Appendix A

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
WinSystems Center Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

August 3, 2011

Colonel Richard Muraski
District Engineer
Attn: Billy Colbert
U.S. Army Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102-0300

Dear Colonel Muraski:

This provides our planning assistance on the Whites Branch mitigation evaluation, Tarrant County, Texas and is supplemental to the November 2002 Planning Aid Letter for the Little Fossil Creek Project. It is intended to assist the U.S. Army Corps of Engineers (Corps) in the planning and evaluation of options available for the City of Haltom City for mitigation needs arising from potential future flood damage control projects within the vicinity. The two documents enclosed include both of our aquatic and terrestrial habitat evaluations.

The purpose of our report is to identify and describe existing fish and wildlife resources within a study area cooperatively delineated by the Corps and the U.S. Fish and Wildlife Service (Service) and to recommend preliminary measures for resource protection. This planning assistance is provided to the Corps pursuant to the Fish and Wildlife Coordination Act (48 Stat, 401, as amended) (FWCA). This information does not represent a final report of the Secretary of the Interior within the meaning of Section 2(b) of the FWCA. A complete FWCA report will be prepared by the Service to accompany the feasibility report after all available pertinent information and proposed project alternatives, including review comments from Texas Parks and Wildlife Department, have been received and evaluated.

We appreciate the opportunity to participate in the planning of this project. If you have any questions or comments concerning this report, please contact Mr. Sean Edwards of my staff at (817) 277-1100.

Sincerely,

Tom Cloud

Thomas J. Cloud, Jr.
Field Supervisor

enclosures

WHITES BRANCH ALTERNATE
MITIGATION AREA
TERRESTRIAL HABITAT EVALUATION

Habitat Descriptions and Suitability Index Values

An interagency biologist team, including the U.S. Army Corps of Engineers (Corps) and the U.S. Fish and Wildlife Service (Service), was convened to conduct a fisheries study of Whites Branch within the City of Haltom City on June 30, 2011. This terrestrial habitat evaluation was also conducted at this time along sample segments of the study area. The Service's *Habitat Evaluation Procedures* (HEP) (U.S. Fish and Wildlife Service 1980) were used to analyze and describe the existing terrestrial habitat in the study area.

Existing riparian woodlands encompassing approximately 27.14 acres within the study area were evaluated for habitat suitability. The HEP defines the riparian woodland cover type as wetland areas dominated by deciduous trees, usually along streams, and that are occasionally flooded. In optimum conditions, this cover type provides food, cover, nesting habitat, and living space to riparian forest dependent species. Large trees are important as nesting habitat for the fox squirrel, wood duck, and barred owl, and escape cover for raccoons, wood ducks, and passerines. Large mast producing trees and shrubs provide food for the fox squirrel. Brush piles and snags provide necessary food, cover, and shelter for wildlife such as raccoons and passerines. Close proximity to water is important for the wood duck. Riparian forest habitats are essential in maintaining biodiversity and providing important wildlife travel corridors. Site descriptions and a list of vegetation species observed at the four data plots are included at the end of this document.

Four wildlife indicator species were selected to represent the wildlife communities that use riparian woodlands including: fox squirrel (*Sciurus niger*), barred owl (*Strix varia*), wood duck (*Aix sponsa*), and downy woodpecker (*Picoides pubescens*). At the suggestion of the Corps, only species with certified bluebook models were utilized. The only other cover type present within the study area, grassland (22.57 acres), is planned for conversion to riparian woodland and was therefore not evaluated.

Baseline habitat conditions are expressed as a Habitat Suitability Index (HSI value) numeric function ranging from 0.0 to 1.0, where 0.0 represents no suitable habitat for an indicator species and 1.0 represents optimum conditions for the species. HSI values ranging from 0.01 to 0.24 are considered "poor" habitat, 0.25 to 0.49 are considered "below average" habitat, 0.50 to 0.69 are "average" habitat, 0.70 to 0.89 are "good" habitat, and 0.90 to 1.00 are considered "excellent" habitat. Habitat units (HU) are calculated by multiplying the HSI for each habitat by the amount of acres of the same habitat.

Table 1 displays the HSI values for each indicator species and overall habitat units. The average HSI values for each species within the study area ranged from 0.07 for wood duck to 0.88 for downy woodpecker. The limiting factors for each species are discussed in the corresponding site descriptions below.

