LAKE FORT SMITH

ANNUAL RESERVOIR/WATERSHED REPORT 2019

Fort Smith Utility
Department of Environmental Quality
Prepared by: Eric White
Watershed Supervisor: Tim Smith
Environmental Quality Manager: Don Clover

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INTRODUCTION

The Fort Smith Utilities, Environmental Quality section conducts annual fishery assessments on both surface water reservoirs used to supply raw water to its two (2) drinking water treatment facilities. Changes in fish population and community structure can reflect shifts in water quality. Monitoring the overall fisheries of the two (2) raw water reservoirs is one (1) tool utilized by the Fort Smith Utilities to ensure quality drinking water, in the quantity demanded by the City of Fort Smith and the surrounding communities. A combination of active and passive sampling techniques is used to evaluate reservoir fish populations, through the generation of specific indices. Indices are evaluated using trend analysis to follow changes in structure, abundance and condition of target fish populations. The degree of monitoring effort varies annually and is typically a function of weather and water conditions.

SITE SELECTION

Passive Sampling

Lake Fort Smith was originally impounded in 1933 and created a 400 acre reservoir. The Lake was combined with Lake Shepherd Springs and enlarged to a 1519 acre reservoir in 2007. Due to the reservoir's physical characteristics, sample site selection for passive collection techniques is difficult at best. Lake Fort Smith covers approximately 1519 acres and has an average depth of 58 feet. The long narrow valley has extremely steep slopes which limits the placement of trap net sites. The only areas that have a shallow enough slope to deploy trap nets are those sites that were road accesses used during the construction of the reservoir. The presence of large quantities of submerged woody debris limits the placement of trap nets and experimental gill nets. Due to the limited number of sites that were available for deployment of passive sampling techniques, a random sampling approach could not be used for site selection. Netting sites were selected for their ease of deployment and included trap net, gill net, seines and larval fish collection sites.

Gill nets are typically deployed on the North-West reservoir shoreline, where reduced surface and sub-surface debris is encountered. Historic data suggests abundant fish movement within the old Lake Shepherd Springs channel, thus ensuring collections that reflect current fishery conditions. Trap nets are deployed north of the buoy line on the West side of the reservoir and the North-East shoreline in the lacustrine portion of the reservoir.

Active Sampling

Boat electro-shocking is conducted over the entire length of the reservoir. Fort Smith Utilities has adopted a random electro-shocking sampling approach, currently being used by the Arkansas Game and Fish Commission (AG&FC). This approach will be detailed in the Methods section of this document.

METHODS

Trap Nets

Standard trap nets require a relatively flat, hard substrate for pot placement and a clean bottom for leader/wing deployment. Nets are set perpendicular to the shore line. The nets are set and contents emptied every 24-hour after deployment. Nets are typically deployed on the Monday of the sampling week, with collections being made on the following days and final net retrieval on Friday. Attempts are made to sample crappie populations early in the season to minimize the effects of post spawn individuals on fish condition indices. Fish are identified to species level, measured, weighed (game fish only) and returned to the water. Some incidental mortality is typically experienced and can be expected while conducting any fishery study. Catch-per-unit-effort, relative weight (Wr) analysis and percent composition indices are calculated from the recorded data. For evaluation purposes, target fish species are grouped into 25-millimeter increments.

Standard trap net dimensions include: two (2), 3'x6', 5/16" diameter steel frames set 2.5-foot apart. Netting material consists of 2-inch square, No. 150 L knotless, and treated nylon. Four (4) 2.5' diameter steel hoops, 24-inches apart, lead to the cod end with a drawstring closure. The 50-foot long leader is constructed of the same net material and has a depth of 3.5 feet. A float line fitted with 2 inch by 1.5 inch corks and a sinker line fitted with 1.5-ounce weights keeps the leader net horizontally extended.

Experimental Gill Nets

Experimental gill nets require a relative flat or gently sloping substrate, and a clean bottom to prevent excessive damage to the mono-filament netting. Experimental gill nets are 91.4 meters in length, 2.4 meters in height and have panels of increasing mesh size (¾ to 2 inches). The nets are set perpendicular to the shore line, stretched taught by boat and anchored to the substrate. Nets are set and the contents are emptied every 24-hours after deployment. Nets are typically deployed on Monday of the sampling week, with collections being made on the following days and final net retrieval on Friday. Fish are identified to species level, measured, weighed (game fish only) and returned to the water. Catch-per-unit-effort and

percent composition of dominant taxa are calculated. For evaluation purposes, target fish species are grouped into 25-millimeter increments.

Boat Electro-shocking

Electro-shocking is conducted through the use of a boat mounted Smith-Root Incorporated®, 5.0 Electro-fishing System, powered by a Honda® GX340, 11.0 horsepower gasoline generator. A single standard anode boom, with a 40-inch diameter array is mounted to the front of the boat. Lighting mounted on the front of the boat, is powered by a Honda® EM650 gasoline generator and converter box combination. Sampling is typically conducted during night time conditions. When the unit is operational, fish are stunned and drawn to the electric field at the front of the boat where they are retrieved using long handled dip nets. Upon collection, the fish are placed in two (2) 30-gallon tubs, partially filled with reservoir water. At the end of each collection period, the fish are identified to species, measured (mm) and weighed (g) (game fish only). The fish are then released in an area that will not influence future sampling numbers. Catch-per-unit-effort (CPUE), relative weight analysis, Proportional Stock Density (PSD), Relative Stock Density (RSD) and percent composition of dominant taxa are calculated. For evaluation purposes, target fish species are grouped into 25-millimeter length increments. A random sampling approach has been adopted to better ensure representative fishery collections. Lake Fort Smith is divided into 40, 600-meter sampling sites. A minimum of 14 sites must be electro-shocked, for a period of 10-minutes each (pedal down time), to ensure a random sample. Prior to sampling, sites are selected from a random numbers table. Sites not conducive to sampling efforts, due to shallow or extremely deep water, are excluded from the selection and a substitute site is chosen. Due to the large number of sites and in case of equipment problems, the 14-sites can be sampled over the course of two (2) nights.

Backpack Electroshocking

Backpack Electroshocking is conducted in three streams in the Lake Fort Smith Watershed. The species of stream fish present are a good indication of water quality depending on the tolerance value assigned to certain species. A Smith-Root Backpack Electro-shocker is used to stun the fish for collection. Two (2) 20 minute runs are done on each stream and the fish are identified to species level after each run. Fish collected are identified and released on site after identification. Data is then analyzed and an Index of Biological Integrity (IBI) trend analysis is done based on a predetermined set of values for each species. The IBI analysis will give a stream condition number that will help determine stream health.

Surber Net

Aquatic Macro-invertebrates are key indicators of stream health. The City of Fort Smith samples twice a year for macros in all the streams in each watershed. Three (3) samples are taken at each site at riffles with enough flow to carry the macros into the surber net. The surber net is 12 inches by 12 inches and is placed in a spot determined by the sampler to have sufficient cobble and flow. The sampler then rubs each rock in the one (1) square foot area enclosed by the surber net, in order to release all clinging macros. After all the rocks are rubbed sufficiently, a garden shovel is used to disturb the stream bed for any macros that are buried. The net is then emptied and the macroinvertebrates are fixed for picking at a later date. The organisms are then picked and preserved and sent off to an outside entity for identification and enumeration. The data received is then compiled and four (4) different metrics are used to obtain a "Stream Condition" factor. Each of the four (4) metrics is on a scale of one (1) to five (5). Five (5) being the best score for each metric and a 20 being the best stream condition factor.

