Final Report:
Documenting Significant Nexus to Navigable Waters in the Southeast
CD 95415609-0

North Carolina Department of Environment and Natural Resources

Division of Water Quality

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1. Introduction

1.1 Background

Recent legal debates have brought attention to headwater streams in the United States. In 2006, decisions from the U.S. Supreme Court on the *Rapanos v. U.S.* and *Carabell v. U.S.* prompted new guidance for regulatory agencies responsible for determining jurisdiction of streams and wetlands (US EPA and US ACE 2008). In the new guidance, jurisdiction of streams can be asserted if it has a permanent or seasonal (e.g., typically 3 mo.) hydrologic connection with Traditionally Navigable Waters (TNW). Those streams that are determined not to have a relatively permanent hydrologic connection can still be classified as jurisdictional if it creates a significant nexus with downstream navigable waters. A significant nexus was loosely defined as a connection through hydrological and ecological factors that affect the chemical, physical, and biological integrity of a TNW (US EPA and US ACE 2008).

The Supreme Court affirmed that the US ACE had jurisdiction to protect TNW under the Commerce clause of the U.S. Constitution. The justices also agreed that in order to protect these waters, US ACE also had jurisdiction over waters that drained into a TNW. A TNW was defined as water that is or was used for interstate commerce; however, it was left to the individual US ACE district to decide exactly how they defined these waters. For instance, in North Carolina, TNW are generally limited to the main stems of rivers, where barges were once used to move goods from NC to the Atlantic Ocean or Tennessee. Reportedly, the definition in Indiana includes streams listed in a book of kayaking runs, since it was documented that kayakers from other states and Canada came to paddle these streams and engaged in commerce (purchasing meals, lodging and gasoline) while in the state. These inconsistencies in defining TNW have created significantly different numbers of TNW stream miles between states.

Justice Kennedy posited the need for a test to demonstrate that a water has a "Significant Nexus" to jurisdictional waters for a feature to be considered jurisdictional. The single most obvious connection was whether water, and pollutants in the water, could flow from someplace into a TNW (i.e., hydrologic nexus), however Justice Kennedy stated that other nexus were possible. Aquatic organisms could be one of the proposed nexus because of the propensity of many aquatic species to drift downstream as a means of colonization and escape from predation which also ensures gene flow along the stream gradient (Bishop and Hynes 1969, Brittain and Eikeland 1988). It is critical for regulatory agencies to make accurate and consistent jurisdictional determinations when a significant nexus is present. A succession of inaccurate or overly conservative jurisdictional determinations that erroneously exclude headwater streams could jeopardize miles of ecologically valuable streams and be detrimental to our nation's freshwaters.

Deriving a practical working definition from the legal rulings presents a challenge and interpretation of the US ACE/EPA guidance has been uneven across US ACE districts, which varied in what they called jurisdictional wetlands and streams even before the

Supreme Court ruling. North Carolina's state 401 wetlands programs are closely linked to the US ACE 404 program, allowing differing jurisdictional interpretations within the US ACE, to lead to uncertainty within the state 401 programs.

1.2 Headwater Streams

In a watershed, there are an abundance of small order streams (1st–3rd) which connect aquatic and terrestrial ecosystems. These streams, referred to as headwaters, drain up to 70−80% of the catchment area (Gomi et al. 2002). Estimates indicate that headwater streams may comprise more than 70% of stream and river miles in the United States (Lowe and Likens 2005). These streams occupy the upper reaches of the watershed and are typically the initial site of degradation from non-point source pollution and anthropogenic landscape disturbances (Figure 1). Despite their small size, headwater streams contribute a large amount of water, sediment, and biota in freshwater ecosystems because of their high density and location in the watershed (Clarke et al. 2008, Finn et al. 2011). Headwater streams contribute over half of the mean-annual water volume and approximately 40% of nitrogen flux to fourth-order and higher-orders streams, including TNW (Alexander et al. 2007). Water quality characteristics of reaches downstream from headwaters are highly correlated with riparian land cover adjacent to the 1st-order streams located upstream, proving that headwater streams have a strong influence on downstream water quality (Dodds and Oakes 2008)

Headwater streams across the Southeast display a range of hydrologic regimes. Streams are ephemeral, intermittent, or perennial depending primarily on their geology, topography, and local climate (i.e., precipitation). Ephemeral streams are defined as conveyances of storm water runoff during and shortly after a precipitation or snowmelt event. Intermittent streams typically flow for several months out of a year but lose their surface water connection with downstream waters during the peak of the growing season and during drought. Perennial streams convey surface water throughout the entire year, except under more extreme drought conditions or, in some cases, after anthropogenic watershed alterations (NC DWQ 2005). Distinguishing between these stream types without historical knowledge requires analyzing indicators of stream geomorphology, hydrology, and biology.

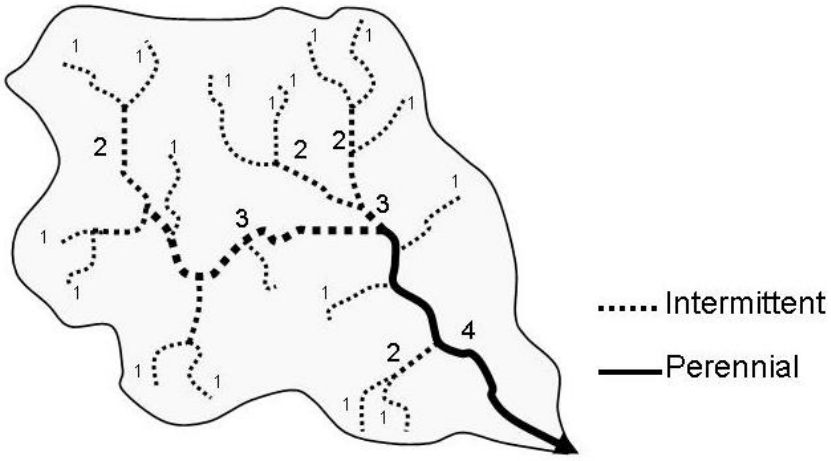

Figure 1: Stream ordering (1st–4th) and predicted hydrologic permanency in a typical watershed.

1.3 Previous Research

Recent literature has stressed the need for more research on headwater streams (Lowe and Likens 2005, Fritz 2007, Dodds and Oakes 2008). Between 2002 and 2005, the North Carolina Division of Water Quality (NC DWQ) studied 15 streams from the Piedmont and Blue Ridge ecoregions (Penrose and Eaton 2005). This study (EPA grant 974043-00-0) identified a group of Perennial Indicator Taxa (PIT) that required perennial streams to support their life cycle and only rarely occurred in intermittent waters (Appendix II). Occurrence of more than one PIT was determined to be sufficient evidence to classify a stream as perennial, regardless of other geomorphologic and hydrologic indicators associated with the North Carolina Stream Origins Method (NC DWQ 2005).

Finn et al. (2011) recently published a review of global headwater stream literature finding that headwaters contributed a disproportionately large amount of macroinvertebrate diversity to overall stream systems. Meyer et al. (2007) highlighted the diverse habitat available in headwater streams for microbial, plant, and animal life. They emphasized the importance of these streams to primary producers, decomposers, insects and other invertebrates, fishes, amphibians, reptiles, birds, and mammals. Morse et al. (1997) indicated that streams in the Southeast are one of the most biologically diverse freshwater habitats in the world and are home to many species of aquatic insects that are rare and vulnerable to extirpation.

1.4 Objectives

Despite knowledge that streams in the southeastern United States supply drinking water to a rapidly growing population and are also some of the most biologically diverse habitats in the world, they are becoming increasingly imperiled by anthropogenic activities. The Rapanos/Carabell decision left a need to identify what determines a

significant nexus between wetlands and headwaters and downstream jurisdictional waters (i.e., TNW). Without consistent and accurate jurisdictional determinations of headwater streams, thousands of miles of streams risk being impacted without mitigation.

The objectives of this project are to demonstrate where jurisdiction of streams begins by determining when biological communities provide a significant nexus with Traditionally Navigable Waters in EPA Region IV in the southeastern United States. We also aim to describe macroinvertebrate composition and relationships within intermittent and perennial streams. Our third objective is to test the applicability of the North Carolina Methodology for Identification of Intermittent and Perennial Streams in states other than North Carolina. This information may be used by the U.S. Army Corps of Engineers (US ACE), NC DWQ, and other state biologists to make more accurate jurisdictional stream determinations and to better understand the biology of headwater streams.

2. Methods

2.1 Site Selection

Headwater stream sites were selected from 7 states in EPA Region IV in the Southeast (SC, GA, FL, AL, MS, TN, and KY) (Figure 2). We attempted to select sites from all 14 Level III ecoregions within this study region but found the Southern Florida Coastal Plain (76) lacked the necessary topography and was too heavily channelized to feasibly locate unimpaired sites from this region. Study sites were selected in minimally impacted watersheds with little to no upstream land or water quality disturbances. Minimally impacted watersheds were selected to reduce the effect of anthropogenic disturbance and impairments to the hydrology, geomorphology, and biology of study sites. Aerial imagery (e.g., Google Earth) along with atlases, gazetteers (DeLorme Inc.), and local knowledge were used to find candidate streams. These candidate sites were usually within state forests, state parks, wildlife management areas, national forests, or municipal parks to avoid needing landowner permission and maximize reference site quality. Once a candidate stream was found, we hiked to the top of the watershed and located the stream origin.

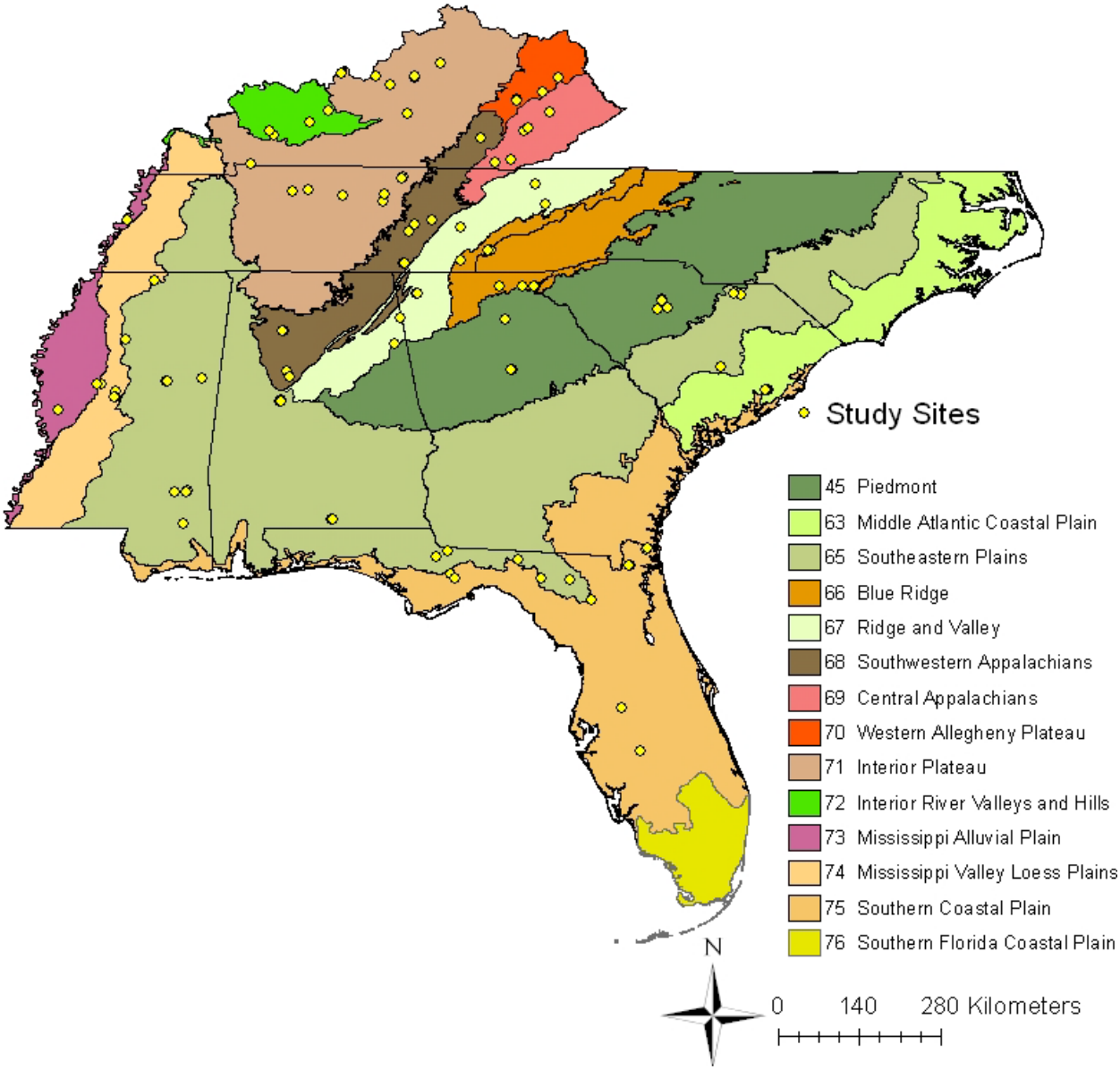

Figure 2: Sampling sites in the Southeast with EPA Level III ecoregions.

We collected macroinvertebrate samples from 117 streams from January, 2009 to September, 2011. We attempted to distribute study sites proportionally in Level III ecoregions within the appropriate state (Table 1). When possible, study sites were sampled multiple times, once in the winter/spring season and once in the summer/fall season. Additional samples were collected from sites when possible. Multiple samples were not always collected in cases where intermittent streams were dry during a visit or re-visiting sites was not logistically possible because of time and travel constraints.

Table 1: List of ecoregions sampled and number of samples collected.

Ecoregion (Level III)	Number of Samples	Name
45	22	Piedmont
63	12	Middle Atlantic Coastal Plain
65	41	South Eastern Plains
66	23	Blue Ridge
67	16	Ridge and Valley
68	30	South Western Appalachians
69	10	Central Appalachians
70	4	Western Allegheny Plains
71	43	Interior Plateau
72	8	Interior River Lowland
73	2	Mississippi Alluvial Plain
74	9	Mississippi Valley Loess Plains
75	18	Southern Coastal Plain
Total	238	

We gathered macroinvertebrate lists from TNW in all states possible using contacts at corresponding state agencies and US ACE regional offices (Appendices IV-VIII). South Carolina, Florida, Mississippi, Tennessee and Kentucky had both TNW and invertebrate data available while TNW data was unavailable in Georgia and invertebrate data was unavailable in Alabama. Traditionally Navigable Waters varied in size and density for each state and were not necessarily directly downstream from study sites.

2.2 NC Stream Identification Form

We used the North Carolina Methodology for Identification of Intermittent and Perennial Streams v.3.1 field form at each site visited (NC DWQ 2005, Appendix I). This methodology incorporates visible and measurable indicators of geomorphology, hydrology, and biology within and adjacent to the stream to determine whether the stream has an intermittent or perennial flow regime. Completion of the field form by a trained professional yields a numerical value which corresponds to a particular flow regime. Scores between ≥ 19 and < 30 generally indicate an intermittent flow regime and scores ≥ 30 usually represent perennial regimes. Results from our previous work in North Carolina introduced PIT into supplemental criteria while using the form. For instance, a stream can be determined perennial if more than one PIT is collected during the corresponding search effort. Also, a stream can be determined to be perennial if fish or amphibians (larval salamanders and large, multi-year tadpoles) are found or if large crayfish or fingernail clams are found and the numerical value is > 18. Using this methodology we identified the intermittent and perennial points of origin along the stream channel.

2.3 Macroinvertebrate Collection and Identification

Benthic macroinvertebrate samples were collected from the best available habitats near the ephemeral−intermittent and intermittent−perennial transition points in each stream. Sampling was done qualitatively using a D-framed sweep net (500 µm, Wildlife Supply Co.) at two habitat locations along the stream reach. Habitat locations were chosen using best professional judgment and were usually taken from riffles, leaf packs, root wads, and/or pools. This method allowed us to capture the most biodiversity while keeping sampling time short and the amount of material collected at a reasonable level. This approach allowed us to travel longer distances and through thick vegetation to reach the stream without burdensome equipment. The D-framed sweep net was capable of sampling small, narrow stream channels and shallow surface waters more adequately than large-stream sampling equipment.

Samples from the intermittent and perennial stream reaches were composited separately to allow comparisons of upstream and downstream samples. Once composited, sample material was preserved in 70% ethanol. Samples were then spread in a white pan and 100% of macroinvertebrates were picked by trained individuals. A quality assurance/quality control (QA/QC) check of the material was performed by a separate trained individual on 10% of samples.

Identification of benthic macroinvertebrates was performed by trained professionals using regional identification keys (e.g., Brigham et al. 1982, Merritt et al. 2008). Specimens were identified to the lowest practical taxonomic level (i.e., genus, species). When specimens were damaged or immature they were taken to lowest taxonomic level possible (i.e., family, order). Taxa that were particularly difficult to identify (e.g., Nematoda, Oligochaeta) were typically left at a broader taxonomic level (i.e., family, order). Taxonomists at the North Carolina DWQ Biological Assessment Unit were consulted regularly when new or difficult taxa were identified to ensure accuracy. A trained professional performed QA/QC on approximately 10% of samples identified and taxonomists interacted regularly to keep the identification process consistent within the group.

2.4 Data Analysis

We used Excel® (Microsoft Inc.) spreadsheets to manage data collected during this study. JMP® (SAS Inc.) was used for statistical analysis procedures. In instances where we described overall stream diversity, we compiled data from multiple sampling visits and sampling points (i.e. intermittent, perennial) to generate a single data point for a more comprehensive comparison. We generated Biotic Index scores using regional values of tolerance to organic pollution (NC DWQ 2011). Biotic Indices were calculated for the 96 sites with 20 or more aquatic taxa. Twenty taxa were chosen as a cut-off value that had enough taxa to reduce variability but still include enough sites that region-wide trends might be detectable. We used ANOVA to test for significant differences ($\alpha = 0.05$) between sites and metrics in the dataset. When groups of sites

were compared, we used an All-pairs Tukey-Kramer test for significant differences ($p \leq 0.05$) between groups. Simpson's diversity (Ds) is a measure of probability of an individual in the community encountering a member of another species (Simpson 1949). Evenness is expressed by considering how close a set of observed species abundances are to the maximum possible diversity for a given number of individuals and species. The maximum possibility exists when the numbers of individuals are distributed evenly among the number of species. Simpson's diversity takes into account both the species richness and evenness to describe the diversity within the community (Brower and Zar 1977).

3. Results and Discussion

3.1 Geography and Stream Origins

Streams across the study area tended to develop in three different forms: perennial and wet weather springs, wetland outflows, and gradually erosive features. Spring seeps were common in the Blue Ridge and found sporadically in the Mississippi Valley Loess Plain, South Eastern Plains, and Interior Plateau. Blue Ridge ecoregion (66) is located in western North Carolina, eastern Tennessee, northwest Georgia, and northwest South Carolina. These streams typically had gravel and rock substrate and shallow depth (**Error! Reference source not found.**3A). The Mississippi Valley Loess Plains (74) is located in western Kentucky and Tennessee with a band through central Mississippi. We found a series of spring seeps emerging from the Bluff Hills (74a) ecoregion at the base of the escarpment draining into the Mississippi Alluvial Plain (73). These springs had sand and gravel bottoms, shallow flow, and seemed surprisingly uncharacteristic for the region. South Eastern Plains (65), the largest ecoregion in the Southeast, covers areas in eastern Mississippi, southern Alabama, southern Georgia, central South Carolina, and north Florida. We found spring seeps present in the Tifton Uplands (65h) of northern Florida and Southern Atlantic Loam Plains (65l) in South Carolina. These springs had sand and gravel bottoms, shallow flow, and appeared from the base of small headcuts. The Interior Plateau (71) is located in central Kentucky, central Tennessee, and northern Georgia. We discovered spring seeps in the Outer Nashville Basin (71h) in Tennessee and the Eastern Highland Rim (71g) in central Kentucky (Figure 3G). Angel Spring, in the Clay Hill Memorial Forest, emerged onto the landscape as a cascade over large boulders and rocks. In general, spring seeps drained small, steep watersheds and had a strong groundwater connection.

Streams that begin as constricted outflow from wetlands were common in the Middle Atlantic Coastal Plain and Southern Coastal Plain. The Middle Atlantic Coastal Plain (63) covers areas in eastern South and North Carolina and the Southern Coastal Plain (75) covers eastern Georgia and the majority of Florida. The majority of streams found in these regions resembled wetlands and had little to no flowing water, except in winter months (Figure 3C, **Error! Reference source not found.**3D). Visible flow was present in cases where wide streams became constricted from culverts or ditching and a channel was formed. Streams in these regions tended to be blackwater systems with high levels of tannins. The Mississippi Alluvial Plains (73) in western Mississippi were similar to the

coastal plains streams, in that they were large floodplains resembling wetlands with little flow. A long history of farming in this region has led to extensive ditching of streams in this area and few, if any, natural headwater streams exist.

Finally, the third major way streams originated in the study area was through a transition of erosive features. These streams typically had an ephemeral, intermittent, and perennial transition point which was identifiable from the stream's geomorphology. Within transitional stream types, we found certain streams had long and short intermittent reaches. Streams that have extensive intermittent reaches were found in the Interior Plateau ecoregion (71) of central Kentucky, Tennessee, and northern Alabama. Streams in these areas often flow underground through porous limestone formations (karst) (**Error! Reference source not found.**3G). For example, we found a stream channel in the Cedars of Lebanon State Park in Tennessee (approximately 52 km^2 (20 mi^2) watershed) which was dry likely due to subsurface flow. Regions in north Florida (65o) and South Carolina were also found to have karst geology making stream studies difficult. Calculating watershed areas in karst topography is problematic and biologists from Kentucky Division of Water (KY DOW) have found that aquifer watershed areas are not equivalent in area to surface topography watersheds (Bryan Marbert, personal communication, October, 2009).