Table 1. HSI Values for Indicator Species within Whites Branch Study Area.	
Indicator Species	**Cover type**
	Riparian Woodland (27.14 ac)
Barred owl	0.33
Wood Duck	0.07
Fox Squirrel	0.35
Downy Woodpecker	0.88
HSI Average	**0.41**
Habitat Units	**11.13**

Distinct differences were observed between the two downstream data sites in contrast to the two upstream data sites. Therefore sites 1 and 2 will be grouped and described separately from the grouping of sites 3 and 4.

Sites 1 & 2:

Riparian woodlands within the downstream area are characterized as a relatively narrow forested strip, especially along the eastern shore. A few mature trees are present, but most appear to be regrowth from a previous clearcutting. An abundance of non-native understory is present composed largely of privet and occasional Chinese tallow.

The winter food requisite was the most limiting factor for fox squirrels. The required number of mast producing trees greater than 10 inches dbh needed for optimum fox squirrel habitat was largely absent in sites 1 and 2 and grain availability was too low in all of the data sites. Sites 1 and 2 were also largely inundated with non-native privet understory further limiting habitat suitability for fox squirrels.

Each of the life requisites was above average or excellent for the downy woodpecker. This was consistent across each of the data sites. The most limiting factors for barred owl were the minimal number of overstory trees with sufficient diameter at breast height (dbh) for nesting and the corresponding low percentage of overstory canopy cover.

The value of riparian woodlands was poor for the wood duck throughout the study area due to the low number of potentially suitable nest cavity trees and the lack of brood and winter cover across all cover types.

Sites 3 & 4:

This upstream area differs from the downstream area in its older growth composition and lack of invasive understory. Abundant, very large hardwood trees dominate the overstory. Consequently, habitat values for the species evaluated are typically higher in this portion of the study area.

The minimal presence of mature mast producers is the limiting factor for fox squirrels, although they are more abundant in this upstream area. Barred owl and downy woodpecker habitat values are good to excellent across both data plots. As in sites 1 and 2, wood duck habitat value suffers from a lack of nesting opportunities and minimal presence of nesting/brooding cover.

Discussion:

Riparian woodlands within the study area represent a viable opportunity for the Corps' mitigation goals. Within the downstream portion in the vicinity of sites 1 and 2, we recommend planting mast producing trees and appropriate hardwoods in the existing woodlands where they are lacking to improve the canopy cover and food base. The thick understory may need to be thinned and cleared around young trees to provide space and sunlight. Snags should be left standing and downed logs should remain in place. Existing mast producing trees should be allowed to mature and increase in size. Grasslands within the study area which are planned for conversion to riparian woodland should likewise be planted with suitable native mast producing and other hardwood species. These efforts should be closely monitored and managed for a time necessary to ensure success. In addition, we recommend that a program be implemented to remove invasive, non-native privet species from the mitigation site.

In general, the Whites Branch watershed has been heavily impacted by urban development. Only a portion of the upstream area appeared to be moderately impacted. However, there are still some valuable wildlife habitats remaining within the watershed. The Corps' proposed mitigation efforts could help restore some of the natural habitats that have been lost and improve habitat diversity and quality of remaining habitats, thus benefitting a variety of resident and migratory wildlife species.

REFERENCES

U.S. Fish and Wildlife Service.1980. The habitat evaluation procedures. USDI Fish and Wildlife Service, Ecological Services Manual 102. 124 pp.

HEP Site Observations for the Whites Branch Project

Site #:__1__ Cover-type: _Riparian Woodland_ **Date:** _June 30, 2011_

GPS Coordinates: _32.65049_ _-97.27164_

General Description and Observations: Minimal overstory, scarce mast producers, abundant privet and tallow understory, woodland area narrow along eastern shoreline

Plant Species:

Tree:	Shrub:	Grass:	Vine or Forb:
American elm hackberry green ash cedar elm Chinese tallow pecan	green ash hackberry pecan Chinese tallow privet rough-leaf dogwood	inland sea oats Johnsongrass	green brier poison ivy grapevine giant ragweed

Wildlife Species Observed:
Northern cardinal, Carolina wren, cicadas

HEP Site Observations for the Whites Branch Project

Site #:__2__ Cover-type: _Riparian Woodland_ **Date:** _June 30, 2011_

GPS Coordinates: _32.85083_ _-97.27168_

General Description and Observations:__Minimal overstory, scarce mast producers, abundant privet and tallow understory, woodland area narrow along eastern shoreline

Plant Species:

