LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

WATERBODY MANAGEMENT PLAN PART B

IVAN LAKE

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY THREE YEARS

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sportfish species are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts.

Ivan Lake gives an opportunity to all anglers alike. Shoreline anglers as well as boaters can enjoy similar experiences on Ivan Lake due to available shoreline access.

Commercial

No commercial fishing strategy is in effect for Ivan Lake. Commercial fishing is not allowed within the Bodcau Wildlife Management Area (WMA) without a special permit from the Secretary of the Louisiana Department of Wildlife and Fisheries (LDWF).

Species of Special Concern

No threatened or endangered fish species are found in this waterbody.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations in effect for all species since impoundment.
The statewide recreational fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/regulations

Commercial

The use of fish nets and traps are prohibited on Ivan Lake in addition to no commercial activities being allowed on the WMA without a permit issued by the Secretary of LDWF.
The statewide commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/regulations

Parish Regulations

None

SPECIES EVALUATION

Recreational

Ivan Lake was historically the subject of minimal sampling due to its small size and proximity to other lakes with higher public utilization. Electrofishing samples were conducted in 1992, 1993, 1997, 1998, and 2001 to collect information on Largemouth Bass (*Micropterus nigricans*) and crappie populations.

Ivan Lake was completely dewatered while undergoing a drawdown for hydrilla control in 2004 (Figure 1). A fish kill followed this accidental dewatering, and an investigation showed a large number of sport fish died as a result of this event. Subsequent sampling to evaluate the remaining fish population in the lake was conducted in 2004 and 2005, utilizing gill nets, electrofishing and seining. These samples indicated low abundance of all fish species. Gill net sampling conducted in 2004 included predominately rough fish. Electrofishing samples in

the spring of 2005 produced only two Largemouth Bass and one Black Crappie (*Pomoxis nigromaculatus*) for 45 minutes of sampling effort at three different stations. Seine sampling conducted in the summer of 2005 indicated some sport fish reproduction, but numbers were low.

Figure 1. Ivan Lake, LA following accidental complete dewatering in the fall of 2004. View looking west along Caney Creek from dam at the water control structure.

Subsequently, Ivan Lake underwent a total renovation and restocking (see MP-A for complete details) following this major fish kill. On February 14, 2012, the gate was closed after the renovation work was completed, and the lake returned to normal pool by the end of March 2012. Restocking began two weeks after gate closure and continued throughout 2012 & 2013.

Historical fisheries information (that collected prior to 2012) can be viewed in **Appendix I**. Since Ivan Lake was essentially a "new lake" habitat following the renovation, the following discussion of fisheries data and analyses will be limited to sampling conducted since the renovation.

Largemouth Bass

Largemouth Bass are targeted for evaluation since they are a popular sportfish and a species indicative of the overall fish population due to their high position in the food chain. Electrofishing sampling results are the best indicator of Largemouth Bass abundance and size distribution, with the exception of large fish (i.e.,> 5 lbs.). Sampling with gill nets provides better assessment of large bass and other large-bodied fish species (e.g., bowfin or carp), however, gill nets have not been used on Ivan Lake since the renovation.

Largemouth Bass Catch Per Unit Effort and Size Distribution

Electrofishing has been the primary sampling technique utilized on Ivan Lake. Results from electrofishing samples for Largemouth Bass from 2014-2022 are presented in Figures 2 & 3,

below. The data suggests an increase in abundance over time and a shift towards larger size bass as the population has expanded into the new habitat.