Streams in the Ridge and Valley ecoregion (67) are characterized by very steep slopes and intermittent reaches are usually less than 100m in length (Figure 3E). Slopes in this region are so steep that biologists for the State of Tennessee have been known to use ropes to get to certain streams. The Central Appalachians (69) and Southwestern Appalachians (68) ecoregions also frequently contain short to moderate intermittent reaches. The Central Appalachians, covering areas in eastern Kentucky and a small segment of northeastern Tennessee, is characterized by steep terrain (**Error! Reference source not found.**3F). The Southwestern Appalachians occupy significant portions of Kentucky, Tennessee, and Alabama. Streams in this region tend to have relatively shallow soils underlain by bedrock (**Error! Reference source not found.**3H). This bedrock separates surface and subsurface water causing large streams (5−10m width) to dry or nearly dry during summer months. Both the Central and Southwestern Appalachians have significant influence from coal mining. Interestingly, the bedrock substrate can be black in streams near active coal mining areas outside Birmingham, Alabama. The Piedmont (45), Mississippi Loess Plains (74), Interior Plateau (71) ecoregions have Level IV ecoregions within them that also contain streams with intermittent origins. For example, we found several streams in Mississippi state parks in the Mississippi Loess Plains that had long ephemeral reaches followed by very short intermittent reaches that created headcuts which formed perennial streams when erosion intersected groundwater at the clay/marl layer (Figure 3B).

3A. Blue Ridge, 66, GA

3B. Mississippi Loess Plains 74, MS

3C. Mid Atlantic Coastal Plain 63, SC

3D. Southern Coastal Plain 75, FL

3E. Ridge and Valley 67, TN

3F. Central Appalachians 69, KY

3G. Interior Plateau 71, TN

3H. Southwestern Appalachians 68, AL

Figure 3: Study streams that represent Level III ecoregions in the Southeast.

While most streams in the Southeast begin in watersheds of a few dozen acres or less, the South Carolina Coastal Plain ecoregion (63h) supports intermittent streams in watersheds of nearly 200 acres. This is likely caused by the shallow clay lens soil layer which has disconnected the surface water from the ground water (Devendra Amatya, personal communication, December 2008). Streams arising around the Castle Hayne aquifer in North Carolina and the Yorktown aquifer in Virginia have stream origins in watersheds half this size or less. Turkey Creek in South Carolina exemplifies the flashy nature of these streams, in four months going from a nearly dry channel to nearly waist deep water over 50 feet across (Figure 4).

4A. Turkey Cr 3 SC 9/2009

4B. Turkey Cr 3 SC 1/2010

Figure 4: Turkey Creek study site in September 2009 (A) and January 2010 (B) showing large temporal variability.

3.2 Overall Diversity and Assemblage Composition

We collected 47,683 organisms in 238 samples from 117 streams during this project. Figure 5 is breakdown of the taxonomic level of identification showing 96% of taxa collected in this study were identified to the Genus or Speces level. The mean number of total aquatic taxa in the 67 intermittent reaches sampled ($\bar{x}$ = 9) was significantly ($p < 0.05$) less than in the 145 perennial reaches ($\bar{x}$ = 22). There was also a significant ($p < 0.05$) difference in the number of Perennial Indicator Taxa (PIT; taxa with long life cycles generally associated with permanent water) at each site ($\bar{x}$ < 1 PIT intermittent, $\bar{x}$ = 6 PIT perennial).

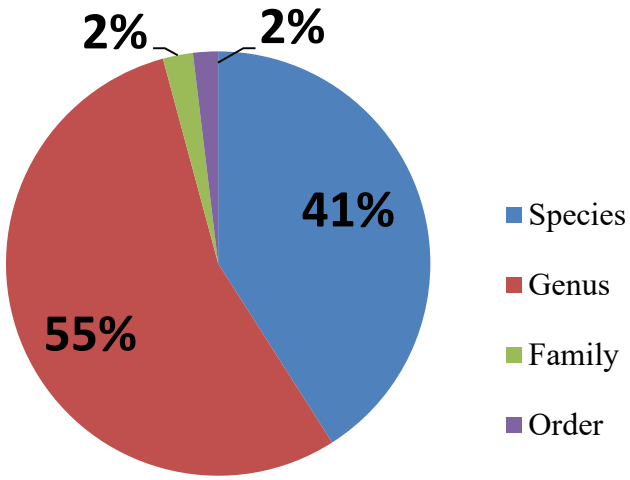

Figure 5: Percentage of taxonomic level reached during identification of aquatic macroinvertebrates during this study.

Data analysis found overlap in the most frequently occurring macroinvertebrates in headwater streams across the study area (Figure 6). Some of these region-wide species include the amphipod *Crangonyx*, the winter stoneflies *Leuctra* and *Amphinemoura delosa*, the midge *Parametriocnemus lundbecki* and the lumbriculid family of worms. Crustaceans seemed to be the single largest group; at least one amphipod or isopod was one of the most frequent and most abundant taxa in ten of the 13 ecoregions in this study.

Figure 6: Five most common macroinvertebrate taxa found in each state.

3.3 Mountain, Piedmont, and Coastal Plain Assemblages

We analyzed large scale differences by grouping sites into Level II ecoregions (Figure 7). These ecoregions generally corresponded to: 8.3 – Mountains; 8.4 – Piedmont; 8.5 − Coastal Plain. The sites in ecoregions defined as Mountains (66, 67, 68, 69 and 70) had an average of over ten more taxa per site than ecoregions defined as Piedmont or Coastal Plain. Most of this difference was in intolerant EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa where there were over twice as many taxa (13) in Mountain sites than Piedmont sites (5) and even fewer in Coastal Plain sites (2). Coastal Plain sites (ecoregions 63, 73 and 75) had more tolerant groups (i.e. Odonata, Coleoptera) represented than the other two regions.

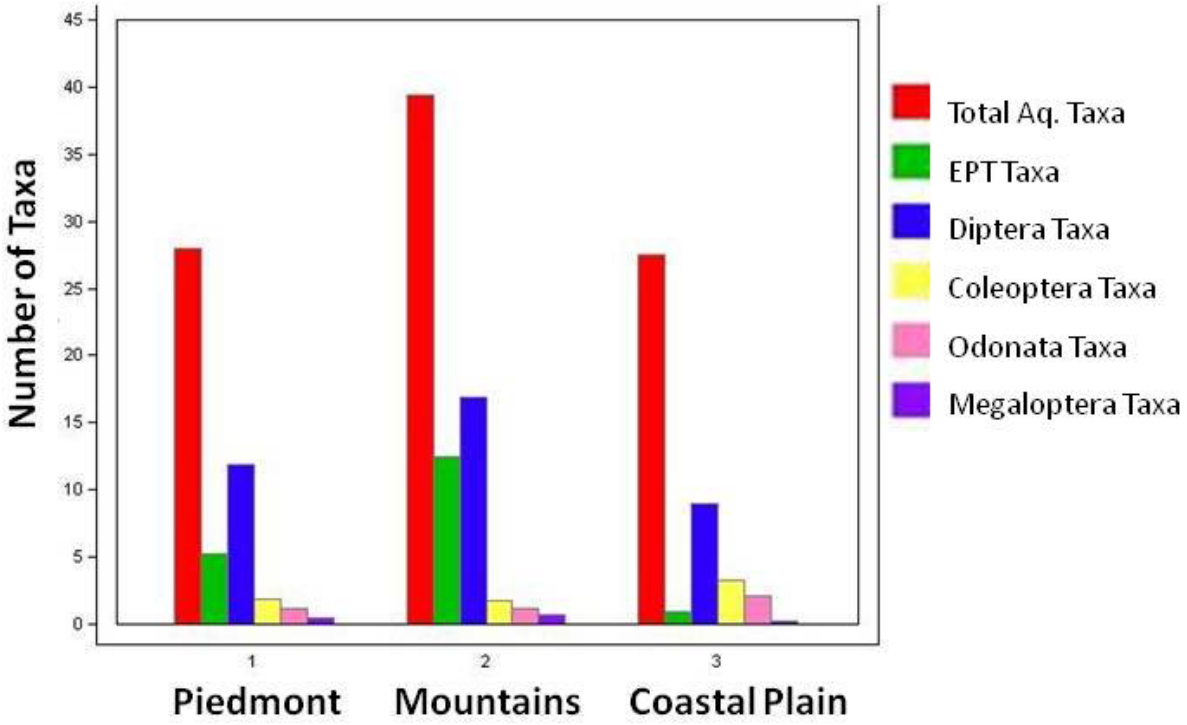

Figure 7: Total taxa and major taxonomic groups by Level II ecoregion.

Differences between Level III ecoregions were minor compared to Level II differences (Figure 8). We found the Blue Ridge ecoregion (66) had significantly more aquatic taxa and total taxa than all others. This ecoregion was unique in that nearly every unimpacted stream begins as a spring whereas most other ecoregions usually had a mix of origin types. It is unclear from this graph alone whether the increased taxa richness in the Blue Ridge ecoregion (66) is due to the cooler temperatures due to higher altitude, stable temperatures due to the constant flow of groundwater, other reasons or a combination of the above.

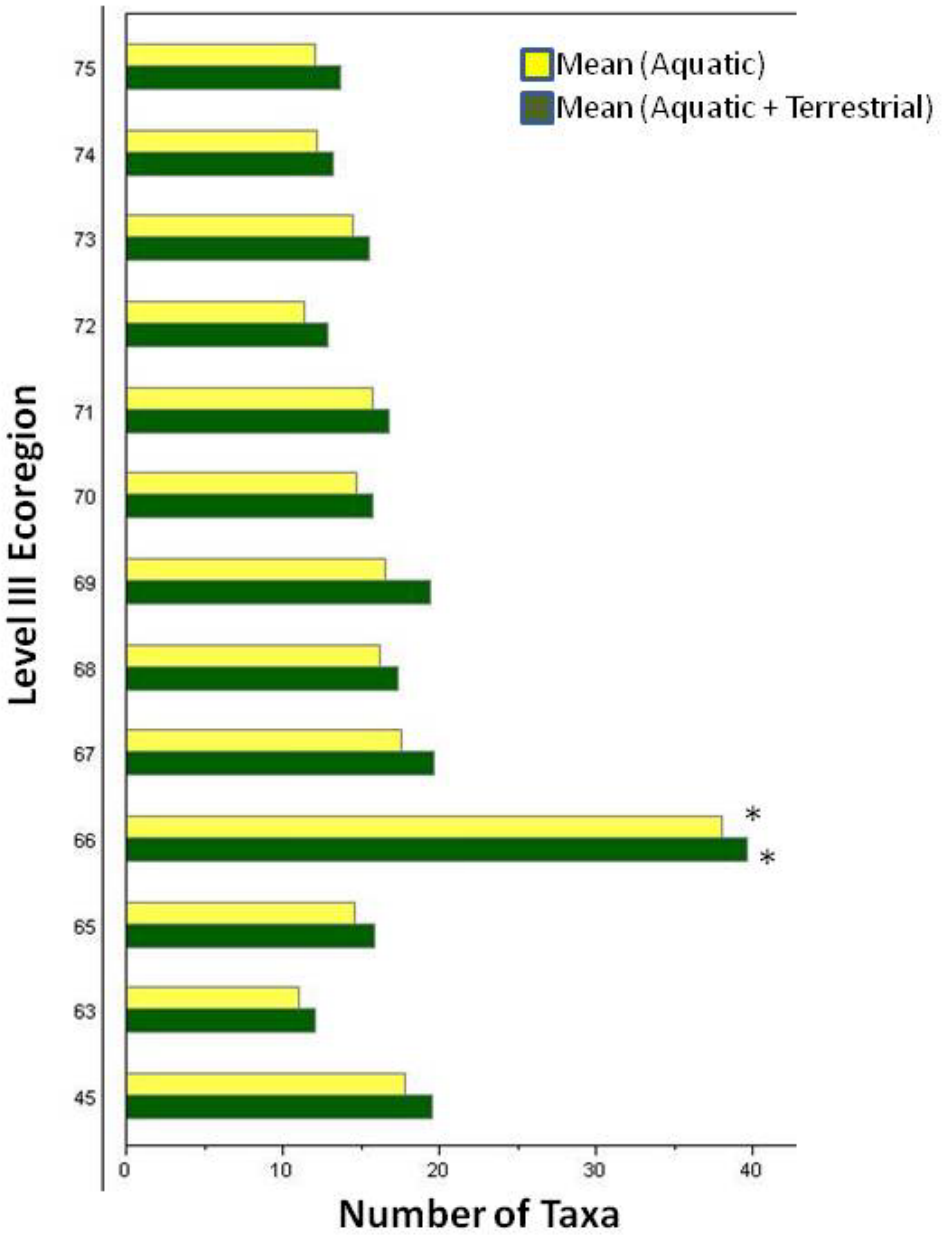

Figure 8: Mean aquatic taxa and total taxa by Level III ecoregion. An asterisk depicts significant difference between ecoregions (ANOVA, $p \leq 0.05$)

3.4 Significant Biological Nexus with Traditionally Navigable Waters

The percentage of taxa collected in headwater streams that are also found in TNW (i.e., overlap) is a possible source for describing significant biological nexus (Figure 9). We examined taxa lists generated for each state collected from headwater streams during this project and TNW for states with available records for overlap (Appendix III). Florida had 80% (111 / 139 taxa) overlap of headwater stream and TNW taxa, the highest overlap found in this study (

Appendix IV). Tennessee had 70% (216 / 308 taxa) overlap between headwater streams and TNW taxa (Appendix VIII). In the 27 samples collected in Florida, each sample had between 50-100 percent of taxa collected listed on the Florida TNW list. South Carolina had 50% (81 / 160 taxa) overlap between headwaters and TNW taxa (Appendix VI). Kentucky and Mississippi had 46% (91 / 196 taxa) and 30% (38 / 129 taxa) overlap, respectively (Appendix V, Appendix VII). The five states listed had between 168 and 1850 TNW taxa. Florida had the largest TNW taxa list and subsequently had the largest percent overlap while Mississippi listed the fewest TNW taxa and was found to have the least amount of overlap. Thus, the number of headwater stream taxa found in TNW depends greatly on the number of taxa collected in TNW of that state.

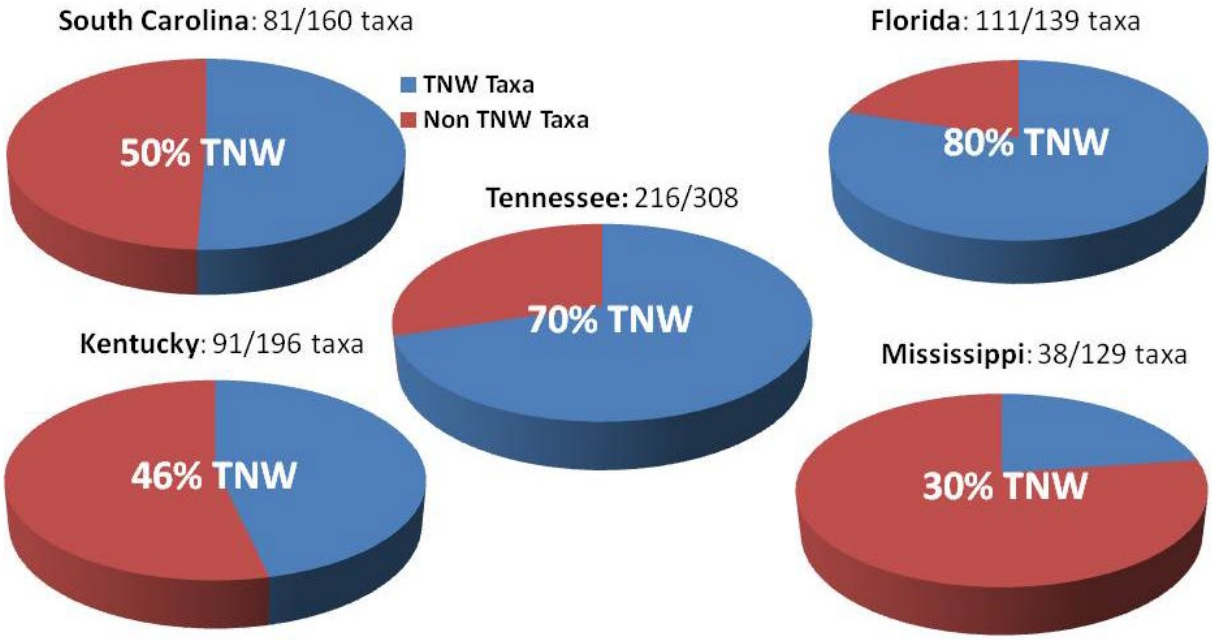

Figure 9: Percentage of Traditionally Navigable Waters (TNW) taxa and Non Traditionally Navigable Waters taxa found in headwater streams taxa lists generated for each state with available taxa lists.

We also examined site overlap to determine the percentage of taxa in each site that correspond with TNW lists for that state (Figure 10). Interestingly, despite Mississippi having the lowest percent overlap of macroinvertebrate communities, 87% (20 / 23 sites) of headwater stream sites sampled contained at least one species found on the TNW list. The mean percentage of the aquatic community per site that was also listed as TNW taxa was 23% (range 0−50% (0−14 taxa)). One of the three sites lacking species found on the TNW list scored 17.5 points on the North Carolina Stream Determination Form, which suggests the stream could have been ephemeral, in which case this may not have been a jurisdictional feature. In Tennessee, every study site contained at least one taxa found on the state TNW list (n = 49, $\bar{x}$ = 75%, Range = 40−100%). In Florida, every study site contained at least one taxa found on the state

TNW list (n = 27, $\bar{x}$ = 83%, range = 50−100%). These results show that TNW taxa could be used as an indicator of jurisdictional significant nexus in headwater streams.

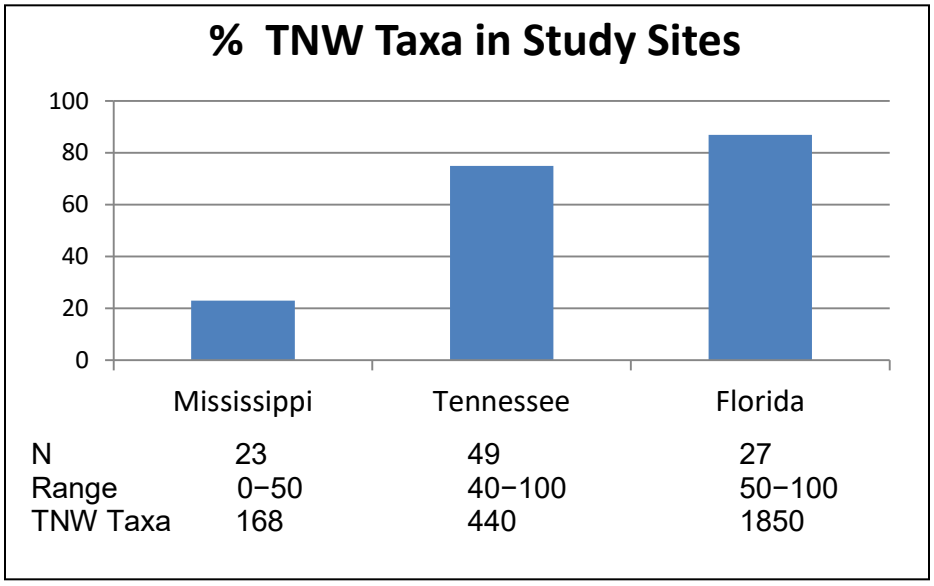

Figure 10: Percentage of Traditionally Navigable Waters (TNW) taxa in headwater study sites in Mississippi, Tennessee, and Florida.

3.5 Intermittent vs. Perennial Assemblages

Differences occurred between upstream (intermittent) reaches and downstream (perennial) reaches of study sites but upstream reaches appeared to be subsets of downstream reaches (Figure 11, Appendix III). Data selected for this analysis was derived from a subset of sites that showed intermittent and perennial conditions during the study period. Generally, total richness and EPT (Ephemeroptera, Plecoptera, Trichoptera) richness increased downstream from intermittent reaches. Mean values for Simpson's Diversity, total richness, and EPT richness were significantly higher (ANOVA, $p \leq 0.05$) in downstream samples when stream from across Level III ecoregions were compared. Relationships were similar when stream origin types (i.e., mountain springs, non-mountain springs, non-mountain surface, mountain surface, wetlands) were analyzed but no significant relationships were identified because variability was high and sample size was small.