Tree:	Shrub:	Grass:	Vine or Forb:
American elm hackberry green ash cedar elm Chinese tallow pecan	green ash hackberry pecan Chinese tallow saphora boxelder privet rough-leaf dogwood black willow	inland sea oats Johnsongrass	green brier poison ivy grapevine giant ragweed

Wildlife Species Observed:

northern cardinal, northern mockingbird, mourning dove, cicadas,

HEP Site Observations for the Whites Branch Project

Site #:__3__ Cover-type: _Riparian Woodland_ **Date:** _June 30, 2011_

GPS Coordinates: _32.85198_ _-97.27256_

General Description and Observations: Abundant older growth hardwoods, open understory, heavy overstory canopy cover

Plant Species:

Tree:	Shrub:	Grass:	Vine or Forb:
American elm green ash cedar elm hackberry pecan redbud black willow bois d' arc	privet cedar elm rough-leaf dogwood American elm redbud green ash hackberry	inland sea oats	green brier poison ivy

Wildlife Species Observed:
Carolina wren, northern cardinal, cicadas

HEP Site Observations for the Whites Branch Project

Site #:__4__ Cover-type: _Riparian Woodland_ **Date:** _June 30, 2011_

GPS Coordinates: _32.85189_ _-97.27290_

General Description and Observations: Abundant older growth hardwoods, open understory, heavy overstory canopy cover

Plant Species:

Tree:	Shrub:	Grass:	Vine or Forb:
green ash cedar elm hackberry pecan black willow American elm bois d' arc	privet American elm rough-leaf dogwood eastern red cedar hackberry redbud cedar elm red mulberry	inland sea oats Virginia wildrye	poison ivy Virginia creeper green brier grapevine

Wildlife Species Observed:
Carolina wren, northern mockingbird, cicadas

BASELINE FISHERIES SURVEY OF WHITES BRANCH WITHIN THE PROPOSED WHITES BRANCH ALTERNATE MITIGATION AREA, TARRANT COUNTY, TEXAS

Introduction

A fisheries survey was conducted on Whites Branch within the City of Haltom City, Tarrant County, Texas, on June 30, 2011, by the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACE). The purpose of this survey was to determine baseline fish-community structure within the area of Whites Branch that could potentially serve as a mitigation site for areas impacted by stream modifications, development, and/or construction activities associated with the proposed Little Fossil Creek Flood Damage Reduction Project.

Materials and Methods

Fish-community structure was assessed at two sites on Whites Branch in Tarrant County, Texas by USFWS/USACE personnel to determine baseline conditions (Table 1 and Figure 1). The two sites were located in areas of the stream that could potentially benefit from mitigation activities associated with the proposed project.

Table 1. Whites Branch baseline fisheries survey sample sites, 2011.

Sample Site	General Description
Site 1	Whites Branch, 2nd order stream, immediately downstream of the concrete pedestrian bridge, a distance approximately 84 meters (275 feet), incorporating shallow pool and shallow riffle-pool habitat. Stream width ranged from 1 meter (3 feet) to 7 meters (23 feet). Water depth averaged 0.3 meters (1.0 feet). Substrate was dominated by silt and sand with areas of gravel, cobble, and concrete debris.
Site 2	Whites Branch, 2nd order stream, approximately 325 meters (1066 feet) upstream of the concrete pedestrian bridge, a distance of approximately 40 meters (130 feet), incorporating shallow riffle-pool sequences. Stream width ranged from 1 meter (3 feet) to 2 meters (6.5 feet). Water depth averaged 0.2 meters (0.7 feet). Substrate was dominated by gravel and small cobble with silt and sand in depositional areas.

The Whites Branch drainage basin encompasses approximately 26.8 square kilometers (10.3 square miles). Discharge at both sampling sites was estimated at 0.028 cubic meters per second (1.0 cubic feet per second). The in-stream habitat at each site consisted of a series of well shaded, shallow riffle pool complexes. Both sites were located within bottomland hardwood habitat areas.

Figure 1. Whites Branch sampling sites.

Fish were collected from all sites using a Smith-Root Inc. backpack electrofisher (Model LR-24; Serial No. C00100). Sampling consisted of electrofishing for a period of 45 minutes at Site 1 and 28 minutes at Site 2. Seines were not utilized at either site due to broken concrete, root snags, fallen branches, and other obstacles that prevented the effective use of this sampling device. After collection, fish were identified to species using Robison and Buchanan (1988) and Miller and Robison (2004), counted, and any observed anomalies were recorded. Hybridized sunfish (*Lepomis spp.*) were identified and recorded as the sunfish species they resembled most. All fish were then released back into the creek. The data resulting from this sampling were used to calculate aquatic life use values for each site and the overall area sampled employing the regional index of biotic integrity.

