LEE CREEK

ANNUAL RESERVOIR/WATERSHED REPORT 2020

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INTRODUCTION

The Fort Smith Utilities, Environmental Quality section conducts annual fisheries and water quality assessments on both surface water reservoirs and their watersheds. The reservoirs are used to supply raw water to the city's two (2) drinking water treatment facilities. Changes in fish, algae and macro-invertebrate population and community structure can reflect shifts in water quality. Monitoring the overall fisheries and water quality 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. Combinations of active and passive sampling techniques are used to evaluate reservoir/stream fish populations, through the generation of specific indices. Aquatic macro-invertebrate populations are evaluated by the generation of specific indices. Indices are evaluated using trend analysis to follow changes in structure, abundance and condition of target fish and macro-invertebrate populations. Algae assessments are done weekly to monitor algal blooms that may affect taste and odor of water produced. The degree of monitoring effort varies annually and is typically a function of weather and water conditions.

SITE SELECTION

Passive Sampling

Due to reservoir's physical characteristics, site selection for passive collection techniques was difficult at best. Lee Creek Reservoir covers approximately 634 acres and has an average depth of eight (8) feet. The 439 square mile watershed delivers extremely high flows to the reservoir during storm events, resulting in large quantities of woody material being washed in and deposited along the reservoir littoral zone. Mats of woody material are often formed after storm events and drift with prevailing winds. The extreme fluctuations in water level, flow and the introduction of woody material hinder the deployment and operation of passive sampling techniques, including trap netting, experimental gill netting and trammel netting. For this reason, a random sampling approach could not be used for site selection. Trap netting sites were selected for their ease of deployment and reduced surface and sub-surface debris that tend to entangle nets and therefore reduce netting efficiency. Two (2) sites are located on the East side and two (2) on the West side of the reservoir. This increases the ability to monitor fish movement during various diel cycles.

One (1) gill and one (1) trammel net site were selected for Lee Creek Reservoir. These two (2) sites are on the West side of the reservoir and were also selected for their ease of deployment and reduced surface and sub-surface debris that tend to entangle nets and therefore reduce netting efficiency. Both nets are set across the primary channel of Lee Creek, thus reducing some bias from their relatively close proximity to one another and their placement only on the West side of the reservoir. Historic data suggests abundant fish movement within the channel, thus ensuring collections that reflect current fishery conditions.

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 (AGFC). 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 shoreline. 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 fisheries study. Catch-per-unit-effort (CPUE), 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 nets are constructed of two (2) 3X6 foot, 5/16 inch diameter steel frames, with center bracing, set 2.5 feet apart. The second 3x6 foot frame has a slit throat. Netting material consists of ½ inch square, No. 150 knotless netset treated nylon. Four (4) 2.5-foot diameter hoops set 24 inches apart lead to a cod end with a five (5) inch, No. 5 braided drawstring closure. The first hoop has a six (6) inch throat and is set 32 inches from the 3x6 foot frame. The leader is constructed of the same net material, hung 14 meshes per foot on a No. 60 nylon twine and will be 50x3.5 feet. A leader float line is fitted with 2x1.5 inch corks and a sinker line fitted with 1.5-ounce weights. The leader will also be netset treated and connected to the second 3x6 foot frame center base.

Experimental Gill Nets

Experimental gill nets require a relatively flat or gently sloping substrate, and a clean bottom to prevent excessive damage to the monofilament 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 shoreline, stretched taut 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. CPUE, Wr analysis and percent composition of dominant taxa are calculated. For evaluation purposes, target fish species are grouped into 25-millimeter increments.

Trammel Nets

Trammel nets require a relatively flat or gently sloping substrate, and a clean bottom to prevent excessive damage to the monofilament netting. Trammel nets are 91.4 meters in length and have a single mesh size (3 inches). Nets are set perpendicular to the shoreline, stretched taut 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 the 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. CPUE, Wr analysis 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 nighttime 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, fish are identified to species level, 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), and percent composition of dominant taxa are calculated. Relative Stock Density (RSD) is also calculated but has now been changed to PSD-P. 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.

As previously mentioned, a random sampling approach has been adopted to better ensure representative fishery collections. Lee Creek Reservoir is divided into 40, 600-meter sampling sites. A minimum of 14 sites must be electro-shocked, for a period of 10-minutes each, to ensure a random sample. Prior to sampling, sites are selected from a random number generator. Sites not conducive to sampling efforts, due to shallow or extremely deep water, are excluded from the selection and a substitute site is chosen at random. 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. However, sampling must be completed during the same week if possible to reduce the bias of fish movement related to changing water or weather conditions.

Backpack Electro-shocking

Backpack Electroshocking is conducted in streams in the Lee Creek 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 Biotic 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 macro-invertebrates in all the streams in each watershed. Three (3) samples are taken at each site at riffles with enough flow to carry the macro-invertebrates into the surber net. The surber net is 12 inches by 12 inches (1 sq. ft.) and is placed in a spot determined by the sampler to have sufficient cobble and flow. The sampler then rubs each rock to detach the macro-invertebrates clinging to each rock in the one (1) square foot area. After all the rocks are rubbed sufficiently a garden shovel is used to disturb the streambed for any macro-invertebrates that are buried. The net is then emptied into a container and the macroinvertebrates are fixed in 10% formalin for picking at a later date. The macroinvertebrates are then picked, preserved, and sent off to an outside contract laboratory 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) is the best score for each metric and a 20 is 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, at which the algae sample is taken. Samples are collected in a 2.2L PVC Beta Plus water bottle (Wildco Inc.) that is lowered to a depth determined by the secchi disk. One (1) sample is collected on Lee Creek at the L2 site. The samples are then taken to the lab and 100 mL of the sample is measured out and concentrated down to 20 mL, using a 63-µm nominal pore size Wisconsin Plankton Bucket. A one (1) mL sample is then taken and placed into a Sedgwick-Rafter counting chamber slide. 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 that could affect water quality or taste.