Algal Enumeration

Algae enumeration is done weekly on both reservoirs. A secchi disk is lowered into the water and used to determine the visible photic zone. This number is then divided by two (2) to obtain the ¼ zone depth. Samples are collected in a Wildco Inc. 2.2L PVC Beta Plus water bottle that is lowered to a depth determined by the secchi disk. One (1) sample is collected on Lake Fort Smith at the LFS 01 site. Another sample is taken below the Lake Fort Smith dam at a raw water outlet. The samples are then taken to the lab and 100 mL of the sample is measured out and concentrated down to 20 mL where a one (1) mL sample is then taken and placed into a SR™ counting chamber. After the algae are counted the data is entered into a database to obtain phytoplankton units per liter and MIB & Geosmin (Taste and Odor) levels. This helps to better track trends and predict blooms.

Water Quality

Phosphorous, Nitrogen, and Chlorophyll-α are three (3) water quality indicators tested by the City of Fort Smith. Phosphorous samples are obtained by a surface grab at

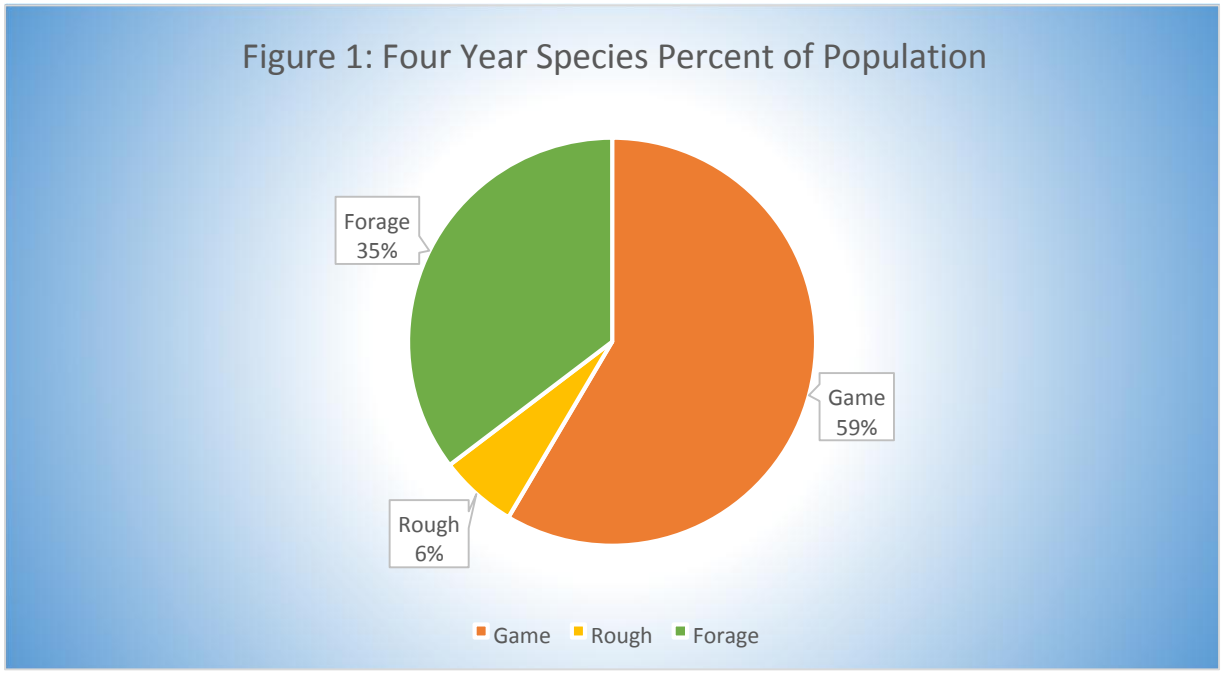
predetermined sites that extend the length of the reservoir. Nitrogen sampling is done on a monthly basis at two (2) sites on both reservoirs. One sample is taken at the site nearest the intake structure while the other sample is taken at the site that is at the uppermost part of the reservoir. Two (2) Chlorophyll-α samples are taken at the site nearest the intake structure. One (1) sample is determined by the secchi disk depth obtained for the algae sample. The other sample is taken at two (2) meters. Phosphorous and nitrogen samples are an indicator of nutrient loading from the reservoir's watersheds and elevated levels can lead to uncontrollable algae blooms. Chlorophyll-α is used to determine algae levels and can give you an insight into the reservoirs trophic status.

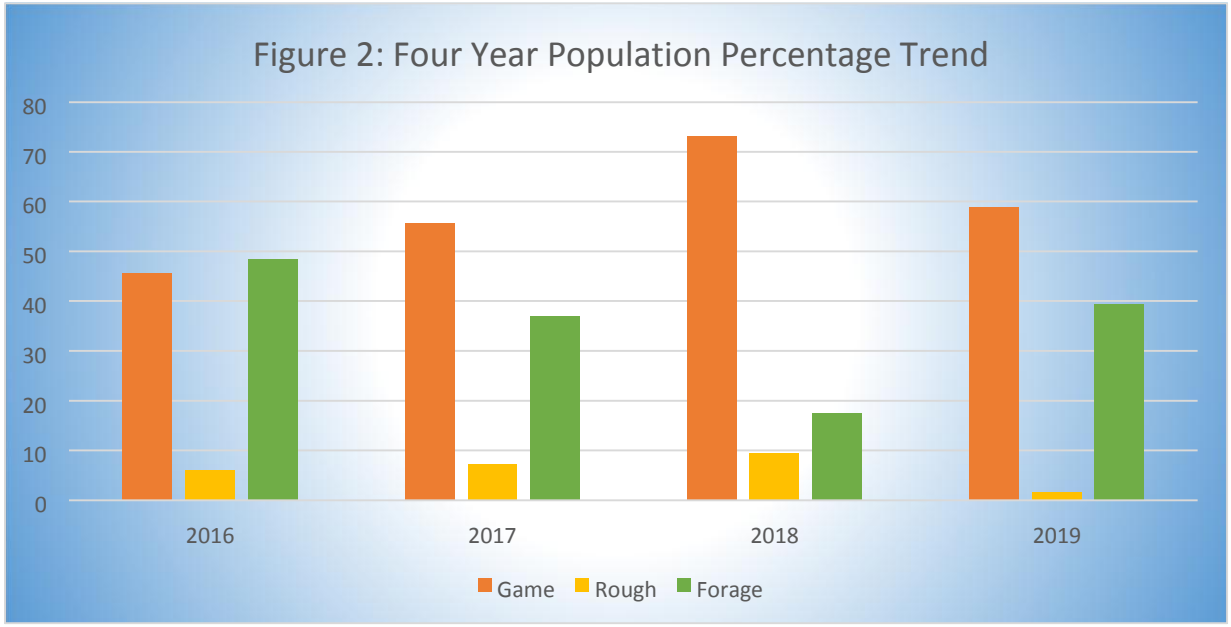
RESULTS

Total Percent

Population:

A total of 18 fish species were collected during the 2019 sample period. Of these, 38.9% (7 out of 18 species) were considered game fish species and included one (1) species of black bass, two (2) species of crappie, two (2) species of catfish, one (1) species of the genus *Stizostedion* (Walleye) and one species of the genus *Morone* (White Bass). The forage base represented 33.3% (6 out of 18 species) of the species composition and included five (5) representatives of the genus *Lepomis*, one (1) of the genus *Dorosoma*. Rough fish comprised 27.8% (5 out of 18 species) of the total composition, one (1) representative of the genus of *Hypentelium*, three (3) *Moxostoma*, and one (1) *Lepisosteus*. These percentages are only of species comparison and not that of game, rough and forage total percentages. A complete species list is shown in Appendix B. The data is a compilation of all sample methods. Each sample method is more suited to capturing a particular group of fish i.e. trap net for crappies and sunfish, while electro-fishing is used mainly for the black bass. By combining all the data from all methods used, we gain an overall picture of population structure within the lake. Figure 1 shows average percentages for representative species in the game, rough and forage fish categories for 2016-2019 cumulatively. Figure 2 shows average percent fish totals, year to year, in the game, rough and forage fish categories for 2016-2019.