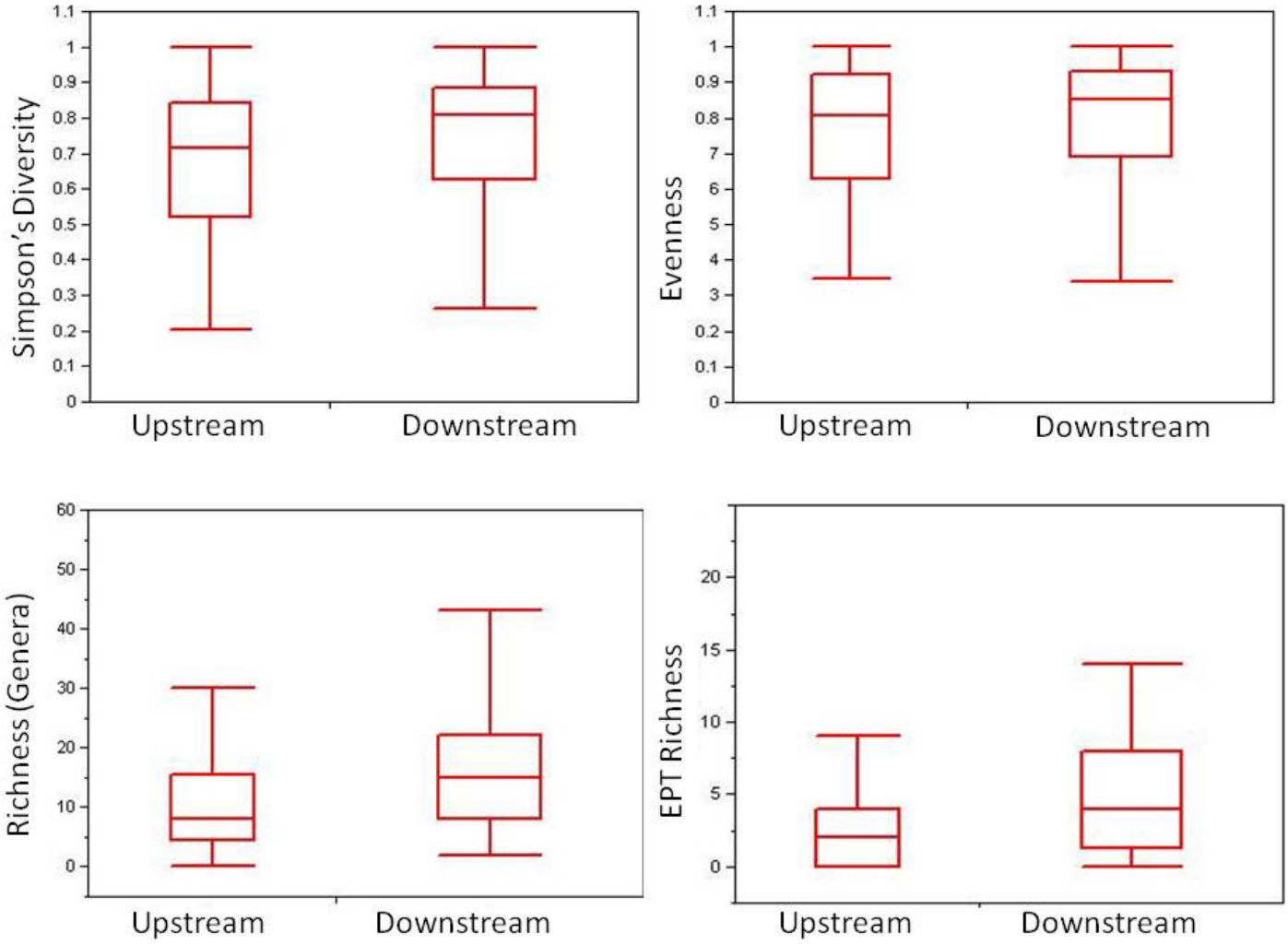

Figure 11: Comparison of upstream (intermittent) and downstream (perennial) macroinvertebrate Simpson's diversity, Evenness, Richness (Genera), and EPT (Ephemeroptera, Plecoptera, Trichoptera) Richness metrics study sites.

3.6 Stream Origin Assemblage Differences

We used Biotic Index, a measure of average tolerance of the aquatic community at a site, to compare differences in the macroinvertebrate assemblage between different types of stream origins (Hilsenhoff, 1987, Lenat 1993). Values range from 0−10, where 0 is very intolerant and 10 is very tolerant. North Carolina Biotic Index values were used to generate a tolerance score (NC DENR 2011). Five general stream classes were identified: Spring-fed Mountain Streams (Ecoregion 66), non-mountainous spring-fed streams (usually karst areas in N. Florida and central Tennessee and Kentucky),non-mountainous streams with surface flow including intermittent and perennial flow, mountainous streams with surface flow (Ecoregions 67–70), and coastal plain or wetland (Figure 12).

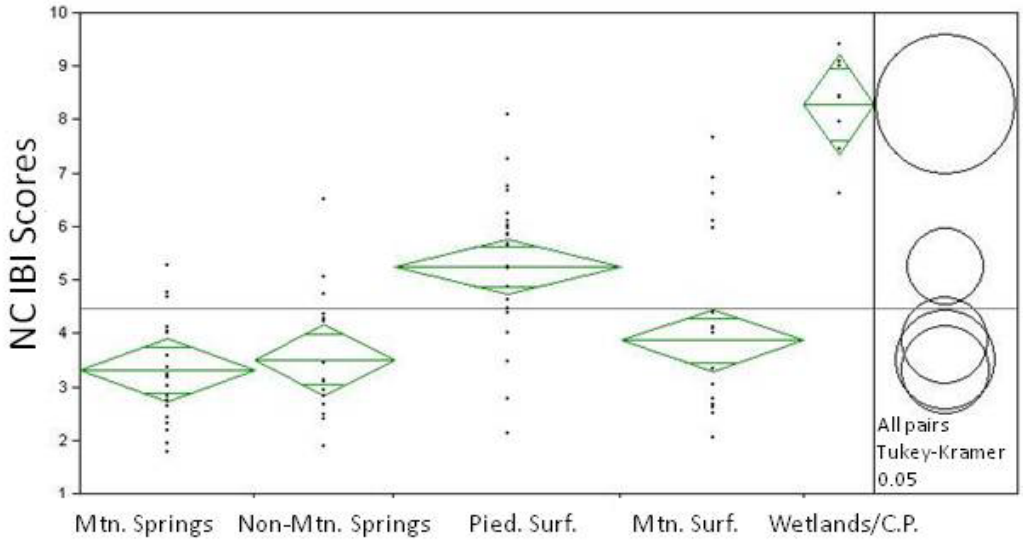

Figure 12: Biotic indices of sites by stream origin class. Circles represent all pairs Tukey-Kramer test for significance ($p \leq 0.05$). Mtn. Springs = mountain springs, Non-Mtn. Springs = non-mountain springs, Pied. Surf. = Piedmont surface waters, Mtn. Surf. = mountain surface waters, and Wetlands/C.P. = wetland and Coastal Plain origins.

Results show little difference between communities in the mountain springs of ecoregion 66 (mean BI = 3.31), the non-mountain springs of ecoregion 74, karst area in ecoregion 71 plus parts of ecoregion 65 (mean BI = 3.50), and mountain streams starting as overland flow in the mountain ecoregions 67, 68, 69 and 70 (mean BI = 3.87). Streams with spring origins found in the Appalachian Mountains (e.g., ecoregion 66) support an intolerant community. It should be noted that biological criteria developed for small streams in ecoregion 66 in North Carolina has the range for an Excellent bioclassification as ≤ 3.29, only 0.02 less than the mean BI for mountains found in this study (NCDENR 2009).

Non-mountainous streams (Piedmont surface waters) that start with overland flow had more tolerant benthic communities than the first three groups (mean BI = 5.24). These areas include ecoregions 45 and 72 plus the non-spring origin streams in ecoregions 65 and 71. While the mean BI is significantly higher in this group than the previous ones, it is still low enough that there may be some room for development of region-wide biological criteria for these headwater streams.

Wetlands and coastal plains study sites (ecoregions 63, 73 and 75) contained the most tolerant taxa, with a mean BI of 8.27. These systems appear to be stressed by slow flow, low dissolved oxygen, and low pH, which are characteristic of wetlands. These stressors are natural and affect BI scores and the future development of biological criteria.

3.8 Perennial Indicator Taxa

Perennial Indicator Taxa (PIT) developed for North Carolina headwater streams were significantly higher in perennial streams compared to intermittent segments across the Southeast (Figure 13). Results also showed that nearly twice as many perennial taxa were found in streams that scored over 30 points (perennial) using the North Carolina method that those that score < 30 points (intermittent). This data was skewed by perennial streams that scored < 30 points due to the lack of strong perennial indicators of geomorphology and hydrology (e.g., spring seeps, groundwater fed streams).

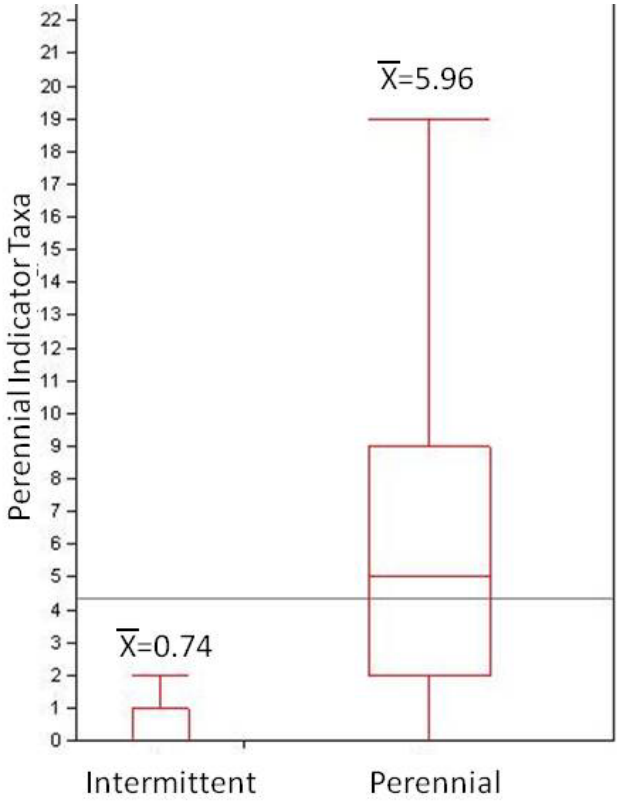

Figure 13: Comparison of mean Perennial Indicator Taxa (PIT) in intermittent and perennial streams.

Perennial Indicator Taxa, as listed in North Carolina's stream determination manual (NC DWQ 2005), included all taxa within the orders Ephemeroptera, Trichoptera (except *Ironoquia sp.*), Plecoptera (Perlidae, Perlodidae, Peltoperlidae and Pteronarcyidae), Odonata, Megaloptera, fish (except *Gambusia sp.)*, and larval amphibians. It also included gilled snails (including limpets), beetles (Elmidae, Psephenidae, adult Dryopidae) and large dipterans (*Tipula, Bittacomorpha, Ptychoptera*). Only larval specimens that were in late-instar stages (i.e., medium − large size) were counted as PIT to eliminate occurrences of early instars that may not have sufficient time to complete their life cycles before streams dry. In rare occurrences, PIT of sufficient size occasionally occurred in intermittent streams but did not alter our results.

3.9 Indicator Taxa for Intermittent Streams

There were very few taxa collected during this study that were found only in intermittent reaches. These taxa include *Stygobromus exilis*, a groundwater dwelling amphipod, collected from the bluffs overlooking Chattanooga, Tennessee. *Cymbiodyta chamberlaini,* a rare, but widespread hydrophilid beetle (Coleoptera: Hydrophilidae), from central Mississippi. *Zalutschia* species A, a rare midge (Diptera: Chironomidae), from the South Carolina Coastal Plain. *Lethocerus uherli,* an air breathing belostomatid (Hemiptera: Belostomatidae), from a blackwater stream in north Florida, and *Pseudostenophylax* (Trichoptera: Limnephilidae), a caddisfly, from the mountains in Kentucky. It should be noted that all of these taxa were only collected once, except *Stygobromus*, which was collected in adjacent watersheds on one date and thus there is not enough evidence to suggest that any of these taxa could be used as an indicators of intermittent streams. Although, in previous collections in the Blue Ridge ecoregion (66), *Pseudostenophylax* was collected only in wet weather springs, with further research this taxon may need to join *Ironoquia* as caddisflies that are not perennial indicators.

3.10 Rare and Vulnerable Taxa

Several species considered rare or vulnerable to extirpation were collected during this project. Conservation status of aquatic insects is poorly known when compared to other faunal groups due to the lack of sufficient information regarding rare species. State natural history programs and regional professionals were consulted to prepare a list of Ephemeroptera, Plecoptera, and Trichoptera species that are significantly rare or vulnerable to extirpation in the Southeast (TN NHP 2009, NC NHP 2010, Boris Kondratieff, personal communication, December 20, 2011, J. Morse, personal communication, December 15, 2011, KY SNPC 2011, Luke Jacobus, personal communication, December 18, 2011). From this list, we collected five species during this project: *Beloneuria georgiana*, *Diploperla morgani*, *Diplectrona metaqui*, *Homoplectra flinti*, and *H. monticola*. It should be noted that many species of aquatic insects require adult specimens or expert identification because characteristics are dubious and many taxonomic identification keys do not allow species determinations. Therefore, it is possible that rare species were collected but only identified at a higher taxonomic level (e.g., genus) because species-level determinations could not be confidently made.

Several other taxa that are considered locally rare or require specific habitat were also collected. *Diplectrona rossi* Morse, historically found in only one spring seep located in eastern Louisiana, was possibly collected from a unique spring seep in western Mississippi (Figure 14). This genus has been under recent review and reorganization by taxonomists which may determine the species to be *D. rossi*, a new species, or possibly a morphotype of *D. modesta* (Jason Robinson, personal communication, February 3, 2012). This specimen is rare and undoubtedly requires habitats found only in headwater streams to survive.

Figure 14: Dorsal head patterns in *Diplectrona rossi* from western MS and its originally described location in eastern LA.

Goerita betteni, an uncommon caddisfly species, was collected from a spring seep in Kentucky. This caddisfly inhabits only spring seeps which have swift sheet flow over large bedrock slabs. *Theliopyche sp.*, an uncommon Lepidostomatid caddisfly, was collected from a headwater stream in Tennessee. This genus (six species) is restricted to the Appalachian Mountains and breeds in spring runs (Flint, Jr. et al. 2008). The habitat specificity makes *G. betteni and Theliopsyche sp.* vulnerable to extirpation because remaining habitats could be easily overlooked and destroyed. We collected two species of *Stygobromus* amphipods, *S. exilus* and *S. smithi,* from several headwater study sites. *Stygobromus*, a subterranean species (i.e., eyeless and unpigmented), is a unique genera because they are restricted to groundwater-related habitats like caves, seeps, springs, wells, interstices, and deep lakes (Holsinger 1988). Together, these taxa represent part of the diverse community relying on the myriad of habitats headwater streams provide.

3.11 Fish and Amphibians

Fish and amphibians occurred in many of our study sites and were collected as bycatch using the sweep-net method. Despite not using preferred sampling methods for collection of vertebrates, we recorded 17 species inhabiting headwater streams (Table 2). A total of seven amphibian and 10 fish species were identified by experts at the North Carolina Natural History Museum and Biological Assessment Unit.

Table 2. Fish and amphibian taxa collected from headwater stream study sites in EPA Region IV.

Order	Family	Genus	Species	Common Name
Caudata	Ambystomatidae	*Ambystoma*	*opacum*	Marbled Salamander
	Plethodontidae	*Desmognathus*	*conati*	Spotted Dusky Salamamder
			ochrophaeus	Mountainn Dusky Salamander
		Pseudotriton	*ruber*	Red Salamander
		Eurycea	*cirrigera*	Southern Two-lined Salamander
			wilderae	Blue Ridge Two-lined Salamander
		Gyrinophilus	*porphyriticus*	Spring Salamander
Cypriniformes	Cyprinidae	*Semotilus*	*atromaculatus*	Creek Chub
			thoreavianus	
Cyprinodontiformes	Fundulidae	*Fundulus*	*notatus*	Blackstripe Topminnow
			diaphnous	Banded Killifish
	Poeciliidae	*Gambusia*	*sp.*	Mosquito Fish
Siluriformes	Ictaluridae	*Ameiurus*	*natalis*	Yellow Bullhead
Percopsiformes	Aphredoderidae	*Aphredoderus*	*sayanus*	Pirate perch
Perciformes	Elassomatidae	*Elassoma*	*zonatum*	Banded Pygmy Sunfish
	Centrarchidae	*Lepomis*	*cyanellus*	Green Sunfish
	Percidae	*Etheostoma*	*parvipinne*	Goldstripe Darter

4. Conclusions

Previous studies coincide with results from this study to show that intermittent stream taxa are largely subsets of downstream, perennial communities but generally contain a higher proportion of tolerant species (Feminella 1996, Del Rosario and Resh 2000, Bonada et al. 2007, Datry et al. 2011). Simpson's diversity, evenness, total richness, and EPT richness were significantly different between intermittent and perennial reaches. We did find that PIT taxa were significantly higher in perennial streams compared to intermittent streams. It appears that the PIT taxa are removed from intermittent stream communities because of shorter available hydroperiods and more variable physico-chemical conditions (Feminella 1996, Williams 1996). The list of PIT developed for North Carolina seems to work throughout the study area with the exception of the caddisfly *Pseudostenophylax* (Trichoptera: Limnephilidae), which may be added to the list of exceptions with *Ironoquia* (Trichoptera: Limnephilidae).

We were able to gather state TNW taxa lists for five (SC, FL, TN, KY, MS) of the seven states sampled during this project. Taxa found in TNW within a state were found in headwater stream samples 99% of the time, suggesting that this could be a viable test for significant nexus. There was between 30−80% overlap between the state TNW list and headwater stream taxa collected from each respective state. Criteria for TNW

differed in each state and results showed higher taxa overlap in states with higher numbers of designated TNW. States should be required to publish TNW taxa lists if TNW taxa are to be implemented as indicators of significant nexus.

Streams begin in a variety of ways across the Southeast, largely reflecting the variety of the landscapes in which they form. Steep or flat, clay or limestone, streams tend to have three basic origins: springs, linear overland flow and wetlands narrowing to form a channel. We found the highest diversity and pollution intolerance in mountain streams, specifically spring-fed streams. Coastal Plains streams, where non-ditched streams begin as wetlands, showed the lowest diversity and highest tolerance in the study area. Our results support previous literature emphasizing the important contribution of headwater stream biodiversity to freshwater ecosystems (Lowe and Likens 2005, Meyer et al. 2007, Clarke et al. 2008, Finn et al. 2011). Rare and undescribed taxa were also collected in headwater streams throughout the study area. Our results suggest that headwaters are a critical source of biodiversity to downstream rivers, including TNW, and deserve appropriate protection.

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6. Appendices

Appendix I. North Carolina Division of Water Quality Stream Identification Form v.3.1 for identifying the origins of intermittent and perennial streams.

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date:	**Project:**	**Latitude:**
Evaluator:	**Site:**	**Longitude:**
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*	**County:**	**Other** *e.g. Quad Name*:

A. Geomorphology (Subtotal =_____)	Absent	Weak	Moderate	Strong
1[a]. Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 [a] Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

[a] Man-made ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = _____)				
14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, **or** Water in channel -- dry or growing season	0	1	2	3
16. Leaflitter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

C. Biology (Subtotal = _____)				
20[b]. Fibrous roots in channel	3	2	1	0
21[b]. Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macrobenthos (note diversity and abundance)	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5

29 [b]. Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0

[b] Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

Appendix II. North Carolina Division of Water Quality Perennial Indicator Taxa (PIT) used in Methodology for Identification of Intermittent and Perennial Streams and their origins v.4.11.

North Carolina Division of Water Quality [A]
Indicators of Perennial Streams

Order	Family	Genus
Mayflies	Baetidae	
Ephemeroptera	Caenidae	
	Ephemerellidae	
	Ephemeridae	
	Heptageniidae	
	Leptophlebiidae	
	Siphlonuridae	
Stoneflies	Peltoperlidae	
Plecoptera	Perlidae	
	Perlodidae	
Caddisflies	Hydropsychidae	
Trichoptera	Lepidostomatidae	
	Limnephilidae	
	Molannidae	
	Odontoceridae	
	Philopotamidae	
	Polycentropidae	
	Psychomyiidae	
	Rhyacophilidae	
Megaloptera	Corydalidae	
	Sialidae	
Odonata	Aeshnidae	
	Calopterygidae	
	Codulegastridae	
	Gomphidae	
	Libellulidae	
Diptera	Ptychopteridae	
	Tipulidae	*Tipula spp.*
Coleoptera	Elmidae	
	Psephenidae	
	Dryopidae	*Helichus* (adult)
Mollusca	Unionidae	
	Ancylidae	
	Planorbidae	
	Pleuroceridae	

[A] Methodology for Identification of Intermittent and Perennial Streams and Their Origins v.4.11

Appendix III. Aquatic species collected from intermittent and perennial study sites with determined hydrologic regime and appearance on Florida or Tennessee state Traditionally Navigable Waters list. Int. = Intermittent, Per. = Perennial, TNW = Traditionally Navigable Waters for Florida and Tennessee.

