Effects of Hydrologic Change on Stream Fish Assemblages in Alabama, USA

by

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Abstract

Alabama is home to the most diverse aquatic fauna in the United States. A major threat to this fauna is habitat degradation mediated by hydrologic alteration. Land cover changes contribute to disrupted flow patterns and volumes. Studies in streams in east Alabama found that hydrologic alteration shifted the assemblage structure from specialist endemics to generalist dominated. This study aimed to find if similar patterns were being repeated in other streams across Alabama's physiographic regions. Streams in six watersheds were sampled for fishes contemporarily and compared to historic fish collections. Hydrologic and land cover data were compiled and analyzed. The assemblage data were analyzed using partial redundancy analysis (pRDA) constrained by hydrologic variables and controlled for watershed area. The impact of land cover was investigated using multiple regression. Evidence of assemblage change was found in most watersheds based on Morisita similarity. Hydrology significantly affected the fish assemblages in 4 of the 6 watersheds. Discharge Uphapee Creek, the most developed watershed, significantly decreased over the past 50 years. Land cover affected the fish assemblages in half of the watersheds. Where hydrology was most altered, the assemblage structure was generalist dominant and temporally variable. These watersheds had the least natural land cover. In Shoal Creek, a heavily forested watershed on Talladega National Forest, hydrologic variables were strongly correlated with precipitation, and the assemblages were stable over time and dominated by fluvial specialists. Land use and associated hydrology are critical components of watershed management and should be considered vital to conservation of Alabama's aquatic biodiversity.

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Introduction

Freshwater ecosystems are among the most diverse and fragile on the planet. They are among the most imperiled ecosystems, and damage to these ecosystems results in great losses in biodiversity (Warren et al. 2000). Almost 30% of freshwater fish species of the southeastern United States are considered endangered, threatened or vulnerable (Warren et al. 2000). Burkhead (2012) found the rate of extinction in North American freshwater fishes to be 877 times greater than the background extinction rate. Protecting these ecosystems is of particular concern in the state of Alabama because of the incredible diversity of freshwater fauna found in the state. Alabama has the highest diversity of fishes, crayfishes and unionid mussels of any state in the United States (Boschung & Mayden 2004). Over 70 of the fish species are endemic to Alabama (Boschung & Mayden 2004).

Loss of aquatic biodiversity is typically the result of habitat alteration, which includes dams, changes in land use, channel modification and other factors. All of these perturbations result in altered hydrology, changing the amount, timing and persistence of water in stream channels (Poff & Zimmerman 2010). As a result, fish assemblages can change from endemic, specialist dominated states to homogenized assemblages of generalist, cosmopolitan species which replace specialists (Scott & Helfman 2001).

Streamflow in unregulated systems can be altered in volume and duration depending on the source of the fluctuation. Drought has one of the most obvious impacts on streams. By reducing the amount of input a watershed receives, the volume of the baseflow and total discharge can be reduced (Lake 2003). Changes to the land cover of a drainage area affects the regime and volume of streamflow by altering the water cycle (Swank & Miner 1968, Roy et al.

2005). These changes to flow regimes are often detrimental to the biota of the streams and their riparian areas and floodplains. In a meta-analysis of 165 papers, Poff and Zimmerman (2009) reported that 92% of the studies investigated found negative ecological changes associated with altered flow regimes, and of the papers that reported increases in ecological metrics, many were due to increased diversity from a rise in non-native species.

Much of the impact of droughts is caused by restricting the streams to baseflow, where groundwater is the only input to the system. In longer droughts, groundwater levels are reduced from lack of recharge which in turn reduces the in-stream flow (Lake 2003). Droughts can be sporadic or occur seasonally, and they can last from just a few months to multiple years (Lake 2003). Some stream reaches in Alabama are naturally intermittent during late summer, but drought increases the length of stream bed that is dry. The reduction of stream flow during droughts reduces the amount of habitat available to stream fishes. The drying of stream reaches fragments the populations of fishes, limiting genetic exchange or access to resources (Lake 2003). The effects of drought are exacerbated by the other impacts on the water availability.

Water withdrawal is another factor acting on streamflows in Alabama. Some of the main purposes are irrigation, drinking water, and industrial purposes. By far the largest use, thermoelectric generation uses 83% of all water withdrawn in the state of Alabama, but most of this water is returned to the system after being used to cool the plant which can raise surface water temperature (Hutson et al. 2009). Public water supply is the next largest user, consuming 8% when combined with residential self-supply (Hutson et al. 2009). Much of this water returns to the system in the form of treated effluent or percolation into the groundwater. Irrigation only makes up about 2% of total water withdrawals in Alabama (Hutson et al. 2009). However, much of this water is lost through evaporation or transpiration when sprayed on cropland and irrigation

tends to be highest during the driest months of the year. Irrigators withdraw from both surface water, which reduces flow directly, and groundwater, which can lower the water table. Alabama does not currently have a statewide water policy, though there is discussion of one in the future (Alabama Department of Economic and Community Affairs (ADECA) 2012). Currently, only those entities with the capacity to withdraw more than 378,541 L per day are required to have a permit and report their water use (ADECA 2012). Because of the lack of permitting on small withdrawals, it is hard to fully account for the amount of water being withdrawn for garden irrigation, livestock watering, and other small water uses.

Changes in land use can alter hydrology beyond the direct impact of water withdrawals. Land cover impacts the water cycle in the timing, duration, and volume of flows (Allan 2004, Freeman & Marcinek 2006). Urbanization has been an increasing problem in the southeastern United States and worldwide (Roy et al. 2005). An increase in impervious surfaces increases the flashiness and peak flow of a stream during a storm event (Roy et al. 2005). Flashiness is defined as the increase in the rate of rise and fall in stream flow (Baker et al. 2004). Because more water runs off than percolates into the ground, recharging the groundwater, the baseflow of the stream can also be reduced by an increase in impervious surface (Roy et al. 2005). Shifts in vegetation also impact water availability. Forest type impacts water availability by changing the amount of evapotranspiration in a watershed (Brown et al. 2005). Changing a watershed from hardwoods to planted pines will reduce the water production of an area because of the increased water use of the trees (Swank & Miner 1968). Cutting a forested area will increase the water production, but the watershed loses some of its ability to buffer extremes such as drought and storms (Bosch & Hewlett 1982). Cropland also impacts water availability, though the type of crop affects how discharge is changed. Perennial crops and those with high transpiration rates can reduce the

water availability in a system, but seasonal crops can increase annual water yield (Allan 2004, Zhang & Schilling 2006). An increase in cropland can also lead to an increase in the use of irrigation, affecting water availability in multiple ways.

Climate change is also expected to alter the hydrology of Alabama. Currently, models of future climate change predict neither a strong increase nor decrease in precipitation in the central Southeast, however, an increase in variability of precipitation is expected (Mulholland et al. 1998). With this predicted change, the mean precipitation for the region may not change much, but more common and more intense droughts will be likely and these would be balanced out with more intense wet periods (Mulholland et al. 1998). In a climate with increased fluctuation of rainfall amount, the ability to recover from flow changes will become important for fish survival.

In Uchee Creek (Chattahoochee River drainage), Alabama, alterations in stream flow have resulted in a loss of fish biodiversity and faunal homogenization (Johnston & Macenia 2009, Lawson & Johnston 2015). These shifts in fish assemblage structure were from fluvial specialist dominated to generalist dominated, and many endemic species are on the brink of extirpation. These changes were strongly related to a severe reduction in water availability in the study watersheds and inspired this current study to expand into other portions of the state. The species that gain most from reductions in flow are generalists which prefer lotic systems, but can tolerate lower flows such as the Blacktail Shiner, *Cyprinella venusta*, and the Blackbanded Darter, *Percina nigrofasciata* (Lawson & Johnston 2015).

It is unknown if the biodiversity loss observed in Uchee Creek is true for other watersheds in Alabama. Furthermore, it is possible that some physiographic regions are more resistant to changes in hydrology than others due to more resilient biota or more stable habitat available. Therefore, the objective of this study was to investigate connections between stream hydrology

and fish assemblage persistence in multiple regions of Alabama. It was anticipated that where watersheds were impacted by disruptions in the natural flow regime caused by changes in land use and other factors, fish assemblage structure would shift from specialists to generalists. Where the watersheds were less impacted, it was expected that the fish assemblages would be more similar to the historic assemblages. Due to the length of time that some of these watersheds have been impacted, there was potential to see recovery in the fish assemblage if the watershed returned toward a more natural state. Specifically, hydrologic, land use and physiographic variables were evaluated in regard to changes in fish assemblage structure over time.

Study Area

This study took place across a wide geographic area in six watersheds throughout state of Alabama (Figure 1). These watersheds were selected based on the availability of historic data on fish assemblage structure and representation of a range of the physiographic regions and drainage basins of Alabama (Boschung & Mayden 2004). None of the streams in this study are flow regulated by dams, though three of them have impoundments in the watershed. The watersheds studied were Uphapee Creek in the Tallapoosa River basin, Five Runs Creek in the Yellow River basin, Shoal Creek in the Coosa River drainage, as well as Bear Creek, Cypress Creek, and Shoal Creek which are tributaries to the Tennessee River. None of these watersheds predominantly urban, but range from almost entirely forested to mixes of agriculture, light residential area and remaining forest (Table 1). All of these streams are strategic habitat units, as proposed by USFWS (http://www.fws.gov/daphne/shu/shu.html).

Uphapee Creek

Uphapee Creek is a tributary to the Tallapoosa River in East Central Alabama that drains an area of 1089 km^2 in portions of Lee, Macon, Russell and Tallapoosa Counties (Figure 2). The major northern tributaries, Chewacla and Choctafaula Creeks, arise in the Piedmont physiographic region and flow to the southwest through the Fall Line Hills onto the East Gulf Coastal Plain. The major southern tributary, Opintlocco Creek, originates along the southern edge of the Fall Line and flows west through the East Gulf Coastal Plain to where it meets Chewacla Creek to form Uphapee Creek. This creek continues through the Coastal Plain to its mouth on the Tallapoosa River. Oglethorpe Reservoir is in the upper portion of Chewacla Creek and is the water source for the city of Auburn. There are also other, small mill dams in the watershed.

Uphapee Creek is the most impacted watershed in this study. The land cover in the Uphapee Creek watershed has historically been made up of pasture, cropland, forest and a small portion of urban development. Much of the forested land is attributable to pulp silviculture. From 2001 to 2011, there has been an increase in cropland and a decrease in forest cover (National Landcover Dataset (NLCD) 2001, 2011). Over this same time period, there has been a slight increase in urban development in the watershed. This urbanization is mostly focused in the two cities in the watershed: Auburn and Tuskegee.

Five Runs Creek

Five Runs Creek is a southward flowing tributary of the Yellow River in Covington County with a watershed area of 318 km^2 (Figure 3). The entire watershed lies on the East Gulf Coastal Plain. The upper end of the watershed is mostly pasture and cropland with some urban development in and around the city of Andalusia. The lower end of the watershed is protected

from development by Conecuh National Forest and the Solon Dixon Forestry Education Center and the overall watershed is 56% forested (NLCD 2011). Historically, this area would have been dominated by Longleaf Pine (*Pinus palustris*) savannah. Much of the watershed is now in Slash Pine (*Pinus elliottii*) or Loblolly Pine (*Pinus taeda*) for pulpwood production, including portions of the National Forest.

Shoal Creek (Coosa River Drainage)

Shoal Creek is a tributary to Choccolocco Creek in the Coosa River basin. It originates on Talladega National Forest and has a watershed area of 102 km^2 (Figure 4). The entire watershed lies within the Piedmont Uplands physiographic region in Calhoun and Cleburne Counties. There are four run-of-the-river impoundments on the mainstem and a tributary built for recreational use by the Forest Service. The watershed is over 90% forested with a small amount of light development from Forest Service campgrounds in the watershed and is the watershed with the least anthropogenic impacts in this study. The far lower end of the watershed below Whiteside's Mill Lake is in cultivated cropland. The portion of the watershed on the National Forest is one of the last strongholds of the rare Holiday Darter, *Etheostoma brevirostrum* (Boschung & Mayden 2004).

Bear Creek

Bear Creek empties to the southern side of the Tennessee River at the Alabama-Mississippi border just upstream of the Tennessee-Tombigbee Waterway. This large stream drains 2444 km^2 in portions of Colbert, Franklin, Lawrence, Marion, and Winston Counties in Alabama and Tishomingo and Itawamba Counties in Mississippi (Figure 5). The very headwaters of Bear Creek start on the edge of the Cumberland Plateau physiographic region and flows through the Highland Rim physiographic region to the Fall Line Hills and Coastal Plain

towards its mouth. The watershed has three main branches: Bear Creek, Little Bear Creek, and Cedar Creek. The Tennessee Valley Authority (TVA) built four run-of-the-river dams (two dams on Bear Creek, one on Little Bear Creek, and one on Cedar Creek) between 1969 and 1979 for flood control, recreation, and water supply (Phillips and Johnston 2004). The Russellville Reservoir was constructed on the upper portion of Cedar Creek to provide water to Russellville.

The land cover in Bear Creek watershed is predominantly forested and agricultural with development making up less than 5% of the watershed. The largest town in the watershed is Russellville, but much of the development is spread throughout the watershed in several other small towns and communities. Bear Creek is a very species rich watershed with 104 fish species found in the watershed (Mettee et al. 2002).

Cypress Creek

Cypress Creek is a northern tributary to the South Bend of the Tennessee River that empties at Florence, Alabama. Cypress Creek drains 554 km^2 of Lauderdale County, Alabama and Wayne County, Tennessee in the Highland Rim physiographic region (Figure 6). The lower portion of the watershed has been impacted by development from Florence and its outskirts. Upstream of the Florence, the watershed is close to an even mix of agriculture and forest. A strip of the watershed is protected by the Natchez Trace Parkway. Cypress Creek is also home to the endemic Crown Darter, *Etheostoma corona* (Boschung & Mayden 2004).

Shoal Creek (Tennessee River Drainage)

Shoal Creek is a large northern tributary of the South Bend of the Tennessee River in the Highland Rim physiographic region (Figure 7). The watershed encompasses 965 km^2 of Lauderdale County, Alabama and Wayne and Lawrence Counties in Tennessee. More than 20 km of the lower portion of Shoal Creek is inundated by the pool of Wilson Reservoir on the

Tennessee River. The watershed is 50% forested above the inundated portion with roughly another quarter of the watershed in agriculture. Less than 8% of the watershed has been developed. There are several large shoals on the mainstem of Shoal Creek including Goose Shoals just above the upper end of the reservoir pool. The watershed is home to the endemic Lollipop Darter, *Etheostoma neopterum*, and the narrowly-distributed, federally endangered Boulder Darter, *Etheostoma wapiti* and the federally threatened Spotfin Chub, *Erimonax monachus*, as well as other rare species with limited occurrences in Alabama.

Methods

Site Selection

Sites were selected based on the availability of historic fish assemblage data, especially from past studies conducted by the Auburn University Fish Biodiversity Lab when available to improve continuity. Other data reviewed were from collections in the Auburn University Museum of Natural History, the University of Alabama Ichthyological Collection, the Tulane University Museum of Natural History – Royal D. Suttkus Fish Collection, and the University of Tennessee Etnier Ichthyological Research Collection accessed through the Fishnet 2 database (www.fishnet2.net). From these sources, collections were selected that represented a sampling of the complete assemblage rather than collections for a select few species. A few of the sites originally selected were not sampled due to high stream flows on the sample dates that prevented sampling, and others were only sampled during one of the years of the study. A total of 80 sites were sampled at least once during the contemporary period of this study (Appendix 1).

Collection Methods

In the summers of 2013 and 2014, streams were sampled according to the same protocol used in past studies conducted by the same lab (Phillips & Johnston 2004, Johnston & Maceina 2009, Lawson & Johnston 2015, Best et al. 2016). Site coordinates were logged using a hand-held GPS unit (Garmin GPSmap 60CSx). Fishes were collected using a backpack electrofisher and a 3 m x 1.75m seine. A stream reach of approximately 15 times the wetted width was sampled at each site. All available mesohabitats were sampled roughly proportional to their area at the site. Samples took roughly an hour to complete. Fishes collected were anesthetized using tricaine mesylate (MS-222) and fixed in a 10% formalin solution. Collections were sorted and identified in the lab and stored in a 50% isopropanol solution. Collections will be deposited in the Auburn University Museum of Natural History. Fish collection records were managed in Microsoft Excel 2013. Most sites were sampled during two consecutive summers and the assemblages compared using the Morisita Similarity Index in order to validate our methods and detection (Appendix 3).

Some of the 2013 samples in the Bear Creek watershed were carried out in collaboration with biologists from the Geologic Survey of Alabama. In these samples, most fishes were identified and released alive with only representative voucher specimens taken for later verification.

Data Analysis

Hydrologic data for analysis were retrieved from the United States Geological Survey (USGS) National Water Information System. Active stream gages were available on the mainstem creek in two watersheds: Uphapee Creek near Tuskegee, AL (USGS 02419000) and Shoal Creek at Iron City, TN (USGS 03588500). Gages in adjacent, watersheds with similar

landcover were used as proxies where gages were not available in the study watershed or the record from the gage was only available for a small period of the time range investigated by this study (Appendix 2). The gage on Choccolocco Creek at Jackson Shoal (USGS 02404400) was the proxy for Shoal Creek in the Coosa drainage; The Blackwater River gage near Bradley, AL (USGS 02369800) was used for Five Runs Creek; Buttahatchee River below Hamilton, AL (USGS 02438000) was proxy for Bear Creek; Shoal Creek at Iron City, TN (USGS 03588500) was used for Cypress Creek. Both annual and daily means for the water years of interest to the study were downloaded for time series analysis and calculation of other hydrologic variables.

To see if if discharge was changing over time in each watershed, mean annual discharge was regressed against time in the open source statistics program R. Annual mean, median, and standard deviation of discharge were calculated in Microsoft Excel from daily mean discharges for the water years (October 1 to September 30) that coincided with fish collections used in this study. Median annual discharge was used as a measure that would be less affected by extreme discharge values than the mean. Mean annual discharge was kept in the analysis because of its widespread use in other analyses. The standard deviation of discharge was initially used as a measure of flashiness, but it was strongly tied to mean discharge. The Richards-Baker Flashiness Index (R-B Index) was used instead as a measure of the flow stability in the watersheds studied. This index compares the pathlength of the of the annual discharge hydrograph to the sum of the mean daily discharges (Baker et al. 2004). The higher the index score, the more extreme the hydrologic fluctuations. The pathlength was computed as the sum of the absolute value of the day-to-day differences of the mean daily discharge over the course of a year and the index is calculated with the following formula:

Richards-Baker Flashiness Index

$$\frac{\sum_{i=1}^{n} |q_i - q_{i-1}|}{\sum_{i=1}^{n} q_i}$$

q = daily mean discharge (ft^3/s)

Watersheds draining to each sample site were delineated using the USGS Stream Stats Version 3 interactive map for Alabama (http://water.usgs.gov/osw/streamstats/alabama.html). Shapefiles for each site's drainage area were downloaded into ArcGIS 10.3.1 for further analysis. Because most site drainage areas were nested within the drainage areas of downstream sites, the data taken from the shapefiles were not entirely independent, but could not be avoided given the nature of watersheds the the availability of historic sample sites. Data and shapefiles for the whole study watersheds were taken from USGS Hydrologic Unit Code (HUC) files.

Land cover data were taken from National Land Cover Dataset (NLCD). Datasets from the 2001, 2006 and 2011 NLCD reports were used to measure changes to the land draining to the sample sites. Arc GIS 10.3.1 was used to measure the proportion of each land cover type in the watersheds draining to the sample sites with a focus on forest, cropland, and development land cover types.

To validate the sampling methods, the fish assemblages from sites sampled twice during the contemporary period were compared between the two years using the Morisita Similarity Index (I_m). The Morisita Index is more conservative than other similarity indices and incorporates species abundances so that it is less biased by naturally rare species (Wolda 1981). Values for the Morisita Index range from 0 to 1 with 1 representing completely identical assemblages and 0 indicative of no overlap in the assemblages. Past studies have considered values ≤ 0.4 to have low similarity and values of ≥ 0.7 to have high similarity (Johnston &

Maceina 2008, Matthews et al. 1988, Phillips & Johnston 2004). Scores were kept separate for comparisons between sites and averaged for each watershed to compare between watersheds. The similarity calculations were made using the program PAST 3.0 according to the formula:

Morisita Similarity Index

$$I_m = \frac{2\sum n_{1i}n_{2i}}{(\lambda_1 + \lambda_2)N_1N_2}, where\ \lambda_j = \frac{\sum n_{ji}(n_{ji} - 1)}{N_j(N_j - 1)}$$

n_{ji} = *the number of individuals of species* i *in sample* j

N_j = *the number of individuals in sample* j

The correlations between fish and landcover and hydrologic data were analyzed using multivariate, constrained ordination techniques using the community ecology analysis package, 'vegan 2.0-10', in the program R. Fish assemblage data from each watershed arranged by site were ordinated using partial redundancy analysis (pRDA). This ordination method combines multiple regression (MR) with principal component analysis (PCA) and is a useful tool to analyze the response of a community to environmental variables (Legendre & Legendre 1998). The ordination in the PCA portion of the analysis is constrained by environmental variables, better explaining the variance caused by these variables. Partial RDA partitions the variance from selected environmental variables allowing them to be accounted for like covariates in linear regression.

Because canonical analyses like RDA use Euclidean distance in the ordination, the raw assemblage data, which contain many zeros, must be transformed for use in these methods (Legendre & Gallagher 2001). Hellinger distance was used in this study because it is considered to maximize both linearity and resolution (Legendre & Gallagher 2001). The transformation of

the assemblage data in this study was done using the vegan package in R. The Hellinger transformation formula for use with Euclidean distance is as follows:

Hellinger transformation

$$y'_{ij} = \sqrt{\frac{y_{ij}}{y_{i+}}}$$

Ordination was carried out in R on the transformed assemblage datasets for each study watershed individually because of the different species makeup across basins. The RDA was constrained using hydrologic variables and year of collection (Tables 1-6). Early analysis found that watershed area had a very strong effect on fish assemblage as would be expected across a gradient of stream sizes (Paller 1994). To account for the variance from watershed size and allow for better analysis of the other variables, the RDA was conditioned by watershed area for each site.

The environmental variables corresponding to the collection years of the fish data were then fit as vectors to the ordination plot using MR in the vegan package of R. Using permutation testing available in the vegan package of R, the significance of these vectors could be tested. Each test was run with 999 permutations allowing for a minimum p-value of 0.001.

One of the advantages of RDA is the ability to do significance testing (Legendre & Legendre 1998). The overall ordinations were tested using a permutation test that is a modified analysis of variance (ANOVA) found in the vegan package for R. Only in ordinations with a significant p-value can the environmental vectors fitted to them have the possibility of significance. The goodness of fit was also calculated for the ordination using the r^2 statistic.

In interpreting the results of the analysis, fish were divided into guilds based on life history traits found in Boschung & Mayden (2004) and the designation provided by the Geological Survey of Alabama (GSA) (O'Neil & Shepard 2009).

Results

Field Collection

A total of 16,662 fishes were collected from 66 samples in 2013 and 75 samples in 2014 (Appendix 1, Appendix 6). Collections were made at 62 of the sites in both 2013 and 2014 (Appendix 3). The average Morisita similarity between samples from 2013 and 2014 was 0.5612. Since most of the sites had moderately high similarities, it was determined that the methods used had an acceptable level of detection and reliability. The Morisita similarities for all sites including historic collections is found in Appendix 4.

Some fish assemblage change was seen in most of the watersheds studied. Shoal Creek (Coosa), Shoal Creek (Tennessee), and Cypress Creek had the most stable assemblages between the historic and contemporary samples. The fish assemblages in Uphapee Creek, Bear Creek and Five Runs Creek were the most dissimilar between historic and contemporary collections.

Where dissimilarity was seen in developed watersheds, much change could be seen in losses or decreases in fluvial specialist minnow and darter species and increases in generalist species. This was the case at many of the sites in the Uphapee watershed (Figure 2) where species such as *Notropis uranoscopus* and *Notropis ammophilus* were reduced while generalists such as *Cyprinella venusta* and *Nocomis leptocephalus* became dominant species.

At other sites, low similarity was not caused by an overall trend, but by an unstable assemblage structure. This was seen most clearly at sites in the Uphapee watershed (Figure 2),

the Five Runs watershed (Figure 3), and the Bear Creek (Figure 5) where the assemblages were already generalist dominated, but the dominant species are in flux. At these sites, we saw low similarity between the two contemporary samples as well as between contemporary and historic samples (Appendix 4). This was also the case seen at Site 10 in the Shoal Creek (Coosa) watershed (Figure 4). At some of the headwater sites in the Cypress Creek and Shoal Creek (Coosa) watersheds (Figures 6, 4), lower similarity scores were seen due to the increased impact of small changes in species proportions due to the small number (<100) of total fishes caught at these sites though they are well protected.

The watersheds in the physiographical uplands, Shoal Creek (Coosa), Cypress Creek, and Shoal Creek (Tennessee) appear to be more resilient based on the similarity index than the lowland watersheds. Because it was possible to only sample the lower portions of the Cypress and Shoal (Tennessee) watersheds, it is possible that the values are more stable due to the increased stability of larger systems.

Hydrology

The time series analysis of the discharge from the USGS gages from the past 50 years found only one significant trend from the data of the 5 gages investigated (Figures 8-12). Uphapee Creek (USGS 02419000) was found to have a 4.05 ft^3/s (±3.21; 95% CI) decrease in discharge per year since 1964 ($p=0.015$, $r^2=0.12$). In the same period, there was no significant trend in precipitation.

The annual mean, median, standard deviation of discharge and R-B flashiness index were calculated for each gage for each water year that was represented by a collection in that watershed (Table 7). Daily means were not available for all years, so some data points are missing. These were used as hydrologic variables in the RDA.

Land Cover

Land cover data was compiled for the area draining to each sample site from the NLCD for 2001, 2006, or 2011 depending on when samples were collected. Land cover data from the 2001 and 2011 surveys were also compiled for the 6 large study watersheds (Figures 13-18). Percentages of each land cover type was used to fit vectors to the RDA. Land use was relatively stable across all the watersheds studied except for Bear Creek which saw a large increase in deciduous forest cover between 2001 and 2011, much of which is accounted for by a loss of scrub, pasture, and cropland, as well as the possible conversion or reclassification of areas of mixed or evergreen forest. The most stable watershed was Shoal Creek in the Coosa drainage since most of the land is protected on Talladega National Forest.

Redundancy Analysis

Permutation testing found the RDA ordinations to be significant in five of the six study watersheds: Uphapee Creek ($p=0.01$), Five Runs Creek ($p=0.005$), Shoal Creek (Coosa) ($p=0.034$), Bear Creek ($p=0.02$), and Shoal Creek (Tennessee) ($p=0.017$). The RDA ordination for Cypress Creek was found to be non-significant ($p=0.52$). In the watersheds with the significant ordinations, the significance scores for the vectors fitted in the MR are valid. In the Cypress Creek watershed, the p-values for the environmental vectors are not valid, but patterns can still be investigated. A significant score for the variable of sample year in the MR represents a detectable change in a fish assemblage over time.

In the analysis for the Uphapee watershed, five environmental variables were found to be significant in the MR (Figure 19, Table 1). Conditioning for watershed area accounted for 5.4% of the variance in the ordination. The constraining hydrologic variables accounted for 10.5% of variance. The vectors for the hydrologic variables and year were somewhat correlated and

strongly negative in the RDA2 axis. The hay and pasture land cover type was nearly perpendicular to the year and discharge vectors and negatively correlated. The species with the strongest response (furthest from the origin) include *Cyprinella venusta*, *Percina nigrofasciata*, *Fundulus olivaceous, Minytrema melanops,* and *Ameiurus natalis*.

In the Five Runs watershed, four hydrologic variables were found to be significant and one land cover variable was close to significant in the MR (Figure 20, Table 2). Watershed area accounted for 6.7% of variance as a conditioning variable. The remaining constraining hydrologic variables accounted for 15.3% of the variance. The pattern of vectors was similar to that of Uphapee, with the hydrologic variables and year in nearly the same direction and negative in RDA2 and mixed forest pulling out perpendicular in a positive direction along RDA1. The most strongly responding species include five centrarchids as well as *Fundulus escambiae* and *Etheostoma swaini*.

The MR for the Shoal Creek (Coosa) watershed had four significant hydrologic variables as well as collection year (Figure 21, Table 3). The RDA aliased all of the constraining variables into two vectors associated with precipitation and year due to collinearity. Watershed area accounted for 12.4% of the variance in the RDA. The remaining variables accounted for 8.9% of the variance. In the MR, year was positive along RDA1. The remaining hydrologic variables are positive in both axes. The species with the strongest responses were more generalist species.

Bear Creek had nine significant environmental vectors in the MR, seven were land cover variables, one was year, and one was flashiness (Figure 22, Table 4). Watershed area accounted for 8.4% of variance and the constraining variables accounted for 4.1%. The development land cover variables are all opposite the two forest variables. The R-B index vector is nearly directly

opposite the hay and pasture vector indicating negative correlation. Many of the species with the strongest responses were generalists, including the invasive Weed Shiner, *Notropis texanus*.

In Shoal Creek (Tennessee) none of the environmental variables in the MR were found to be significant, although the overall ordination was. The year, mean discharge, and R-B index vectors had the lowest p-values and were displayed in the plot to visualize potential patterns (Figure 23, Table 5). The ordination was conditioned for watershed area, which accounted for 20.2% of the total variance. The constraining hydrologic variables accounted for 33.8% of variance. The year and the R-B index vectors were negatively correlated. The mean discharge vector was positive in the RDA1 axis and negative in the RDA2 axis. The species with the strongest responses included both generalists, such as *Campostoma oligolepis*, and specialists, such as *Erimystax dissimilis*.

The RDA ordination for Cypress Creek was non-significant, but environmental vectors were fit to the ordination using MR to investigate possible patterns (Figure 24, Table 6). Of the variance in the ordination, 11.2% was accounted for by watershed area and 14.5% were accounted for by the constraining variables. In the MR, mean and median discharge were nearly collinear on the positive side of RDA1 and the negative side of RDA2. The mixed forest land cover vector and the R-B index vector were nearly collinear and positive on both axes. The vector for year was negative on both axes. The species farthest from the origin were mostly generalist species.

Discussion

Across Alabama, changes were seen in the hydrologic regimes and fish assemblages of the study streams. In most cases where a detectable change was seen in the fish assemblages, it

was toward an increase in generalists. The generalist fish species were more likely to show a strong response in the analysis to environmental variables than specialists which points toward their opportunistic lifestyles when other fishes are negatively impacted. Past studies found similar trends in Alabama of increasing proportions of generalist species related with hydrologic alteration (Kinsolving & Bain 1993, Phillips & Johnston 2004, Poff et al. 2007, Lawson & Johnston 2015, Best et al. 2016). The generalist fishes that positively respond to altered flow regimes are typically cosmopolitan species with a wide range and little conservation concern. On the other hand, fluvial specialist species often include watershed or basin endemics that are considered of high conservation importance. In the Shoal Creek (Tennessee Drainage) watershed, two fluvial specialist, narrow basin endemics have been extirpated. Spotfin Chub, *Erimonax monachus*, and Boulder Darter, *Etheostoma wapiti*, have suffered from the loss and impairment of habitat (Boschung & Mayden 2004). Though loss of habitat from the inundation of the lower portion of the mainstem by Wilson Pool is unlikely to be improved in the foreseeable future, both fishes have been reintroduced into the upper portions of the stream. Hopefully the improved hydrologic stability seen in that watershed in this study will improve the chances of recovery for these fishes.

Many of the common, negative impacts to stream habitat such as siltation, bank incision, and reduction of lotic character are related to hydrologic changes. Increased flashiness from increased overland storm flow can lead to an increase of erosion and stream bed down cutting. These actions result in excess silt in the stream and loss of floodplain connectivity from the incision of the stream (Lawson & Johnston 2015). Such signs of hydrologic alteration were seen in streams in almost all of the watersheds in this study. The most extreme examples were in Uphapee Creek where portions of the stream were incised over 4 m and the stream bed had been

scoured to a solid layer of clay in the runs and the pools were filled with unstable shifting sediment (pers. obs.). Similar alteration to the hydrologic regime can lead to a reduction in baseflow that can lead to a greater portion of a stream becoming lentic habitat. These changes favor habitat generalists.

The hydrologic changes that lead to habitat degradation are strongly tied to changes in land cover. The watershed in this study that saw the only significant trend in water availability (Uphapee Creek) had much of the land cover converted to agriculture over the course of the 20th century. A growing population will lead to increased demand for water and development of residential areas. These could exacerbate hydrologic regime alteration. In half of the watersheds of this study, land cover variables were found to be significant, implying that land cover has an effect on the fish assemblages in these watersheds. In Shoal Creek on the Talladega National Forest, there was no impact found from land use because of the uniformity and stability of forest cover in the majority of the watershed. At the site off of the National Forest (Site 10), the assemblage was quite different from those on the forest and was an unstable mix of generalists that turnover through time. The biggest way land use affects the assemblage is through changes in hydrology. Though runoff of chemicals and nutrients can affect the life in streams, more commonly hydrology has a widespread impact.

In this study, the upland watersheds, Shoal Creek (Tennessee) (Highland Rim), Cypress Creek (Highland Rim), and Shoal Creek (Coosa) (Piedmont Uplands), appeared to be more resilient than the lowland streams. This may be a result of more resilient, larger substrate types in upland streams than in lowland streams. However, investigating the role of physiography in fish assemblage resilience to other perturbations was weakened due to little or no replication in

physiographic region and the difficulty in accounting for differences in fish species make up in different drainage basins.

Uphapee Creek

The Uphapee Creek watershed had the most developed area draining to any of the sites in this study. With a long record of occupation and a history of poor farming practices, this watershed has more anthropogenic impacts than others in this study. It is also the only watershed in the study that had a strong, significant trend in mean annual discharge in the 50 years leading up to the contemporary collections of this study. In the time period represented by available fish data, the hydrologic variables appear to be positively correlated with year, suggesting that as time goes by discharge is increasing, but so is flashiness. With a predicted 45.6% increase in the Lee County population (Trent 2012), the city of Auburn in the upper end of the watershed is expected to grow, which will cause more water forest drain to the streamresulting in increasing runoff and changing the flow regime. The only significant land cover variable for Uphapee Creek was hay and pasture use. Hay and pasture have less holding capacity than natural forest and so may also contribute to lower baseflow even with reduced transpiration (Allan 2004).

The species most strongly affected in the general direction of change over time in the Uphapee Creek watershed in the RDA appear to be *Percina nigrofasciata* and *Cyprinella venusta*, two generalist species. The species most strongly, negatively associated with the passage of time and increase in discharge appears to be *Fundulus olivaceous*. Because the period of impact in this watershed goes back further than reliable historic fish assemblage data, some of the sites in this watershed show high similarity across time with assemblages being indicative of an impacted stream. This points to chronic impacts. Some of the sites show increases in

proportion of specialists over time, which may be associated with improved farming practices reducing heavy runoff.

The dominance of *Cyprinella venusta* and *Percina nigrofasciata* over time is reflective of the shift to generalist dominated assemblages, including those species, with the reduction of water availability seen in the adjacent Uchee Creek watershed (Lawson and & Johnston 2015).

Five Runs Creek

The Five Runs Creek watershed has roughly been half converted to agriculture and residential area and half maintained as evergreen forest with very little change in the entire watershed since 2001 (Figure 14). The natural predominant land cover for that area is Longleaf Pine (*Pinus palustris*) savannah, and this land cover has been reasonably well maintained on the Conecuh National Forest. In the RDA of the data for the watershed, the hydrologic variables were positively correlated with the passage of time along the RDA2 axis. This may have been influenced by the fact that the historic survey of the watershed carried out by this lab took place in severe drought and made up the largest portion of the historic data in this watershed. The contemporary samples were conducted during two very wet years in the watershed and may have affected the trend of the analysis.

Mixed forest was another significant vector. In the Five Runs watershed, mixed forest is mostly found around residential areas as a result of selective regrowth after cutting the native longleaf pine forest and around swampy areas. This is reflected by the species associated with this vector which are either swamp denizens (*Fundulus escambiae* and *Centrarchus macropterus*) or generalists (*Pomoxis nigromaculatus, Lepomis marginatus,* and *Gambusia holbrooki*).

A few of the sites in the upper portion of the watershed are in the residential and agricultural areas surrounding the city of Andalusia. These sites have been impacted over a long period of time and some of these showed assemblages predominated by generalists historically and contemporarily (Sites 2 and 16). The lower end of the watershed has been more protected and the assemblages reflect this with higher levels of specialists. Many of the fishes of coastal plains streams have adapted to a more generalist lifestyle in order to cope with the naturally more variable hydrology of the region.