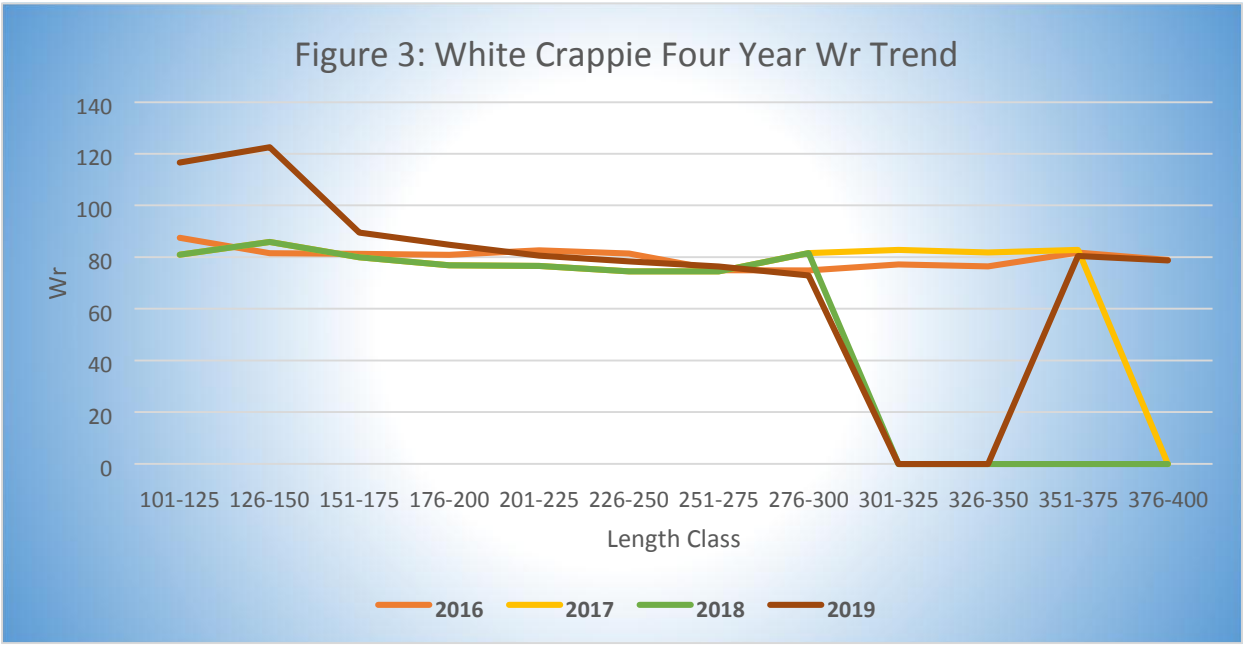
Trap Net:

Trap net sampling was conducted during the months of March through May with a total of 37 net nights sampled. During the last four years, a total of 1140 crappie were collected, of that number black crappie (*Pomoxis nigromaculatus*) comprised 57% of the population and white crappie *(Pomoxis annularis*) were the remaining 43%. Table 1 shows the year to year fluctuation in seven (7) metrics for white crappie while Table 2 represents the same for black crappie.

Table 1. White Crappie Trap Net Summary of Statistics

Year	2016	2017	2018	2019
Net Nights	53	49	32	37
N	73	161	45	211
Mean Length (mm)	208.5	214.1	206.3	208.3
Mean Weight (g)	151.6	140.6	105.8	113.1
CPUE	0.057	0.011	0.004	0.012
PSD	21	44	58	54
PSD-P	42	27	13	6

PSD (proportional stock density) is based on the quality length class (≥127mm). Fluctuation of these values are attributed to the number of fish caught below the 127mm threshold. 2016 had more fish caught below 127mm therefore lowering the PSD. By taking the average of the last three (3) years, a PSD of 52 is more realistic for white crappie for this reservoir. PSD-P (proportional stock density- preferred) for 254 mm (preferred length class) crappie was also inconsistent. The larger number of specimens collected across all the lower length classes (Figure 3) during 2016 and 2017 may indicate that a RSD_{10} of 34.5, averaged from 2016 and 2017 results, is more realistic for white crappie for this reservoir.



For all length classes that show "0", no fish were collected within that length class.

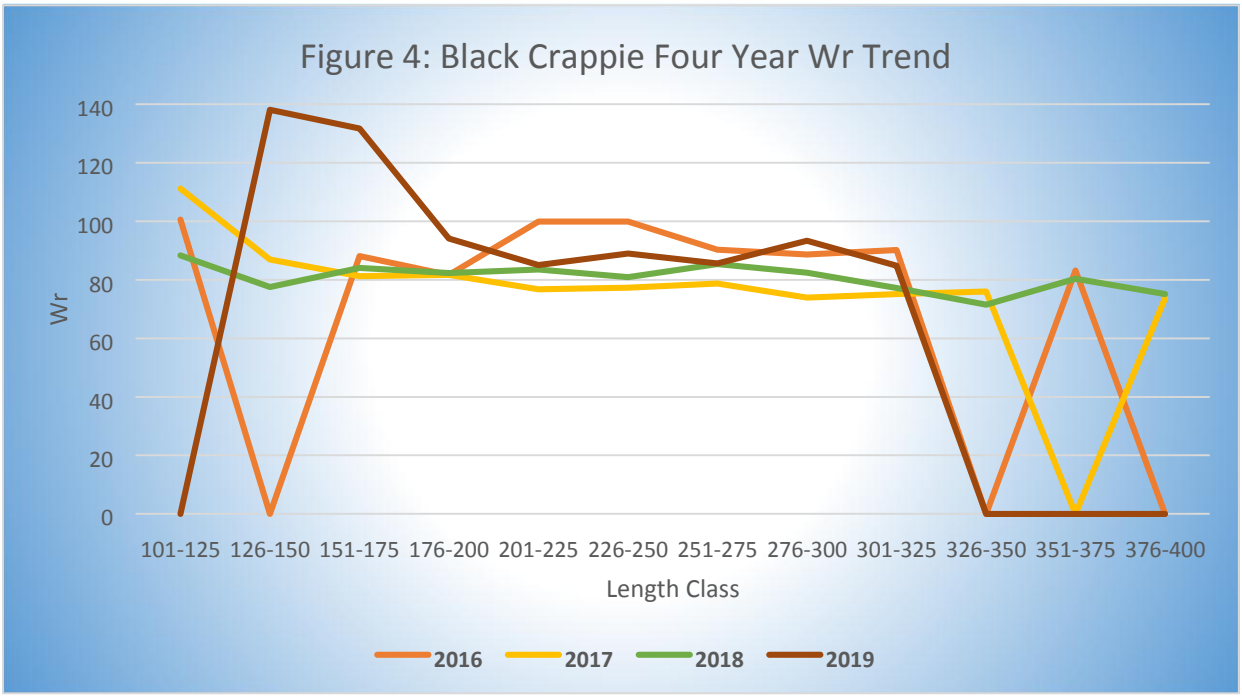
The variable data was the result of limited numbers of fish collected, only 36 compared to 296 from 2016 and 2018 respectively. Weather conditions had a negative impact on our ability to collect fish. The Wr for black crappie was variable with values ranging from 73.91 to 138.20 (Figure 4).