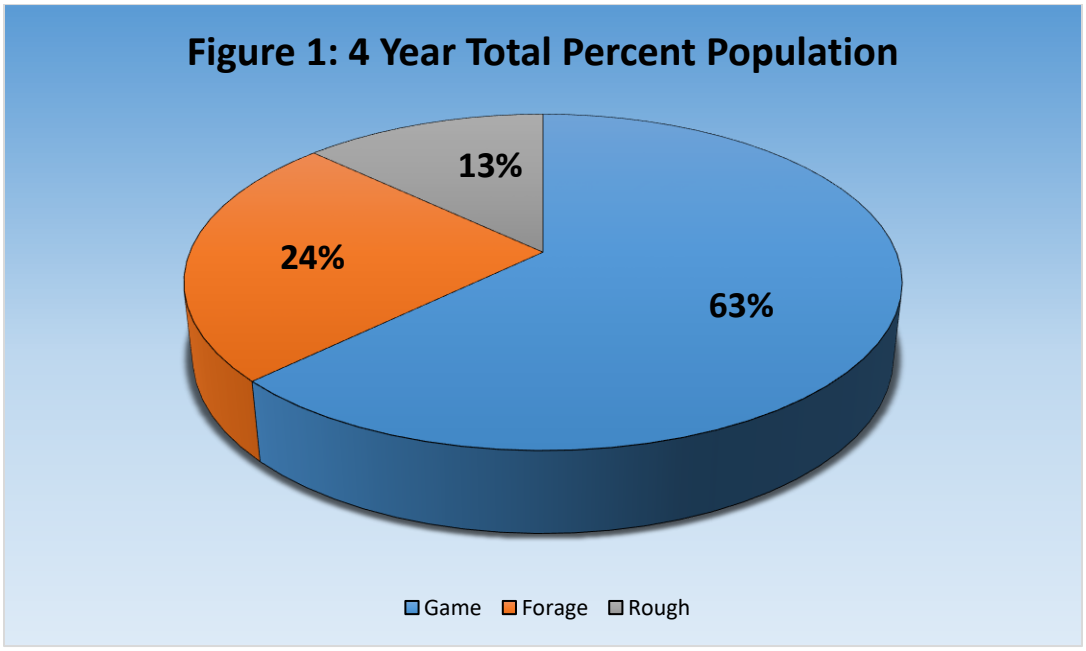
Water Quality

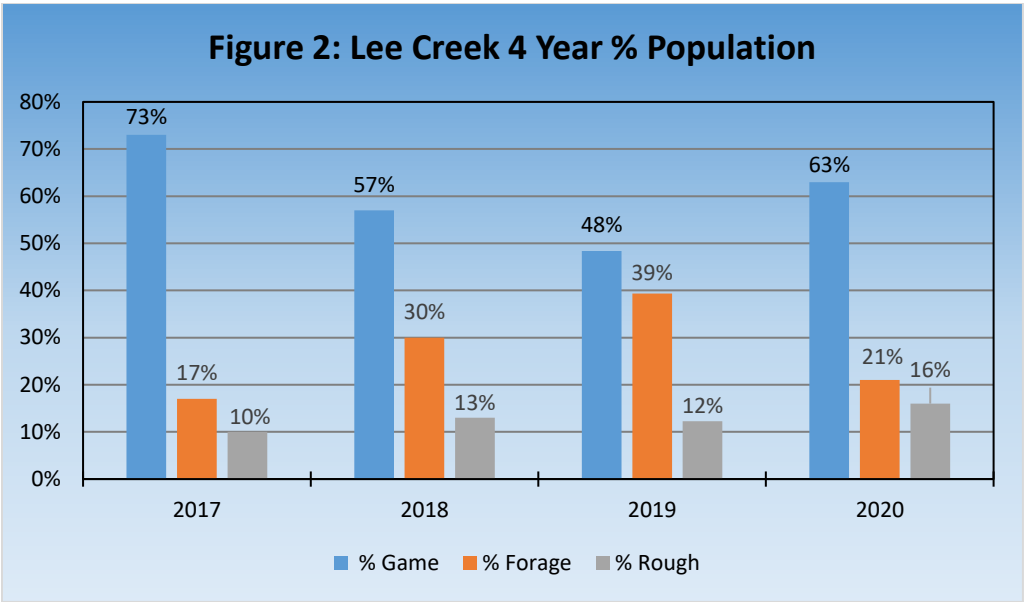
Phosphorous, nitrogen, and chlorophyll-α are three (3) water quality indicators tested by the City of Fort Smith. Phosphorous samples are obtained by a surface grab at five (5) pre-determined sites that extend the length of the reservoir. Nitrogen sampling is done on a monthly basis at two (2) sites on both reservoirs. One sample is taken at the site nearest the intake structure (L2) while the other sample is taken at the site that is at the uppermost part of the reservoir (O). Chlorophyll-α is taken at the site nearest the intake structure and two (2) samples are taken. 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 primary productivity and can give you an insight into the reservoirs trophic status.

RESULTS

Total Percent Population

A total of 20 species of fish were collected on Lee Creek Reservoir during this four (4) year sample period. Game fish included two (2) species of bass, two (2) species of crappie and (3) species of catfish. Game fish made up 63% of the population sampled over the four (4) years, varying yearly from 48% to 73%. Forage fish made up 24% of the population over four years. This number is a little low but relative weights (Wr) of game fish do not indicate a lack of forage making sampling bias a more likely reason for low percentages seen. The rough fish population looks steady at 13% of the population when comparing years in figure 2.





Trap Nets

Trap net sampling was different this year compared to years past. Sampling in spring, March 3-26, 2020, and in the fall, October 22-November 6, 2020, was done to compare relative weights (Wr) of white crappie (*Pomoxis annularis)* and to see how/if spawn significantly affected Wr in the population. A more diverse sample of length classes was another reason for the fall sample. Black crappie (*Pomoxis nigromaculatus*) were sampled but only seven (7) individuals were caught. That data has been omitted because the number (N) of individuals is too low to perform any meaningful statistical analysis. Table 2 shows the 2020 sampling data split by season and totaled together. Table 1 only includes the spring sample data to ensure accurate comparisons to previous years that only include spring sampling.

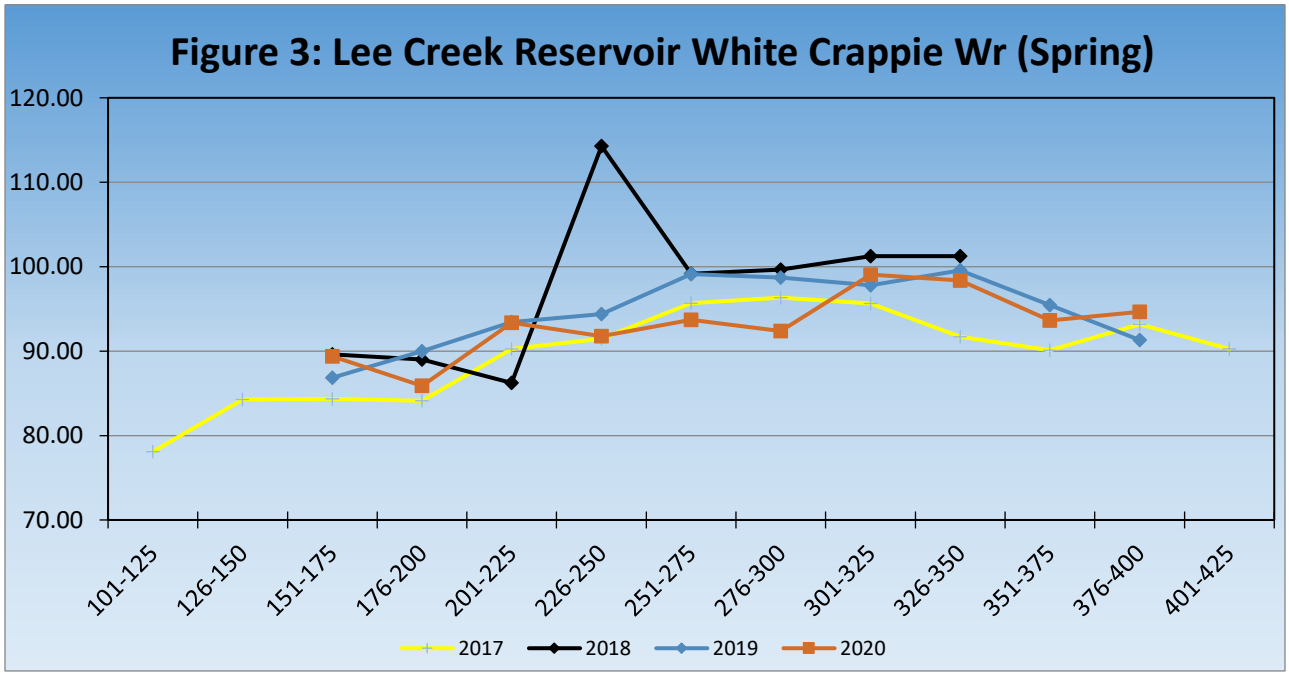
Wr values from 95-105 are desired as the range for a balanced fisheries population. The average Wr of white crappie was 93.96 in spring and 96.69 in fall. This averaged out to a Wr of 95.65 meaning the crappie were in the 95th percentile for the standard length specific weight. The data would suggest the forage base is sufficient for growth and there is not too much competition for food. Figure 3 shows Wr's for four (4) years of spring sampling.

