY site.

*Brachycentrus numerosus* (Say). Scattered localities statewide except Western Coalfield (larger creeks and rivers); May (Resh 1975).

Genus *Micrasema*. Five of the 18 North American species of *Micrasema* occur in KY. The larvae occupy small streams, where they are usually found in clumps of aquatic mosses (Wiggins 1996). Larvae and adults of KY species can be identified using Chapin (1978).

*Micrasema bennetti* Ross. Dry Br (MACA), Edmonson Co; Steeles Run, Fayette Co; March–April (Resh 1975). Range: GA, KY, NC, SC, TN, VA, and WV. According to Chapin (1978), the lack of records for this species stems from its brief emergence period and diurnal behavior.

*Micrasema charonis* Banks. Widely distributed in Interior Plateau, Southwestern Appalachians, and Western Allegheny Plateau; April–May (Houp 1999).

*Micrasema rusticum* (Hagen). Trammel Frk, Allen Co; Little Yellow Crk, Bell Co; Hickman Crk, Jessamine Co; Gasper River, Logan Co; Cumberland River and Cogur Frk, McCreary Co; Buck Crk, Pulaski Co; Horselick Crk, Rockcastle Co; Little South Frk, Wayne Co; April–May (Resh 1975).

+\**Micrasema scotti* Ross. Dry Frk, Metcalfe Co.; October. Range: AL, IN, KY, NC, TN, VA, and WV (Chapin 1978). Rank: G3G4. Proposed KY rank and status: S1S2, T. We discovered the new Kentucky population in Dry Fork, a small, spring-fed tributary of South Fork Little Barren River in Metcalfe County.

*Micrasema wataga* Ross. Sinking Crk, Laurel Co; Red River and Sinking Crk, Logan Co; Cumberland River, McCreary Co; Big South Fork Cumberland River (BISO); April–July (Resh 1975).

#### Family Calamoceratidae

The Family Calamoceratidae is represented by three genera and five species in North

America. Two genera, *Anisocentropus* and *Heteroplectron*, are known from KY.

Genus *Anisocentropus*. The only North American species, *Anisocentropus pyraloides* (Walker), is reported from KY for the first time. The flat, oval, leaf-like case is unique among North American caddisfly larvae. The adults were illustrated by Betten and Mosely (1940); the larva was illustrated by Wiggins (1996).

\**Anisocentropus pyraloides* (Walker). Small DBNF streams in Southwestern Appalachians and several spring habitats in Pennyroyal (MACA): Edmonson, Jackson, Laurel, McCreary, Pulaski, and Whitley counties (adults and larvae); April, June, August. Range: widely distributed from NJ to FL and west to MS. This species was first collected in Kentucky by KDOW personnel and Johansen (2000), but these records were not published. We have recent material (2005–2007) from the DBNF (McCreary and Pulaski counties) and MACA (Edmonson Co).

Genus *Heteroplectron*. The only species in eastern North America, *Heteroplectron americanum*, was illustrated by Schmid (1983). Wiggins (1996) illustrated the larva. The larval case is unique among eastern caddisflies, consisting of a hollowed-out twig.

*Heteroplectron americanum* (Walker). Eagle Crk and Rock Crk, McCreary Co.; Cane Crk, Jackie Br, and South Frk Dogslaughter Crk, Whitley Co. (adults and larvae); July. Etnier et al. (1998) reported an emergence period of April–May for TN. This species is widely distributed in eastern North America (AL to QC).

#### Family Dipseudopsidae

The Family Dipseudopsidae is represented by one genus (*Phylocentropus*) in North America. Three species of *Phylocentropus* are known from KY. The larvae of *Phylocentropus* are retreat-makers, constructing buried, silken tubes covered by sand grains (Wiggins 1996).

Genus *Phylocentropus*. Larval keys for all KY species were provided by Sturkie and Morse (1998). Adults can be identified in Schuster and Hamilton (1984).

*Phylocentropus carolinus* Carpenter. Scattered localities in Central and Southwestern Appalachians, Pennyroyal, Western Coalfield, and Jackson Purchase: Breathitt, Christian, Edmonson, Graves, Hardin, Harlan, Laurel, McCreary, and Pulaski counties (adults and larvae); May–August (Resh 1975).

*Phylocentropus lucidus* (Hagen). Central Appalachians, Southwestern Appalachians, and Western Allegheny Plateau: Davis Br (CUGA), Bell Co; unnamed bog (MACA), Edmonson Co; Watts Crk (Blanton Forest SNP), Harlan Co; Big Dog Br (DBNF), Laurel Co; Bad Br (Bad Br SNP), Letcher Co; unnamed trib Dog Frk, Wolfe Co; June–August (Schuster and Hamilton 1984).

*Phylocentropus placidus* (Banks). Scattered localities in Eastern Coalfield, western Pennyroyal, and Jackson Purchase: Calloway, Crittenden, Elliott, Graves, Hickman, Marshall, Morgan, Rockcastle, and Whitley counties (adults and larvae); April–May, August (Resh 1975).

#### Family Glossosomatidae

The Family Glossosomatidae is represented by six genera in North America; four genera are known from KY. When present, members of this family are often one of the more conspicuous groups of caddisflies as the larvae graze on algae, diatoms, and fine organic particles on the uppermost, exposed surfaces of rocks. The larvae construct and are concealed within dome-like, rock cases that resemble a tortoise shell (Wiggins 1996).

Genus *Agapetus*. Larvae cannot be identified to species at the present time; Etnier et al. (2010) provided a taxonomic review of the eastern species, with descriptions of 12 new species. Six *Agapetus* species are known from KY, including *A. kirchneri*, one of the new species described in Etnier et al. (2010). *Agapetus* larvae are generally found in small, spring-fed streams.

*Agapetus avitus* Edwards. Southwestern Appalachians and Pennyroyal: Clinton, McCreary, Trigg, Warren, and Wayne counties; April–June (Etnier et al. 2006).

*Agapetus hessi* Leonard and Leonard. Southwestern Appalachians and Pennyroyal: Logan, Pulaski, Warren, and Wayne counties; April–May (Resh 1975).

*Agapetus illini* Ross. Southwestern Appalachians and Interior Plateau: Bullitt, Christian, Clinton, Fayette, Jackson, Jessamine, Lincoln, Logan, Mercer, Pulaski, Wayne, Whitley, and Woodford counties (adults and larvae); April–July (Resh 1975).

+*Agapetus kirchneri* Parker, Etnier, and Baxter. Davis Br (CUGA), Bell Co; (larvae); April–July (Etnier et al. 2010). Range: KY,

TN, and VA. Proposed rank: G2. Proposed KY rank and status: S1, T. Type locality is Station Creek (CUGA), Lee Co, VA, just southeast of the KY border.

*Agapetus minutus* Sibley. Robinson Forest, Breathitt Co; Blue Spring, Good Spring, and unnamed bog (all MACA), Edmonson Co; Kinniconick Crk, Lewis Co; April, June–August (Phillippi and Schuster 1987).

*Agapetus tomus* Ross. Davis Br (CUGA), Bell Co; Robinson Forest, Breathitt Co; Green Co. (no location provided); Sinking Crk, Laurel Co; Bad Br (Bad Br SNP), Colliers Crk, Poor Frk, and Smith Crk, Letcher Co; Big South Frk Cumberland River (BISO), Cogur Frk, and Eagle Crk (DNBF), McCreary Co; April–July (Resh 1975).

Genus *Glossosoma*. All but 3 of the 22 North American *Glossosoma* are restricted to mountainous regions of the western U.S. and Canada. Two species, *G. intermedium* and *G. nigrior*, have been recorded from springs or spring-fed streams in KY. No keys are available for larvae of *Glossosoma*; adult males were illustrated by Ross (1944) and Schmid (1982).

*Glossosoma intermedium* (Klapalek). Scattered localities statewide except Bluegrass and Jackson Purchase; March–April (Resh 1975).

*Glossosoma nigrior* Banks. Scattered localities statewide except Bluegrass and Jackson Purchase; April–October (Resh 1975).

Genus *Matrioptila*. This monotypic genus has been recorded from PA south to AL. The larva of *M. jeanae* is illustrated in Wiggins (1996); male genitalia were illustrated by Ross (1938).

*Matrioptila jeanae* (Ross). Cumberland River, Bell Co; Little Barren River, Green Co; Big Dog Br, Laurel Co; Whippoorwill Crk, Logan Co; Big South Frk Cumberland River (BISO), McCreary Co; Cumberland River, McCreary Co; Buck Crk system, Pulaski Co; Little South Frk, Wayne Co; April–July (Resh 1975).

Genus *Protoptila*. The genus is represented by 13 species in North America; three species have been recorded from KY. Larvae of *Protoptila* occupy warmer habitats than other glossosomatids. No keys are available for larvae; Ross (1941, 1944) provided adult illustrations of genitalia for the three KY species.

+*Protoptila alexanderi* Ross. Sturgis, Union Co; August (Resh 1975). Range: widely

distributed in TX and Mexico (Houghton and Stewart 1998, Baumgardner and Bowles 2005) and reported from one Kentucky locality by Resh (1975). Rank: G5. Proposed KY rank and status: S1S2, T. We have not been able to re-examine and confirm the disjunct Kentucky record reported by Resh (1975); consequently, we consider this record to be tentative.

*Protoptila maculata* (Hagen). Anderson, Bell, Franklin, Harrison, McCreary, Pulaski, Shelby, Spencer, Warren, and Whitley counties; May–September (Resh 1975).

*Protoptila palina* Ross. Davis Br (CUGA) and Cumberland River, Bell Co; Green River, Green Co and Hart Co; Sinking Crk, Laurel Co; Salt Lick Crk, Marion Co; May–September (Resh 1975).

#### Family Goeridae

This family is represented by four North American genera, two of which occur in KY. Within KY, the larvae are restricted to cool streams of the Eastern Coalfields and springs or spring-fed streams of the Interior Plateau (Pennyroyal).

Genus *Goera*. Flint (1960) provided larval keys, and Schmid (1983) provided illustrations of adult genitalia for KY species.

*Goera calcarata* Banks. Eastern Coalfield and southeastern Pennyroyal: Bell, Breathitt, Clinton, Laurel, Letcher, McCreary, Pulaski, and Wayne counties (adults and larvae); May–September (Resh 1975).

+\**Goera fuscata* Banks. A single Kentucky locality: Good Spring (MACA), Edmonson Co; June, August. Range: GA, KY, MA, ME, NC, NY, PA, QC, SC, VT, and VA. Rank: G5. Proposed KY rank and status: S1S2, S. The discovery of this species in KY represents a northwestern range extension for the species, as the closest known records are from TN and VA.

*Goera stylata* Ross. Eastern Coalfield and springs or spring-fed streams of Pennyroyal: Davis Br (CUGA), Bell Co; Clemons Frk and Coles Frk (Robinson Forest), Breathitt and Knott counties; Poplar Spring (Fort Knox), Hardin Co; unnamed springs along Houchins Ferry Road and Good Spring (MACA), Edmonson Co; Buffalo Spring, Doe Run, and McCracken Spring, Meade Co; Dry Frk system, Metcalfe Co; unnamed spring-fed trib Lynn Camp Crk, Hart Co; Sinking Crk system, Laurel Co; Cumberland River,

McCreary Co (adults and larvae); May–August (Resh 1975).

Genus *Goerita*. Parker (1998) provided keys to larvae and adults.

*Goerita betteni* Ross. Headwater streams and spring seeps in Eastern Coalfield (Breathitt, Harlan, Letcher, Menifee, McCreary, and Whitley counties) and Pennyroyal (Edmonson, Green, and Taylor counties); June–July (Phillippi and Schuster 1987). Parker (1998) described the larval habitat of *G. betteni* as vertical or steep rock faces in thin films of water along forested ravines. We collected larvae from similar habitats in KY. Prior to our collections in 2005 and 2006, KY records were limited to sandstone-dominated habitats in the Eastern Coalfield (Phillippi and Schuster 1987; Jones 2000; Pond 2000); however, we discovered additional populations in the karst, limestone-dominated region of the Pennyroyal.

#### Family Helicopsychidae

Within North America, the family is represented by a single genus, *Helicopsyche*.

Genus *Helicopsyche*. The genus is represented by five species in North America north of Mexico. A single, wide-ranging species, *Helicopsyche borealis* (Hagen), occurs in KY. Its snail-like, helical case is unique among North American caddisflies and serves as a valuable diagnostic character in the field. Adults and larvae of *H. borealis* are described by Ross (1944) and Moulton and Stewart (1996).

*Helicopsyche borealis* (Hagen). Widespread and locally abundant in Interior Plateau, but less abundant in Eastern Coalfield and apparently absent from Western Coalfield and Jackson Purchase; May–October (Resh 1975). Zhou et al. (2011) provided evidence that *H. borealis* is a species complex composed of many, genetically distinct lineages exhibiting similar (if not identical) male genitalia.

#### Family Hydropsychidae

This is a large and dominant family represented by 10 genera in North America. The larvae are restricted to lotic habitats or wave-washed shorelines of lakes where they construct fixed, silken retreats to capture suspended food particles from the current. The family is extremely important to stream

ecology because of its wide-spread occurrence, abundance, and large biomass (Wiggins 1996).

Genus *Cheumatopsyche*. Within North America, the genus includes at least 50 species, many of which are very common and widely distributed. Several species are tolerant of water quality and habitat perturbations and can be quite abundant under those conditions. No larval keys are available, but descriptions and illustrations of Kentucky males and females were provided by Gordon (1974).

*Cheumatopsyche analis* (Banks). Widespread and common statewide; April–October (Resh 1975). One of the most common and pollution-tolerant caddisfly species in eastern North America. It is often abundant at disturbed or impaired sites.

*Cheumatopsyche aphanta* Ross. Robinson Forest, Breathitt Co; Moore Crk, Knox Co; unnamed trib Dog Frk, Wolfe Co; June–July (Resh 1975).

*Cheumatopsyche burksi* Ross. John James Audubon State Park, Henderson Co; no specific locality, Oldham Co; Schoolhouse Hollow Spring and Turkey Spring (both LBL), Trigg Co; June, August, October (Resh 1975).

*Cheumatopsyche campyla* Ross. Statewide; May–September (Resh 1975).

*Cheumatopsyche geora* Denning. Davis Br and Tunnel Crk (both CUGA), Bell Co; Grindstone Crk, Calloway Co; Crooked Crk (LBL), Trigg Co; May–September (Resh 1975).

+\**Cheumatopsyche gyra* Ross. Davis Br (CUGA), Bell Co; September. Range: east coast from ME to GA. Rank: G4G5. Proposed KY rank and status: S1S2, T. Its collection in KY represents a western range extension.

\**Cheumatopsyche halima* Denning. Davis Br and Shillalah Crk, Bell Co.; Colliers Crk, Letcher Co; June. Range: eastern North America from QC to SC and west to AR.

*Cheumatopsyche harwoodi harwoodi* Denning. Scattered localities in Central Appalachians, plus isolated localities in Pennyroyal, Western Coalfield and Jackson Purchase: Bell, Edmonson, Graves, Harlan, Henderson, Knox, Laurel, Letcher, McCreary, and Pulaski counties; April–September (Resh 1975).

+*Cheumatopsyche helma* Ross. This species has been documented from only one Kentucky locality: Pineville, Bell Co; June (Resh 1975).

Range: AL, AR, KY, ME, NC, PA, TN, and WV. Rank: G3, SH; KY status: H. This species has not been observed in KY for over 30 years and is possibly extirpated (KSNPC 2010, 2011).

*Cheumatopsyche minuscula* (Banks). Eastern Coalfield: Cumberland River (Pineville), Bell Co; Watts Crk (Blanton Forest SNP), Harlan Co; Big South Frk Cumberland River (BISO), McCreary Co; Burnside, Pulaski Co; April–August (Resh 1975).

*Cheumatopsyche oxa* Ross. Widespread in Eastern Coalfield and eastern Pennyroyal; April–October (Resh 1975).

*Cheumatopsyche pasella* Ross. Scattered localities in Bell, Breathitt, Edmonson, Green, Graves, Hart, McCreary, and Spencer counties; May–September (Resh 1975).

\**Cheumatopsyche pinaca* Ross. Blood River, Calloway Co; Terrapin Crk SNP, Graves Co; Beaver Crk, Cogur Frk, and Eagle Crk (all DBNF), McCreary Co; Big South Frk Cumberland River (BISO), McCreary Co; May–June. Range: widely distributed along eastern seaboard from ME to LA. Its collection in KY represents a western range extension.

*Cheumatopsyche sordida* (Hagen). Cumberland River (Pineville), Bell Co; Cumberland River, McCreary Co; Rockcastle River (Livingston), Rockcastle Co; May–June, August (Resh 1975).

*Cheumatopsyche speciosa* (Banks). Salt River, Spencer Co; July (Ross 1944). Range: widely distributed throughout eastern U.S. and Canada. Within KY, this species appears to be restricted to the Salt River system (Resh et al. 1975; Haag et al. 1984).

Genus *Diplectrona*. Five species of *Diplectrona* are known from North America north of Mexico, including one species from western North America. Larvae and adults of the two Kentucky species, *D. modesta* Banks and *D. metaqui* Ross, are described in Ross (1944, 1970) and Wiggins (1996).

*Diplectrona metaqui* Ross. Springs, spring seeps, or small, spring-fed streams in seven, widely separated counties: Bell, Bullitt, Edmonson, Franklin, Hardin, Harlan, Hart, Larue, McCreary, Powell, Taylor, and Trigg; all KY records based on larvae, flight period unknown (Phillippi and Schuster 1987). Larval habitats for this species are often overlooked by researchers and not typically sampled by water resource agencies; consequently, the species is

rarely observed and likely underrepresented in larval surveys. The flight period in TN was reported as April–early June (Etnier et al. 1998).

*Diplectrona modesta* Banks. Statewide in small, cool streams, but less common in western Pennyroyal and Jackson Purchase; April–October (Resh 1975). Zhou et al. (2011) provided evidence that *D. modesta* is a species complex composed of morphologically similar forms with substantial genetic divergence.