Table 2. Black Crappie Trap Net Summary of Statistics

Year	2016	2017	2018	2019
Net Nights	53	49	32	37
N	36	238	296	80
Mean Length (mm)	236	209.1	223.1	218.4
Mean Weight (g)	262.4	143.3	166	140.8
CPUE	0.028	0.015	0.019	0.026
PSD	26	56	65	63
PSD-P	87	20	18	19

PSD values were fairly consistent despite the high variability in the numbers of fish collected during the 2016 through 2019 sampling years with exception of 2016. This is more

than likely due to the limited number of specimens sampled within the “quality” length class. PSD-P for 254 mm (10 inch) black crappie was inconsistent (18 in 2018 to 87 in 2016). The larger number of specimens collected across all length classes during 2017 and 2018 may indicate that a PSD-P of 19 is more realistic for this reservoir.



For all length classes that show “0”, no fish were collected within that length class.

Catch-per-unit-effort (CPUE) analysis, defined as “the number or weight of fish captured within a defined unit of sampling or fishing effort”, is summarized in Table 1 and 2 for white and black crappie respectively. The 2016 sampling experienced the greatest CPUE’s for white crappie with a value of 0.057 fish per hour while the CPUE for black crappie was 0.028 also during 2016. The lowest CPUE for white crappie was during the 2018 sampling season with a value of 0.004 fish per hour. The lowest CPUE for black crappie was during the 2017 sampling season with a value of 0.015 fish per hour.

Gill Netting

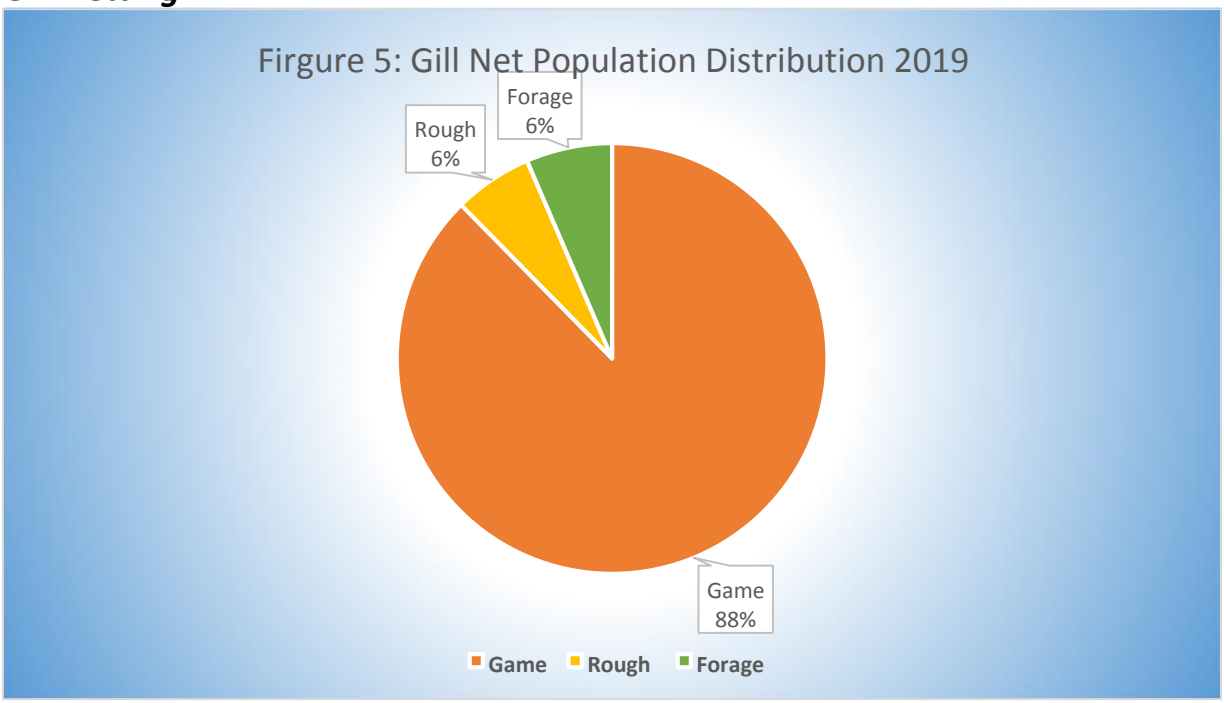


Figure 5 shows the breakdown of game, rough and forage fish for 2019. A total of 170 fishes were sampled this year during the gill netting season.

Boat Electro-shocking:

In the spring of 2015 Lake Fort Smith was reassigned to the northwest Arkansas district of the Arkansas Game and Fish Commission. At that time we started to conduct our electrofishing activities during the fall season to avoid the temperature extremes and the high turbidities associated with the spring sampling season. 2019 was the wettest year on record for the state of Arkansas and as such conditions were unfavorable for Boat Electroshocking to be conducted. High turbidity was the main factor in the inability to conduct this sampling method as fish are easily overlooked in cloudy, murky water

Walleye:

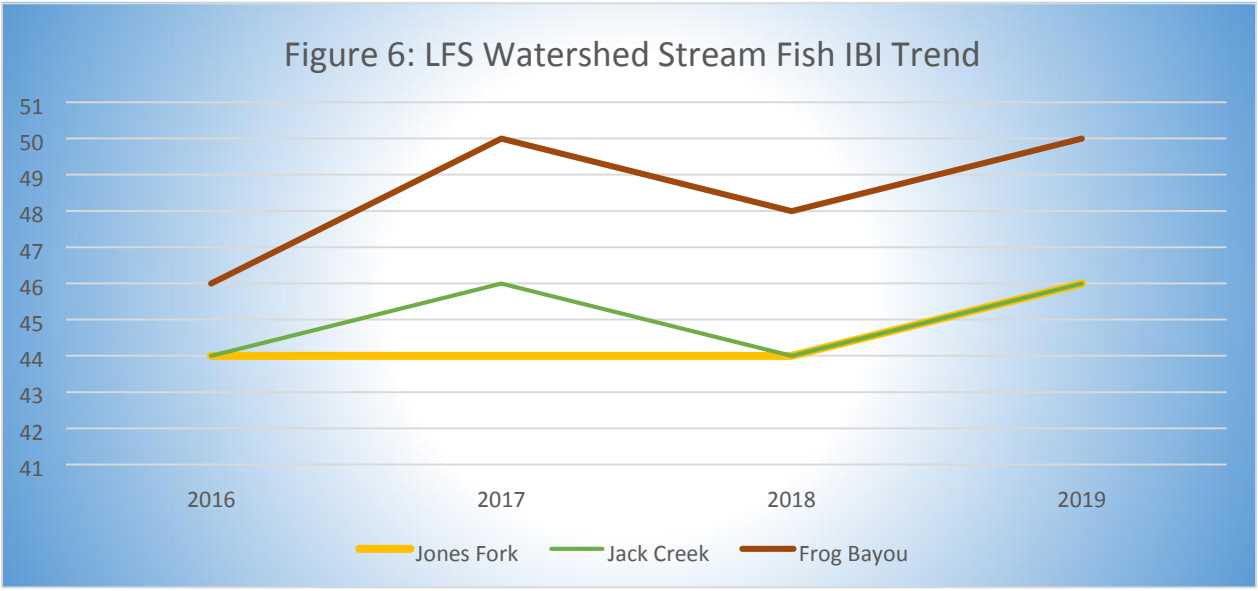
Walleye *(Stizostedion vitreum*) were first stocked in Lake Fort Smith in June of 2013. 9600 fingerlings were stocked the first year with 9600 stocked again in 2014 and 2015. 2800 fingerlings were stocked during 2016 and 2017. A total of 15,500 were stocked in 2018. A total of 9000 were stocked in 2019. Each year, in cooperation with Arkansas Game and Fish Commission personnel, a population survey is conducted on Lake Fort Smith. During this year's survey five (5) walleye were collected. They ranged in length from 305mm to 506mm. The average Wr was 83.19. Table 3 details the total Walleye caught starting in 2016 to current day. Only 17 Walleye have been caught during this time frame. This figure is intended to track not only the relative weight of these fish but also the dates these fish were acquired to better understand the growing population within the reservoir.