PSD-Q and PSD-P values were calculated for spring, fall, and total this year. PSD-Q, formerly PSD, was at 82.5 in spring, 73.33 in fall and combined for 76.8 in 2020. Recommended PSD-Q for crappie is 30-60. 2020 values are above what is recommended due to a lack of smaller fish (<203mm) and an overabundance of fish >203 mm. PSD-P, or RSD_{10}, went from 73.3 in spring to 27.17 in fall. Combined for 2020 the PSD-P was at 44.8. Recommended PSD-P values are >10. The fall sample is a reasonable PSD-P value where the spring sample at 73.3 is a high value. The high PSD numbers could be due to a dominant age class that is commonly seen in crappie

populations. Another explanation could be sampling site or time of year. The spring sample is conducted around spawn and this could explain the data skewing towards larger fish. The fall sample lends some evidence to this explanation in that more smaller fish were caught bringing values down into more normal recommended ranges.

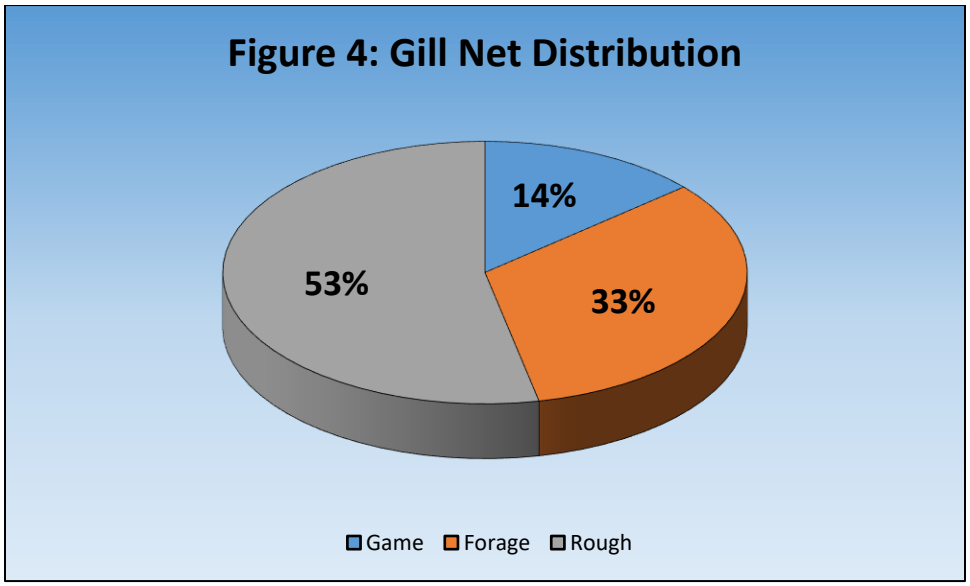
Table 1. Lee Creek Trap Net Data				
	2017	2018	2019	2020
Net Nights	20	20	22	15
N	553	81	138	120
Mean L (mm)	244.8	275.95	294.18	277.29
Mean W (g)	217.53	339.26	408.3	349.23
Mean Wr	91.81	97.71	97.11	93.96
CPUE	1.15	0.344	0.261	0.33
PSD	93	88.9	94	82.5
PSD-P	28	72.8	80.4	73.3

Table 2. Lee Creek 2020 Trap Net Data			
	2020 Spring	2020 Fall	2020 Total
Net Nights	15	5	20
N	120	196	316
Mean L (mm)	277.29	230	248
Mean W (g)	349.23	187.8	249
Mean Wr	93.96	96.69	95.65
CPUE	0.33	1.63	0.66
PSD-Q	82.5	73.33	76.8
PSD-P	73.3	27.17	44.8



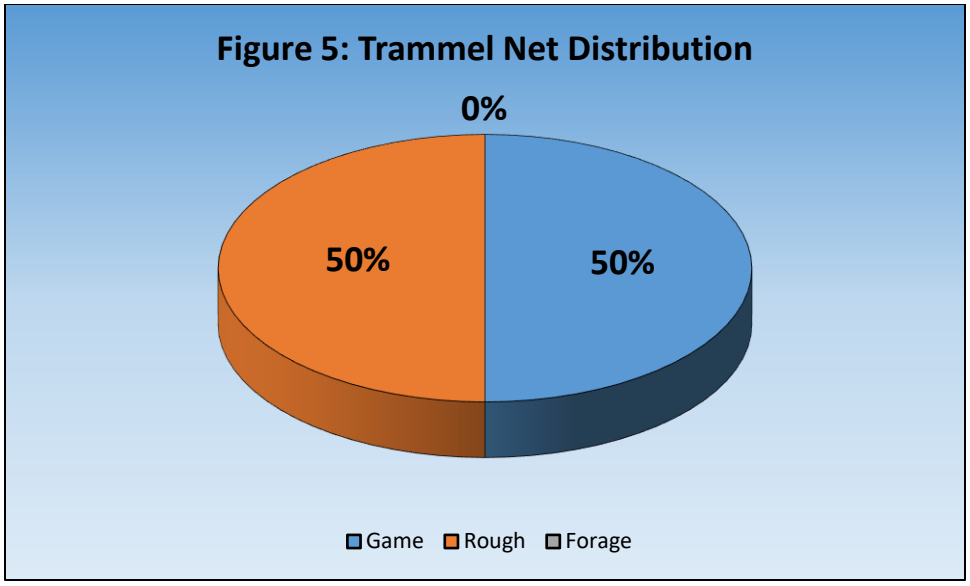
Gill Nets

A gill net was set for six (6) net nights from February 19, 2020 to February 27, 2020. Nineteen (19) white crappie and six (6) channel catfish (*Ictalurus punctatus*) were the majority of game fish sampled. Gizzard shad (*Dorosoma cepedianum*) made up all of the forage fish with 65 netted in the six (6) nights. The rough fish consisted of 104 spotted suckers (*Minytrema melanops*) and one (1) spotted gar (*Lepisosteus oculatus*).