Genus *Homoplectra*. About 12 species are known from North America, with three species limited to the east (Flint et al. 2004). Larvae occur in intermittent streams and seeps (Wiggins 1996). Larval and adult descriptions were provided by Ross (1944) and Weaver et al. (1979).

*Homoplectra doringa* (Milne). Scattered localities in Eastern Coalfield and eastern half of Interior Plateau (adults and larvae); April–May, July (Resh 1975).

Genus *Hydropsyche*. Within North America, the genus is represented by about 76 species (Flint et al. 2004), approximately one-third of which (23) occur in KY. The taxonomy of the genus *Hydropsyche* has been controversial, with much disagreement over the placement of *Ceratopsyche* and *Hydropsyche* (Schuster and Etnier 1978; Schuster 1984; Scheffer et al. 1986; Morse 1993). We follow recent proposals by Olah and Johnson (2008), which synonymized *Ceratopsyche* with *Hydropsyche*, and Geraci et al. (2010), which established new species groups for the genus *Hydropsyche* – *H. bronta* Group (generally corresponds with *Ceratopsyche*, *H. (Ceratopsyche)*, *H. morosa* Group, or *H. newae* Group) and *H. instabilis* Group (generally corresponds with *Hydropsyche s.s.*). Larval descriptions of eastern species were provided by Schuster and Etnier (1978) and Scheffer and Wiggins (1986). Male and female descriptions for some Kentucky species were provided by Ross (1944).

#### *Hydropsyche Bronta* Group

\**Hydropsyche alhedra* Ross. Central Appalachians: Dark Ridge Br, Davis Br, Martins Frk, and Shillalah Crk (all CUGA), Bell Co; July–September. Range: widely distributed from Alaska, across Canada and the northern US, with extensions along the Rocky Mountains to CO and the Appalachian Mountains to TN and NC.

*Hydropsyche bronta* Ross. Scattered localities in Eastern Coalfield: Bell, Breathitt, Clay, Estill, Floyd, Harlan, Jackson, Knott, Leslie, Letcher, Martin, Owsley, Perry, and Pike counties; June–August (Resh 1975).

*Hydropsyche cheilonis* Ross. Widespread in Eastern Coalfield and eastern half of Interior Plateau; May–September (Resh 1975).

+*Hydropsyche etnieri* (Schuster and Talak). Peter Br of Little Wolf Crk, Whitley Co; no flight period information provided (Etnier et al. 1998). We also have records from near the KY border at Gap Crk (CUGA), Lee Co, VA. Range: KY, TN, and VA. Rank: G2. Proposed KY rank and status: S1S2, T. Ranked as “Rare and Vulnerable” by Morse et al. (1997).

*Hydropsyche morosa* Hagen. Central Appalachians: Martins Frk, Shillalah Crk, and Sugar Run (all CUGA), Bell Co; Robinson Forest, Breathitt Co; March, June–September (Resh 1975).

*Hydropsyche slossonae* (Banks). Scattered localities in Pennyroyal and Eastern Coalfield: Allen, Barren, Bell, Christian, Green, Harlan, Hart, Jackson, Knott, Lee, Letcher, Martin, Meade, Metcalfe, Monroe, Pike, Trigg, and Wayne counties; May–June, August, October (Thoeny and Batch 1983).

*Hydropsyche sparna* Ross. Widespread and common statewide; April–September (Resh 1975).

*Hydropsyche ventura* Ross. Central and Southwestern Appalachians: Bell, Breathitt, Harlan, Jackson, Laurel, Letcher, and Pike counties; May–June, August (Phillippi and Schuster 1987).

#### *Hydropsyche Instabilis* Group

*Hydropsyche aerata* Ross. Mayfield Crk, Carlisle Co; Rough River, Hardin Co; July (Houp 1999).

\**Hydropsyche alvata* Denning. Green River, Edmonson Co; June. Range: AL, AR, FL, GA, IL, IN, KY, LA, MI, MO, MS, NC, OK, SC, and VA.

*Hydropsyche betteni* Ross. Statewide; April–October (Resh 1975). This species is very common and appears to be one of Kentucky’s most pollution-tolerant caddisflies, based on its abundance at impaired sites.

*Hydropsyche bidens* Ross. Mayfield Crk, Carlisle Co.; Green River, Green Co; July (Houp 1999).

*Hydropsyche cuanis* Ross. Pennyroyal: Russell Crk, Adair Co; Green River, Green Co; Red River, Logan Co; June–July (Houp 1999).

*Hydropsyche depravata* (Hagen). Scattered localities in Pennyroyal: Caldwell, Logan, Lyon, Meade, Metcalfe, Simpson, Warren, and Wayne counties and two localities in CUGA, Bell Co; April, June–July, September–October (Resh 1975).

*Hydropsyche dicantha* Ross. Statewide; April–August (Resh 1975).

*Hydropsyche frisoni* Ross. Eastern Coalfield and Pennyroyal; May–August (Thoeny and Batch 1983).

*Hydropsyche hageni* Banks. Cumberland River mainstem, Bell, McCreary, and Whitley counties; Bark Camp Crk, Whitley Co; April–June, August (Resh 1975).

+\**Hydropsyche mississippiensis* Flint. Blood River, Calloway Co; April. Range: AL, FL, KY, LA, MS, NC, SC, TN, TX, and VA. Rank: G5. Proposed KY rank and status: S2S3, S. Our KY record represents a northern range extension for the species.

*Hydropsyche orris* Ross. Scattered localities in Western Allegheny Plateau, Interior Plateau, Western Coalfield, and Jackson Purchase; June–September (Resh 1975).

*Hydropsyche patera* Schuster and Etnier. Elkhorn Crk system, Franklin and Scott counties; June (Houp 1999).

*Hydropsyche phalerata* Hagen. Cumberland River mainstem, Bell, McCreary, and Whitley counties; unnamed bogs and Green River mainstem (MACA), Edmonson Co; April, June (Resh 1975).

*Hydropsyche rossi* Flint, Voshell, and Parker. East Frk Clarks River (Clarks River NWR), Marshall Co; Horselick Crk, Rockcastle Co; Salt River, Spencer Co; Barren River, Warren Co; May–July (Houp 1999).

*Hydropsyche simulans* Ross. Statewide; May–September (Resh 1975).

*Hydropsyche valanis* Ross. Scattered localities statewide, except Jackson Purchase; July (Resh 1975).

*Hydropsyche venularis* Banks. Cumberland River (Pineville), Bell Co; Big South Frk Cumberland River (BISO), McCreary Co; June (Resh 1975).

Genus *Macrostemum*. The genus is represented by three eastern species, one of which, *Macrostemum zebratum* Hagen, occurs

in KY. Among the North American hydropsychids, nets of *Macrostemum* larvae have the smallest mesh size (5 × 40 microns) (Wallace and Sherberger 1974). The adults are distinctive based on their long antennae and brightly colored, yellow and black wings. Larval and adult descriptions of *M. zebratum* were provided by Ross (1944).

*Macrostemum zebratum* Hagen. Large streams and rivers of eastern Pennyroyal, Southwestern Appalachians, and Central Appalachians: Adair, Bell, Casey, Green, Harlan, Laurel, Marion, McCreary, Owsley, and Pulaski counties (adults and larvae); May–September (Resh 1975).

Genus *Parapsyche*. Larvae of *Parapsyche* typically inhabit cold, running waters, where the retreats are located in strong currents (Wiggins 1996). Keys are provided in Flint (1961). Only one species, *Parapsyche cardis* Ross, is known from KY and is reported here for the first time.

\**Parapsyche cardis* Ross. Central Appalachians: Shillalah Crk (CUGA), Bell Co; Watts Crk, Blanton Forest SNP, Harlan Co; Bad Br, (Bad Br SNP), Letcher Co (adults and larvae); May–June. Range: GA, KY, NC, SC, TN, and VA. We have EKU and KDOW records of *P. cardis* from the 1980s and 1990s, but the records were not published. We collected additional individuals from Bad Branch and Watts Creek in 2007 and from Shillalah Creek in 2010. All three streams have excellent water quality.

Genus *Potamyia*. Only one species, *P. flava* occurs in eastern North America. Descriptions of larvae are provided by Wiggins (1996); adults are illustrated in Ross (1944).

*Potamyia flava* (Hagen). Scattered localities in Western Allegheny Plateau, Interior Plateau, Western Coalfield, and Jackson Purchase (large streams and rivers); May–September (Resh 1975).

#### Family Hydroptilidae

Members of the Family Hydroptilidae (microcaddisflies) are the smallest caddisflies in North America. The family is represented by 16 genera and 225 species in North America north of Mexico, and it is the largest caddisfly family in KY, with 11 genera and 65 species. Unless otherwise noted below, diagnostic keys and descriptions are unavailable for the majority of larvae and females. Ross

(1944) and Blickle (1979) provide male descriptions and illustrations for the majority of Kentucky species.

Genus *Agraylea*. Ross (1944) described the final larval instar of the only Kentucky species, *A. multipunctata*. The larvae construct a silken case interspersed with algal filaments. Larval habitats include lakes, ponds, or slow flowing portions of rivers, where they feed on filamentous algae (Wiggins 1996).

*Agraylea multipunctata* Curtis. Doe Run, Meade Co; Three Springs (MACA), Edmonson Co (adults and larvae); April (Minckley 1963; Resh 1975). Range: Canada and northern US, with records extending to TN and VA.

Genus *Dibusa*. This monotypic genus is represented by one eastern species, *Dibusa angata* Ross. It is the largest hydroptilid in North America, with larvae reaching lengths up to 6.7 mm (Wiggins 1996). The life history of this species is unique among eastern caddisflies because the final larval instar feeds on the red alga, *Lemanea australis*, and incorporates the same algal material into its case (Resh and Houpp 1986).

*Dibusa angata* Ross. Scattered localities in Eastern Coalfield, Bluegrass, and Knobs: Breathitt, Fleming, Jessamine, Johnson, Laurel, Lewis, Madison, McCreary, Pendleton, Pulaski, and Woodford counties; April–May (Resh 1975).

Genus *Hydroptila*. The genus contains more than 125 species in North America, with 31 species reported here for KY.

*Hydroptila ajax* Ross. Russell Crk, Adair Co; Troublesome Crk, Breathitt Co; Mitchell Crk and White Oak Crk (Sinking Crk basin), Laurel Co; Brashears Crk and Salt River, Spencer Co; May–September (Resh 1975).

*Hydroptila amoena* Ross. Scattered localities in Central Appalachians, Southwestern Appalachians, and Interior Plateau: Anderson, Bell, Breathitt, Bullitt, Hart, Laurel, Madison, McCreary, and Rockcastle counties; May–October (Resh 1975).

+\**Hydroptila ampoda* Ross. Unnamed trib Line Frk (Lilley Cornett Woods), Letcher Co; unnamed trib Dog Frk, Wolfe Co; June–July. Range: northeastern U.S. (CT, KY, ME, MN, NH, PA, and TN) and Canada (NB, NS, and QC). Rank: G5. Proposed KY rank and status: S1S3, S. This species was first collected in KY

by Jones (2000), but his record was not published. We collected additional specimens in 2010 from Big Everidge Hollow (Lilley Cornett Woods), Letcher Co.

*Hydroptila angusta* Ross. Salt River, Anderson Co; Salt River and Brashears Crk, Spencer Co; June–September (Resh 1975).

*Hydroptila armata* Ross. Scattered localities in Central Appalachians, Southwestern Appalachians, and Interior Plateau; April–October (Resh 1975).

*Hydroptila consimilis* Morton. Scattered localities in Central Appalachians, Southwestern Appalachians, Western Allegheny Plateau, Interior Plateau, and one locality in Jackson Purchase (Terrapin Crk SNP); May–October (Resh 1975).

+\**Hydroptila coweetensis* Huryn. Coles Frk (Robinson Forest), Breathitt Co; unnamed spring and Three Springs area (both MACA), Edmonson Co; Powder Mill Crk (Sinking Crk basin), Laurel Co; August. Range: AL, KY, NC, and VA (Morse et al. 1997). Rank: G1G2. Proposed KY rank and status: S1S2, T. Johansen (2000) provided the first KY record for this species during his intensive survey of the Sinking Crk basin in Laurel Co. We obtained additional records in 2007 and 2008 from spring and small stream habitats at MACA and Robinson Forest, respectively. Ranked as “Rare and Vulnerable” by Morse et al. (1997).

+\**Hydroptila decia* Etnier & Way. Big Dog Br (Sinking Crk basin), Laurel Co; May. Range: AL, KY, TN, and VA (Morse et al. 1997). Rank: G2. Proposed KY rank and status: S1S2, T. Johansen (2000) provided the first KY record for this species during his intensive survey of the Sinking Crk basin in Laurel Co. We also have records from CUGA, Lee Co, VA. Ranked as “Rare and Vulnerable” by Morse et al. (1997).

*Hydroptila delineata* Morton. Three Springs area (MACA), Edmonson Co; Salt Lick Crk, Marion Co; Big South Frk Cumberland River (BISO), McCreary Co; Cumberland River, Whitley Co; April, July–August (Resh 1975).

+\**Hydroptila fiskei* Blickle. Sinking Crk and White Oak Crk, Laurel Co; July–August. Range: KY, ME, NC, NH, PA, TN, and VA. Rank: G4. Proposed KY rank and status: S1S3, T. Johansen (2000) provided the only KY records for this species during his intensive

survey of the Sinking Crk basin in Laurel Co, but his records were not published.

*Hydroptila grandiosa* Ross. Eastern Coalfield (Bell, Breathitt, Johnson, Laurel, Letcher, McCreary, Pulaski, and Wolfe counties) and one Bluegrass locality (Muddy Crk, Blue Grass Army Depot, Madison Co); May–September (Resh 1975).

*Hydroptila gunda* Milne. Scattered localities in Central Appalachians, Interior Plateau, and Jackson Purchase (Bell, Edmonson, Graves, Letcher, Logan, Meade, Pulaski, Simpson, and Trigg counties); May–July, October (Floyd and Schuster 1990).

*Hydroptila hamata* Morton. Central and Southwestern Appalachians (Bell, Breathitt, Johnson, Laurel, McCreary, and Pulaski counties), Bluegrass (Franklin, Mercer, and Spencer counties), and western Pennyroyal (Trigg Co); May–September (Resh 1975).

+*Hydroptila howelli* Houp, Houp, and Harris. One of two Kentucky endemics, *H. howelli* has been documented from three widely separated localities: Sinking Crk system, Laurel Co; Salt Lick Crk, Marion Co; unnamed spring seep (Red River Gorge, DBNF), Menifee Co; April–May, July (Houp et al. 1998). Rank: G2G3. Proposed KY rank and status: S1S2, T.

*Hydroptila jackmanni* Blickle. Unnamed trib Casey Crk and Dry Frk (Fort Campbell), Trigg Co; May–June (Etnier et al. 2006).

+*Hydroptila kuehnei* Houp, Houp, and Harris. Blue Spring and Good Spring (MACA), Edmonson Co; Salt Lick Crk, Marion Co; McCracken Spring, Meade Co; Dry Frk basin, Metcalfe Co; April–October (Houp et al. 1998). One of two Kentucky endemics, *H. kuehnei* is restricted to spring or spring-fed streams of the Pennyroyal. Rank: G1G2. Proposed KY rank and status: S1S2, T.

+*Hydroptila lennoxii* Blickle. Clemons Frk (Robinson Forest) and Frozen Crk, Breathitt Co; Big Dog Br and White Oak Crk (Sinking Crk basin), Laurel Co; unnamed trib Dog Frk, Wolfe Co; June–July. Range: AL, KY, NH, and VA. Rank: G2G4. Proposed KY rank and status: S1S3, T. Johansen (2000) and Jones (2000) provided the first Kentucky records for this species, but their records were not published.

+*Hydroptila oneili* Harris. Western Pennyroyal (Fort Campbell): unnamed trib Casey Crk, Trigg Co; Noahs Spring, Christian Co;

June (Etnier et al. 2006). Range: AL, AR, GA, KY, and TN. Rank: G2G3. Proposed KY rank and status: S1S2, S.

+*Hydroptila paramoena* Harris. Little Yellow Crk and Tunnel Crk (CUGA), Bell Co; Big South Frk Cumberland River (BISO), McCreary Co; July–August. Range: mountainous regions of AL, GA, KY, and TN. Rank: G2G3. Proposed KY rank and status: S1S2, S.

+*Hydroptila paraxella* Harris and Armitage. Muddy Crk (BGAD), Madison Co; Thompson Br, Simpson Co; April–May. Range: KY and OH. Proposed rank: G3. Proposed KY rank and status: S2S3, S. Our specimens were examined by Steve Harris (Clarion University, Pennsylvania), who identified them as a recently described species from Ohio (Armitage et al. 2011).

*Hydroptila perdita* Morton. Scattered localities in Central Appalachians, Southwestern Appalachians, and Interior Plateau; Anderson, Bell, Breathitt, Casey, Clark, Franklin, Green, Jessamine, Johnson, Madison, Meade, Pulaski, Spencer, and Woodford counties; May–October (Resh 1975).

\**Hydroptila quinola* Ross. Jackson Purchase and Southwestern Appalachians (Sinking Crk basin): Blood River, Calloway Co; Terrapin Crk SNP, Graves Co; Big Dog Br and Powder Mill Br, Laurel Co; East Frk Clarks River, Marshall Co; April–August, October. Range: widely distributed in eastern U.S. and Canada.

\**Hydroptila remita* Blickle and Morse. Little Yellow Crk (CUGA), Bell Co; Sloans Crossing Pond (MACA), Edmonson Co; April, July–September. Range: AL, AR, FL, KY, LA, ME, MS, NC, NH, NJ, PA, SC, TN, and TX.

+*Hydroptila sandersoni* Mathis and Bowles. Buck Crk system, Pulaski Co; May–August (Floyd and Schuster 1990). Range: AL, AR, KY, MO, OH, OK, and TN. Rank: G3G4. Proposed KY rank and status: S1S2, S.

+*Hydroptila scolops* Ross. Little Yellow Crk (CUGA), Bell Co; April, July, September. Range: IL, KS, KY, MB, MN, TX, and WI. Rank: G4. Proposed KY status and rank: S1S3, T. Our KY record represents a southeastern range extension for the species.