Order	Family	Genus	Species	Int.	Per.	TNW
Amphipoda	Crangonyctidae	*Crangonyx*	*serratus*	•	•	•
			sp.	•	•	•
		Stygobromus	*exilus*	•		
			smithi		•	
			sp.	•	•	
	Gammaridae	*Gammarus*	*minus*	•	•	•
			sp.		•	•
	Hyalellidae	*Hyalella*	*azteca*	•	•	•
	Crangonyctidae	*Synurella*	*bifurca*	•	•	•
			dentata	•	•	•
			sp.	•	•	•
Arhynchobdellida	Erpobdellidae	*Erpobdella*	sp	•	•	•
		Mooreobdella	sp.		•	•
Basommatophora	Ancylidae	*Laevapex*	*fuscus*		•	•
	Lymnaeidae	*Pseudosuccinea*	*collumella*		•	•
	Physidae	*Physella*	*hendersoni*		•	•
			sp.	•	•	•
	Planorbidae	*Menetus*	*dilatus*	•	•	•
		Planorbella	*trivolvis*		•	•
	Ancylidae	*Ferrissia*	sp.	•	•	•
Branchiobdellida	Cambarincolidae	*Cambarinicola*	sp.		•	
Coleoptera	Byrrhoidea	*Optioservus*	*immunis*		•	•
			sp.		•	•
	Dryopidae	*Pelonomus*	*obscurus*		•	•
			sp.		•	•
		Helichus	*fastigiatus*		•	•
			sp.	•	•	•
	Dytiscidae	*Agabus*	*punctatus*		•	•
			sp.	•	•	•
		Celina	sp.		•	•
		Copelatus	sp.	•		•
		Dytiscus	sp.	•		•
		Hoperius	sp.	•	•	•
		Hydaticus	*bimarginatus*	•	•	•
		Hydaticus	sp.	•	•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Coleoptera	Dytiscidae	*Thermonectus*	*basillaris*		•	•
		Acilius	*mediatus*	•		•
			sp.	•		•
		Coptotomus	*interrogatus*	•	•	•
			venustus		•	•
		Hydroporus	sp.	•	•	•
		Hygrotus	sp.	•		•
		Ilybius	sp.		•	•
		Neoporus	*carolinus*		•	•
			dixianus	•		•
			sp.	•	•	•
		Pachydrus	*princeps*	•	•	•
		Rhantus	*calidus*		•	•
	Elmidae	*Dubiraphia*	sp.		•	•
		Promoresia	sp.		•	•
		Stenelmis	sp.		•	•
	Gyrinidae	*Dineutus*	sp.	•	•	•
	Haliplidae	*Peltodytes*	*oppositus*		•	•
			sp.		•	•
	Hydraenidae	*Hydraena*	sp.		•	•
	Hydrochidae	*Hydrochus*	*minimus*		•	•
			sp.	•	•	•
	Hydrophilidae	*Berosus*	sp.	•	•	•
		Cymbiodyta	*chamberlaini*	•		
		Enochrus	sp.	•		•
		Hydrobius	sp.		•	•
			tumidus	•		•
		Hydrochara	*soror*	•		•
			sp.	•		•
		Tropisternus	*blatchleyi*	•	•	•
			sp.		•	•
		Derallus	*altus*		•	•
			sp.		•	•
		Helocombus	sp.	•	•	•
	Psephenidae	*Ectopria*	*nervosa*		•	•
			sp.		•	•
		Psephenus	*herricki*		•	•
			sp.		•	•
	Ptilodactylidae	*Anchytarsus*	*bicolor*		•	•
		Anchytarsus	sp.		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Coleoptera	Scirtidae	*Scirtes*	sp.	•	•	•
	Scolytidae				•	
Collembola				•	•	•
Corixidae	Corixidae	*Sigara*	sp.	•	•	
		Trichocorixa	sp.	•		•
Cyclopoida						
Decapoda	Astacidae				•	
	Cambaridae	*Cambarus*	*bartoni*	•	•	•
			sp.	•	•	•
		Orconectes	*perfectus*		•	
		Procambarus	*acutus*	•	•	•
			sp.	•	•	•
	Palaemonidae	*Palaemonetes*	*paludosus*		•	•
Diplostraca	Daphniidae	*Daphnia*	sp.	•	•	
Diptera	Chironomidae	*Ablabesmyia*	*peleensis*		•	•
		Alotanypus	sp.		•	•
		Apsectrotanypus	sp.		•	•
		Beardius	*reissi*	•		•
		Bethbilbeckia	sp.		•	
		Boreochlus	*persimilis*		•	
		Brillia	*parva*		•	•
			sp.		•	•
		Camptocladius	sp.	•	•	
		Cantopelopia	sp.	•		•
		Chaetocladius	sp.		•	•
		Chironomus	*stigmaterus*		•	•
			sp.	•	•	•
		Cladotanytarsus	*cf daviesi*		•	•
			sp.		•	•
		Clinotanypus	*pinquis*		•	•
			sp.		•	•
		Conchapelopia	sp.	•	•	•
		Constempellina	sp.		•	•
		Corynoneura	sp.	•	•	•
		Cricotopus	*annulator*		•	•
			bicinctus		•	•
			fugax		•	•
			politus		•	•
			sylvestris		•	•
			sp. 40		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Chironomidae	*Cricotopus*	sp. 2		•	•
			sp. 52	•		•
			sp.54		•	•
			sp.	•	•	•
		Cryptochironomus	sp.		•	•
		Demicryptochironomus	sp. A		•	•
			sp.		•	•
		Diamesa	sp. B		•	•
			sp.		•	•
		Dicrotendipes	*modestus*	•	•	•
			neomodestus		•	•
			nervosus	•	•	•
			sp.		•	•
		Diplocladius	*cultriger*	•	•	•
		Dsalmagatrsta	sp.		•	•
		Einfeldia	sp. A		•	•
		Endochironomus	*nigricans*		•	•
			subtendens		•	•
		Endotribelos	*hesperium*		•	•
		Eukiefferiella	*gracei*		•	•
			tirolensis	•	•	•
			sp. 1			•
			sp. 3			•
			sp. 6		•	•
			sp.	•	•	•
		Euorthocladius	sp.		•	
		Georthocladius	sp.	•	•	•
		Glyptotendipes	sp.		•	•
		Goeldichironomus	sp.		•	•
		Gymnometriocnemus	sp.		•	•
		Heleniella	sp.		•	•
		Heterotrissocladius	*marcidus*	•	•	•
			sp.		•	•
			sp.	•	•	•
		Hydrobaenus	*pilipes*		•	•
			sp. O	•	•	•
			sp.	•	•	•
		Krenosmittia	sp.		•	•
		Labrundinia	*neopilosella*		•	•
		Labrundinia	*pilosella*	•		•

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Chironomidae	*Larsia*	sp. B (Epler)			•
			sp.		•	•
		Limnophyes	sp.	•	•	•
		Lopescladius	sp.		•	•
		Mesocricotopus	sp.			
		Mesosmittia	sp.	•		•
		Metriocnemus	*eurynotus*		•	
			sp.		•	•
		Micropsectra	*dives/gemmata*			•
			sp. 3		•	•
			sp. 4	•	•	•
			sp. 5		•	•
			sp. 9	•	•	•
			sp. 5		•	•
			sp. A (sp. 1)		•	•
			sp. D (sp. 4?)		•	•
			sp. E (Epler)			•
		Microtendipes	*pedellus*	•	•	•
			rydalensis		•	•
			sp.		•	•
		Monopelopia	*boliekae*		•	•
		Natarsia	sp.	•	•	•
		Nilotanypus	*fimbriatus*		•	•
		Odontomesa	*fulva*		•	
		Omisis	sp.	•		•
		Orthocladius	*annectans*		•	•
			clarkei	•		•
			dubitatus		•	•
			frigidus		•	•
			lignicola		•	•
			nigritus			•
			sp.		•	•
		Pagastia	sp.		•	•
		Parachaetocladius	sp.	•	•	•
			abnobaeus		•	•
		Parachironomus	*tenuicaudatus*		•	•
			sp.		•	•
		Paracricotopus	sp.		•	
		Parakieferiella	*coronata*		•	•
			sp. A		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Chironomidae	*Parakieferiella*	sp. B		•	•
			sp.		•	•
		Parametriocnemus	*lundbecki*	•	•	•
			sp.	•	•	•
		Paraphaenocladius	*exagitans*		•	•
			lundbecki		•	•
			sp.	•	•	•
		Parasmittia	*carinata*		•	•
			sp.	•		•
		Paratanytarsus	sp.		•	•
			subequalis		•	•
		Paratendipes	*albimanus*		•	•
			sp.		•	•
		Phaenopsectra	*obediens*		•	•
			punctipis		•	•
			sp.	•	•	•
		Platysmittia	*fimbriata*		•	
			sp.	•	•	
		Polypedilum	*aviceps*	•	•	•
			fallax		•	•
			flavum	•	•	•
			halterale		•	•
			illinoense	•	•	•
			scalaenum		•	•
			trigonus	•	•	•
			tritum	•	•	•
			sp.		•	•
		Potthastia	*longimana*		•	•
		Procladius	sp.		•	•
		Psectrocladius	*monopsectrocladus*	•		•
			octomaculatus		•	•
			psilopterus sp. (sp. 3)		•	•
			sp.	•	•	•
		Pseudorthocladius	sp.			•
		Pseudosmittia	sp.		•	•
		Psilometriocnemus	*triannulatus*		•	•
			sp.		•	•
		Rheocricotopus	*effusus*	•	•	•
			eminellobus		•	•
			tuberculatus		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Chironomidae	*Rheocricotopus*	*unidentatus*	•	•	•
			sp.	•	•	•
		Rheomyia	sp.		•	
		Rheotanytarsus	*exiguus*		•	•
			pellucidus		•	•
			sp.		•	•
		Smittia	sp.	•	•	•
		Stempellina	sp.		•	•
		Stempellinella	sp.		•	•
			sp. B		•	
		Stenochironomus	sp.	•	•	•
		Stilocladius	*clinopecten*		•	•
			sp.	•	•	•
		Sublettea	*coffmani*		•	
		Synorthocladius	sp.		•	•
		Tanypus	*neopunctipennis*		•	•
			punctipennis		•	•
			sp.		•	•
		Tanytarsus	sp. 0		•	•
			sp. 1	•	•	•
			sp. 2	•	•	•
			sp. 3	•	•	•
			sp. 5	•	•	•
			sp. 6		•	•
			sp. 15	•		•
		Thienemaniella	*boltoni*		•	•
			sp.	•	•	•
		Thienemannimyia	*group sp.*		•	•
		Tribelos	*fuscicorne*	•	•	•
			jucundus		•	•
			sp.	•	•	•
		Tvetenia	*bavarica*	•	•	•
			paucunca (Epler sp. 1)		•	•
			sp.	•	•	•
		Zalutschia	sp. A	•		
		Zavrelia	sp.		•	•
		Zavrelimyia	sp.	•	•	•
	Tipulidae	*Tipula*	sp.	•	•	•
	Ceratopogonidae	*Atrichopogon*	sp.		•	•
		Bezzia	sp.	•	•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Ceratopogonidae	*Dasyhelea*	sp.	•	•	•
		Forcipomyia	sp.	•	•	•
		Palpomyia	sp.	•	•	•
	Chaoboridae	*Chaoborus*	*punctipennis*		•	•
			sp.		•	•
	Culicidae	*Aedes*	sp.	•	•	•
		Anopheles	sp.	•	•	•
		Culex	sp.	•	•	•
		Psorophora	sp.	•	•	•
	Dixidae	*Dixa*	sp.	•	•	•
		Dixella	sp.		•	•
	Dolichopodidae			•	•	•
	Empididae			•	•	•
	Ephydridae	*Ephydra*	sp.	•		•
	Muscidae	*Limnophora*	sp.	•	•	•
	Psychodidae	*Pericoma*	sp.	•	•	•
	Ptychopteridae	*Bittacomorpha*	sp.		•	•
		Ptychoptera	sp.		•	•
	Sciomyzidae	*Sepedon*	sp.		•	•
	Simulidae	*Prosimulium*	sp.	•	•	•
		Simulium	sp.	•	•	•
	Stratiomyidae	*Nemotelus*	sp.		•	•
		Stratiomys	sp.		•	•
	Tabanidae	*Chrysops*	sp.	•	•	•
		Tabanus	sp.	•	•	•
	Tipulidae	*Antocha*	sp.		•	•
		Dicranota	sp.		•	•
		Hexatoma	sp.	•	•	•
		Limnophila	sp.	•	•	•
		Limonia	sp.		•	•
		Lipsothrix	sp.		•	
		Nippotipula	sp.	•	•	
		Ormosia	sp.	•	•	•
		Pedicia	sp.	•	•	•
		Pilaria	sp.		•	•
		Platytipula	sp.	•	•	
		Prionocera	sp.	•	•	
		Tipula	sp.	•		•
		Yamatotipula	sp.	•	•	
	Tipulidae	*Pseudolimnophila*	sp.	•	•	

Order	Family	Genus	Species	Int.	Per.	TNW
Diptera	Syrphidae	*Neoascia*	sp.		•	
Dorylaimida	Dorylaimidae	*Thornia*	sp.		•	
		Mesodorylaimus	sp.		•	
Ephemeroptera	Ameletidae	*Ameletus*	*lineatus*	•	•	•
			sp.		•	•
	Baetidae	*Acentrella*	*parvula*		•	•
			sp.		•	•
		Baetis	*pluto*		•	•
			tricaudatus		•	•
			sp.		•	•
		Centroptilum	sp.		•	•
		Heterocloen	*amplum*		•	
		Pseudocloeon	sp.		•	•
	Caenidae	*Caenis*	sp.		•	•
	Ephemerellidae	*Eurylophella*	*bicolor*		•	•
			dorothea		•	•
			funeralis		•	•
			verisimilis		•	•
			sp.		•	•
		Ephemerella	*dorothea*		•	•
			sp.		•	•
		Serratella	*deficiens*		•	•
	Ephemeridae	*Ephemera*	sp.		•	•
		Hexagenia	sp.		•	•
	Heptageniidae	*Epeorus*	*dispar*		•	•
			sp.		•	•
		Heptagenia	sp.		•	•
		Maccaffertium	*meririvulanum*		•	•
			sp.		•	•
		Nixe	sp.		•	•
		Stenacron	*carolina*		•	•
			interpunctatum		•	•
			pallidum		•	•
			sp.		•	•
		Stenonema	*integrum*		•	•
			modestum		•	•
			vicarium		•	•
			sp.		•	•
	Isonychiidae	*Isonychia*	sp.		•	•
		Leptophlebia	sp.		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Ephemeroptera	Leptophlebiidae	*Habrophlebia*	*vibrans*	•	•	•
		Paraleptophlebia	sp.	•	•	•
	Siphlonuridae	*Siphlonurus*	sp.	•	•	•
Haplotaxida	Enchytraeidae			•	•	•
	Naididae	*Nais*	sp.		•	•
		Pristina	sp.	•	•	•
		Pristinella	sp.	•	•	•
		Specaria	*josinae*		•	•
		Stephensoniana	*tandyi*			•
	Tubificidae	*Ilyodrylus*	*templetoni*		•	•
			sp.	•		•
		Branchiura	*sowerbyi*		•	•
		Spirosperma	*ferox*		•	•
			nikolskyi	•	•	
	Naididae	*Dero*	*flabelliger*		•	•
Harpacticoida				•		
Hemiptera	Belostomatidae	*Belostoma*	sp.	•	•	•
	Gerridae	*Rheumatobates*	sp.		•	•
	Mesoveliidae	*Mesovelia*	sp.		•	•
	Ochteridae	*Ochterus*	sp.	•	•	•
	Veliidae			•	•	
	Belostomatidae	*Lethocerus*	*uhleri*	•		
	Corixidae	*Corisella*	sp.		•	
	Gerridae	*Gerris*	sp.	•	•	•
		Limnoporus	sp.	•		•
		Aquarius	sp.		•	
		Trepobates	sp.		•	•
	Hydrometridae	*Hydrometra*	sp.		•	
	Naucoridae	*Pelocoris*	sp.		•	•
	Nepidae	*Ranatra*	sp.		•	•
	Notonectidae	*Notonecta*	*irrorata*		•	
			sp.	•	•	•
	Veliidae	*Rhagovelia*	sp.		•	•
		Microvelia	sp.	•	•	•
Heterostropha	Valvatidae	*Valvata*	bicarinata		•	
Hoplonemertea	Tetrastemmatidae	*Prostoma*	*graecens*		•	
Hydracarina				•		
Isopoda	Asellidae	*Lirceus*	*brachyurus*		•	•
			fontinalis	•	•	•
			lineatus	•	•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Isopoda	Asellidae	*Lirceus*	sp.	•	•	•
			sp. A	•	•	•
		Caecidotea	*attenuatus*	•	•	•
			brevicardata			
			forbesi	•	•	
			intermedius	•		•
			montanus			
			nodulus	•		
			obtusus	•	•	•
			racovitzai	•	•	•
			sp.	•	•	•
Lepidoptera	Crambidae			•	•	
	Pyralidae				•	
Lumbriculida	Lumbriculidae	*Eclipidrilus*	sp.	•	•	•
Megaloptera	Corydalidae	*Chauliodes*	*pectinicomis*		•	•
			rastricornis	•	•	•
			sp.		•	•
		Nigronia	*fasciatus*		•	•
			serricornis		•	•
			sp.		•	•
	Sialidae	*Sialis*	sp.		•	•
Mesogastropoda	Pilidae			•		
Metacopina					•	
Neotaenioglossa	Hydrobiidae	*Cincinnatia*	sp.		•	•
	Pleuroceridae	*Elimia*	*ebenum*		•	•
			sp.		•	•
	Hydrobiidae	*Amnicola*	sp.		•	•
Odonata	Aeshnidae	*Aeshna*	*umbrosa*	•		•
		Anax	*longipes*		•	•
		Basiaeschna	*janata*		•	•
		Boyeria	*vinosa*	•	•	•
			sp.		•	•
		Gomphaeschna	*antilope*	•		
		Nasiaeschna	*pentacantha*		•	•
	Calopterygidae	*Hetaerina*	sp.		•	•
		Calopteryx	sp.		•	•
	Coenagrionidae	*Argia*	sp.		•	•
		Ischnura	*prognatha*	•		•
			sp.		•	•
		Enallagma	sp.		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Odonata	Coenagrionidae	*Nehalennia*	*helebasis*		•	
	Cordulegastridae	*Cordulegaster*	*diastatops*		•	•
			erronea		•	•
			fasciata		•	•
			maculata		•	•
			sp.	•	•	•
	Corduliidae				•	•
		Somatochlora	*albastylus*		•	
			sp.	•		•
		Tetragoneuria	sp.		•	•
	Gomphidae	*Dromogomphus*	sp.		•	•
		Lanthus	*vernalis*		•	•
			sp.		•	•
		Gomphus	sp.		•	•
	Leptoceridae	*Erythemis*	*simplicicollis*		•	•
			sp.		•	•
	Lestidae	*Lestes*	sp.		•	•
	Libellulidae	*Libellula*	sp.	•	•	•
		Pachydiplax	*longipennis*	•	•	•
			sp.		•	•
		Perithemis	sp.		•	•
		Plathemis	*lydia*		•	•
			sp.	•		•
		Sympetrum	sp.		•	•
Ostracoda (class)				•	•	
Plecoptera	Capniidae	*Allocapnia*	sp.	•	•	•
		Nemocapnia	sp.			•
		Paracapnia	*opis*		•	•
			sp.		•	•
	Chloroperlidae	*Rasvena*	sp.		•	
		Sweltsa	sp.		•	•
		Utaperla	sp.		•	
	Leuctridae	*Leuctra*	sp.	•	•	•
	Nemouridae	*Amphinemura*	*delosa*		•	•
			sp.		•	•
		Nemoura	sp.		•	•
		Ostrocerca	sp.	•	•	
		Shipsa	*rotunda*	•	•	
		Soyedina	*caroliniensis*		•	•
	Nemouridae	*Soyedina*	sp.		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Plecoptera	Peltoperlidae	*Peltoperla*	sp.		•	•
		Tallaperla	sp.		•	•
		Viehoperla	sp.		•	
	Perlidae	*Acroneuria*	*abnormis*		•	•
			carolinensis		•	•
			sp.		•	•
		Beloneuria	*georgiana*		•	•
			stewarti		•	•
			sp.		•	•
		Eccoptura	*xanthenes*		•	•
			sp.		•	•
		Perlesta	sp.	•	•	•
	Perlodidae	*Clioperla*	clio			•
			sp.		•	•
		Diploperla	*duplicata*	•	•	•
			morgani		•	•
			robusta		•	•
		Isoperla	*bilineata*	•	•	•
			nana		•	•
			nr orata		•	•
			similis		•	•
			transmarina		•	•
			sp.		•	•
		Remenus	sp.		•	
		Yugus	*bulbosus*		•	•
		Malirekus	*hastatus*		•	
	Taeniopterygidae	*Strophopteryx*	*limata*		•	
			sp.	•	•	
		Taeniopteryx	sp.			•
Prosobranchia	Viviparidae	*Campeloma*	*decisum*		•	•
			sp.	•		•
Rhynchobdellida	Glossiphoniidae	*Helobdella*	*stagnalis*		•	•
		Placobdella	*papillifera*		•	•
			multilineata		•	•
Trichoptera	Agapetinae	*Agapetus*	sp.		•	•
	Calamoceratidae	*Heteroplectron*	*americanum*		•	•
		Anisocentropus	*pyraloides*		•	•
	Glossosomatidae	*Glossosoma*	sp.		•	•
	Goeridae	*Goera*	*calcarata*		•	•
	Goeridae	*Goerita*	*betteni*		•	

Order	Family	Genus	Species	Int.	Per.	TNW
Trichoptera	Hydropsychidae	*Ceratopsyche*	*sparna*		•	•
		Cheumatopsyche	sp.		•	•
		Diplectrona	*metaqui*		•	•
			modesta	•	•	•
			rossi	•	•	•
			sp.		•	•
		Homoplectra	*flinti*	•	•	
			monticola		•	
			sp.		•	
		Hydropsyche	sp.		•	•
		Parapsyche	*cardis*		•	•
		Symphitopsyche	*sparna*		•	•
	Hydroptilidae	*Hydroptila*	sp.	•	•	•
	Lepidostomatidae	*Lepidostoma*	sp.	•	•	•
		Theliopsyche	sp.		•	
	Leptoceridae	*Nectopsyche*	*exquisita*		•	•
			sp.			•
		Oecetis	sp. E	•		•
		Triaenodes	sp.		•	•
	Limnephilidae	*Hydatophylax*	*argus*		•	•
		Ironoquia	*punctatissima*	•	•	•
			sp.	•	•	•
		Pseudostenophylax	sp.	•		
		Pycnopsyche	*gentilis*		•	•
			guttifer		•	•
			sp.	•	•	•
	Molannidae	*Molanna*	*blenda*		•	•
	Odontoceridae	*Psilotreta*	*rufa*		•	•
			sp.		•	•
	Philopotamidae	*Chimarra*	sp.		•	•
		Dolophilodes	sp.		•	•
		Wormaldia	sp.	•	•	•
	Phryganeidae	*Oligostomis*	sp.		•	
		Ptilostomis	sp.		•	•
	Polycentropodidae	*Neureclipsis*	sp.		•	•
		Nyctiophylax	sp.		•	•
		Polycentropus	sp.	•	•	•
	Psychomyiidae	*Lype*	*diversa*		•	•
	Rhyacophilidae	*Rhyacophila*	*appalachia*		•	•
			carolina		•	•