Trammel Nets

Trammel nets were set out for three (3) net nights from February 25-27, 2020. The game fish included five (5) white crappie, three (3) flathead catfish (*Pylodicitis olivaris*), two (2) channel catfish and a single blue catfish (*Ictalurus furcatus*). The only other fish sampled were eight (8) spotted sucker and three (3) common carp (*Cyprinus carpio*).

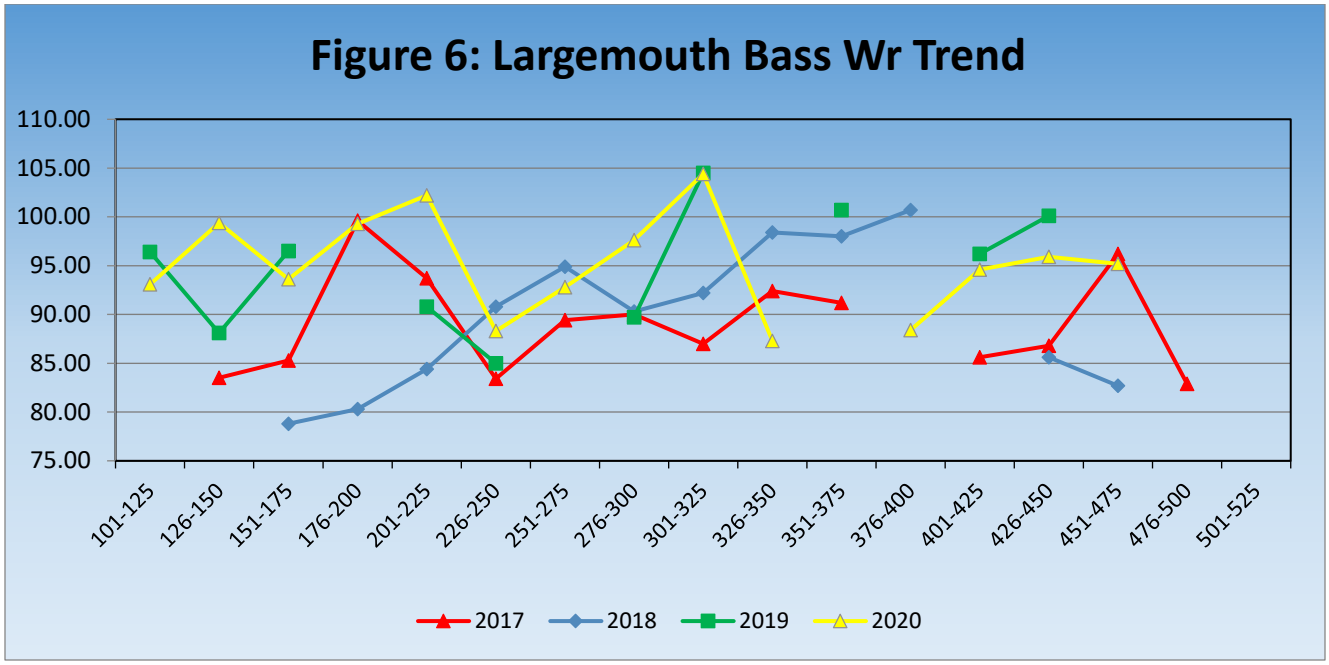


Boat Electro-shocking

Boat electro-shocking was conducted on one night, September 29, 2020. Two-hundred and thirty (230) largemouth bass (*Micropterus salmoides*) were sampled with an average Wr of 96.8. Mean lengths and mean weights were lower than previous years due to a large sampling of smaller bass between 126 to 200mm. These three length classes made up 76% of the fish sampled. The PSD value is lower than the recommended 40-70 due to this large sampling of smaller bass that are smaller than standard stock length bass (203mm). The PSD-P value is right in the middle of the recommended values. This means there was a good proportion of larger fish to smaller fish when considering preferred length bass (381mm).

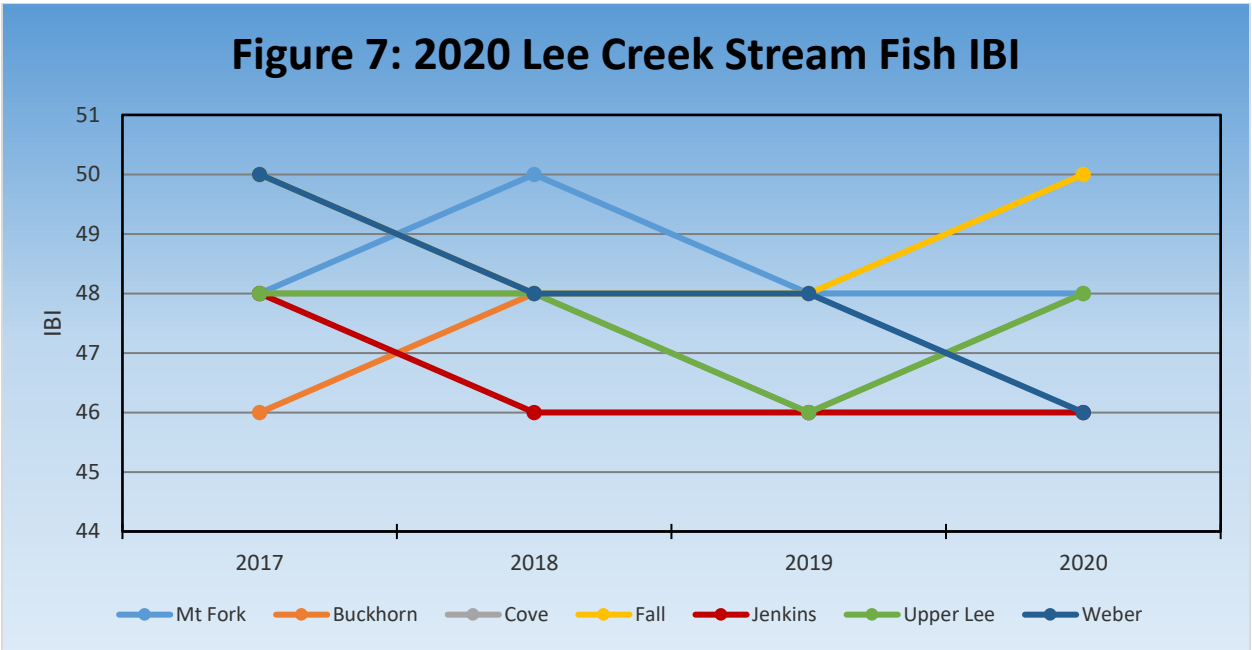
Table 3. Lee Creek Electroshocking Data

	2017	2018	2019	2020
N	43	50	19	230
Mean L	316.5	277.1	244.1	185.4
Mean W	507.4	364.9	348.2	117.26
Mean Wr	89.1	89.7	93.5	96.8
CPUE	18.45	21.46	10.38	98.71
PSD	60.0	33.3	41.7	23.81
PSD-P	25.0	13.3	25	19.05



Backpack Electro-shocking

Backpack electro-shocking was conducted from July 25, 2020 to August 21, 2020. Six sites were sampled this year to obtain IBI scores to gauge the "health" of each stream. Buckhorn was not sampled this year due to weather constraints and the creek drying up. The number of taxa ranged from 14 at Fall to 20 at Jenkins, Weber, and Upper Lee. Weber was the only creek that saw a drop in IBI score this year going from 48 to 46. Three (3) creeks, Fall, Cove, and Upper Lee all had IBI scores that went up by 2 points. Jenkins and Mt. Fork stayed the same from 2019. All creeks were in the good range of IBI scores except for Jenkins and Weber which are between the good and fair ranges.