*Hydroptila spatulata* Morton. Scattered localities in Central Appalachians and Interior Plateau: Barren, Bell, Breathitt, Bullitt, Hart,

Wayne, and Whitley counties; May–August (Resh 1975).

*Hydroptila talladega* Harris. Coles Frk (Robinson Forest), Breathitt Co; Sinking Crk basin, Laurel Co; April–May, July–August (Houp 1999). Limited to two KY localities but entire range includes AL, GA, KY, NC, OH, PA, SC, and VA.

*Hydroptila vala* Ross. Robinson Forest, Breathitt Co; Good Spring (MACA), Edmonson Co; Sinking Crk basin, Laurel Co; Beaver Crk, Cogur Frk, and Eagle Crk (all DBNF), McCreary Co; Pitman Crk, Pulaski Co; unnamed trib Dog Frk, Wolfe Co; May–June (Resh 1975).

*Hydroptila virgata* Ross. Robinson Forest, Breathitt Co; Pitman Crk, Pulaski Co; May–June (Resh 1975).

*Hydroptila waskesia* Ross. Russell Crk, Adair Co; Trammel Frk, Allen Co; Pitman Crk, Pulaski Co; April–May (Houp 1999).

*Hydroptila waubesianana* Betten. Scattered localities statewide; May–October (Resh 1975).

Genus *Ithytrichia*. Ross (1944) described the larva of the only Kentucky species. Larvae are strongly compressed and are distinguished from other hydroptilid genera by the presence of prominent, lobate projections on the abdomen (Moulton et al. 1999). The larval case is transparent and made of silk (Wiggins 1996).

*Ithytrichia mazon* Ross. Salt River, Spencer Co; June (Resh 1975). Range: AR, IL, KY, OH, and OK.

Genus *Leucotrichia*. Flint (1970) provided diagnostic characters for larvae and adults of the only Kentucky species, *L. pictipes* (Banks). Final instar larvae construct flattened, elliptical cases that are fastened immovably to rocks (resembling the egg cases of leaches). Final instar larvae graze on diatoms by extending their bodies through the anterior opening of the case (Wiggins 1996).

*Leucotrichia pictipes* (Banks). Scattered localities in Eastern Coalfield and Interior Plateau: Bell, Edmonson, Fleming, Harlan, Mercer, Powell, and Pulaski counties (larvae); Houp (1999).

Genus *Mayatrichia*. Ross (1944) described the larva of the only Kentucky species. Larvae construct tapered, silken cases that are reinforced with longitudinal or circular silken ridges. The preferred larval habitat is rocks in rapid sections of rivers and large streams (Wiggins 1996).

*Mayatrichia ayama* Mosely. Cumberland River, Bell Co; Indian Crk, McCreary Co; Big South Frk Cumberland River (BISO), McCreary Co; April–July (Resh 1975).

Genus *Metrichia*. Within North America north of Mexico, the genus is known only from AZ, OK, and TX. The larvae construct a silken case with attached algal filaments.

\**Metrichia* sp. The KDOW has collected larvae from four KY counties (Knox, Lewis, Magoffin, Morgan) that possess morphological characters typical of *Metrichia* (M. Vogel, KDOW, pers. comm., 10 November 2009). The specimens have long, sparse setae on the anterior margin of all three thoracic nota; stout, strongly curved tarsal claws; and lateral humps on abdominal segments II and IV. Adult specimens are needed for a positive identification, but it appears that these KY records represent a significant range extension for the genus.

Genus *Neotrichia*. The genus is represented by 16 species in North America north of Mexico. Five species are known from KY. These are the smallest caddisflies in North America, with a maximum length of about 2.5 mm (Wiggins 1996).

*Neotrichia collata* Morton. This species was first reported from Kentucky by Ross (1944), but no specific locality was given. We have recent collections from Sugar Run (CUGA), Bell Co; March, July. Range: limited to one KY locality but widely distributed in eastern U.S. (AL, IL, KY, ME, NY, SC, and VT), with one outlying record from UT.

*Neotrichia minutisimella* (Chambers). Rockcastle River (Livingston), Rockcastle Co; June (Resh 1975). Limited to one KY locality but widely distributed in central and eastern US.

*Neotrichia okopa* Ross. Salt River, Anderson Co; Brashears Crk and Salt River, Spencer Co; June (Resh 1975).

+*Neotrichia riegeli* Ross. Paint Crk, Johnson Co; June–August. June–August (Resh 1975). Range: AR, IL, KY, and OK. Rank: G3. Proposed KY rank and status: S1S3, S.

*Neotrichia vibrans* Ross. Troublesome Crk, Breathitt Co; East Frk Clarks River (Clarks River NWR), Marshall Co; Big South Frk Cumberland River (BISO), McCreary Co; and trib of Casey Crk, Trigg Co; April–May, July–September (Etnier et al. 2006).

Genus *Ochrotrichia*. About 50 species are known north of Mexico; 10 species are now

recorded from KY. Larvae occur in a variety of lotic habitats.

*Ochrotrichia anisca* (Ross). Clemons Frk (Robinson Forest), Breathitt Co; June (Resh 1975). Limited to one KY locality but entire range includes AR, IL, KS, KY, MO, OK, and TX.

*Ochrotrichia arva* (Ross). Unnamed spring trib Lynn Camp Crk, Hart Co; unnamed trib East Frk Clear Crk, Jessamine Co; Mill Springs, Wayne Co; Clear Crk and Lees Br, Woodford Co; April–June (Houp 1999).

*Ochrotrichia confusa* (Morton). Hickman Crk at Indian Falls, Jessamine Co; April (Resh 1975). Limited to one KY locality but entire range includes AL, FL, KY, NC, NY, OH, ON, PA, SC, and TN.

*Ochrotrichia eliaga* (Ross). Widespread in Interior Plateau: Adair, Allen, Barren, Bullitt, Edmonson, Fayette, Franklin, Hart, Logan, Madison, Pulaski, Simpson, Taylor, Warren, and Woodford counties; April–August (Houp 1999).

*Ochrotrichia reisi* Ross. Scattered localities in Bluegrass, Pennyroyal, and Eastern Coalfield: Breathitt, Edmonson, Fayette, Hart, Jessamine, Laurel, Madison, Mercer, Taylor, Wolfe, and Woodford counties; April–June, August (Houp 1999).

*Ochrotrichia shawnee* (Ross). Scattered localities in Bluegrass and Pennyroyal: Adair, Allen, Barren, Bullitt, Jessamine, Marion, and Taylor counties, plus the Buck Crk system (Pulaski Co) at the boundary of the Interior Plateau and Southwestern Appalachians; May–June (Resh 1975).

*Ochrotrichia spinosa* (Ross). Scattered localities in Bluegrass (Jessamine, Madison, Mercer, Spencer, and Woodford counties), plus one locality in Knobs (Salt Lick Crk, Marion Co); April–July (Resh 1975).

*Ochrotrichia tarsalis* (Hagen). Scattered localities in Bluegrass, Pennyroyal, and Eastern Coalfield: Adair, Bell, Breathitt, Edmonson, Green, Hart, Laurel, Spencer, and Whitley counties; May–October (Resh 1975).

+\**Ochrotrichia wojcickyi* Blickle. Elk Lick Crk (Floracliff SNP), Fayette Co; June. Range: limited to one KY locality but entire range includes IN, KY, MB, ME, MN, NH, OH, PA, TN and VA. Rank: G4. Proposed KY rank and status: S1S3. S. Elk Lick Crk is a steep, cascading, bedrock/cobble stream of the Kentucky River Palisades.

*Ochrotrichia xena* (Ross). Scattered localities in Bluegrass and eastern Pennyroyal: Breckinridge, Madison, Spencer, and Woodford counties; May (Resh 1975).

Genus *Orthotrichia*. The genus is represented by six species in North America; three species are known from KY. The larvae occupy lentic habitats or slowly flowing sections of streams or rivers.

*Orthotrichia aegerfasciella* (Chambers). Statewide; May–September (Resh 1975).

*Orthotrichia cristata* Morton. Scattered localities statewide: Anderson, Bell, Bullitt, Edmonson, Graves, Henderson, Laurel, Letcher, Pulaski, and Spencer counties; May–August (Resh 1975).

+\**Orthotrichia curta* (Kingsolver and Ross). Sinking Crk, Laurel Co; June–August. Range: AL, FL, KY, LA, ME, MN, NJ, QC, and TX. Rank: G4. Proposed KY status and rank: S1S2. T. Johansen (2000) provided the only KY records for this species during his intensive survey of the Sinking Crk basin in Laurel Co.

Genus *Oxyethira*. The genus is represented by about 40 species in North America north of Mexico; 8 species are now known from KY. Fifth-instar larvae construct a distinctively flattened, flask-shaped, clear case and occupy lentic habitats or slowly flowing portions of streams.

*Oxyethira forcipata* Mosely. Davis Br and Yellow Crk (both CUGA), Bell Co; Wilson Crk (Bernheim Forest), Bullitt Co; Buck Crk, Pulaski Co; White Oak Crk, Laurel Co; Hematite Lake (LBL), Trigg Co; April–October (Floyd and Schuster 1990).

\**Oxyethira grisea* Betten. Davis Br, Bell Co; Beaver Crk and Eagle Crk, McCreary Co; Schoolhouse Hollow Spring (LBL), Trigg Co; April, June, October. Range: widely distributed in eastern U.S. and Canada.

\**Oxyethira novasota* Ross. Blood River, Calloway Co; Cogur Frk, McCreary Co; April. Range: AL, AR, FL, GA, KY, LA, MS, NJ, OH, SC, and TX.

*Oxyethira pallida* (Banks). Scattered localities statewide; May–September (Resh 1975). This species is the most widespread *Oxyethira* in Kentucky, with records from lentic and lotic habitats.

+*Oxyethira pescadori* Harris & Keth. Piney Frk Crk (Fort Campbell), Montgomery, TN

(Christian Co, Kentucky); July–August (Etnier et al. 2006). Range: AL, FL, KY, TN, and VA. Rank: G3G4. Proposed KY rank and status: S1S2, S.

+\**Oxyethira rivicola* Blicke and Morse. Sinking Crk system, Laurel Co; July–August. Range: widely distributed in eastern U.S. and Canada. Rank: G5. Proposed KY rank and status: S1S2, T. Johansen (2000) provided the only KY records for this species during his intensive survey of the Sinking Crk basin in Laurel Co.

+\**Oxyethira rossi* Blicke and Morse. Big South Frk Cumberland River (BISO), McCreary Co; May, July–August. Range: KY, ME, MN, NH, TN, and WI. Rank: G3G4. Proposed KY rank and status: S1S2, T.

*Oxyethira zeronia* Ross. Sinking Crk system, Laurel Co; Buck Crk, Pulaski Co; unnamed trib Dog Frk, Wolfe Co (Jones 2000); June–September (Floyd and Schuster 1990).

Genus *Stactobiella*. The genus is represented by five species in North America; three species are known from KY. The larvae occupy rocks in swiftly flowing sections of small streams.

*Stactobiella delira* (Ross). Clemons and Coles Frk (Robinson Forest), Breathitt Co; Sinking Crk system, Laurel Co; Salt Lick Crk, Marion Co; Cumberland River and Laurel Crk, McCreary Co; Brushy Crk and Buck Crk, Pulaski Co; Horselick Crk, Rockcastle Co; Bark Camp Crk, Whitley Co; April–May (Resh 1975).

*Stactobiella martynovi* Blicke and Denning. Three widely scattered localities: Bad Br SNP, Letcher Co; Piney Frk Crk (Ft. Campbell Mil. Res.), Montgomery Co, TN (Christian Co., Kentucky); Clear Crk, Woodford Co; June (Houp 1999).

*Stactobiella palmata* (Ross). Scattered localities in Bluegrass, eastern Pennyroyal, and Eastern Coalfield: Anderson, Bell, Breathitt, Bullitt, Johnson, Laurel, Madison, McCreary, Pulaski, Spencer, Wayne, Whitley, and Woodford counties; April–September (Resh 1975).

#### Family Lepidostomatidae

Within North America, the family is represented by two genera, *Lepidostoma* and *Theliopsyche*, both of which have representatives in KY.

Genus *Lepidostoma*. About 75 species of *Lepidostoma* have been reported from North America (Wiggins 1996). The larvae construct distinctive, four-sided cases composed of quadrat plant or bark pieces. No keys are available for *Lepidostoma* larvae, but Weaver (1988) provided adult descriptions for all Kentucky species.

+\**Lepidostoma carrolli* (Flint). Schoolhouse Hollow Spring and Turkey Spring (LBL), Trigg Co; October. Range: AR, CT, KY, MD, ME, NC, NJ, OH, PA, SC, TN, and VA. Rank: G5. Proposed KY rank and status: S1S2, S.

+\**Lepidostoma etnieri* Weaver. Shillalah Crk (CUGA), Bell Co, September. Range: KY and TN (Grainger, Knox, and Roane counties) (Etnier et al. 1998). Rank: G1G2Q (Q = taxonomy questioned by NatureServe 2011, but we consider the taxon to be valid). Proposed KY rank and status: S1, E. Ranked as “Rare and Vulnerable” by Morse et al. (1997). Etnier (1997) evaluated the status of *L. etnieri* and determined that it did not warrant federal protection.

*Lepidostoma griseum* (Banks). Martins Frk (CUGA), Bell Co; Blowing Springs Cave, Jackson Co; Dry Frk, Metcalfe Co; Big Lick Br, Pulaski Co; unnamed trib Dog Frk, Wolfe Co (Jones 2000); September–October (Resh 1975).

+\**Lepidostoma lydia* Ross. Green River, Edmonson Co; June. Range: limited to one KY locality but widely distributed in eastern U.S. and Canada (GA, KY, MA, NC, NF, NH, NJ, NS, NY, OH, PA, QC, SC, TN, VA, and VT). Rank: G5. Proposed KY rank and status: S1S2, S.

*Lepidostoma pictile* (Banks). Buck Crk, Pulaski Co; April (Floyd and Schuster 1990). Range: widely distributed in eastern U.S. and Canada.

+\**Lepidostoma sackeni* (Banks). Upper Houchins Ferry Road (MACA), Edmonson Co. April. Range: widespread in eastern U.S. and Canada (CT, KY, MA, ME, MI, NC, ND, NF, NH, NS, NY, OH, ON, PA, QC, VT, WI, and WV). Rank: G5. Proposed KY rank and status: S1S2, S.

*Lepidostoma togatum* (Hagen). Scattered localities in Pennyroyal, Central Appalachians, and Southwestern Appalachians: Breathitt, Christian, Edmonson, Green, Harlan, Hart,

Laurel, Letcher, McCreary, Pulaski, Rockcastle, and Whitley counties; April–August (Resh 1975).

Genus *Theliopsyche*. The genus is represented by six species, all of which are restricted to the Appalachian Mountains and are locally distributed. Only one species, *Theliopsyche melas* Edwards is known from KY. Larvae of *Theliopsyche* construct smooth, rock cases and occupy small, spring-fed streams. No keys are available for *Theliopsyche* larvae, but an adult description of *T. melas* was provided by Edwards (1956).

*Theliopsyche melas* Edwards. Fayette Co. (no specific location provided by Resh [1975] – record questionable, not verified); Blue Heron Campground (BISO), McCreary Co; Big Everidge Hollow (Lily Cornett Woods), Letcher Co (Pond 2000); unnamed trib Dog Frk, Wolfe Co (Jones 2000); May–July, September (Resh 1975). Range: AL, KY, TN, VA, and WV.

#### Family Leptoceridae

Members of the Family Leptoceridae (long-horned caddisflies) represent some of the most widespread and abundant caddisflies in the Commonwealth. Within Kentucky, they are third behind the Hydroptilidae and Hydropsychidae in the number of species represented. Larval keys are available for all genera (see below); Ross (1944), Schmid (1980) and Moulton and Stewart (1996) provide keys and descriptions of adults.

Genus *Ceraclea*. The genus is represented by about 39 species in North America; 16 species are known from KY. The larvae construct cases of both mineral and plant fragments, and they are found in a variety of habitats. Most species are detritivores, but a few species feed on freshwater sponges (Resh 1976). Morse (1975) and Ross (1944) provided adult descriptions for most Kentucky species. Larvae of most eastern species were described by Resh (1976).

+\**Ceraclea alabamiae* Harris. Big South Frk Cumberland River (BISO), McCreary Co; April–May, July–August. Range: AL, KY, PA, and TN. Rank: G1G3. Proposed KY rank and status: S1S2, T. Ranked as “Rare and Vulnerable” by Morse et al. (1997).

*Ceraclea ancylus* (Vorhies). Widely distributed in large streams and rivers of Eastern

Coalfield, eastern Interior Plateau, with isolated records from Red River system (Logan Co) and John James Audubon State Park (Henderson Co); May–September (Resh 1975).

*Ceraclea cancellata* (Banks). Widely distributed in large streams and rivers of Eastern Coalfield and eastern Interior Plateau, with isolated records from Red River system (Logan Co) and John James Audubon State Park (Henderson Co); May–September (Resh 1975).

*Ceraclea diluta* (Hagen). Overall Crk and Wilson Crk (Bernheim Forest), Bullitt Co; Green River, Green Co; Salt Lick Crk, Marion Co; and Eagle Crk, Owen Co; May–August (Houp 1999).

+\**Ceraclea enodis* Whitlock and Morse. Unnamed pond (Wandering Woods property, MACA), Edmonson Co; July. Range: CT, GA, IL, KY, NC, ON, SC, and VA. Rank: G4. Proposed KY rank and status: S1S3, S.

*Ceraclea flava* (Banks). Cumberland River, Bell Co; Green River, Hart Co; Kinniconick Crk, Lewis Co; Big South Frk Cumberland River (BISO), McCreary Co; South Frk Licking River, Pendleton Co; Rockcastle River, Rockcastle Co; April–August (Resh 1975).

*Ceraclea maculata* (Banks). Scattered localities statewide; May–September (Resh 1975).

*Ceraclea neffi* (Resh). Robinson Forest, Breathitt Co; Sinking Crk system, Laurel Co; South Frk Licking River, Pendleton Co; Horselick Crk, Rockcastle Co; June–August (Resh 1975).