Order	Family	Genus	Species	Int.	Per.	TNW
Trichoptera	Rhyacophilidae	*Rhyacophila*	*glaberrima*	•	•	•
			ledra/fenestra	•	•	•
			nigrita		•	•
			sp.	•	•	•
	Sericostomatidae	*Fattigia*	*pele*		•	
	Uenoidae	*Neophylax*	*antiqua*		•	•
			concinnus		•	•
			mitchelli		•	•
			sp.	•	•	•
Tricladida	Planariidae	*Dugesia*	*tigrina*		•	•
			sp.		•	•
Trombidiformes	Eylaidae	*Eylais*	sp.	•		•
	Mideopsidae	*Mideopsis*			•	•
Veneroida	Pisidiidae	*Musculium*	sp.		•	•
		Pisidium	sp.	•	•	•
		Sphaerium	sp.	•	•	•

Appendix IV. Taxa located in Florida Traditionally Navigable Waters

Ephemeroptera

Acentrella
Acentrella alachua
Acentrella parvula
Acerpenna (Acentrella) pygmaea
Ameletus
Asioplax dolani (Leptohyphes)
Attaneuria ruralis
Attenella
Attenella attenuata
Baetis
Baetis alachua
Baetis armillatus
Baetis australis
Baetis ephippiatus
Baetis frondalis
Baetis intercalaris
Baetis propinquus
Baetis punctiventris
Baetis pygmaeus
Baetis spiethi
Baetis spinosus
Baetisca
Baetisca becki
Baetisca callosa
Baetisca escambiensis
Baetisca gibbera
Baetisca obesa
Baetisca rogersi
Blasturus intermedius (Leptophlebia)
Brachycercus
Brachycercus lacustris
Brachycercus maculatus
Caenis
Caenis amica
Caenis diminuta
Caenis eglinensis
Caenis hilaris
Caenis punctata
Callibaetis
Callibaetis floridanus
Callibaetis pretiosus
Centroptilum
Centroptilum hobbsi
Centroptilum triangulifer
Centroptilum viridocularis
Cercobrachys etowah

Choroterpes
Choroterpes basalis
Choroterpes hubbelli
Cloeon
Cloeon rubropictum
Cloeon triangulifer (Centroptilum)
Dannella simplex
Dolania americana
Ephemerella
Ephemerella argo
Ephemerella choctawhatchee
Ephemerella deficiens
Ephemerella doris
Ephemerella excrucians
Ephemerella hirsuta
Ephemerella invaria
Ephemerella trilineata
Eurylophella
Eurylophella doris
Eurylophella temporalis
Eurylophella trilineata
Habrophlebia
Habrophlebia vibrans
Habrophlebiodes brunneipennis
Heptagenia
Heptagenia flavescens
Hexagenia
Hexagenia bilineata
Hexagenia limbata
Hexagenia munda
Hexagenia munda elegans
Hexagenia munda marilandica
Hexagenia munda orlando
Isonychia
Isonychia arida
Isonychia pictipes
Isonychia sayi
Isonychia sicca
Labiobaetis (Pseudocloeon)
Labiobaetis ephippiatus
Labiobaetis frondalis
Labiobaetis propinquus
Leptohyphes dolani
Leptophlebia
Leptophlebia bradleyi
Leptophlebia cupida
Leptophlebia intermedia
Maccaffertium

Maccaffertium exiguum
Maccaffertium mexicanum integrum
Maccaffertium smithae
Macdunnoa
Macdunnoa brunnea
Neoephemera
Neoephemera compressa
Neoephemera youngi
Paraleptophlebia
Paraleptophlebia bradleyi
Paraleptophlebia volitans
Pentagenia
Plauditus
Plauditus bimaculatus
Plauditus (Acentrella) parvulus
Plauditus punctiventris
Procloeon
Procloeon hobbsi
Procloeon rubropictum
Procloeon viridocularis
Pseudiron centralis
Pseudocentroptiloides usa
Pseudocloeon
Pseudocloeon alachua
Pseudocloeon bimaculatus
Pseudocloeon ephippiatum
Pseudocloeon frondale
Pseudocloeon parvulum
Pseudocloeon propinquum
Pseudocloeon punctiventris
Serratella
Serratella deficiens
Siphlonurus
Siphloplecton
Siphloplecton speciosum
Sparbarus nasutus
Stenacron
Stenacron floridense
Stenacron interpunctatum
Stenonema
Stenonema annexum
Stenonema exiguum
Stenonema integrum
Stenonema interpunctatum
Stenonema mexicanum integrum
Stenonema modestum
Stenonema proximum
Stenonema pulchellum
Stenonema smithae

Teloganopsis deficiens (Serratella)
Tortopus
Tortopus incertus

Plecoptera
Acroneuria
Acroneuria abnormis
Acroneuria arenosa
Acroneuria arenosa/evoluta
Acroneuria lycorias
Acroneuria mela
Acroneuria perplexa
Acroneuria ruralis
Agnetina
Agnetina annulipes
Allocapnia
Alloperla
Amphinemura
Amphinemura delosa
Amphinemura nigritta
Atoperla
Atoperla ephyre (Perlinella)
Clioperla clio
Diplocladius
Eccoptura
Eccoptura xanthenes
Haploperla
Haploperla (Hastaperla) brevis
Helopicus
Helopicus bogaloosa
Helopicus subvarians
Hydroperla
Hydroperla phormidia
Isoperla
Isoperla bilineata
Isoperla clio
Isoperla dicala
Isoperla lata
Isoperla orata
Leuctra
Leuctra ferruginea
Nemocapnia carolina
Neoperla
Neoperla carlsoni
Neoperla clymene
Neophasganophora capitata
Paragnetina
Paragnetina fumosa
Paragnetina kansensis
Perlesta
Perlesta placida
Perlesta placida complex
Perlinella
Perlinella drymo
Perlinella ephyre
Perlinella fumipennis
Phasganophora capitata
Pteronarcys
Pteronarcys dorsata
Pteronarcys pictetii
Taeniopteryx
Taeniopteryx lita
Taeniopteryx nivalis
Taeniopteryx maura

Trichoptera
Agapetus
Agarodes
Agarodes libalis
Agraylea
Agrypnia vestita
Anisocentropus
Anisocentropus pyraloides
Apatania
Arctopsyche
Athripsodes (Ceraclea)
Beraea
Brachycentrus
Brachycentrus chelatus
Brachycentrus numerosus
Ceraclea
Ceraclea cancellatus
Ceraclea diluta
Ceraclea flava
Ceraclea maculata
Ceraclea resurgens
Ceraclea transversus
Ceratopsyche
Cernotina
Cernotina spicata
Cernotina truncona
Cheumatopsyche
Chimarra
Chimarra aterrima
Chimarra feria
Chimarra perigua
Chimarra socia
Cyrnellus
Cyrnellus fraternus
Cyrnellus marginalis
Diplectrona
Diplectrona modesta
Glossosoma
Helicopsyche
Helicopsyche borealis
Heteroplectron americanum
Hydatophylax argus
Hydropsyche
Hydropsyche decalda
Hydropsyche elissoma
Hydropsyche frisoni
Hydropsyche incommoda
Hydropsyche mississippiensis
Hydropsyche phalerata
Hydropsyche rossi
Hydropsyche simulans
Hydropsyche sparna
Hydropsyche venularis
Hydroptila
Ironoquia
Ironoquia parvula
Lepidostoma
Leptocella (Nectopsyche)
Leptocella pavida
Leptocerus
Leptocerus americanus
Lype
Lype diversa
Macronema (Macrostemum)
Macronema carolina
Macrostemum carolina
Mayatrichia
Mayatrichia ayama
Micrasema
Micrasema rusticum
Micrasema sp. n
Micrasema wataga
Molanna
Molanna blenda
Molanna tryphena
Molanna ulmerina
Mystacides
Nectopsyche
Nectopsyche candida
Nectopsyche exquisita
Nectopsyche paludicola
Nectopsyche pavida
Nectopsyche tavara
Neotrichia
Neureclipsis

Neureclipsis crepuscularis
Neureclipsis melco
Nyctiophylax
Nyctiophylax celta
Nyctiophylax moestus
Ochrotrichia
Oecetis
Oecetis avara
Oecetis cinerascens
Oecetis georgia
Oecetis inconspicua
Oecetis inconspicua cmplx.
Oecetis morsei or sphyra
Oecetis nocturna
Oecetis osteni
Oecetis parva
Oecetis persimilis
Oecetis porteri
Oecetis sp. a floyd
Oecetis sp. c floyd
Oecetis sp. e floyd
Oecetis sp. f floyd
Oecetis sphyra
Oecetis sphyra/morsei
Orthotrichia
Oxyethira
Paranyctiophylax
Parapsyche
Phylocentropus
Phylocentropus carolinus
Phylocentropus placidus
Polycentropus
Polycentropus cinereus
Polycentropus crassicornis
Polycentropus flavus
Polycentropus interruptus
Polycentropus remotus
Polyplectropus
Potamyia
Potamyia flava
Protoptila
Psychomyia
Psychomyia flavida
Ptilostomis
Pycnopsyche
Pycnopsyche guttifer
Pycnopsyche scabripennis
Rhyacophila
Rhyacophila carolina
Rhyacophila ledra
Setodes
Stactobiella
Triaenodes
Triaenodes abus
Triaenodes flavescens
Triaenodes florida
Triaenodes furcellus
Triaenodes helo
Triaenodes ignitus
Triaenodes injusta
Triaenodes ochraceus
Triaenodes perna
Triaenodes perna/helo
Triaenodes sp. a
Triaenodes tarda
Tricorythodes
Tricorythodes albilineatus
Wormaldia moesta

Coleoptera
Acilius
Acilius mediatus
Acillius semisulcatus
Agabetes
Agabetes acuductus
Agabinus
Agabus
Agabus johannis
Anacaena (Hydrophylid)
Anchytarsus bicolor
Ancyronyx
Ancyronyx variegatus
Anodocheilus exiguus
Bagous carinatus
Berosus
Berosus exiguus
Berosus infuscatus
Berosus peregrinus
Berosus pugnax
Berosus striatus
Bidessonotus
Bidessonotus longovalis
Bidessonotus pulicarius
Bidessus
Bidessus flavicollis
Brachyvatus
Brachyvatus apicatus
Brachyvatus seminulum
Brychius
Celina
Celina contiger
Celina grossula
Celina slossoni
Cercyon
Chaetarthria
Chaetarthria pallida
Colpius (Coleop)
Colpius inflatus
Conchapelopia
Copelatus
Copelatus caelatipennis
Copelatus chevrolati
Copelatus chevrolati chevrolati
Copelatus glyphicus
Coptotomus
Coptotomus interrogatus
Coptotomus lenticus
Coptotomus loticus
Coptotomus venustus
Cybister
Cybister fimbriolatus crotchi
Cymbiodyta
Cyphon
Dactylosternum
Derallus
Derallus altus
Deronectes
Deronectes griseostriatus
Derovatellus
Derovatellus lentus floridanus
Desmopachria
Desmopachria grana
Dineutus
Dineutus americanus
Dineutus angustus
Dineutus assimilis
Dineutus carolinus
Dineutus ciliatus
Dineutus discolor
Dineutus emarginatus
Dineutus emarginatus floridensis
Dineutus nigrior
Dineutus serrulatus
Dryops
Dubiraphia
Dubiraphia bivittata
Dubiraphia quadrinotata
Dubiraphia vittata
Dytiscus
Ectopria

Ectopria nervosa
Ectopria thoracica
Elodes (Scirted)
Enochrus
Enochrus blatchleyi
Enochrus cinctus
Enochrus ochraceus
Enochrus pygmaeus
Enochrus sayi
Enochrus sublongus
Gonielmis
Gonielmis dietrichi
Graphoderus
Graphoderus liberus
Gymnochthebius fossatus
Gyretes
Gyretes iricolor
Gyrinus
Gyrinus analis
Gyrinus elevatus
Gyrinus floridanus
Gyrinus frosti
Gyrinus lugens
Gyrinus marginellus
Gyrinus minutus
Gyrinus pachysomus
Gyrinus rockinghamensis
Gyrinus woodruffi
Haliplus
Haliplus annulatus
Haliplus confluentus
Haliplus fasciatus
Haliplus mutchleri
Haliplus punctatus
Helichus
Helichus basalis
Helichus fastigiatus
Helichus lithophilus
Helobata striata
Helochares
Helocombus
Helophorus
Heterelmis
Hydaticus
Hydaticus bimarginatus
Hydraena
Hydraena marginicollis
Hydraena pennsylvanica
Hydrobiomorpha
Hydrobiomorpha castus
Hydrobius
Hydrobius tumidus
Hydrocanthus
Hydrocanthus iricolor
Hydrocanthus oblongus
Hydrocanthus regius
Hydrochara
Hydrochus
Hydrochus equicarinatus
Hydrochus foveatus
Hydrochus rugosus
Hydrochus simplex
Hydrocolus
Hydrophilus
Hydrophilus triangularis
Hydroporus
Hydroporus cimicoides
Hydroporus dixianus
Hydroporus falli
Hydroporus floridanus
Hydroporus hybridus
Hydroporus lobatus
Hydroporus oblitus
Hydroporus pilatei
Hydroporus vittatipennis
Hydrotrupes (coleop)
Hydrovatus
Hydrovatus peninsularis
Hydrovatus pustulatus compressus
Hygrobates
Hygrotus
Hygrotus marginipennis
Ilybius oblitus
Laccobius
Laccodytes
Laccodytes pumilio
Laccophilus
Laccophilus fasciatus
Laccophilus gentilis
Laccophilus proximus
Laccophilus terminalis
Laccornis
Laccornis difformis
Limnichus
Liodessus
Liodessus flavicollis
Lioporeus
Lioporeus pilatei
Lioporeus triangularis
Macronychus
Macronychus glabratus
Matus
Matus ovatus
Mesonoterus
Microcylloepus
Microcylloepus pusillus
Microcylloepus pusillus lodingi
Microcylloepus pusillus perditus
Narpus
Neoelmis
Neoporus
Neoporus asidytus
Neoporus clypealis
Neoporus dixianus
Neoporus lobatus
Neoporus mellitus
Neoporus vittatipennis
Notomicrus
Notomicrus nanulus
Optioservus
Ora/scirtes
Oreodytes
Pachydrus
Pachydrus princeps
Paracymus
Paracymus nanus
Paracymus reductus
Paracymus subcupreus
Pelonomus
Pelonomus obscurus
Pelonomus obscurus gracilipes
Peltodytes
Peltodytes dietrichi
Peltodytes duodecimpuntatus
Peltodytes floridensis
Peltodytes lengi
Peltodytes muticus
Peltodytes oppositus
Peltodytes sexmaculatus
Peltodytes shermani
Phanocerus clavicornis
Platumbus (dytiscid)
Prionocyphon
Promoresia
Promoresia elegans
Promoresia tardella
Pronoterus
Pronoterus addendus
Pronoterus semipunctata
Psephenus

Psephenus herricki
Ptilodactyla
Rhantus calidus
Scirtes
Simsonia quadrinotata
Stenelmis
Stenelmis antennalis
Stenelmis convexula
Stenelmis crenata
Stenelmis fuscata
Stenelmis humerosa
Stenelmis hungerfordi
Stenelmis sinuata
Stenelmis vittipennis
Stenelmis xylonastis
Suphis
Suphis inflatus
Suphisellus
Suphisellus floridanus
Suphisellus gibbulus
Suphisellus insularis
Suphisellus parsoni
Suphisellus puncticollis
Thermonectus basillaris
Tropisternus
Tropisternus blatchleyi
Tropisternus collaris
Tropisternus lateralis nimbatus
Tropisternus natator
Tropisternus quadristriatus
Tropisternus striolatus
Uvarus

Odonata
Aeschna
Aeschna umbrosa
Agrion (Calopteryx)
Agrion (Calopteryx) aequabilis
Agrion (Calopteryx) maculata
Anax
Anax amazili
Anax junius
Anax longipes
Anomalagrion
Anomalagrion hastatum
Aphylla
Aphylla williamsoni
Argia
Argia apicalis
Argia bipunctulata
Argia fumipennis
Argia moesta
Argia sedula
Argia tibialis
Argia translata
Arigomphus
Arigomphus pallidus
Basiaeschna janata
Boyeria
Boyeria grafiana
Boyeria vinosa
Brachymesia
Brachymesia gravida
Calopteryx
Calopteryx dimidiata
Calopteryx maculata
Cannacria gravida (Brachymesia)
Celithemis
Celithemis amanda
Celithemis eponina
Celithemis ornata
Cordulegaster
Cordulegaster maculata
Cordulegaster obliqua
Coryphaeschna
Coryphaeschna ingens
Coryphaeschna virens
Crocothemis
Didymops
Didymops transversa
Dorocordulia
Dromogomphus
Dromogomphus armatus
Dromogomphus spinosus
Dromogomphus spoliatus
Dythemis
Dythemis rufinervis
Dythemis velox
Enallagma
Enallagma basidens
Enallagma cardenium
Enallagma civile
Enallagma coecum
Enallagma concisum
Enallagma daecki
Enallagma divagans
Enallagma doubledayi
Enallagma dubium
Enallagma durum
Enallagma pallidum
Enallagma pollutum
Enallagma signatum
Enallagma traviatum
Enallagma vesperum
Enallagma weewa
Epiaeschna heros
Epicordulia
Epicordulia princeps
Epicordulia princeps regina
Epicordulia regina
Epitheca
Epitheca cynosura
Epitheca princeps
Epitheca princeps regina
Epitheca sepia
Erythemis
Erythemis versiculosa
Erythemis simplicicollis
Erythrodiplax
Erythrodiplax conata
Erythrodiplax conata miniscula
Erythrodiplax umbrata
Gomphaeschna furcillata
Gomphoides
Gomphus
Gomphus cavillaris
Gomphus (Gomphurus) dilatatus
Gomphus geminatus
Gomphus exilis
Gomphus ivae
Gomphus lividus
Gomphus minutus
Gomphus modestus
Gomphus pallidus
Gomphus plagiatus
Gynacantha
Gynacantha nervosa
Hagenius
Hagenius brevistylus
Hetaerina
Hetaerina americana
Hetaerina titia
Hylogomphus geminatus
Ischnura
Ischnura cervula
Ischnura credula
Ischnura hastata
Ischnura posita
Ischnura prognatha
Ischnura ramburi

Ladona deplanata
Lestes
Lestes disjunctus australis
Lestes forcipatus
Lestes inaequalis
Lestes vigilax
Libellula
Libellula auripennis
Libellula diplanata
Libellula incesta
Libellula needhami
Libellula pulchella
Libellula semifasciata
Libellula vibrans
Lipogomphus
Macrodiplax
Macromia
Macromia alleghaniensis
Macromia georgiana
Macromia illinoiensis
Macromia illinoiensis georgina
Macromia taeniolata
Macrothemis
Miathyria
Miathyria marcella
Micrathyria
Micrathyria didyma
Nannothemis
Nannothemis bella
Nasiaeschna pentacantha
Nehalennia
Nehalennia intergricollis
Neoneura
Neurocordulia
Neurocordulia alabamensis
Neurocordulia molesta
Neurocordulia obsoleta
Neurocordulia virginiensis
Ophiogomphus
Orthemis
Orthemis ferruginea
Pachydiplax
Pachydiplax longipennis
Pantala flavescens
Perithemis
Perithemis seminola
Perithemis tenera
Perithemis tenera seminole
Plathemis
Plathemis lydia
Progomphus
Progomphus alachuensis
Progomphus obscurus
Somatochlora
Stylurus
Stylurus ivae
Stylurus plagiatus
Sympetrum ambiguum
Tarnetrum
Tarnetrum corruptum
Tauriphila
Telebasis
Telebasis byersi
Tetragoneuria
Tetragoneuria cynosura
Tetragoneuria petechialis
Tetragoneuria semiaquea
Tetragoneuria sepia
Tetragoneuria spinosa
Tramea
Tramea carolina
Tramea lacerata

Megaloptera

Chauliodes
Chauliodes pectinicornis
Chauliodes rastricornis
Corydalus
Corydalus cornutus
Neohermes
Nigronia
Nigronia fasciatus
Nigronia serricornis
Sialis
Sialis americana
Sialis iola
Sialis mohri

Diptera (Chironomidae)

Ablabesmyia
Ablabesmyia (karelia) grp.
Ablabesmyia americana
Ablabesmyia annulata
Ablabesmyia aspera
Ablabesmyia auriensis
Ablabesmyia cinctipes
Ablabesmyia hauberi
Ablabesmyia idei
Ablabesmyia illinoensis
Ablabesmyia janta
Ablabesmyia mallochi
Ablabesmyia monilis
Ablabesmyia ornata
Ablabesmyia parajanta
Ablabesmyia peleensis
Ablabesmyia philosphagnos
Ablabesmyia rhamphe
Ablabesmyia rhamphe grp.
Ablabesmyia sp. a epler
Ablabesmyia sp. b epler
Ablabesmyia tarella
Alluaudomyia
Alotanypus
Alotanypus aris
Anatopynia (Tanypode)
Antillocladius
Apedilum
Apedilum elachista
Apsectrotanypus
Apsectrotanypus johnsoni
Asheum beckae (Polypedilum)
Axarus
Beardius
Beardius sp. a epler
Beardius truncatus
Brillia
Brillia flavifrons
Brillia par
Brillia sera
Bryophaenocladius
Calopsectra (Tanytarsus)
Cantopelopia gesta
Cardiocladius
Cardiocladius albiplumus
Cardiocladius obscurus
Chernovskiia
Chironomini gen. 3 epler
Chironomini gen. a (Fissimentum)
Chironomini genus iv
Chironomus
Chironomus abortivus
Chironomus anthracinus
Chironomus attenuatus
Chironomus carus
Chironomus crassicaudatus
Chironomus decorus
Chironomus fulvipilus
Chironomus ochreatus
Chironomus plumosus
Chironomus riparius