Table 3. Walleye Wr Tracking

Year	2016	2017	2018	2019
N	3	4	5	4
Mean Length (mm)	339.3	403.5	496.4	439.25
Mean Weight (g)	349.3	629.5	1248.8	848.75
Mean Wr	83.39	85.52	93.91	83.19

Backpack Electroshocking:

The stream fish Index of Biotic Integrity ranged from a low of 44 on Jones Creek and Jack Creek in 2016 to a high of 50 on Frog Bayou in 2017 and 2019 (Figure 6). A complete list of the fish species collected is shown in Appendix A. From 2016-2019, stream IBI scores remained relatively unchanged indicating stable stream health.



Surber Net:

The stream macroinvertebrate IBI values ranged from a low of 14 on Jones Fork in 2017 and 2018 to a high of 20 (max IBI score) for all three creeks at varying years (Table 4). The lack of values for any given creek is due to no samples being collected during that time frame. High water levels prevented sample collection. No samples were collected during the first quarter of 2017 due to no flow conditions on all of the streams.

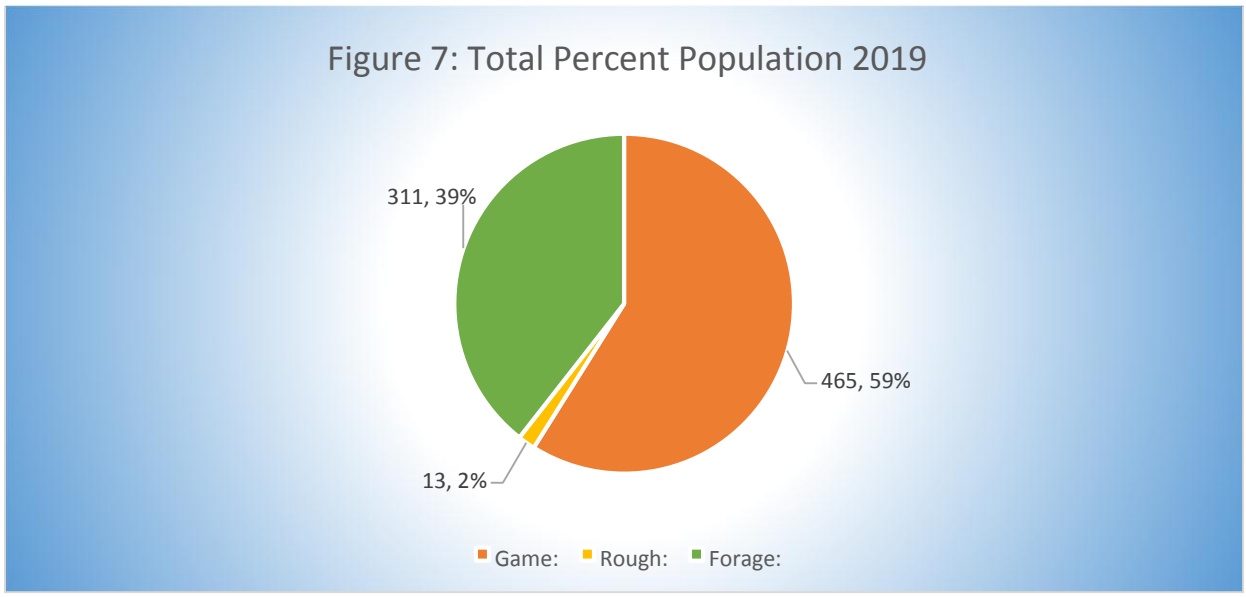
Table 4: Lake Fort Smith Basin IBI Scoring

Year	2016	2017	2018	2019
Creek				
Jack Creek	20	na	20	20
Jones Fork	20	na	14	18
Frog Bayou	16	na	16	20
Year	2016	2017	2018	2019
Creek				
Jack Creek	20	20	20	16
Jones Fork	na	14	20	14
Frog Bayou	na	16	18	16

Top values represent first quarter sampling, bottom represent second quarter

Reservoir Population Distribution:

The total fish population distribution is broken down into three primary groups of fish. Each with a different function within the ecosystem. The forage fish, which are insectivores and herbivores, are those that are primarily used as a source of food by the predators. The predators, which consume the forage fish, are referred to as the game fish. The last group, rough fish, are primarily made up of the suckers, carp, drum, gar and buffalo fish. Rough fish are typically not sought after by anglers and are typically not stocked. The forage fish made up 39% of the total population of the fish collected in 2019, while the predators comprised 59% of the population. The rough fish made up the remaining 2% of the total population (Figure 7).