*Ceraclea nepha* (Ross). Scattered localities in Interior Plateau, Southwestern Appalachians, and Jackson Purchase: Bullitt, Calloway, Clinton, Graves, Hickman, Laurel, Marshall, Pulaski, and Trigg counties (May–June; Floyd and Schuster 1990).

*Ceraclea ophioderus* (Ross). Barren River, Warren Co.; July (Houp 1999). Range: widely distributed in eastern U.S. (AL, AR, FL, IL, IN, KY, LA, MO, MS, NC, TX, VA, and WV).

*Ceraclea protonepha* Morse and Ross. Scattered localities in Central and Southwestern Appalachians, Pennyroyal, and Jackson Purchase: Bell, Calloway, Clinton, Graves, Hickman, Jackson, Marshall, McCreary, Pulaski, Trigg, and Wayne counties; May–July (Floyd and Schuster 1990).

*Ceraclea punctata* (Banks). Scattered localities in Licking River basin and western Pennyroyal: Bath, Christian, Kenton, Pendleton, and Rowan counties; larvae (Houp and Schuster 1997).

*Ceraclea resurgens* (Walker). Harrods Crk, Jefferson Co; Cumberland River, McCreary Co; Buck Crk, Pulaski Co; April–June (Resh 1975).

+\**Ceraclea spongillovorax* (Resh). Unnamed pond (Blue Heron campground, BISO), McCreary Co; May, July, September. Range: AL, FL, IL, IN, KS, KY, LA, MD, MS, and VA. Rank: G3G4. Proposed KY rank and status: S1S2, T.

*Ceraclea tarsipunctata* (Vorhies). Statewide; May–July (Resh 1975).

*Ceraclea transversa* (Hagen). Scattered localities statewide, except Western Allegheny Plateau and Western Coalfield; May–September (Resh 1975).

Genus *Leptocerus*. A single species occurs in North America, *Leptocerus americanus* (Banks). *Leptocerus* larvae live among aquatic plants in lentic habitats, where they construct transparent, silken cases. Adults and larvae of the only North American species, *Leptocerus americanus* (Banks), were described by Ross (1944).

*Leptocerus americanus* (Banks). Scattered localities in western Pennyroyal and Jackson Purchase: Adair, Calloway, Christian, Edmonson, Graves, Hart, Hickman, and Trigg counties, with one additional record from Hart Co, 100-acre pond; May–August (Etnier et al. 2006).

Genus *Mystacides*. One of only three North American species, *Mystacides sepulchralis* (Walker), occurs in Kentucky. The larval case is composed of rock or plant material, with twigs or conifer needles protruding from the case. Adults and larvae are illustrated in Ross (1944).

*Mystacides sepulchralis* (Walker). Statewide; May–October (Resh 1975).

Genus *Nectopsyche*. About 15 species occur north of Mexico; four species are known from KY. Adult descriptions of *Nectopsyche* were provided by Ross (1944) and Haddock (1977); eastern larvae were described by Glover and Floyd (2005).

\**Nectopsyche albida* (Walker). Farm pond, Fayette Co; larvae. Range: widely distributed in northern and eastern North America.

*Nectopsyche candida* (Hagen). Scattered localities statewide; May–September (Resh 1975).

*Nectopsyche exquisita* (Walker). Statewide; May–October (Resh 1975).

*Nectopsyche pavidata* (Hagen). Scattered localities in Eastern Coalfield and Central Pennyroyal: Bell, Breathitt, Edmonson, Green, Hart, Logan, McCreary, Owsley, Pulaski, Rockcastle, and Warren, and Wayne counties, with one record from a Bluegrass locality, Elk Lick Crk, Fayette Co; May–September (Resh 1975).

Genus *Oecetis*. Approximately 25 species are known from North America north of Mexico. The larvae are predaceous and construct a variety of cases out of rock and plant materials. Adults of Kentucky species were described by Ross (1941, 1944, 1966); Floyd (1995) provided larval descriptions of all Kentucky species except *O. ditissa* and *O. scala*.

*Oecetis avara* (Banks). Eastern Coalfield, eastern Interior Plateau, and isolated records from Christian Co and Hickman Co; June–August (Resh 1975).

*Oecetis cinerascens* (Hagen). Statewide; May–October (Resh 1975).

*Oecetis ditissa* Ross. Statewide; May–October (Resh 1975).

*Oecetis inconspicua* (Walker). Statewide; April–October (Resh 1975). One of the most widely distributed caddisfly species in KY and North America. Based on larval and adult associations made by Floyd (1995) and genetic evidence provided by Zhou et al. (2011), *O. inconspicua* appears to be a species complex with an undetermined number of species.

*Oecetis nocturna* Ross. Statewide; May–October (Resh 1975).

*Oecetis persimilis* (Banks). Statewide; June–October (Resh 1975).

+*Oecetis scala* Ross. Big South Frk Cumberland River (BISO), McCreary Co; April–August (Houp 1999). Range: locally distributed in AL, AR, KY, MD, NC, NH, NJ, PA, QC, and SC. Rank: G4G5. Proposed KY rank and status: S1S2, T.

+\**Oecetis sphyra* Ross. Big South Frk Cumberland River (BISO), McCreary Co; July. Range: widely distributed in the southeastern U.S. (AL, FL, GA, KY, LA, MS, NC, SC, TN, TX, and VA). Rank: G5. Proposed KY rank and status: S1S2, T.

Genus *Setodes*. Nine species are known from North America; only two species have been found in KY. Holzenthal (1982) provided adult descriptions and distributional information for all North American species; Nations (1994) provided larval descriptions of both Kentucky species.

+*Setodes epicampes* Edwards. Red River, Logan Co; unnamed trib Casey Crk (Fort Campbell), Trigg Co; June (Etnier et al. 2006). Range: AL, KY, and TN. Rank: G2. Proposed KY rank and status: S2, S.

*Setodes incertus* (Walker). Cumberland River, Bell Co; unnamed spring (MACA), Edmonson Co; Green River, Green and Hart counties; 100-acre Pond, Hart Co; South Knob Crk (ABLI), Larue Co; Big South Frk Cumberland River (BISO), McCreary Co; June–September (Resh 1975).

Genus *Triadenodes*. The genus is represented by 22 species in North America, 12 of which are known from KY. The slender, tapered larval cases are constructed of spirally arranged plant pieces. Glover (1996) provided larval descriptions of all Kentucky species except *Triadenodes dipsius* Ross. Manuel (2010) reviewed the adults of all North American species, including the description of several new species.

*Triadenodes aba* Milne. Scattered localities across KY: Elliott, Graves, Henderson, Hickman, Jefferson, Johnson, Scott, and Wayne counties; May, July (Resh 1975).

+\**Triadenodes cumberlandensis* Etnier and Way. Grindstone Crk, Calloway Co; June. Range: AL, AR, GA, KY, OK, and TN. Rank: G3G4. Proposed KY rank and status: S1S3, S.

+\**Triadenodes dipsius* Ross. Clemons Frk (Robinson Forest), Breathitt Co; June. Range: AL, AR, KS, KY, MN, ND, OH, OK, PA, QC, TN, VA, and WI. Rank: G5. Proposed KY rank and status: S1S2, T.

*Triadenodes flavescens* Banks. No specific locality, Bell Co; Big Sandy River, Boyd Co; no date provided (Resh 1975). The KDOW provided numerous larval (KDOW) records of this species, but until larval vouchers can be located or adults are collected from some of these same sites, we will assume that the species is restricted to the Boyd Co locality.

*Triadenodes ignitus* (Walker). Statewide; May–July (Resh 1975).

*Triadenodes injustus* (Hagen). Statewide; May–September (Resh 1975).

*Triadenodes marginatus* Sibley. Scattered localities statewide: Bell, Breathitt, Calloway, Clay, Crittenden, Franklin, Grayson, Harlan, Laurel, Letcher, Martin, Metcalfe, McCreary, Pike, Trigg, and Wayne counties; April–September (Etnier et al. 2006).

*Triadenodes melaca* Ross. Scattered localities statewide: May–September (Resh 1975).

*Triadenodes nox* Ross. Saline Crk (Fort Campbell), Stewart Co, TN (Trigg Co, KY); 100-acre Pond, Hart Co; June (Etnier et al. 2006).

\**Triadenodes ochraceus* (Betten and Mosely). Grindstone Crk, Calloway Co; Beaver Crk, McCreary Co; June. Range: AL, AR, CT, DE, FL, GA, KY, MS, NC, OH, SC, TN, TX, and VA.

*Triadenodes perna* Ross. Statewide; May–September (Houp 1999).

*Triadenodes tardus* Milne. Statewide; May–October (Resh 1975).

#### Family Limnephilidae

This family contains nearly 100 genera and 900 described species. The group has attracted the attention of scientists for many years, but much uncertainty remains about the family limits and internal organization (Vshivkova et al. 2007). The arrangement used below may change again in the near future.

Genus *Frenesia*. The genus *Frenesia* is comprised of two species, *F. difficilis* (Walker) and *F. missa* (Milne), both of which are confined to eastern North America. Larvae were described by Flint (1960); adult descriptions of *F. difficilis* and *F. missa* were provided by Betten and Mosely (1940) and Moulton and Stewart (1996), respectively. Only *F. difficilis* has been observed in Kentucky.

+\**Frenesia difficilis* (Walker). Springs and spring runs at Terrapin Crk SNP, Graves Co; November–January. Range: locally distributed from NF to TN and west to KY. Rank: G5. Proposed KY rank and status: S1S2, T. Larvae of this species were first observed in KY by KSNPC and KDOW in 2000, but adults were not collected until November 2008 when Malaise traps produced over 100 individuals. The Terrapin Crk population represents a significant, western range extension for the

species as the closest, previously known populations in OH (Stillfork Swamp, Carroll County) and TN (Great Smoky Mountains National Park) are located approximately 480 to 780 km to the east (Usis and MacLean 1986; Etnier et al. 1998). Adults of this species are unusual in that they emerge during the late fall and early winter (November to January).

Genus *Ironoquia*. Four species of *Ironoquia* are known from North America; three of these species, *I. kaskaskia* (Ross), *I. lyrata* (Ross), and *I. punctatissima* (Walker), occur in Kentucky. Flint (1960) described the larva of *I. punctatissima* (Flint 1960), and associated material exists for the other two Kentucky species (Etnier et al. 1998; Wiggins 1996). Adult descriptions were provided by Ross (1944) and Moulton and Stewart (1996).

*Ironoquia kaskaskia* (Ross). Unnamed spring seep (DBNF), Bath Co; Noahs Spring (Fort Campbell), Christian Co; Sinking Crk (DBNF), Laurel Co; East Frk Clarks River, Marshall Co; Thompson Br, Simpson Co; September–October (Etnier et al. 2006). Johansen (2000) provided the first Kentucky record of this species (Sinking Crk, Laurel Co), but his record was not published.

*Ironoquia lyrata* (Ross). Tunnel Crk (CUGA), Bell Co; Big Sandy River, Boyd Co; June, September (Haag and Hill 1983). Range: locally distributed from QC to VA and west to WI.

*Ironoquia punctatissima* (Walker). Scattered localities statewide; September–October (Resh 1975).

Genus *Limnephilus*. The genus is represented in North America by almost 100 species. Flint (1960) described the larvae of both Kentucky species, *I. indivisus* Walker and *I. submonilifer* Walker; Ruiter (1995) provided adult descriptions. This paper provides the first records of this genus from Kentucky, but both species have been reported from neighboring states (Arkansas, Illinois, Indiana, Ohio, Tennessee, and Virginia). Larvae of these species frequent temporary ponds and wetlands.

+\**Limnephilus indivisus* Walker. Davis Br (CUGA), Bell Co; May, July, September. Range: widely distributed across Canada and eastern US, with records extending to UT and VA. Rank: G5. Proposed KY rank and status: S1S3, S.

+\**Limnephilus submonilifer* Walker. Davis Br (CUGA), Bell Co; Clear Crk, Woodford Co; April, October. Range: eastern U.S. and Canada, with records extending to TN and VA. Rank: G5. Proposed KY rank and status: S1S3, S.

Genus *Platycentropus*. Only one of the three Nearctic species, *P. radiatus* (Say), occurs in Kentucky. Flint (1960) described the larva; adult descriptions were provided by Ross (1944), Schmid (1980), and Moulton and Stewart (1996). We have records of *P. radiatus* from two very different habitats, a natural wetland habitat in western Kentucky (Murphys Pond, Hickman County) and a cool mountain stream in southeastern Kentucky (Letcher County). These extremes support the general habitat description provided by Wiggins (1996), who reported that *Platycentropus* larvae can occupy a wide variety of habitat types and temperature regimes.

*Platycentropus radiatus* (Say). Murphys Pond, Hickman Co; Colliers Crk, Letcher Co; May–June (Resh 1975).

Genus *Pseudostenophylax*. Only one of two eastern species, *Pseudostenophylax uniformis* (Betten), occurs in Kentucky. Larvae frequent cool spring runs or small streams with intermittent flow (Wiggins 1996). Larval descriptions were provided by Flint (1960); adult genitalia were illustrated by Ross (1944) and Moulton and Stewart (1996).

*Pseudostenophylax uniformis* (Betten). Unnamed spring seep (Shillalah Crk WMA) and unnamed spring at Hensley Settlement (CUGA), Bell Co; unnamed spring (MACA), Edmonson Co.; Hog Camp Crk, Elliott Co; Paint Crk, Johnson Co; Bad Br (Bad Br SNP), Poor Frk, and unnamed trib to Line Frk (Lilley Cornett Woods), Letcher Co; Hell For Certain Crk, Leslie Co; unnamed trib Salt Lick Crk, Marion Co; Little Angel Spring (Clay Hill Memorial Forest), Taylor Co; unnamed trib Dog Frk, Wolfe Co; April–June (Resh 1975).

Genus *Pycnopsyche*. The genus is represented in North America by about 20 species. Adults, larvae, and larval cases of Kentucky species are described in Wojtowicz (1982) and Flint (1960). Identification of larvae is difficult but can be achieved for some species if the identifications are based on mature specimens, accurate locality information, and

careful use of species descriptions and keys provided in the references listed above (Etnier et al. 1998). At the present time, larvae of *P. flavata* and *P. gentilis* can be identified with the most certainty. Adult emergence generally occurs in the fall, typically from early September through October in Kentucky streams.

*Pycnopsyche antica* (Walker). Scattered localities statewide except Bluegrass: Bell, Boyd, Bullitt, Edmonson, Graves, Harlan, Laurel, McCreary, Metcalfe, Pulaski, Rowan, and Trigg counties. August–October (Picazzo and DeMoss 1980).

+\**Pycnopsyche circularis* (Provancher). Scattered localities in Eastern Coalfield: unnamed spring seep (DBNF), Bath Co; Martins Frk (CUGA), Bell Co; Sinking Crk system (DBNF), Laurel Co; September–October. Range: northeastern Canada (NS and QC) to TN and VA. Rank: G5. Proposed KY rank and status: S1S3, S. Johansen (2000) observed this species during his intensive survey of the Sinking Crk basin in Laurel County, but the record was not published. This species is widely distributed across eastern North America (NS to TN and west to WI), but populations appear to be localized, with only a few individuals observed at each site (Wojtowicz 1982).

+\**Pycnopsyche flavata* (Banks). Limited to Central Appalachians: Shillalah Crk (CUGA), Bell Co; July, September. Range: southern Appalachian Mountains of GA, KY, NC, SC, TN, and VA. Rank: G4. Proposed KY rank and status: S1S2, T. This species inhabits higher elevation seeps and streams and is one of the earliest emerging *Pycnopsyche*, with adults appearing as early as May or June in some parts of its range (Wojtowicz 1982).

*Pycnopsyche gentilis* MacLachlan. Scattered localities statewide except Jackson Purchase (adults and larvae); August–October (Resh 1975).

*Pycnopsyche guttifer* (Walker). Scattered localities in Southwestern Appalachians and Interior Plateau: Bell, Bullitt, Edmonson, Fayette, Jefferson, Laurel, Pulaski, Simpson, and Woodford counties; September–October (Resh 1975). The Beargrass Crk population (Jefferson Co) is likely extirpated due to water quality and habitat degradation.

*Pycnopsyche indiana* (Ross). Scattered localities in Eastern Coalfield and Interior

Plateau: Bath, Bell, Boyd, Bullitt, Fayette, Hart, Jessamine, Menifee, Simpson, Washington, and Woodford counties; September–October (Haag and Hill 1983).

*Pycnopsyche lepida* (Hagen). Shillalah Crk (Shillalah Crk WMA), Bell Co; Overall Crk and Wilson Crk (Bernheim Forest), Bullitt Co; 300-Springs, Hart Co; Chalk Slough (Obion Crk WMA), Hickman Co; Sinking Crk system, Laurel Co; Covered Bridge Boy Scout Camp, Oldham Co; Buck Crk, Pulaski Co; and Thompson Br, Simpson Co; August–October (Resh 1975).

*Pycnopsyche luculenta* (Betten). Scattered localities in Pennyroyal and Eastern Coalfield: Davis Br, Martins Frk, and Shillalah Crk (CUGA), Bell Co; Big Sandy River, Boyd Co; Cope Frk, Breathitt Co; cinnamon fern bog (MACA), Edmonson Co; Sinking Crk system, Laurel Co; Dry Frk system, Metcalfe Co; Big Lick Br (DBNF), Pulaski Co; Thompson Br, Simpson Co; unnamed trib Dog Frk, Wolfe Co; September–October (Haag and Hill 1983).

+\**Pycnopsyche rossi* Betten. Springs and spring-fed streams of Pennyroyal: unnamed spring-fed trib Lynn Camp Crk, Hart Co; Buffalo Spring and Doe Run, Meade Co; Dry Frk system, Metcalfe Co; September–October. Range: AR, IN, IL, KY, MO, OH, and TN (Wojtowicz 1982; Moulton and Stewart 1996). Rank: G3. Proposed KY rank and status: S2S3, S. This species is restricted to springs and spring-fed streams across its range.