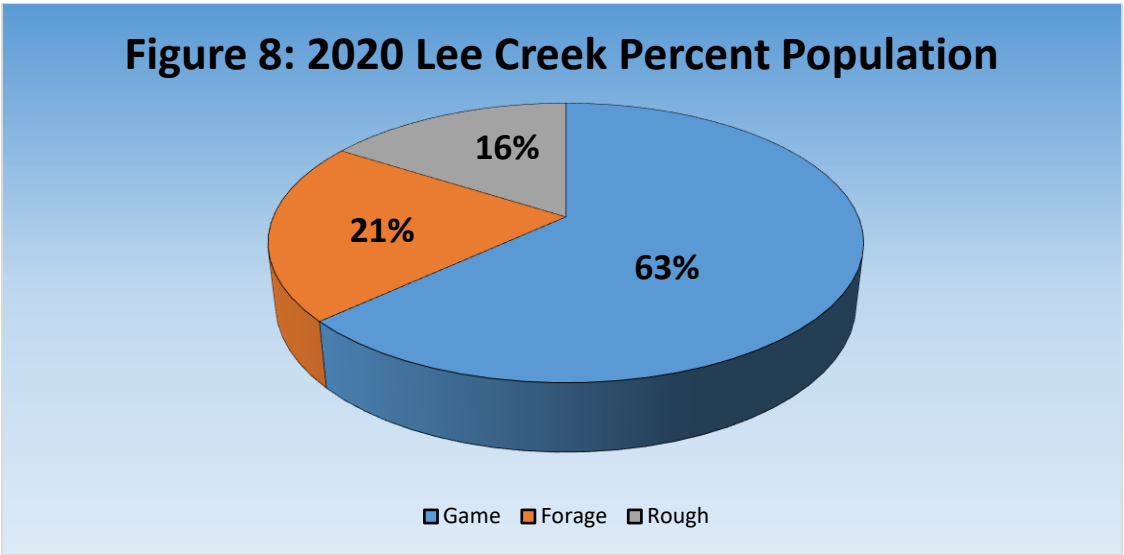


Surber Nets

There is no bug data available for 2020.

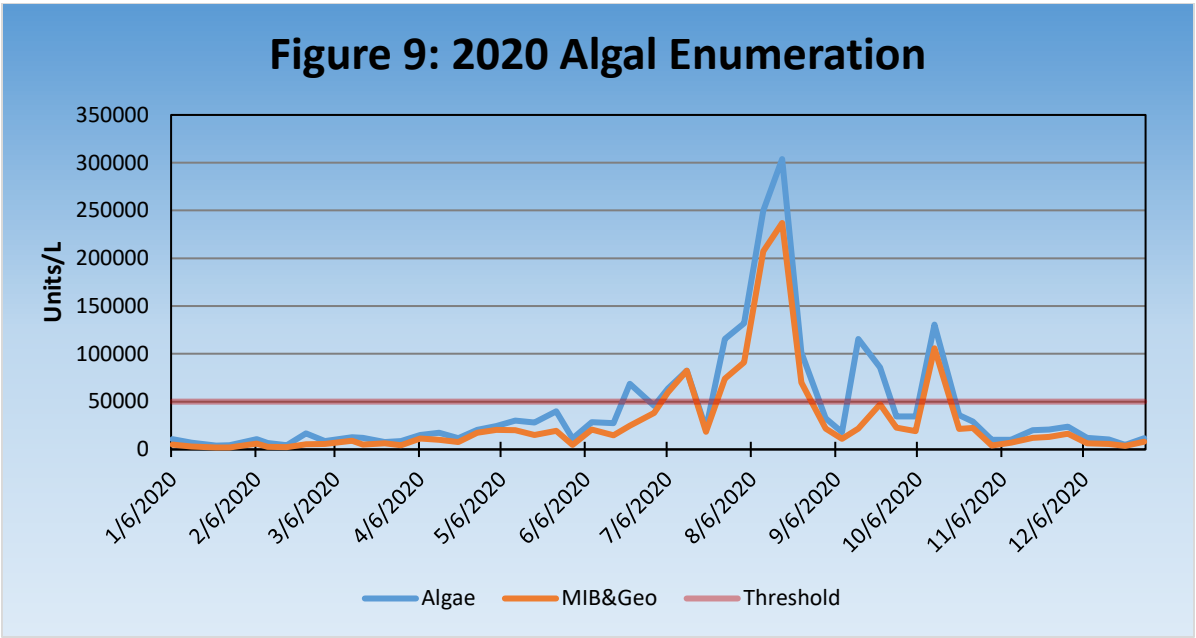
Reservoir Population Distribution

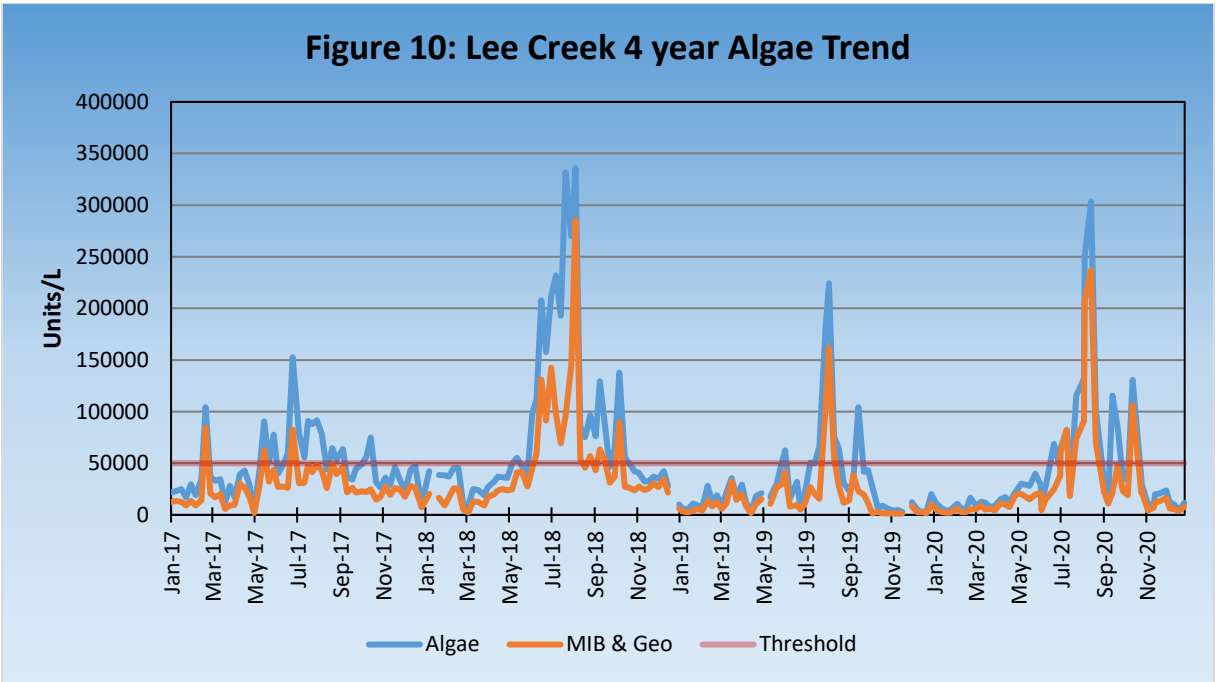
The reservoir population distribution is split into three (3) groups: Game, Forage, and Rough fish. The game fish are most of the predators sought after by anglers e.g. crappie, bass, and catfish. This group made up 63% of the population sampled this year. Forage fish are at the bottom of the food chain and are typically predated on or eaten by the game fish and other predators. Forage fish made up 21% of the fish sampled this year. Forage fish population is important because low forage numbers lead to smaller Wr's for predator fish due to competition and lack of food. Rough fish are the last group not actively sought after by anglers. This group accounted for 16% of the population and are typically the suckers, gar, carp, etc.