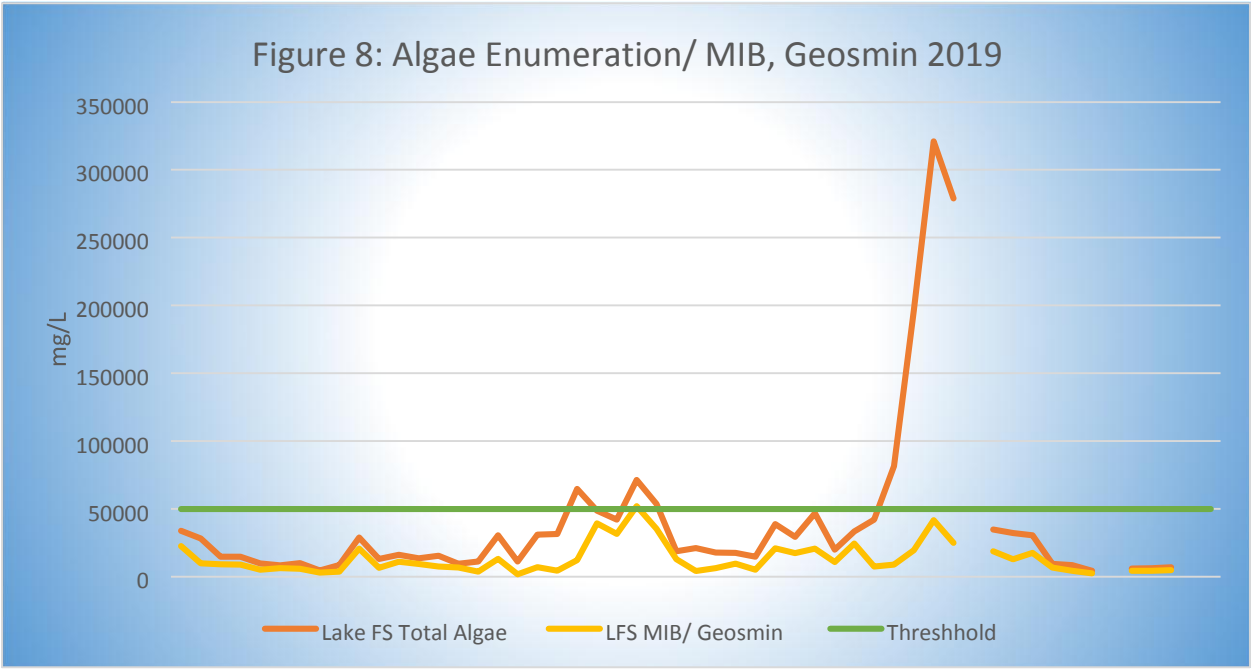


Algae Enumeration:

Algae populations are dependent upon the amount of sunlight they receive and amount of nutrients that are available to them for photosynthesis. Different types of algae have different requirements in order for them to be at their most productive and will fill niches the dying algae leave vacant. With that in mind, the algae populations in Lake Fort Smith vary in (Figure 11) varieties and population numbers with the seasonal changes as well as the amount of nutrients that are available. The nutrient levels (nitrogen and phosphorous) are dependent upon the size and intensity of storm events that occur within the watershed.

The percentage of the algae population that are responsible for MIB and Geosmin also varies with seasonal changes and storm events. The exception to this is the re-suspension of nutrients due to turn over events that occur within the lake. This occurs during November

through January (Figure 8) when the lake experiences rapid turnover events and re-suspends sediments and nutrients that were brought into the system during the spring storm events.



Water Quality:

The phosphorous levels in Lake Fort Smith (Figure 9) mirror the size and intensity of storm events that occurred within the watershed. Of course there is a lag time between the peak of the storm event and a peak in phosphorous levels recorded in the lake. This lag time is due to the amount of time it takes for the storm water to be completely dispersed across the entire body of water. This set of circumstances also occurs with the nitrogen concentrations that enter the lake (Figure 11.).

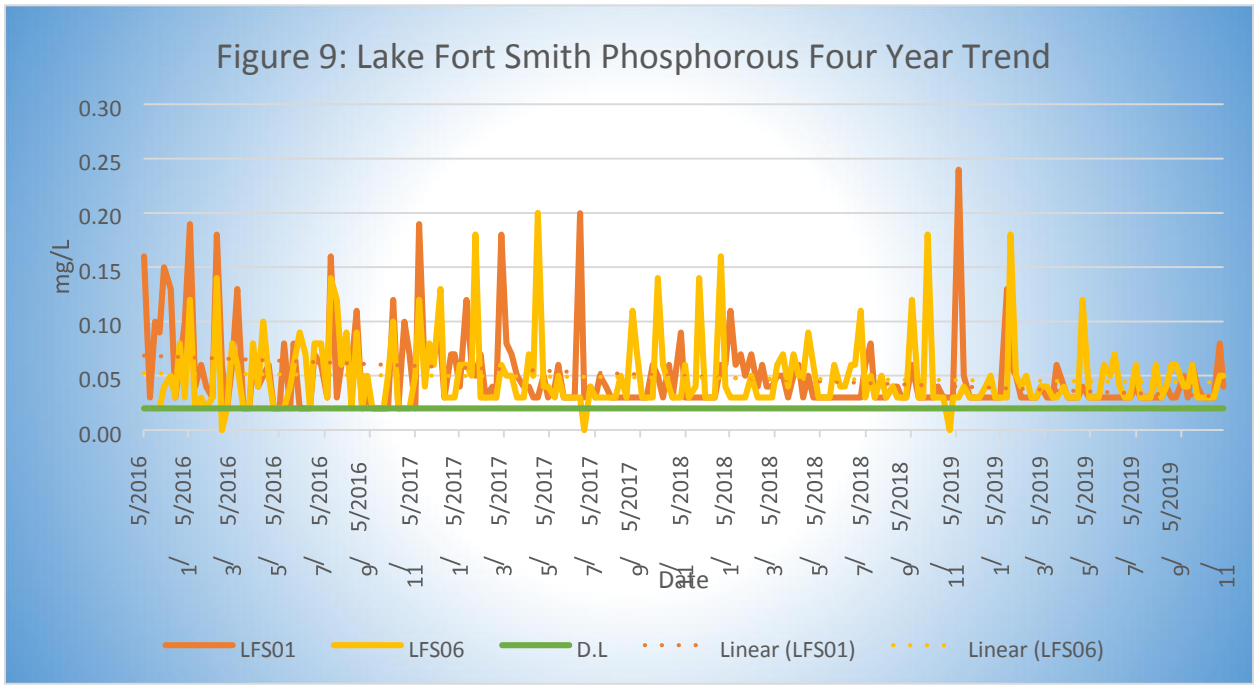


Figure 9: Lake Fort Smith Phosphorous Four Year Trend
0.30
0.25
0.20
0.15
0.10
0.05
0.00
mg/L
5/2016
5/2017
5/2018
5/2019
Date
LFS01
LFS06
D.L
Linear (LFS01)
Linear (LFS06)