Shoal Creek (Coosa)

Shoal Creek is the most forested watershed in this study and is protected by Talladega National Forest. In the analysis, the hydrologic variables were aliased to year and precipitation, indicating that discharge and the other hydrologic variables were strongly associated with precipitation. This association is to be expected given how well buffered the watershed is since development is not affecting the flow regime. The first axis is collinear with year and can be considered interannual variation and accounts for the most variance. The species associated with that change go from more generalist species in the past (*e.g. Ameiurus natalis, Lepomis macrochirus*) toward more specialist species contemporarily (*Cyprinella caerulea*). Many of the species seen along this gradient were only found at the lower most site below Whiteside's Mill Dam, which is off the National Forest and in an agricultural field and tend to show improvement at that site. There was little change in the assemblages on the National Forest supporting the protection given by a forested watershed.

Bear Creek

Bear Creek is the largest and most extensively sampled watershed in this study. The watershed has a complex interplay of many different land cover types that affect the fish

assemblage. In the RDA, this watershed had the highest number of significant land cover classes. More than half of the significant land cover classes were levels of development (i.e. open, low, moderate, and high). These run somewhat opposite to the R-B index vector, which is counter to the typical response of increased flashiness to increased urbanization (Baker et al. 2004). Instead, flashiness seems to be negatively correlated with pasture. The two forest types were strongly, negatively correlated with the development classes. The largest change in land cover in any watershed in the study was seen in Bear Creek with a large increase in deciduous forest. Surprisingly, deciduous forest was not found to be a significant factor in the analysis.

Best et al. (2016) similarly found land cover to be a very important driver of assemblage in the Bear Creek watershed. The relationships between the various land cover classes were also very similar as was the small part played by hydrology: mean annual discharge in Best et al. (2016) and flashiness in this study. Many of the generalist species in this analysis were positively correlated with the R-B index in this watershed showing that high variability favors generalists. It is possible that the role of hydrology in a large watershed as this, would be better detected if multiple gages were available in different parts of the watershed with different land cover trends.

Shoal Creek (Tennessee)

Shoal Creek is a large watershed with a majority of the area in the state of Tennessee. This watershed had the smallest number of sites and samples of any watershed in the study, which likely led to the non-significant MR results. It is still possible to look at the patterns from the vectors with the lowest p-values. By doing so, it is clear that R-B index is negatively correlated with year. There is a strong decrease in flashiness in the 40 year period covered by the historic collections used in this study, but with very little change in land cover over the past 15 years.

Potentially, this watershed is recovering from past land practices beyond the scope of the land cover data used in this study. The species associated with the change in time are a mix of generalists, fluvial specialists, and fish that do not fit in either category. This watershed has been very stable over the years as seen from the similarity data which may reflect a stability in land use through the years.

Cypress Creek

Cypress Creek did not have a significant ordination, but some potential patterns did arise. In the MR, which were significantly fitted to the ordination, but non-significant overall, flashiness is again negatively correlated with year. This may not be the case for this watershed itself though, because the hydrologic data was taken from the gage on Shoal Creek at Iron City, Tennessee. If discharge is investigated though, it is negatively correlated with a cluster of darters which unclear becausemost of these species are fluvial specialists. The amount of historic data for this watershed was very limited which may have affected the analysis.

Conclusions

Fish assemblages are changing or variable in some of the streams in Alabama. These changes are at least partially driven by altered hydrology in some of the cases which is in turn a product of land cover and water use in the watershed. Unlike the hydrologic impacts from hydroelectric dams where the cause of the change is clear, in unregulated systems the causes of the hydrologic shift occurs at the landscape scale. On a regulated stream, it is possible to mitigate for some of the changes caused to the hydrology downstream of the impoundment by implementing releases that mimic natural flows (Kiernan et al. 2012). Repairing changes to the hydrology caused by land cover change takes a community approach that encourages and funds

improved farming practices, intelligent development planning, and natural reforestation where possible.

Other studies in the region found have found fairly clear connections between hydrology, land cover, and stream communities. A series of studies in western Georgia found connections between altered hydrology and land cover, and in turn stream community structures based on contemporary data; these connections found more habitat generalists in more anthropogenically affected conditions (Helms et al. 2005, Schoonover et al. 2006, Helms et al. 2009). Another study in Georgia found similar results based on urbanization (Roy et al. 2005). In eastern Alabama, the studies that inspired this study found homogenization of fish assemblages with shifts to generalist dominated structures mediated by alterations in hydrology and land cover over a 40 year time period (Johnston & Maceina 2009, Lawson & Johnston 2015). This current study found changes occurred in fish assemblages across a range of times, but determining which hydrology and land cover factors were affecting these changes were less clear due to legacy effects of land use in some of the more developed watersheds as well as potentially different responces to change in different physiographic regions on fish faunas native to different river drainages.

It is important to consider the impacts of hydrology on the stream biota in Alabama because of the incredible aquatic biodiversity that is found in the state. In order to protect this diversity from possible future harm from unforeseen circumstances, it is important to maintain natural, biodiverse and resilient faunal assemblages now (Allison 2004).

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Figure 1 – Study Watersheds

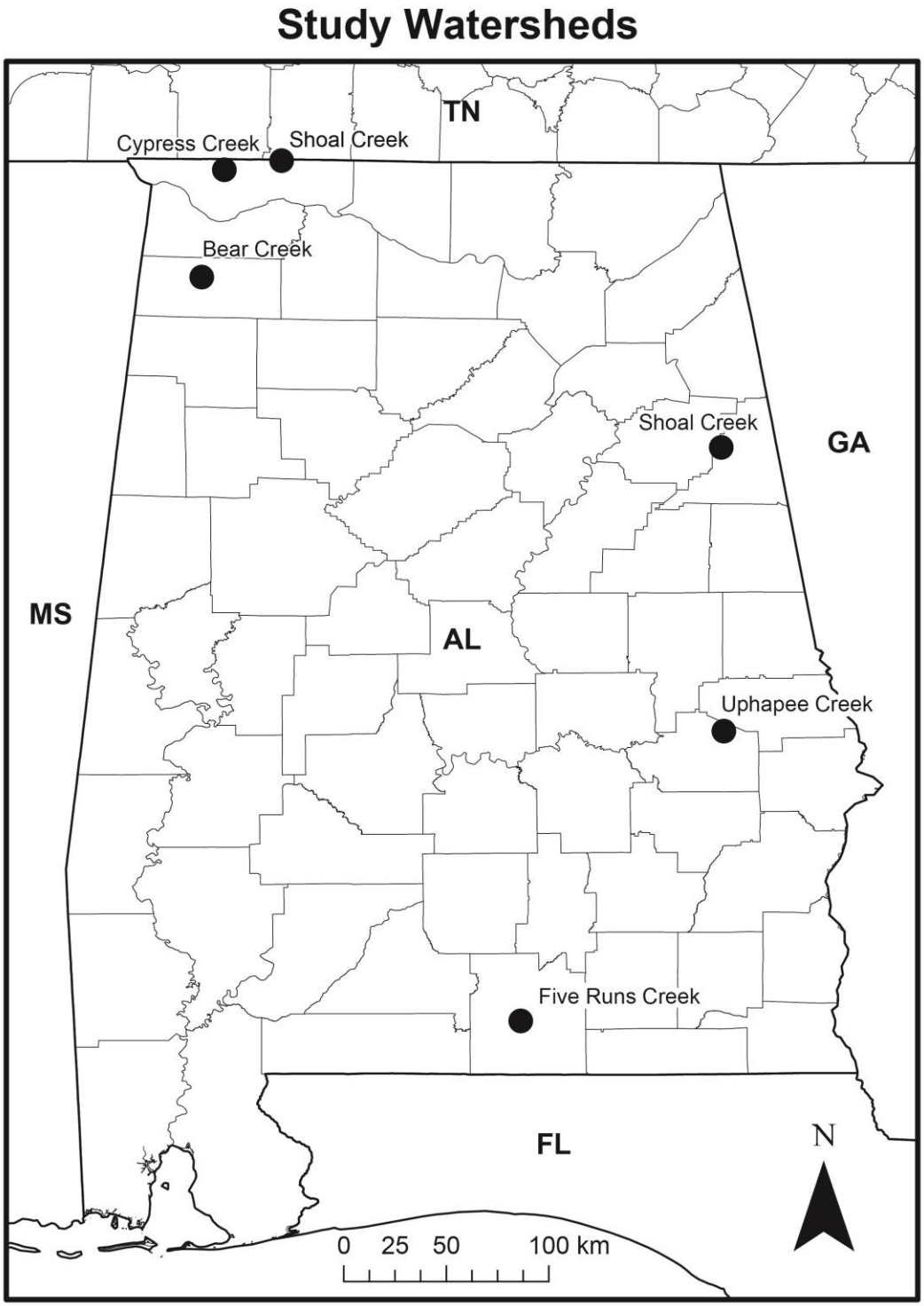

Figure 2 – Uphapee Creek watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

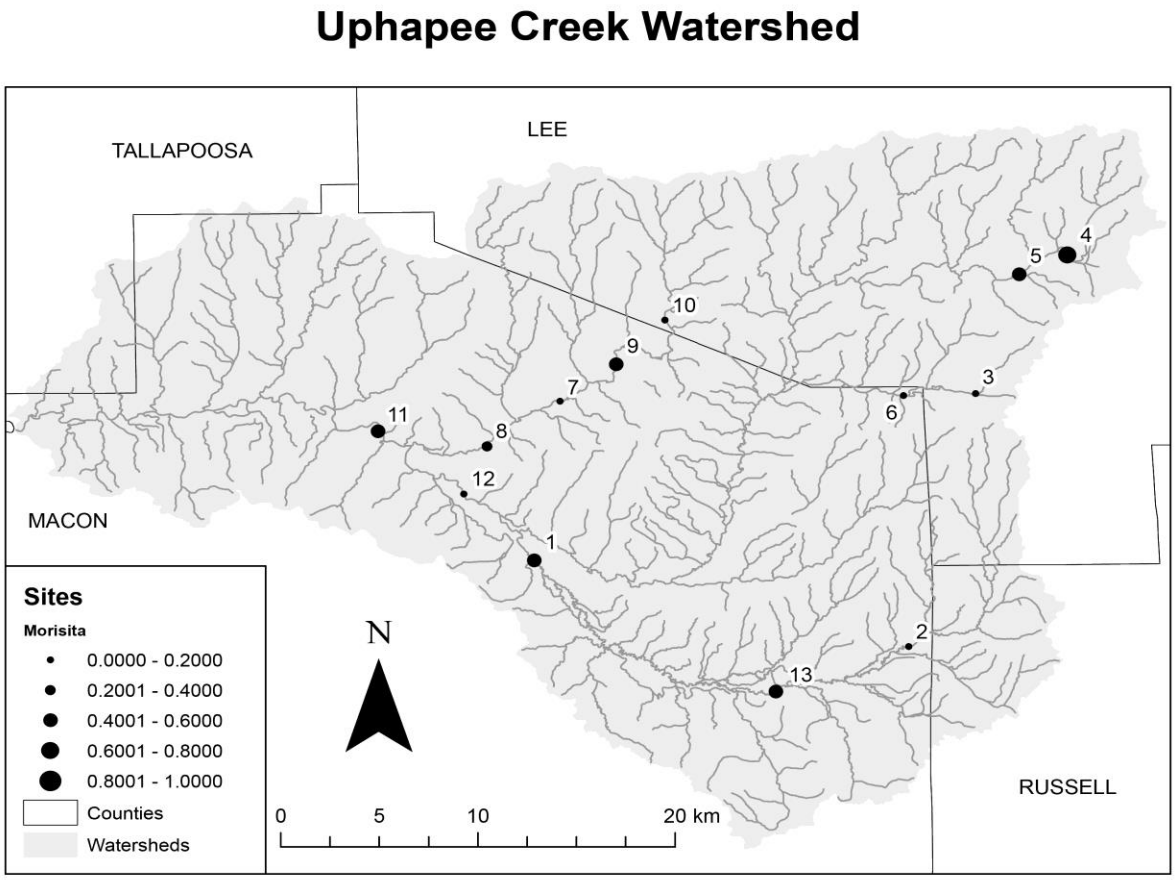

Figure 3 – Five Runs Creek watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

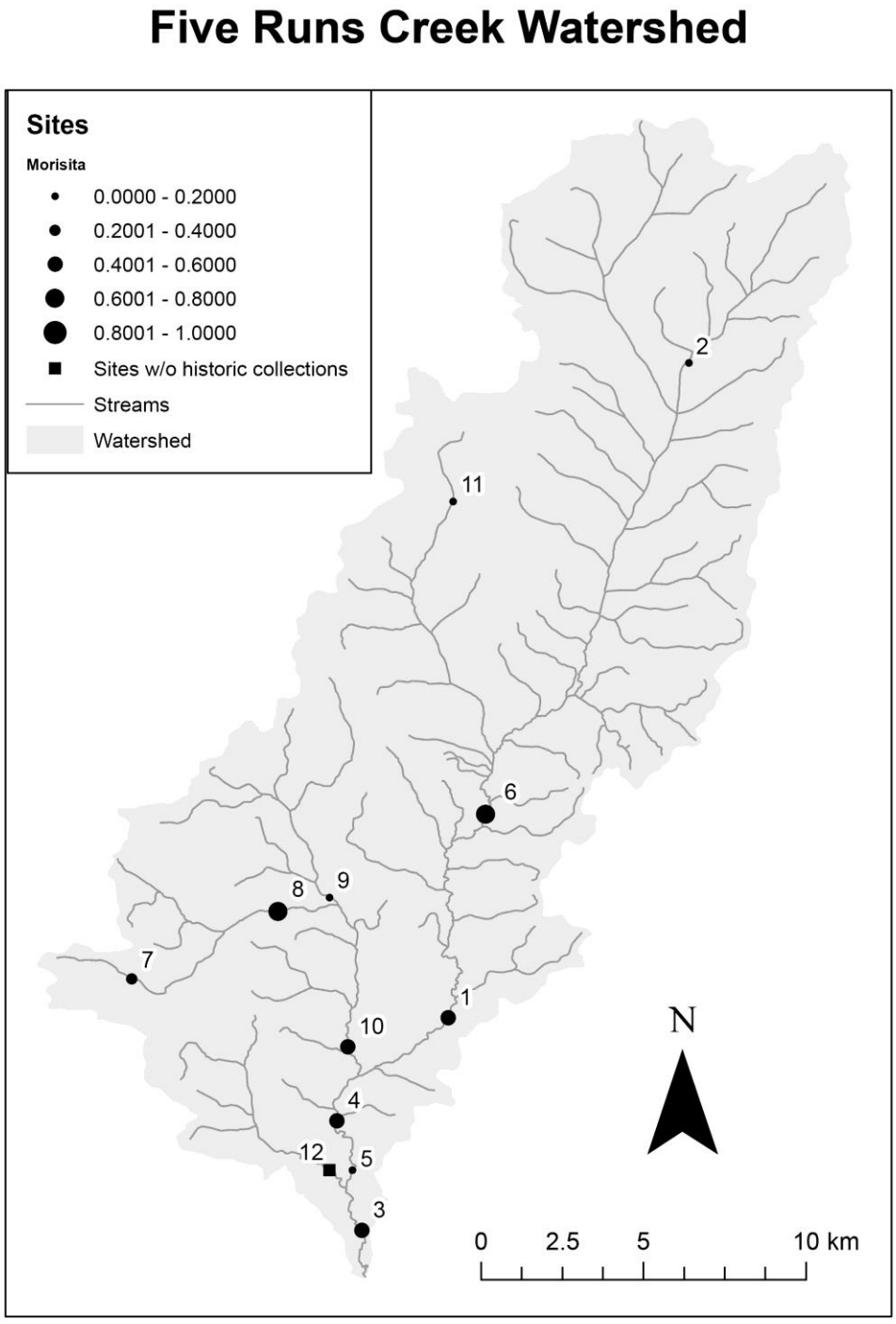

Figure 4 – Shoal Creek (Coosa) watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

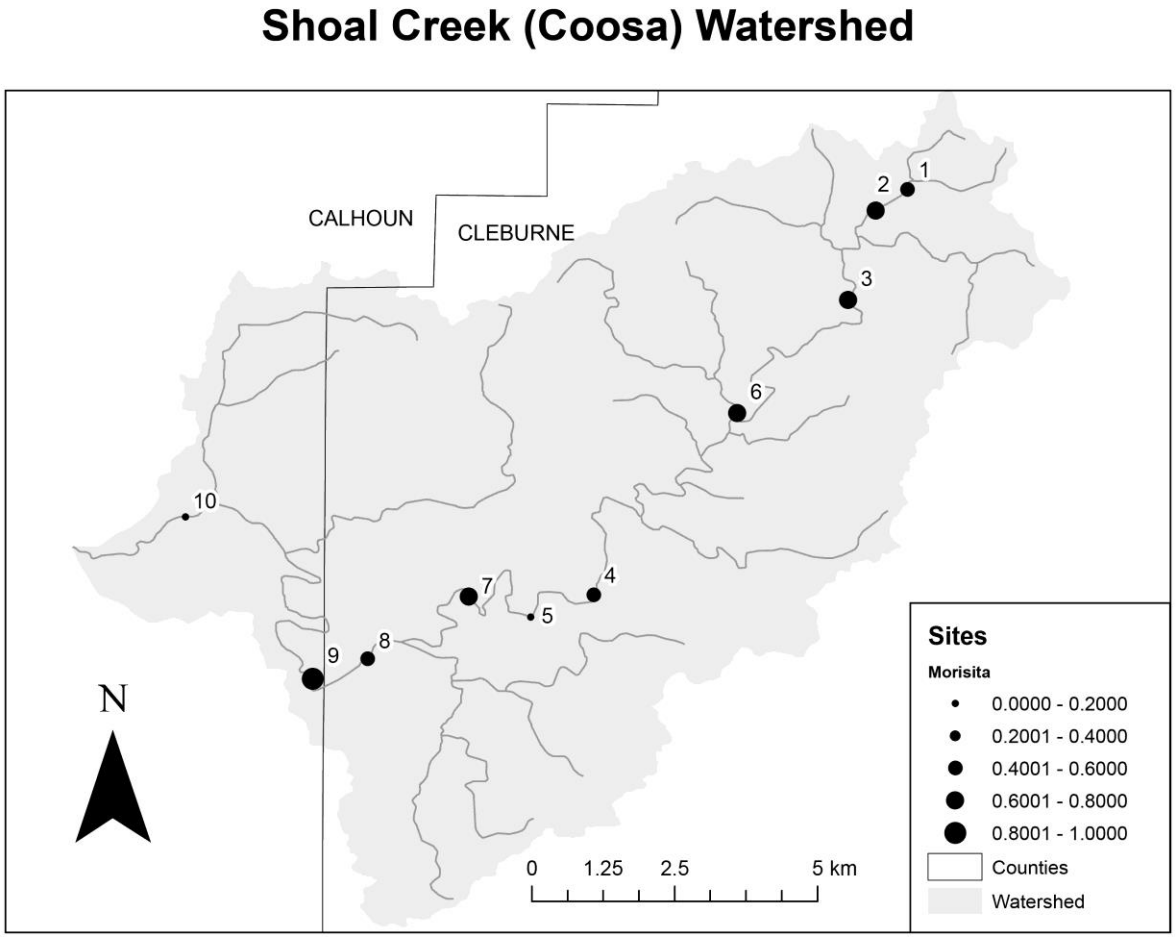

Figure 5 – Bear Creek watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

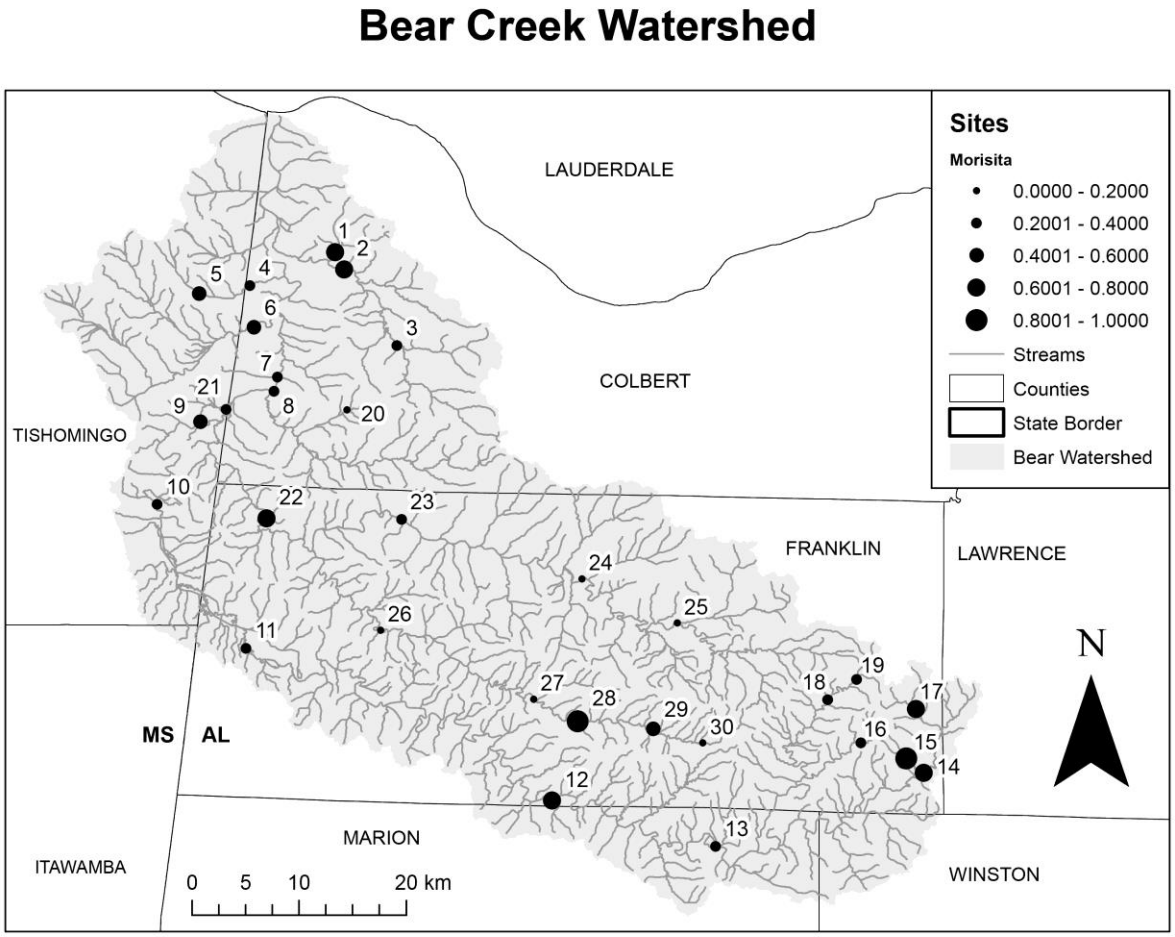

Figure 6 – Cypress Creek watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

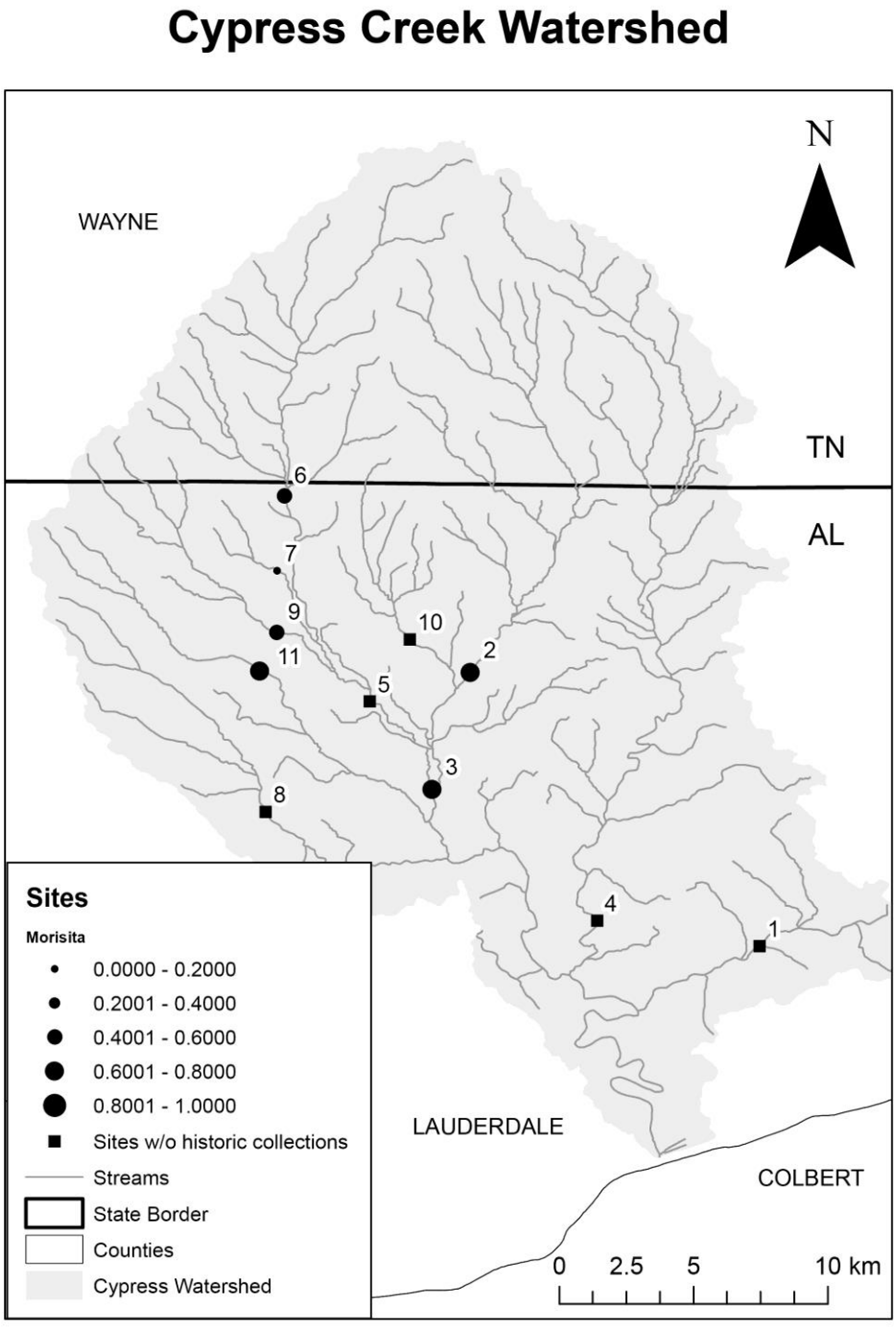

Figure 7 – Shoal Creek (Tennessee) watershed sample sites with comparison of contemporary and historic assemblages using Morisita's similarity