An index of biotic integrity (IBI) provides a means to assess aquatic life use within a given water body using multiple metrics. Accounting for the high variability in fish assemblages in aquatic systems between various ecological regions (eco-regions) in Texas, Linam et al. (2002) developed regionalized IBIs. The Whites Branch drainage is located in the region designated by Linam et al. (2002) as the Subhumid Agricultural Plains, which incorporates the variability of fish species inhabiting aquatic systems in Ecoregions 27 (Central Great Plains), 29 (Central Oklahoma/Texas Plains), and 32 (Texas Blackland Prairies). The regionalized IBI for this area consists of 11 metrics that define species richness, trophic composition, and abundance (Table 2 and Figure 2). Each one of these metrics is scored with values ranging from low (1) to high (5). In turn, aquatic life use values are determined by adding each metric score for a total score. These aquatic life use values can range from limited to exceptional.

Table 2. Regional index of biotic integrity scoring criteria for stream fish assemblages in the Subhumid Agricultural Plains (Ecoregions 27, 29, and 32). Total score for aquatic life use categories: >49 = Exceptional, 41-48 = High, 35-40 = Intermediate, and <35 = Limited (Linam et al. 2002).

Metric	Scoring Criteria		
	5	3	1
1. Total number of fish species	See figure 2		
2. Number of native cyprinid species	>3	2-3	<2
3. Number of benthic invertivore species	>1	1	0
4. Number of sunfish species	>3	2-3	<2
5. % of individuals as tolerant species (excluding western mosquitofish)	<26%	26-50%	>50%
6. % of individuals as omnivores	<9%	9-16%	>16%
7. % of individuals as invertivores	>65%	33-65%	<33%
8. % of individuals as piscivores	>9%	5-9%	<5%
9. (a) Number of individuals/seine haul	>87	36-87	<36
9. (b) Number of individuals/minute of electrofishing	>7.1	3.3-7.1	<3.3
10. % of individuals as non-native species	<1.4%	1.4-2.7%	>2.7%
11. % of individuals with disease or other anomaly	<0.6%	0.6-1%	>1%

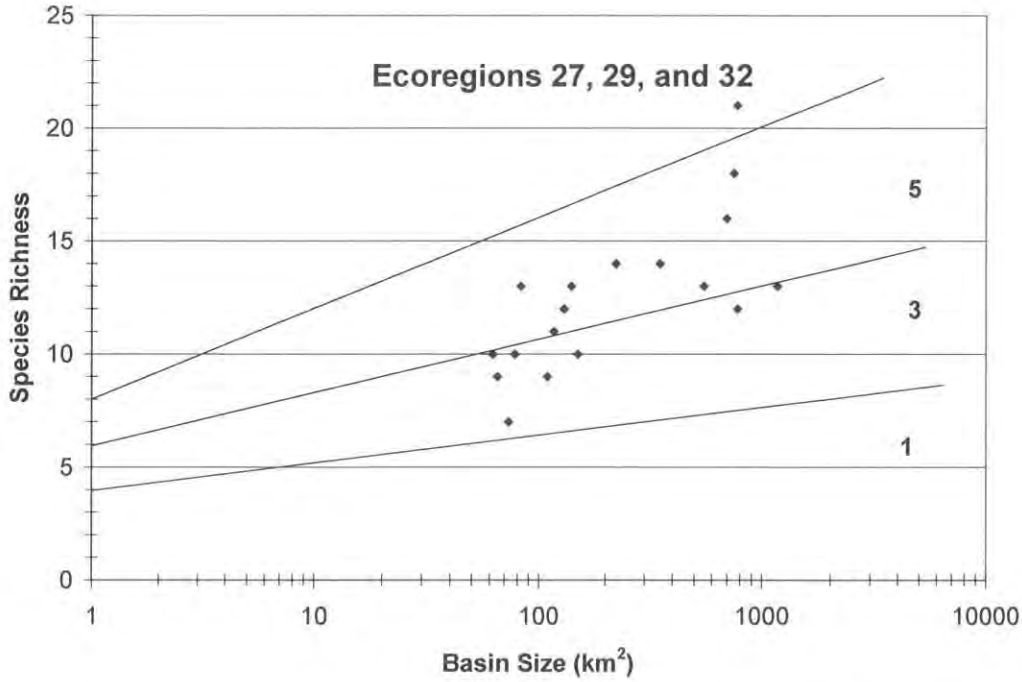

Figure 2. Fish species richness versus drainage basin size for the Subhumid Agricultural Plains -- Ecoregions 27, 29, and 32 (Linam et al. 2002).