+\**Pycnopsyche subfasciata* (Say). Elk Lick Crk, Fayette Co; 300-Springs, Hart Co; September–October. Range: widely distributed, with records from Quebec south to GA and west to CO and AB (Wojtowicz 1982). Rank: G5. Proposed KY rank and status: S1S3, S.

+\**Pycnopsyche virginica* (Banks). Noahs Spring, Christian Co; East Frk Clarks River (Clarks River NWR), Marshall Co; October (Etnier et al. 2006). Range: locally distributed in AL, KY, NC, SC, TN, and VA (Wojtowicz 1982; Flint et al. 2008). Rank: G3G4. Proposed KY rank and status: S1S3, T. This species is the rarest *Pycnopsyche*, with few adult collections across its range (Wojtowicz 1982). Flint et al. (2008) commented that adults in VA have been taken only in the Coastal Plain near small, spring-fed streams.

## Family Molannidae

The Molannidae is a small family of the Oriental and Holarctic faunas, having only two genera and about three dozen species. Both genera occur in North America, but only one occurs in Kentucky. Larvae are instantly recognized by their distinctive shield-shaped cases, made of a central tube of fine sand grains with lateral flanges and a prolonged, anterior hood or cowl made of larger sand grains or gravel. Larvae are completely hidden by the flanges and hood when moving and feeding. In this sense, they resemble certain larvae of *Ceraclea* (Leptoceridae), but they differ in details of case construction and in their habitats.

Genus *Molanna*. Six species of *Molanna* have been reported from North America. The larvae construct distinctive, flattened cases with an anterior hood and lateral flanges. Sherberger and Wallace (1971) provided larval keys for all Kentucky species; Ross (1944) and Roy and Harper (1980) provided illustrations of males and females, respectively.

*Molanna blenda* Sibley. Spring-fed streams of Eastern Coalfield, southern Pennyroyal, and Jackson Purchase: Allen, Barren, Bell, Breathitt, Clay, Edmonson, Elliott, Graves, Harlan, Hart, Laurel, Letcher, McCreary, Metcalfe, Owsley, Trigg, Whitley, and Wolfe counties; May–October (Houp 1999). Zhou et al. (2011) provided evidence that *M. blenda* is a species complex composed of morphologically similar forms with substantial genetic divergence.

\**Molanna tryphena* Betten. Blood River, Calloway Co; Cogur Frk (DBNF), McCreary Co.; April, June. Range: QC to AL.

\**Molanna ulmerina* Navas. Big South Frk Cumberland River (BISO) and Cogur Frk (DBNF), McCreary Co; April–August. Range: southern Canada south to FL and west to AR.

## Family Odontoceridae

The Odontoceridae is a small family with just over 100 species and 14 genera with a world-wide distribution. Thirteen species and six genera are known from North America; two genera and six species are found in the study area.

Genus *Psilotreta*. Parker and Wiggins (1987) provided descriptions, keys, and distributional information for all 11 North American

species. *Psilotreta* larvae are unique among North American caddisflies based on their sturdy case construction (strongest case of any North American caddisfly) and their propensity just prior to pupation to attach their cases in dense layers on the underside of rocks.

\**Psilotreta frontalis* Banks. Station Creek (CUGA), Lee Co, VA (larvae). Larvae were discovered within CUGA, just south of the KY border.

*Psilotreta labida* Ross. Fletchers Frk (Fort Campbell), Montgomery Co, TN (Christian Co, KY); Salt Lick Crk, Marion Co; Little South Frk, McCreary Co; Casey Crk, Trigg Co; Clear Crk, Woodford Co; May–June (Parker and Wiggins 1987).

*Psilotreta rufa* (Hagen). Springs or spring runs of Western Allegheny Plateau and Pennyroyal: Cooper Spring, Good Spring, and Three Springs (MACA), Edmonson Co; Cooper Spring (MACA), Hart Co; Little Angel Spring (Clay Hill Memorial Forest), Taylor Co; Schoolhouse Hollow Spring (LBL), Trigg Co; unnamed trib Dog Br (DBNF), Wolfe Co; May–June (Resh 1975).

## Family Philopotamidae

Larvae of Philopotamidae are restricted to lotic habitats where they construct elongate, sac-like nets on the underside of rocks. The fine-mesh nets are used to filter the water, and trapped food particles are removed from the net with the larva's highly specialized (T-shaped), membranous labrum. Lago and Harris (1987) and Armitage (1991) provided adult descriptions, keys, and distributional information for adults of all North American species.

Genus *Chimarra*. The genus *Chimarra* is represented by 20 species in North America north of Mexico. Ross (1944) provided larval descriptions and a key to all four Kentucky species.

*Chimarra aterrima* Hagen. Statewide; April–September (Resh 1975).

*Chimarra feria* Ross. Scattered localities of western Pennyroyal and Jackson Purchase: Grindstone Crk, Calloway Co; Terrapin Crk SNP, Graves Co; Thompson Br, Simpson Co; Arlt Spring and Crooked Crk (LBL), Trigg Co; May–July, October (Resh 1975).

*Chimarra obscura* (Walker). Statewide; May–October (Resh 1975).

*Chimarra socia* Hagen. Trammel Frk, Allen Co; Salt River, Anderson Co; Cumberland River, Bell Co; Big South Frk Cumberland River (BISO) and Cogur Frk (DBNF), McCreary Co; May–July (Resh 1975).

Genus *Dolophilodes*. The genus is represented by 10 species in North America. Ross (1944) described the larva of the only Kentucky species, *Dolophilodes distincta* (Walker).

*Dolophilodes distincta* (Walker). Statewide, except northern Bluegrass and Jackson Purchase; February–October (Resh 1975).

Genus *Fumonta*. Blahník (2005) elevated the monotypic subgenus *Fumonta* of *Dolophilodes* to generic status. Adult illustrations of *F. major* (Banks) were provided by Ross (1956), and Weaver et al. (1981) described the larva.

+\**Fumonta major* (Banks). Big Lick Br (DBNF), Pulaski Co; June. Range: Appalachian Mountains of AL, GA, KY, NC, SC, TN, and VA. Rank: G4G5. Proposed KY rank and status: S1S2, T.

Genus *Wormaldia*. The genus is represented in Kentucky by only 3 of the 14 North American species. Ross (1944) described the larvae of *Wormaldia moesta* (Banks) and *W. shawnee* Ross. The larva of *W. thyria* is unknown.

*Wormaldia moesta* (Banks). Cool, spring-fed streams of Eastern Coalfield and Interior Plateau; March–October (Resh 1975).

*Wormaldia shawnee* Ross. Scattered localities in Southwestern Appalachians and Interior Plateau: Allen, Bullitt, Christian, Grant, Laurel, Pulaski, Taylor, and Woodford counties; April–June, August (Resh 1975).

+\**Wormaldia thyria* Denning. Pine Mountain Settlement School and Watts Crk (Blanton Forest SNP), Harlan Co; Yahoo Crk and Big South Frk Cumberland River (BISO), McCreary Co; June. Range: Appalachian Mountains of KY, NC, SC, TN, and VA. Rank: G3. Proposed KY rank and status: S1S2, T. All KY populations occur in small, undisturbed streams with good water quality.

#### Family Phryganeidae

The Phryganeidae, or giant caddisflies, include some of the largest species (over 40 mm long) in North America. The larvae are more active than other case-making caddisflies and are less dependent on their case, which they may abandon when threatened (Wiggins 1996). The adults are strong fliers

and appear to be attracted to sugar solutions, as evidenced by their capture in fermenting molasses traps in Arkansas (Bowles et al. 1990). Wiggins (1998) provided detailed descriptions, keys, and distributional information for adults and some larvae of North American genera and species. The family is represented in Kentucky by five genera and eight species.

Genus *Agrypnia*. This Holarctic genus contains 17 species, with 10 species in North America and one species in KY. Larvae prefer habitats with still or slowly moving water.

*Agrypnia vestita* (Walker). Scattered localities statewide: Anderson, Bath, Bell, Edmonson, Fayette, Graves, Hart, Meade, Metcalfe, Pulaski, Trigg, Wolfe, and Woodford counties; April–October (Resh 1975).

Genus *Banksiola*. This genus is comprised of five species, all of which are restricted to North America. Only one species is known from KY.

*Banksiola dossuaria* (Say). Central Appalachians: Martins Frk and Shillalah Crk (CUGA), Bell Co; Bad Br SNP, Letcher Co; Shelby Gap, Pike Co; June–July (Resh 1975). Range: widely distributed in eastern North America (LB to SC to WI).

Genus *Oligostomis*. This is a Holarctic genus of five species, two of which are restricted to North America. Only one species is known from the study area. The omnivorous larvae inhabit cool streams in areas of slow current and accumulated leaves.

+\**Oligostomis ocelligera* (Walker). Dry Br (MACA), Edmonson Co; April. Range: northeastern U.S. and Canada, with isolated records from IN and TN. Rank: G5. Proposed KY rank and status: S1S3, S.

Genus *Phryganea*. This is a Holarctic genus of eight species, two of which are found in North America and KY. The omnivorous larvae prefer lake and marsh habitats.

+\**Phryganea cinerea* (Walker). Good Spring (MACA), Edmonson Co; April, June, August. Range: northern U.S. and Canada (Wiggins 1998), with isolated records in Clark County, IN (Waltz and McCafferty 1983) and KY. Rank: G5. Proposed KY rank and status: S1S3, S. Its collection in Kentucky represents a southern range extension.

*Phryganea sayi* Milne. Scattered localities statewide: Breathitt, Bullitt, Edmonson, Fayette, Graves, Larue, Laurel, Marion, Marshall,

McCreary, Meade, Oldham, Pendleton, Pulaski, Spencer, and Whitley counties; May, July–September (Resh 1975).

Genus *Ptilostomis*. The genus is restricted to North America, with a total of four species. Three of these species are known from KY. Species of *Ptilostomis* are considered “ecological generalists,” particularly *P. ocellifera* (Wiggins 1998). Larvae are found in a wide range of habitats from spring streams to temporary pools. Adults of all four species are similar in appearance and are less ornamentally marked than other phryganeid genera. Larvae cannot be separated at this time.

*Ptilostomis ocellifera* (Walker). Grindstone Crk, Calloway Co; Wet Prong (MACA), Edmonson Co; Sinking Crk system, Laurel Co; no specific locality, Oldham Co; unnamed trib Dog Frk, Wolfe Co; May–July (Resh 1975).

*Ptilostomis postica* (Walker). Scattered localities statewide: Bath, Bullitt, Edmonson, Graves, Hart, Hickman, Larue, Letcher, Marshall, McCreary, and Pulaski counties; April–June, September–October (Floyd and Schuster 1990).

*Ptilostomis semifasciata* (Say). Cumberland River, Bell Co; Coles Frk (Robinson Forest), Breathitt Co; White Oak Crk, Laurel Co; June, August (Resh 1975).

#### Family Polycentropodidae

Larvae of Polycentropodidae construct a variety of fixed, silken retreats, many of which have outlying silken strands that allow the larva to detect the vibrations of potential prey. Larval descriptions are lacking for most North American species, but Ross (1944) provided larval descriptions and keys for some Kentucky species. Armitage and Hamilton (1990) provided descriptions, keys, and distributional information for North American adults.

Genus *Cernotina*. Only seven species are known from North America, north of Mexico; one species occurs in Kentucky.

*Cernotina spicata* Ross. Scattered localities in Eastern Coalfield, western Pennyroyal, and Jackson Purchase: Bell, Christian, Graves, Laurel, and Trigg counties; May–August (Etnier et al. 2006).

Genus *Cyrnellus*. Only one species, *Cyrnellus fraternus* (Banks), is known from

North America and is widely distributed in the eastern US.

*Cyrnellus fraternus* (Banks). Statewide; June–September (Resh 1975).

Genus *Neureclipsis*. Five species are known from North America. Larvae of *Neureclipsis* construct distinctive, trumpet shaped nets (up to 10 cm in length) that are attached to fixed objects in areas with slow current.

*Neureclipsis crepuscularis* (Walker). Scattered localities in Eastern Coalfield, Pennyroyal, and Jackson Purchase; May–August (Resh 1975).

*Neureclipsis parvula* (Banks). Cumberland River, Bell Co; Cumberland River, Lyon Co; June–August (Resh 1975).

+*Neureclipsis piersoni* Frazer and Harris. Noahs Spring (FCMR), Christian Co; Big South Frk Cumberland River (BISO), McCreary Co; unnamed trib Casey Crk (FCMR), Trigg Co; no date (Etnier et al. 2006). Range: AL, GA, KY, and TN. Rank: G1G3. Proposed KY rank and status: S1S3, S.

Genus *Nyctiophylax*. About 10 species of *Nyctiophylax* have been reported from North America; 6 species are reported from Kentucky, including 3 species for the first time.

*Nyctiophylax affinis* (Banks). Statewide; May–September (Resh 1975).

+\**Nyctiophylax banksi* Morse. White Oak Crk, Laurel Co; June–August. Range: AL, CT, KY, ME, MA, MN, MS, ON, PA, QC, SC, TN. Rank: G4G5. Proposed KY rank and status: S1S3, T. Johansen (2000) provided the first and only Kentucky record of this species, but the record was not published.

*Nyctiophylax celta* Denning. Big South Frk Cumberland River (BISO), McCreary Co; Cumberland River, Whitley Co; unnamed trib Dog Frk, Wolfe Co; August (Resh 1975).

\**Nyctiophylax moestus* Banks. Shillalah Crk and Sugar Run (CUGA), Bell Co; Clemons Frk, Breathitt Co; Grindstone Crk, Calloway Co; Good Spring and Wet Prong (MACA), Edmonson Co; Sinking Crk System, Laurel Co; Bad Br (Bad Br SNP) and Big Everidge Hollow (Lilley Cornett Woods), Letcher Co; Salt Lick Crk, Marion Co; Eagle Crk and Yahoo Crk (BISO), McCreary Co; Dry Frk, Metcalfe Co; May–August. Range: widely distributed in northern and eastern North America.

*Nyctiophylax serratus* Lago and Harris. Murphys Pond and East Frk Clarks River

(Clarks River NWR), Marshall Co; Saline Crk, Stewart Co, TN (Trigg Co); May–June (Etnier et al. 2006). Range: AL, AR, FL, KY, MS, MO, TN, TX, and VA.

*Nyctiophylax uncus* Ross. No specific locality reported by Morse (1972), who reported the species from eastern Kentucky (Resh 1975). Range: widely distributed in the eastern U.S. and Canada from ON and QC south to KY and TN.

Genus *Polycentropus*. The genus *Polycentropus* is represented by about 50 species in North America (Wiggins 1996) and 16 species in Kentucky. Ross (1944) provided larval descriptions for six species, but larval-adult associations are lacking for most species.

+*Polycentropus barri* Ross and Yamamoto. Robinson Forest, Breathitt Co; Blowing Springs Cave and John Rogers Cave (DBNF), Jackson Co; May–July (Resh 1975). Range: AL, KY, PA, and TN. Rank: G2G4. Proposed KY rank and status: S1S2, T.

*Polycentropus blicklei* Ross and Yamamoto. South Knob Crk (ABLI), Larue Co; Salt Lick Crk, Marion Co; Arlt Spring (LBL) and Lake Barkley, Trigg Co; April–June (Resh 1975).

+\**Polycentropus carolinensis* Banks. Dark Ridge Br and Shillalah Crk (CUGA), Bell Co; unnamed springs (MACA), Edmonson Co; unnamed trib Dog Br, Wolfe Co; April, July. Range: eastern North America from QC to TN and VA. Rank: G5. Proposed KY rank and status: S2S3, S.

*Polycentropus centralis* Banks. Scattered localities of Southwestern Appalachians and Interior Plateau: Bullitt, Calloway, Christian, Edmonson, Fayette, Franklin, Larue, Laurel, Madison, Marion, Marshall, Pulaski, Simpson, Taylor, and Trigg counties; April–October (Floyd and Schuster 1990).

*Polycentropus chelatus* Ross and Yamamoto. Harts Run and Overall Crk (Bernheim Forest), Bullitt Co; Little Angel Spring (Clay Hill Memorial Forest), Taylor Co; unnamed trib Casey Crk, Trigg Co; May (Etnier et al. 2006).

*Polycentropus cinereus* Hagen. Statewide; May–October (Resh 1975).

+\**Polycentropus colei* Ross. Shillalah Crk (Shillalah Crk WMA and CUGA), Bell Co; June. Range: KY, NC, PA, QC, TN, and WV. Rank: G3G4. Proposed KY rank and status: S1S2, T.

*Polycentropus confusus* Hagen. Interior Plateau and Eastern Coalfield: Bell, Bullitt, Edmonson, Elliott, Fayette, Harlan, Laurel, Letcher, Marion, McCreary, Metcalfe, Pulaski, Rockcastle, and Simpson counties; May–October (Resh 1975).

*Polycentropus crassicornis* Walker. Camp Breckinridge, Breckinridge Co; East Frk Clarks River (Clarks River NWR), Marshall Co; Arlt Spring (LBL), Trigg Co; May (Resh 1975).

*Polycentropus elarus* Ross. Interior Plateau and Eastern Coalfield: Barren, Bell, Breathitt, Bullitt, Edmonson, Elliott, Fayette, Franklin, Laurel, Letcher, Marion, Meade, Metcalfe, Pulaski, Taylor, and Wayne counties; April–October (Resh 1975).

*Polycentropus maculatus* Banks. High quality, cool streams of Central Appalachians and Western Allegheny Plateau: Bell, Breathitt, Harlan, Letcher, and Wolfe counties; May–August (Resh 1975).

+\**Polycentropus nascotius* Ross. Eastern Coalfield: Davis Br and Shillalah Crk (CUGA), Bell Co; Watts Crk (Blanton Forest SNP), Harlan Co; Blue Heron Campground (BISO), McCreary Co; May–July, September. Range: locally distributed in eastern North America (MN to NS south to OK and AL). Rank: G5. Proposed KY rank and status: S2S3, S.

+*Polycentropus neiswanderi* Ross. Salt Lick Crk, Marion Co; April (Houp 1999). Range: KY and OH. Rank: G1G3. Proposed KY rank and status: S1S2; KY Status: T.