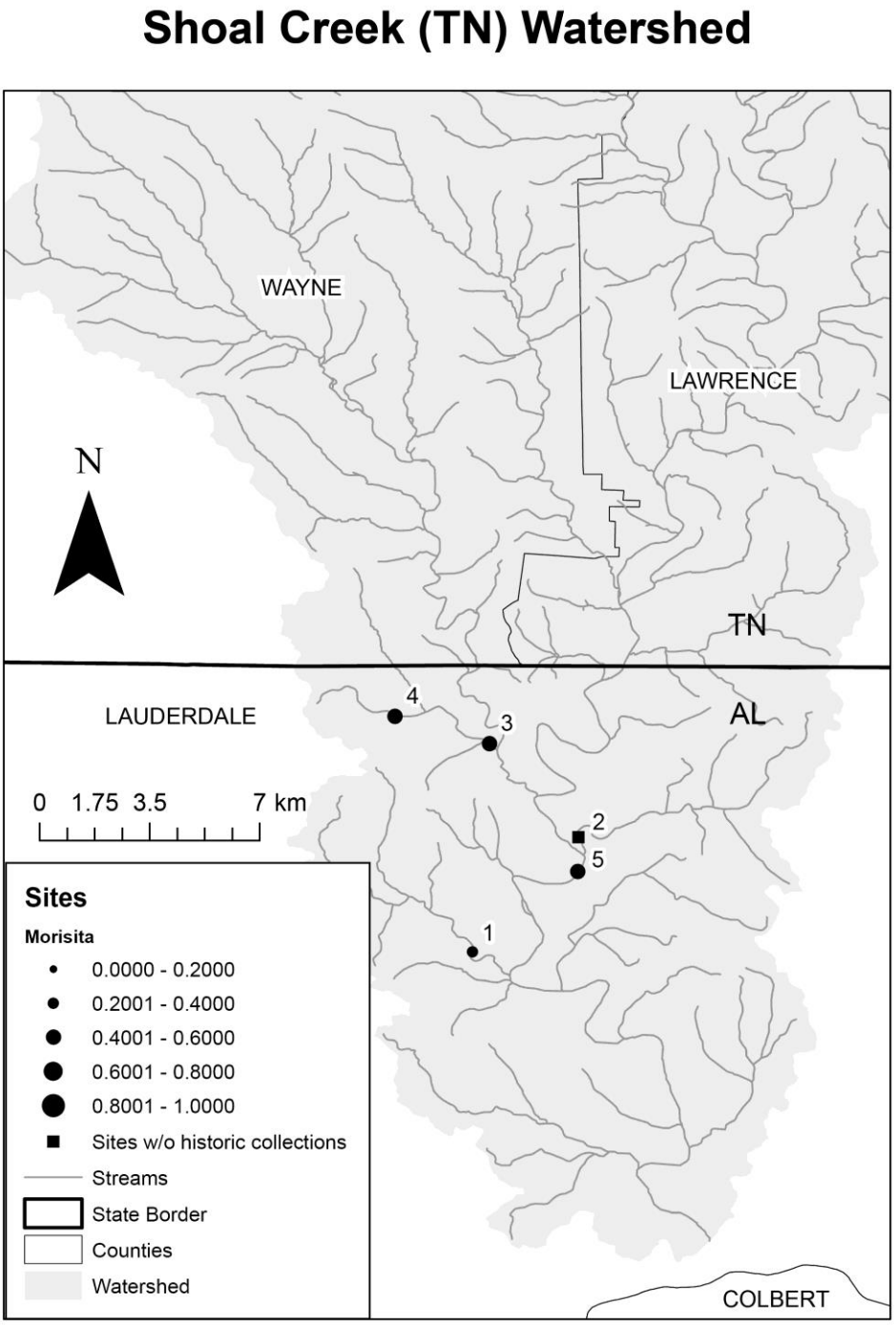

Figure 8 – Uphapee mean annual discharge, 1964-2014, showing negative trend

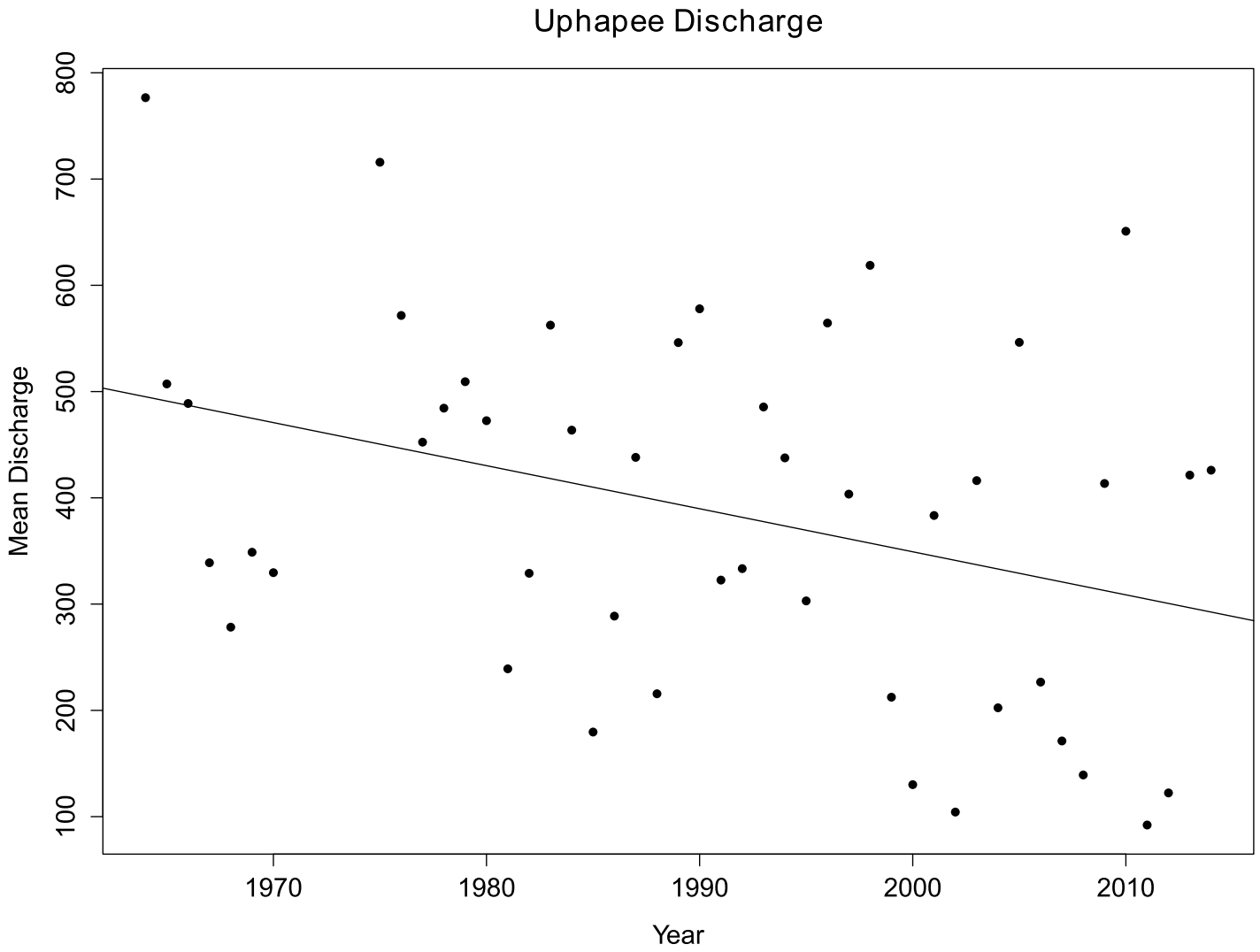

Figure 9 – Blackwater River mean annual discharge, 1968-2014

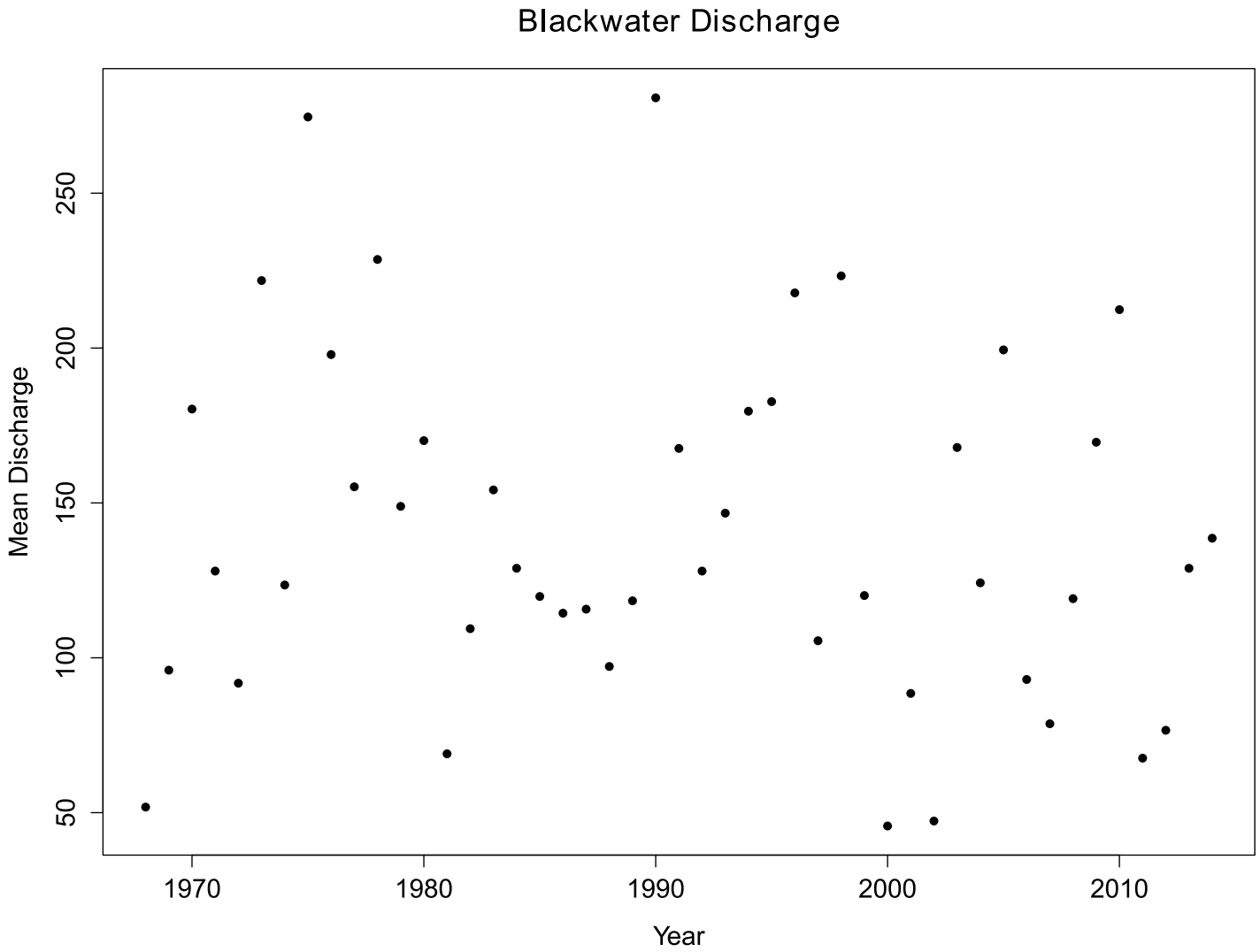

Figure 10 – Choccolocco Creek mean annual discharge, 1964-2014

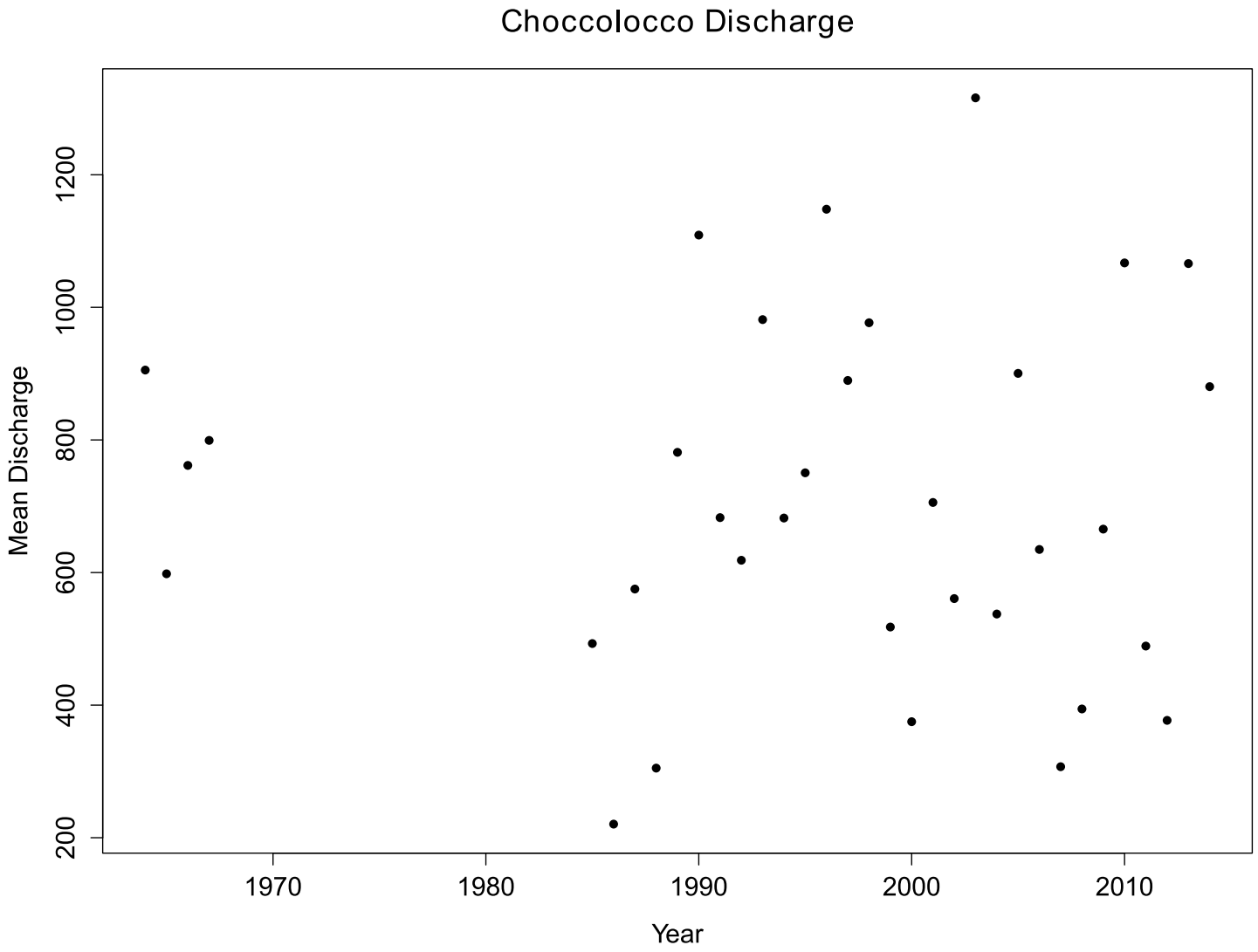

Figure 11 – Buttahatchee River mean annual discharge, 1964-2014

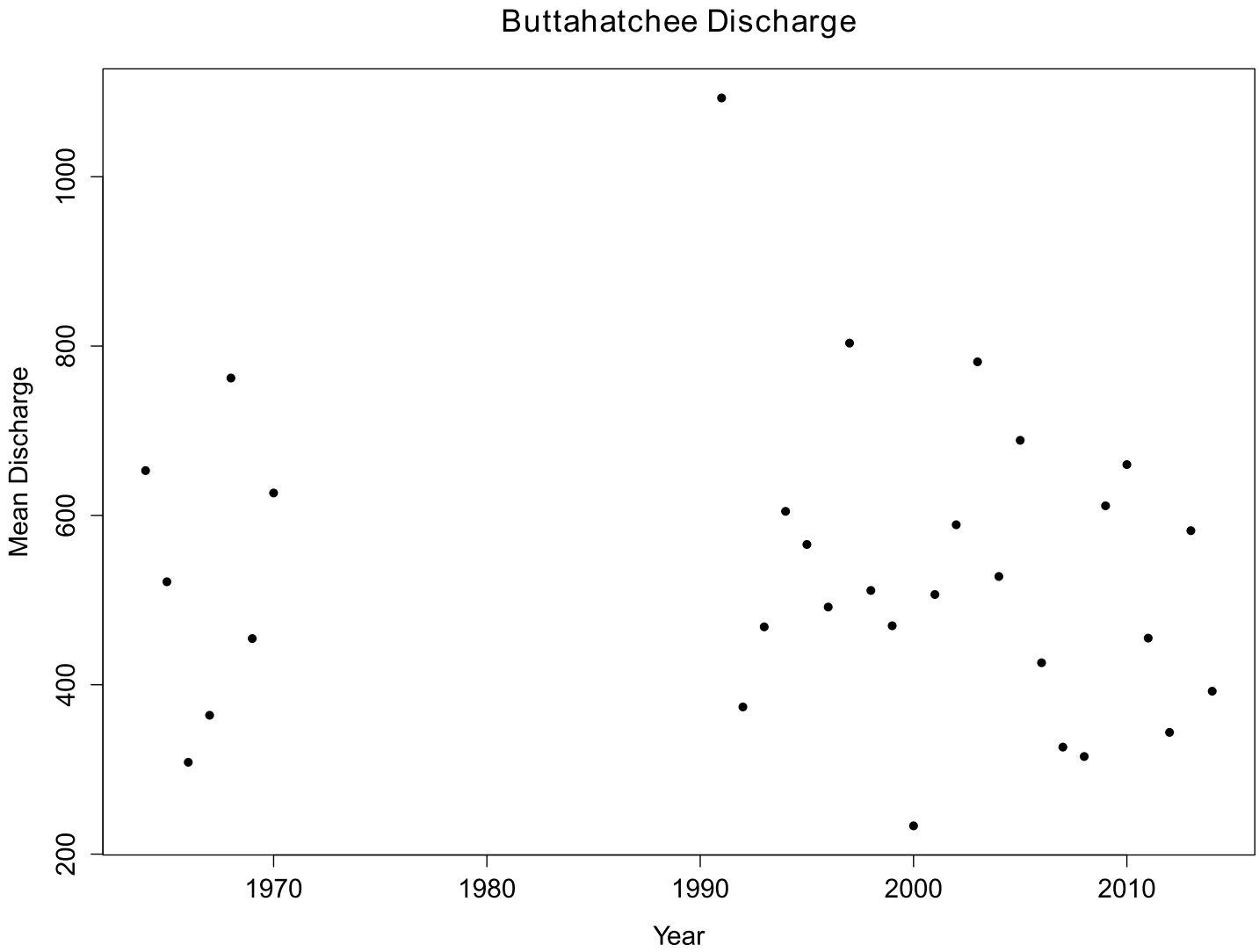

Figure 12 – Shoal Creek at Iron City, TN mean annual discharge, 1964-2014

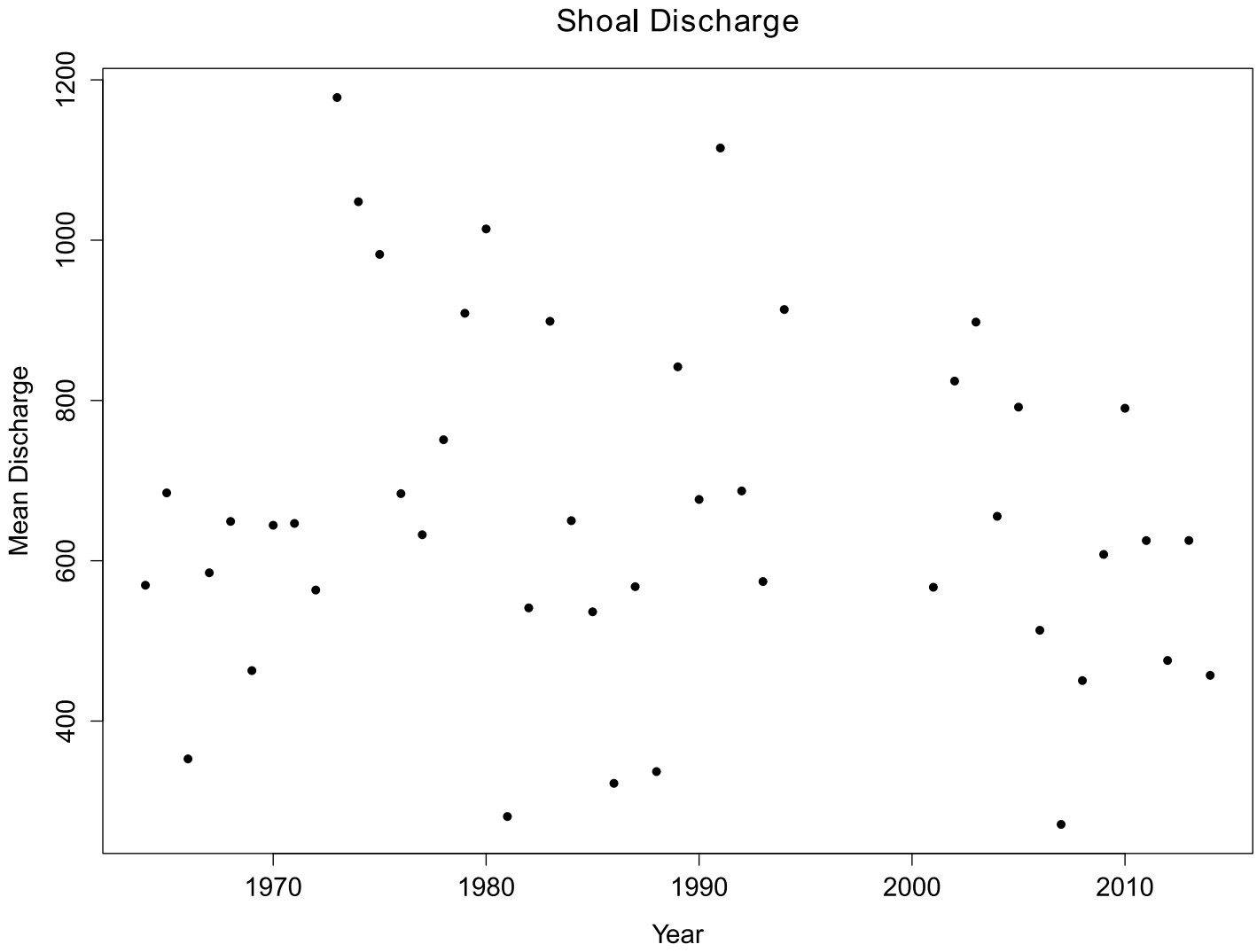

Figure 13 – Uphapee Creek Land Cover, 2001 and 2011

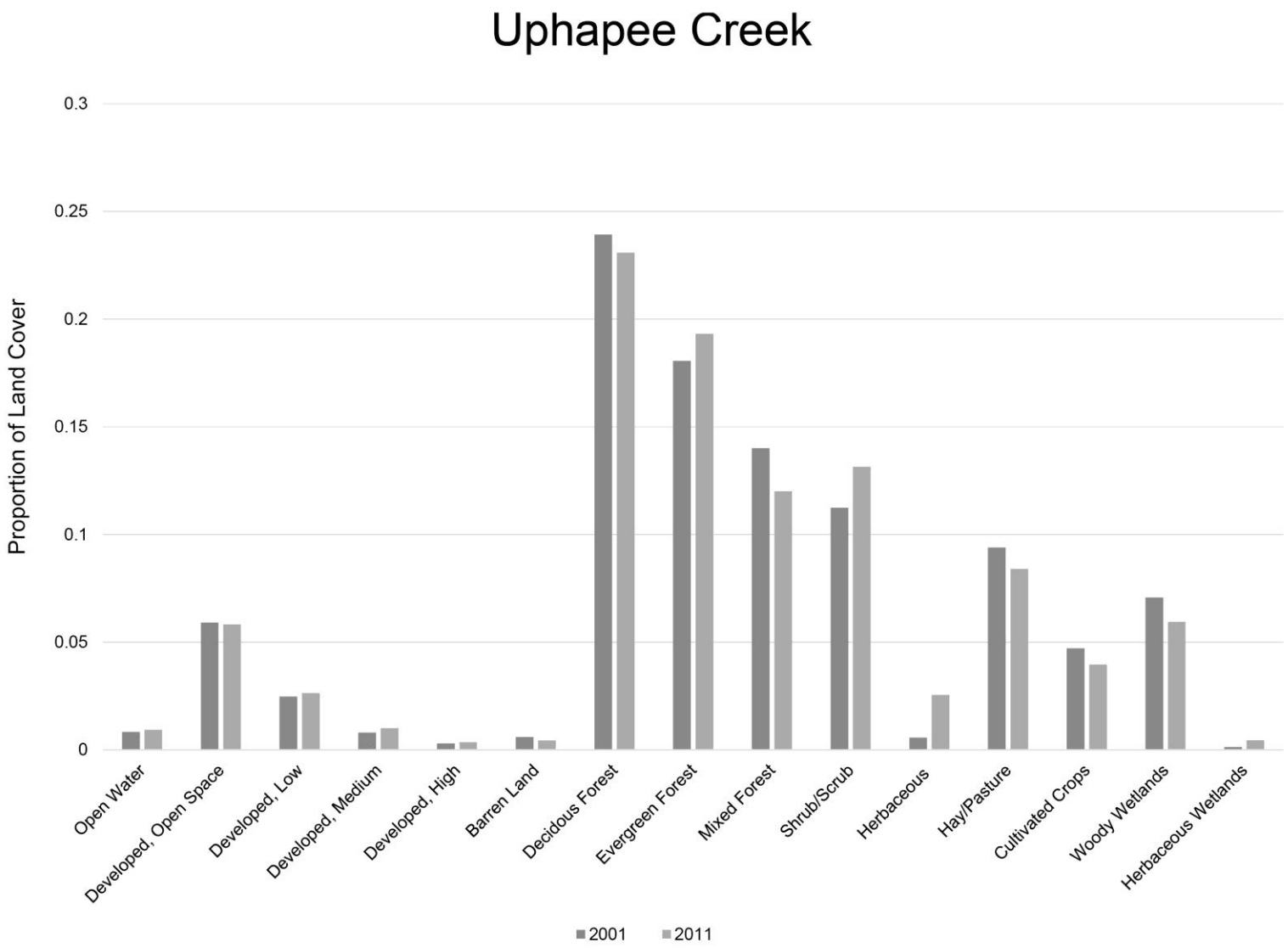

Figure 14 – Five Runs Creek Land Cover, 2001 and 2011

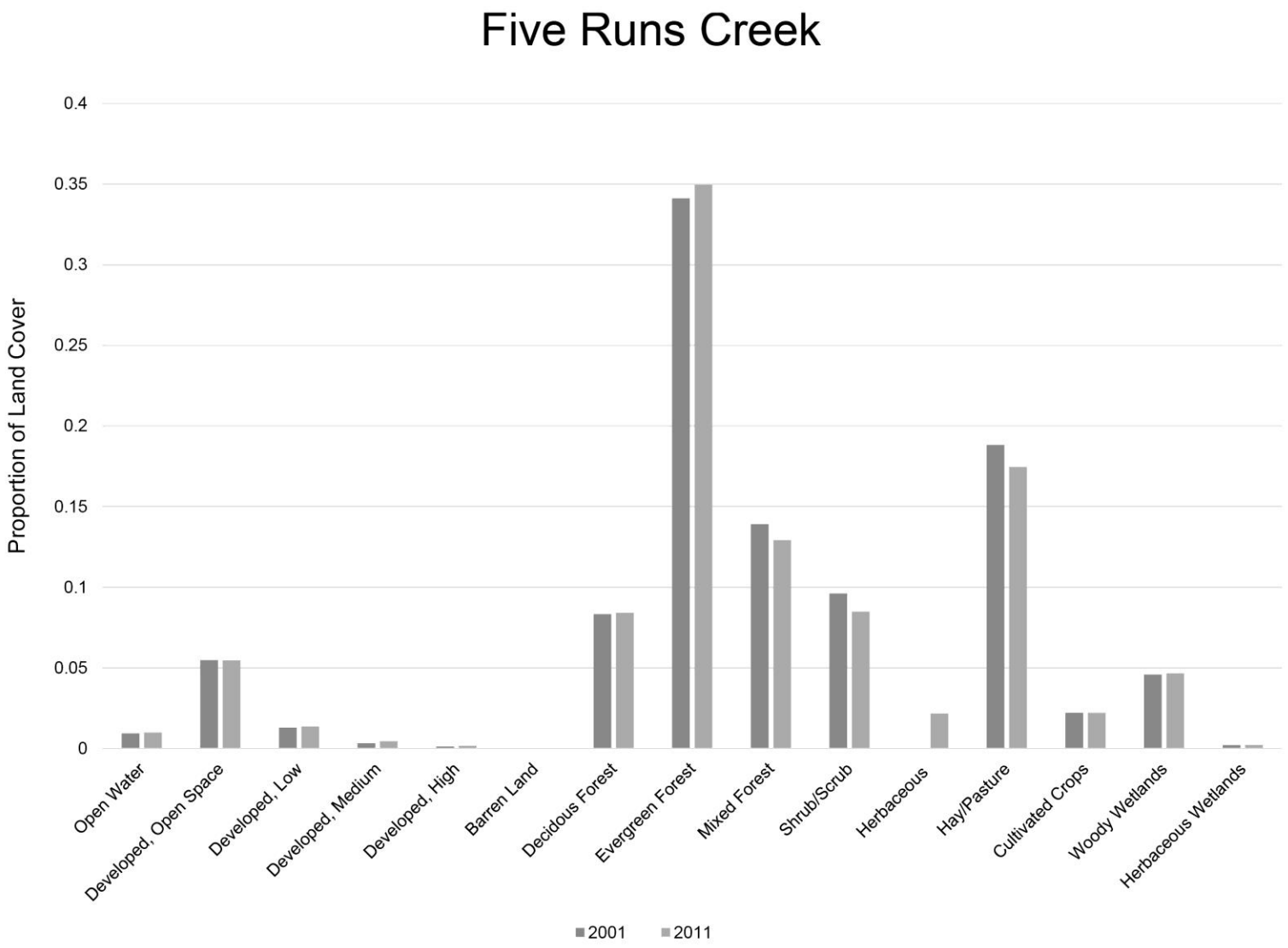

Figure 15 – Shoal Creek (Coosa) Land Cover, 2001 and 2011

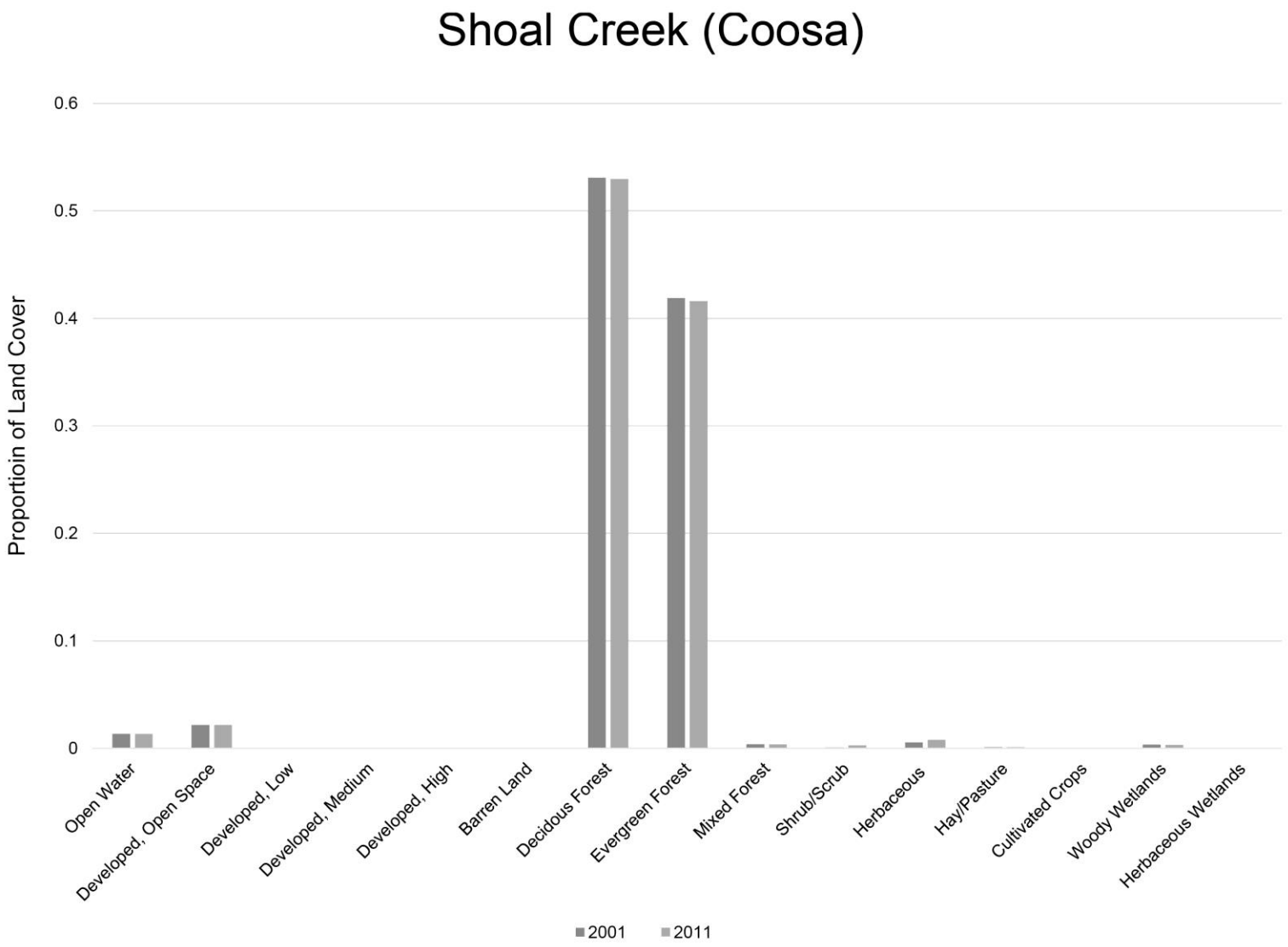

Figure 16 – Bear Creek Land Cover, 2001 and 2011

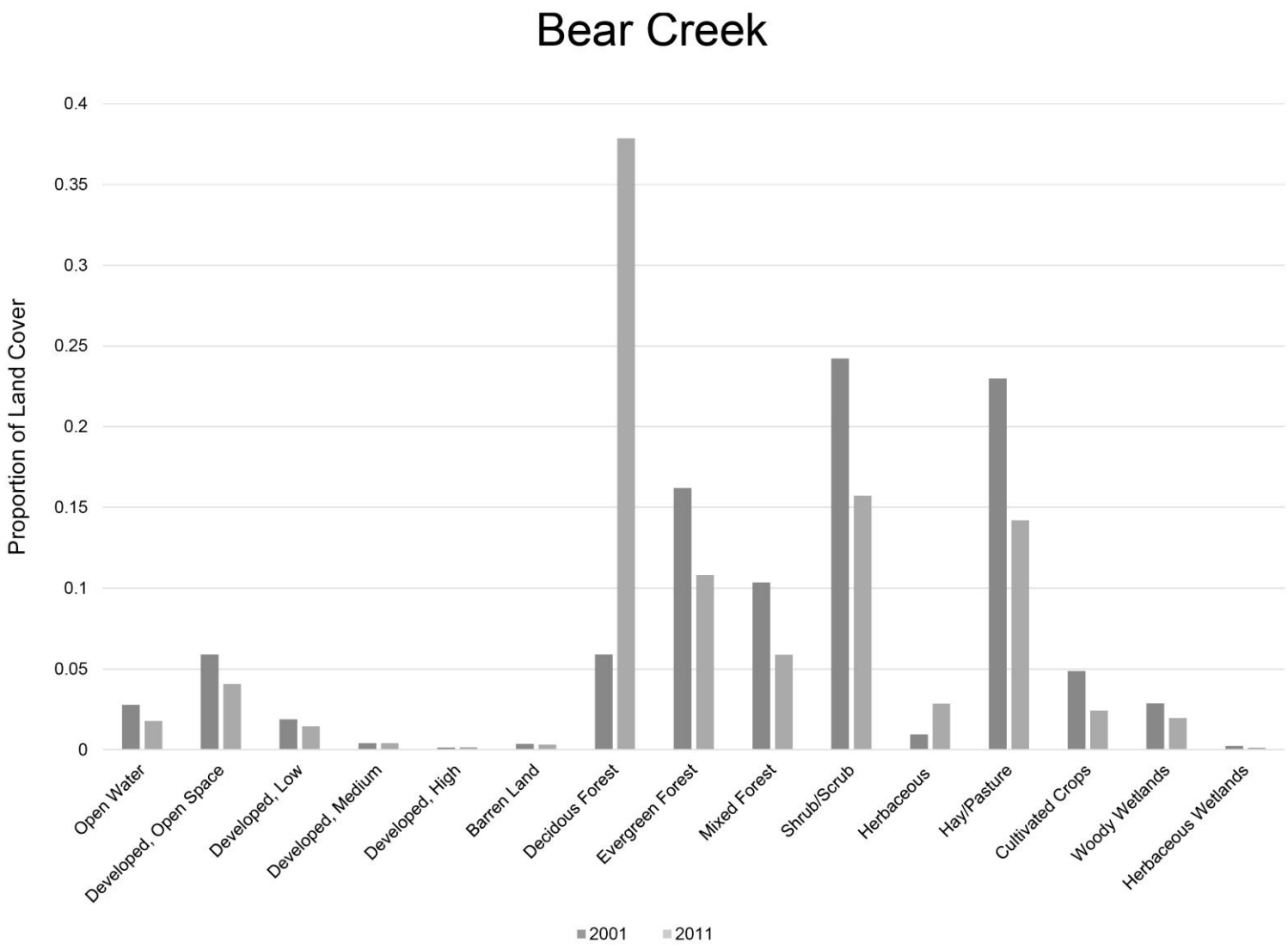

Figure 17 – Cypress Creek Land Cover, 2001 and 2011

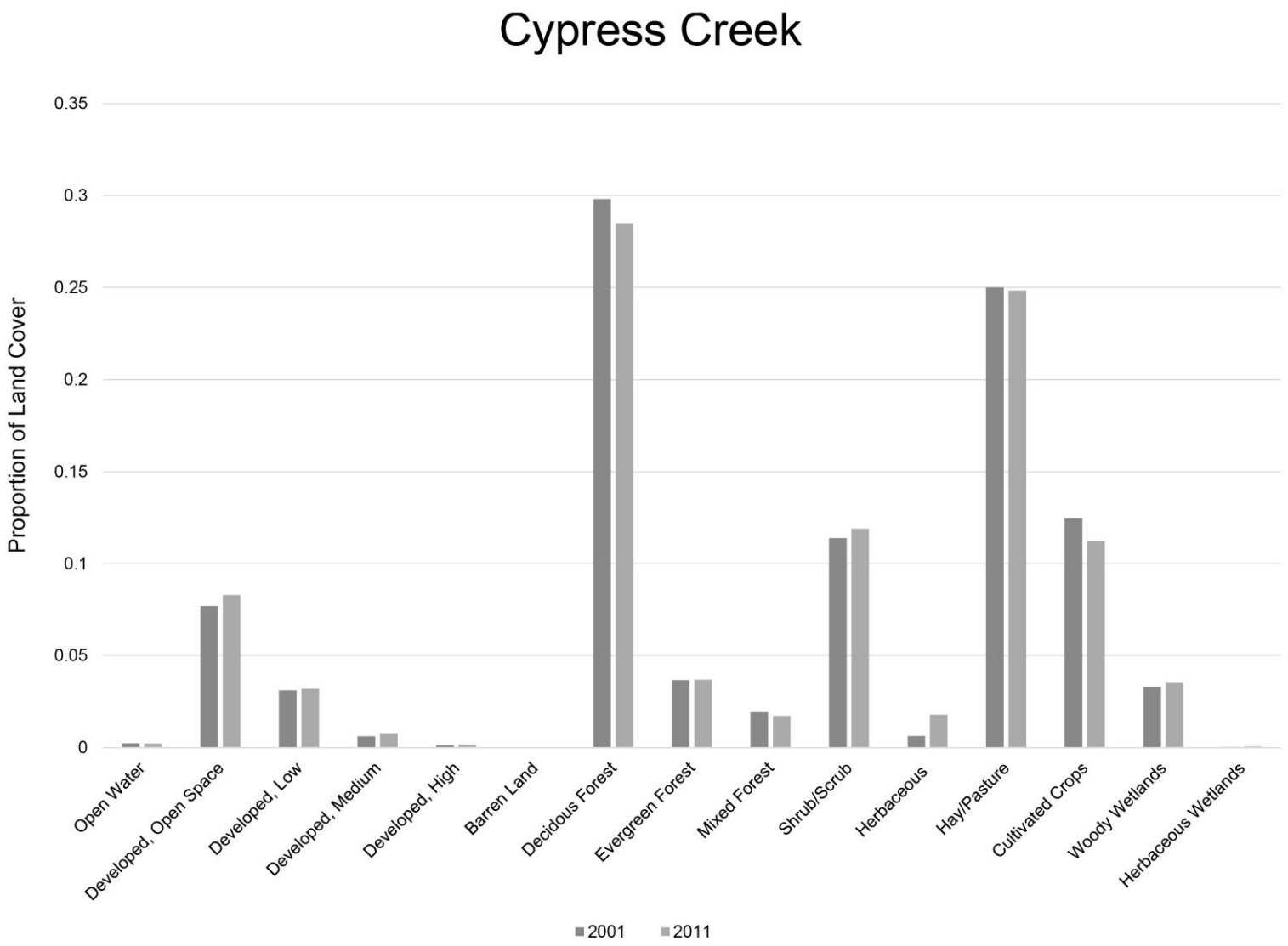

Figure 18 – Shoal Creek (Tennessee) Land Cover, 2001 and 2011

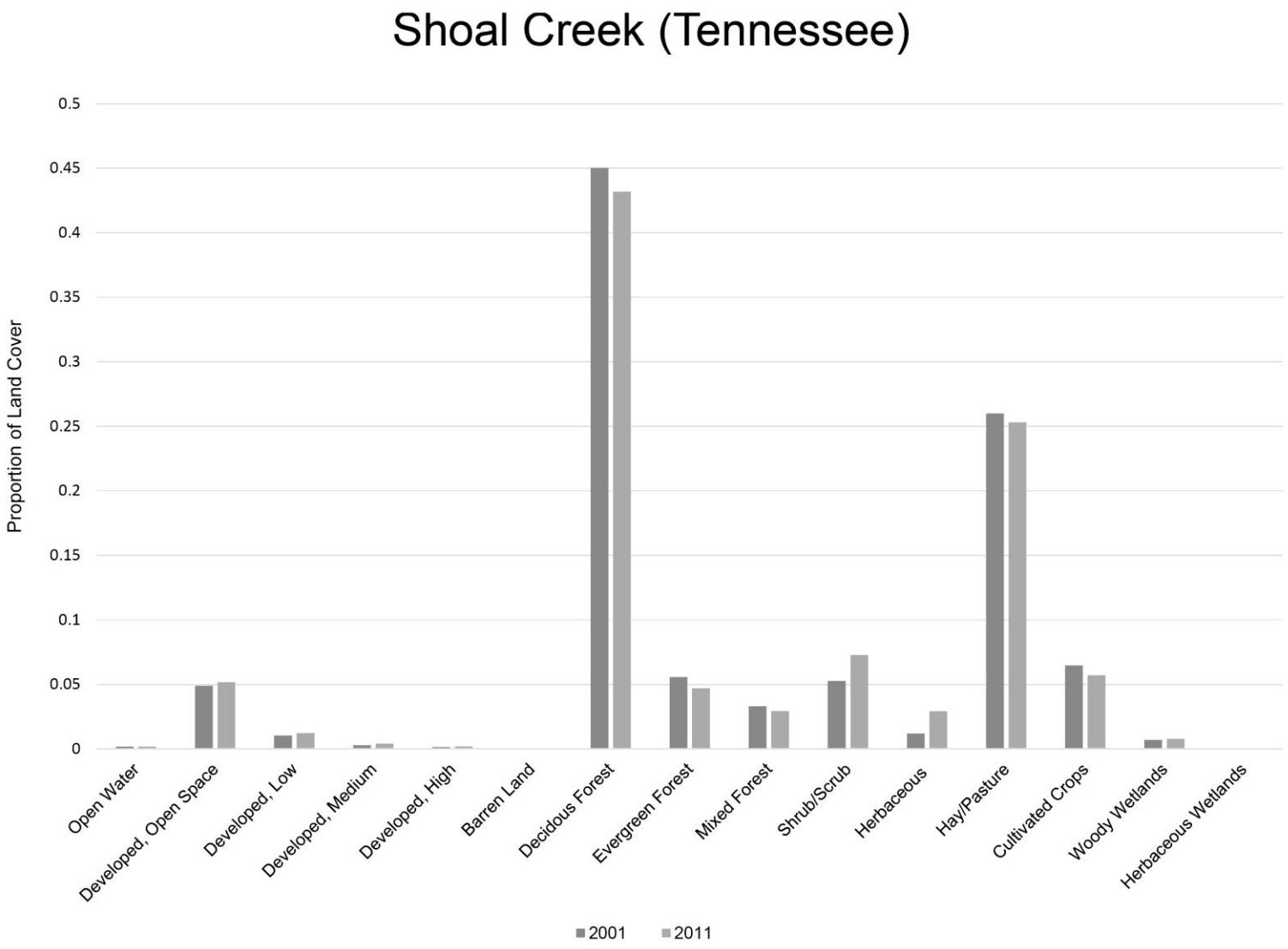

Figure 19 – Uphapee Creek RDA with significant environmental vectors (p<0.05) and species with >20% of variance explained