Results

A total of 659 fish comprising 11 species from 5 families, were collected from the Whites Branch drainage (Table 3). Blacktail shiner (*Notropis venustus*) represented 47.3% of the total number of fish collected from both sites, followed by green sunfish (*Lepomis cyanellus*, 23.4%), yellow bullhead (*Ameiurus natalis*, 8.3%), central stoneroller (*Campostoma anomalum,* 5.5%), orangespotted sunfish (*Lepomis humilis,* 4.9%) bluegill (*Lepomis macrochirus,* 3.5%), and red shiner (*Cyprinella lutrensi,* 3.5%). Blackstripe topminnow (*Fundulus notatus),* spotted bass (*Micropterus punctulatus*), western mosquitofish (*gambusia affinis*), and black bullhead (*Ameiurus melas*) accounted for the remaining 3.6% of individuals captured.

Eleven species, representing 393 individuals, were collected at Site 1 and eight species, representing 266 individuals, were captured at Site 2 (Table 3). No indications of disease and/or other anomalies (such as tumors or lesions) were observed in any of the captured fish and no fish species considered to be non-native or intolerant to limited water conditions (i.e., poor water quality, fluctuating water levels, reduced flow, etc.) by Linam and Kleinsasser (1998) were collected at any of the sites. In addition to fish, numerous odonate (dragonfly) larvae and tadpoles (*Rana spp.*) were observed at Sites 1 and 2, while one smooth softshell turtle (*Apalone mutica*) was observed at Site 1.

Table 3. Fish collected by USFWS and USACE personnel from two sites within the Whites Branch drainage, Tarrant County, Texas, June, 30, 2011. Note: nc is not collected.				
Family	**Species**	**Site 1**	**Site 2**	**Total**
Centrarchidae (sunfish)	*Lepomis cyanellus* - Green Sunfish	115	39	154
	Lepomis macrochirus – Bluegill	21	2	23
	Lepomis humilis - Orangespotted Sunfish	31	1	32
	Micropterus punctulatus – Spotted Bass	4	nc	4
Cyprinidae (minnows)	*Cyprinella lutrensis* – Red Shiner	21	2	23
	Notropis venustus – Blacktail Shiner	134	178	312
	Campostoma anomalum – Central Stoneroller	15	21	36
Fundulidae (topminnows)	*Fundulus notatus* - Blackstripe Topminnow	5	4	9
Ictaluridae (catfish)	*Ameiurus natalis* – Yellow Bullhead	36	19	55
	Ameiurus melas – Black Bullhead	8	nc	8
Poeciliidae (live-bearers)	*Gambusia affinis* – Western Mosquitofish	3	nc	3

Designated tolerance levels and associated trophic guilds for the species collected from all sites were obtained from Linam and Kleinsasser (1998) and are presented in Table 4. Results of the regionalized IBI calculations for the two sites, as well as the overall study area, are included in Tables 5 through 7.

Table 4. Fish species and their associated tolerance levels and trophic guilds collected from three sites within the Whites Branch drainage, Tarrant County, Texas, June, 30, 2011; where I = intermediate, N = intolerant, and T = tolerant (Linam and Kleinsasser 1998).			
Family	**Species**	**Tolerance Class**	**Trophic Guild**
Centrarchidae	*Lepomis cyanellus* - Green Sunfish	T	piscivore
	Lepomis macrochirus – Bluegill	T	invertivore
	Lepomis humilis - Orangespotted Sunfish	I	invertivore
	Micropterus punctulatus - Spotted Bass	I	piscivore
Cyprinidae	*Cyprinella lutrensis* – Red Shiner	T	herbivore
	Notropis venustus – Blacktail Shiner	I	invertivore
	Campostoma anomalum – Central Stoneroller	I	herbivore
Fundulidae	*Fundulus notatus* - Blackstripe Topminnow	I	invertivore
Ictaluridae	*Ameiurus natalis* – Yellow Bullhead	I	omnivore
	Ameiurus melas – Black Bullhead	T	omnivore
Poeciliidae	*Gambusia affinis* – Western Mosquitofish	T	invertivore