Chironomus staegeri
Chironomus stigmaterus
Cladopelma
Cladopelma galeator
Cladotanytarsus
Cladotanytarsus aeiparthenus
Cladotanytarsus cf. daviesi
Cladotanytarsus mancus
Cladotanytarsus sp. a epler
Cladotanytarsus sp. b epler
Cladotanytarsus sp. c epler
Cladotanytarsus sp. d epler
Cladotanytarsus sp. f epler
Cladotanytarsus sp. g epler
Cladotanytarsus sp. h epler
Cladotanytarsus sp. i epler
Cladotanytarsus viridiventris
Clinotanypus
Clinotanypus pinguis
Coelotanypus
Coelotanypus concinnus
Coelotanypus scapularis
Coelotanypus tricolor
Conchapelopia fasciata
Conchapelopia gigas
Constempellina
Corynoneura
Corynoneura celeripes
Corynoneura lobata
Corynoneura scutellata
Corynoneura sp. b epler
Corynoneura sp. c epler
Corynoneura sp. e epler
Corynoneura sp. f epler
Corynoneura sp. g epler
Corynoneura taris
Corynoneura xena
Cricotopus
Cricotopus absurdus
Cricotopus albiforceps
Cricotopus annulator complex
Cricotopus bicinctus
Cricotopus bicinctus grp.
Cricotopus intersectus
Cricotopus lebetis
Cricotopus or orthocladius
Cricotopus politus
Cricotopus remus
Cricotopus sylvestris grp.
Cricotopus tricinctus
Cricotopus trifasciatus
Cryptochironomus
Cryptochironomus blarina
Cryptochironomus fulvus
Cryptochironomus stylifera
Cryptochironomus pectinatellae
Cryptotendipes
Cryptotendipes casuarius
Demeijerea
Demicryptochironomus
Demicryptochironomus sp a
Denopelopia
Denopelopia atria
Dicrotendipes
Dicrotendipes incurvus
Dicrotendipes fumidus
Dicrotendipes leucoscelis
Dicrotendipes lobus
Dicrotendipes lucifer
Dicrotendipes modestus
Dicrotendipes neomodestus
Dicrotendipes nervosus
Dicrotendipes simpsoni
Dicrotendipes sp. a epler
Dicrotendipes sp. b epler
Dicrotendipes thanatogratus
Dicrotendipes tritomus
Djalmabatista
Djalmabatista pulcher
Einfeldia
Einfeldia austini
Einfeldia natchitocheae
Einfeldia sp. a epler
Endochironomus
Endochironomus nigricans
Endochironomus subtendens
Endotribelos
Endotribelos hesperium
Epoicocladius
Epoicocladius flavens
Eukiefferiella
Eukiefferiella brevicalcar
Eukiefferiella claripennis grp.
Eukiefferiella coerulescens
Eukiefferiella devonica grp sp. a epler
Eukiefferiella discoloripes
Fissimentum
Fittkauimyia
Fittkauimyia serta
Georthocladius
Glyptotendipes
Glyptotendipes amplus
Glyptotendipes barbipes
Glyptotendipes lobiferus
Glyptotendipes meridionalis
Glyptotendipes paripes
Glyptotendipes seminole
Glyptotendipes senilis
Glyptotendipes sp. b epler
Glyptotendipes sp. f epler
Glyptotendipes sp. g epler
Goeldichironomus
Goeldichironomus amazonicus
Goeldichironomus carus
Goeldichironomus cf. natans
Goeldichironomus fluctuans
Goeldichironomus holoprasinus
Goeldichironomus natans
Guttipelopia
Guttipelopia currani
Guttipelopia guttipennis
Gymnometriocnemus
Harnischia
Harnischia amachaerus
Harnischia boydi
Harnischia collator
Harnischia complex gen. b epler
Harnischia curtilamellatus
Harnischia edwardsi
Harnischia galeator
Hayesomyia
Hayesomyia senata
Helopelopia
Heterotrissocladius
Heterotrissocladius marcidus
Hudsonimyia
Hydrobaenus
Kiefferulus
Kiefferulus dux
Kiefferulus pungens
Kloosia dorsenna
Krenopelopia hudsoni
Krenosmittia
Labrundinia
Labrundinia becki
Labrundinia floridana
Labrundinia johannseni
Labrundinia maculata
Labrundinia neopilosella
Labrundinia pilosella

Labrundinia sp. 3 epler
Labrundinia sp. 3 nr. virescens
Labrundinia sp. 4 epler
Labrundinia sp. 6 epler
Labrundinia sp. a epler
Labrundinia sp. b epler
Labrundinia virescens
Larsia
Larsia berneri
Larsia decolorata
Larsia indistincta
Larsia lurida
Larsia sp. a epler
Larsia sp. b
Lauterborniella
Lauterborniella agrayloides
Leptochironomus (Microchironomus)
Limnochironomus (Dicrotendipes)
Limnophyes
Lopescladius
Macropelopia
Meropelopia
Mesosmittia
Metriocnemus
Metriocnemus lundbecki
Micropsectra
Micropsectra sp. c epler
Micropsectra sp. d epler
Microtendipes
Microtendipes caelum
Microtendipes pedellus
Microtendipes pedellus grp.
Microtendipes rydalensis
Microtendipes rydalensis grp.
Monopelopia
Monopelopia boliekae
Nanocladius
Nanocladius alternantherae
Nanocladius balticus grp.
Nanocladius cf rectinervis
Nanocladius crassicornus
Nanocladius distinctus
Nanocladius minimus
Natarsia
Natarsia baltimoreus
Natarsia sp. a roback
Nilodorum
Nilotanypus
Nilotanypus americanus
Nilotanypus fimbriatus
Nilothauma
Nilothauma bicorne
Nimbocera
Nimbocera limnetica
Nimbocera patagonica
Nimbocera pinderi
Omisus
Omisus pica
Orthocladiinae gen. c epler
Orthocladius
Orthocladius annectens
Orthocladius dubitatus
Orthocladius lignicola
Pagastiella
Pagastiella orophila
Pagastiella ostansa
Parachaetocladius abnobaeus
Parachironomus
Parachironomus alatus
Parachironomus carinatus
Parachironomus chaetoalus complex
Parachironomus directus
Parachironomus frequens
Parachironomus hirtalatus
Parachironomus longistilus
Parachironomus monochromus
Parachironomus pectinatellae
Parachironomus schneideri
Parachironomus sublettei
Parachironomus supparilis
Parachironomus tenuicaudatus complex
Paracladopelma
Paracladopelma doris
Paracladopelma loganae
Paracladopelma nereis
Paracladopelma undine
Parakiefferiella
Parakiefferiella coronata
Parakiefferiella sp. a epler
Parakiefferiella sp. b epler
Parakiefferiella sp. c epler
Parakiefferiella sp. d epler
Parakiefferiella sp. e epler
Parakiefferiella sp. f epler
Paralauterborniella
Paralauterborniella elachista
Paralauterborniella nigrohalterale
Paralimnophyes
Paramerina
Paramerina anomala
Parametriocnemus
Parametriocnemus lundbecki
Parametriocnemus sp. f epler
Paraphaenocladius
Paraphaenocladius exagitans
Parasmittia
Paratanytarsus
Paratanytarsus dissimilis
Paratanytarsus quadratus
Paratanytarsus sp. a epler
Paratanytarsus sp. b epler
Paratanytarsus sp. c epler
Paratendipes
Paratendipes basidens
Paratendipes connectens
Paratendipes subaequalis
Parorthocladius
Pedionomus beckae
Pentaneura
Pentaneura aequifasciata
Pentaneura auriensis
Pentaneura carnea
Pentaneura inconspicua
Pentaneura inculta
Pentaneura monilis
Pentaneura pilosella
Phaenonotum
Phaenonotum exstriatum
Phaenopsectra
Phaenopsectra dyari
Phaenopsectra flavipes
Phaenopsectra obediens
Phaenopsectra obediens grp.
Phaenopsectra punctipes grp.
Polypedilum
Polypedilum aviceps
Polypedilum beckae
Polypedilum convictum
Polypedilum convictum grp.
Polypedilum fallax
Polypedilum flavum
Polypedilum halterale
Polypedilum halterale grp.
Polypedilum illinoense
Polypedilum illinoense grp.
Polypedilum laetum
Polypedilum ontario
Polypedilum scalaenum
Polypedilum scalaenum grp.
Polypedilum sp. a epler

Polypedilum trigonum
Polypedilum trigonus
Polypedilum tritum
Potthastia
Potthastia longimana
Procladius
Procladius (holotanypus)
Procladius bellus
Procladius bellus var. 1 epler
Procladius bellus var. 2 epler
Procladius culiciformis
Psectrocladius
Psectrocladius elatus
Psectrocladius flavus
Psectrocladius psilopterus gp. sp. 1
Psectrocladius simulans
Psectrocladius vernalis
Psectrotanypus
Pseudochironomus
Pseudochironomus fulviventris
Pseudochironomus richardsoni
Pseudorthocladius
Pseudosmittia
Rheocricotopus
Rheocricotopus robacki
Rheocricotopus tuberculatus
Rheopelopia
Rheosmittia
Rheosmittia arcuata
Rheotanytarsus
Rheotanytarsus distinctissimus
Rheotanytarsus exiguus
Rheotanytarsus exiguus grp.
Rheotanytarsus pellucidus
Robackia
Robackia claviger
Robackia demeijerei
Saetheria hirta
Saetheria tylus
Smittia
Stelechomyia perpulchra
Stempellina
Stempellina sp. a epler
Stempellinella
Stempellinella cf. leptocelloides
Stempellinella fimbriata
Stempellinella leptocelloides
Stempellinella sp. a epler
Stenochironomus
Stenochironomus aestivalis
Stenochironomus hilaris
Stictochironomus
Stictochironomus caffrarius grp.
Stictochironomus devinctus
Stilocladius
Symbiocladius
Sympotthastia
Synorthocladius
Tanypus
Tanypus carinatus
Tanypus clavatus
Tanypus neopunctipennis
Tanypus punctipennis
Tanypus stellatus
Tanytarsus
Tanytarsus coffmani
Tanytarsus dendyi
Tanytarsus dissimilis
Tanytarsus glabrescens
Tanytarsus guerlus
Tanytarsus jucundus
Tanytarsus limneticus
Tanytarsus polita
Tanytarsus sp. a epler
Tanytarsus sp. b epler
Tanytarsus sp. c epler
Tanytarsus sp. d epler
Tanytarsus sp. e epler
Tanytarsus sp. f epler
Tanytarsus sp. g epler
Tanytarsus sp. i epler
Tanytarsus sp. j epler
Tanytarsus sp. k epler
Tanytarsus sp. l epler
Tanytarsus sp. m epler
Tanytarsus sp. n epler
Tanytarsus sp. o epler
Tanytarsus sp. p epler
Tanytarsus sp. q epler
Tanytarsus sp. r epler
Tanytarsus sp. s epler
Tanytarsus sp. t epler
Tanytarsus sp. u epler
Tanytarsus sp. v epler
Tanytarsus sp. w epler
Tanytarsus sp. y epler
Tendipes (Chironomus)
Tendipes decorus
Thienemanniella
Thienemanniella fusca
Thienemanniella lobapodema
Thienemanniella similis
Thienemanniella sp. a epler
Thienemanniella sp. b epler
Thienemanniella sp. c epler
Thienemanniella sp. d epler
Thienemanniella xena
Thienemannimyia grp.
Tribelos
Tribelos atrum
Tribelos fuscicornis
Tribelos jucundum
Tribelos quadripunctatus
Trichocladius (Rheocricotopus)
Trichocladius extatus
Trichocladius robacki
Trissocladius
Tvetenia
Tvetenia discoloripes grp.
Tvetenia paucunca
Tvetenia vitracies
Unniella
Unniella multivirga
Wyeomyia haynei
Xenochironomus
Xenochironomus rogersi
Xenochironomus taenionotus
Xenochironomus xenolabis
Xestochironomus subletti
Xylotopus par
Zalutschia
Zavrelia
Zavreliella
Zavreliella marmorata
Zavrelimyia
Zavrelimyia sinuosa
Zavrelimyia sp. a epler

Diptera (Misc)

Aedes
Anopheles
Anopheles quadrimaculatus
Antocha
Atherix
Atherix lantha
Atherix variegata
Atrichopogon
Atrichopogon websteri
Bezzia
Bezzia setulosa

Bezzia varicolor
Caloparyphus
Ceratopogon
Chaoborus albatus
Chaoborus albipes
Chaoborus punctipennis
Chelifera
Chlorotabanus
Chrysops
Clinocera
Clinohelea
Cnephia pecuarum
Corethrella
Culex
Culex erraticus
Culex salinarius
Culicoides
Dasyhelea
Dixa
Dolichopodidae
Empididae
Eriocera (Hexatoma)
Erioptera
Eristalis
Eulalia(insecta -Odontomyia)
Forcipomyia
Hedriodiscus
Hexatoma
Hydrellia
Hydrometra
Hydrometra australis
Hydrometra barei
Hydrometra martini
Hydrometra wileyae
Limnophila
Limnophora
Limonia
Mallochohelea
Mansonia
Mansonia dyari
Mansonia perturbans
Megistocera
Megistocera longipennis
Myxosargus
Neoplasta
Nephrotoma
Nilobezzia
Notiphila
Ochlerotatus
Odontomyia
Ormosia
Oxycera
Palpomyia
Palpomyia flavipes
Palpomyia longipennis
Palpomyia tibialis
Palpomyia/bezzia grp.
Pericoma
Pilaria
Prionocera
Probezzia
Pseudolimnophila
Psorophora
Ptychoptera
Rhabdomastix
Rhaphium
Roederiodes
Roederiodes junctus
Sepedon
Simulium
Simulium congareenarum
Simulium exiguum
Simulium jenningsi
Simulium jonesi
Simulium nyssa
Simulium slossonae
Simulium taxodium
Sphaeromias
Stilobezzia
Stratiomys
Syritta
Tabanus
Telmatoscopus albipunctatus
Tipula
Tipula caloptera
Uranotaenia sapphirina

Oligochaeta

Aeolosoma
Aeolosoma leidyi
Aeolosoma niveum
Aeolosoma tenebrarum
Allonais
Allonais inaequalis
Allonais paraguayensis
Allonais pectinata
Amphichaeta leydigi
Arcteonais lomondi
Aulodrilus
Aulodrilus americanus
Aulodrilus limnobius
Aulodrilus pigueti
Aulodrilus pluriseta
Aulophorus (Dero)
Aulophorus furcata
Branchiura
Branchiura sowerbyi
Bratislavia
Bratislavia bilongata
Bratislavia unidentata
Chaetogaster
Chaetogaster diaphanus
Chaetogaster diastrophus
Chaetogaster limnaei
Chaoborus
Dero
Dero abranchiata
Dero digitata
Dero digitata complex
Dero dorsalis
Dero flabelliger
Dero furcata
Dero lodeni
Dero nivea
Dero obtusa
Dero pectinata
Dero trifida
Dero vaga
Eclipidrilus
Eclipidrilus palustris
Haber
Haber speciosus
Haemonais
Haemonais waldvogeli
Haplotaxis
Homochaeta naidina
Ilyodrilus
Ilyodrilus templetoni
Isochaetides freyi
Limnodriloides
Limnodrilus
Limnodrilus angustipenis
Limnodrilus hoffmeisteri
Limnodrilus profundicola
Limnodrilus udekemianus
Lumbriculus
Lumbriculus inconstans
Lumbriculus variegatus
Megalonaias
Monopylephorus lacteus

Monopylephorus rubroniveus
Nais barbata
Nais behningi
Nais bretscheri
Nais communis
Nais communis complex
Nais elinguis
Nais magnaseta
Nais pardalis
Nais pseudobtusa
Nais simplex
Nais variabilis
Ophidonais serpentina
Paranais litoralis
Peloscolex
Peloscolex benedeni
Peloscolex carolinensis
Peloscolex ferox
Peloscolex gabriellae
Peloscolex multisetosus
Peloscolex variegatus
Potamothrix
Potamothrix hammoniensis
Potamothrix vejdovskyi
Premnodrilus palustris
Pristina
Pristina aequiseta
Pristina americana
Pristina breviseta
Pristina foreli
Pristina idrensis
Pristina leidyi
Pristina longiseta
Pristina longiseta leidyi
Pristina longisoma
Pristina osborni
Pristina proboscidea
Pristina sima
Pristina synclites
Pristinella
Pristinella jenkinae
Pristinella longisoma
Pristinella osborni
Pristinella sima
Psammoryctides californianus
Psammoryctides convolutus
Quistradrilus multisetosus
Rhizodrilus lacteus
Rhyacodrilus coccineus
Slavina
Slavina appendiculata
Sparganophilus tamesis
Sparganophilus
Specaria josinae
Spirosperma
Spirosperma ferox
Stephensoniana
Stephensoniana tandyi
Stephensoniana trivandrana
Stylaria
Stylaria fossularis
Stylaria lacustris
Stylodrilus
Stylodrilus heringianus
Sutroa
Tubifex
Tubifex ignotus
Tubifex tubifex
Varichaetadrilus angustipenis
Varichaetadrilus psammophilus
Vejdovskyella comata

Crustacea

Asellus (Caecidotea)
Asellus attenuatus
Asellus communis
Asellus intermedius
Asellus laticaudatus
Asellus militaris
Asellus obtusus
Asellus occidentlis
Asellus racovitzai
Asellus racovitzai australis
Cambarellus schmitti
Cambarus
Chlamydotheca (ostracod)
Crangonyx
Crangonyx floridanus
Crangonyx richmondensis
Crangonyx serratus
Gammarus
Gammarus fasciatus
Gammarus mucronatus
Gammarus palustris
Gammarus tigrinus
Hyalella
Hyalella azteca
Lirceus
Lirceus fontinalis
Macrobrachium
Macrobrachium acanthurus
Macrobrachium carcinus
Macrobrachium ohione
Macrobrachium olfersii
Melita nitida
Orconectes
Palaemonetes
Palaemonetes kadiakensis
Palaemonetes paludosus
Potimirim potimirim
Procambarus
Procambarus alleni
Procambarus fallax
Procambarus paeninsulanus
Procambarus pygmaeus
Procambarus spiculifer
Synurella

Mollusca

Amblema
Amnicola
Amnicola dalli
Amnicola dalli johnsoni
Amnicola limosa
Amnicola rhombostoma
Amphigyra (Planorbid)
Anodonta
Anodonta couperiana
Anodonta imbecillis
Aphaostracon
Arcidens
Biomphalaria
Biomphalaria glabrata
Biomphalaria havanensis
Byssanodonta
Byssanodonta cubensis
Campeloma
Campeloma floridense
Campeloma geniculum
Campeloma lewisi
Carunculina parva
Cincinnatia
Cincinnatia floridana
Clappia(mollusk)
Congeria leucophaeta
Corbicula
Corbicula fluminea
Corbicula manilensis
Elimia
Elimia athearni

Elimia albanyensis
Elimia buffyae
Elimia curvicostata
Elimia dickinsoni
Elimia doolyensis
Elimia floridensis
Elliptio
Elliptio buckleyi
Elliptio complanata
Elliptio congaraea
Elliptio crassidens
Elliptio dilatata
Elliptio icterina
Elliptio jayensis
Elliptio macmichaeli
Elliptoideus
Eupera
Eupera cubensis
Ferrissia
Ferrissia dalli
Ferrissia hendersoni
Ferrissia rivularis
Floridobia
Floridobia floridana
Fossaria
Fossaria cubensis
Fossaria modicella
Fusconaia succissa
Gillia
Goniobasis
Goniobasis floridensis
Gundlachia(mollusca)
Gyraulus
Gyraulus parvus
Haitia (Physa)
Haitia cubensis
Hebetancylus excentricus
Helisoma
Helisoma campanulatum
Helisoma scalare (Planorbella)
Hyalopyrgus
Hyalopyrgus aequicostatus
Hydrobia
Hydrobia totteni
Laevapex
Laevapex fuscus
Laevapex peninsulae
Lampsilis
Lampsilis claibornensis
Lampsilis teres
Lioplax
Lioplax pilsbryi
Littoridina (Texadina)
Littoridinops
Littoridinops monroensis
Littoridinops tenuipes
Lymnaea
Lyogyrus
Marisa cornuarietis
Melanoides
Melanoides tuberculata
Melanoides turriculus
Menetus
Micromenetus
Micromenetus dilatatus
Micromenetus dilatatus avus
Micromenetus floridensis
Musculium
Musculium lacustre
Musculium partumeium
Musculium securis
Musculium transversum
Mytilopsis leucophaeata
Neritina clenchi
Neritina reclivata (usnea)
Neritina virginea
Notogillia
Notogillia wetherbyi
Physa
Physa heterostropha
Physa pumilia
Physella
Physella cubensis
Physella hendersoni
Physella heterostropha pomila
Pisidium
Pisidium adamsi
Pisidium casertanum
Pisidium dubium
Pisidium punctiferum
Planorbella
Planorbella duryi
Planorbella scalaris
Planorbella trivolvis
Planorbella trivolvis intertexta
Planorbula
Plectomerus dombeyanus
Pleurobema strodeanum
Pleurocera
Pomacea
Pomacea bridgesi
Pomacea paludosa
Pomatiopsis
Promenetus
Pseudosuccinea
Pseudosuccinea columella
Pyrgophorus
Pyrogophorus platyrachis
Quincuncina
Rhapinema dacryon
Somatogyrus
Somatogyrus walkerianus
Sphaerium
Sphaerium occidentale
Sphaerium partumeium
Sphaerium striatinum
Spilochlamys
Spilochlamys conica
Spilochlamys gravis
Tarebia granifera
Tryonia aequicostata
Uniomerus
Uniomerus caroliniana
Uniomerus tetralasmus
Villosa
Villosa amygdala
Villosa vibex
Villosa villosa
Viviparus
Viviparus georgianus
Viviparus intertextus