+\**Polycentropus pentus* Ross. Shillalah Crk (CUGA), Bell Co; unnamed trib Camp Pleasant Br, Franklin Co; unnamed trib Dog Br, Wolfe Co; May–June, August. Range: eastern North America (MB to NS, south to AL), with one outlying record from WY. Rank: G5. Proposed KY rank and status: S1S3, S. This species was first observed in Kentucky (Wolfe Co) by Jones (2000), but his record was not published. The species appears to be limited to small, spring seeps and spring-fed first order streams.

*Polycentropus remotus* Banks. Salt River, Spencer Co; no date provided (Resh 1975). Range: widely distributed across Canada and eastern US; KY represents a southern extension of its range. The only Kentucky record of *P. remotus* was provided by Resh (1975), who based the record on an immature (“imm”). Until adults of this species are located, the

presence of this species within Kentucky should be considered tentative.

+\**Polycentropus rickeri* Yamamoto. Shillalah Crk (CUGA), Bell Co; June, September. Range: Appalachian Mountains in AL, KY, PA, TN, and VA. Rank: G3G4. Proposed KY rank and status: S1S2, T.

#### Family Psychomyiidae

Adult descriptions, keys, and illustrations for the two Kentucky species, *Lype diversa* (Banks) and *Psychomyia flavida* (Hagen), were provided by Ross (1944) and Armitage and Hamilton (1990). Larvae were described and illustrated by Flint (1964) and Wiggins (1996).

Genus *Lype*. Within North America, the genus is represented by a single species, *Lype diversa* (Banks).

*Lype diversa* (Banks). Scattered localities statewide except northern Bluegrass; April–October (Resh 1975).

Genus *Psychomyia*. Within North America, the genus is represented by three species, one of which, *Psychomyia flavida* (Hagen), occurs in Kentucky.

*Psychomyia flavida* (Hagen). Scattered localities statewide except Jackson Purchase; March–October (Resh 1975).

#### Family Ptilocolepidae

Based on taxonomic work by Malicky (2001), Morse (2011) placed the hydroptilid subfamily Ptilocolepinae in its own family. We have followed that arrangement here. Ptilocolepidae consists of two genera and 16 species, with only the genus *Palaeagapetus* found in North America.

Genus *Palaeagapetus*. This genus is represented by three North American species; the single eastern species, *P. celsus*, is reported from KY for the first time. Larvae are depressed dorsoventrally and construct unique, flattened cases constructed of small pieces of liverwort.

+\**Palaeagapetus celsus* (Ross). Headwaters of Martins Frk (CUGA), Bell Co (larvae). Range: localized populations in NC, QC, TN, and VA. Rank: G5. Proposed KY rank and status: S1S2, T.

#### Family Rhyacophilidae

The family includes 2 genera and more than 120 species in North America; only 1 genus,

*Rhyacophila*, occurs in Kentucky and is represented by 15 species.

Genus *Rhyacophila*. *Rhyacophila* larvae are restricted to cool, lotic habitats where they are free-living, active predators (Wiggins 1996). Most larvae are pollution-intolerant and serve as useful biological indicators of pollution (Lenat 1993). Despite the larva's free-living lifestyle, pupation takes place within a tough, silken cocoon and loosely packed rock dome constructed by the last larval instar. Prather and Morse (2001) provided keys and descriptions for all Kentucky larvae and adults except *R. otica* Etnier and Way.

+\**Rhyacophila appalachia* Morse and Ross. Robinson Forest, Breathitt Co; June (Resh 1975). Range: Appalachian Mountains in KY, NC, SC, TN, and VA. Rank: G3. Proposed KY rank and status: S1S2, E. Recent attempts to locate the species at Robinson Forest were unsuccessful.

*Rhyacophila carolina* Banks. Widespread in Eastern Coalfield and eastern half of Interior Plateau; April–October (Resh 1975).

*Rhyacophila carpenteri* Milne. Springs or spring-fed streams of Eastern Coalfield and eastern Pennyroyal: Tunnel Crk and Shillalah Crk (CUGA), Bell Co; unnamed trib Rough Br and Watts Crk (Blanton Forest SNP), Harlan Co; Bad Br SNP, Letcher Co; Dog Foot Springs, Madison Co; unnamed trib Salt Lick Crk, Marion Co; Morgans Crk, Meade Co; Buck Crk, Pulaski Co; Mill Springs Recreation Area, Wayne Co; unnamed trib Dog Frk, Wolfe Co; April–August (Resh 1975).

*Rhyacophila fenestra* Ross. Scattered localities in Bluegrass and Pennyroyal: Bullitt, Edmonson, Fayette, Franklin, Madison, Shelby, Simpson, Taylor, Trigg, and Trimble counties; April–May (Resh 1975).

\**Rhyacophila fuscata* (Walker). Central and Southwestern Appalachians: Bell, Harlan, Letcher, Pike, and Wayne counties (adults and larvae); April–June. Range: widely distributed in eastern North America. Larvae of this species were first collected in Kentucky by KDOW personnel, but these records were not published.

*Rhyacophila glaberrima* Ulmer. Widely distributed statewide, except Jackson Purchase; April–May, October (Resh 1975). Zhou et al. (2011) presented genetic evidence that *R. glaberrima* is a species complex.

+\**Rhyacophila invaria* (Walker). Upper Houchins Ferry Road (MACA), Edmonson Co; unnamed trib Big South Frk Cumberland River (BISO), McCreary Co (adults and larvae); April–May. Range: NF to WI and south to NC. The species' collection in Kentucky represents a southwestern range extension. Rank: G5. Proposed KY rank and status: S1S3, S.

*Rhyacophila ledra* Ross. Davis Br (CUGA), Bell Co; Harts Run, Bullitt Co; unnamed springs (MACA), Edmonson Co; Raven Run, Fayette Co; Terrapin Crk SNP, Graves Co; unnamed trib East Frk Clear Crk, Jessamine Co; Arlt Spring and Hematite Lake (LBL), Trigg Co; Little South Frk, Wayne Co; unnamed trib Dog Frk, Wolfe Co; May (Resh 1975).

*Rhyacophila lobifera* Betten. Statewide, except Western Coalfield and Jackson Purchase (adults and larvae); April–May (Resh 1975).

*Rhyacophila minora* Banks. Eastern Coalfield: Bell, Breathitt, Clay, Harlan, Jackson, Lee, McCreary, Menifee, Pike, and Wolfe counties; April–May (Resh 1975).

\**Rhyacophila nigrita* Banks. Undisturbed, high quality streams in Central Appalachians: Shillalah Crk (CUGA), Bell Co; Martins Frk (CUGA) and Watts Crk, Harlan Co; Bad Br (Bad Br SNP), Letcher Co; June. Larvae of this species were first collected in Kentucky by KDOW personnel, but these records were not published. Zhou et al. (2011) presented evidence that *R. nigrita* represents a species complex.

+*Rhyacophila otica* Etnier and Way. This species has been documented from two Kentucky localities: Robinson Forest, Breathitt Co; unnamed seep habitats (Pine Mountain Settlement School), Harlan Co; June (Resh 1975). Range: KY, PA, TN, and VA. Rank: G3G4Q. Proposed KY rank and status: S1S2, T.

*Rhyacophila parantra* Ross. Scattered localities in Bluegrass, Pennyroyal, and Eastern Coalfield: Bell, Edmonson, Fayette, Franklin, Garrard, Harlan, Hart, Madison, Marion, McCreary, Meade, Taylor, Wayne, and Wolfe counties; March–August (Resh 1975).

*Rhyacophila torva* Hagen. Scattered localities in the eastern half of state; April–October (Resh 1975).

*Rhyacophila vibox* Milne. Scattered localities in Eastern Coalfield: Bell, Elliott, Laurel,

Letcher, and Morgan counties; May (Houp 1999).

#### Family Sericostomatidae

The family is represented by 3 North American genera and 12 species. Only one genus, *Agarodes*, has been observed in Kentucky.

Genus *Agarodes*. In the southeastern US, *Agarodes* larvae occur in springs or small spring-fed streams with sand and gravel substrates. Keth and Harris (2008) provided descriptions, illustrations, and keys to adult males and associated females and larvae of North American species.

+\**Agarodes stannardi* (Ross). Four localities in western Pennyroyal: Grindstone Crk, Calloway Co.; Arlt Spring, Schoolhouse Spring, and Turkey Spring (LBL), Trigg Co (larvae, pupae, and adults); May–June. Range: AL, KY, MS, and TN (Harris et al. 1991; Keth and Harris 2008). Rank: G2G3. Proposed KY rank and status: S1S3, S. We collected one female of this species in southern Calloway County in June 2008, but attempts to collect additional individuals were unsuccessful. In June 2009, we located a second population in a spring run on LBL in Trigg County. Additional LBL populations were discovered at Schoolhouse Spring and Turkey Spring in 2010. Our collections extend the species' range approximately 160 km to the north.

#### Family Thremmatidae

The Family Thremmatidae is represented by 3 North American genera; only 1 genus, *Neophylax*, occurs in Kentucky and is represented by 10 species.

Genus *Neophylax*. This genus was assigned formerly to the families Limnephilidae (Ross 1944) and Uenoidae (Vineyard and Wiggins 1987; Vineyard et al. 2005), but we follow the more recent placement of the genus in Thremmatidae (Vshivkova et al. 2007). *Neophylax* larvae can be abundant in Kentucky streams during the early spring and later undergo a two- to six-month aestivation just prior to pupation (Vineyard et al. 2005). Adults typically emerge in the fall (September to October). Vineyard et al. (2005) provided keys, illustrations, and descriptions for all Kentucky larvae and adults.

+*Neophylax acutus* Vineyard and Wiggins. Red River system, Logan Co; Buck Crk system, Pulaski Co; October (Floyd and Schuster 1990). Range: AL, KY, TN, and VA. Rank: G2G3. Proposed KY rank and status: S1S3, S.

\**Neophylax aniqua* Ross. Central and Southwestern Appalachians: Tunnel Crk (CUGA) and Shillalah Crk (Shillalah Crk WMA), Bell Co; unnamed trib Little Millseat Br (Robinson Forest), Breathitt Co; unnamed trib Big South Frk Cumberland River and Yahoo Crk below falls (BISO), McCreary Co (larvae). Etnier et al. (1998) reported a flight period of September–October in TN. Range: southern Canada and the northern US, with extensions down the Appalachian Mountains to KY, NC, TN, and VA.

*Neophylax ayanus* Ross. Scattered localities in Interior Plateau: Bear Crk, Anderson Co; Elk Lick Crk and South Elkhorn Crk, Fayette Co; unnamed trib Camp Pleasant Br, Franklin Co; Nolin River, Hardin Co; unnamed trib Lynn Camp Crk, Hart Co; Hickman Crk, Jessamine Co; Beargrass Crk system, Jefferson Co; Harrods Crk, Oldham Co; Clear Crk, Woodford Co; September–October (Resh 1975). This species was described originally from collections made by Dr. Herbert H. Ross in the 1930s at Beargrass Crk, Jefferson County (Ross 1938). Resh (1975) reported that the species was absent from Beargrass Crk during collections at the same localities in 1972; we could not find the species during collections in 2009.

*Neophylax concinnus* MacLachlan. Widespread in eastern two-thirds of state, absent from Western Coalfield and Jackson Purchase; October (Resh 1975).

*Neophylax consimilis* Betten. Limited to three localities in Eastern Coalfield: Yellow Crk (CUGA), Bell Co; Yahoo Crk below falls (BISO), McCreary Co; Fishtrap Lake, Pike Co; May, July (Resh 1975). Range: narrowly distributed along the Appalachian Mountains from NS to northern GA.

+\**Neophylax etnieri* Vineyard and Wiggins. Central and Southwestern Appalachians: Davis Br and Tunnel Crk (CUGA), Bell Co; Yahoo Crk below falls (BISO), McCreary Co; May, July–September. Range: Appalachian Mountains of KY, TN, and VA. Rank: G3. Proposed KY rank and status: S1S2, T.

*Neophylax fuscus* Banks. Boone Crk, Clark Co; unnamed spring, 3 springs, and Green River (MACA), Edmonson Co; Fleming Co. (no specific locality); Green River, Green Co; Buck Crk, Pulaski Co (adults and larvae); October (Phillippi and Schuster 1987).

+\**Neophylax lewisae* Etnier. Four sites in Pennyroyal: Bays Fork, Allen Co; Dry Frk system and Fallen Timber Creek, Metcalfe Co; Thompson Br, Simpson Co (adults and larvae); October. Range: springs or spring-fed habitats in KY and TN. Proposed rank: G2G3. Proposed KY rank and status: S1S3, S.

*Neophylax mitchelli* Denning. Rivals, Spencer Co (larvae) (Resh 1975). Range: southern Canada with a narrow band extending down the Appalachian Mountains to TN and VA. G3G4. We consider this record tentative because voucher specimens are not available. The Spencer Co record was based on immatures (Resh 1975), and all records from adjacent states (TN and VA) are restricted to the Appalachian Mountains.

\**Neophylax wigginsi* Sykora and Weaver. Shillalah Crk (CUGA), Bell Co; Wandering Woods site (MACA), Edmonson Co; North Frk Knob Crk (ABLI), Laure Co; Yahoo Crk below falls (BISO), McCreary Co; Big Lick Br, Pulaski Co; unnamed trib Dog Frk, Wolfe Co; September–October. Range: KY, OH, PA, TN, and VA.

## DISCUSSION

The 69 new distributional records represent a 30% increase in the number of Trichoptera known from Kentucky. As expected, collections from least disturbed sites or areas with unique natural or biological features (e.g., OSRWs, SNPs, natural wetlands, sinkhole ponds, and springs) supported the most diverse caddisfly faunas and also produced the greatest number of new Kentucky records. No new species were discovered during our survey efforts, but several significant range extensions were documented (e.g., *Agarodes stannardi*, *Frenesia difficilis*, and *Metrichia* sp.). We expect additional species to be found as sampling efforts continue across the Commonwealth. Unique habitats such as springs, seeps, bogs, and natural wetlands have the most potential to produce new records, and less traditional sampling techniques (e.g., Malaise traps) should be em-

Table 1. Imperiled and vulnerable Trichoptera of Kentucky.

Species	Global	KY	KY	KY County Distribution
	Rank <sup>1</sup>	Rank <sup>2</sup>	Status <sup>3</sup>	
		KSNPC (2010)		
<i>Manophylax butleri</i> Schuster	G2	S2	S	Bell, Carter, McCreary, Wolfe
<i>Cheumatopsyche helma</i> Ross	G3	SH	H	Bell
		Proposed		
<i>Brachycentrus nigrosoma</i> (Banks)	G5	S2S3	S	Bell, Laurel, Pulaski
<i>Micrasema scotti</i> Ross	G3G4	S1S2	T	Metcalfe
<i>Agapetus kirchneri</i> Parker, Etnier & Baxter	G2*	S1	T	Bell
<i>Protophila alexanderi</i> Ross	G5	S1S2	T	Union
<i>Goera fuscata</i> Banks	G5	S1S2	S	Edmonson
<i>Cheumatopsyche gyra</i> Ross	G4G5	S1S2	T	Bell
<i>Hydropsyche etnieri</i> Schuster & Talak	G2	S1S2	T	Whitley
<i>Hydropsyche mississippiensis</i> Flint	G5	S2S3	S	Calloway
<i>Hydroptila ampoda</i> Ross	G5	S1S3	S	Letcher, Wolfe
<i>Hydroptila coweetensis</i> Hurn	G1G2	S1S2	T	Breathitt, Edmonson, Laurel
<i>Hydroptila decia</i> Etnier & Way	G2	S1S2	T	Laurel
<i>Hydroptila fiskei</i> Blickle	G4G5	S1S3	T	Laurel
<i>Hydroptila howelli</i> Houp, Houp & Harris	G2G3	S1S2	T	Larue/Marion, Laurel, Meniffee
<i>Hydroptila kuehnei</i> Houp, Houp & Harris	G1G2	S1S2	T	Edmonson, Larue/Marion, Meade, Metcalfe
<i>Hydroptila lennoxii</i> Blickle	G2G4	S1S3	T	Breathitt, Laurel, Wolfe
<i>Hydroptila oneili</i> Harris	G2G3	S1S2	S	Christian, Trigg
<i>Hydroptila paramoena</i> Harris	G2G3	S1S2	S	Bell, McCreary
<i>Hydroptila paraxella</i> Harris & Armitage	G3*	S1S2	S	Madison, Simpson
<i>Hydroptila sandersoni</i> Mathis & Bowles	G3G4	S1S2	S	Pulaski
<i>Hydroptila scolops</i> Ross	G4G5	S1S3	T	Bell
<i>Neotrichia riegeli</i> Ross	G3	S1S3	S	Johnson
<i>Ochrotrichia wojcickii</i> Blickle	G4G5	S1S3	S	Fayette
<i>Orthotrichia curta</i> (Kingsolver & Ross)	G4G5	S1S2	T	Laurel
<i>Oxyethira pescadori</i> Harris & Keth	G3G4	S1S2	S	Christian
<i>Oxyethira rivicola</i> Blickle & Morse	G5	S1S2	T	Laurel
<i>Oxyethira rossi</i> Blickle & Morse	G3G4	S1S2	T	McCreary
<i>Lepidostoma carrolli</i> (Flint)	G5	S1S2	S	Trigg
<i>Lepidostoma etnieri</i> Weaver	G1G2Q	S1	E	Bell
<i>Lepidostoma lydia</i> Ross	G5	S1S2	S	Edmonson
<i>Lepidostoma sackeni</i> (Banks)	G5	S1S2	S	Edmonson
<i>Ceraclea alabamiae</i> Harris	G1G3	S1S2	T	McCreary
<i>Ceraclea enodis</i> Whitlock & Morse	G4G5	S1S3	S	Edmonson
<i>Ceraclea spongillovorax</i> (Resh)	G3G4	S1S2	T	McCreary
<i>Oecetis scala</i> Ross	G4G5	S1S2	T	McCreary
<i>Oecetis sphyra</i> Ross	G5	S1S2	T	McCreary
<i>Setodes epicampes</i> Edwards	G2	S2	S	Logan, Trigg
<i>Triaenodes cumerlandensis</i> Etnier & Way	G3G4	S1S3	S	Calloway
<i>Triaenodes dipstus</i> Ross	G5	S1S2	T	Breathitt
<i>Frenesia difficilis</i> (Walker)	G5	S1S2	T	Graves
<i>Limnephilus indivisus</i> Walker	G5	S1S3	S	Bell
<i>Limnephilus submonilifer</i> Walker	G5	S2S3	S	Bell, Woodford
<i>Pycnopsyche circularis</i> (Provancher).	G5	S3	S	Bath, Bell, Laurel
<i>Pycnopsyche flavata</i> (Banks)	G4	S1S2	T	Bell
<i>Pycnopsyche rossi</i> Betten	G3	S2S3	S	Hart, Meade, Metcalfe
<i>Pycnopsyche subfasciata</i> (Say)	G5	S1S3	S	Fayette, Hart
<i>Pycnopsyche virginica</i> (Banks)	G3G4	S1S2	T	Christian, Marshall
<i>Fumonta major</i> (Banks)	G4G5	S1S2	T	Pulaski
<i>Wormaldia thyria</i> Denning	G3	S1S2	T	Harlan
<i>Oligostomis ocelligera</i> (Walker)	G5	S1S3	S	Edmonson
<i>Phryganea cinerea</i> (Walker)	G5	S1S3	S	Edmonson
<i>Neureclipsis piersoni</i> Frazer & Harris	G1G3	S1S3	S	Christian, Trigg
<i>Nyctiophylax banksi</i> Morse	G4G5	S1S2	T	Laurel
<i>Polycentropus barri</i> Ross & Yamamoto	G2G4	S1S2	T	Breathitt, Jackson
<i>Polycentropus carolinensis</i> Banks	G5	S2S3	S	Bell, Edmonson

Table 1. Continued.