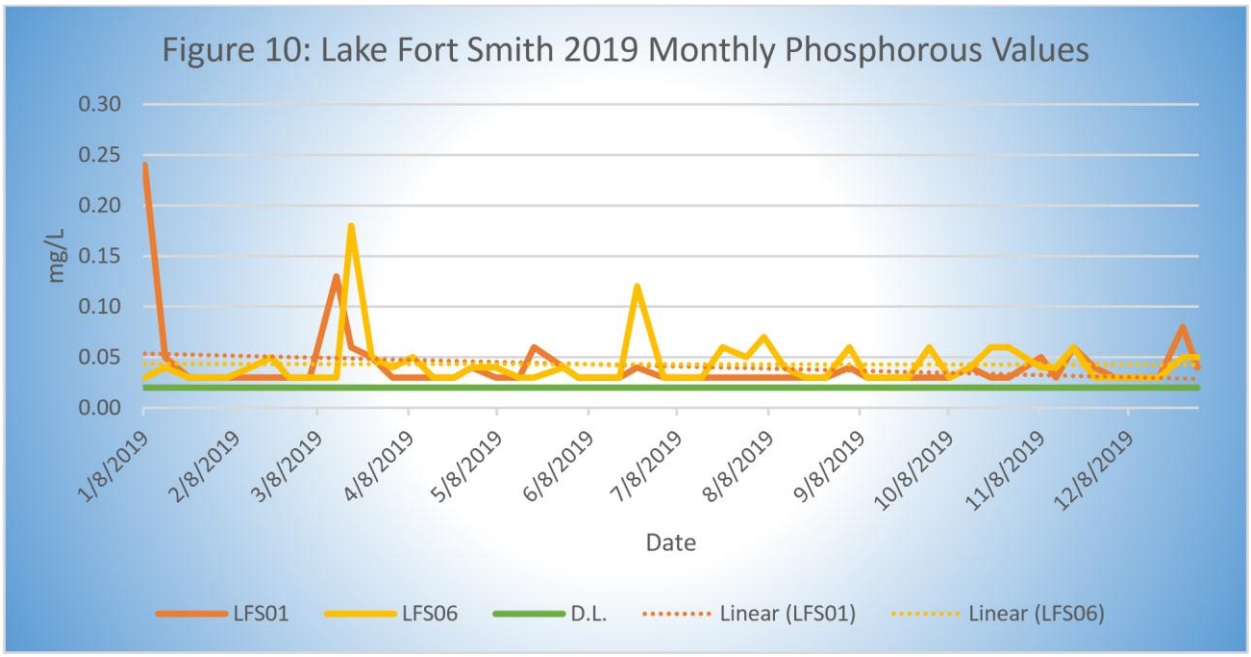
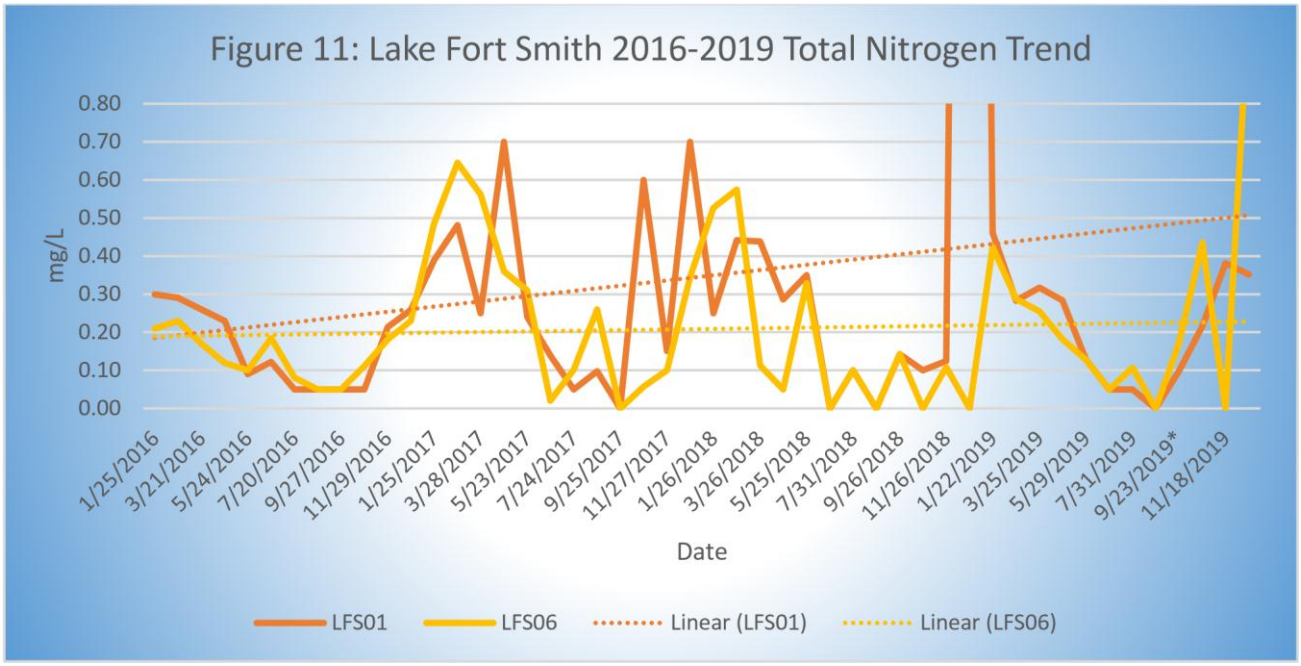
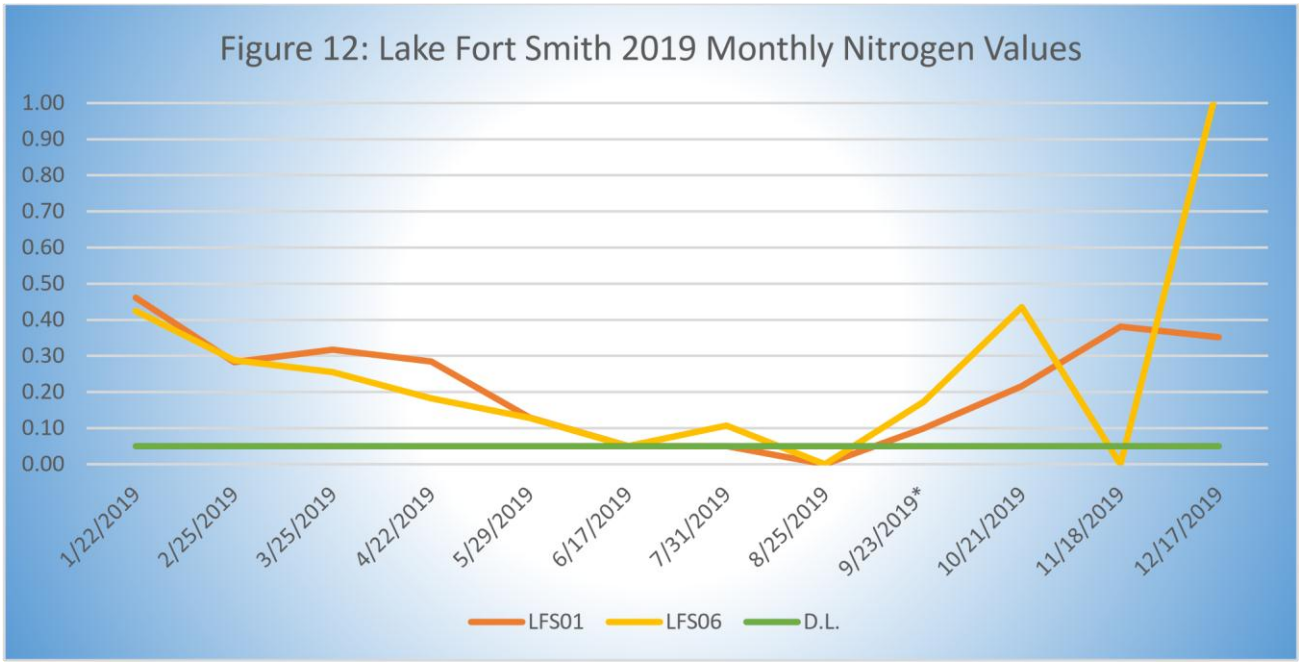


Figure 10: Lake Fort Smith 2019 Monthly Phosphorous Values
0.30
0.25
0.20
0.15
0.10
0.05
0.00
mg/L
1/8/2019
2/8/2019
3/8/2019
4/8/2019
5/8/2019
6/8/2019
7/8/2019
8/8/2019
9/8/2019
10/8/2019
11/8/2019
12/8/2019
Date
LFS01
LFS06
D.L.
Linear (LFS01)
Linear (LFS06)



Nitrogen value for 12/26/2018 had a spike to 6.005 mg/L and on 12/17/2019 had a spike of 1.059 mg/L. This is uncharacteristic as average nitrogen values for Lake Fort Smith Reservoir are around 0.26 mg/L. As such, these drastic outlier altered the trend line extensively. At site LFS01, pasture runoff could be influencing these nitrogen loading rates due to excessively high rainfall for each year.