Algal Enumeration

Algae counts are conducted on samples collected weekly. The counts are done to determine the percent composition of MIB & Geosmin producing algae, which affect drinking waters taste and odor. The counts are also used to monitor phytoplankton growth especially blue-green algae, which are becoming more of a concern in drinking water reservoirs worldwide. 2020 followed Lee Creeks normal trend of low algae counts until around August-September when growing season peaks and algae tend to grow rapidly and sometimes bloom. The first peak seen on 7/13/2020 was the diatom *Fragilaria spp.* The second peak seen from 7/27/2020-8/24/2020 was predominately two MIB & Geosmin producing genera of algae, the diatom *Fragilaria spp.* and the green *Ankistrodesmus spp.* Two other genera that attributed to the spike were both diatoms *Cyclotella spp.* and *Rhizosolena spp.* The next peak seen around 9/14/2020 was due to a single genus of diatom *Cymbella spp.* This genus is not a taste and odor producer and is a relatively harmless alga. The last peak seen on Lee Creek was 10/12/2020 and was once again due to the diatom *Fragilaria spp.* and the green *Ankistrodesmus spp.* Blue-green algae were present in minute numbers this year and never got close to any levels of concern. Lee Creek is typically low in blue-green algae numbers with the exception of dry years where the lake is more stagnant and not allowed to flush by flowing over the dam.