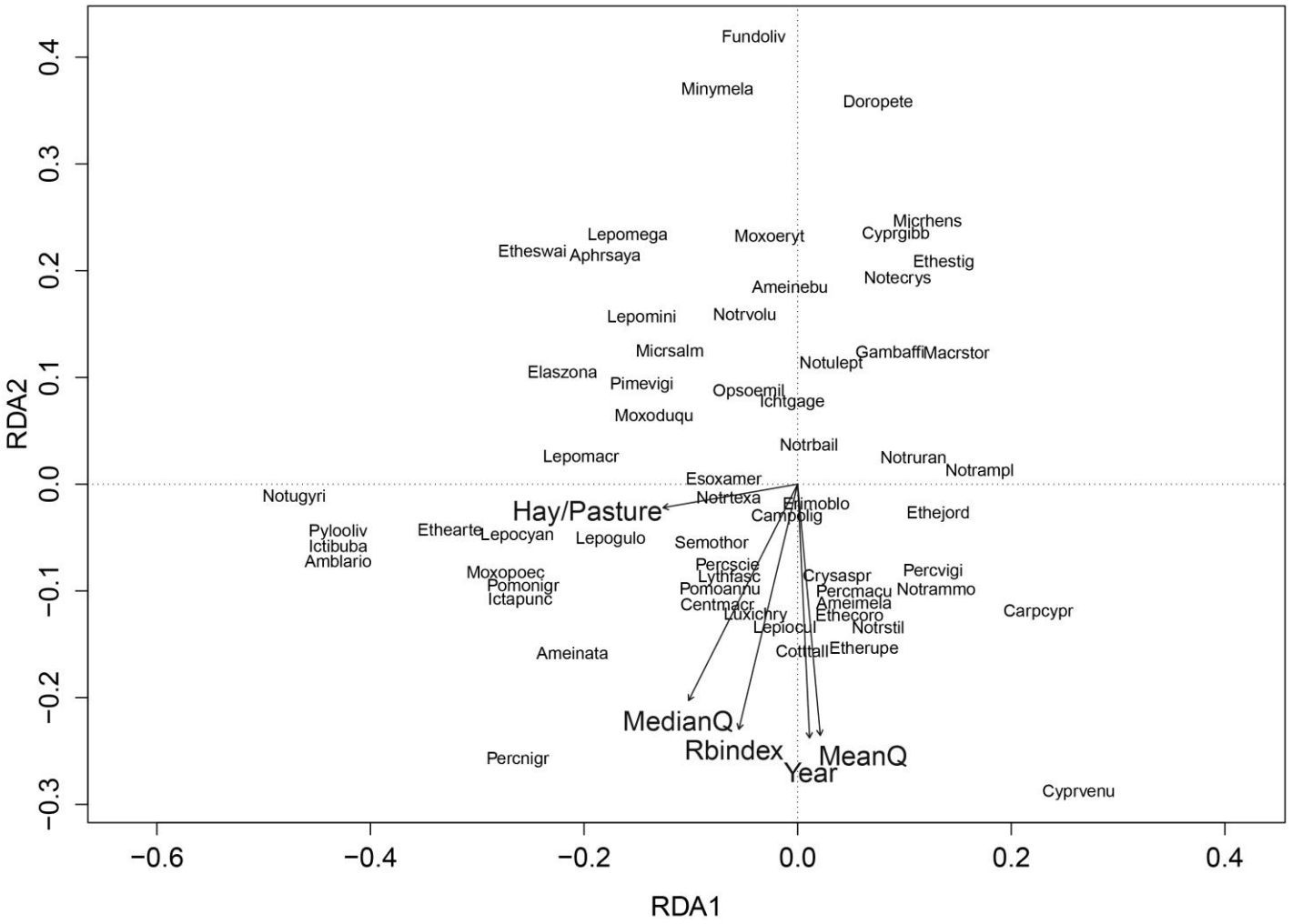

Figure 20 – Five Runs Creek RDA with environmental vectors with p < 0.075 and species with >20% of variance explained

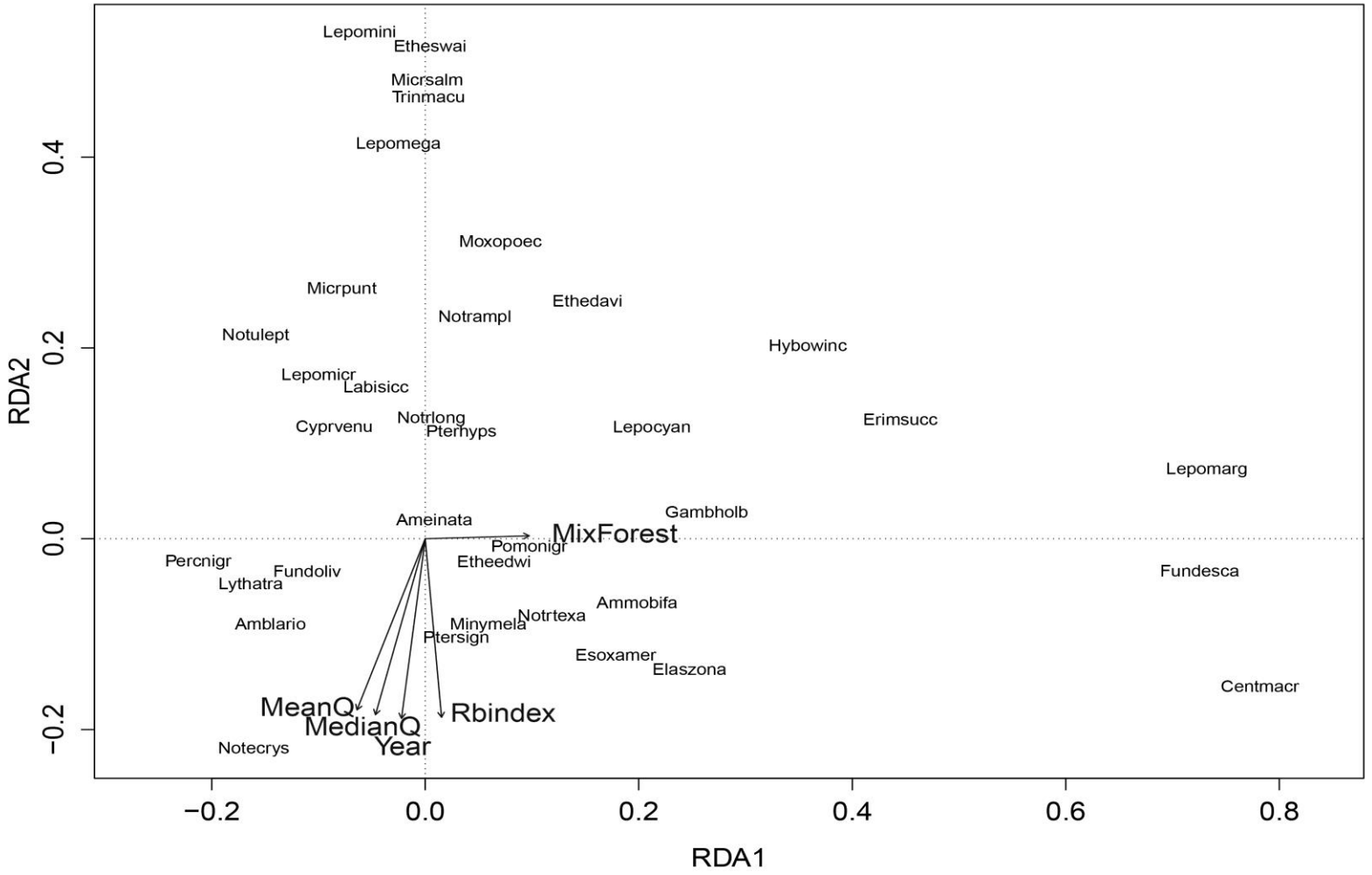

Figure 21 – Shoal Creek (Coosa) RDA with significant environmental vectors (p<0.05) and species with >20% of variance explained

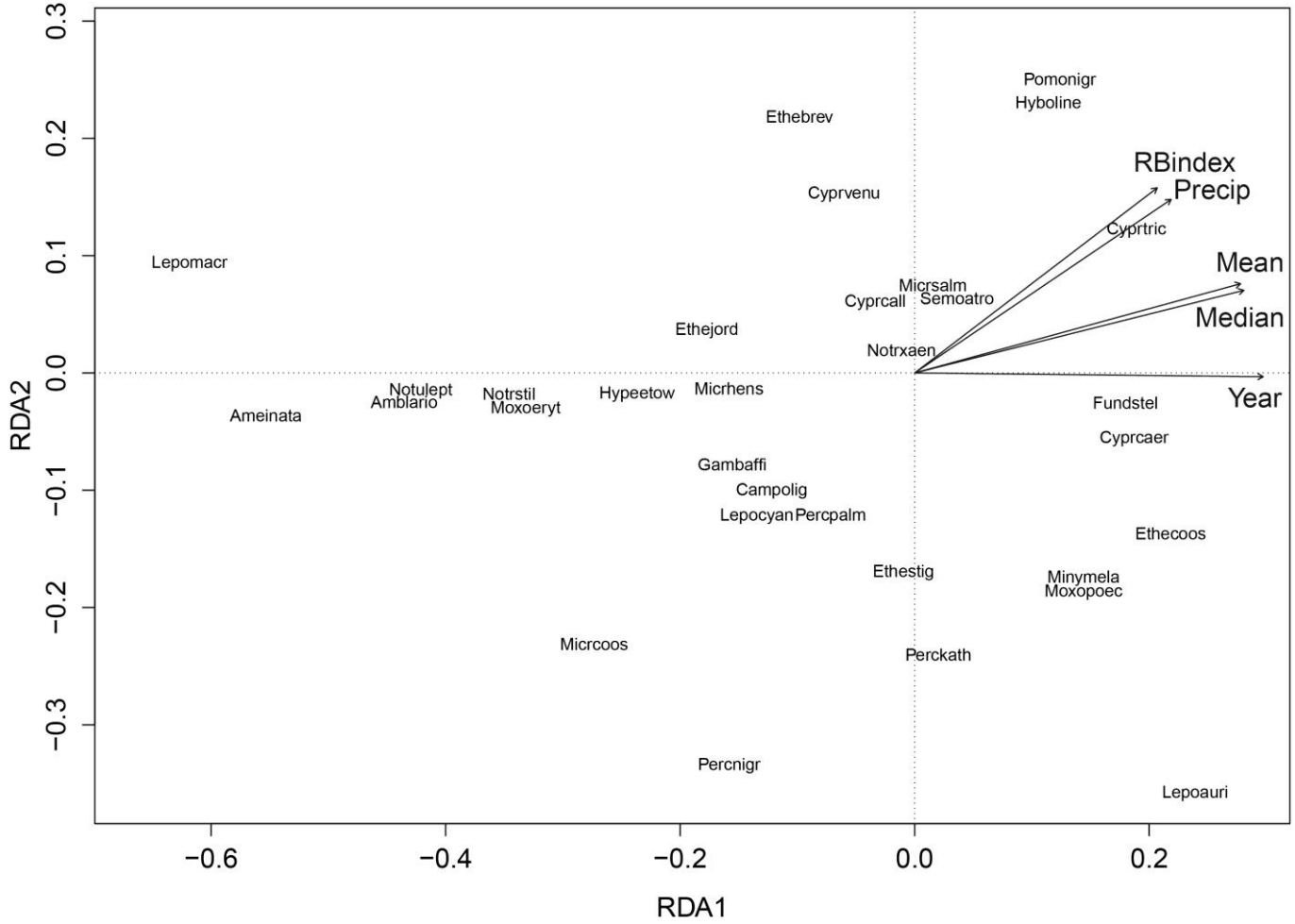

Figure 22 – Bear Creek RDA with significant environmental vectors (p < 0.05) and species with > 20% of variance explained

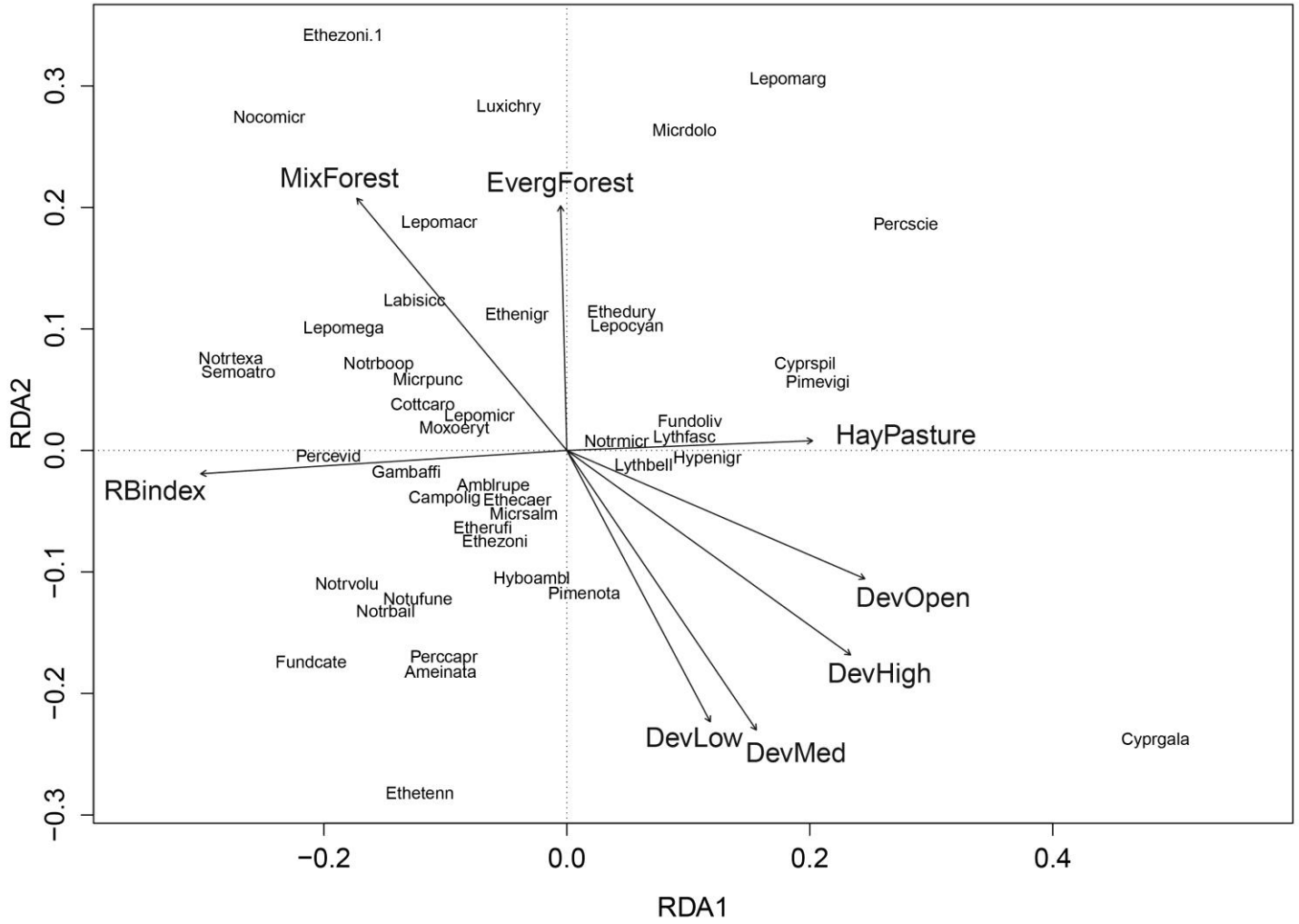

Figure 23 – Shoal Creek (Tennessee) RDA with environmental vectors with p<0.3 and species with >20% of variance explained

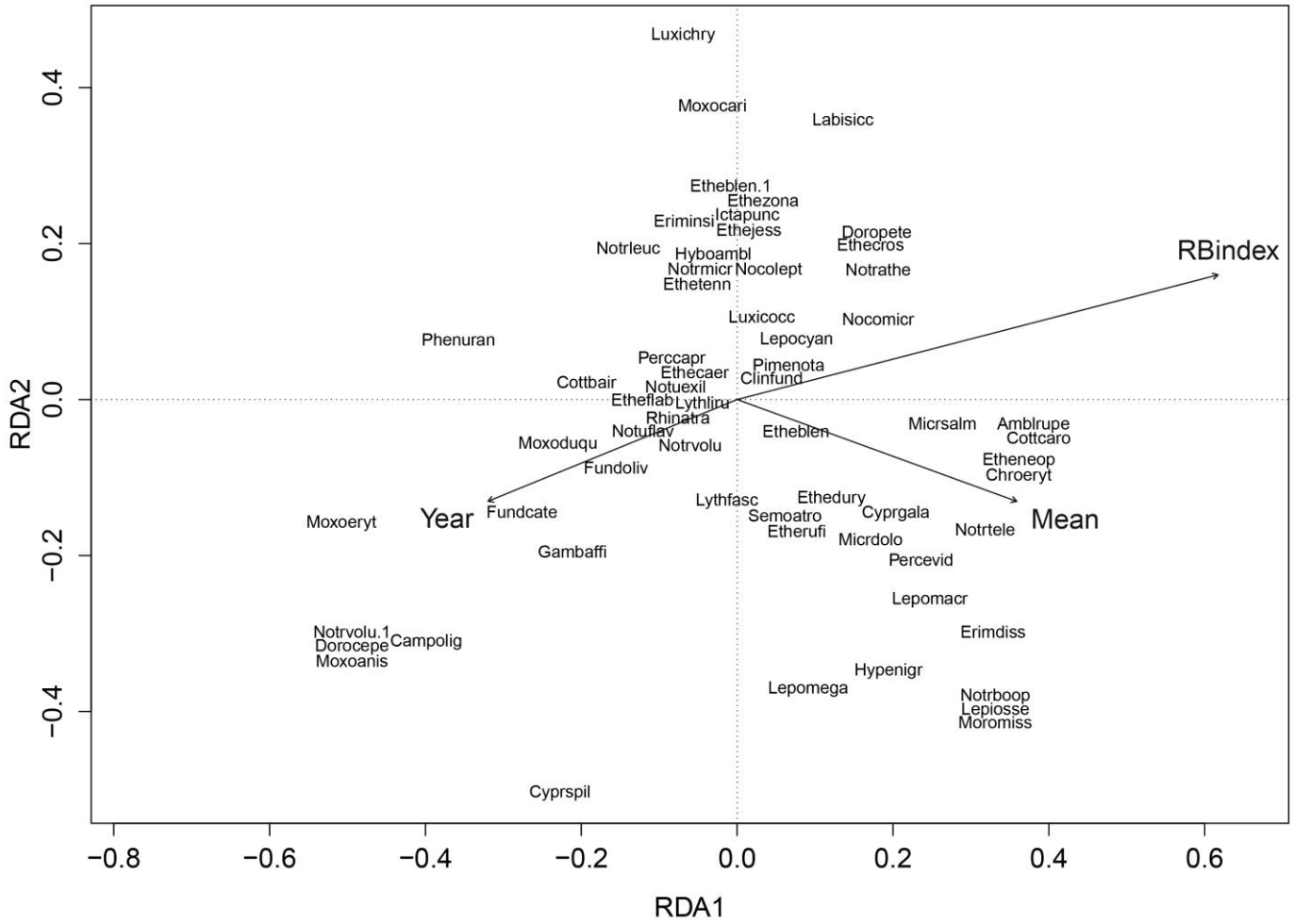

Figure 24 – Cypress RDA with hydrologic variables and mixed forest and species with > 20% of variance explained

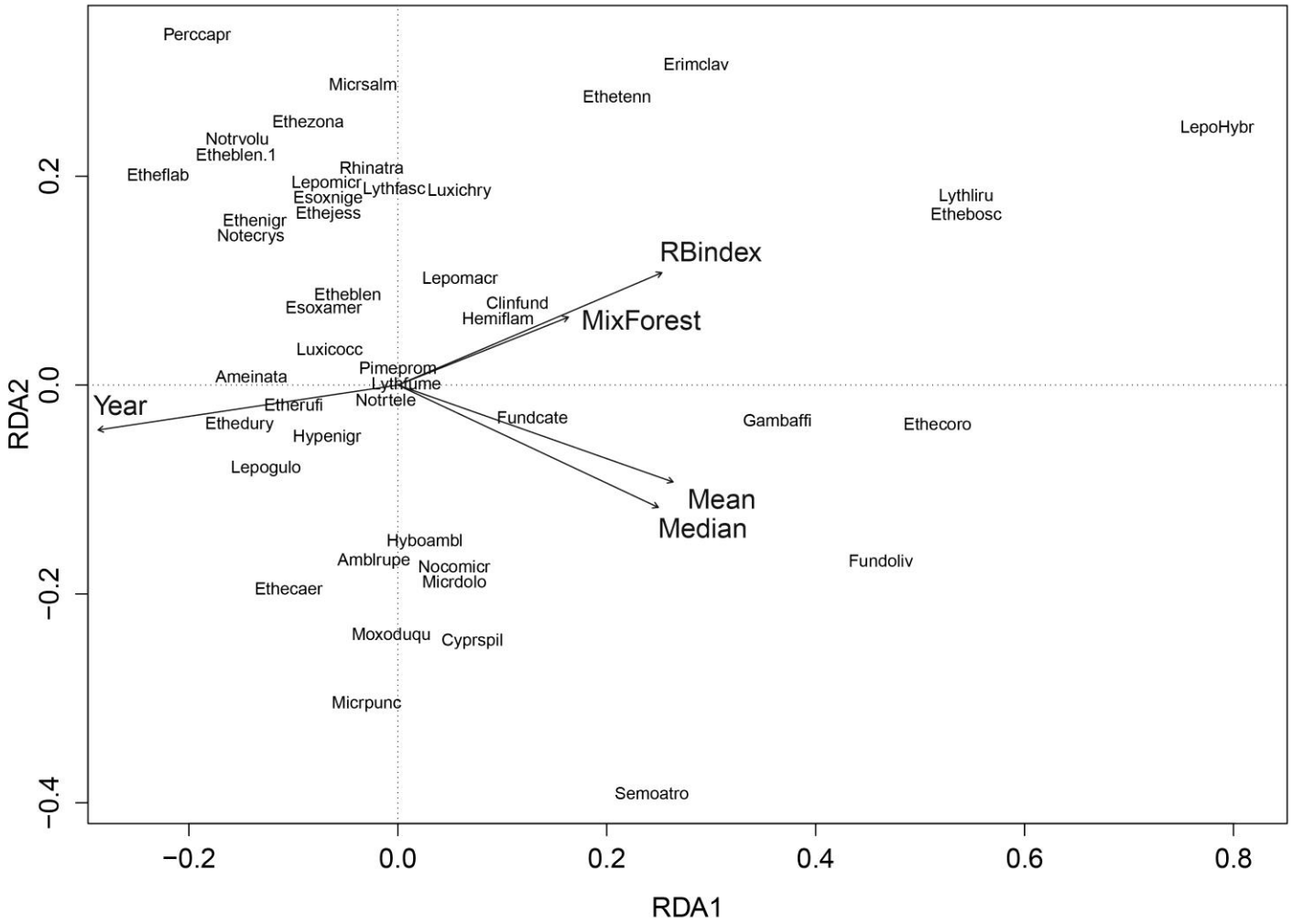

Table 1 - Land cover make up of study watersheds (%)

	Uphapee Creek	Shoal Creek (Coosa)	Five Runs Creek	Bear Creek	Shoal Creek (TN)	Cypress Creek
Open Water	0.92	1.34	0.99	1.78	0.17	0.23
Developed, Open Space	5.83	2.17	5.47	4.07	5.17	8.30
Developed, Low	2.63	0.00	1.36	1.45	1.22	3.19
Developed, Medium	1.01	0.00	0.46	0.40	0.41	0.79
Developed, High	0.35	0.00	0.17	0.15	0.18	0.17
Barren Land	0.43	0.03	0.02	0.31	0.05	0.02
Decidous Forest	23.08	52.96	8.42	37.86	43.19	28.50
Evergreen Forest	19.32	41.61	34.97	10.81	4.71	3.70
Mixed Forest	12.01	0.36	12.91	5.87	2.93	1.72
Shrub/Scrub	13.14	0.27	8.49	15.73	7.28	11.90
Herbaceous	2.55	0.79	2.17	2.85	2.92	1.80
Hay/Pasture	8.41	0.10	17.46	14.21	25.29	24.84
Cultivated Crops	3.95	0.03	2.22	2.42	5.70	11.23
Woody Wetlands	5.93	0.33	4.66	1.96	0.78	3.56
Herbaceous Wetlands	0.45	0.00	0.23	0.13	0.01	0.06

Table 2 – Environmental Variables from Uphapee Creek multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
MeanQ	Mean Discharge	0.08967	-0.99597	0.7145	0.001	***
MedianQ	Median Discharge	-0.45	-0.89303	0.6587	0.001	***
Year	Sample Year	0.04676	-0.99891	0.7246	0.001	***
Rbindex	R-B Index	-0.23311	-0.97245	0.7134	0.001	***
DevOpen	Developed, Open	0.14244	-0.9898	0.0898	0.247	
DevLow	Developed, Low	-0.68248	-0.7309	0.1357	0.102	
DevMed	Developed, Moderate	0.59421	-0.80431	0.0906	0.235	
DevHigh	Developed, High	0.0343	-0.99941	0.0687	0.386	
Barren	Barren Land	-0.83733	-0.5467	0.1256	0.125	
DecForest	Deciduous Forest	-0.69875	0.71536	0.0351	0.554	
EvergForest	Evergreen Forest	-0.69866	0.71546	0.1039	0.195	
MixForest	Mixed Forest	0.97021	0.24225	0.0785	0.285	
HayPasture	Hay/Pasture	-0.98509	-0.17206	0.2098	0.018	*
Cultivated	Cultivated Crops	0.95673	-0.29098	0.035	0.571	

Table 3 – Environmental Variables from Five Runs Creek multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
Year	Sample Year	-0.11709	-0.99312	0.7286	0.001	***
MeanQ	Mean Discharge	-0.33572	-0.94196	0.7349	0.001	***
MedianQ	Median Discharge	-0.24479	-0.96958	0.7335	0.001	***
Rbindex	R-B Index	0.08148	-0.99667	0.7146	0.001	***
DevOpen	Developed, Open	0.9664	0.25704	0.1352	0.127	
DevLow	Developed, Low	0.95839	0.28546	0.1339	0.137	
DevMed	Developed, Moderate	0.97337	0.22924	0.0817	0.295	
DevHigh	Developed, High	0.96978	0.24397	0.0926	0.244	
DecForest	Deciduous Forest	0.98754	0.15736	0.0106	0.87	
EvergForest	Evergreen Forest	-0.98291	-0.18409	0.0802	0.347	
MixForest	Mixed Forest	0.99951	0.03127	0.1925	0.071	.
HayPasture	Hay/Pasture	-0.14126	0.98997	0.0031	0.967	
Cultivated	Cultivated Crops	0.97794	-0.20888	0.0177	0.797	

Table 4 – Environmental variables from Shoal Creek (Coosa) multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
Year	Sample Year	0.99994	-0.01076	0.7881	0.001	***
Precip	Annual Precipitation	0.82824	0.56037	0.6224	0.001	***
Mean	Mean Discharge	0.96449	0.26411	0.7412	0.001	***
Median	Median Discharge	0.96992	0.24343	0.7481	0.001	***
RBindex	R-B Index	0.7951	0.60648	0.6041	0.001	***
DevOpen	Developed, Open	0.98052	-0.19643	0.0008	0.99	
Barren	Barren Land	0.71763	-0.69642	0.0465	0.549	
DecForest	Deciduous Forest	-0.45863	0.88863	0.0052	0.924	
EvergForest	Evergreen Forest	-0.87905	-0.47672	0.0055	0.937	
MixForest	Mixed Forest	0.72468	-0.68908	0.0136	0.846	
HayPasture	Hay/Pasture	-0.47736	0.87871	0.0002	0.997	
Cultivated	Cultivated Crops	0.97217	-0.23429	0.0482	0.496	

Table 5 - Environmental variables from Bear Creek multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
Year	Sample Year	-0.88196	-0.47132	0.3525	0.001	***
Mean	Mean Discharge	-0.04325	0.99906	0.0311	0.151	
Median	Median Discharge	0.66855	-0.74366	0.0048	0.743	
RBindex	R-B Index	-0.99798	-0.06357	0.1512	0.001	***
DevOpen	Developed, Open	0.91853	-0.39536	0.1183	0.001	***
DevLow	Developed, Low	0.46743	-0.88403	0.1058	0.001	***
DevMed	Developed, Moderate	0.56133	-0.82759	0.1281	0.001	***
DevHigh	Developed, High	0.81136	-0.58455	0.1374	0.001	***
DecForest	Deciduous Forest	-0.64281	-0.76603	0.0163	0.378	
EvergForest	Evergreen Forest	-0.0255	0.99967	0.0672	0.021	*
MixForest	Mixed Forest	-0.6401	0.76829	0.121	0.002	**
HayPasture	Hay/Pasture	0.99923	0.03935	0.0679	0.013	*
Cultivated	Cultivated Crops	-0.99343	0.11446	0.0211	0.263	

Table 6 - Environmental variables from Shoal Creek (Tennessee) multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
Year	Sample Year	-0.92589	-0.37779	0.1746	0.267	
Mean	Mean Discharge	0.93969	-0.34203	0.2135	0.296	
Median	Median Discharge	0.95016	0.31176	0.0761	0.745	
RBindex	R-B Index	0.96806	0.25072	0.5949	0.098	.
DevOpen	Developed, Open	-0.97927	-0.20255	0.0196	0.912	
DevLow	Developed, Low	0.29104	-0.95671	0.0065	0.977	
DevMed	Developed, Moderate	0.53046	-0.84771	0.0169	0.949	
DevHigh	Developed, High	0.86988	-0.49326	0.0082	0.978	
DecForest	Deciduous Forest	0.93228	0.36175	0.0107	0.942	
EvergForest	Evergreen Forest	0.93723	0.34871	0.0298	0.908	
MixForest	Mixed Forest	-0.95303	0.30287	0.0003	1.00	
HayPasture	Hay/Pasture	-0.99959	-0.02852	0.0065	0.97	
Cultivated	Cultivated Crops	0.46117	0.88731	0.0023	0.995	

Table 7 - Environmental variables from Cypress Creek multiple regression

Code	Variable	RDA1	RDA2	r^2	Pr(>r)	
Year	Sample Year	0.98737	-0.15845	0.6083	0.006	**
Mean	Mean Discharge	-0.8395	0.54336	0.7804	0.001	***
Median	Median Discharge	-0.81352	0.58153	0.8108	0.001	***
RBindex	R-B Index	-0.99838	-0.05691	0.7116	0.006	**
DevOpen	Developed, Open	0.49923	-0.86647	0.1044	0.206	
DevLow	Developed, Low	0.97817	-0.2078	0.0275	0.676	
DevMed	Developed, Moderate	0.97531	-0.22084	0.0319	0.618	
DevHigh	Developed, High	0.96804	-0.25079	0.0314	0.62	
DecForest	Deciduous Forest	-0.3902	0.92073	0.032	0.694	
EvergForest	Evergreen Forest	-0.97821	-0.20762	0.0538	0.546	
MixForest	Mixed Forest	-0.8618	0.50725	0.1175	0.239	
HayPasture	Hay/Pasture	0.99922	-0.03953	0.0336	0.725	
Cultivated	Cultivated Crops	-0.94652	0.32266	0.0466	0.618	

Table 8 – Hydrologic variables calculated for analysis. Discharge is in ft^3/s

Year	Mean Discharge	Median Discharge	Standard Deviation	R-B index
		Uphapee		
2014	426.0	138	967.9	0.4690
2013	421.4	177	854.5	0.4311
2009	413.5	155	828.3	0.4442
2008	139.2	39.5	218.7	0.3454
2007	171.2	55	357.8	0.3546
2006	226.6	132	379.6	0.3250
2000	130.1	53	231.7	0.4058
1999	209.8	95	390.7	0.3528
1991	323.4	146	777.9	0.4687
1989	546.1	219	905.4	0.4060
1988	215.6	95	358.1	0.3323
1987	438.1	236	640.1	0.3222
1986	288.7	70	635.8	0.3589
		Five Runs		
2014	138.6	86	170.9	0.3112
2013	128.9	83	153.3	0.2903
2000	45.7	38	28.6	0.1808
1998	223.3	84	800.2	0.5814
1992	128.0	86	118.6	0.2360
1979	148.9	86	200.9	0.3214
1975	274.6	123	594.6	0.4611
1974	123.5	71	150.2	0.3113
1972	91.8	57	89.2	0.2301
		Shoal Creek (Coosa)		
2014	880.4	612	924.2	0.2304
2013	1065.8	760	1349.4	0.3118
2002	560.7	323	605.7	0.2081
		Bear Creek		
2014	392.4	203	607.9	0.4607
2013	582.0	332	767.0	0.4561
2012	343.8	151.5	548.3	0.4511
2009	611.4	246	1166.7	0.4770
2008	315.3	140	524.2	0.4627
2000	233.4	106	640.9	0.3582
1999	469.7	205	910.1	0.5067

1998	511.4	250	827.1	0.3671
Year	Mean Discharge	Median Discharge	Standard Deviation	R-B index
Cypress and Shoal Creeks (Tennessee)				
2014	457.1	326	538.4	0.3249
2013	625.3	413	736.4	0.3167
2012	475.6	269.5	528.0	0.2903
2011	625.2	343	1022.5	0.3537
2006	513.3	322	856.1	0.3156
2003	897.8	526	1574.5	0.4369
2001	567.0	308	1084.6	0.4014
1992	687.6	351	1476.0	0.4250
1991	1115.0	402	2762.3	0.5148
1983	898.8	483	1693.3	0.4933
1979	908.8	512	1565.8	0.5145
1974	1048.5	520	2036.7	0.4959

Appendix 1- Site Index

Site	Stream	Description	Drainage	County	Lat	Long	Year	Historic Collector
1	Shoal Creek	FSR 548 crossing east of FSR 500	Coosa River	Cleburne	33.78872	-85.5467	2014	
							2013	
							2002	Johnston 2002
2	Shoal Creek	Approximately 1/4 mile S of FSR 548/500	Coosa River	Cleburne	33.78541	-85.5516	2014	
							2013	
							2002	Johnston 2002
3	Shoal Creek	FSR 553, 5 mi NW Edwardsville	Coosa River	Cleburne	33.77134	-85.556	2014	
							2013	
							2002	Johnston 2002
4	Shoal Creek	.5 mi upstream of Pine Glenn Campground	Coosa River	Cleburne	33.72489	-85.5961	2014	
							2013	
							2002	Johnston 2002
5	Shoal Creek	.5 mi downstream of Pine Glenn Campground	Coosa River	Cleburne	33.72115	-85.606	2014	
							2013	
							2002	Johnston 2002
6	Shoal Creek	Upstream of Sweetwater Lake at FSR 546	Coosa River	Cleburne	33.7535	-85.5734	2014	
							2013	
							2002	Johnston 2002

7	Shoal Creek	near Pinhoti Trail crossing of FSR 531I	Coosa River	Cleburne	33.72293	-85.6157	2014	
							2013	
							2002	Johnston 2002
8	Shoal Creek	Below Highrock Lake via FSR 522A	Coosa River	Cleburne	33.7146	-85.6317	2014	
							2002	Johnston 2002
9	Shoal Creek	End of FSR 530/ on Hunting Club	Coosa River	Calhoun	33.71171	-85.6403	2014	
							2013	
							2002	Johnston 2002
10	Shoal Creek	2.3mi SE White Plains, Below Whiteside's Dam	Coosa River	Calhoun	33.7372	-85.6604	2014	
							2013	
							2002	Johnston 2002
1	Bear Creek	Mill Creek at Mill Creek Loop rd.	Tennessee River	Colbert, AL	34.7763	-88.0408	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
2	Bear Creek	Buzzard Roost at US Hwy. 72	Tennessee River	Colbert, AL	34.7617	-88.0333	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
3	Bear Creek	Buzzard Roost Creek at Co. Hwy. 21	Tennessee River	Colbert, AL	34.6981	-87.989	2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
4	Bear Creek	Pennywinkle creek at State Line Rd.	Tennessee River	Colbert, AL	34.7486	-88.1125	2014	
							2013	

							2012	Johnston 2012
							2009	Shepard et al. 2009
5	Bear Creek	Pennywinkle Creek at Co. Hwy. 995	Tennessee River	Tishomingo, MS	34.7417	-88.155		
							2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							1998	Phillips 2001
6	Bear Creek	Cripple Deer Creek at Co. Hwy. 1	Tennessee River	Colbert, AL	34.7132	-88.1092		
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
7	Bear Creek	Bear Creek at Natchez Trace	Tennessee River	Colbert, AL	34.6716	-88.0894		
							2012	Johnston 2012
							2009	Shepard et al. 2009
8	Bear Creek	Bear Creek at Natchez Trace	Tennessee River	Colbert, AL	34.6596	-88.0923		
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
							1998	Phillips 2001
9	Bear Creek	Bear Creek at MS Hwy. 30	Tennessee River	Tishomingo, MS	34.6342	-88.1541		
							2014	
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
							1999	Phillips 2001
10	Bear Creek	Bear creek at Co. Hwy. 86	Tennessee River	Tishomingo, MS	34.5649	-88.1901		
							2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009