Table 5. Regional IBI Metric Calculations (IBI Score) for Site 1.			
1. Total # of fish species:	11(5)	7. % of individuals as invertivores:	49.4(3)
2. # of native cyprinid species:	3(3)	8. % of individuals as piscivores:	30.3(5)
3. # of benthic invertivore species:	0(1)	9a. # of individuals/seine haul:	na
4. # of sunfish species:	3(3)	9b. # of individuals/minute of electro-fishing:	8.7(5)
5. % of individuals as tolerant species (excluding mosquitofish):	42(3)	10. % of individuals as non-native species:	0(5)
6. % of individuals as omnivores:	11.7(3)	11. % of individuals with disease or other anomaly:	0(5)
IBI Total Score: 41 (High)			

Table 6. Regional IBI Metric Calculations (IBI Score) for Site 2.			
1. Total # of fish species:	8(3)	7. % of individuals as invertivores:	69.5(5)
2. # of native cyprinid species:	3(3)	8. % of individuals as piscivores:	14.7(5)
3. # of benthic invertivore species:	0(1)	9a. # of individuals/seine haul:	na
4. # of sunfish species:	3(3)	9b. # of individuals/minute of electro-fishing:	9.5(5)
5. % of individuals as tolerant species (excluding mosquitofish):	16.2(5)	10. % of individuals as non-native species:	0(5)
6. % of individuals as omnivores:	7.1(5)	11. % of individuals with disease or other anomaly:	0(5)
IBI Total Score: 45 (High)			

Table 7. Regional IBI Metric Calculations (IBI Score) for Overall Study Area.			
1. Total # of fish species:	11(5)	7. % of individuals as invertivores:	57.5(3)
2. # of native cyprinid species:	3(3)	8. % of individuals as piscivores:	24(5)
3. # of benthic invertivore species:	0(1)	9a. # of individuals/seine haul:	na
4. # of sunfish species:	3(3)	9b. # of individuals/minute of electro-fishing:	9(5)
5. % of individuals as tolerant species (excluding mosquitofish):	31.6(3)	10. % of individuals as non-native species:	0(5)
6. % of individuals as omnivores:	9.6(3)	11. % of individuals with disease or other anomaly:	0(5)
IBI Total Score: 41 (High)			

The regional IBI assessment results demonstrated a high aquatic life use value for the fish communities sampled at Sites 1 and 2 (score of 41 and 45, respectively). The fish community within the overall study area was characterized as high (score of 41). The mean IBI score for both sites also characterized the study area as high (mean score of 43).

Discussion

The fish community assessed at the Whites Branch drainage in Tarrant County, Texas, on June 30, 2011, within the potential mitigation area associated with the proposed Little Fossil Creek Flood Damage Reduction Project, demonstrated a high overall aquatic life use value with an IBI score of 41. In 2002, Armstrong and Hale (2003) performed an IBI on Whites Branch approximately 6 kilometers (3.7 miles) upstream of its confluence with Big Fossil Creek in an area devoid of riparian vegetation. Their sample site, located approximately 4.7 kilometers (2.9 miles) upstream of Site 2 and outside of the Whites Branch potential mitigation area, characterized Whites Branch drainage basin as high aquatic life value for fish communities with a regional IBI score of 42 (Armstrong and Hale 2003).

Although both studies IBI scores were comparable, Armstrong and Hale collected 15 fish species utilizing backpack electrofishing and seines (2003), in contrast to the 11 species collected using only electrofishing during this study. Seven species were common to both studies (red shiner, yellow bullhead, blackstripe topminnow, western mosquitofish, green sunfish, bluegill, and hybridized sunfish). In addition to these seven species, Armstrong and Hale (2003) collected gizzard shad (*Dorosoma cepedianum*), golden shiner (*Notemigonus crysoleucas*), bullhead minnow (*Pimephales vigilax*), warmouth (*Lepomis gulosus*), longear sunfish (*Lepomis megalotis*), redear sunfish (*Lepomis microlophus*), largemouth bass (*Micropterus salmoides*), white crappie (*Pomoxis annularis*), and orangethoat darter (*Etheostoma spectabile*). The blacktail shiner, central stoneroller, orangespotted sunfish, and spotted bass collected from Whites Branch in 2011 were not represented in Armstrong and Hale (2003). The differences in species composition may be due to naturally occurring spatial and temporal shifts in community structure or influenced by the lack of riparian corridor adjacent to the 2002 sampling site.

References

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Linam, G.W. and L.J. Kleinsasser. 1998. Classification of Texas Freshwater Fishes into Trophic and Tolerance Groups (River Studies Report No. 14). Texas Parks and Wildlife Department. Austin, Texas.

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