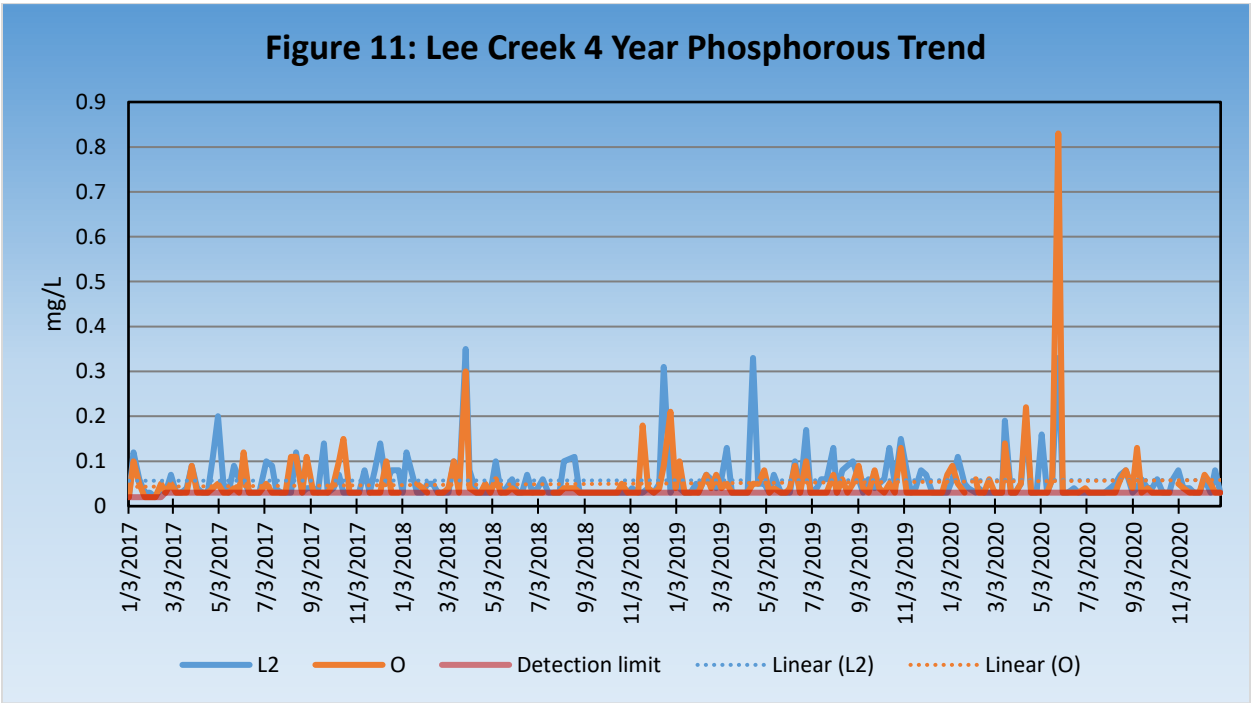


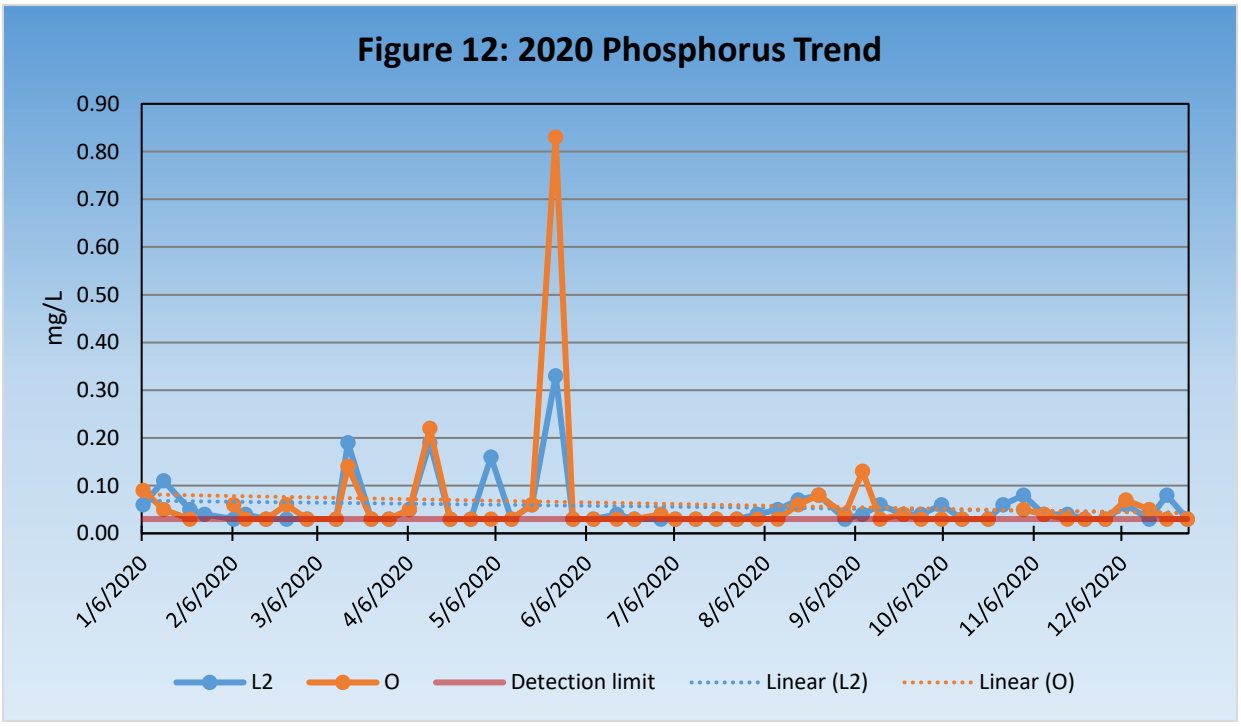


Water Quality

Phosphorous (P) levels at both sites “L2” and “O” show a slight decrease to no change in the trend line over the 4-year sample period (Figure 12). The large spike seen at the end of May is more than likely in relation to a large rain event introducing nutrients into the reservoir. Soil erosion from creek banks due to large rain events with heavy water flow tends to be the main source of P introduction into Lee Creek.

Nitrogen (N) data is stable at both sample sites as seen in Figure 14. “L2” Nitrogen levels showed a slight decrease over the 4-year period while the “O” site levels are trending fairly even over the same period. The 2020 data is broken up but most spikes seen coincide with large rain events where storm run-off deposited nutrients into the reservoir. Most of the Nitrogen entering Lee Creek is from run-off and the atmosphere as there are not many large cattle operations in the basin.





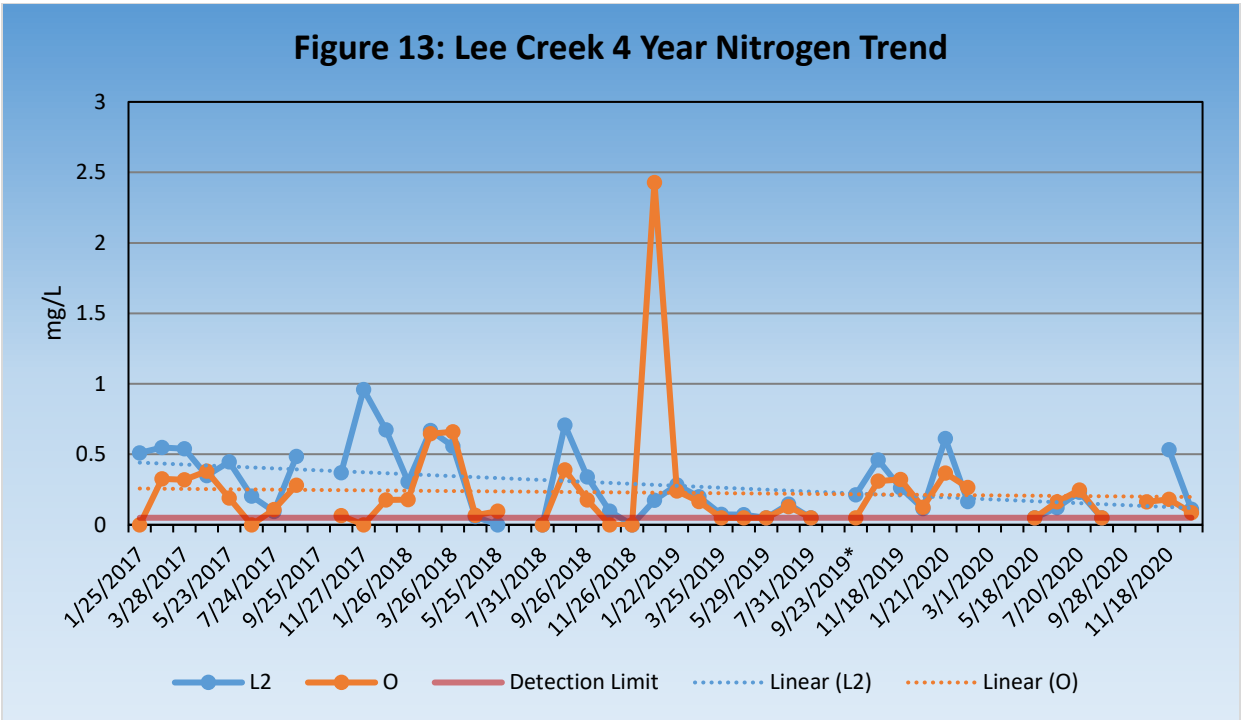


Figure 13: Lee Creek 4 Year Nitrogen Trend
mg/L
3
2.5
2
1.5
1
0.5
0
1/25/2017
3/28/2017
5/23/2017
7/24/2017
9/25/2017
11/27/2017
1/26/2018
3/26/2018
5/25/2018
7/31/2018
9/26/2018
11/26/2018
1/22/2019
3/25/2019
5/29/2019
7/31/2019
9/23/2019*
11/18/2019
1/21/2020
3/1/2020
5/18/2020
7/20/2020
9/28/2020
11/18/2020
L2
O
Detection Limit
Linear (L2)
Linear (O)