							2008	Shepard et al. 2009
							1998	Phillips 2001
11	Bear Creek	Bear Creek at Co. Hwy	Tennessee River	Franklin, AL	34.4441	-88.1157		
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
12	Bear Creek	Bear Creek at Co. Hwy. 57	Tennessee River	Franklin, AL	34.3163	-87.8586	2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
							1998	Phillips 2001
13	Bear Creek	Bear Creek at AL Hwy. 241	Tennessee River	Marion, AL	34.278	-87.7213	2014	
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
							2000	Phillips 2001
14	Bear Creek	Bear Creek at Co. Hwy. 93	Tennessee River	Franklin, AL	34.3394	-87.5466	2014	
							2013	
							2009	Shepard et al. 2009
							1998	Phillips 2001
15	Bear Creek	Chenault Spring Branch at Co. Hwy. 34	Tennessee River	Franklin, AL	34.3517	-87.5616	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
16	Bear Creek	Turkey Creek at Co. Hwy. 89	Tennessee River	Franklin, AL	34.3646	-87.5993	2014	

							2012	Johnston 2012
							2009	Shepard et al. 2009
17	Bear Creek	McNair Branch at Co. Hwy. 38	Tennessee River	Franklin, AL	34.393	-87.5532	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
18	Bear Creek	Little Bear Creek at Co. Hwy. 34	Tennessee River	Franklin, AL	34.4008	-87.6275	2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							1998	Phillips 2001
19	Bear Creek	Little Bear Creek at Co. Hwy. 38	Tennessee River	Franklin, AL	34.418	-87.6031	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
20	Bear Creek	Chandelower Creek at Sally Burns Rd. and Co. Rd. 1	Tennessee River	Colbert, AL	34.6274	-88.0249	2014	
							2012	Johnston 2012
							2009	Shepard et al. 2009
21	Bear Creek	Cedar Creek at Natchez Trace	Tennessee River	Colbert, AL	34.6444	-88.1325	2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
22	Bear Creek	Cedar Creek at Co. Hwy. 90	Tennessee River	Franklin, AL	34.5529	-88.0983	2014	

							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
							1999	Phillips 2001
23	Bear Creek	Cedar Creek at AL Hwy. 247	Tennessee River	Franklin, AL	34.5522	-87.9851		
							2014	
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
24	Bear Creek	Cedar Creek at Co. Hwy. 73	Tennessee River	Franklin, AL	34.5023	-87.8338		
							2012	Johnston 2012
							2008	Shepard et al. 2009
25	Bear Creek	Cedar Creek at US Hwy. 43	Tennessee River	Franklin, AL	34.4652	-87.7538		
							2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
							1998	Phillips 2001
26	Bear Creek	Little Bear Creek at AL Hwy. 24	Tennessee River	Franklin, AL	34.4593	-88.0026		
							2014	
							2013	
							2012	Johnston 2012
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
							1998	Phillips 2001
27	Bear Creek	Little Bear Creek at AL Hwy. 187	Tennessee River	Franklin, AL	34.4013	-87.8744		
							2014	
							2013	
							2009	Shepard et al. 2009

							2008	Shepard et al. 2009
							1998	Phillips 2001
28	Bear Creek	Little Bear Creek at Co. Hwy. 122	Tennessee River	Franklin, AL	34.3827	-87.8372		
							2014	
							2013	
							2009	Shepard et al. 2009
							2008	Shepard et al. 2009
							1998	Phillips 2001
29	Bear Creek	Little Bear Creek at Co. Hwy. 59	Tennessee River	Franklin, AL	34.3763	-87.7738		
							2014	
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
							1998	Phillips 2001
30	Bear Creek	Little Bear Creek at McCarley Rd.	Tennessee River	Franklin, AL	34.3647	-87.7322		
							2014	
							2013	
							2012	Johnston 2012
							2008	Shepard et al. 2009
							1998	Phillips 2001
1	Five Runs Creek	Five Runs Creek at CR 31	Yellow River	Covington	31.135	-86.4864		
							2014	
							2000	Herrington et al.
							1975	Boschung et al.
2	Five Runs Creek	Five Runs Creek at US 84	Yellow River	Covington	31.31639	-86.4197		
							2013	
							2013	

3	Five Runs Creek	Five Runs Creek FR 337 (Bass Rd/CR 112)	Yellow River	Covington	31.07611	-86.5103	1992	Kuhajda et al.
							2014	
							2013	
							2000	Herrington et al.
							1974	Boschung et al.
4	Five Runs Creek	Five Runs Creek at CR 24	Yellow River	Covington	31.10639	-86.5172		
							2014	
							2013	
							2000	Herrington et al.
							1979	Williams et al.
5	Five Runs Creek	Five Runs Creek at Blue Spring Run	Yellow River	Covington	31.08972	-86.5144		
							2014	
							2013	
							2000	Herrington et al.
6	Five Runs Creek	Five Runs Creek at Bass Bridge Rd	Yellow River	Covington	31.19139	-86.4744		
							2014	
							2013	
							2000	Herrington et al.
							1972	Harima et al.
7	Five Runs Creek	Camp Creek at AL 137	Yellow River	Covington	31.14583	-86.5739		
							2014	
							2013	
							2000	Herrington et al.
8	Five Runs Creek	Camp Creek at FSR 332	Yellow River	Covington	31.16441	-86.5334		
							2014	
							2013	
							2000	Herrington et al.
9	Five Runs Creek	Hogfoot Creek at CR 17	Yellow River	Covington	31.16833	-86.5192		
							2014	

							2013	
							2000	Herrington et al.
							1998	Kuhajda et al.
10	Five Runs Creek	Hogfoot Creek at FS 339	Yellow River	Covington	31.12694	-86.5142		
							2014	
							2013	
							2000	Herrington et al.
11	Five Runs Creek	Bay Bridge Creek at CR 56	Yellow River	Covington	31.27806	-86.485		
							2014	
							2013	
							2000	Herrington et al.
12	Five Runs Creek	Pond Creek at CR 337	Yellow River	Covington	31.09261	-86.5183		
							2014	
							2013	
1	Uphapee Creek	Opintlocco Creek at CR 26	Tallapoosa River	Macon	32.41228	-85.6157		
							2014	
							2013	
							1999	Keeton et al.
							1991	Wood et al
							1986	Orr
2	Uphapee Creek	Opintlocco Creek at CR 43	Tallapoosa River	Macon	32.37027	-85.4448		
							2014	
							2013	
							1999	Keeton et al.
3	Uphapee Creek	Opintlocco Creek at Hwy 80	Tallapoosa River	Lee	32.49453	-85.4144		
							2014	
							2013	
							1999	Keeton et al.
4	Uphapee Creek	Chewacla Creek at Hwy 51	Tallapoosa River	Lee	32.56127	-85.3723		
							2014	

							2013	
							1999	Keeton et al.
5	Uphapee Creek	Chewacla Creek at CR 112	Tallapoosa River	Lee	32.55196	-85.3945	2014	
							2013	
							1999	Keeton et al.
6	Uphapee Creek	Cossey Branch at CR 43	Tallapoosa River	Macon	32.49282	-85.4471	2014	
							2013	
							1999	Keeton et al.
7	Uphapee Creek	Choctafaula Creek at FSR 906	Tallapoosa River	Macon	32.48926	-85.604	2014	
							2013	
							1999	Keeton et al.
								Taylor and
							1991	Harbaugh
8	Uphapee Creek	Choctafaula Creek adjacent to FSR 900	Tallapoosa River	Macon	32.46721	-85.6373	2014	
							2013	
								Gangloff and
							2000	Buntin
								Taylor and
							1991	Harbaugh
							1988	Stephenson et al.
9	Uphapee Creek	Choctafaula Creek above CR 54 (Below Vaughn's Mill)	Tallapoosa River	Macon	32.50791	-85.5784	2014	
							2013	

							2009	Werneke et al.
							2007	Butler et al.
							2006	Butler et al.
							1991	Taylor and Harbaugh
							1971	Barclay et al.
10	Uphapee Creek	Choctafaula Creek at CR 14	Tallapoosa River	Lee	32.52956	-85.5561	2014	
							2013	
11	Uphapee Creek	Uphapee Creek at US 81	Tallapoosa River	Macon	32.4745	-85.6878	2014	
							2013	
							1999	Keeton et al.
							1989	Pierson and Krotzer
							1987	Johnston and Moorman
							1972	Jenkinson and Jenkinson
12	Uphapee Creek	Uphapee Creek at US 80	Tallapoosa River	Macon	32.44482	-85.6478	2014	
							2013	
							1999	Keeton et al.
13	Uphapee Creek	Opintlocco Creek at CR 79	Tallapoosa River	Macon	32.34753	-85.5045	2014	
							2000	Armbruster et al.
							1987	Stephenson et al.
1	Cypress Creek	Cox Creek at Mars Hill Rd	Tennessee River	Lauderdale	34.85004	-87.6608	2014	
							2013	
2	Cypress	Middle Cypress Creek	Tennessee	Lauderdale	34.94167	-87.7578	2014	

	Creek	at CR 8	River					
							2013	
							1991	Humphries et al.
3	Cypress Creek	Middle Cypress Creek at CR 6	Tennessee River	Lauderdale	34.9025	-87.7706	2014	
							2013	
							1983	Suttkus et al.
4	Cypress Creek	Little Cypress Creek at CR 16	Tennessee River	Lauderdale	34.85861	-87.7153	2014	
							2013	
5	Cypress Creek	Cypress Creek at CR 8	Tennessee River	Lauderdale	34.93194	-87.7914	2014	
							2013	
6	Cypress Creek	Cypress Creek at Natchez Trace, Hike in	Tennessee River	Lauderdale	35.0008	-87.8207	2014	
							2013	
7	Cypress Creek	N Fork Cypress Creek at Natchez Trace	Tennessee River	Lauderdale	34.97583	-87.8225	2014	
							2013	
							1979	Nieland et al.
8	Cypress Creek	Burcham Creek at CR 6	Tennessee River	Lauderdale	34.895	-87.8264	2014	
							2013	
9	Cypress Creek	Threet Creek at Natchez Trace	Tennessee River	Lauderdale	34.955	-87.8228	2014	
							2013	
							2011	Ray et al.
							2006	Henderson et al.
							2003	Dinkins et al.
10	Cypress	Greenbriar Branch at	Tennessee	Lauderdale	34.95278	-87.7781	2014	

	Creek	CR 259	River					
							2013	
11	Cypress Creek	Lindsey Creek at Natchez Trace	Tennessee River	Lauderdale	34.94206	-87.8283	2014	
							2013	
							2003	Dinkins et al.
							1979	Boschung et al.
1	Shoal Creek	Indian Camp Creek at CR 135	Tennessee River	Lauderdale	34.92194	-87.6206	2014	
							2013	
							1974	Wagers and Freeman
2	Shoal Creek	Cowpen Creek at CR 8	Tennessee River	Lauderdale	34.95472	-87.5903	2014	
							2013	
3	Shoal Creek	Little Butler Creek at CR 61	Tennessee River	Lauderdale	34.98139	-87.6158	2014	
							2013	
							1992	Boschung et al.
4	Shoal Creek	Little Butler Creek at CR 299	Tennessee River	Lauderdale	34.98917	-87.6428	2014	
							2013	
							1996	Kuhajda et al.
5	Shoal Creek	Shoal Creek at Goose Shoals (CR 8)	Tennessee River	Lauderdale	34.95058	-87.5914	2014	
							2013	
							2012	Johnston et al.
							2011	Johnston et al.
							2001	Johnston et al.
							1999	Johnston et al.

Appendix 2 – USGS gages used for hydrology analysis

Study Watershed	Gage Location	USGS Gage Number	Date Range
Uphapee Creek	Uphapee Creek near Tuskegee, AL	02419000	1964-1970 1975-2014
Five Runs Creek	Blackwater River near Bradley, AL	02369800	1968-2014
Shoal Creek (Coosa)	Choccolocco Creek at Jackson Shoal	02404400	1964-1967 1985-2014
Bear Creek	Buttahatchee River below Hamilton, AL	02369800	1964-1970 1991-2014
Shoal Creek (Tennessee)	Shoal Creek at Iron City, TN	03588500	1964-1994 2001-2014
Cypress Creek	Shoal Creek at Iron City, TN	03588500	1964-1994 2001-2014

Appendix 3 - Sites Sampled in both 2013 & 2014 with Morisita Similarities of the contemporary samples (Dissimilar values < 0.4, Similar values > 0.7).

Stream	Location	Morisita Similarity
Opintlocco Cr	CR 26	0.7032
Opintlocco Cr	CR 43	0.1791
Opintlocco Cr	US 80	0.4292
Chewacla Cr	AL 51	0.8571
Chewacla Cr	CR 112	0.6638
Cossey Br	CR 43	0.8925
Choctafaula Cr	FSR 906	0.2101
Choctafaula Cr	FSR 900	0.2486
Choctafaula Cr	CR 54	0.2048
Choctafaula Cr	CR 014	0.9619
Uphapee Cr	US 81	0.8604
Uphapee Cr	US 80	0.8318
Shoal Cr	FSR 548	0.8368
Shoal Cr	1/4 mi S of FSR 548/ 500	0.6031
Shoal Cr	FSR 553	0.4837
Shoal Cr	1/2 mi US Pine Glenn	0.9878
Shoal Cr	1/2mi DS Pine Glenn	0.3399
Shoal Cr	Upstream SW Lake	0.6595
Shoal Cr	Pinhoti Tr Crossing FSR 531I	0.8765
Five Runs	US 84	0
Five Runs	Bass Road	0.1382
Camp Cr	Hwy 137	0.9852
Hogfoot Cr	CR 17	0.6084
Five Runs	CR 24	0.3041
Five Runs	Blue Spring	0.7049
Camp Cr	FSR 332	0.6648
Hogfoot Cr	FSR 339	0.1828
Bay Br	CR 56	0.4148
Pond Cr	CR 337	0.0717
Cox Cr	Mars Hill Rd	0.5817
Middle Cypress Cr	CR 8	0.9117
Middle Cypress Cr	CR 6	0.9064
Little Cypress Cr	CR 16	0.4495
Cypress Cr	CR 8	0.7436
Cypress Cr	Natchez Trace	0.5371

Stream	Location	Morisita Similarity
N Fork Cypress Cr	Natchez Trace	0.366
Burcham Cr	CR 6	0.0698
Threet Cr	Natchez Trace	0.4659
Greenbrier Br	CR 259	0.6868
Lindsey Cr	Natchez Trace	0.6181
Indian Camp Cr	CR 135	0.8836
Cowpen Cr	CR 8	0.8665
Little Butler Cr	CR 61	0.8968
Little Butler Cr	CR 299	0.7407
Shoal Cr	Goose Shoals	0.9533
Cedar Cr	US 43	0.6139
Little Bear Cr	AL 24	0.3814
Pennywinkle Cr	State Line Rd	0.8016
Little Bear Cr	Co. Hwy. 122	0.6654
Little Bear Cr	AL 187	0.5065
Little Bear Cr	Co. Hwy 34	0.4151
Bear Creek	Co. Hwy. 93	0.4404
Cedar Cr	US 247	0.5347
Bear Cr	Co. Hwy. 57	0.9201
Bear Cr	MS 30	0.4381
Bear Cr	Co Hwy 86	0.3768
Bear Cr	AL 241	0.489
Cedar Cr	Natchez Trace	0.8772
Little Bear Cr	Co Hwy 59	0.7576
Little Bear Cr	McCarley Rd	0.2781
Pennywinkle Cr	Co Hwy 995	0.8207
	Mean Similarity	**0.5612**

Appendix 4 – Summary of Morisita Similarity Index between contemporary and historic samples (Dissimilar values < 0.4, similar values > 0.7).

Uphapee

Site	Years	Morisita	Site	Years	Morisita
1	2014-2013	0.7032	9	2014-2013	0.2048
	2014-1999	0.4292		2014-2009	0.6493
	2014-1991	0.2471		2014-2007	0.2057
	2014-1986	0.8252		2014-2006	0.5114
2	2014-2013	0.1791		2014-1991	0.1213
	2014-1999	0.0966		2014-1971	0.2975
3	2014-2013	0.4292	10	2014-2013	0.9619
	2014-1999	0.0403	11	2014-2013	0.8605
4	2014-2013	0.8571		2014-1999	0.4977
	2014-1999	0.633		2014-1989	0.3226
5	2014-2013	0.6638		2014-1987	0.4264
	2014-1999	0.5285		2014-1972	0.326
6	2014-2013	0.8925	12	2014-2013	0.8318
	2014-1999	0.0556		2014-1999	0.1795
7	2014-2013	0.2101	13	2014-2000	0.4594
	2014-1999	0.0034		2014-1987	0.2573
	2014-1991	0.7044			
8	2014-2013	0.2486			
	2014-2000	0.2469			
	2014-1991	0.4723			
	2014-1988	0.7941			

Five Runs

Site	Years	Morisita	Site	Years	Morisita
1	2014-2000	0.4066	7	2014-2013	0.3041
	2014-1975	0.0677		2014-2000	0.3877
2	2014-2013	0	8	2014-2013	0.6084
	2014-1992	0		2014-2000	0.7672
3	2014-2013	0.1382	9	2014-2013	0.7049
	2014-2000	0.4611		2014-2000	0.1591
	2014-1974	0.2179		2014-1998	0.1705
4	2014-2013	0.3041	10	2014-2013	0.1828
	2014-2000	0.48		2014-2000	0.5177
	2014-1979	0.5886	11	2014-2013	0.4148
5	2014-2013	0.9852		2014-2000	0.1312
	2014-2000	0.1591	12	2014-2013	0.0717
6	2014-2013	0.6648			
	2014-2000	0.7672			
	2014-1972	0.3959			

Shoal Creek (Coosa)

Site	Years	Morisita	Site	Years	Morisita
1	2014-2013	0.8368	6	2014-2013	0.6595
	2014-2002	0.4425		2014-2002	0.6658
2	2014-2013	0.6031	7	2014-2013	0.8765
	2014-2002	0.6199		2014-2002	0.6973
3	2014-2013	0.4837	8	2014-2002	0.5717
	2014-2002	0.6968	9	2014-2013	0.8745
4	2014-2013	0.9878		2014-2002	0.8271
	2014-2002	0.4635	10	2014-2013	0.274
5	2014-2013	0.3399		2014-2002	0.1099
	2014-2002	0.1209			

Bear Creek

Site	Years	Morisita	Site	Years	Morisita	Site	Years	Morisita
1	2014-2012	0.4941	12	2014-2013	0.9201	23	2014-2013	0.5347
	2014-2009	0.7497		2014-2012	0.415		2014-2012	0.8256
2	2014-2012	0.1546		2014-2009	0.9614		2014-2008	0.3862
	2014-2009	0.638		2014-2008	0.3554	24	2012-2008	0.1836
3	2013-2012	0.0854		2014-1998	0.6294	25	2014-2013	0.6139
	2013-2008	0.2529	13	2014-2013	0.489		2014-2012	0.4092
4	2014-2013	0.7051		2014-2012	0.5815		2014-2009	0.3135
	2014-2012	0.1082		2014-2008	0.0368		2014-2008	0.9332
	2014-2009	0.2367		2014-2000	0.3384		2014-1998	0.1379
5	2014-2013	0.747	14	2014-2013	0.3851	26	2014-2013	0.3814
	2014-2012	0.798		2014-2009	0.4259		2014-2012	0.0901
	2014-2009	0.7516		2014-1998	0.796		2014-2009	0.4058
	2014-1998	0.5874	15	2014-2012	0.9139		2014-2008	0.1645
6	2012-2009	0.6584		2014-2009	0.9099		2014-1998	0.033
	2012-2008	0.4933	16	2014-2012	0.528	27	2014-2013	0.5065
7	2012-2009	0.2613		2014-2009	0.2507		2014-2009	0.4072
8	2013-2012	0.5893	17	2014-2012	0.8907		2014-2008	0.2878
	2013-2008	0.3243		2014-2009	0.7106		2014-1998	0.1286
	2013-1998	0.3788	18	2014-2013	0.4103	28	2014-2013	0.6658
9	2014-2013	0.4381		2014-2012	0.501		2014-2012	0.5623
	2014-2012	0.266		2014-2009	0.4583		2014-2008	0.7484
	2014-2008	0.4484		2014-1998	0.3682		2014-1998	0.8024
	2014-1999	0.5487	19	2014-2012	0.8525	29	2014-2013	0.7576
10	2014-2013	0.3768		2014-2009	0.3975		2014-2012	0.6292
	2014-2012	0.6145	20	2014-2012	0.2802		2014-2008	0.3971
	2014-2009	0.4581		2014-2009	0.1863		2014-1998	0.446
	2014-2008	0.5848	21	2014-2013	0.8772	30	2014-2013	0.2781
	2014-1998	0.214		2014-2012	0.8463		2014-2012	0.2506
11	2012-2009	0.3389		2014-2009	0.3055		2014-2008	0.1186
	2012-2008	0.2589		2014-2008	0.2223		2014-1998	0.0116
			22	2014-2012	0.5067			
				2014-2009	0.6			
				2014-2008	0.5631			
				2014-1999	0.7778			

Cypress Creek

Site	Years	Morisita	Site	Years	Morisita
1	2014-2013	0.5817	8	2014-2013	0.0698
2	2014-2013	0.8984	9	2014-2013	0.4659
	2014-1991	0.6306		2014-2011	0.6589
3	2014-2013	0.9064		2014-2006	0.5663
	2014-1983	0.6017		2014-2003	0.4743
4	2014-2013	0.4677	10	2014-2013	0.6868
5	2014-2013	0.7436	11	2014-2013	0.6181
6	2014-2013	0.5371		2014-2003	0.6117
	2013-2000	0.5183		2014-1979	0.0427
7	2014-2013	0.1645			
	2014-1979	0.0217			

Shoal Creek (Tennessee)

Site	Years	Morisita
1	2014-2013	0.8836
	2014-1974	0.319
2	2014-2013	0.8995
3	2014-2013	0.8967
	2014-1992	0.5742
4	2014-2013	0.7407
	2014-1996	0.4274
5	2014-2013	0.9538
	2014-2012	0.5185
	2014-2011	0.4827
	2014-2001	0.3491
	2014-1999	0.4236

Appendix 5 – Land cover proportions for watersheds draining to the sample sites taken from the NLCD

Watershed	Uphapee										
Site	1	1	2	2	3	3	4	4	5	5	6
NLCD Year	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Water	0.006	0.005	0.010	0.006	0.000	0.000	0.015	0.015	0.013	0.012	0.002
Developed,Open	0.020	0.020	0.026	0.026	0.034	0.028	0.057	0.047	0.062	0.046	0.024
Developed, Low	0.003	0.003	0.011	0.011	0.018	0.015	0.034	0.028	0.043	0.030	0.008
Developed, Moderate	0.000	0.000	0.000	0.000	0.001	0.000	0.007	0.005	0.009	0.005	0.001
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.007	0.004	0.004	0.000
Barren	0.000	0.000	0.000	0.000	0.002	0.000	0.020	0.023	0.013	0.012	0.001
Deciduous Forest	0.288	0.298	0.217	0.239	0.148	0.143	0.242	0.252	0.281	0.314	0.318
Evergreen Forest	0.206	0.201	0.175	0.186	0.315	0.256	0.149	0.170	0.175	0.210	0.186
Mixed Forest	0.112	0.128	0.089	0.103	0.079	0.088	0.018	0.020	0.015	0.018	0.111
Shrub/Scrub	0.125	0.114	0.122	0.077	0.006	0.133	0.112	0.054	0.116	0.052	0.183
Herbaceous	0.016	0.001	0.012	0.000	0.015	0.000	0.051	0.069	0.045	0.042	0.084
Hay/Pasture	0.074	0.079	0.113	0.115	0.118	0.099	0.190	0.211	0.154	0.182	0.027
Cultivated	0.035	0.036	0.100	0.109	0.221	0.200	0.065	0.066	0.047	0.048	0.025
Woody Wetland	0.104	0.114	0.110	0.125	0.037	0.035	0.025	0.033	0.020	0.025	0.027
Herbaceous Wetland	0.011	0.002	0.014	0.002	0.007	0.003	0.008	0.000	0.005	0.000	0.004

Watershed	Uphapee										
Site	6	7	7	8	8	9	10	11	11	12	12
NLCD Year	2001	2011	2001	2011	2001	2011	2011	2011	2001	2011	2001
Water	0.002	0.009	0.008	0.009	0.008	0.012	0.011	0.006	0.008	0.009	0.008
Developed,Open	0.024	0.061	0.056	0.059	0.057	0.069	0.082	0.046	0.059	0.059	0.054
Developed, Low	0.008	0.022	0.016	0.017	0.013	0.034	0.048	0.021	0.025	0.031	0.026
Developed, Moderate	0.001	0.011	0.007	0.008	0.005	0.020	0.029	0.009	0.008	0.013	0.008
Developed, High	0.000	0.002	0.001	0.001	0.001	0.003	0.004	0.003	0.003	0.005	0.003
Barren	0.000	0.001	0.000	0.010	0.009	0.002	0.002	0.004	0.006	0.002	0.002
Deciduous Forest	0.369	0.161	0.169	0.151	0.158	0.164	0.157	0.162	0.239	0.253	0.270
Evergreen Forest	0.219	0.128	0.145	0.160	0.180	0.093	0.066	0.125	0.181	0.177	0.182
Mixed Forest	0.148	0.202	0.221	0.203	0.224	0.161	0.156	0.090	0.140	0.096	0.110
Shrub/Scrub	0.142	0.137	0.102	0.135	0.096	0.145	0.145	0.094	0.112	0.132	0.117
Herbaceous	0.000	0.008	0.000	0.015	0.006	0.007	0.008	0.014	0.006	0.022	0.006
Hay/Pasture	0.028	0.105	0.112	0.106	0.110	0.136	0.132	0.063	0.094	0.086	0.095
Cultivated	0.027	0.111	0.118	0.084	0.090	0.118	0.142	0.310	0.047	0.035	0.040
Woody Wetland	0.030	0.040	0.042	0.041	0.042	0.032	0.016	0.047	0.071	0.072	0.078
Herbaceous Wetland	0.002	0.002	0.001	0.002	0.001	0.003	0.004	0.004	0.001	0.007	0.001

Watershed	Shoal (Coosa)										
Site	1	1	2	2	3	3	4	4	5	5	6
NLCD Year	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Water	0.000	0.000	0.000	0.000	0.005	0.005	0.004	0.006	0.006	0.006	0.006
Developed,Open	0.032	0.032	0.033	0.033	0.039	0.039	0.034	0.024	0.024	0.025	0.025
Developed, Low	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Developed, Moderate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Barren	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.434	0.434	0.444	0.444	0.463	0.463	0.483	0.489	0.488	0.492	0.492
Evergreen Forest	0.504	0.504	0.497	0.497	0.478	0.479	0.466	0.469	0.465	0.465	0.461
Mixed Forest	0.012	0.012	0.011	0.011	0.010	0.010	0.008	0.005	0.005	0.005	0.005
Shrub/Scrub	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.004	0.000	0.004
Herbaceous	0.015	0.015	0.013	0.013	0.005	0.004	0.004	0.002	0.004	0.002	0.004
Hay/Pasture	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001
Cultivated	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Woody Wetland	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.003
Herbaceous Wetland	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Watershed	Shoal (Coosa)									Five Runs	
Site	6	7	7	8	8	9	9	10	10	1	1
NLCD Year	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001
Water	0.004	0.006	0.006	0.005	0.005	0.005	0.005	0.013	0.013	0.012	0.012
Developed,Open	0.034	0.024	0.024	0.024	0.024	0.025	0.025	0.022	0.022	0.060	0.060
Developed, Low	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.019
Developed, Moderate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.005
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.002
Barren	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.483	0.492	0.493	0.507	0.507	0.509	0.510	0.530	0.531	0.107	0.105
Evergreen Forest	0.467	0.461	0.465	0.447	0.450	0.443	0.446	0.416	0.419	0.225	0.220
Mixed Forest	0.008	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.145	0.157
Shrub/Scrub	0.000	0.004	0.000	0.003	0.000	0.003	0.000	0.003	0.001	0.099	0.107
Herbaceous	0.004	0.004	0.002	0.006	0.005	0.007	0.005	0.008	0.005	0.027	0.000
Hay/Pasture	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.223	0.239
Cultivated	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.030
Woody Wetland	0.001	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.041	0.042
Herbaceous Wetland	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002

Watershed	Five Runs										
Site	2	3	3	4	4	5	5	6	6	7	8
NLCD Year	2011	2011	2001	2011	2001	2011	2001	2011	2001	2011	2011
Water	0.018	0.010	0.009	0.010	0.009	0.010	0.009	0.013	0.013	0.008	0.003
Developed,Open	0.037	0.055	0.055	0.056	0.056	0.055	0.055	0.063	0.063	0.060	0.050
Developed, Low	0.004	0.014	0.013	0.015	0.014	0.014	0.014	0.022	0.021	0.001	0.003
Developed, Moderate	0.001	0.005	0.003	0.005	0.003	0.005	0.003	0.008	0.006	0.000	0.000
Developed, High	0.000	0.002	0.001	0.002	0.001	0.002	0.001	0.003	0.002	0.000	0.000
Barren	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.148	0.084	0.083	0.090	0.088	0.089	0.088	0.114	0.113	0.018	0.019
Evergreen Forest	0.198	0.350	0.341	0.321	0.314	0.325	0.317	0.213	0.211	0.669	0.716
Mixed Forest	0.164	0.129	0.139	0.134	0.145	0.134	0.144	0.144	0.157	0.137	0.085
Shrub/Scrub	0.102	0.085	0.096	0.088	0.098	0.087	0.098	0.103	0.112	0.032	0.039
Herbaceous	0.028	0.022	0.000	0.023	0.000	0.023	0.000	0.028	0.000	0.000	0.008
Hay/Pasture	0.254	0.175	0.188	0.186	0.200	0.184	0.198	0.224	0.238	0.040	0.056
Cultivated	0.036	0.022	0.022	0.024	0.024	0.024	0.023	0.028	0.028	0.010	0.010
Woody Wetland	0.009	0.045	0.046	0.044	0.045	0.046	0.046	0.035	0.035	0.024	0.009
Herbaceous Wetland	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.003

Watershed	Five Runs							Bear			
Site	8	9	10	10	11	11	12	1	1	2	2
NLCD Year	2001	2011	2011	2001	2011	2001	2011	2011	2006	2011	2006
Water	0.003	0.005	0.006	0.005	0.003	0.004	0.011	0.001	0.001	0.001	0.000
Developed,Open	0.050	0.052	0.046	0.046	0.222	0.218	0.046	0.021	0.021	0.029	0.029
Developed, Low	0.003	0.003	0.002	0.002	0.182	0.178	0.001	0.000	0.000	0.007	0.007
Developed, Moderate	0.000	0.000	0.000	0.000	0.067	0.045	0.000	0.000	0.000	0.001	0.001
Developed, High	0.000	0.000	0.000	0.000	0.027	0.020	0.000	0.000	0.000	0.000	0.000
Barren	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.019	0.078	0.054	0.053	0.086	0.089	0.013	0.572	0.598	0.511	0.515
Evergreen Forest	0.716	0.384	0.534	0.519	0.054	0.061	0.774	0.078	0.092	0.080	0.064
Mixed Forest	0.085	0.099	0.105	0.112	0.150	0.152	0.061	0.069	0.068	0.045	0.035
Shrub/Scrub	0.048	0.097	0.068	0.088	0.079	0.086	0.053	0.218	0.187	0.185	0.184
Herbaceous	0.000	0.032	0.017	0.001	0.005	0.000	0.004	0.000	0.001	0.001	0.033
Hay/Pasture	0.056	0.220	0.127	0.135	0.113	0.131	0.022	0.026	0.025	0.086	0.084
Cultivated	0.008	0.012	0.012	0.009	0.005	0.008	0.000	0.011	0.002	0.042	0.036
Woody Wetland	0.009	0.017	0.026	0.027	0.007	0.007	0.013	0.004	0.005	0.012	0.012
Herbaceous Wetland	0.003	0.001	0.002	0.002	0.000	0.000	0.001	0.000	0.000	0.001	0.001

Watershed											
						Bear					
Site	3	3	4	4	5	5	5	6	6	7	7
NLCD Year	2011	2006	2011	2006	2011	2006	2001	2011	2006	2011	2006
Water	0.000	0.000	0.002	0.000	0.001	0.000	0.001	0.006	0.006	0.021	0.021
Developed,Open	0.020	0.020	0.044	0.044	0.051	0.054	0.051	0.040	0.040	0.039	0.040
Developed, Low	0.000	0.002	0.013	0.013	0.022	0.023	0.023	0.011	0.011	0.013	0.013
Developed, Moderate	0.000	0.000	0.002	0.002	0.005	0.005	0.005	0.001	0.001	0.003	0.003
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
Barren	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.009	0.009	0.002	0.002
Deciduous Forest	0.657	0.654	0.359	0.362	0.332	0.355	0.332	0.214	0.206	0.383	0.396
Evergreen Forest	0.103	0.068	0.149	0.144	0.131	0.154	0.131	0.176	0.175	0.103	0.101
Mixed Forest	0.050	0.033	0.175	0.171	0.209	0.154	0.208	0.169	0.160	0.061	0.057
Shrub/Scrub	0.147	0.151	0.148	0.152	0.115	0.124	0.116	0.110	0.104	0.160	0.147
Herbaceous	0.000	0.052	0.001	0.021	0.000	0.006	0.000	0.000	0.044	0.007	0.026
Hay/Pasture	0.011	0.009	0.035	0.030	0.041	0.037	0.040	0.111	0.102	0.164	0.158
Cultivated	0.007	0.005	0.050	0.038	0.067	0.058	0.067	0.060	0.051	0.027	0.021
Woody Wetland	0.004	0.004	0.020	0.021	0.026	0.029	0.027	0.088	0.089	0.014	0.014
Herbaceous Wetland	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.001	0.001

Watershed						Bear					
Site	8	8	8	9	9	9	10	10	10	11	11
NLCD Year	2011	2006	2001	2011	2006	2001	2011	2006	2001	2011	2006
Water	0.021	0.021	0.021	0.014	0.012	0.015	0.015	0.014	0.015	0.016	0.016
Developed,Open	0.039	0.039	0.039	0.044	0.037	0.043	0.044	0.045	0.044	0.044	0.045
Developed, Low	0.013	0.013	0.013	0.014	0.013	0.015	0.015	0.014	0.014	0.012	0.012
Developed, Moderate	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002
Developed, High	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001
Barren	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003
Deciduous Forest	0.382	0.384	0.384	0.318	0.273	0.323	0.315	0.320	0.317	0.344	0.346
Evergreen Forest	0.104	0.104	0.104	0.125	0.105	0.125	0.126	0.122	0.125	0.133	0.127
Mixed Forest	0.061	0.061	0.061	0.079	0.063	0.079	0.076	0.072	0.076	0.080	0.075
Shrub/Scrub	0.160	0.160	0.160	0.115	0.092	0.113	0.116	0.110	0.114	0.110	0.108
Herbaceous	0.007	0.007	0.007	0.010	0.026	0.010	0.011	0.030	0.011	0.013	0.033
Hay/Pasture	0.164	0.164	0.164	0.214	0.178	0.212	0.218	0.214	0.219	0.208	0.205
Cultivated	0.027	0.027	0.027	0.038	0.178	0.037	0.038	0.031	0.038	0.022	0.016
Woody Wetland	0.014	0.014	0.014	0.020	0.016	0.020	0.019	0.019	0.019	0.011	0.011
Herbaceous Wetland	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.000	0.000