Species	Global	KY	KY	KY County Distribution
	Rank <sup>1</sup>	Rank <sup>2</sup>	Status <sup>3</sup>	
<i>Polycentropus colei</i> Ross	G3G4	S1S2	T	Bell
<i>Polycentropus nascotius</i> Ross	G5	S2S3	S	Bell, Harlan, McCreary
<i>Polycentropus neiswanderi</i> Ross	G1G3	S1S2	T	Christian, Marion
<i>Polycentropus pentus</i> Ross	G5	S3	S	Bell, Franklin, Wolfe
<i>Polycentropus rickeri</i> Yamamoto	G3G4	S1S2	T	Bell
<i>Palaeagapetus celsus</i> (Ross)	G5	S1S2	T	Bell
<i>Rhyacophila appalachia</i> Morse & Ross	G3	S1S2	E	Breathitt
<i>Rhyacophila invaria</i> (Walker)	G5	S1S3	S	Edmonson, McCreary
<i>Rhyacophila otica</i> Etnier & Way	G3G4Q	S1S2	T	Breathitt, Harlan
<i>Agarodes stannardi</i> (Ross)	G2G3	S1S3	S	Calloway, Trigg
<i>Neophylax acutus</i> Vineyard & Wiggins	G2G3	S1S3	S	Logan, Pulaski
<i>Neophylax etnieri</i> Vineyard & Wiggins	G3	S1S2	T	Bell, McCreary
<i>Neophylax lewisae</i> Etnier	G2G3*	S1S3	S	Metcalfe, Simpson

<sup>1</sup> Global rank (NatureServe 2012): G1 (critically imperiled) G2 (imperiled) G3 (vulnerable) G4 (apparently secure) G5 (secure) and Q (taxonomy questioned); proposed ranks marked by an asterisk (\*).

<sup>2</sup> KY rank: S1 (critically imperiled) S2 (imperiled) S3 (vulnerable) S4 (apparently secure) and S5 (secure).

<sup>3</sup> KY status: E (endangered) T (threatened) S (special concern) and H (historic).

ployed to locate species that do not respond to ultraviolet light. The Licking River basin, direct tributaries of the Ohio River (e.g., Kinniconick Creek in Lewis County), and low gradient habitats in western Kentucky should be emphasized in future sampling efforts because these areas have not been sampled as extensively as other regions of the Commonwealth.

Compared to nearby states, Kentucky's fauna of 293 species is transitional, exceeding that of Illinois (183) Indiana (190), and Ohio (270) but falling short of species totals for Alabama (342), North Carolina (348), Tennessee (352), and Virginia (361). Among Kentucky's ecoregions, the Interior Plateau has the greatest number of caddisfly records (215 species), but the region also covers about half of the Commonwealth's total surface area. The Eastern Coalfield region covers about a third of Kentucky, but it exhibits even greater diversity (229 species), including 70 unique records. The lower recorded diversity of the Western Coalfield and Jackson Purchase regions is not surprising as these areas are much smaller than other regions and the western half of Kentucky has not been sampled as completely or with the same frequency as the eastern half of the Commonwealth. We expect totals for western Kentucky regions to increase with additional survey efforts.

We identify 69 species as imperiled or vulnerable in Kentucky (Table 1). Our list

includes two species, *Manophylax butleri* and *Cheumatopsyche helma*, already designated by KSNPC (2010) as Special Concern (*M. butleri*) and Historical (*C. helma*), but the list also contains Kentucky's two endemic species, *Hydroptila howelli* and *H. kuehnei*, and four other species that are known from only two states – *Hydroptila paraxella* (KY and OH), *Lepidostoma etnieri* (KY and TN), *Polycentropus neiswanderi* (KY and OH), and *Neophylax lewisae* (KY and TN). We are proposing state endangered status for two species, *L. etnieri*, which is known from only one KY locality and three TN counties (Grainger, Knox, and Roane) (Etnier et al. 1998), and *Rhyacophila appalachia*, which is known from the Appalachian Mountains of KY, NC, SC, TN, and VA. We are proposing state threatened status for 33 species and special concern status for the remaining 32 species. We acknowledge the preliminary nature of our proposed designations and the lack of detailed distributional information for some species, but we believe formulation of such a list is a reasonable step toward conservation of the group in Kentucky. It is our hope that future revisions to Kentucky's Comprehensive Wildlife Conservation Strategy (KDFWR 2010) will include caddisflies as a group of conservation interest.

#### ACKNOWLEDGEMENTS

Assistance with collection permits and site access were provided by Joyce Bender

(KSNPC), Dr. Melinda Wilder and Robert Woods (Lilley Cornett Woods), Michael Johnson (Clarks River National Wildlife Refuge), Jenny Beeler and Mark Woods (CUGA), Mike Brandenburg (Fort Knox), Alan Colwell and Tom Edwards (BGAD), Dr. Jeff Stringer (Robinson Forest), Tom Blount and Steve Bakalatz (BISO), Robert Ward (MACA and ABLI), and Steve Bloemer and Travis McDonald (LBL). We express our thanks to the many persons who provided field assistance: Carrie Allison, Mike Armstrong, Stephanie Brandt, Sue Bruenderman, Tez Butler, Mike Compton, Phil DeGarmo, Andrew Eller, Ryan Evans, Nancy Floyd, Clarence Floyd, Dawn Floyd, Nathaniel Floyd, James Gruhala, Mark Gumbert, Ed Hartowicz, Dr. Richie Kessler, Chris Leftwich, Rodney Martinez, Randall Payne, Joe Metzmeier, Dr. Andrew Radomski, Bert Remley, Dr. Matt Thomas, Anthony Velasco, Mark Vogel, Dr. Gordon Weddle, and Alan Whited. Greg Abernathy (KSNPC) kindly prepared Figure 1. Ellis Laudermilk (KSNPC) provided a detailed review of the manuscript, reviewed our preliminary list of imperiled and vulnerable taxa, and helped with development of KY ranks and status information. Adult and larval specimens were provided by Loran Gibson, Ellis Laudermilk, Dr. Don Tarter, Mark Vogel, and Ron Houpp. Dr. Steve Harris identified or verified numerous Hydroptilidae and provided a detailed review of the manuscript. Collections by Charles Parker and Jason Robinson were supported by a grant from the U.S. Geological Survey through the Natural Resources Preservation Program. Finally, our sincere thanks are extended to Mr. Virgil Lee Andrews, Jr. (USFWS), who provided financial support in the form of equipment, travel expenses, and page costs.

## REFERENCES

- Abernathy, G., D. White, E. L. Laudermilk, and M. Evans (eds). 2010. Kentucky's natural heritage: an illustrated guide to biodiversity. University Press of Kentucky, Lexington, Kentucky.
- Armitage, B. J. 1991. Diagnostic atlas of the North American caddisfly adults: I. Philopotamidae. 2nd ed. Caddis Press, Athens, Alabama.
- Armitage, B. J., and S. H. Hamilton. 1990. Diagnostic atlas of the North American caddisfly adults: II. Ecnomidae, Polycentropodidae, Psychomyiidae, and Xiphocentronidae. Caddis Press, Athens, Alabama.
- Armitage, B. J., et al. 2011. Atlas of Ohio aquatic insects. Trichoptera. Vol. I. Ohio Biological Survey, Columbus, Ohio.
- Benke, A. C., and J. B. Wallace. 1980. Trophic basis of production among net spinning caddisflies in a southern Appalachian stream. *Ecology* 61:108–118.
- Betten, C., and M. E. Mosely. 1940. The Francis Walker types of Trichoptera in the British Museum. British Museum. Natural History, London.
- Blahnik, R. 2005. *Alterosa*, a new caddisfly genus from Brazil (Trichoptera: Philopotamidae). *Zootaxa* 991:1–60.
- Blickle, R. L. 1979. Hydroptilidae (Trichoptera) of America north of Mexico. Bulletin 509. New Hampshire Agricultural Experiment Station.
- Bowles, D. E., and M. L. Mathis. 1989. Caddisflies (Insecta: Trichoptera) of mountainous regions in Arkansas, with new state records for the order. *J Kansas Entomol Soc* 62:234–244.
- Bowles, D. E., K. Stephan, and M. L. Mathis. 1990. A new method for collecting adult phyrganeid caddisflies (Trichoptera: Phryganeidae). *Entomological News* 101:222–224.
- Brack, V., Jr, and R. K. LaVal. 1985. Food habits of the Indiana bat in Missouri. *J Mammal* 66:308–315.
- Burr, B. M., and M. L. Warren, Jr. 1986. A distributional atlas of Kentucky fishes. Series 4. Kentucky State Nature Preserves Commission Scientific and Technical, Frankfort, Kentucky.
- Chapin, J. W. 1978. Systematics of Nearctic *Micrasema* (Trichoptera: Brachycentridae). Ph.D. Dissertation. Clemson University, Clemson, South Carolina.
- Crichton, M. J. 1959. Attacks by birds on caddisflies. *Bird Study* 6:22–25.
- Davic, R. D., and H. H. Welsh, Jr. 2004. On the ecological role of salamanders. *Annu Rev Ecol Evol S* 35:405–434.
- DeWalt, R. E., C. Favret, and D. W. Webb. 2005. Just how imperiled are aquatic insects? A case study in Illinois. *Ann Entomol Soc Am* 98:941–950.
- DeWalt, R. E., and B. D. Heinold. 2005. Summer emerging Ephemeroptera, Plecoptera, and Trichoptera of Abrams Creek, Great Smoky Mountains National Park. *P Entomol Soc Wash* 107:34–48.
- Edwards, S. W. 1956. The Trichoptera of Reelfoot Lake with descriptions of three new species. *J Tennessee Acad Sci* 31:7–19.
- Etnier, D. A. 1973. Extensions of the known ranges of northern Trichoptera into the southern Appalachians. *J Georgia Entomol Soc* 8:272–274.
- Etnier, D. A. 1997. Status of *Ceratopsyche etnieri*, *Glyphopsyche missouri*, *Hydroptila decia*, and *Lepidostoma etnieri* (Insecta: Trichoptera). Report to U.S. Fish and Wildlife Service. Asheville, North Carolina. 7 pp.
- Etnier, D. A., J. T. Baxter, Jr, S. J. Fraley, and C. R. Parker. 1998. A checklist of the Trichoptera of Tennessee. *J Tennessee Acad Sci* 73:53–72.
- Etnier, D. A., B. H. Bauer, and G. Zirkle. 2006. A survey of the Trichoptera of the Fort Campbell Military

- Reservation, Kentucky and Tennessee. *J Tennessee Acad Sci* 81:55–61.
- Etnier, D. A., C. R. Parker, J. T. Baxter, Jr, and T. M. Long. 2010. A review of the genus *Agapetus* Curtis (Trichoptera: Glossosomatidae) in eastern and central North America, with description of 12 new species. *Insecta Mundi* 0149:1–77.
- Fenneman, N. M. 1938. Physiography of the eastern United States. McGraw-Hill Book Company, New York.
- Flint, O. S., Jr. 1960. Taxonomy and biology of Nearctic limnephilid larvae (Trichoptera), with special reference to species in eastern United States. *Entomologica Americana* 40:1–117.
- Flint, O. S., Jr. 1961. The immature stages of the Arctopsychinae occurring in eastern North America (Trichoptera: Hydropsychidae). *Ann Entomol Soc Am* 54:5–11.
- Flint, O. S., Jr. 1964. Notes on some Nearctic Psychomyiidae with special reference to their larvae. *P US Natl Museum* 115:467–481.
- Flint, O. S., Jr. 1970. Studies of Neotropical caddisflies, X: *Leucotrichia* and related genera from North and Central America (Trichoptera: Hydroptilidae). *Smithsonian Contributions Zool* 60.
- Flint, O. S., Jr. 1984. The genus *Brachycentrus* in North America, with a proposed phylogeny of the genera of Brachycentridae (Trichoptera). *Smithsonian Contributions to Zool* 398:1–58.
- Flint, O. S., Jr, R. L. Hoffman, and C. R. Parker. 2004. An annotated list of the caddisflies (Trichoptera) of Virginia: Part I. Introduction and families of Annulipalpia and Spicpalpia. *Banisteria* 24:23–46.
- Flint, O. S., Jr, R. L. Hoffman, and C. R. Parker. 2008. An annotated list of the caddisflies (Trichoptera) of Virginia: Part II. families of Integripalpia. *Banisteria* 31:3–23.
- Flint, O. S., Jr, R. L. Hoffman, and C. R. Parker. 2009. An annotated list of the caddisflies (Trichoptera) of Virginia: Part III. Emendations and biogeography. *Banisteria* 34:3–16.
- Floyd, M. A. 1992. New microcaddisfly (Trichoptera: Hydroptilidae) records for Kentucky. *T Kentucky Acad Sci* 53:50.
- Floyd, M. A. 1995. Larvae of the caddisfly genus *Oecetis* (Trichoptera: Leptoceridae) in North America. *Bull Ohio Biol Surv New Series* 10:viii + pp 93.
- Floyd, M. A., and G. A. Schuster. 1990. The caddisflies (Insecta: Trichoptera) of the Buck Creek system, Pulaski County, Kentucky. *T Kentucky Acad Sci* 51:127–134.
- Gall, W. K. 1997. Biogeographic and ecologic relationships in the Plenitentoria (Trichoptera). Pages 109–116 in R. W. Holzenthal and O. S. Flint, Jr. (eds). *P Eighth Int Symp Trichoptera*. Ohio Biological Survey, Columbus, Ohio.
- Geraci, C. J., X. Zhou, J. C. Morse, and K. M. Kjer. 2010. Defining the genus *Hydropsyche* (Trichoptera: Hydropsychidae) based on DNA and morphological evidence. *J N Am Benthol Soc* 29:918–933.
- Glover, J. B. 1996. Larvae of the caddisfly genus *Triaenodes* and *Ylodes* (Trichoptera: Leptoceridae) in North America. *Bull Ohio Biol Surv New Series* 11:vii + 89 pp.
- Glover, J. B., and M. A. Floyd. 2005. Larvae of the genus *Nectopsyche* (Trichoptera: Leptoceridae) in eastern North America, including a new species from North Carolina. *J N Am Benthol Soc* 23:526–541.
- Gordon, A. E. 1974. A synopsis and phylogenetic outline of the Nearctic members of *Cheumatopsyche*. *P Acad Nat Sci Phila* 126:117–160.
- Haag, K. H., and P. L. Hill. 1983. Additions to the distributional list of Kentucky Trichoptera: Big Sandy River (Boyd County); Pond Creek and Scenic Lake (Henderson County). *T Kentucky Acad Sci* 44:21–23.
- Haag, K. H., V. H. Resh, and S. E. Neff. 1984. Changes in the adult caddisfly (Trichoptera) community of the Salt River, Kentucky. *T Kentucky Acad Sci* 45:101–108.
- Haddock, J. D. 1977. The biosystematics of the caddis fly genus *Nectopsyche* in North America with emphasis on the aquatic stages. *Am Midl Nat* 98:382–421.
- Harris, S. C. 1990. Preliminary considerations on rare and endangered invertebrates in Alabama. *Ala Acad Sci J* 61:64–92.
- Harris, S. C., P. E. O'Neil, and P. K. Lago. 1991. Caddisflies of Alabama. *Geol Surv Ala Bull* 141:1–442.
- Holzenthal, R. W. 1982. The caddisfly genus *Setodes* in North America (Trichoptera: Leptoceridae). *J Kansas Entomol Soc* 55:253–271.
- Houghton, D. C., R. W. Holzenthal, M. P. Monson, and D. B. MacLean. 2001. Updated checklist of the Minnesota caddisflies (Trichoptera) with geographic affinities. *T Am Entomol Soc* 127:495–512.
- Houp, R. E. 1999. New caddisfly (Trichoptera) records from Kentucky with implications for water quality. *J Kentucky Acad Sci* 60:1–3.
- Houp, R. E., K. H. Houp, and S. C. Harris. 1998. Two new species of microcaddisflies (Trichoptera: Hydroptilidae) from Kentucky. *Entomol News* 109:99–102.
- Houp, R. E., and G. A. Schuster. 1997. Caddisflies (Insecta: Trichoptera) of the mainstem of the Kentucky River, Kentucky. *T Kentucky Acad Sci* 58:67–73.
- Hurn, A. D., and B. J. Foote. 1983. An annotated list of the caddisflies (Trichoptera) of Ohio. *P Entomol Soc Wash* 85:783–796.
- Johansen, J. J. 2000. A survey of the Trichoptera (Insecta) fauna of Sinking Creek, Laurel County, Kentucky. MSc Thesis. Eastern Kentucky University, Richmond, Kentucky.
- Jones, D. R. 2000. The life history of *Manophylax butleri* Schuster (Trichoptera: Apataniidae) in Red River Gorge, Wolfe County, Kentucky, with a survey of the associated trichopteran fauna. Unpublished MSc Thesis. Eastern Kentucky University, Richmond, Kentucky.
- Kentucky Department of Fish and Wildlife Resources. 2010. Kentucky's Comprehensive Wildlife Conservation Strategy. Frankfort, Kentucky.