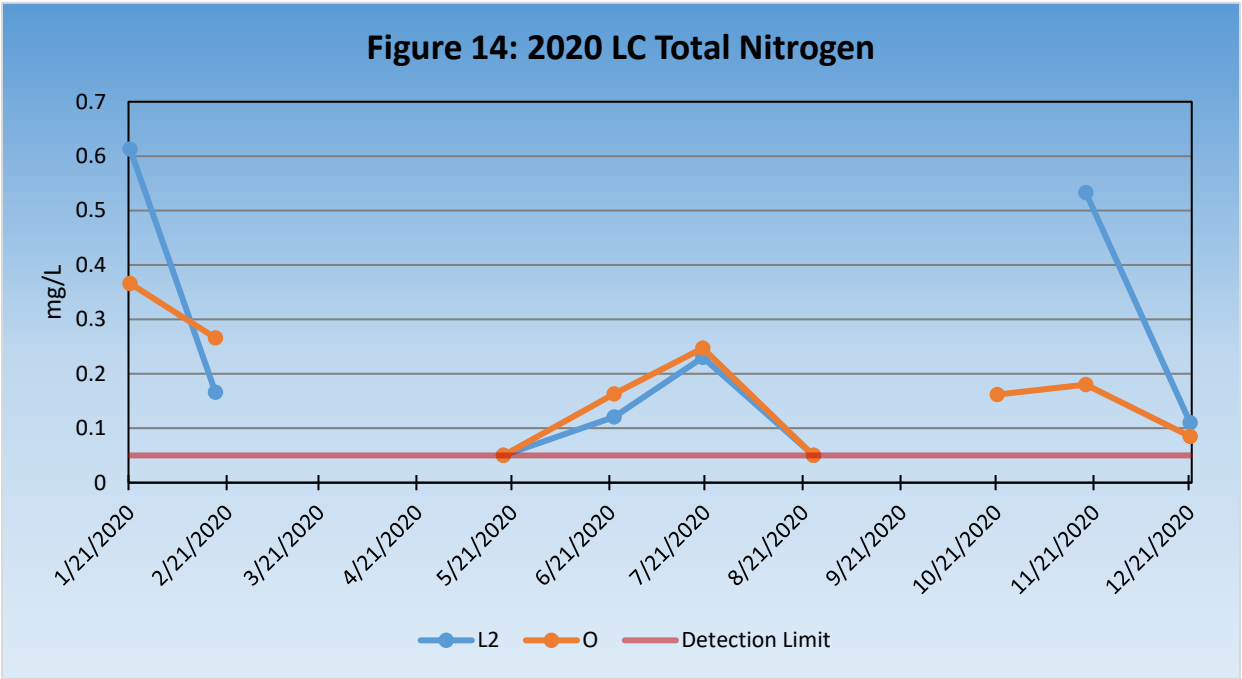


Figure 14: 2020 LC Total Nitrogen
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1/21/2020
2/21/2020
3/21/2020
4/21/2020
5/21/2020
6/21/2020
7/21/2020
8/21/2020
9/21/2020
10/21/2020
11/21/2020
12/21/2020
L2
O
Detection Limit

CONCLUSION

2020 was a good year for fisheries data on Lee Creek while some of the water quality data is incomplete due to outside circumstances. Total fish population numbers look about normal, although, higher forage fish numbers would be ideal. The methods employed to sample fish tend to target game fish over others so a higher percentage of game species is expected.

Trap net numbers show a trend towards larger fish even when adding the spring and fall sampling. The Wr's are good at 95.65 but both PSD-Q and PSD-P show a possible trend towards larger fish. PSD-Q should be anywhere from 30-60 and is at 76.8. PSD-P should be >10 and is at 44.8. Crappie lengths for the spring sample averaged 277 mm while the fall sample averaged 230 mm. The average weights were 349 g for spring and 188 g for fall. The fall sample helped to balance out the overabundance of larger fish seen in the spring sample giving a better idea of the crappie population in Lee Creek.

Boat electro-shocking yielded a sample size (N) of 230 largemouth bass. The average Wr was at 98.7 meaning the fish were healthy and not stressed for food. A good portion of the bass sampled were smaller bass between 126-200 mm making for low PSD and PSD-P values. Even though the PSD values are low, it is good to see a high number of smaller bass. Previous years data shows bigger fish are in the reservoir so this year served to tell how well the smaller bass population is doing.

IBI scores went up at three (3) creeks: Fall, Cove, and Upper Lee, while Weber was the only creek to drop in IBI score for 2020. Taxa numbers ranged from 14 at Fall to 20 at Jenkins. Buckhorn was the only creek not sampled this year due to weather then no water in the creek. All of the creeks in the Lee Creek watershed scored in the good range with two, Jenkins and Weber being between good and fair.

Algae numbers were normal this year with peaks seen between July and September, which is typical algae growing season. Diatoms and green algae were the main organisms causing the spikes seen. Blue-green algae numbers continue to stay low for the reservoir and do not seem to be of great concern at the time being. Phosphorous and nitrogen levels were relatively low for 2020 with the exception of one peak seen at the end of May beginning of June. That peak more than likely coincides with a heavy rain event that deposited nutrients from run-off and erosion.

The overall water quality and fisheries data seems to be within normal ranges for Lee Creek when looking at past data. Large sample sizes (N) for fisheries helped to get accurate population statistics on both bass and crappie. The water quality data for both phosphorous and nitrogen was either trending slightly downward or about average for 2020.

Appendix A.

Lee Creek Watershed Stream Fish Species List							
Family	**Genus**	**Species**	**Common Name**	**2017**	**2018**	**2019**	**2020**
Atherinidae	Labidesthes	sicculus	Brook Silverside				
Catostomidae	Moxostoma	duquesnei	Black Redhorse				
Catostomidae	Moxostoma	erythrurum	Golden Redhorse	✓	✓	✓	✓
Catostomidae	Hypentelium	nigricans	Northern Hog Sucker	✓	✓	✓	✓
Centrarchidae	Lepomis	cyanellus	Green Sunfish	✓	✓	✓	✓
Centrarchidae	Lepomis	macrochirus	Bluegill	✓	✓	✓	✓
Centrarchidae	Lepomis	megalotis	Longear Sunfish	✓	✓	✓	✓
Centrarchidae	Micropterus	dolomieu	Smallmouth Bass	✓	✓	✓	✓
Centrarchidae	Micropterus	punctulatus	Spotted bass	✓	✓	✓	
Centrarchidae	Lepomis	gulosus	Warmouth				
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	Notropis	atherinoides	Emerald Shiner				
Cyprinidae	Notropis	boops	Bigeye Shiner	✓	✓	✓	✓
Cyprinidae	Semotilus	atromaculatus	Creek Chub	✓	✓	✓	✓
Cyprinidae	Nocomis	asper	Redspot Chub			✓	✓
Cyprinidae	Notropis	whipplei	Steelcolor Shiner	✓	✓	✓	✓
Cyprinidae	Notropis	nubilus	Ozark Minnow	✓	✓	✓	✓
Fundulidae	Fundulus	catenatus	Northern Studfish	✓	✓	✓	✓
Fundulidae	Fundulus	notatus	Blackstriped Topminnow	✓	✓	✓	✓
Ictaluridae	Noturus	exilis	Slender Madtom	✓	✓	✓	✓
Ictaluridae	Ameiurus	natalis	Yellow Bullhead	✓	✓	✓	✓
Ictaluridae	Ameiurus	melas	Black 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	✓	✓	✓	✓
Ictaluridae	Pylodictis	olivaris	Flathead Catfish		✓		
Ictaluridae	Ictalurus	punctatus	Channel Catfish			✓	✓

Appendix B.

Lee Creek Reservoir Fish Species List							
Family	**Genus**	**Species**	**Common Name**	**2017**	**2018**	**2019**	**2020**
Catostomidae	Minytrema	melanops	Spotted Sucker	✓	✓	✓	✓
Catostomidae	Moxostoma	erythrurum	Golden Redhorse	✓	✓	✓	✓
Catostomidae	Moxostoma	carinatum	River 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	Notemigonus	crysoleucas	Golden Shiner				
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				
Petromyzontidae	Ichthyomyzon	castaneus	Chestnut Lamprey	✓		✓	✓