Watershed						Bear					
Site	12	12	12	13	13	13	14	14	14	15	15
NLCD Year	2011	2006	2001	2011	2006	2001	2011	2006	2001	2011	2006
Water	0.017	0.017	0.017	0.022	0.023	0.023	0.001	0.001	0.001	0.000	0.000
Developed,Open	0.051	0.052	0.051	0.053	0.062	0.055	0.031	0.031	0.031	0.029	0.031
Developed, Low	0.015	0.015	0.015	0.015	0.015	0.015	0.001	0.001	0.001	0.000	0.000
Developed, Moderate	0.003	0.003	0.003	0.003	0.006	0.003	0.000	0.000	0.000	0.000	0.000
Developed, High	0.001	0.001	0.001	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.000
Barren	0.003	0.004	0.003	0.005	0.005	0.005	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.276	0.276	0.277	0.258	0.237	0.242	0.360	0.362	0.358	0.277	0.271
Evergreen Forest	0.150	0.144	0.150	0.147	0.145	0.149	0.188	0.198	0.189	0.106	0.108
Mixed Forest	0.098	0.092	0.098	0.106	0.103	0.109	0.149	0.149	0.149	0.156	0.155
Shrub/Scrub	0.088	0.087	0.088	0.069	0.073	0.070	0.070	0.069	0.071	0.079	0.085
Herbaceous	0.018	0.037	0.019	0.024	0.040	0.025	0.010	0.011	0.010	0.004	0.005
Hay/Pasture	0.242	0.242	0.243	0.258	0.256	0.263	0.150	0.142	0.150	0.324	0.334
Cultivated	0.024	0.017	0.024	0.022	0.015	0.023	0.010	0.005	0.010	0.014	0.001
Woody Wetland	0.013	0.014	0.013	0.017	0.017	0.017	0.030	0.030	0.030	0.011	0.011
Herbaceous Wetland	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Watershed						Bear					
Site	16	16	17	17	18	18	18	19	19	20	20
NLCD Year	2011	2006	2011	2006	2011	2006	2001	2011	2006	2011	2006
Water	0.003	0.002	0.002	0.009	0.001	0.001	0.001	0.002	0.002	0.000	0.000
Developed,Open	0.039	0.039	0.038	0.037	0.045	0.043	0.045	0.046	0.047	0.022	0.023
Developed, Low	0.003	0.002	0.002	0.003	0.004	0.004	0.004	0.005	0.006	0.002	0.002
Developed, Moderate	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Barren	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.307	0.276	0.319	0.323	0.352	0.316	0.352	0.427	0.334	0.728	0.732
Evergreen Forest	0.062	0.055	0.136	0.140	0.105	0.119	0.106	0.125	0.124	0.033	0.032
Mixed Forest	0.138	0.119	0.117	0.115	0.088	0.089	0.087	0.098	0.097	0.011	0.010
Shrub/Scrub	0.046	0.046	0.059	0.057	0.053	0.053	0.052	0.021	0.028	0.132	0.131
Herbaceous	0.004	0.065	0.015	0.016	0.026	0.052	0.026	0.008	0.099	0.000	0.002
Hay/Pasture	0.359	0.359	0.278	0.278	0.305	0.309	0.304	0.259	0.259	0.060	0.058
Cultivated	0.015	0.012	0.023	0.012	0.010	0.002	0.010	0.004	0.000	0.011	0.008
Woody Wetland	0.025	0.025	0.008	0.008	0.010	0.010	0.010	0.003	0.003	0.002	0.002
Herbaceous Wetland	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Watershed						Bear					
Site	21	21	22	22	22	23	23	24	24	25	25
NLCD Year	2011	2006	2011	2006	2001	2011	2006	2011	2006	2011	2006
Water	0.031	0.031	0.033	0.033	0.057	0.039	0.040	0.008	0.008	0.006	0.006
Developed,Open	0.036	0.036	0.036	0.037	0.064	0.039	0.040	0.047	0.048	0.059	0.059
Developed, Low	0.014	0.014	0.015	0.015	0.025	0.020	0.020	0.031	0.032	0.048	0.049
Developed, Moderate	0.003	0.004	0.004	0.004	0.006	0.005	0.005	0.009	0.009	0.013	0.013
Developed, High	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.003	0.003	0.004	0.004
Barren	0.002	0.002	0.003	0.003	0.005	0.004	0.004	0.005	0.005	0.007	0.009
Deciduous Forest	0.420	0.435	0.425	0.437	0.005	0.410	0.421	0.379	0.383	0.318	0.312
Evergreen Forest	0.088	0.093	0.085	0.091	0.148	0.085	0.092	0.090	0.099	0.087	0.091
Mixed Forest	0.048	0.046	0.045	0.042	0.078	0.053	0.050	0.065	0.064	0.071	0.069
Shrub/Scrub	0.190	0.169	0.188	0.168	0.323	0.168	0.155	0.115	0.105	0.085	0.086
Herbaceous	0.005	0.021	0.005	0.021	0.010	0.008	0.017	0.015	0.022	0.024	0.033
Hay/Pasture	0.138	0.131	0.140	0.132	0.242	0.144	0.137	0.206	0.199	0.245	0.241
Cultivated	0.017	0.011	0.015	0.010	0.026	0.016	0.012	0.019	0.015	0.023	0.018
Woody Wetland	0.006	0.006	0.005	0.005	0.009	0.006	0.005	0.008	0.008	0.009	0.009
Herbaceous Wetland	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000

Watershed						Bear					
Site	25	26	26	26	27	27	27	28	28	28	29
NLCD Year	2001	2011	2006	2001	2011	2006	2001	2011	2006	2001	2011
Water	0.006	0.039	0.000	0.039	0.006	0.005	0.006	0.008	0.007	0.008	0.010
Developed,Open	0.059	0.033	0.037	0.033	0.041	0.044	0.042	0.045	0.048	0.045	0.058
Developed, Low	0.048	0.008	0.009	0.008	0.013	0.013	0.013	0.016	0.017	0.016	0.023
Developed, Moderate	0.014	0.002	0.003	0.002	0.003	0.005	0.004	0.005	0.007	0.005	0.009
Developed, High	0.004	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
Barren	0.007	0.002	0.002	0.002	0.003	0.004	0.003	0.004	0.005	0.005	0.009
Deciduous Forest	0.318	0.496	0.524	0.495	0.468	0.472	0.467	0.440	0.442	0.441	0.399
Evergreen Forest	0.087	0.055	0.060	0.056	0.061	0.054	0.061	0.068	0.060	0.069	0.066
Mixed Forest	0.071	0.034	0.033	0.035	0.045	0.042	0.045	0.053	0.049	0.053	0.057
Shrub/Scrub	0.085	0.159	0.153	0.158	0.112	0.111	0.112	0.100	0.099	0.099	0.121
Herbaceous	0.024	0.000	0.011	0.000	0.000	0.009	0.000	0.000	0.011	0.000	0.000
Hay/Pasture	0.244	0.157	0.156	0.157	0.234	0.230	0.234	0.247	0.243	0.246	0.231
Cultivated	0.023	0.011	0.007	0.011	0.010	0.007	0.010	0.010	0.006	0.009	0.007
Woody Wetland	0.009	0.003	0.003	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.007
Herbaceous Wetland	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Watershed	Bear					Cypress					
Site	29	29	30	30	30	1	2	3	4	5	6
NLCD Year	2006	2001	2011	2006	2001	2011	2011	2011	2011	2011	2011
Water	0.009	0.011	0.014	0.014	0.015	0.003	0.001	0.001	0.001	0.001	0.001
Developed,Open	0.066	0.058	0.047	0.056	0.046	0.150	0.037	0.040	0.079	0.059	0.372
Developed, Low	0.027	0.024	0.020	0.029	0.021	0.124	0.003	0.004	0.015	0.008	0.006
Developed, Moderate	0.013	0.009	0.004	0.015	0.004	0.063	0.000	0.000	0.002	0.000	0.000
Developed, High	0.002	0.002	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.000
Barren	0.011	0.009	0.000	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.000
Deciduous Forest	0.402	0.400	0.410	0.412	0.411	0.099	0.422	0.334	0.344	0.355	0.262
Evergreen Forest	0.059	0.067	0.056	0.047	0.057	0.007	0.042	0.032	0.018	0.093	0.064
Mixed Forest	0.053	0.056	0.044	0.044	0.044	0.007	0.015	0.014	0.015	0.020	0.016
Shrub/Scrub	0.118	0.120	0.176	0.162	0.175	0.048	0.153	0.135	0.110	0.164	0.109
Herbaceous	0.004	0.000	0.000	0.000	0.000	0.014	0.036	0.026	0.023	0.010	0.006
Hay/Pasture	0.226	0.230	0.207	0.196	0.207	0.369	0.201	0.276	0.294	0.154	0.121
Cultivated	0.004	0.007	0.010	0.005	0.010	0.064	0.057	0.101	0.076	0.108	0.033
Woody Wetland	0.007	0.007	0.011	0.010	0.011	0.026	0.031	0.037	0.022	0.027	0.007
Herbaceous Wetland	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000

Watershed	Cypress								Shoal (Tennessee)		
Site	7	8	9	9	9	10	11	11	1	2	3
NLCD Year	2011	2011	2011	2006	2001	2011	2011	2001	2011	2011	2011
Water	0.001	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Developed,Open	0.036	0.075	0.051	0.045	0.047	0.039	0.056	0.047	0.067	0.075	0.031
Developed, Low	0.006	0.010	0.006	0.006	0.006	0.003	0.014	0.016	0.004	0.010	0.003
Developed, Moderate	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.001
Developed, High	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Barren	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Deciduous Forest	0.466	0.185	0.302	0.305	0.298	0.234	0.237	0.257	0.393	0.371	0.603
Evergreen Forest	0.091	0.016	0.146	0.121	0.136	0.007	0.021	0.027	0.032	0.008	0.021
Mixed Forest	0.020	0.013	0.017	0.016	0.018	0.008	0.024	0.031	0.021	0.050	0.040
Shrub/Scrub	0.194	0.172	0.188	0.198	0.189	0.155	0.163	0.166	0.108	0.064	0.078
Herbaceous	0.004	0.006	0.005	0.024	0.000	0.010	0.037	0.000	0.031	0.022	0.049
Hay/Pasture	0.013	0.159	0.029	0.030	0.042	0.326	0.050	0.050	0.303	0.318	0.136
Cultivated	0.149	0.306	0.235	0.239	0.248	0.204	0.372	0.379	0.037	0.069	0.024
Woody Wetland	0.005	0.050	0.017	0.015	0.014	0.013	0.024	0.025	0.004	0.010	0.014
Herbaceous Wetland	0.014	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000

Watershed	Shoal (Tennessee)		
Site	4	5	5
NLCD Year	2011	2011	2001
Water	0.000	0.002	0.002
Developed,Open	0.041	0.052	0.049
Developed, Low	0.006	0.012	0.010
Developed, Moderate	0.002	0.004	0.003
Developed, High	0.000	0.002	0.001
Barren	0.000	0.001	0.000
Deciduous Forest	0.523	0.432	0.450
Evergreen Forest	0.014	0.047	0.056
Mixed Forest	0.048	0.029	0.033
Shrub/Scrub	0.062	0.073	0.052
Herbaceous	0.069	0.029	0.012
Hay/Pasture	0.189	0.253	0.260
Cultivated	0.025	0.057	0.065
Woody Wetland	0.019	0.008	0.007
Herbaceous Wetland	0.000	0.000	0.000

Appendix 6 – Contemporary Collection Records

Stream	Opintlocco Cr		Opintlocco Cr		Opintlocco Cr	
Location	CR 26		CR 43		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Lee Co.	
Latitude	32.412281		32.492815		32.494529	
Longitude	-85.615707		-85.447137		-85.414381	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	10	3				
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta	54	37				
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus						
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus	53	10				2
Lythrurus fasciolaris				3		
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus	21					
Notropis amplamala	20	1				
Notropis asperifrons						

Stream	Opintlocco Cr		Opintlocco Cr		Opintlocco Cr	
Location	CR 26		CR 43		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Lee Co.	
Latitude	32.412281		32.492815		32.494529	
Longitude	-85.615707		-85.447137		-85.414381	
Year	2014	2013	2014	2013	2014	2013
Notropis atherinoides						
Notropis baileyi						
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius	12					
Notropis telescopus						
Notropis texanus			1			
Notropis uranoscopus						
Notropis volucellus	18					
Notropis xaenocephalus						
Opsopoeodus emiliae				3		
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax	1	1				
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus					4	13
Carpiodes cyprinus						
Erimyzon claviformis				2	2	
Hypentelium etowanum	3					
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum	7	1				
Moxostoma poecilurum	2					
Ameiurus melas				1		
Ameiurus natalis	2				1	

Stream	Opintlocco Cr		Opintlocco Cr		Opintlocco Cr	
Location	CR 26		CR 43		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Lee Co.	
Latitude	32.412281		32.492815		32.494529	
Longitude	-85.615707		-85.447137		-85.414381	
Year	2014	2013	2014	2013	2014	2013
Ameiurus nebulosus						
Ictalurus punctatus						
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus	1					
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus					3	
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						
Fundulus stellifer						
Gambusia affinis	18	7		7	1	2
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus				3		
Lepomis auritus						
Lepomis cyanellus			1			
Lepomis gulosus				1		
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	6	3	4	2	6	
Lepomis megalotis	8		1	1		
Lepomis microlophus		1				
Lepomis miniatus						

Stream	Opintlocco Cr		Opintlocco Cr		Opintlocco Cr	
Location	CR 26		CR 43		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Lee Co.	
Latitude	32.412281		32.492815		32.494529	
Longitude	-85.615707		-85.447137		-85.414381	
Year	2014	2013	2014	2013	2014	2013
Micropterus coosae						
Micropterus dolomieu						
Micropterus henshalli	3					
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						1
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae	2					
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani	16	12				
Etheostoma nigripinne						
Etheostoma nigrum				2		
Etheostoma rufilineatum						
Etheostoma rupestre	3					
Etheostoma simoterum						
Etheostoma stigmaeum	4	3				
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						

Stream	Opintlocco Cr		Opintlocco Cr		Opintlocco Cr	
Location	CR 26		CR 43		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Lee Co.	
Latitude	32.412281		32.492815		32.494529	
Longitude	-85.615707		-85.447137		-85.414381	
Year	2014	2013	2014	2013	2014	2013
Etheostoma sp. zonistium						
Percina caprodes						
Percina evides						
Percina kathae						
Percina maculata				1		
Percina nigrofasciata	22	1				
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Chewacla Cr		Chewacla Cr		Cossey Br	
Location	AL 51		CR 112		CR 43	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Lee Co.		Macon Co.	
Latitude	32.561267		32.551957		32.492815	
Longitude	-85.372307		-85.394518		-85.447137	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	2					
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta					1	6
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	1	3	6	1		
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus	19	20	5	1		
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus					6	12
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi	1	2		1		

Stream	Chewacla Cr		Chewacla Cr		Cossey Br	
Location	AL 51		CR 112		CR 43	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Lee Co.		Macon Co.	
Latitude	32.561267		32.551957		32.492815	
Longitude	-85.372307		-85.394518		-85.447137	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum	8	3	3	7	1	
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum	1					
Ameiurus melas						
Ameiurus natalis	2					
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Chewacla Cr		Chewacla Cr		Cossey Br	
Location	AL 51		CR 112		CR 43	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Lee Co.		Macon Co.	
Latitude	32.561267		32.551957		32.492815	
Longitude	-85.372307		-85.394518		-85.447137	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus	1		1		1	
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						1
Fundulus stellifer						
Gambusia affinis						1
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae	2	2	7	12		
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus					1	
Lepomis auritus						
Lepomis cyanellus	1					
Lepomis gulosus			1			1
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	6		9	5		
Lepomis megalotis	6	2			1	
Lepomis microlophus			2			
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Chewacla Cr		Chewacla Cr		Cossey Br	
Location	AL 51		CR 112		CR 43	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Lee Co.		Macon Co.	
Latitude	32.561267		32.551957		32.492815	
Longitude	-85.372307		-85.394518		-85.447137	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						1
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus			1			
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum						
Etheostoma stigmaeum		2				
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						

Stream	Chewacla Cr		Chewacla Cr		Cossey Br	
Location	AL 51		CR 112		CR 43	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Lee Co.		Macon Co.	
Latitude	32.561267		32.551957		32.492815	
Longitude	-85.372307		-85.394518		-85.447137	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata	4	2	4		1	1
Percina palmaris						
Percina phoxocephala						
Percina sciera			2			
Percina vigil						

Stream	Choctafaula Cr		Choctafaula Cr		Choctafaula Cr	
Location	FSR 906		FSR 900		CR 54	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Macon Co.	
Latitude	32.489264		32.46721		32.507913	
Longitude	-85.603957		-85.637281		-85.578364	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei					17	
Lepisosteus oculatus					1	
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis			59	2	15	
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta	11	2	14	22		11
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	5	2	3	3		4
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus			12		6	33
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus	1		3		2	
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus	6		8	1		
Notropis amplamala				1		
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi	40		83	2	17	7

Stream	Choctafaula Cr		Choctafaula Cr		Choctafaula Cr	
Location	FSR 906		FSR 900		CR 54	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Macon Co.	
Latitude	32.489264		32.46721		32.507913	
Longitude	-85.603957		-85.637281		-85.578364	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus		2				
Notropis uranoscopus			5			
Notropis volucellus				1		
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum	1		8	1	3	
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei				4	1	
Moxostoma erythrurum			1		1	
Moxostoma poecilurum			10			
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Choctafaula Cr		Choctafaula Cr		Choctafaula Cr	
Location	FSR 906		FSR 900		CR 54	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Macon Co.	
Latitude	32.489264		32.46721		32.507913	
Longitude	-85.603957		-85.637281		-85.578364	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus	2				7	
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus	1					
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						
Fundulus stellifer						
Gambusia affinis			1	7		
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus					1	
Lepomis gulosus	1					
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus					2	1
Lepomis megalotis	1		1			
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Choctafaula Cr		Choctafaula Cr		Choctafaula Cr	
Location	FSR 906		FSR 900		CR 54	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Macon Co.	
Latitude	32.489264		32.46721		32.507913	
Longitude	-85.603957		-85.637281		-85.578364	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli			2			
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae	2					
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani			3		7	
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre			21	3		
Etheostoma simoterum						
Etheostoma stigmaeum	1				1	1
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						

Stream	Choctafaula Cr		Choctafaula Cr		Choctafaula Cr	
Location	FSR 906		FSR 900		CR 54	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Macon Co.		Macon Co.		Macon Co.	
Latitude	32.489264		32.46721		32.507913	
Longitude	-85.603957		-85.637281		-85.578364	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata	11		35		30	1
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Choctafaula Cr		Uphapee Cr		Uphapee Cr	
Location	CR 014		US 81		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Macon Co.		Macon Co.	
Latitude	32.529557		32.474498		32.444822	
Longitude	-85.556068		-85.687767		-85.647803	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus					1	
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	25	23		1		
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta			75	35	31	14
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	29	23	1			
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus					24	3
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana			8			
Nocomis leptocephalus	6	1				
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus			26	5	7	
Notropis amplamala				1		3
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi	4	1				

Stream	Choctafaula Cr		Uphapee Cr		Uphapee Cr	
Location	CR 014		US 81		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Macon Co.		Macon Co.	
Latitude	32.529557		32.474498		32.444822	
Longitude	-85.556068		-85.687767		-85.647803	
Year	2014	2013	2014	2013	2014	2013
Notropis baileyi	4	1				
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius			9			
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus			1	3	3	1
Notropis volucellus			5			
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						4
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus		1				
Carpiodes cyprinus			1			
Erimyzon claviformis						
Hypentelium etowanum	9	6		2	1	
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum				1		
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						

Stream	Choctafaula Cr		Uphapee Cr		Uphapee Cr	
Location	CR 014		US 81		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Macon Co.		Macon Co.	
Latitude	32.529557		32.474498		32.444822	
Longitude	-85.556068		-85.687767		-85.647803	
Year	2014	2013	2014	2013	2014	2013
Ictalurus punctatus			1			
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus				3		
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						
Fundulus stellifer						
Gambusia affinis			4	7		1
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	6		7			
Lepomis megalotis	3	1	3	3	3	
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						

Stream	Choctafaula Cr		Uphapee Cr		Uphapee Cr	
Location	CR 014		US 81		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Macon Co.		Macon Co.	
Latitude	32.529557		32.474498		32.444822	
Longitude	-85.556068		-85.687767		-85.647803	
Year	2014	2013	2014	2013	2014	2013
Micropterus dolomieu						
Micropterus henshalli	1	1	1	2		
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella					1	
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona		1				
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani			16	3		1
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre			2	16		
Etheostoma simoterum						
Etheostoma stigmaeum			1			
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						

Stream	Choctafaula Cr		Uphapee Cr		Uphapee Cr	
Location	CR 014		US 81		US 80	
Drainage	Tallapoosa River		Tallapoosa River		Tallapoosa River	
County	Lee Co.		Macon Co.		Macon Co.	
Latitude	32.529557		32.474498		32.444822	
Longitude	-85.556068		-85.687767		-85.647803	
Year	2014	2013	2014	2013	2014	2013
Percina caprodes						
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata			9	11		
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil			1			

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	FSR 548		1/4 mi S of FSR 548/ 500		FSR 553	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.78872		33.78541		33.77134	
Longitude	-85.54666		-85.55163		-85.55602	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	1	1	4		7	2
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia					4	4
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia	1				2	24
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						1
Luxilus chrysocephalus						
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons					1	5
Notropis atherinoides						
Notropis longirostris						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	FSR 548		1/4 mi S of FSR 548/ 500		FSR 553	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.78872		33.78541		33.77134	
Longitude	-85.54666		-85.55163		-85.55602	
Year	2014	2013	2014	2013	2014	2013
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus	6	2	13		11	7
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus	4	2	18	10		
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						1
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	FSR 548		1/4 mi S of FSR 548/ 500		FSR 553	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.78872		33.78541		33.77134	
Longitude	-85.54666		-85.55163		-85.55602	
Year	2014	2013	2014	2013	2014	2013
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						
Fundulus stellifer						
Gambusia affinis						
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae		1			1	4
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus	1		1			
Lepomis cyanellus	1	1	1		3	
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	1					1
Lepomis megalotis	2	1			2	1
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae	1			1	4	
Micropterus dolomieu						
Micropterus henshalli						
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	FSR 548		1/4 mi S of FSR 548/ 500		FSR 553	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.78872		33.78541		33.77134	
Longitude	-85.54666		-85.55163		-85.55602	
Year	2014	2013	2014	2013	2014	2013
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum		2				
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae	10	3	12		8	7
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani					3	6
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum						
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	FSR 548		1/4 mi S of FSR 548/ 500		FSR 553	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.78872		33.78541		33.77134	
Longitude	-85.54666		-85.55163		-85.55602	
Year	2014	2013	2014	2013	2014	2013
Percina palmaris					3	
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	1/2 mi US Pine Glenn		1/2mi DS Pine Glenn		Upstream SW Lake	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.72489		33.72115		33.7535	
Longitude	-85.59613		-85.60604		-85.57344	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis		1	2	2	12	10
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia	8	7		3	3	8
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia	31	26		28	1	6
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus						
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons			72	20		
Notropis atherinoides						
Notropis baileyi						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	1/2 mi US Pine Glenn		1/2mi DS Pine Glenn		Upstream SW Lake	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.72489		33.72115		33.7535	
Longitude	-85.59613		-85.60604		-85.57344	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus	11	9		41	1	3
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum	2	2	3			
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	1/2 mi US Pine Glenn		1/2mi DS Pine Glenn		Upstream SW Lake	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.72489		33.72115		33.7535	
Longitude	-85.59613		-85.60604		-85.57344	
Year	2014	2013	2014	2013	2014	2013
Ictalurus punctatus						
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus						
Fundulus stellifer	2	1				
Gambusia affinis						
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae	4	2			12	3
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus						3
Lepomis megalotis		1	2	4		
Lepomis microlophus				2		7
Lepomis miniatus						
Micropterus coosae	2		2			

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	1/2 mi US Pine Glenn		1/2mi DS Pine Glenn		Upstream SW Lake	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.72489		33.72115		33.7535	
Longitude	-85.59613		-85.60604		-85.57344	
Year	2014	2013	2014	2013	2014	2013
Micropterus dolomieu						
Micropterus henshalli						1
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum		2		1		2
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae	3	1	1		8	5
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani		1			3	1
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum						
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						

Stream	Shoal Cr		Shoal Cr		Shoal Cr	
Location	1/2 mi US Pine Glenn		1/2mi DS Pine Glenn		Upstream SW Lake	
Drainage	Coosa River		Coosa River		Coosa River	
County	Cleburne Co.		Cleburne Co.		Cleburne Co.	
Latitude	33.72489		33.72115		33.7535	
Longitude	-85.59613		-85.60604		-85.57344	
Year	2014	2013	2014	2013	2014	2013
Percina caprodes						
Percina evides						
Percina kathae			6	1		
Percina maculata						
Percina nigrofasciata						
Percina palmaris		2			3	
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Shoal Cr		Shoal Cr
Location	Pinhoti Tr Crossing FSR 531I		Below Highrock Lake via FSR522A
Drainage	Coosa River		Coosa River
County	Cleburne Co.		Cleburne Co.
Latitude	33.72293		33.7146
Longitude	-85.61574		-85.63169
Year	2014	2013	2014
Ichthyomyzon gagei			
Lepisosteus oculatus			
Lepisosteus osseus			
Dorosoma petenense			
Campostoma oligolepis		2	
Clinostomus funduloides			
Cyprinella caerulea			
Cyprinella callistia	15	9	14
Cyprinella galactura			
Cyprinella gibbsi			
Cyprinella spiloptera			
Cyprinella trichroistia	11	15	22
Cyprinella venusta			
Erimystax dissimilis			
Erimystax insignis			
Hemitremia flammea			
Hybopsis amblops			
Hybopsis lineapunctata			
Luxilus chrysocephalus			
Luxilus coccogenis			
Lythrurus atrapiculus			
Lythrurus bellus			
Lythrurus fasciolaris			
Lythrurus fumeus			
Lythrurus lirus			
Macrhybopsis storeriana			
Nocomis leptocephalus			
Nocomis micropogon			
Notemigonus crysoleucas			
Notropis ammophilus			
Notropis amplamala			
Notropis asperifrons			
Notropis atherinoides			

Stream	Shoal Cr		Shoal Cr
Location	Pinhoti Tr Crossing FSR 531I		Below Highrock Lake via FSR522A
Drainage	Coosa River		Coosa River
County	Cleburne Co.		Cleburne Co.
Latitude	33.72293		33.7146
Longitude	-85.61574		-85.63169
Year	2014	2013	2014
Notropis baileyi			
Notropis boops			
Notropis harperi			
Notropis leuciodus			
Notropis longirostris			
Notropis micropteryx			
Notropis stilbius			9
Notropis telescopus			
Notropis texanus			
Notropis uranoscopus			
Notropis volucellus			
Notropis xaenocephalus	1		
Opsopoeodus emiliae			
Phenocobius uranops			
Pimephales notatus			
Pimephales promelas			
Pimephales vigilax			
Pteronotropis hypselopterus			
Pteronotropis signipinnis			
Rhinichthys atratulus			
Semotilus atromaculatus			
Semotilus thoreauianus			
Carpiodes cyprinus			
Erimyzon claviformis			
Hypentelium etowanum		2	4
Hypentelium nigricans			
Minytrema melanops			
Moxostoma carinatum			
Moxostoma duquesnei			
Moxostoma erythrurum			
Moxostoma poecilurum			
Ameiurus melas			
Ameiurus natalis			

Stream	Shoal Cr		Shoal Cr
Location	Pinhoti Tr Crossing FSR 531I		Below Highrock Lake via FSR522A
Drainage	Coosa River		Coosa River
County	Cleburne Co.		Cleburne Co.
Latitude	33.72293		33.7146
Longitude	-85.61574		-85.63169
Year	2014	2013	2014
Ameiurus nebulosus			
Ictalurus punctatus			
Noturus exilis			
Noturus funebris			
Noturus flavus			
Noturus gyrinus			
Noturus leptacanthus			
Noturus miurus			
Esox americanus			
Esox niger			
Aphredoderus sayanus			
Fundulus catenatus			
Fundulus notatus			
Fundulus olivaceus			
Fundulus stellifer			
Gambusia affinis			
Gambusia holbrooki			
Labidesthes sicculus			
Cottus bairdi			
Cottus carolinae	9	16	11
Cottus tallapoosae			
Elassoma zonatum			
Ambloplites ariommus	1		
Ambloplites rupestris			
Centrarchus macropterus			
Lepomis auritus			
Lepomis cyanellus			
Lepomis gulosus			
Lepomis humilis			
Lepomis Hybrid			
Lepomis macrochirus		2	
Lepomis megalotis		1	1
Lepomis microlophus		1	
Lepomis miniatus			

Stream	Shoal Cr		Shoal Cr
Location	Pinhoti Tr Crossing FSR 531I		Below Highrock Lake via FSR522A
Drainage	Coosa River		Coosa River
County	Cleburne Co.		Cleburne Co.
Latitude	33.72293		33.7146
Longitude	-85.61574		-85.63169
Year	2014	2013	2014
Micropterus coosae			4
Micropterus dolomieu			
Micropterus henshalli			
Micropterus punctulatus			
Micropterus salmoides			
Pomoxis annularis			
Pomoxis nigromaculatus			
Ammocrypta bifascia			
Ammocrypta meridiana			
Crystallaria asprella			
Etheostoma artesiae			
Etheostoma blennioides			
Etheostoma blennius			
Etheostoma brevirostrum	2	1	4
Etheostoma caeruleum			
Etheostoma colorosum			
Etheostoma coosae	1	2	
Etheostoma corona			
Etheostoma crossopterum			
Etheostoma duryi			
Etheostoma edwini			
Etheostoma flabellare			
Etheostoma histrio			
Etheostoma jessiae			
Etheostoma jordani	1	5	2
Etheostoma nigripinne			
Etheostoma nigrum			
Etheostoma rufilineatum			
Etheostoma rupestre			
Etheostoma simoterum			
Etheostoma stigmaeum			
Etheostoma swaini			
Etheostoma zonale			

Stream	Shoal Cr		Shoal Cr
Location	Pinhoti Tr Crossing FSR 531I		Below Highrock Lake via FSR522A
Drainage	Coosa River		Coosa River
County	Cleburne Co.		Cleburne Co.
Latitude	33.72293		33.7146
Longitude	-85.61574		-85.63169
Year	2014	2013	2014
Etheostoma zonistium			
Etheostoma sp. zonistium			
Percina caprodes			
Percina evides			
Percina kathae			4
Percina maculata			
Percina nigrofasciata	1		2
Percina palmaris	2	2	1
Percina phoxocephala			
Percina sciera			
Percina vigil			

Stream	Shoal Cr		Shoal Creek	
Location	End of FSR 530 on Hunting Club		Below Whitesides Mill Dam	
Drainage	Coosa River		Coosa River	
County	Calhoun Co.		Calhoun Co.	
Latitude	33.71171		33.7372	
Longitude	-85.64033		-85.66037	
Year	2014	2013	2014	2013
Ichthyomyzon gagei				
Lepisosteus oculatus				
Lepisosteus osseus				
Dorosoma petenense				
Campostoma oligolepis	1		5	
Clinostomus funduloides				
Cyprinella caerulea			68	10
Cyprinella callistia	9	12	1	9
Cyprinella galactura				
Cyprinella gibbsi				
Cyprinella spiloptera				
Cyprinella trichroistia	13	9	10	4
Cyprinella venusta			3	42
Erimystax dissimilis				
Erimystax insignis				
Hemitremia flammea				
Hybopsis amblops				
Hybopsis lineapunctata				
Luxilus chrysocephalus				
Luxilus coccogenis				
Lythrurus atrapiculus				
Lythrurus bellus				
Lythrurus fasciolaris				
Lythrurus fumeus				
Lythrurus lirus				
Macrhybopsis storeriana				
Nocomis leptocephalus				
Nocomis micropogon				
Notemigonus crysoleucas				
Notropis ammophilus				
Notropis amplamala				
Notropis asperifrons				
Notropis atherinoides				
Notropis baileyi				

Stream	Shoal Cr		Shoal Creek	
Location	End of FSR 530 on Hunting Club		Below Whitesides Mill Dam	
Drainage	Coosa River		Coosa River	
County	Calhoun Co.		Calhoun Co.	
Latitude	33.71171		33.7372	
Longitude	-85.64033		-85.66037	
Year	2014	2013	2014	2013
Notropis boops				
Notropis harperi				
Notropis leuciodus				
Notropis longirostris				
Notropis micropteryx				
Notropis stilbius			2	11
Notropis telescopus				
Notropis texanus				
Notropis uranoscopus				
Notropis volucellus				
Notropis xaenocephalus		1		
Opsopoeodus emiliae				
Phenocobius uranops				
Pimephales notatus				
Pimephales promelas				
Pimephales vigilax				
Pteronotropis hypselopterus				
Pteronotropis signipinnis				
Rhinichthys atratulus				
Semotilus atromaculatus				
Semotilus thoreauianus				
Carpiodes cyprinus				
Erimyzon claviformis				
Hypentelium etowanum		1	11	1
Hypentelium nigricans				
Minytrema melanops				
Moxostoma carinatum				
Moxostoma duquesnei				
Moxostoma erythrurum				
Moxostoma poecilurum			6	
Ameiurus melas				
Ameiurus natalis				
Ameiurus nebulosus				

Stream	Shoal Cr		Shoal Creek	
Location	End of FSR 530 on Hunting Club		Below Whitesides Mill Dam	
Drainage	Coosa River		Coosa River	
County	Calhoun Co.		Calhoun Co.	
Latitude	33.71171		33.7372	
Longitude	-85.64033		-85.66037	
Year	2014	2013	2014	2013
Ictalurus punctatus				
Noturus exilis				
Noturus funebris				
Noturus flavus				
Noturus gyrinus				
Noturus leptacanthus				
Noturus miurus				
Esox americanus				
Esox niger				
Aphredoderus sayanus				
Fundulus catenatus				
Fundulus notatus				
Fundulus olivaceus				
Fundulus stellifer				
Gambusia affinis			9	
Gambusia holbrooki				
Labidesthes sicculus				
Cottus bairdi				
Cottus carolinae	10	17		
Cottus tallapoosae				
Elassoma zonatum				
Ambloplites ariommus		1		
Ambloplites rupestris				
Centrarchus macropterus				
Lepomis auritus			2	
Lepomis cyanellus				
Lepomis gulosus				
Lepomis humilis				
Lepomis Hybrid				
Lepomis macrochirus			2	1
Lepomis megalotis			1	1
Lepomis microlophus				
Lepomis miniatus				
Micropterus coosae		1		

Stream	Shoal Cr		Shoal Creek	
Location	End of FSR 530 on Hunting Club		Below Whitesides Mill Dam	
Drainage	Coosa River		Coosa River	
County	Calhoun Co.		Calhoun Co.	
Latitude	33.71171		33.7372	
Longitude	-85.64033		-85.66037	
Year	2014	2013	2014	2013
Micropterus dolomieu				
Micropterus henshalli			6	
Micropterus punctulatus				
Micropterus salmoides			1	1
Pomoxis annularis				
Pomoxis nigromaculatus				1
Ammocrypta bifascia				
Ammocrypta meridiana				
Crystallaria asprella				
Etheostoma artesiae				
Etheostoma blennioides				
Etheostoma blennius				
Etheostoma brevirostrum	3	4		
Etheostoma caeruleum				
Etheostoma colorosum				
Etheostoma coosae		2		
Etheostoma corona				
Etheostoma crossopterum				
Etheostoma duryi				
Etheostoma edwini				
Etheostoma flabellare				
Etheostoma histrio				
Etheostoma jessiae				
Etheostoma jordani	5	4		
Etheostoma nigripinne				
Etheostoma nigrum				
Etheostoma rufilineatum				
Etheostoma rupestre				
Etheostoma simoterum				
Etheostoma stigmaeum			3	
Etheostoma swaini				
Etheostoma zonale				
Etheostoma zonistium				
Etheostoma sp. zonistium				

Stream	Shoal Cr		Shoal Creek	
Location	End of FSR 530 on Hunting Club		Below Whitesides Mill Dam	
Drainage	Coosa River		Coosa River	
County	Calhoun Co.		Calhoun Co.	
Latitude	33.71171		33.7372	
Longitude	-85.64033		-85.66037	
Year	2014	2013	2014	2013
Percina caprodes				
Percina evides				
Percina kathae	3	1	1	
Percina maculata				
Percina nigrofasciata	6		2	
Percina palmaris	1	4	7	1
Percina phoxocephala				
Percina sciera				
Percina vigil				

Stream	Five Runs	Five Runs		Five Runs	
Location	CR 31	US 84		Bass Road	
Drainage	Yellow River	Yellow River		Yellow River	
County	Covington Co.	Covington Co.		Covington Co.	
Latitude	31.135	31.316389		31.076111	
Longitude	-86.48639	-86.419722		-86.510278	
Year	2014	2014	2013	2014	2013
Ichthyomyzon gagei					
Lepisosteus oculatus					
Lepisosteus osseus					
Dorosoma petenense					
Campostoma oligolepis					
Clinostomus funduloides					
Cyprinella caerulea					
Cyprinella callistia					
Cyprinella galactura					
Cyprinella gibbsi					
Cyprinella spiloptera					
Cyprinella trichroistia					
Cyprinella venusta	6			9	4
Erimystax dissimilis					
Erimystax insignis					
Hemitremia flammea					
Hybopsis amblops					
Hybopsis lineapunctata					
Luxilus chrysocephalus					
Luxilus coccogenis					
Lythrurus atrapiculus	12		8	2	8
Lythrurus bellus					
Lythrurus fasciolaris					
Lythrurus fumeus					
Lythrurus lirus					
Macrhybopsis storeriana					
Nocomis leptocephalus					
Nocomis micropogon					
Notemigonus crysoleucas					1
Notropis ammophilus					
Notropis amplamala	1			33	
Notropis asperifrons					
Notropis atherinoides					
Notropis baileyi					