Other

Abedus
Abedus immaculatus
Acentria
Acentropus
Actinobdella
Albia (mite)
Alboglossiphonia heteroclita
Arrenurus
Arrenurus apetiolatus
Arrenurus apopkensis
Arrenurus bicaudatus
Arrenurus hovus
Arrenurus magnicaudatus
Arrenurus problecornis
Arrenurus zapus
Arrenurus zeugicornis
Arrenurus zorus

Atractides
Batracobdella
Batracobdella paludosa
Batracobdella phalera
Batracobdella picta
Belostoma
Belostoma flumineum
Belostoma lutarium
Belostoma testaceum
Centrolimnesia
Clathrosperchon
Climacea
Climacia areolaris
Cordylophora
Cordylophora lacustris
Cura foremanii
Desserobdella
Desserobdella phalera
Dina
Dina microstoma
Dugesia
Dugesia tigrina
Eoparargyractis
Eoparargyractis floridalis
Erpobdella
Erpobdella punctata
Euparyphus
Eylais (acari)
Forelia (acari)
Forelia floridensis
Frontipoda
Geayia (acari)
Gerris
Gerris buenoi
Gerris canaliculatus
Gerris nebularis
Girardia (Dugesia)
Gloiobdella elongata
Glossiphonia
Haemopis
Hebrus
Hebrus consolidus
Helobdella
Helobdella elongata
Helobdella fusca
Helobdella lineata
Helobdella papillata
Helobdella punctatolineata
Helobdella stagnalis
Helobdella triserialis
Hemerodromia
Hemerodromia seguyi
Hesperocorixa
Hydra
Hydra americana
Hydrachna (acari)
Hydrochoreutes ungulatus
Hydrodroma
Hydryphantes (mite)
Hymanella retenuova
Koenikea
Koenikea angulata
Koenikea aphrasta
Koenikea elaphra
Koenikea floridensis
Koenikea spinipes carella
Krendowskia
Krendowskia similis
Lebertia
Lebertia sp. 1 pluchino
Lebertia sp. 4 pluchino
Lethocerus
Lethocerus americanus
Lethocerus uhleri
Limnesia
Limnochares
Limnogonus
Limnogonus (Neogerris) hesione
Limnoporus
Limnoporus canaliculatus
Lophopodella
Lophopodella carteri
Macrobdella ditetra
Macrovelia hornii
Mammersellides
Merragata
Merragata brunnea
Merragata hebroides
Mesovelia
Mesovelia amoena
Mesovelia mulsanti
Metrobates anomalus
Metrobates hesperius
Metrobates hesperius
Micronecta
Micronecta ludibunda
Microvelia
Microvelia austrina
Microvelia hinei
Microvelia pulchella
Mideopsis
Momonia
Mooreobdella
Mooreobdella microstoma
Mooreobdella tetragon
Munroessa
Munroessa gyralis
Myzobdella
Myzobdella lugubris
Neargyractis slossonalis
Neogerris
Neogerris hesione
Neoplea
Neoplea striola
Neumania
Neumania distincta
Notonecta
Notonecta indica
Notonecta uhleri
Nymphula
Ochterus
Oligobdella biannulata
Ostrinia nubilalis
Oxus
Palmacorixa buenoi
Paragordius
Parargyractis
Paraplea
Paraponyx
Paraponyx maculalis
Parargyractis
Paravelia
Paravelia brachialis
Pectinatella
Pectinatella magnifica
Pelocoris
Pelocoris carolinensis
Pelocoris femoratus
Petrophila
Philobdella gracilis
Philobdella floridana
Piona (acari)
Piscicolaria reducta
Placobdella
Placobdella multilineata
Placobdella nuchalis
Placobdella ornata
Placobdella papillifera
Placobdella parasitica
Placobdella pediculata

Placobdella translucens
Planaria
Platyvelia brachialis
Plea
Plea striola
Procotyla fluviatilis
Prostoma
Prostoma graecense
Prostoma rubrum
Psychoda
Psychoda alternata
Ranatra
Ranatra australis
Ranatra brevicollis
Ranatra buenoi
Ranatra drakei
Ranatra fusca
Ranatra kirkaldyi
Ranatra nigra
Rhagovelia
Rhagovelia choreutes
Rhagovelia obesa
Rheumatobates
Rheumatobates tenuipes
Samea
Samea multiplicalis
Sigara
Sigara hubbelli
Sigara zimmermanni
Sisyra
Sisyra apicalis
Sisyra vicaria
Sperchon
Sperchonopsis
Sperchonopsis verrucosa
Sperchopsis tessellatus
Sperchopsis
Sperchopsis tessellatus
Spongilla
Spongilla aspinosa
Spongilla lacustris
Synclita
Synclita obliteralis
Tiphys (mite)
Torrenticola
Trepobates
Trepobates pictus
Trichocorixa
Trichocorixa louisianae
Trichocorixa minima
Trichocorixa sexcincta
Trichocorixa verticalis
Tubulanus pellucidus
Turbellaria
Tyrrellia (acari)
Unionicola
Urnatella gracilis
Velia

Appendix V.Taxa located in Kentucky Traditionally Navigable Waters.

Ephemeroptera

Acentrella ampla
Acentrella sp
Acentrella turbida
Acerpenna macdunnoughi
Anthopotamus myops
Anthopotamus sp
Anthopotamus verticis
Antocha saxicola
Baetis brunneicolor
Baetis flavistriga
Baetis intercalaris
Baetis sp
Baetis tricaudatus
Baetisca gibbera
Caenis amica
Caenis anceps
Caenis diminuta
Caenis hilaris
Caenis latipennis
Caenis punctata
Caenis sp
Callibaetis sp
Centroptilum sp
Choroterpes sp
Cloeon sp
Ephemera simulans
Ephemera sp
Ephemerella sp
Ephoron leukon
Ephoron sp
Eurylophella bicolor
**Eurylophella sp*
Fallceon sp
Habrophlebia sp
Heptagenia marginalis
Heptagenia sp
Heterocloeon curiosum
Heterocloeon frivolus
Heterocloeon frivolus
Hexagenia sp
Leucrocuta aphrodite
Leucrocuta maculipennis
Leucrocuta sp
Merragata sp
Paraleptophlebia sp
Plauditus dubius
Plauditus sp
Procloeon sp
Pseudocentroptiloides sp
Pseudocloeon ephippiatus
Pseudocloeon longipalpus
Pseudocloeon propinquus
Pseudocloeon sp
Serratella deficiens
Serratella sp
Siphlonurus sp
Stenacron candidum
Stenacron interpunctatum
Stenacron sp
Stenonema exiguum
Stenonema femoratum
Stenonema mediopunctatum
**Stenonema meririvulanum*
Stenonema modestum
Stenonema pulchellum
Stenonema sp
Stenonema terminatum
Stenonema vicarium
Timpanoga lita
Tricorythodes sp

Plecoptera

Acroneuria abnormis
Acroneuria frisoni
Acroneuria internata
Acroneuria sp
Agnetina capitata
Agnetina sp
Haploperla sp
Isoperla sp
Leuctra sp
Neoperla sp
Perlesta sp
Pteronarcys dorsata
Pteronarcys proteus
Pteronarcys sp
Remenus bilobatus
Taeniopteryx sp

Trichoptera

Agraylea multipunctata
Agraylea sp
Brachycentrus nigrosoma
Brachycentrus numerosus
Brachycentrus sp
Brachycercus sp
Ceraclea ancylus
Ceraclea cancellata
Ceraclea flava
Ceraclea maculata
Ceraclea neffi
Ceraclea punctata
Ceraclea sp
Ceraclea tarsipunctata
Ceraclea transversa
Ceratopsyche bifida
Ceratopsyche bronta
Ceratopsyche cheilonis
Ceratopsyche slossonae
Ceratopsyche sp
Ceratopsyche sparna
Cernotina sp
Cheumatopsyche sp
Chimarra sp
Cyrnellus fraternus
Dibusa angata
Glossosoma sp
Helicopsyche borealis
Helicopsyche sp
Hydatophylax argus
Hydropsyche betteni gp
Hydropsyche demora
Hydropsyche dicantha
Hydropsyche frisoni
Hydropsyche hageni
Hydropsyche orris
Hydropsyche phalerata
Hydropsyche simulans
Hydropsyche sp
Hydropsyche valanis
Hydropsyche valanis
Hydroptila sp
**Lepidostoma sp*
Leucotrichia pictipes
Lype diversa
Macrostemum sp
Macrostemum zebratum

Micrasema charonis
Micrasema sp
Mystacides sepulchralis
Mystacides sp
Nectopsyche candida
Nectopsyche exquisita
Nectopsyche pavida
Nectopsyche sp
Neophylax acutus
Neophylax ayanus
Neophylax concinnus
Neophylax consimilis
Neophylax fuscus
Neophylax sp
Neotrichia sp
Neureclipsis crepuscularis
Neureclipsis parvulus
Neureclipsis sp
Nyctiophylax sp
Ochrotrichia sp
Oecetis avara
Oecetis cinerascens
Oecetis inconspicua
Oecetis nocturna
Oecetis persimilis
Oecetis sp
Orthotrichia sp
Oxyethira sp
Paraspyche cardis
Phryganea sp
Polycentropus sp
Polycentropus sp1(short tarsus)
Polycentropus sp2(long tarsus)
Protoptila maculata
Protoptila sp
Psychomyia flavida
Psychomyia sp
Ptilostomis sp
Pycnopsyche sp
Rhyacophila carolina
Rhyacophila lobifera
Rhyacophila sp
Setodes sp
Triaenodes flavescens
Triaenodes ignitus
Triaenodes injustus
Triaenodes perna
Triaenodes perna/helo
Triaenodes sp
Triaenodes tardus
**Wormaldia sp*

Misc Diptera
Anopheles sp
Antocha sp
Atherix lantha
Atherix sp
Atrichopogon sp
Bezzia sp
Bezzia/Palpomyia gp
Chaoborus punctipennis
Chelifera sp
Chlorotabanus sp
Chrysops sp
Culicoides sp
Dicranota sp
Dixella sp
Hemerodromia sp
Limnophila sp
Limnophora sp
Palpomyia sp
Pedicia sp
Pilaria sp
Probezzia sp
Prosimulium sp
Simulium sp
Simulium tuberosum
Simulium vittatum
Sphaeromias sp
Stilobezzia sp
Stratiomys sp
Tabanus reinwardtii
Tabanus sp
Tipula abdominalis
Tipula sp
Tipula strepens

Diptera (Chironomidae)
Ablabesmyia (Karelia) sp
Ablabesmyia annulata
Ablabesmyia janta
Ablabesmyia mallochi
Ablabesmyia parajanta
Ablabesmyia peleensis
Ablabesmyia rhamphe
Ablabesmyia sp
Alluaudomyia sp
Apedilum elachistum
Brillia sp
Cardiocladius obscurus
Cardiocladius sp
Chironomus riparius
Chironomus sp
Cladotanytarsus sp
Clinotanypus sp
Coelotanypus scapularis
Conchapelopia sp
Corynoneura sp
Corynoneura sp C (Epler)
Corynoneura taris
Cricotopus annulator complex
Cricotopus bicinctus gp
Cricotopus luciae
Cricotopus sp
Cricotopus trifascia
Cricotopus/Orthocladius gp
Cryptochironomus sp
Cryptotendipes sp
Demicryptochironomus sp
Diamesa sp
Dicrotendipes fumidus
Dicrotendipes lucifer
Dicrotendipes modestus
Dicrotendipes neomodestus
Dicrotendipes nervosus
Dicrotendipes sp
Djalmabatista pulcher
Endochironomus sp
Endochironomus subtendens
Endotribelos sp
Eukiefferiella gracei gp
Eukiefferiella sp
Glyptotendipes lobiferus
Glyptotendipes meridionalis
Glyptotendipes sp
Glyptotendipes sp B (Epler)
Harnischia sp
Hayesomyia sp
Krenopelopia sp
Labrundinia pilosella
Larsia sp
Meropelopia sp
Micropsectra sp
Microtendipes pedellus gp
Microtendipes sp
Nanocladius branchicolus
Nanocladius downesi
Nanocladius rectinervis
Nanocladius sp
Natarsia sp

Nilotanypus fimbriatus
Nilotanypus sp
Nilotanypus sp
Nilothauma babyi
Orthocladius annectens
Orthocladius obumbratus
Orthocladius sp
Parachironomus frequens
Paracladopelma sp
Parakiefferiella sp
Paramerina sp
Parametriocnemus sp
Paratanytarsus sp
Paratendipes albimanus
Paratendipes sp
Pentaneura sp
Phaenopsectra flavipes
Phaenopsectra punctipes gp
Phaenopsectra sp
Phaenopsectra/Tribelos sp
Polypedilum aviceps
Polypedilum braseniae
Polypedilum fallax
Polypedilum flavum
Polypedilum halterale
Polypedilum illinoense
Polypedilum ontario
Polypedilum scalaenum gp
Polypedilum simulans/digitifer
Polypedilum sp
Polypedilum tritum
Procladius sp
Procladius sublettei
Pseudochironomus sp
Pseudosmittia sp
Rheocricotopus sp
Rheotanytarsus exiguus gp
Rheotanytarsus sp
Stelechomyia perpulchra
Stempellinella fimbriatus
Stempellinella sp
Stenochironomus hilaris
Stenochironomus sp
Stictochironomus devinctus
Sublettea sp
Tanypus neopunctipennis
Tanypus sp
Tanytarsus sp
Tanytarsus sp A (Epler)
Tanytarsus sp C
Tanytarsus sp L
Thienemanniella lobapodema
Thienemanniella similis
Thienemanniella sp
Thienemanniella sp B
Thienemanniella xena
Thienemannimyia gp
Tribelos atrum
Tribelos fuscicorne
Tribelos jucundum
Tribelos sp
Tvetenia discoloripes gp
Tvetenia vitracies
Xenochironomus sp
Xenochironomus xenolabis
Xylotopus par

Coleoptera
Agabus sp
Ancyronyx sp
Ancyronyx variegatus
Berosus aculeatus
Berosus pantherinus
Berosus peregrinus
Berosus sp
Berosus sp A
Coptotomus interrogatus
Cyphon sp
Deronectes sp (larvae)
Dineutus assimilis
Dineutus discolor
Dineutus serrulatus
Dineutus sp
Dubiraphia minima
Dubiraphia quadrinotata
Dubiraphia sp
Dubiraphia vittata
Dytiscus sp
Ectopria nervosa
Enochrus pygmaeus nebulosus
Enochrus sp
Gyretes iricolor
Gyrinus analis
Gyrinus sp
Haliplus triopsis
Helichus basalis
Helichus fastigiatus
Helichus lithophilus
**Helichus sp*
Helophorus sp
Hydaticus sp
Hydrobius tumidus
Hydrochus sp
Hydroporus sp
Ilybius biguttulus
Laccophilus maculosus maculosus
Laccophilus sp
Lioporeus pilatei
Lixus sp
Macronychus glabratus
Macronychus sp
Microcylloepus pusillus
Neoplea striola
Neoporus dixianus
Neoporus mellitus
Neoporus sp
Optioservus ovalis
Optioservus sp
Optioservus trivittatus
Oulimnius latiusculus
Paracymus subcupreus
Peltodytes duodecimpunctatus
Peltodytes lengi
Peltodytes muticus
Peltodytes sexmaculatus
Peltodytes sp
Psephenus herricki
Scirtes sp
Stenelmis crenata
Stenelmis humerosa
Stenelmis markeli
Stenelmis mera
Stenelmis musgravei
Stenelmis sandersoni
Stenelmis sexlineata
Stenelmis sp
Stenelmis vittipennis
Thinobius sp
Tropisternus blatchleyi blatchleyi
Tropisternus collaris
Tropisternus lateralis nimbatus
Tropisternus natator
Tropisternus sp

Odonata
Argia apicalis
Argia fumipennis violacea
Argia moesta
Argia sedula
Argia sp

Argia tibialis
Argia translata
Basiaeschna janata
Boyeria grafiana
Boyeria sp
Boyeria vinosa
Calopteryx angustipennis
Calopteryx maculata
Calopteryx sp
Celithemis amanda
Cordulegaster maculata
Cordulegaster sp
Didymops sp
Didymops transversa
Dromogomphus sp
Dromogomphus spinosus
Dromogomphus spoliatus
Enallagma divagans
Enallagma exsulans
Enallagma sp
Enallagma sulcatum
Enallagma traviatum
Epicordulia princeps
Erythemis simplicicollis
Gomphus dilatatus
Gomphus externus
Gomphus fraternus
Gomphus lineatifrons
Gomphus lividus
Gomphus notatus
Gomphus quadricolor
Gomphus sp
Gomphus spiniceps
Gomphus vastus
Gomphus viridifrons
Hagenius brevistylus
Hagenius sp
Hetaerina americana
Hetaerina sp
Hetaerina titia
Ischnura posita
Ischnura sp
Isonychia sp
Lestes sp
Libellula auripennis
Libellula sp
Macromia alleghaniensis
Macromia annulata
Macromia illinoiensis/illinoiensis
Macromia sp
Macromia taeniolata
Nasiaeschna pentacantha
Neurocordulia alabamensis
Neurocordulia molesta
Neurocordulia obsoleta
Neurocordulia sp
Neurocordulia sp
Neurocordulia virginiensis
Ophiogomphus rupinsulensis
Ophiogomphus sp
Perithemis sp
Plathemis lydia
Progomphus obscurus
Progomphus sp
Somatochlora sp
Stylogomphus albistylus
Stylurus sp
Stylurus spiniceps

Oligochaeta
Aulodrilus pigueti
Branchiura sowerbyi
Chaetogaster sp
Dero digitata
Dero nivea
Eclipidrilus sp
Ilyodrilus templetoni
Limnodrilus hoffmeisteri
Limnodrilus sp
Lumbriculus sp
Nais sp
Nais variabilis
Ophidonais serpentina
Pristina osborni
Pristina sp
Slavina appendiculata
Stephensoniana trivandrana
Stylaria fossularis
Stylaria lacustris
Tubifex sp

Megaloptera
Chauloides rastricornis
Corydalus cornutus
Nigronia serricornis
Nigronia sp
Sialis infumata
Sialis sp
Sialis velata

Crustacea
**Caecidotea sp*
Cambarus cumberlandensis
Cambarus distans
Cambarus rusticiformis
Cambarus sp
Cambarus tenebrosus
**Crangonyx sp*
Gammarus lacustris
Gammarus sp
Hyalella azteca
Lirceus fontinalis
Lirceus sp
Orconectes cristavarius
Orconectes juvenilis
Orconectes kentuckiensis
Orconectes placidus
Orconectes putnami
Orconectes rusticus
Orconectes sp
Palaemonetes kadiakensis

Mollusca
Actinonaias ligamentina (LV)
Actinonaias pectorosa (LV)
Amblema plicata (LV)
Amnicola sp
Campeloma crassulum
Campeloma decisum
Campeloma sp
Corbicula fluminea
Cyclonaias tuberculata (LV)
Cyprogenia stegaria (LV)
Dreissena polymorpha
Elimia costifera
Elimia ebenum
Elimia laqueata laqueata
Elimia livescens
Elimia plicatastriata
Elimia semicarinata
Elimia sp
Elliptio dilatata (LV)
Ferrissia rivularis
Ferrissia sp
Fossaria sp
Helisoma anceps anceps
Helisoma sp
Laevapex fuscus
Lampsilis cardium (LV)
Lampsilis fasciola (LV)

Lampsilis ovata (LV)
Lampsilis siliquoidea (LV)
Lasmigona complanata complanata (LV)
Lasmigona costata (LV)
Leptodea fragilis (LV)
Leptoxis praerosa
Leptoxis sp
Ligumia recta (LV)
Lithasia obovata
Lithasia sp
Lymnaea sp
**Micromenetus sp*
Musculium transversum
Physa sp
Pisidium sp
Planorbella sp
Pleurocera acuta
Pleurocera canaliculata
Pleurocera sp
Potamilus alatus (LV)
Promenetus exacuous
Pseudosuccinea columella
Ptychobranchus fasciolaris (LV)
Quadrula pustulosa (LV)
Sphaerium fabale
Sphaerium simile
Sphaerium sp
Villosa taeniata (LV)

Other
Aquarius sp
Climacia areolaris
Climacia sp
Corixini sp
Dugesia sp
Gerris marginatus
Gerris nebularis
Helobdella elongata
Helobdella papillata
Helobdella triserialis
Hesperocorixa sp
Hydra sp
Hydrometra martini
Hydrometra sp
Hydrometra wileyae
Mesovelia amoena
Mesovelia mulsanti
Mesovelia mulsanti
Mesovelia sp
Metrobates hesperius
Microvelia americana
Microvelia sp
Oredytes sp
Parapoynx obscuralis
Parapoynx sp
Pectinatella magnifica
Petrophila confusalis
Petrophila sp
Phagocata sp
Piscicola punctata
Piscicolaria reducta
Placobdella papillifera
Planaria sp
Plumatella emarginata
Plumatella repens
Prostoma sp
Protoplasa fitchii
Ranatra australis
Ranatra buenoi
Ranatra kirkaldyi
Ranatra nigra
Ranatra sp
Rhagovelia obesa
Rhagovelia sp
Rheumatobates rileyi
Rheumatobates sp
Sigara sp
Sperchopsis tessellatta
Spongilla sp
Stactobiella sp
Trepobates imermis
Trepobates sp
Trichocorixa sp

Appendix VI. Taxa located in South Carolina Traditionally Navigable Waters.