- Keth, A. C., and S. C. Harris. 2008. The North American Genus *Agarodes* Banks (Trichoptera: Sericostomatiidae). Caddis Press, Columbus, Ohio.
- [KSNPC] Kentucky State Nature Preserves Commission. 2010. Rare and extirpated biota and natural communities of Kentucky. *J Kentucky Acad Sci* 71:67–81.
- [KSNPC] Kentucky State Nature Preserves Commission. 2011. Endangered, threatened, and special concern plants, animals, and natural communities of Kentucky with habitat description. Frankfort, Kentucky.
- Kurta, A., and J. O. Whitaker, Jr. 1998. Diet of the endangered Indiana bat (*Myotis sodalis*) on the northern edge of its range. *Am Midl Nat* 140:280–286.
- LaFontaine, G. 1981. Caddisflies. Winchester Press, Piscataway, New Jersey.
- Lago, P. K., and S. C. Harris. 1987. The *Chimarra* (Trichoptera: Philopotamidae) of eastern North America with descriptions of three new species. *J New York Entomol S* 95:225–251.
- Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. *J N Am Benthol Soc* 12:279–290.
- Lotrich, V. A. 1973. Growth, production, and community composition of fishes inhabiting a first-, second-, and third-order stream of eastern Kentucky. *Ecol Monogr* 43:377–397.
- Malicky, H. 2001. Notes on the taxonomy of *Rhadicleptus*, *Ptilocolepus* and *Pseudoneureclipsis*. *Braueria* 28:19–20.
- Manuel, K. 2010. The longhorn caddisfly genus *Triadenodes* (Trichoptera: Leptoceridae) in North America. The Caddis Press, Columbus, Ohio.
- Mathis, M. L., and D. E. Bowles. 1992. A preliminary survey of the Trichoptera of the Ozark Mountains, Missouri. *Entomol News* 103:19–29.
- Merritt, R. W., K. W. Cummins, and M. B. Berg (eds). 2008. An introduction to the aquatic insects of North America, 4th ed. Kendall/Hunt Publishing Company, Dubuque, Iowa.
- Minckley, W. L. 1963. The ecology of a spring stream, Doe Run, Meade County, Kentucky. *Wildlife Monogr* 11:1–124.
- Minshall, G. W. 1968. Community dynamics of the benthic fauna in a woodland springbrook. *Hydrobiologia* 32:305–339.
- Morse, J. C. 1972. The genus *Nyctiophylax* in North America. *Journal of the Kansas Entomological Society* 45:172–181.
- Morse, J. C. 1975. A phylogeny and revision of the caddisfly genus *Ceraclea* (Trichoptera: Leptoceridae). *Contrib Am Entomol Inst* 11:1–97.
- Morse, J. C. 1993. A checklist of the Trichoptera of North America, including Greenland and Mexico. *Trans Am Entomol Soc* 119:47–93.
- Morse, J. C. (ed). 2011. Trichoptera World Checklist home page. Available at <http://entweb.clemson.edu/database/trichopt/index.htm>. Accessed December 17, 2011.
- Morse, J. C. 2012. Trichoptera species of America north of Mexico. Unpublished list. Clemson University, Clemson, South Carolina.
- Morse, J. C., B. P. Stark, W. P. McCafferty, and K. J. Tennessen. 1997. Southern Appalachian and other southeastern streams at risk: implications for mayflies, dragonflies and damselflies, stoneflies, and caddisflies. Pages 17–42 in G. W. Benz and D. E. Collins (eds). *Aquatic Fauna in Peril: the Southeastern Perspective*. Lenz Design and Communications, Decatur, Georgia.
- Moulton, S. R., II, and K. W. Stewart. 1996. Caddisflies (Trichoptera) of the Interior Highlands of North America. *Mem Am Entomol Inst* 56:1–313.
- Moulton, S. R., II, S. C. Harris, and J. P. Slusark. 1999. The microcaddisfly genus *Ithytrichia* Eaton (Trichoptera: Hydroptilidae) in North America. *Proc Entomol Soc Wash* 101:233–241.
- Nations, V. L. 1994. A phylogenetic analysis of the North American species of *Setodes* (Trichoptera: Leptoceridae) with descriptions of the larvae and key to their identification. MSc thesis. University of Alabama, Tuscaloosa, Alabama.
- NatureServe. 2012. NatureServe explorer: an online encyclopedia of life (web application). *NatureServe* (Arlington, Virginia). Available at [www.natureserve.org/explore](http://www.natureserve.org/explore). Accessed January 11, 2012.
- Neff, S. E., and L. A. Krumholz. 1973. A detailed investigation of the sociological, economic, and ecological aspects of proposed reservoir sites in the Salt River Basin of Kentucky. Research Report No. 67. Water Resources Institute, University of Kentucky, Lexington, Kentucky.
- Olah, J., and K. A. Johanson. 2008. Generic review of Hydropsychinae, with description of *Schmidopsyche*, new genus, 3 new genus clusters, 8 new species groups, 4 new species clades, 12 new species clusters and 62 new species from the Oriental and Afrotropical regions (Trichoptera: Hydropsychidae). *Zootaxa* 1802:3–248.
- Parker, C. R. 1998. A review of *Goerita* (Trichoptera: Goeridae) with descriptions of a new species. *Insecta Mundi* 12:227–238.
- Parker, C. R., and J. R. Voshell, Jr. 1981. A preliminary checklist of the caddisflies (Trichoptera) of Virginia. *J Georgia Entomol Soc* 16:1–7.
- Parker, C. R., and G. B. Wiggins. 1987. Revision of the caddisfly genus *Psilotreta* (Trichoptera: Odontoceridae). *Roy Ontario Mus Life Sci Contr* 144:1–55.
- Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington, DC.
- Phillippi, M. A., and G. A. Schuster. 1987. New records of caddisflies (Trichoptera) from Kentucky. *Entomol News* 98:113–116.
- Picazo, E. D., and G. L. DeMoss. 1980. The aquatic insects, exclusive of Diptera, of Hays Br, Rowan County, Kentucky. *T Kentucky Acad Sci* 41:99–104.
- Pobst, D., and C. Richards. 1998. The caddisfly handbook. The Lyons Press, New York.

- Pond, G. J. 2000. Comparison of macroinvertebrate communities of two intermittent streams with different disturbance histories in Letcher County, Kentucky. *J Kentucky Acad Sci* 61:10–22.
- Prather, A. L., and J. C. Morse. 2001. Eastern Nearctic *Rhyacophila* species, with revision of the *Rhyacophila invaria* group (Trichoptera: Rhyacophilidae). *T Am Entomol Soc* 127:85–166.
- Quartermann, E., and R. L. Powell. 1978. Potential ecological/geological natural landmarks on the Interior Low Plateaus. National Park Service, United States Department of the Interior, Washington, District of Columbia.
- Rasmussen, A. K., D. R. Denson, and S. C. Harris. 2008. Status of caddisflies (Insecta: Trichoptera) in greatest conservation need in Florida. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.
- Resh, V. H. 1974. New species of *Athripsodes* caddisflies from eastern United States (Trichoptera: Leptoceridae). *J Georgia Entomol Soc* 9:267–269.
- Resh, V. H. 1975. A distributional study of the caddisflies of Kentucky. *T Kentucky Acad Sci* 36:6–16.
- Resh, V. H. 1976. The biology and immature stages of the caddisfly genus *Ceraclea* in eastern North America (Trichoptera: Leptoceridae). *Ann Entomol Soc Am* 69:1039–1061.
- Resh, V. H., and K. H. Haag. 1973. Species diversity, parasitism, and flight activity of caddisflies in a Kentucky stream. *P Entomol Soc Am* 28:155–163.
- Resh, V. H., and R. E. Houp. 1986. Life history of the caddisfly *Dibusa angata* and its association with the red alga *Lemanea australis*. *J N Am Benthol Soc* 5:28–40.
- Resh, V. H., K. H. Haag, and S. E. Neff. 1975. Community structure and diversity of caddisfly adults from the Salt River, Kentucky. *Env Entomol* 4:241–253.
- Rosenberg, D. M., and V. H. Resh. 1993. Freshwater biomonitoring and benthic macroinvertebrates. Chapman and Hall, New York.
- Ross, H. H. 1938. Description of Nearctic caddisflies. *Bull Illinois Nat Hist Surv* 21:101–183.
- Ross, H. H. 1941. Descriptions and records of North American Trichoptera. *T Am Entomol Soc* 67:35–126.
- Ross, H. H. 1944. The Caddis Flies, or Trichoptera, of Illinois. *Bull Illinois Nat Hist Surv* 23:1–326.
- Ross, H. H. 1956. Evolution and classification of the mountain caddisflies. University of Illinois Press, Urbana, Illinois.
- Ross, H. H. 1959. The relationships of three new species of *Triaenodes* from Illinois and Florida (Trichoptera). *Entomol News* 70:39–45.
- Ross, H. H. 1966. Two new species of *Oecetis* occurring in eastern North America (Trichoptera: Leptoceridae). *T Illinois St Acad Sci* 59:11–14.
- Ross, H. H. 1970. Hydropsychid genus A, *Diplectrona* (Trichoptera: Hydropsychidae). *J Georgia Entomol Soc* 5:229–231.
- Ross, H. H., and T. Yamamoto. 1965. New species of the caddisfly genus *Polycentropus* from eastern North America (Trichoptera, Psychomyiidae). *P Biol Soc Washington* 78:241–246.
- Ross, D. H., and J. B. Wallace. 1983. Longitudinal patterns of production, food consumption, and seston utilization by net-spinning caddisflies (Trichoptera) in a southern Appalachian stream. *Holarctic Ecol* 6:270–284.
- Roy, D., and P. P. Harper. 1980. Females of the Nearctic *Molanna* (Trichoptera: Molannidae). *P Entomol Soc Washington* 82:229–236.
- Ruiter, D. E. 1995. The adult *Limnephilus* Leach (Trichoptera: Limnephilidae) of the New World. *Ohio Biol Surv Bull New Series* 11:iv.
- Scheffer, P. W., and G. B. Wiggins. 1986. A systematic study of the Nearctic larvae of the *Hydropsyche morosa* group (Trichoptera: Hydropsychidae). Life Sciences Miscellaneous Publication, Royal Ontario Museum, Toronto, Canada.
- Scheffer, P. W., G. B. Wiggins, and J. D. Unzicker. 1986. A proposal for assignment of *Ceratopsyche* as a subgenus of *Hydropsyche*, with new synonyms and a new species (Trichoptera: Hydropsychidae). *J N Am Benthol Soc* 5:67–84.
- Schmid, F. 1980. Genera des Trichopteres du Canada et des Etats adjacents. Agriculture, Canada.
- Schmid, F. 1982. Revision des Trichopteres Canadiens. II. Les Glossosomatidae et Philopotamidae (Annulipalpia). *Mem Entomol Soc Can* 122:1–76.
- Schmid, F. 1983. Revision des Trichopteres Canadiens. III. Les Hyalopsychidae, Psychomyiidae, Goeridae, Brachycentridae, Sericostomatidae, Helicopsychidae, Beraeidae, Odontoceridae, Calamoceratidae et Molannidae. *Mem Entomol Soc Can* 125:1–109.
- Schuster, G. 1984. *Hydropsyche*? – *Symphitopsyche*? – *Ceratopsyche*? : a taxonomic enigma. in J. C. Morse (ed). *P Fourth Intl Symp Trichoptera*. The Hague, The Netherlands.
- Schuster, G. A. 1997. Description of a new species of terrestrial limnephilid caddisfly (Trichoptera) from Kentucky and West Virginia. Pages 417–424 in R. W. Holzenthal and O. S. Flint, Jr (eds). *P Eighth Intl Symp Trichoptera*. Ohio Biol. Surv, Columbus, Ohio.
- Schuster, G. A., and D. A. Etnier. 1978. A manual for the identification of the larvae of the caddisfly genera *Hydropsyche* Pictet and *Symphitopsyche* Ulmer in eastern and central North America (Trichoptera: Hydropsychidae). U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, EPA-600/4-78-060. 129.
- Schuster, G. A., and S. W. Hamilton. 1984. The genus *Phylocentropus* in North America (Trichoptera: Polycentropodidae). Pages 347–362 in J. C. Morse (ed). *P Fourth Intl Symp Trichoptera*. The Hague, The Netherlands.
- Sherberger, F. F., and J. B. Wallace. 1971. Larvae of southeastern species of *Molanna*. *J Kansas Entomol Soc* 44:217–224.
- Sturkie, S. K., and J. C. Morse. 1998. Larvae of the three common North American species of *Phylocentropus*

- (Trichoptera: Dipseudopsidae). *Insecta Mundi* 12: 175–179.
- Tarter, D. C. 1990. A checklist of the caddisflies (Trichoptera) from West Virginia. *Entomol News* 101:236–245.
- Tarter, D. C., J. L. Wykle, and J. A. Morgan. 1999. New West Virginia record for *Fabria inornata* (Trichoptera: Phryganeidae). *Entomol News* 110:51–52.
- Taylor, C., and G. A. Schuster. 2004. The Crayfishes of Kentucky. Illinois Natural History Survey Special Publication. No. 28:viii.
- Thoeny, W. T., and D. L. Batch. 1983. New species records of caddisflies (Trichoptera: Hydropsychidae) in Kentucky. *T Kentucky Acad Sci* 44:74.
- Todd, L. D., R. G. Poulin, and R. M. Brigham. 1998. Diet of common nighthawks (*Chordeiles minor*: Caprimulgidae) relative to prey abundance. *Am Midl Nat* 139:20–28.
- Ulack, R., K. Raitz, and G. Pauer. 1998. Atlas of Kentucky. The University Press of Kentucky, Lexington, Kentucky.
- United States Environmental Protection Agency. 2002. Level III Ecoregions of the continental United States. National Health and Environmental Effects Research Laboratory, Corvallis, Oregon. Map M-1, various scales.
- Usis, J. D., and D. B. MacLean. 1986. The caddisflies (Trichoptera) of Stillfork Swamp Nature Preserve, Carroll County, Ohio. *Ohio J Sci* 86:33–40.
- Usis, J. D., and B. A. Foote. 1989. New records of caddisflies (Trichoptera) from Ohio, with particular reference to Stillfork Swamp, Carroll County. *Entomol News* 100:83–85.
- Vineyard, R. N., G. B. Wiggins, H. E. Frania, and P. W. Scheffer. 2005. The caddisfly genus *Neophylax* (Trichoptera: Uenoidae). *Roy Ontario Mus Contrib Sci* 2:141.
- Vshivkova, T., J. C. Morse, and D. Ruiter. 2007. Phylogeny of Limnephilidae and composition of the genus *Limnephilus* (Limnephilidae, Limnephilinae, Limnephilini). Pages 309–319 in Joaquín Bueno-Soria, Rafael Barba-Álvarez and Brian J. Armitage (eds). P 12th Intl Symp Trichoptera. The Caddis Press, Columbus, Ohio.
- Wallace, J. B., and F. F. Sherberger. 1974. The retreat and feeding net of *Macronema* Carolina Banks (Trichoptera: Hydropsychidae). *Hydrobiologia* 45: 177–184.
- Waltz, R. D., and W. P. McCafferty. 1983. The caddisflies of Indiana (Insecta: Trichoptera). (Agricultural Exp. Sta., Purdue University, West Lafayette, Indiana). *Res Stat Bull* 978:1–25.
- Weaver, J. S., III. 1988. A synopsis of the North American Lepidostomatidae (Trichoptera). *Am Entomol Soc Contrib* 25:1–141.
- Weaver, J. S., III, G. B. Swegman, and J. L. Sykora. 1979. The description of immature forms of *Aphropsyche monticola* Flint (Trichoptera: Hydropsychidae). *Aquatic Insects* 1:143–148.
- Weaver, J. S., III, J. A. Wojtowicz, and D. A. Etnier. 1981. Larval and pupal descriptions of *Dolophilodes (Fumonta) major* (Banks) (Trichoptera: Philopotamidae). *Entomol News* 92:85–90.
- Wiggins, G. B. 1996. Larvae of the North American caddisfly genera (Trichoptera), 2nd ed. Univ Toronto Press, Ontario, Canada.
- Wiggins, G. G. 1998. The caddisfly family Phryganeidae (Trichoptera). Univ Toronto Press, Ontario, Canada.
- Wiggins, G. B., and R. J. MacKay. 1978. Some relationships between systematics and trophic ecology in Nearctic aquatic insects, with special reference to Trichoptera. *Ecol* 59:1211–1220.
- Wojtowicz, J. A. 1982. A review of the adults and larvae of the genus *Pycnopsyche* (Trichoptera: Limnephilidae) with revision of the *Pycnopsyche scabripennis* (Rambur) and *Pycnopsyche lepida* (Hagen) complexes. Ph.D. dissertation. The University of Tennessee, Knoxville, Tennessee.
- Woods, A. J., et al. 2002. Ecoregions of Kentucky (color poster with map, descriptive text summary tables, and photographs). United States Geological Survey, Reston, Virginia map scale 1:1,000,000.
- Zhou, X., et al. 2011. Accelerated construction of a regional DNA-barcode reference library: caddisflies (Trichoptera) in the Great Smoky Mountains National Park. *J N Am Benthol Soc* 30:131–162.



Floyd, Michael A. et al. 2012. "An Annotated Checklist of the Caddisflies (Insecta: Trichoptera) of Kentucky." *Journal of the Kentucky Academy of Science* 73(1), 4-40. <https://doi.org/10.3101/1098-7096-73.1.4>.

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