Stream	Five Runs	Five Runs		Five Runs	
Location	CR 31	US 84		Bass Road	
Drainage	Yellow River	Yellow River		Yellow River	
County	Covington Co.	Covington Co.		Covington Co.	
Latitude	31.135	31.316389		31.076111	
Longitude	-86.48639	-86.419722		-86.510278	
Year	2014	2014	2013	2014	2013
Notropis boops					
Notropis harperi	1				
Notropis leuciodus					
Notropis longirostris				3	
Notropis micropteryx					
Notropis stilbius					
Notropis telescopus					
Notropis texanus	40			28	
Notropis uranoscopus					
Notropis volucellus					
Notropis xaenocephalus					
Opsopoeodus emiliae					
Phenocobius uranops					
Pimephales notatus					
Pimephales promelas					
Pimephales vigilax					
Pteronotropis hypselopterus	1				
Pteronotropis signipinnis					
Rhinichthys atratulus					
Semotilus atromaculatus					
Semotilus thoreauianus					
Carpiodes cyprinus					
Erimyzon claviformis					
Hypentelium etowanum					
Hypentelium nigricans					
Minytrema melanops					
Moxostoma carinatum					
Moxostoma duquesnei					
Moxostoma erythrurum					
Moxostoma poecilurum					
Ameiurus melas					
Ameiurus natalis					
Ameiurus nebulosus					
Ictalurus punctatus					

Stream	Five Runs	Five Runs		Five Runs	
Location	CR 31	US 84		Bass Road	
Drainage	Yellow River	Yellow River		Yellow River	
County	Covington Co.	Covington Co.		Covington Co.	
Latitude	31.135	31.316389		31.076111	
Longitude	-86.48639	-86.419722		-86.510278	
Year	2014	2014	2013	2014	2013
Noturus exilis					
Noturus funebris					
Noturus flavus					
Noturus gyrinus					
Noturus leptacanthus			1		
Noturus miurus					
Esox americanus		3			
Esox niger					
Aphredoderus sayanus		2			
Fundulus catenatus					
Fundulus notatus					
Fundulus olivaceus	3		1	5	
Fundulus stellifer					
Gambusia affinis					
Gambusia holbrooki				1	
Labidesthes sicculus					
Cottus bairdi					
Cottus carolinae					
Cottus tallapoosae					
Elassoma zonatum					
Ambloplites ariommus					
Ambloplites rupestris					
Centrarchus macropterus					
Lepomis auritus					
Lepomis cyanellus					
Lepomis gulosus		1			
Lepomis humilis					
Lepomis Hybrid					
Lepomis macrochirus					
Lepomis megalotis				2	
Lepomis microlophus					
Lepomis miniatus					
Micropterus coosae					
Micropterus dolomieu					

Stream	Five Runs	Five Runs		Five Runs	
Location	CR 31	US 84		Bass Road	
Drainage	Yellow River	Yellow River		Yellow River	
County	Covington Co.	Covington Co.		Covington Co.	
Latitude	31.135	31.316389		31.076111	
Longitude	-86.48639	-86.419722		-86.510278	
Year	2014	2014	2013	2014	2013
Micropterus henshalli					
Micropterus punctulatus					
Micropterus salmoides					
Pomoxis annularis					
Pomoxis nigromaculatus					
Ammocrypta bifascia				8	
Ammocrypta meridiana					
Crystallaria asprella					
Etheostoma artesiae					
Etheostoma blennioides					
Etheostoma blennius					
Etheostoma brevirostrum					
Etheostoma caeruleum					
Etheostoma colorosum	1			2	
Etheostoma coosae					
Etheostoma corona					
Etheostoma crossopterum					
Etheostoma duryi					
Etheostoma edwini					
Etheostoma flabellare					
Etheostoma histrio					
Etheostoma jessiae					
Etheostoma jordani					
Etheostoma nigripinne					
Etheostoma nigrum					
Etheostoma rufilineatum					
Etheostoma rupestre					
Etheostoma simoterum					
Etheostoma stigmaeum					
Etheostoma swaini					
Etheostoma zonale					
Etheostoma zonistium					
Etheostoma sp. zonistium					
Percina caprodes					

Stream	Five Runs	Five Runs		Five Runs	
Location	CR 31	US 84		Bass Road	
Drainage	Yellow River	Yellow River		Yellow River	
County	Covington Co.	Covington Co.		Covington Co.	
Latitude	31.135	31.316389		31.076111	
Longitude	-86.48639	-86.419722		-86.510278	
Year	2014	2014	2013	2014	2013
Percina evides					
Percina kathae					
Percina maculata					
Percina nigrofasciata	4		2	10	1
Percina palmaris					
Percina phoxocephala					
Percina sciera					
Percina vigil					

Stream	Camp Cr		Hogfoot Cr		Five Runs	
Location	Hwy 137		CR 17		CR 24	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.145833		31.168333		31.106389	
Longitude	-86.573889		-86.519167		-86.517222	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis						
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta			5	2	13	12
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus						
Luxilus coccogenis						
Lythrurus atrapiculus			2	2	1	1
Lythrurus bellus						
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas				1		1
Notropis ammophilus						
Notropis amplamala					3	
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Camp Cr		Hogfoot Cr		Five Runs	
Location	Hwy 137		CR 17		CR 24	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.145833		31.168333		31.106389	
Longitude	-86.573889		-86.519167		-86.517222	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi				3		
Notropis leuciodus						
Notropis longirostris				2		
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus			7	5	55	3
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus			3			
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans						
Minytrema melanops						5
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum						1
Ameiurus melas						
Ameiurus natalis	2	1				
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Camp Cr		Hogfoot Cr		Five Runs	
Location	Hwy 137		CR 17		CR 24	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.145833		31.168333		31.106389	
Longitude	-86.573889		-86.519167		-86.517222	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus	1	1				
Esox niger						
Aphredoderus sayanus	3		1		1	
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus			3	1		3
Fundulus stellifer						
Gambusia affinis						
Gambusia holbrooki						
Labidesthes sicculus						1
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum	29	7				
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus			1			
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus						6
Lepomis megalotis						2
Lepomis microlophus					1	5
Lepomis miniatus					1	1
Micropterus coosae						
Micropterus dolomieu						

Stream	Camp Cr		Hogfoot Cr		Five Runs	
Location	Hwy 137		CR 17		CR 24	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.145833		31.168333		31.106389	
Longitude	-86.573889		-86.519167		-86.517222	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus						1
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia			1		7	1
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum			1			
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum						
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						

Stream	Camp Cr		Hogfoot Cr		Five Runs	
Location	Hwy 137		CR 17		CR 24	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.145833		31.168333		31.106389	
Longitude	-86.573889		-86.519167		-86.517222	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata				5	4	5
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Five Runs		Five Runs	Camp Cr	
Location	Blue Spring		Bass Bridge Rd	FSR 332	
Drainage	Yellow River		Yellow River	Yellow River	
County	Covington Co.		Covington Co.	Covington Co.	
Latitude	31.089722		31.19139	31.164414	
Longitude	-86.514444		-86.47444	-86.533384	
Year	2014	2013	2014	2014	2013
Ichthyomyzon gagei					
Lepisosteus oculatus					
Lepisosteus osseus					
Dorosoma petenense					
Campostoma oligolepis					
Clinostomus funduloides					
Cyprinella caerulea					
Cyprinella callistia					
Cyprinella galactura					
Cyprinella gibbsi					
Cyprinella spiloptera					
Cyprinella trichroistia					
Cyprinella venusta	6		13		
Erimystax dissimilis					
Erimystax insignis					
Hemitremia flammea					
Hybopsis amblops					
Hybopsis lineapunctata					
Luxilus chrysocephalus					
Luxilus coccogenis					
Lythrurus atrapiculus			15		1
Lythrurus bellus					
Lythrurus fasciolaris					
Lythrurus fumeus					
Lythrurus lirus					
Macrhybopsis storeriana					
Nocomis leptocephalus					
Nocomis micropogon					
Notemigonus crysoleucas					
Notropis ammophilus					
Notropis amplamala	1		5		
Notropis asperifrons					
Notropis atherinoides					
Notropis baileyi					

Stream	Five Runs		Five Runs	Camp Cr	
Location	Blue Spring		Bass Bridge Rd	FSR 332	
Drainage	Yellow River		Yellow River	Yellow River	
County	Covington Co.		Covington Co.	Covington Co.	
Latitude	31.089722		31.19139	31.164414	
Longitude	-86.514444		-86.47444	-86.533384	
Year	2014	2013	2014	2014	2013
Notropis boops					
Notropis harperi			1		
Notropis leuciodus					
Notropis longirostris	1		1		
Notropis micropteryx					
Notropis stilbius					
Notropis telescopus					
Notropis texanus	35	3	75	1	
Notropis uranoscopus					
Notropis volucellus					
Notropis xaenocephalus					
Opsopoeodus emiliae					
Phenocobius uranops					
Pimephales notatus					
Pimephales promelas					
Pimephales vigilax					
Pteronotropis hypselopterus				2	22
Pteronotropis signipinnis					
Rhinichthys atratulus					
Semotilus atromaculatus					
Semotilus thoreauianus					
Carpiodes cyprinus					
Erimyzon claviformis					
Hypentelium etowanum					
Hypentelium nigricans					
Minytrema melanops					
Moxostoma carinatum					
Moxostoma duquesnei					
Moxostoma erythrurum					
Moxostoma poecilurum					
Ameiurus melas					
Ameiurus natalis					
Ameiurus nebulosus					
Ictalurus punctatus					

Stream	Five Runs		Five Runs	Camp Cr	
Location	Blue Spring		Bass Bridge Rd	FSR 332	
Drainage	Yellow River		Yellow River	Yellow River	
County	Covington Co.		Covington Co.	Covington Co.	
Latitude	31.089722		31.19139	31.164414	
Longitude	-86.514444		-86.47444	-86.533384	
Year	2014	2013	2014	2014	2013
Noturus exilis					
Noturus funebris					
Noturus flavus					
Noturus gyrinus					
Noturus leptacanthus	3				1
Noturus miurus					
Esox americanus					
Esox niger					
Aphredoderus sayanus					
Fundulus catenatus					
Fundulus notatus					
Fundulus olivaceus		2	7		
Fundulus stellifer					
Gambusia affinis					
Gambusia holbrooki					
Labidesthes sicculus			1		
Cottus bairdi					
Cottus carolinae					
Cottus tallapoosae					
Elassoma zonatum					
Ambloplites ariommus		1			
Ambloplites rupestris					
Centrarchus macropterus					
Lepomis auritus					
Lepomis cyanellus					
Lepomis gulosus					
Lepomis humilis					
Lepomis Hybrid					
Lepomis macrochirus					
Lepomis megalotis					
Lepomis microlophus					
Lepomis miniatus		1		1	
Micropterus coosae					
Micropterus dolomieu					

Stream	Five Runs		Five Runs	Camp Cr	
Location	Blue Spring		Bass Bridge Rd	FSR 332	
Drainage	Yellow River		Yellow River	Yellow River	
County	Covington Co.		Covington Co.	Covington Co.	
Latitude	31.089722		31.19139	31.164414	
Longitude	-86.514444		-86.47444	-86.533384	
Year	2014	2013	2014	2014	2013
Micropterus henshalli					
Micropterus punctulatus					
Micropterus salmoides					
Pomoxis annularis					
Pomoxis nigromaculatus					
Ammocrypta bifascia	3				
Ammocrypta meridiana					
Crystallaria asprella					
Etheostoma artesiae					
Etheostoma blennioides					
Etheostoma blennius					
Etheostoma brevirostrum					
Etheostoma caeruleum					
Etheostoma colorosum			3	1	3
Etheostoma coosae					
Etheostoma corona					
Etheostoma crossopterum					
Etheostoma duryi					
Etheostoma edwini				1	2
Etheostoma flabellare					
Etheostoma histrio					
Etheostoma jessiae					
Etheostoma jordani					
Etheostoma nigripinne					
Etheostoma nigrum					
Etheostoma rufilineatum					
Etheostoma rupestre					
Etheostoma simoterum					
Etheostoma stigmaeum					
Etheostoma swaini					
Etheostoma zonale					
Etheostoma zonistium					
Etheostoma sp. zonistium					
Percina caprodes					

Stream	Five Runs		Five Runs	Camp Cr	
Location	Blue Spring		Bass Bridge Rd	FSR 332	
Drainage	Yellow River		Yellow River	Yellow River	
County	Covington Co.		Covington Co.	Covington Co.	
Latitude	31.089722		31.19139	31.164414	
Longitude	-86.514444		-86.47444	-86.533384	
Year	2014	2013	2014	2014	2013
Percina evides					
Percina kathae					
Percina maculata					
Percina nigrofasciata	2	1	2	1	2
Percina palmaris					
Percina phoxocephala					
Percina sciera					
Percina vigil					

Stream	Hogfoot Cr		Bay Br		Pond Cr	
Location	FSR 339		CR 56		CR 337	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.126944		31.278056		31.092606	
Longitude	-86.514167		-86.485		-86.518341	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						1
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis						
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta	1					
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus						
Luxilus coccogenis						
Lythrurus atrapiculus			12	15		
Lythrurus bellus						
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala			5			
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Hogfoot Cr		Bay Br		Pond Cr	
Location	FSR 339		CR 56		CR 337	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.126944		31.278056		31.092606	
Longitude	-86.514167		-86.485		-86.518341	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris		1				
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus	12			26		
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus	5	1			2	
Pteronotropis signipinnis					17	
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans						
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis			2	2		
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Hogfoot Cr		Bay Br		Pond Cr	
Location	FSR 339		CR 56		CR 337	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.126944		31.278056		31.092606	
Longitude	-86.514167		-86.485		-86.518341	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus	1		1	1	1	2
Noturus miurus						
Esox americanus			3	1	2	
Esox niger						
Aphredoderus sayanus	1			3		1
Fundulus catenatus						
Fundulus notatus						
Fundulus olivaceus	1		3	4		
Fundulus stellifer						
Gambusia affinis						
Gambusia holbrooki			8	1		
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum			2	1		
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	1		1	6		
Lepomis megalotis						
Lepomis microlophus						
Lepomis miniatus			4	1		
Micropterus coosae						
Micropterus dolomieu						

Stream	Hogfoot Cr		Bay Br		Pond Cr	
Location	FSR 339		CR 56		CR 337	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.126944		31.278056		31.092606	
Longitude	-86.514167		-86.485		-86.518341	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus			1	1		
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia	9					
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum	1	1			1	
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum						
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						

Stream	Hogfoot Cr		Bay Br		Pond Cr	
Location	FSR 339		CR 56		CR 337	
Drainage	Yellow River		Yellow River		Yellow River	
County	Covington Co.		Covington Co.		Covington Co.	
Latitude	31.126944		31.278056		31.092606	
Longitude	-86.514167		-86.485		-86.518341	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata	9			1	1	5
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Cox Cr		Middle Cypress Cr		Middle Cypress Cr	
Location	Mars Hill Rd		CR 8		CR 6	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.850036		34.941667		34.9025	
Longitude	-87.660772		-87.757778		-87.770556	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	1	2	2	40	15	1
Clinostomus funduloides	7	40	7	4	3	
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops			1		3	9
Hybopsis lineapunctata						
Luxilus chrysocephalus			9		7	28
Luxilus coccogenis			1			8
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris	2	1	70	342	193	115
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Cox Cr		Middle Cypress Cr		Middle Cypress Cr	
Location	Mars Hill Rd		CR 8		CR 6	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.850036		34.941667		34.9025	
Longitude	-87.660772		-87.757778		-87.770556	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus					1	
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus	1	1				
Semotilus atromaculatus	1	2	2	1		3
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis			2	1		
Hypentelium etowanum						
Hypentelium nigricans			4	3	2	1
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei					1	6
Moxostoma erythrurum						
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Cox Cr		Middle Cypress Cr		Middle Cypress Cr	
Location	Mars Hill Rd		CR 8		CR 6	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.850036		34.941667		34.9025	
Longitude	-87.660772		-87.757778		-87.770556	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus			2			
Esox niger					1	
Aphredoderus sayanus						
Fundulus catenatus			1	1	1	2
Fundulus notatus			1			
Fundulus olivaceus				1	2	2
Fundulus stellifer						
Gambusia affinis			8			4
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi	15	2	1	4		4
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						1
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus				1		
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus		1		1		
Lepomis megalotis			4	9		
Lepomis microlophus					1	
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Cox Cr		Middle Cypress Cr		Middle Cypress Cr	
Location	Mars Hill Rd		CR 8		CR 6	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.850036		34.941667		34.9025	
Longitude	-87.660772		-87.757778		-87.770556	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus				1		
Micropterus salmoides					1	
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides			1		2	
Etheostoma blennius			1		3	
Etheostoma brevirostrum						
Etheostoma caeruleum	1	6		7		
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona		1				
Etheostoma crossopterum						
Etheostoma duryi	1	9			3	
Etheostoma edwini				2		
Etheostoma flabellare	21	18	3			5
Etheostoma histrio						
Etheostoma jessiae					3	
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum			5	17	5	21
Etheostoma rupestre						
Etheostoma simoterum			14	16	14	19
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes			1			

Stream	Cox Cr		Middle Cypress Cr		Middle Cypress Cr	
Location	Mars Hill Rd		CR 8		CR 6	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.850036		34.941667		34.9025	
Longitude	-87.660772		-87.757778		-87.770556	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Little Cypress Cr		Cypress Cr		Cypress Cr	
Location	CR 16		CR 8		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.858611		34.931944		35.000556	
Longitude	-87.715278		-87.791389		-87.819722	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	9	45	14	23	3	9
Clinostomus funduloides	1	1	5		5	13
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera		42		7		
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea			1		3	
Hybopsis amblops	1	49		1		
Hybopsis lineapunctata						
Luxilus chrysocephalus	23	14	10	15	3	
Luxilus coccogenis	9	20	11	15	1	2
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris	4	56	23	76	19	40
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon		1				
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Little Cypress Cr		Cypress Cr		Cypress Cr	
Location	CR 16		CR 8		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.858611		34.931944		35.000556	
Longitude	-87.715278		-87.791389		-87.819722	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus			1	2		
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus					1	
Semotilus atromaculatus			1	33		66
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans	4	13	1	18	5	1
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum	3					
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Little Cypress Cr		Cypress Cr		Cypress Cr	
Location	CR 16		CR 8		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.858611		34.931944		35.000556	
Longitude	-87.715278		-87.791389		-87.819722	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus		1				
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus		2	22	3		2
Fundulus notatus						
Fundulus olivaceus				1		
Fundulus stellifer						
Gambusia affinis		3		3		
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi	6	3	4	1	3	3
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris	1	1				
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus	1	21				1
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus		1				
Lepomis megalotis		2		1		
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu		1				

Stream	Little Cypress Cr		Cypress Cr		Cypress Cr	
Location	CR 16		CR 8		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.858611		34.931944		35.000556	
Longitude	-87.715278		-87.791389		-87.819722	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus						
Micropterus salmoides	1					
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides	6	9		3		
Etheostoma blennius	1	3	9	20	4	
Etheostoma brevirostrum						
Etheostoma caeruleum	1					
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona		1				1
Etheostoma crossopterum						
Etheostoma duryi		3	2			
Etheostoma edwini						
Etheostoma flabellare	9	2	6	7	15	20
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum	5	17	7	21	4	8
Etheostoma rupestre						
Etheostoma simoterum	5	20	7	15	1	
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale	2		1			
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes	2	2	1		1	

Stream	Little Cypress Cr		Cypress Cr		Cypress Cr	
Location	CR 16		CR 8		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.858611		34.931944		35.000556	
Longitude	-87.715278		-87.791389		-87.819722	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	N Fork Cypress Cr		Burcham Cr		Threet Cr	
Location	Natchez Trace		CR 6		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.975833		34.895		34.955	
Longitude	-87.8225		-87.826389		-87.822778	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	3	1		30	47	21
Clinostomus funduloides	5	4			7	
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea	3	23		15	26	3
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	3	9			10	
Luxilus coccogenis	1					
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris	19				26	8
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas					1	
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	N Fork Cypress Cr		Burcham Cr		Threet Cr	
Location	Natchez Trace		CR 6		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.975833		34.895		34.955	
Longitude	-87.8225		-87.826389		-87.822778	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus					1	
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus	1					
Semotilus atromaculatus		2		2		26
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis					5	
Hypentelium etowanum						
Hypentelium nigricans	5			1	6	19
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						4
Moxostoma erythrurum					31	
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	N Fork Cypress Cr		Burcham Cr		Threet Cr	
Location	Natchez Trace		CR 6		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.975833		34.895		34.955	
Longitude	-87.8225		-87.826389		-87.822778	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						1
Fundulus notatus						
Fundulus olivaceus		4		1	2	
Fundulus stellifer						
Gambusia affinis				13	2	
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi	3					12
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus				7		1
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus			12	3		
Lepomis megalotis						
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	N Fork Cypress Cr		Burcham Cr		Threet Cr	
Location	Natchez Trace		CR 6		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.975833		34.895		34.955	
Longitude	-87.8225		-87.826389		-87.822778	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus				7		
Micropterus salmoides			5	2	3	
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius	4					
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona		6			3	3
Etheostoma crossopterum						
Etheostoma duryi		2	11			8
Etheostoma edwini						
Etheostoma flabellare	15					
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne			1			
Etheostoma nigrum						
Etheostoma rufilineatum	4					
Etheostoma rupestre						
Etheostoma simoterum	1				16	
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes	1					

Stream	N Fork Cypress Cr		Burcham Cr		Threet Cr	
Location	Natchez Trace		CR 6		Natchez Trace	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.975833		34.895		34.955	
Longitude	-87.8225		-87.826389		-87.822778	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Greenbrier Br		Lindsey Cr		Indian Camp Cr	
Location	CR 259		Natchez Trace		CR 135	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.952778		34.941944		34.921944	
Longitude	-87.778056		-87.828611		-87.620556	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	36	30			84	37
Clinostomus funduloides	24	28	24	20	5	9
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						1
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea	27		4			
Hybopsis amblops					18	8
Hybopsis lineapunctata						
Luxilus chrysocephalus	5	1	6	13	15	9
Luxilus coccogenis					4	
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris	5		27			1
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Greenbrier Br		Lindsey Cr		Indian Camp Cr	
Location	CR 259		Natchez Trace		CR 135	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.952778		34.941944		34.921944	
Longitude	-87.778056		-87.828611		-87.620556	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus					49	45
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus	10	4	5	17	6	5
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis	2					
Hypentelium etowanum						
Hypentelium nigricans			4	11		4
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum						
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis	5	1				
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Greenbrier Br		Lindsey Cr		Indian Camp Cr	
Location	CR 259		Natchez Trace		CR 135	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.952778		34.941944		34.921944	
Longitude	-87.778056		-87.828611		-87.620556	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus	6	16		1	1	1
Fundulus notatus						
Fundulus olivaceus	1	1		3	1	
Fundulus stellifer						
Gambusia affinis						
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi			1	1	3	9
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris				1		
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus	24	7				2
Lepomis gulosus	3	1				
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	7	1				3
Lepomis megalotis	2			2	1	6
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Greenbrier Br		Lindsey Cr		Indian Camp Cr	
Location	CR 259		Natchez Trace		CR 135	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.952778		34.941944		34.921944	
Longitude	-87.778056		-87.828611		-87.620556	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus		1				
Micropterus salmoides	2					
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides					8	2
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum		1			50	11
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona	4		1	1		
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare	23		23	9	9	8
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum						
Etheostoma rupestre						
Etheostoma simoterum					14	11
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes						

Stream	Greenbrier Br		Lindsey Cr		Indian Camp Cr	
Location	CR 259		Natchez Trace		CR 135	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.952778		34.941944		34.921944	
Longitude	-87.778056		-87.828611		-87.620556	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Cowpen Cr		Little Butler Cr		Little Butler Cr	
Location	CR 8		CR 61		CR 299	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.954722		34.981389		34.989167	
Longitude	-87.590278		-87.615833		-87.642778	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	25	29	21	30	25	25
Clinostomus funduloides	1		4	2	18	27
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura	1	6	1	7		1
Cyprinella gibbsi						
Cyprinella spiloptera						
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops	17	13	4	3		
Hybopsis lineapunctata						
Luxilus chrysocephalus	39	32	23	30	2	1
Luxilus coccogenis	3	12	28	64		
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris		1	4	27	5	18
Lythrurus fumeus						
Lythrurus lirus		9				1
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Cowpen Cr		Little Butler Cr		Little Butler Cr	
Location	CR 8		CR 61		CR 299	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.954722		34.981389		34.989167	
Longitude	-87.590278		-87.615833		-87.642778	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus	20	8	31	34		
Notropis longirostris						
Notropis micropteryx						1
Notropis stilbius						
Notropis telescopus	2		10	18		
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus		1		1		
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops				1		
Pimephales notatus	3					
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus					12	12
Semotilus atromaculatus		3	2	3	5	8
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans	8	4	3	7	2	4
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei		2		1		
Moxostoma erythrurum	2					
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Cowpen Cr		Little Butler Cr		Little Butler Cr	
Location	CR 8		CR 61		CR 299	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.954722		34.981389		34.989167	
Longitude	-87.590278		-87.615833		-87.642778	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis		1	3			
Noturus funebris						
Noturus flavus				1		
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus	4	2	2	2		1
Fundulus notatus						
Fundulus olivaceus	1			4		
Fundulus stellifer						
Gambusia affinis		1				
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi	16	11	15	3	5	9
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris			1	1		
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	1					
Lepomis megalotis		7		5		1
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Cowpen Cr		Little Butler Cr		Little Butler Cr	
Location	CR 8		CR 61		CR 299	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.954722		34.981389		34.989167	
Longitude	-87.590278		-87.615833		-87.642778	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus						
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides	5	12	11	6	7	3
Etheostoma blennius			4	3		
Etheostoma brevirostrum						
Etheostoma caeruleum	9	6	9	6		1
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi				8		27
Etheostoma edwini						
Etheostoma flabellare	16	16	1		25	37
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum	23	15	13	19		
Etheostoma rupestre						
Etheostoma simoterum	39	20	21	27	26	
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes	10		2	1		

Stream	Cowpen Cr		Little Butler Cr		Little Butler Cr	
Location	CR 8		CR 61		CR 299	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Lauderdale Co.		Lauderdale Co.	
Latitude	34.954722		34.981389		34.989167	
Longitude	-87.590278		-87.615833		-87.642778	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Shoal Cr		Cedar Cr		Little Bear Cr	
Location	Goose Shoals		US 43		AL 24	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Franklin		Franklin	
Latitude	34.95058		34.4652		34.4593	
Longitude	-87.59144		-87.7538		-88.0026	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus				1		
Dorosoma petenense	1	1				
Campostoma oligolepis	227	179	49	63		73
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura	6	27				
Cyprinella gibbsi						
Cyprinella spiloptera			3	5		
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis	2	5				
Erimystax insignis	12	38				
Hemitremia flammea						
Hybopsis amblops	74	197	1	15		
Hybopsis lineapunctata						
Luxilus chrysocephalus	499	602	2	2		11
Luxilus coccogenis	36	43				
Lythrurus atrapiculus						
Lythrurus bellus			1	4		
Lythrurus fasciolaris	1				1	10
Lythrurus fumeus					1	
Lythrurus lirus	5					
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides		5				
Notropis baileyi						

Stream	Shoal Cr		Cedar Cr		Little Bear Cr	
Location	Goose Shoals		US 43		AL 24	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Franklin		Franklin	
Latitude	34.95058		34.4652		34.4593	
Longitude	-87.59144		-87.7538		-88.0026	
Year	2014	2013	2014	2013	2014	2013
Notropis boops				1		
Notropis harperi						
Notropis leuciodus	185	123				
Notropis longirostris						
Notropis micropteryx	5					
Notropis stilbius						
Notropis telescopus		45				
Notropis texanus						
Notropis uranoscopus						
Notropis volucellus	3					3
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops	6	10				
Pimephales notatus	10	29	1	17	1	6
Pimephales promelas				1		
Pimephales vigilax				3		
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans	10	4		3		1
Minytrema melanops						
Moxostoma carinatum	1					
Moxostoma duquesnei		24				
Moxostoma erythrurum	17	3		5		3
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis				2		
Ameiurus nebulosus						
Ictalurus punctatus		1				

Stream	Shoal Cr		Cedar Cr		Little Bear Cr	
Location	Goose Shoals		US 43		AL 24	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Franklin		Franklin	
Latitude	34.95058		34.4652		34.4593	
Longitude	-87.59144		-87.7538		-88.0026	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus	12	6				
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						1
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus			1			
Fundulus notatus						
Fundulus olivaceus	1	4		7	3	2
Fundulus stellifer						
Gambusia affinis				1		
Gambusia holbrooki						
Labidesthes sicculus	8	40				
Cottus bairdi	1	4				
Cottus carolinae			2	1		1
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris	3	8		1		7
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus			3	9		2
Lepomis gulosus				2		
Lepomis humilis						
Lepomis Hybrid				1		
Lepomis macrochirus	3	1	7	12		
Lepomis megalotis	20	9	2	20		3
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu	1	4				

Stream	Shoal Cr		Cedar Cr		Little Bear Cr	
Location	Goose Shoals		US 43		AL 24	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Franklin		Franklin	
Latitude	34.95058		34.4652		34.4593	
Longitude	-87.59144		-87.7538		-88.0026	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus			2	1		1
Micropterus salmoides	1	1				
Pomoxis annularis			1			
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides	33	36	3	28	4	3
Etheostoma blennius	29	8				
Etheostoma brevirostrum						
Etheostoma caeruleum	1		1	9	6	41
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum		7				
Etheostoma duryi		5		23	2	55
Etheostoma edwini						
Etheostoma flabellare	2	2				
Etheostoma histrio						
Etheostoma jessiae		1			2	9
Etheostoma jordani						
Etheostoma nigripinne				1		
Etheostoma nigrum						
Etheostoma rufilineatum	164	89	21	10	2	4
Etheostoma rupestre						
Etheostoma simoterum	28	25	3	61	10	12
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale	12	4				
Etheostoma zonistium			1		2	
Etheostoma sp. zonistium						
Percina caprodes	6	4	2	8		

Stream	Shoal Cr		Cedar Cr		Little Bear Cr	
Location	Goose Shoals		US 43		AL 24	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Lauderdale Co.		Franklin		Franklin	
Latitude	34.95058		34.4652		34.4593	
Longitude	-87.59144		-87.7538		-88.0026	
Year	2014	2013	2014	2013	2014	2013
Percina evides	3	16				
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala					2	
Percina sciera				1		
Percina vigil						

Stream	Pennywinkle Cr		Little Bear Cr		Little Bear Cr	
Location	State Line Rd		Co. Hwy. 122		AL 187	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Colbert		Franklin		Franklin	
Latitude	34.7486		34.3827		34.4013	
Longitude	-88.1125		-87.8372		-87.8744	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei	1					
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	3	10	8	221	5	64
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura			8	32	3	38
Cyprinella gibbsi						
Cyprinella spiloptera				2		
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops				55		24
Hybopsis lineapunctata						
Luxilus chrysocephalus	2	42	3	30	8	19
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus						
Lythrurus fasciolaris			18	13	3	6
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus	9	16				
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi	20	44				

Stream	Pennywinkle Cr		Little Bear Cr		Little Bear Cr	
Location	State Line Rd		Co. Hwy. 122		AL 187	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Colbert		Franklin		Franklin	
Latitude	34.7486		34.3827		34.4013	
Longitude	-88.1125		-87.8372		-87.8744	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus	1	1				
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus			1	16		4
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus	2		2			
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans				12	3	2
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum				2		
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis	1		1			
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Pennywinkle Cr		Little Bear Cr		Little Bear Cr	
Location	State Line Rd		Co. Hwy. 122		AL 187	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Colbert		Franklin		Franklin	
Latitude	34.7486		34.3827		34.4013	
Longitude	-88.1125		-87.8372		-87.8744	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis				1		
Noturus funebris	3	7				
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus			1	13		9
Fundulus notatus						
Fundulus olivaceus	1		6	25		8
Fundulus stellifer						
Gambusia affinis						
Gambusia holbrooki						
Labidesthes sicculus			1			
Cottus bairdi						
Cottus carolinae	1		3	6	21	13
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris				2	1	1
Centrarchus macropterus						
Lepomis auritus						3
Lepomis cyanellus	3	9		1	1	1
Lepomis gulosus						
Lepomis humilis		1				
Lepomis Hybrid		2				
Lepomis macrochirus		1		1	2	14
Lepomis megalotis		2		17		3
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Pennywinkle Cr		Little Bear Cr		Little Bear Cr	
Location	State Line Rd		Co. Hwy. 122		AL 187	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Colbert		Franklin		Franklin	
Latitude	34.7486		34.3827		34.4013	
Longitude	-88.1125		-87.8372		-87.8744	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus						1
Micropterus salmoides						
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum	1	2	4	16	2	10
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi		2		2		
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae						
Etheostoma jordani						
Etheostoma nigripinne	1	2				
Etheostoma nigrum				1		
Etheostoma rufilineatum			20	168	7	64
Etheostoma rupestre						
Etheostoma simoterum	1		9	29	1	28
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium		2				
Etheostoma sp. zonistium						
Percina caprodes	1	5		8	1	3

Stream	Pennywinkle Cr		Little Bear Cr		Little Bear Cr	
Location	State Line Rd		Co. Hwy. 122		AL 187	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Colbert		Franklin		Franklin	
Latitude	34.7486		34.3827		34.4013	
Longitude	-88.1125		-87.8372		-87.8744	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Little Bear Cr		Bear Creek		Cedar Cr	
Location	Co. Hwy 34		Co. Hwy. 93		US 247	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Franklin		Franklin	
Latitude	34.4008		34.3394		34.5522	
Longitude	-87.6275		-87.5466		-87.9851	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	8	36	2	16	52	50
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						6
Cyprinella gibbsi						
Cyprinella spiloptera						6
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	9	28	5	13		10
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus			20	9		
Lythrurus fasciolaris		36				
Lythrurus fumeus			4			
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus	3	3	1	7		
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi	2	58	5	57		

Stream	Little Bear Cr		Bear Creek		Cedar Cr	
Location	Co. Hwy 34		Co. Hwy. 93		US 247	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Franklin		Franklin	
Latitude	34.4008		34.3394		34.5522	
Longitude	-87.6275		-87.5466		-87.9851	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx						
Notropis stilbius						
Notropis telescopus						
Notropis texanus						1
Notropis uranoscopus						
Notropis volucellus						
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus	1					27
Pimephales promelas						
Pimephales vigilax						
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus		3				
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans				5		32
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum					1	
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis		1		3		
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Little Bear Cr		Bear Creek		Cedar Cr	
Location	Co. Hwy 34		Co. Hwy. 93		US 247	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Franklin		Franklin	
Latitude	34.4008		34.3394		34.5522	
Longitude	-87.6275		-87.5466		-87.9851	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus		3		4		
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus						16
Fundulus notatus						
Fundulus olivaceus	1	23	3	7		5
Fundulus stellifer						
Gambusia affinis						9
Gambusia holbrooki						
Labidesthes sicculus						1
Cottus bairdi						
Cottus carolinae						
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus	1					2
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus	5	11		3		5
Lepomis megalotis		2	1	9		
Lepomis microlophus						
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Little Bear Cr		Bear Creek		Cedar Cr	
Location	Co. Hwy 34		Co. Hwy. 93		US 247	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Franklin		Franklin	
Latitude	34.4008		34.3394		34.5522	
Longitude	-87.6275		-87.5466		-87.9851	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus						
Micropterus salmoides	1					
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides						
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum					1	
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						5
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae	2	8	3	26		
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum					4	20
Etheostoma rupestre						
Etheostoma simoterum	1	11				7
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium	16				2	
Etheostoma sp. zonistium		3		3		
Percina caprodes					9	

Stream	Little Bear Cr		Bear Creek		Cedar Cr	
Location	Co. Hwy 34		Co. Hwy. 93		US 247	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Franklin		Franklin	
Latitude	34.4008		34.3394		34.5522	
Longitude	-87.6275		-87.5466		-87.9851	
Year	2014	2013	2014	2013	2014	2013
Percina evides						
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						
Percina vigil						