Ephemeroptera
Acentrella carolina
Acentrella sp.
Acerpenna pygmaea
Baetidae
Baetis brunneicolor
Baetis dubium
Baetis intercalaris
Baetis pluto
Baetis punctiventris
Baetis sp.
Baetisca gibbera
Baetisca sp.
Caenis diminuta
Caenis hilaris
Caenis latipennis
Caenis punctata
Caenis sp.
Callibaetis sp.
Centroptilum sp.
Choroterpes sp.
Dannella simplex
Ephemerella catawba
Ephemerella dorothea
Ephemerella inconstans
Ephemerella needhami
Ephemerella septentrionalis
Ephemerella sp.
Eurylophella bicolor
Eurylophella prudentalis
Eurylophella sp.
Heptagenia sp.
Heptagenidae
Hexagenia sp.
Isonychia sp.
Leptohyphes dolani
Leptohyphes robacki
Leptohyphes sp.
Leptophlebiidae
Maccaffertium exiguum
Maccaffertium integrum
Maccaffertium modestum
Maccaffertium sp.
Maccaffertium terminatum
Neoephemera purpurea
Paraleptophlebia sp.
Plauditus sp.
Procloeon sp.
Pseudocloeon ephippiatum
Pseudocloeon frondale
Pseudocloeon propinquum
Pseudocloeon sp.
Serratella serratoides
Stenacron interpunctatum
Stenacron sp.
Tricorythodes sp.

Plecoptera
Acroneuria abnormis
Acroneuria carolinensis
Acroneuria mela
Acroneuria sp.
Acroneuria/Eccoptura.
Agnetina sp.
Allocapnia sp.
Amphinemura delosa
Amphinemura sp.
Capniidae
Clioperla clio
Helopicus subvarians
Isoperla bilineata
Isoperla clio
Isoperla dicala
Isoperla sp.
Leuctra sp.
Neoperla sp.
Paragnetina fumosa
Paragnetina kansensis
Paragnetina sp.
Perlesta placida
Perlesta sp.
Perlidae
Pteronarcys dorsata
Pteronarcys sp.
Shipsa rotunda
Strophopteryx sp.
Taeniopteryx metequi
Taeniopteryx sp.

Trichoptera
Anisocentropus pyraloides
Brachycentrus numerosus
Brachycentrus sp.
Ceraclea sp.
Cheumatopsyche sp.
Chimarra aterrima
Chimarra obscura
Chimarra socia
Chimarra sp.
Hydropsyche betteni
Hydropsyche incommoda
Hydropsyche rossi
Hydropsyche simulans
Hydropsyche sp.
Hydropsyche venularis
Hydropsychidae
Hydroptila sp.
Lepidostoma sp.
Leptoceridae
Lype diversa
Macrostemum carolina
Macrostemum sp.
Micrasema rusticum
Micrasema sp.
Micrasema wataga
Molanna tryphena
Nectopsyche candida
Nectopsyche exquisita
Nectopsyche pavida
Nectopsyche sp.
Neophylax sp.
Neureclipsis sp.
Nyctiophylax moestus
Nyctiophylax sp.
Ochrotrichia sp.
Oecetis cinerascens
Oecetis morsei/sphyra
Oecetis nocturna
Oecetis persimilis
Oecetis sp.
Phylocentropus sp.
Polycentropus sp.
Polycentropus/Cernotina
Pycnopsyche antica
Pycnopsyche antica/guttifer
Pycnopsyche guttifer
Pycnopsyche lepida
Pycnopsyche luculenta
Pycnopsyche sp.
Rhyacophila ledra
Triaenodes ignitus
Triaenodes injusta
Triaenodes perna
Triaenodes sp.

Coleoptera
Agabus sp.
Agasicles hygrophila
Anchytarsus bicolor
Ancyronyx variegatus
Berosus sp.
Coptotomus interrogatus
Coptotomus sp.
Cyphon sp.
Dineutus discolor
Dineutus sp.
Dubiraphia bivittata
Dubiraphia quadrinotata
Dubiraphia sp.
Dubiraphia vittata
Ectopria sp.
Elmidae
Enochrus sp.
Gyrinus sp.
Haliplus sp.
Helichus basalis
Helichus lithophilus
Helichus sp.
Helobata striata
Helocombus sp.
Helophorus sp.
Hydaticus bimarginatus
Hydrobiomorpha casta
Hydrobius sp.
Hydrochus sp.
Hydroporus sp.
Hydroporus undulatus
Hydroporus vittatipennis
Macronychus glabratus
Microcylloepus pusillus
Neoporus sp.
Optioservus sp.
Paracymus sp.
Peltodytes duodicimpunctatus
Peltodytes muticus
Peltodytes oppositus
Peltodytes sexmaculatus
Peltodytes sp.
Phaenonotum sp.
Promoresia elegans
Promoresia tardella
Psephenus herricki
Sperchopsis tessellatus
Staphylinidae
Stenelmis hungerfordi
Stenelmis sp.
Stenus sp.
Thermonectus sp.
Tropisternus glaber
Tropisternus sp.

Diptera (Chironomidae)
Ablabesmyia hauberi
Ablabesmyia janata
Ablabesmyia mallochi
Ablabesmyia rhamphe GR
Ablabesmyia sp.
Apsectrotanypus johnsoni
Brillia sp.
Chaetocladius sp.
Chironomidae
Chironominae
Chironomus sp.
Cladopelma sp.
Cladotanytarsus sp.
Clinotanypus pinguis
Clinotanypus sp.
Conchapelopia Group
Corynoneura sp.
Cricotopus bicinctus
Cricotopus sp.
Cricotopus/Orthocladius
Cryptochironomus fulvus
Cryptochironomus sp.
Cryptotendipes sp.
Dicrotendipes sp.
Diplocladius cultriger
Diplocladius sp.
Djalmabatista sp.
Eukiefferiella brevicalcar GR
Eukiefferiella claripennis GR
Eukiefferiella sp.
Hydrobaenus sp.
Labrundinia neopilosella
Labrundinia sp.
Lopescladius sp.
Microtendipes pedellus GR
Microtendipes rydalensis GR
Microtendipes sp.
Nanocladius sp.
Nilotanypus fimbriatus
Nilotanypus sp.
Orthocladius sp.
Paracladopelma loganea
Paracladopelma sp.
Paracladopelma undine
Parakiefferiella sp.
Paralauterborniella nigrohalteralis
Paramerina NR anomala
Paramerina sp.
Parametriocnemus lundbecki
Paratanytarsus sp.
Paratendipes sp.
Phaenopsectra flavipes
Phaenopsectra sp.
Polypedilum aviceps
Polypedilum convictum
Polypedilum fallax
Polypedilum fallax gr.
Polypedilum flavum
Polypedilum halterale
Polypedilum illinoense
Polypedilum scalaenum
Polypedilum sp.
Polypedilum tritum
Potthastia longimanus
Procladius sp.
Pseudochironomus sp.
Rheocricotopus robacki
Rheotanytarsus sp.
Robackia demeijerei
Smittia sp.
Stelechomyia perpulchra
Stenochironomus sp.
Tanypodinae
Tanypus sp.
Tanytarsus guerlus
Tanytarsus sp.
Thienemaniella sp.
Thienemannimyia GR
Tribelos fusicorne
Tribelos jucundum
Tribelos sp.
Tvetenia sp.
Tvetenia vitracies
Unniella multivirga
Zavrelimyia sp.

Diptera (misc)
Anopheles sp.
Antocha sp.
Atherix sp.
Bessia
Ceratopogonidae

Chrysops sp.
Culex sp.
Ephydridae
Erioptera
Limnophila sp.
Palpomyia (Complex)
Pilaria sp.
Psychoda sp.
Simuliidae
Simulium jonesi
Simulium podostemi
Simulium sp.
Simulium tuberosum
Simulium verecundum
Tabanidae
Tipula sp.
Uranotaenia sp.

Odonata
Argia sedula
Argia sp.
Argia translata
Basiaeschna janata
Boyeria sp.
Boyeria vinosa
Calopteryx dimidiata
Calopteryx maculata
Calopteryx sp.
Coenagrionidae
Cordulegaster sp.
Dromogomphus spinosus
Enallagma divigens
Enallagma sp.
Epicordulia sp.
Erpetogomphus designatus
Gomphus sp.
Hagenius brevistylus
Hetaerina tittia
Ischnura/Anomalagrion
Lanthus vernalis
Lestes sp.
Libellula sp.
Libellulidae
Macromia illinoense
Macromia sp.
Macromia taeniolata
Nasiaeschna pentacantha
Neurocordulia sp.
Ophiogomphus mainensis
Pachydiplax longipennis
Pentaneura inconspicua
Pentaneura sp.
Perithemis sp.
Plathemis lydia
Progomphus sp.
Somatochlora sp.
Stylurus sp.

Oligochaeta
Branchiura sowerbyi
Dero digitata
Lumbriculidae
Oligochaeta
Tubifex tubifex
Tubificidae

Megaloptera
Chauliodes pectinicornis
Corydalus cornutus
Nigronia serricornis
Sialis sp.

Crustacea
Caecidotea sp.
Cambaridae
Cambarus sp.
Crangonyx sp.
Gammarus sp.
Hyallela azteca
Lirceus sp.
Palaemonetes paludosus
Palaemonetes sp.
Procambarus sp.

Mollusca
Ancylidae
Campeloma sp.
Corbicula fluminea
Elimia sp.
Elliptio angustata
Elliptio complanata
Elliptio icterina
Elliptio sp.
Ferrissia sp.
Gastropoda
Helisoma anceps
Helisoma trivolvis
Hydrobiidae
Menetus dilitatus
Physella sp.
Planorbella sp.
Planorbidae
Pseudosuccinea columella
Sphaerium sp.
Unionidae
Villosa delumbis

Other
Belostoma sp.
Belostomatidae
Collembola
Corixidae
Gerridae
Gerris conformis
Gerris sp.
Hemerodromia sp.
Hirudinea
Hydracarina
Lepidoptera
Mesovelia mulsanti
Mesovelia sp.
Metrobates hesperus
Metrobates sp.
Noctuidae
Notonecta sp.
Notonectidae
Paravelia sp.
Placobdella sp.
Pyralidae
Ramphocorixa sp.
Ranatra buenoi
Ranatra sp.
Rhagovelia obesa
Rheumatobates sp.
Trepobates sp.
Trichocorixa sp.

Appendix VII. Taxa located in Mississippi Traditionally Navigable Waters.

Ephemeroptera
Amercaenis
Apobaetis
Baetis
Brachycercus
Caenis
Centroptilum
Cercobrachys
Eurylophella
Hexagenia
Isonychia
Leucrocuta
Maccaffertium
Paracloeodes
Procloeon
Procloeon/Centroptilum
Pseudocloeon
Stenonema femoratum
Tortopus
Tricorythodes

Plecoptera
Neoperla

Trichoptera
Ceraclea
Cernotina/Polycentropus
Cheumatopsyche
Chimarra
Cyrnellus fraternus
Hydropsyche
Hydroptila
Macrostemum
Nectopsyche
Neotrichia
Neureclipsis
Nyctiophylax
Oecetis
Oxyethira
Polycentropus
Pycnopsyche
Triaenodes

Coleptera
Ancyronyx variegata
Berosus
Coptotomus
Dineutus
Dubiraphia
Enochrus
Gyretes
Gyrinus
Helichus
Hydraena
Hydrocanthus
Macronychus glabratus
Microcylloepus
Neoporus
Peltodytes
Prionocyphon
Stenelmis
Tropisternus

Diptera (Chironomidae)
Ablabesmyia
Ablabesmyia mallochi
Ablabesmyia rhamphe grp
Axarus
Chironomus
Cladopelma
Cladotanytarsus
Clinotanypus
Coelotanypus
Corynoneura
Cricotopus
Cricotopus bicinctus
Cricotopus bicinctus grp
Cricotopus/Orthocladius
Cryptochironomus
Cryptotendipes
Demicryptochironomus
Dicrotendipes
Djalmabatista
Endochironomus
Eukiefferiella
Glyptotendipes
Goeldichironomus
Gillotia
Harnischia
Hayesomyia
Hayesomyia senata
Labrundinia
Larsia
Lopescladius
Meropelopia grp
Microchironomus
Nanocladius
Natarsia
Nilotanypus fimbriatus
Nilothauma
Orthocladius
Pagastiella
Parachironomus
Paracladopelma
Parakiefferiella
Paralauterborniella nigrohalterale
Parametriocnemus
Paratanytarsus
Paratendipes
Pentaneura inconspicua
Polypedilum
Polypedilum beckae
Polypedilum flavum
Polypedilum halterale grp
Polypedilum halterale/scalaenum grp
Polypedilum illinoense grp
Polypedilum scalaenum grp
Potthastia longimana
Procladius
Pseudochironomus
Pseudosmittia
Rheocricotopus
Rheotanytarsus
Stelechomyia perpulchra
Stempellina
Stenochironomus
Stictochironomus
Tanypus
Tanytarsus
Thienemanniella
Thienemannimyia gr.
Tribelos
Xenochironomus xenolabis
Xestochironomus
Zavreliella marmorata

Diptera (misc)
Chrysops
Gonomyia
Hexatoma
Potamyia flava
Silvius
Stratiomys

Odonata
Argia
Boyeria
Didymops
Enallagma
Erpetogomphus
Gomphus
Hetaerina
Ischnura
Macromia
Nasiaeschna pentacantha
Neurocordulia
Progomphus
Stylurus
Tetragoneuria

Oligochaeta
Aeolosoma
Aulodrilus
Bratislavia
Dero
Haemonais waldvogeli
Limnodrilus
Nais
Pristina
Slavina appendiculata
Stylaria lacustris

Megaloptera
Corydalus cornutus
Sialis

Crustacea
Caecidotea
Hyalella azteca
Orconectes

Mollusca
Corbicula

Other
Belostoma
Climacia
Dugesia tigrina
Gelastocoris
Gerris
Hemerodromia
Hydracarina
Metrobates
Neoplea
Paraponyx
Petrophila
Ranatra
Rheumatobates
Trepobates
Trichocorixa
Urnatella

Appendix VIII. Taxa located in Tennessee Traditionally Navigable Waters.

Ephemeroptera
Acentrella
Acerpenna
Ameletus
Ameletus
Attenella
Baetis
Baetisca
Caenis
Centroptilum
Choroterpes
Cinygmula
Diphetor
Drunella
Epeorus
Ephemera
Ephemerella
Ephoron
Eurylophella
Habrophlebia
Habrophlebiodes
Heptagenia
Hexagenia
Isonychia
Labiobaetis
Leptophlebia
Leucrocuta
Nixe
Paraleptophlebia
Procloeon
Pseudocloeon
Rhithrogena
Serratella
Stenacron
Stenonema
Tricorythodes

Plecoptera
Acroneuria
Agnetina
Allocapnia
Alloperla
Amphinemura
Beloneuria
Cultus
Diploperla
Eccoptura
Haploperla
Helopicus
Isoperla
Leuctra
Nemoura
Neoperla
Oemopteryx
Paracapnia
Paragnetina
Paraleuctra
Peltoperla
Perlesta
Perlinella
Pteronarcys
Soyedina
Sweltsa
Taenionema
Taeniopteryx
Tallaperla
Yugus
Helobdella
Placobdella

Trichoptera
Agapetus
Agarodes
Agraylea
Anisocentropus
Apatania
Arctopsyche
Brachycentrus
Ceraclea
Ceratopsyche
Cernotina
Cheumatopsyche
Chimarra
Cyrnellus
Diplectrona
Dolophilodes
Glossosoma
Goera
Helicopsyche
Hydatophylax
Hydropsyche
Hydroptila
Ironoquia
Lepidostoma
Leucotrichia
Limnephilus
Lype
Macrostemum
Mayatrichia
Micrasema
Molanna
Mystacides
Nectopsyche
Neophylax
Neotrichia
Neureclipsis
Ochrotrichia
Oecetis
Orthotrichia
Oxyethira
Paranyctiophylax
Parapsyche
Phylocentropus
Polycentropus
Psilotreta
Psychomyia
Ptilostomis
Pycnopsyche
Rhyacophila
Setodes
Triaenodes
Wormaldia
Diptera
Atherix
Aedes
Allognosta
Alluaudomyia
Anopheles
Antocha
Atrichopogon
Bezzia
Bittacomorpha
Blepharicera
Caloparyphus
Ceratopogon
Chaoboridae
Chelifera
Chrysops
Clinocera
Culex
Culicoides
Dasyhelea
Dicranota
Dixa
Dixella
Dohrniphora

Dolichopodidae
Empididae
Ephydridae
Erioptera
Forcipomyia
Gonomyia
Hemerodromia
Hexatoma
Limnophila
Limonia
Molophilus
Nemotelus
Odontomyia
Ormosia
Pedicia
Pilaria
Probezzia
Prosimulium
Protoplasa
Pseudolimnophila
Psychoda
Rhabdomastix
Sciomyzidae
Sepedon
Serromyia
Simulium
Sphaeromias
Stilobezzia
Stratiomys
Syrphidae
Tabanus
Tipula

Diptera (Chironomidae)
Ablabesmyia
Alluaudomyia
Alotanypus
Antillocladius
Apedilum
Apsectrotanypus
Axarus
Brillia
Brundiniella
Cardiocladius
Chaetocladius
Chironomus
Cladopelma
Cladotanytarsus
Clinotanypus
Coelotanypus
Conchapelopia
Constempellina
Corynoneura
Cricotopus
Cryptochironomus
Cryptotendipes
Demicryptochironomus
Diamesa
Dicrotendipes
Diplocladius
Djalmabatista
Einfeldia
Endochironomus
Endotribelos
Eukiefferiella
Glyptotendipes
Goeldichironomus
Harnischia
Hayesomyia
Heleniella
Helopelopia
Heterotrissocladius
Hydrobaenus
Kiefferulus
Krenopelopia
Labrundinia
Larsia
Limnophyes
Lopescladius
Meropelopia
Mesosmittia
Metriocnemus
Micropsectra
Microtendipes
Nanocladius
Natarsia
Nilotanypus
Nilothauma
Orthocladius
Pagastia
Parachaetocladius
Parachironomus
Paracladopelma
Parakiefferiella
Paralauterborniella
Paramerina
Parametriocnemus
Paraphaenocladius
Paratanytarsus
Paratendipes
Pentaneura
Phaenopsectra
Polypedilum
Potthastia
Procladius
Psectrocladius
Pseudochironomus
Pseudorthocladius
Pseudosmittia
Psilometriocnemus
Rheocricotopus
Rheopelopia
Rheosmittia
Rheotanytarsus
Robackia
Saetheria
Smittia
Stelechomyia
Stempellina
Stempellinella
Stenochironomus
Stilocladius
Sublettea
Symbiocladius
Symposiocladius
Sympotthastia
Synorthocladius
Tanypus
Tanytarsus
Thienemanniella
Thienemannimyia
Tribelos
Trissopelopia
Tvetenia
Unniella
Xenochironomus
Xestochironomus
Xylotopus
Zavrelia
Zavreliella
Zavrelimyia

Coleoptera
Agabus
Anchytarsus
Ancyronyx
Berosus
Copelatus
Coptotomus
Cyphon
Desmopachria

Dineutus
Dubiraphia
Ectopria
Elodes
Enochrus
Gonielmis
Gyrinus
Haliplus
Helochares
Helophorus
Hydaticus
Hydraena
Hydrobiomorpha
Hydrobius
Hydrobius
Hydrocanthus
Hydrochus
Hydrophilus
Hydroporus
Hydrovatus
Hygrotus
Laccobius
Laccodytes
Laccophilus
Macronychus
Microcylloepus
Optioservus
Oulimnius
Paracymus
Peltodytes
Prionocyphon
Promoresia
Psephenus
Rhantus
Scirtes
Sperchopsis
Stenelmis
Stenus
Suphisellus
Tropisternus
Uvarus

Odonata
Argia
Arigomphus
Basiaeschna
Boyeria
Calopteryx
Chromagrion
Cordulegaster
Dromogomphus
Enallagma
Epitheca
Erythemis
Gomphus
Hetaerina
Ischnura
Lanthus
Libellula
Macromia
Neurocordulia
Ophiogomphus
Perithemis
Progomphus
Somatochlora
Stylogomphus
Stylurus

Oligochaeta
Bratislavia
Dero
Eclipidrilus
Limnodrilus
Lumbricidae
Lumbriculidae
Lumbriculus
Nais
Pristina
Pristinella
Slavina
Spirosperma
Stephensoniana
Stylaria
Quistadrilus
Tubifex

Megaloptera
Chauliodes
Corydalus
Nigronia
Sialis

Crustacea
Crangonyx
Gammarus
Hyalella
Cambarus
Orconectes
Palaemontes
Procambarus
Mysis

Mollusca
Campeloma
Corbicula
Elimia
Eupera
Ferrissia
Fossaria
Gyraulus
Hydrobiidae
Laevapex
Leptoxis
Lymnaea
Menetus
*Physella**
Pisidium
Planorbella
Pseudosuccinea
Sphaerium
Stagnicola
Viviparus

Other
Acentria
Aeolosoma
Belostoma
Caecidotea
Cura
Dugesia
Gelastocoris
Gerris
Hebrus
Hydra
Hydrometra
Isotomurus (Collembola)
Lethocerus
Limnoporus
Lipogomphus
Lirceus
Mesovelia
Metrobates
Microvelia
Mooreobdella
Neoplea
Notonecta
Palmacorixa
Petrophila
Prostoma
Pyralidae
Ranatra

Rhagovelia
Rheumatobates
Sisyra
Sminthurides (Collembolla)
Trepobates
Trichocorixa