All other “0” values were for those below detection limits.

The nitrogen concentrations will be slightly elevated over the stream concentrations due to atmospheric deposition that occurs naturally.

CONCLUSION:

Overall the reservoir fisheries population is stable. The game fish base makes up the majority of the fisheries population but is more than likely skewed. The lack of boat electroshocking data took out a significant portion of information; that would have made the reservoir population distribution more precise. There is fairly stable growth rates and recruitment rates for the predator population. The stream fish IBI on all three (3) tributaries is within the fair to good water quality. The stream macroinvertebrate IBI on all three (3) tributaries is good to excellent. The overall water quality of Lake Fort Smith can be classified as mesotrophic. The mesotrophic classification takes into account the nitrogen, phosphorous, and chlorophyll α levels encountered during the entire year. This designation takes into account the seasonal variables and storm events that can impact water quality within the reservoir. Lake Fort Smith had an exciting development with sexually mature male and female walleye being collected in the past three (3) years (2017, 2018 and 2019). Walleye are very temperamental, deep water fish that are highly desirable to anglers and reflect positively on the overall health of the reservoir. If allowed by clear, debris free water, larval walleye sampling next spring would be preferable to ensure there is actual reproduction taking place. With the addition of the Walleye Wr tracking chart comes hope that the population will become self-sustaining within the next few years.

Appendix A

Lake Fort Smith Stream Fish Species List

Family	Genus	Species	Common Name	2016	2017	2018	2019
Atherinidae	Labidesthes	sicculus	Brook Silverside				✓
Catostomidae	Moxostoma	duquesnei	Black Redhorse		✓	✓	✓
Catostomidae	Moxostoma	erythrurum	Golden Redhorse	✓	✓	✓	
Catostomidae	Hypentelium	nigricans	Northern Hog Sucker	✓	✓	✓	✓
Centrarchidae	Lepomis	megalotis	Longear Sunfish	✓	✓	✓	✓
Centrarchidae	Lepomis	cyanellus	Green Sunfish	✓	✓	✓	✓
Centrarchidae	Lepomis	macrochirus	Bluegill	✓	✓	✓	✓
Centrarchidae	Micropterus	dolomieu	Smallmouth Bass	✓	✓	✓	✓
Centrarchidae	Micropterus	punctulatus	Spotted bass	✓	✓	✓	✓
Centrarchidae	Lepomis	gulosus	Warmouth			✓	
Cyprinidae	Cyprinus	carpio	Common Carp		✓		
Cyprinidae	Notropis	greenei	Wedgespot	✓	✓		✓
Cyprinidae	Campostoma	anomalum	Central Stoneroller				
Cyprinidae	Campostoma	spadiceum	Highland Stoneroller	✓	✓	✓	✓
Cyprinidae	Luxilus	cardinalis	Cardinal Shiner				
Cyprinidae	Pimephales	notatus	Bluntnose Minnow	✓	✓	✓	✓
Cyprinidae	Pimephales	vigilax	Bullhead Minnow	✓	✓	✓	
Cyprinidae	Notropis	atherinoides	Emerald Shiner	✓	✓	✓	
Cyprinidae	Notropis	boops	Bigeye Shiner		✓		✓
Cyprinidae	Notemigonus	crysoleucas	Golden Shiner				
Cyprinidae	Semotilus	atromaculatus	Creek Chub	✓	✓	✓	✓
Cyprinidae	Notropis	whipplei	Steelcolor Shiner				
Cyprinidae	Notropis	nubilus	Ozark Minnow	✓	✓	✓	✓
Fundulidae	Fundulus	catenatus	Northern Studfish				
Fundulidae	Fundulus	notatus	Blackspotted Topminnow	✓	✓	✓	✓
Ictaluridae	Noturus	exilis	Slender Madtom	✓	✓	✓	✓
Ictaluridae	Ameiurus	natalis	Yellow Bullhead	✓	✓	✓	✓
Percidae	Etheostoma	blennioides	Greenside Darter	✓	✓	✓	✓
Percidae	Etheostoma	flabellare	Fantail Darter	✓	✓	✓	✓
Percidae	Etheostoma	spectabile	Orangethroat Darter	✓	✓	✓	✓
Percidae	Etheostoma	punctulatum	Stippled/Sunburst Darter	✓	✓	✓	✓
Percidae	Etheostoma	whipplei	Redfin Darter	✓	✓	✓	✓
Percidae	Etheostoma	zonale	Banded Darter			✓	✓
Percidae	Percina	caprodes	Logperch	✓	✓	✓	✓

Poeciliidae	Gambusia	affinis	Mosquito fish	✓		✓	
Percidae	Percina	copelandi	Channel Darter				✓

Appendix B

Lake Fort Smith Reservoir Species List

Family	Genus	Species	Common Name	2016	2017	2018	2019
Atherinidae	Labidesthes	sicculus	Brook Silverside	✓	✓	✓	
Catostomidae	Hypentelium	nigricans	Northern Hogsucker	✓	✓	✓	✓
Catostomidae	Minytrema	melanops	Spotted Sucker				
Catostomidae	Moxostoma	erythrurum	Golden Redhorse	✓	✓	✓	✓
Catostomidae	Moxostoma	carinatum	River Redhorse	✓	✓		✓
Catostomidae	Moxostoma	duquesnei	Black Redhorse			✓	✓
Centrarchidae	Micropterus	salmoides	Largemouth Bass	✓	✓	✓	✓
Centrarchidae	Micropterus	punctulatus	Spotted Bass	✓	✓	✓	
Centrarchidae	Lepomis	macrochirus	Bluegill	✓	✓	✓	✓
Centrarchidae	Lepomis	microlophus	Redear Sunfish	✓	✓	✓	✓
Centrarchidae	Lepomis	cyanellus	Green Sunfish	✓	✓	✓	✓
Centrarchidae	Lepomis	gulosus	Warmouth	✓	✓	✓	✓
Centrarchidae	Lepomis	megalotis	Longear Sunfish	✓	✓	✓	✓
Centrarchidae	Pomoxis	annularis	White Crappie	✓	✓	✓	✓
Centrarchidae	Pomoxis	nigromaculatus	Black Crappie	✓	✓	✓	✓
Clupeidae	Dorosoma	cepedianum	Gizzard Shad	✓	✓	✓	✓
Cyprinidae	Cyprinus	carpio	Common Carp	✓	✓	✓	
Cyprinidae	Campostoma	spadiceum	Highland Stoneroller			✓	
Ictaluridae	Ameiurus	natalis	Yellow Bullhead	✓		✓	
Ictaluridae	Ictalurus	punctatus	Channel Catfish	✓	✓	✓	✓
Ictaluridae	Ictalurus	furcatus	Blue Catfish	✓	✓		
Ictaluridae	Pylodictis	olivaris	Flathead Catfish	✓	✓	✓	✓
Lepisosteidae	Lepisosteus	oculatus	Spotted Gar				

Lepisosteidae	Lepisosteus	osseus	Longnose Gar	✓	✓	✓	✓
Moronidae	Morone	chrysops	White Bass	✓	✓	✓	✓
Percidae	Percina	caprodes	Logperch	✓	✓		
Percidae	Stizostedion	vitreum	Walleye	✓	✓	✓	✓
Petromyzontidae	Ichthyomyzon	castaneus	Chestnut Lamprey		✓		