Stream	Bear Cr		Bear Cr		Bear Cr	
Location	Co. Hwy. 57		MS 30		Co Hwy 86	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Tishomingo, MS		Tishomingo, MS	
Latitude	34.3163		34.63394		34.56424	
Longitude	-87.8586		-88.15337		-88.19124	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	4	115	11	4	5	11
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura						
Cyprinella gibbsi						
Cyprinella spiloptera	11	30	6	18	8	2
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops						
Hybopsis lineapunctata						
Luxilus chrysocephalus	1	20				31
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus		15				
Lythrurus fasciolaris						
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides						
Notropis baileyi						

Stream	Bear Cr		Bear Cr		Bear Cr	
Location	Co. Hwy. 57		MS 30		Co Hwy 86	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Tishomingo, MS		Tishomingo, MS	
Latitude	34.3163		34.63394		34.56424	
Longitude	-87.8586		-88.15337		-88.19124	
Year	2014	2013	2014	2013	2014	2013
Notropis boops						
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx	13				7	4
Notropis stilbius						
Notropis telescopus						
Notropis texanus				19		2
Notropis uranoscopus						
Notropis volucellus			3	15	3	3
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus		2				
Pimephales promelas						
Pimephales vigilax			1			
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans	4	2	15		8	13
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum					2	
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis		1			1	
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Bear Cr		Bear Cr		Bear Cr	
Location	Co. Hwy. 57		MS 30		Co Hwy 86	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Tishomingo, MS		Tishomingo, MS	
Latitude	34.3163		34.63394		34.56424	
Longitude	-87.8586		-88.15337		-88.19124	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis		1				
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus			6	1		3
Fundulus notatus						
Fundulus olivaceus				1	4	4
Fundulus stellifer						
Gambusia affinis		1	8	2	1	9
Gambusia holbrooki						
Labidesthes sicculus				10		
Cottus bairdi						
Cottus carolinae		3				
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus						
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus						
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus				14		
Lepomis megalotis	1	4			6	
Lepomis microlophus				1		1
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Bear Cr		Bear Cr		Bear Cr	
Location	Co. Hwy. 57		MS 30		Co Hwy 86	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Tishomingo, MS		Tishomingo, MS	
Latitude	34.3163		34.63394		34.56424	
Longitude	-87.8586		-88.15337		-88.19124	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus	1	1	3	2	2	2
Micropterus salmoides		1	1			
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides	9	3		2		
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum						
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi						
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio				1		
Etheostoma jessiae		9	1			
Etheostoma jordani						
Etheostoma nigripinne						
Etheostoma nigrum						
Etheostoma rufilineatum	62	298	9	24	1	
Etheostoma rupestre						
Etheostoma simoterum					1	
Etheostoma stigmaeum						
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes	2	8	3	4	1	4

Stream	Bear Cr		Bear Cr		Bear Cr	
Location	Co. Hwy. 57		MS 30		Co Hwy 86	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Franklin		Tishomingo, MS		Tishomingo, MS	
Latitude	34.3163		34.63394		34.56424	
Longitude	-87.8586		-88.15337		-88.19124	
Year	2014	2013	2014	2013	2014	2013
Percina evides			2	3	2	
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala						
Percina sciera						1
Percina vigil						

Stream	Bear Cr		Cedar Cr		Little Bear Cr	
Location	AL 241		Natchez Trace		Co Hwy 59	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Marion		Colbert		Franklin	
Latitude	34.278		34.6444		34.3763	
Longitude	-87.7213		-88.1325		-87.7738	
Year	2014	2013	2014	2013	2014	2013
Ichthyomyzon gagei						
Lepisosteus oculatus						
Lepisosteus osseus						
Dorosoma petenense						
Campostoma oligolepis	4	44	8	10	4	17
Clinostomus funduloides						
Cyprinella caerulea						
Cyprinella callistia						
Cyprinella galactura	2	10			1	5
Cyprinella gibbsi						
Cyprinella spiloptera		5	1	7		
Cyprinella trichroistia						
Cyprinella venusta						
Erimystax dissimilis						
Erimystax insignis						
Hemitremia flammea						
Hybopsis amblops					2	
Hybopsis lineapunctata						
Luxilus chrysocephalus		1		3		
Luxilus coccogenis						
Lythrurus atrapiculus						
Lythrurus bellus	7					
Lythrurus fasciolaris				1	16	34
Lythrurus fumeus						
Lythrurus lirus						
Macrhybopsis storeriana						
Nocomis leptocephalus						
Nocomis micropogon						
Notemigonus crysoleucas						
Notropis ammophilus						
Notropis amplamala						
Notropis asperifrons						
Notropis atherinoides			9			
Notropis baileyi						

Stream	Bear Cr		Cedar Cr		Little Bear Cr	
Location	AL 241		Natchez Trace		Co Hwy 59	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Marion		Colbert		Franklin	
Latitude	34.278		34.6444		34.3763	
Longitude	-87.7213		-88.1325		-87.7738	
Year	2014	2013	2014	2013	2014	2013
Notropis boops				1		
Notropis harperi						
Notropis leuciodus						
Notropis longirostris						
Notropis micropteryx		2	1			
Notropis stilbius						
Notropis telescopus						
Notropis texanus			6	6		
Notropis uranoscopus						
Notropis volucellus			44	54		
Notropis xaenocephalus						
Opsopoeodus emiliae						
Phenocobius uranops						
Pimephales notatus						
Pimephales promelas						
Pimephales vigilax			7			
Pteronotropis hypselopterus						
Pteronotropis signipinnis						
Rhinichthys atratulus						
Semotilus atromaculatus						
Semotilus thoreauianus						
Carpiodes cyprinus						
Erimyzon claviformis						
Hypentelium etowanum						
Hypentelium nigricans	1	1	13			5
Minytrema melanops						
Moxostoma carinatum						
Moxostoma duquesnei						
Moxostoma erythrurum			6			
Moxostoma poecilurum						
Ameiurus melas						
Ameiurus natalis						
Ameiurus nebulosus						
Ictalurus punctatus						

Stream	Bear Cr		Cedar Cr		Little Bear Cr	
Location	AL 241		Natchez Trace		Co Hwy 59	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Marion		Colbert		Franklin	
Latitude	34.278		34.6444		34.3763	
Longitude	-87.7213		-88.1325		-87.7738	
Year	2014	2013	2014	2013	2014	2013
Noturus exilis						
Noturus funebris						
Noturus flavus						
Noturus gyrinus						
Noturus leptacanthus						
Noturus miurus						
Esox americanus						
Esox niger						
Aphredoderus sayanus						
Fundulus catenatus			2	2		1
Fundulus notatus						
Fundulus olivaceus		1			2	
Fundulus stellifer						
Gambusia affinis			1			
Gambusia holbrooki						
Labidesthes sicculus						
Cottus bairdi						
Cottus carolinae			1	2		1
Cottus tallapoosae						
Elassoma zonatum						
Ambloplites ariommus		1				
Ambloplites rupestris						
Centrarchus macropterus						
Lepomis auritus						
Lepomis cyanellus		1				
Lepomis gulosus						
Lepomis humilis						
Lepomis Hybrid						
Lepomis macrochirus					2	4
Lepomis megalotis			2	7		2
Lepomis microlophus		1		1		
Lepomis miniatus						
Micropterus coosae						
Micropterus dolomieu						

Stream	Bear Cr		Cedar Cr		Little Bear Cr	
Location	AL 241		Natchez Trace		Co Hwy 59	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Marion		Colbert		Franklin	
Latitude	34.278		34.6444		34.3763	
Longitude	-87.7213		-88.1325		-87.7738	
Year	2014	2013	2014	2013	2014	2013
Micropterus henshalli						
Micropterus punctulatus		2	7		1	2
Micropterus salmoides	1					1
Pomoxis annularis						
Pomoxis nigromaculatus						
Ammocrypta bifascia						
Ammocrypta meridiana						
Crystallaria asprella						
Etheostoma artesiae						
Etheostoma blennioides			1			
Etheostoma blennius						
Etheostoma brevirostrum						
Etheostoma caeruleum					11	6
Etheostoma colorosum						
Etheostoma coosae						
Etheostoma corona						
Etheostoma crossopterum						
Etheostoma duryi					1	
Etheostoma edwini						
Etheostoma flabellare						
Etheostoma histrio						
Etheostoma jessiae	2		1	2		
Etheostoma jordani						
Etheostoma nigripinne					1	
Etheostoma nigrum						
Etheostoma rufilineatum			1	4	20	9
Etheostoma rupestre						
Etheostoma simoterum				3	6	4
Etheostoma stigmaeum		2				
Etheostoma swaini						
Etheostoma zonale						
Etheostoma zonistium						
Etheostoma sp. zonistium						
Percina caprodes			3	1		2

Stream	Bear Cr		Cedar Cr		Little Bear Cr	
Location	AL 241		Natchez Trace		Co Hwy 59	
Drainage	Tennessee River		Tennessee River		Tennessee River	
County	Marion		Colbert		Franklin	
Latitude	34.278		34.6444		34.3763	
Longitude	-87.7213		-88.1325		-87.7738	
Year	2014	2013	2014	2013	2014	2013
Percina evides			2			
Percina kathae						
Percina maculata						
Percina nigrofasciata						
Percina palmaris						
Percina phoxocephala		4				
Percina sciera						
Percina vigil						

Stream	Little Bear Cr		Pennywinkle Cr		Rock Cr
Location	McCarley Rd		Co Hwy 995		Co Hwy 1
Drainage	Tennessee River		Tennessee River		Tennessee River
County	Franklin		Tishomingo, MS		Colbert
Latitude	34.3647		34.7417		34.6318
Longitude	-87.7322		-88.155		-88.091
Year	2014	2013	2014	2013	2014
Ichthyomyzon gagei					
Lepisosteus oculatus					
Lepisosteus osseus					
Dorosoma petenense					
Campostoma oligolepis		2	1		8
Clinostomus funduloides					
Cyprinella caerulea					
Cyprinella callistia					
Cyprinella galactura					
Cyprinella gibbsi					
Cyprinella spiloptera					
Cyprinella trichroistia					
Cyprinella venusta					
Erimystax dissimilis					
Erimystax insignis					
Hemitremia flammea					
Hybopsis amblops		1			
Hybopsis lineapunctata					
Luxilus chrysocephalus			26	6	4
Luxilus coccogenis					
Lythrurus atrapiculus					
Lythrurus bellus					
Lythrurus fasciolaris	1	13			5
Lythrurus fumeus					
Lythrurus lirus					
Macrhybopsis storeriana					
Nocomis leptocephalus			12	15	
Nocomis micropogon					
Notemigonus crysoleucas					
Notropis ammophilus					
Notropis amplamala					
Notropis asperifrons					
Notropis atherinoides					
Notropis baileyi			33	50	

Stream	Little Bear Cr		Pennywinkle Cr		Rock Cr
Location	McCarley Rd		Co Hwy 995		Co Hwy 1
Drainage	Tennessee River		Tennessee River		Tennessee River
County	Franklin		Tishomingo, MS		Colbert
Latitude	34.3647		34.7417		34.6318
Longitude	-87.7322		-88.155		-88.091
Year	2014	2013	2014	2013	2014
Notropis boops					
Notropis harperi					
Notropis leuciodus					
Notropis longirostris					
Notropis micropteryx					
Notropis stilbius					
Notropis telescopus					
Notropis texanus				6	
Notropis uranoscopus					
Notropis volucellus					2
Notropis xaenocephalus					
Opsopoeodus emiliae					
Phenocobius uranops					
Pimephales notatus					1
Pimephales promelas					
Pimephales vigilax					
Pteronotropis hypselopterus					
Pteronotropis signipinnis					
Rhinichthys atratulus					
Semotilus atromaculatus	1		6		
Semotilus thoreauianus					
Carpiodes cyprinus					
Erimyzon claviformis					
Hypentelium etowanum					
Hypentelium nigricans	1	2			
Minytrema melanops					
Moxostoma carinatum					
Moxostoma duquesnei					
Moxostoma erythrurum					
Moxostoma poecilurum					
Ameiurus melas					
Ameiurus natalis		2			
Ameiurus nebulosus					
Ictalurus punctatus					

Stream	Little Bear Cr		Pennywinkle Cr		Rock Cr
Location	McCarley Rd		Co Hwy 995		Co Hwy 1
Drainage	Tennessee River		Tennessee River		Tennessee River
County	Franklin		Tishomingo, MS		Colbert
Latitude	34.3647		34.7417		34.6318
Longitude	-87.7322		-88.155		-88.091
Year	2014	2013	2014	2013	2014
Noturus exilis					
Noturus funebris	6		2	1	
Noturus flavus					
Noturus gyrinus					
Noturus leptacanthus					
Noturus miurus					
Esox americanus					
Esox niger					
Aphredoderus sayanus					
Fundulus catenatus					
Fundulus notatus					
Fundulus olivaceus	1				2
Fundulus stellifer					
Gambusia affinis					3
Gambusia holbrooki					
Labidesthes sicculus					
Cottus bairdi					
Cottus carolinae					
Cottus tallapoosae					
Elassoma zonatum					
Ambloplites ariommus					
Ambloplites rupestris					1
Centrarchus macropterus					
Lepomis auritus					
Lepomis cyanellus			8	1	
Lepomis gulosus					
Lepomis humilis					
Lepomis Hybrid					
Lepomis macrochirus	7	2		2	1
Lepomis megalotis	2	3			1
Lepomis microlophus					
Lepomis miniatus					
Micropterus coosae					
Micropterus dolomieu					

Stream	Little Bear Cr		Pennywinkle Cr		Rock Cr
Location	McCarley Rd		Co Hwy 995		Co Hwy 1
Drainage	Tennessee River		Tennessee River		Tennessee River
County	Franklin		Tishomingo, MS		Colbert
Latitude	34.3647		34.7417		34.6318
Longitude	-87.7322		-88.155		-88.091
Year	2014	2013	2014	2013	2014
Micropterus henshalli					
Micropterus punctulatus					
Micropterus salmoides		1			
Pomoxis annularis					
Pomoxis nigromaculatus					
Ammocrypta bifascia					
Ammocrypta meridiana					
Crystallaria asprella					
Etheostoma artesiae					
Etheostoma blennioides					
Etheostoma blennius					
Etheostoma brevirostrum					
Etheostoma caeruleum				1	
Etheostoma colorosum					
Etheostoma coosae					
Etheostoma corona					
Etheostoma crossopterum					
Etheostoma duryi					
Etheostoma edwini					
Etheostoma flabellare					
Etheostoma histrio					
Etheostoma jessiae					
Etheostoma jordani					
Etheostoma nigripinne					
Etheostoma nigrum					
Etheostoma rufilineatum	6	2			3
Etheostoma rupestre					
Etheostoma simoterum	3		3	3	4
Etheostoma stigmaeum					
Etheostoma swaini					
Etheostoma zonale					
Etheostoma zonistium				3	
Etheostoma sp. zonistium					
Percina caprodes			1		

Stream	Little Bear Cr		Pennywinkle Cr		Rock Cr
Location	McCarley Rd		Co Hwy 995		Co Hwy 1
Drainage	Tennessee River		Tennessee River		Tennessee River
County	Franklin		Tishomingo, MS		Colbert
Latitude	34.3647		34.7417		34.6318
Longitude	-87.7322		-88.155		-88.091
Year	2014	2013	2014	2013	2014
Percina evides					
Percina kathae					
Percina maculata					
Percina nigrofasciata					
Percina palmaris					
Percina phoxocephala					
Percina sciera					1
Percina vigil					

Stream	Chandelower Cr	Little Bear Cr
Location	Co Hwy 1 & Sally Burns Rd	Co Hwy 122
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.6274	34.3827
Longitude	-88.0249	-87.8372
Year	2014	2014
Ichthyomyzon gagei		
Lepisosteus oculatus		
Lepisosteus osseus		
Dorosoma petenense		
Campostoma oligolepis	3	8
Clinostomus funduloides		
Cyprinella caerulea		
Cyprinella callistia		
Cyprinella galactura		
Cyprinella gibbsi		
Cyprinella spiloptera		
Cyprinella trichroistia		
Cyprinella venusta		
Erimystax dissimilis		
Erimystax insignis		
Hemitremia flammea		
Hybopsis amblops		
Hybopsis lineapunctata		
Luxilus chrysocephalus	9	3
Luxilus coccogenis		
Lythrurus atrapiculus		
Lythrurus bellus		
Lythrurus fasciolaris	36	18
Lythrurus fumeus		
Lythrurus lirus		
Macrhybopsis storeriana		
Nocomis leptocephalus		
Nocomis micropogon		
Notemigonus crysoleucas		
Notropis ammophilus		
Notropis amplamala		
Notropis asperifrons		
Notropis atherinoides		
Notropis baileyi		

Stream	Chandelower Cr	Little Bear Cr
Location	Co Hwy 1 & Sally Burns Rd	Co Hwy 122
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.6274	34.3827
Longitude	-88.0249	-87.8372
Year	2014	2014
Notropis boops		
Notropis harperi		
Notropis leuciodus		
Notropis longirostris		
Notropis micropteryx		
Notropis stilbius		
Notropis telescopus		
Notropis texanus		
Notropis uranoscopus		
Notropis volucellus		
Notropis xaenocephalus		
Opsopoeodus emiliae		
Phenocobius uranops		
Pimephales notatus	1	1
Pimephales promelas		
Pimephales vigilax		
Pteronotropis hypselopterus		
Pteronotropis signipinnis		
Rhinichthys atratulus		
Semotilus atromaculatus	1	2
Semotilus thoreauianus		
Carpiodes cyprinus		
Erimyzon claviformis		
Hypentelium etowanum		
Hypentelium nigricans		
Minytrema melanops		
Moxostoma carinatum		
Moxostoma duquesnei		
Moxostoma erythrurum		
Moxostoma poecilurum		
Ameiurus melas		
Ameiurus natalis		1
Ameiurus nebulosus		
Ictalurus punctatus		

Stream	Chandelower Cr	Little Bear Cr
Location	Co Hwy 1 & Sally Burns Rd	Co Hwy 122
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.6274	34.3827
Longitude	-88.0249	-87.8372
Year	2014	2014
Noturus exilis		
Noturus funebris		
Noturus flavus		
Noturus gyrinus		
Noturus leptacanthus		
Noturus miurus		
Esox americanus		
Esox niger		
Aphredoderus sayanus		
Fundulus catenatus		1
Fundulus notatus		
Fundulus olivaceus	17	6
Fundulus stellifer		
Gambusia affinis		
Gambusia holbrooki		
Labidesthes sicculus		1
Cottus bairdi		
Cottus carolinae	1	3
Cottus tallapoosae		
Elassoma zonatum		
Ambloplites ariommus		
Ambloplites rupestris		
Centrarchus macropterus		
Lepomis auritus		
Lepomis cyanellus	2	
Lepomis gulosus		
Lepomis humilis		
Lepomis Hybrid		
Lepomis macrochirus		
Lepomis megalotis	6	
Lepomis microlophus		
Lepomis miniatus		
Micropterus coosae		
Micropterus dolomieu		

Stream	Chandelower Cr	Little Bear Cr
Location	Co Hwy 1 & Sally Burns Rd	Co Hwy 122
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.6274	34.3827
Longitude	-88.0249	-87.8372
Year	2014	2014
Micropterus henshalli		
Micropterus punctulatus		
Micropterus salmoides		
Pomoxis annularis		
Pomoxis nigromaculatus		
Ammocrypta bifascia		
Ammocrypta meridiana		
Crystallaria asprella		
Etheostoma artesiae		
Etheostoma blennioides		
Etheostoma blennius		
Etheostoma brevirostrum		
Etheostoma caeruleum		4
Etheostoma colorosum		
Etheostoma coosae		
Etheostoma corona		
Etheostoma crossopterum		
Etheostoma duryi		
Etheostoma edwini		
Etheostoma flabellare		
Etheostoma histrio		
Etheostoma jessiae		
Etheostoma jordani		
Etheostoma nigripinne	3	
Etheostoma nigrum		
Etheostoma rufilineatum		20
Etheostoma rupestre		
Etheostoma simoterum	6	9
Etheostoma stigmaeum		
Etheostoma swaini		
Etheostoma zonale		
Etheostoma zonistium		
Etheostoma sp. zonistium		
Percina caprodes		

Stream	Chandelower Cr	Little Bear Cr
Location	Co Hwy 1 & Sally Burns Rd	Co Hwy 122
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.6274	34.3827
Longitude	-88.0249	-87.8372
Year	2014	2014
Percina evides		
Percina kathae		
Percina maculata		
Percina nigrofasciata		
Percina palmaris		
Percina phoxocephala		
Percina sciera		
Percina vigil		

Stream	Little Bear Cr	Turkey Cr	Chenault Sp Br
Location	Co Hwy 38	Co Hwy 89	Co Hwy 34
Drainage	Tennessee River	Tennessee River	Tennessee River
County	Franklin	Franklin	Franklin
Latitude	34.418	34.3646	34.3517
Longitude	-87.6031	-87.5993	-87.5616
Year	2014	2014	2014
Ichthyomyzon gagei			
Lepisosteus oculatus			
Lepisosteus osseus			
Dorosoma petenense			
Campostoma oligolepis	1	10	1
Clinostomus funduloides			
Cyprinella caerulea			
Cyprinella callistia			
Cyprinella galactura			
Cyprinella gibbsi			
Cyprinella spiloptera			
Cyprinella trichroistia			
Cyprinella venusta			
Erimystax dissimilis			
Erimystax insignis			
Hemitremia flammea			
Hybopsis amblops			
Hybopsis lineapunctata			
Luxilus chrysocephalus	17	2	1
Luxilus coccogenis			
Lythrurus atrapiculus			
Lythrurus bellus	1		
Lythrurus fasciolaris			
Lythrurus fumeus			
Lythrurus lirus			
Macrhybopsis storeriana			
Nocomis leptocephalus	13	3	3
Nocomis micropogon			
Notemigonus crysoleucas			
Notropis ammophilus			
Notropis amplamala			
Notropis asperifrons			
Notropis atherinoides			
Notropis baileyi	23	2	20

Stream	Little Bear Cr	Turkey Cr	Chenault Sp Br
Location	Co Hwy 38	Co Hwy 89	Co Hwy 34
Drainage	Tennessee River	Tennessee River	Tennessee River
County	Franklin	Franklin	Franklin
Latitude	34.418	34.3646	34.3517
Longitude	-87.6031	-87.5993	-87.5616
Year	2014	2014	2014
Notropis boops			
Notropis harperi			
Notropis leuciodus			
Notropis longirostris			
Notropis micropteryx			
Notropis stilbius			
Notropis telescopus			
Notropis texanus			
Notropis uranoscopus			
Notropis volucellus			
Notropis xaenocephalus			
Opsopoeodus emiliae			
Phenocobius uranops			
Pimephales notatus			
Pimephales promelas			
Pimephales vigilax			
Pteronotropis hypselopterus			
Pteronotropis signipinnis			
Rhinichthys atratulus			
Semotilus atromaculatus	2		9
Semotilus thoreauianus			
Carpiodes cyprinus			
Erimyzon claviformis			
Hypentelium etowanum			
Hypentelium nigricans			
Minytrema melanops			
Moxostoma carinatum			
Moxostoma duquesnei			
Moxostoma erythrurum			
Moxostoma poecilurum			
Ameiurus melas			
Ameiurus natalis		1	
Ameiurus nebulosus			
Ictalurus punctatus			

Stream	Little Bear Cr	Turkey Cr	Chenault Sp Br
Location	Co Hwy 38	Co Hwy 89	Co Hwy 34
Drainage	Tennessee River	Tennessee River	Tennessee River
County	Franklin	Franklin	Franklin
Latitude	34.418	34.3646	34.3517
Longitude	-87.6031	-87.5993	-87.5616
Year	2014	2014	2014
Noturus exilis			
Noturus funebris			
Noturus flavus			
Noturus gyrinus			
Noturus leptacanthus			
Noturus miurus			
Esox americanus			
Esox niger			
Aphredoderus sayanus			
Fundulus catenatus			
Fundulus notatus			
Fundulus olivaceus	9	1	
Fundulus stellifer			
Gambusia affinis			
Gambusia holbrooki			
Labidesthes sicculus			
Cottus bairdi			
Cottus carolinae			
Cottus tallapoosae			
Elassoma zonatum			
Ambloplites ariommus			
Ambloplites rupestris			
Centrarchus macropterus			
Lepomis auritus			
Lepomis cyanellus			
Lepomis gulosus			
Lepomis humilis			
Lepomis Hybrid			
Lepomis macrochirus	2	2	
Lepomis megalotis	1		
Lepomis microlophus			
Lepomis miniatus			
Micropterus coosae			
Micropterus dolomieu			

Stream	Little Bear Cr	Turkey Cr	Chenault Sp Br
Location	Co Hwy 38	Co Hwy 89	Co Hwy 34
Drainage	Tennessee River	Tennessee River	Tennessee River
County	Franklin	Franklin	Franklin
Latitude	34.418	34.3646	34.3517
Longitude	-87.6031	-87.5993	-87.5616
Year	2014	2014	2014
Micropterus henshalli			
Micropterus punctulatus			
Micropterus salmoides			
Pomoxis annularis			
Pomoxis nigromaculatus			
Ammocrypta bifascia			
Ammocrypta meridiana			
Crystallaria asprella			
Etheostoma artesiae			
Etheostoma blennioides			
Etheostoma blennius			
Etheostoma brevirostrum			
Etheostoma caeruleum			
Etheostoma colorosum			
Etheostoma coosae			
Etheostoma corona			
Etheostoma crossopterum			
Etheostoma duryi			
Etheostoma edwini			
Etheostoma flabellare			
Etheostoma histrio			
Etheostoma jessiae	1		
Etheostoma jordani			
Etheostoma nigripinne			
Etheostoma nigrum			
Etheostoma rufilineatum			
Etheostoma rupestre			
Etheostoma simoterum			
Etheostoma stigmaeum			
Etheostoma swaini			
Etheostoma zonale			
Etheostoma zonistium			
Etheostoma sp. zonistium			
Percina caprodes			

Stream	Little Bear Cr	Turkey Cr	Chenault Sp Br
Location	Co Hwy 38	Co Hwy 89	Co Hwy 34
Drainage	Tennessee River	Tennessee River	Tennessee River
County	Franklin	Franklin	Franklin
Latitude	34.418	34.3646	34.3517
Longitude	-87.6031	-87.5993	-87.5616
Year	2014	2014	2014
Percina evides			
Percina kathae			
Percina maculata			
Percina nigrofasciata			
Percina palmaris			
Percina phoxocephala			
Percina sciera			
Percina vigil			

Stream	McNair Br	Buzzard Roost Cr
Location	Co Hwy 34	US 72
Drainage	Tennessee River	Tennessee River
County	Franklin	Colbert
Latitude	34.393	34.7617
Longitude	-87.5532	-88.0333
Year	2014	2014
Ichthyomyzon gagei		
Lepisosteus oculatus		
Lepisosteus osseus		
Dorosoma petenense		
Campostoma oligolepis		7
Clinostomus funduloides		
Cyprinella caerulea		
Cyprinella callistia		
Cyprinella galactura		
Cyprinella gibbsi		
Cyprinella spiloptera		
Cyprinella trichroistia		
Cyprinella venusta		
Erimystax dissimilis		
Erimystax insignis		
Hemitremia flammea		
Hybopsis amblops		
Hybopsis lineapunctata		
Luxilus chrysocephalus		10
Luxilus coccogenis		
Lythrurus atrapiculus		
Lythrurus bellus		
Lythrurus fasciolaris		20
Lythrurus fumeus		
Lythrurus lirus		
Macrhybopsis storeriana		
Nocomis leptocephalus	4	
Nocomis micropogon		
Notemigonus crysoleucas		
Notropis ammophilus		
Notropis amplamala		
Notropis asperifrons		
Notropis atherinoides		
Notropis baileyi	37	

Stream	McNair Br	Buzzard Roost Cr
Location	Co Hwy 34	US 72
Drainage	Tennessee River	Tennessee River
County	Franklin	Colbert
Latitude	34.393	34.7617
Longitude	-87.5532	-88.0333
Year	2014	2014
Notropis boops		
Notropis harperi		
Notropis leuciodus		
Notropis longirostris		
Notropis micropteryx		
Notropis stilbius		
Notropis telescopus		
Notropis texanus		
Notropis uranoscopus		
Notropis volucellus	1	
Notropis xaenocephalus		
Opsopoeodus emiliae		
Phenocobius uranops		
Pimephales notatus		
Pimephales promelas		
Pimephales vigilax		
Pteronotropis hypselopterus		
Pteronotropis signipinnis		
Rhinichthys atratulus		
Semotilus atromaculatus	1	
Semotilus thoreauianus		
Carpiodes cyprinus		
Erimyzon claviformis		
Hypentelium etowanum		
Hypentelium nigricans		4
Minytrema melanops		
Moxostoma carinatum		
Moxostoma duquesnei		
Moxostoma erythrurum		
Moxostoma poecilurum		
Ameiurus melas		
Ameiurus natalis		
Ameiurus nebulosus		
Ictalurus punctatus		

Stream	McNair Br	Buzzard Roost Cr
Location	Co Hwy 34	US 72
Drainage	Tennessee River	Tennessee River
County	Franklin	Colbert
Latitude	34.393	34.7617
Longitude	-87.5532	-88.0333
Year	2014	2014
Noturus exilis		
Noturus funebris		
Noturus flavus		
Noturus gyrinus		
Noturus leptacanthus		
Noturus miurus		
Esox americanus		
Esox niger		
Aphredoderus sayanus		
Fundulus catenatus		
Fundulus notatus		
Fundulus olivaceus	4	
Fundulus stellifer		
Gambusia affinis		
Gambusia holbrooki		
Labidesthes sicculus		
Cottus bairdi		
Cottus carolinae		21
Cottus tallapoosae		
Elassoma zonatum		
Ambloplites ariommus		
Ambloplites rupestris		
Centrarchus macropterus		
Lepomis auritus		
Lepomis cyanellus		
Lepomis gulosus		
Lepomis humilis		
Lepomis Hybrid		
Lepomis macrochirus		4
Lepomis megalotis		1
Lepomis microlophus		
Lepomis miniatus		
Micropterus coosae		
Micropterus dolomieu		

Stream	McNair Br	Buzzard Roost Cr
Location	Co Hwy 34	US 72
Drainage	Tennessee River	Tennessee River
County	Franklin	Colbert
Latitude	34.393	34.7617
Longitude	-87.5532	-88.0333
Year	2014	2014
Micropterus henshalli		
Micropterus punctulatus		
Micropterus salmoides		
Pomoxis annularis		
Pomoxis nigromaculatus		
Ammocrypta bifascia		
Ammocrypta meridiana		
Crystallaria asprella		
Etheostoma artesiae		
Etheostoma blennioides		1
Etheostoma blennius		
Etheostoma brevirostrum		
Etheostoma caeruleum		1
Etheostoma colorosum		
Etheostoma coosae		
Etheostoma corona		
Etheostoma crossopterum		
Etheostoma duryi		2
Etheostoma edwini		
Etheostoma flabellare		
Etheostoma histrio		
Etheostoma jessiae		
Etheostoma jordani		
Etheostoma nigripinne		
Etheostoma nigrum		
Etheostoma rufilineatum		34
Etheostoma rupestre		
Etheostoma simoterum		
Etheostoma stigmaeum		
Etheostoma swaini		
Etheostoma zonale		
Etheostoma zonistium		
Etheostoma sp. zonistium		
Percina caprodes		3

Stream	McNair Br	Buzzard Roost Cr
Location	Co Hwy 34	US 72
Drainage	Tennessee River	Tennessee River
County	Franklin	Colbert
Latitude	34.393	34.7617
Longitude	-87.5532	-88.0333
Year	2014	2014
Percina evides		
Percina kathae		
Percina maculata		
Percina nigrofasciata		
Percina palmaris		
Percina phoxocephala		
Percina sciera		
Percina vigil		

Stream	Mill Cr	Cedar Cr
Location	Mill Cr Loop Rd	Co Hwy 90
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.7763	34.5529
Longitude	-88.0408	-88.0983
Year	2014	2014
Ichthyomyzon gagei	1	
Lepisosteus oculatus		
Lepisosteus osseus		
Dorosoma petenense		
Campostoma oligolepis		6
Clinostomus funduloides	6	
Cyprinella caerulea		
Cyprinella callistia		
Cyprinella galactura		
Cyprinella gibbsi		
Cyprinella spiloptera		2
Cyprinella trichroistia		
Cyprinella venusta		
Erimystax dissimilis		
Erimystax insignis		
Hemitremia flammea		
Hybopsis amblops		
Hybopsis lineapunctata		
Luxilus chrysocephalus	9	
Luxilus coccogenis		
Lythrurus atrapiculus		
Lythrurus bellus		
Lythrurus fasciolaris	4	2
Lythrurus fumeus		
Lythrurus lirus		
Macrhybopsis storeriana		
Nocomis leptocephalus		
Nocomis micropogon		
Notemigonus crysoleucas		
Notropis ammophilus		
Notropis amplamala		
Notropis asperifrons		
Notropis atherinoides		
Notropis baileyi		

Stream	Mill Cr	Cedar Cr
Location	Mill Cr Loop Rd	Co Hwy 90
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.7763	34.5529
Longitude	-88.0408	-88.0983
Year	2014	2014
Notropis boops		
Notropis harperi		
Notropis leuciodus		
Notropis longirostris		
Notropis micropteryx		
Notropis stilbius		
Notropis telescopus		
Notropis texanus		1
Notropis uranoscopus		
Notropis volucellus		1
Notropis xaenocephalus		
Opsopoeodus emiliae		
Phenocobius uranops		
Pimephales notatus		
Pimephales promelas		
Pimephales vigilax		
Pteronotropis hypselopterus		
Pteronotropis signipinnis		
Rhinichthys atratulus		
Semotilus atromaculatus	3	
Semotilus thoreauianus		
Carpiodes cyprinus		
Erimyzon claviformis		
Hypentelium etowanum		
Hypentelium nigricans		2
Minytrema melanops		
Moxostoma carinatum		
Moxostoma duquesnei		
Moxostoma erythrurum		1
Moxostoma poecilurum		
Ameiurus melas		
Ameiurus natalis		
Ameiurus nebulosus		
Ictalurus punctatus		

Stream	Mill Cr	Cedar Cr
Location	Mill Cr Loop Rd	Co Hwy 90
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.7763	34.5529
Longitude	-88.0408	-88.0983
Year	2014	2014
Noturus exilis		
Noturus funebris		
Noturus flavus		
Noturus gyrinus		
Noturus leptacanthus		
Noturus miurus		
Esox americanus		
Esox niger		
Aphredoderus sayanus		
Fundulus catenatus		1
Fundulus notatus		
Fundulus olivaceus		
Fundulus stellifer		
Gambusia affinis		
Gambusia holbrooki		
Labidesthes sicculus		
Cottus bairdi		
Cottus carolinae	7	
Cottus tallapoosae		
Elassoma zonatum		
Ambloplites ariommus		
Ambloplites rupestris		
Centrarchus macropterus		
Lepomis auritus		
Lepomis cyanellus		
Lepomis gulosus		
Lepomis humilis		
Lepomis Hybrid		
Lepomis macrochirus	2	
Lepomis megalotis		
Lepomis microlophus		
Lepomis miniatus		
Micropterus coosae		
Micropterus dolomieu		

Stream	Mill Cr	Cedar Cr
Location	Mill Cr Loop Rd	Co Hwy 90
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.7763	34.5529
Longitude	-88.0408	-88.0983
Year	2014	2014
Micropterus henshalli		
Micropterus punctulatus		
Micropterus salmoides		
Pomoxis annularis		
Pomoxis nigromaculatus		
Ammocrypta bifascia		
Ammocrypta meridiana		
Crystallaria asprella		
Etheostoma artesiae		
Etheostoma blennioides	1	
Etheostoma blennius		
Etheostoma brevirostrum		
Etheostoma caeruleum	2	
Etheostoma colorosum		
Etheostoma coosae		
Etheostoma corona		
Etheostoma crossopterum		
Etheostoma duryi	2	
Etheostoma edwini		
Etheostoma flabellare		
Etheostoma histrio		1
Etheostoma jessiae		1
Etheostoma jordani		
Etheostoma nigripinne	1	
Etheostoma nigrum		
Etheostoma rufilineatum	6	3
Etheostoma rupestre		
Etheostoma simoterum		1
Etheostoma stigmaeum		
Etheostoma swaini		
Etheostoma zonale		
Etheostoma zonistium		
Etheostoma sp. zonistium		
Percina caprodes		

Stream	Mill Cr	Cedar Cr
Location	Mill Cr Loop Rd	Co Hwy 90
Drainage	Tennessee River	Tennessee River
County	Colbert	Franklin
Latitude	34.7763	34.5529
Longitude	-88.0408	-88.0983
Year	2014	2014
Percina evides		
Percina kathae		
Percina maculata		
Percina nigrofasciata		
Percina palmaris		
Percina phoxocephala		
Percina sciera		
Percina vigil		