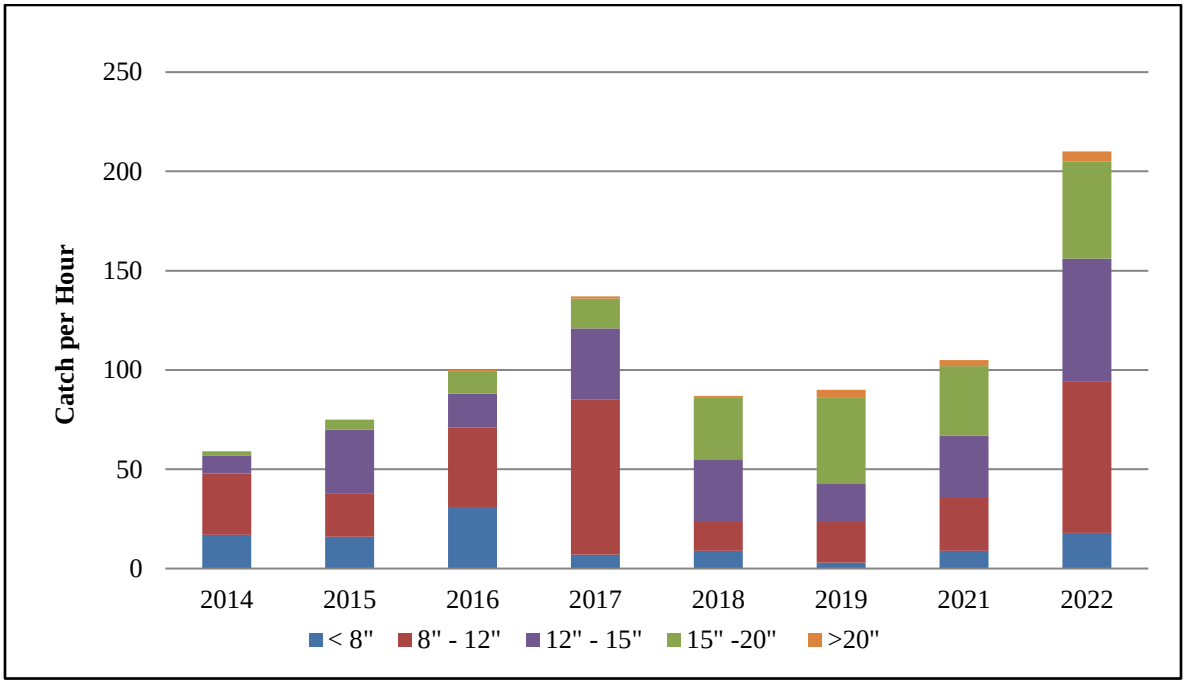

Figure 2. Spring electrofishing catch-per-unit-of-effort (CPUE) for total, stock-size (8" and up), quality-size (12" and up), and preferred-size (15" and up) Largemouth Bass on Ivan Lake, LA from 2014-to 2022.

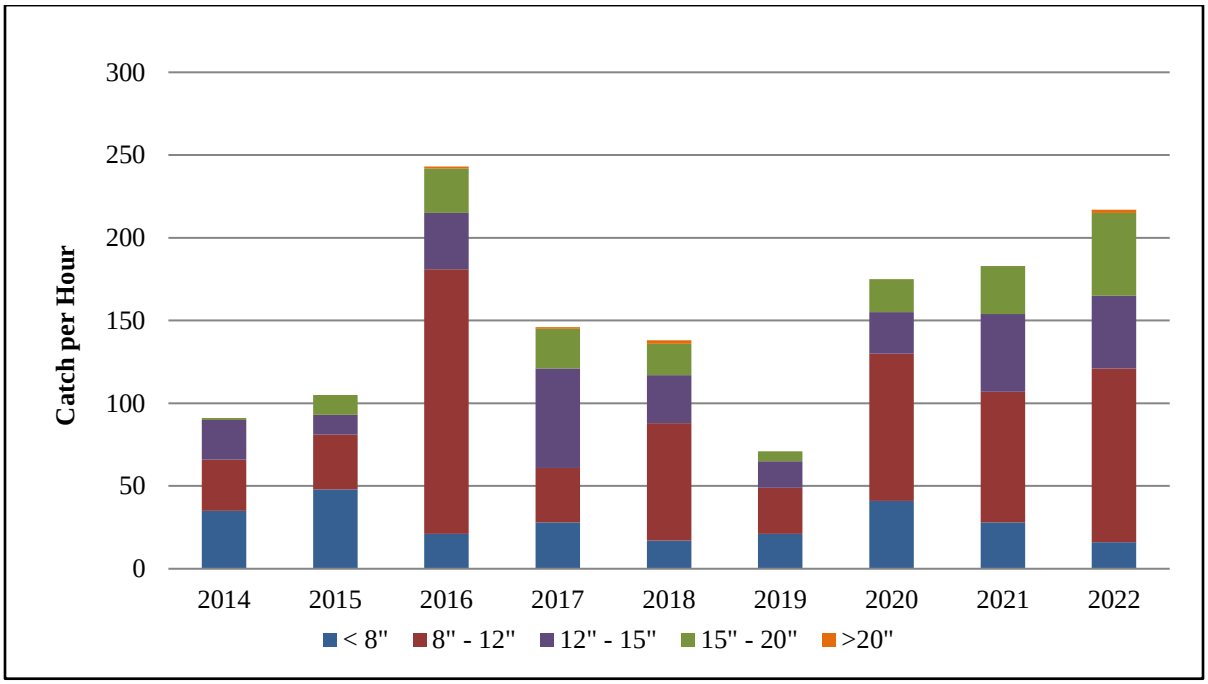

Figure 3. Fall electrofishing catch-per-unit-of-effort (CPUE) for total cumulative, stock-size (8" and up), quality-size (12" and up), and preferred-size (15" and up) Largemouth Bass on Ivan Lake, LA from 2014-to 2022.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe size distribution (length) data. Proportional stock density compares the number of fish of quality-size (greater than 12 inches for Largemouth Bass) to the number of

bass of stock-size [greater than 8 inches in total length (TL)]. PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. Relative stock density compares the number of fish of a given size range to the number of bass of stock size. A common calculation used in fisheries management is for RSD-Preferred or RSD-P. This value compares the number of Largemouth Bass > 15 inches TL to the number of stock-size Largemouth Bass in the population. This ratio is also commonly referred to as RSD-15 values. Values for PSD and RSD – Preferred (> 15 inches in TL), are shown in Figures 4 & 5 below. Healthy PSD and RSD-P values for Largemouth Bass range from 40-70 and 10-40, respectively. When evaluating PSD values from both spring and fall sampling, it appears that the index value has increased post renovation since the first samples were taken in spring of 2014. Since that time, the values now fall within the range or above the desired values and appears to have somewhat stabilized. The value may rise over time, as recruitment will likely diminish once the "new lake" habitat has been altered. When evaluating the RSD-P values from both spring and fall sampling, it is apparent that the value has risen over time and now falls within the desired ranges..

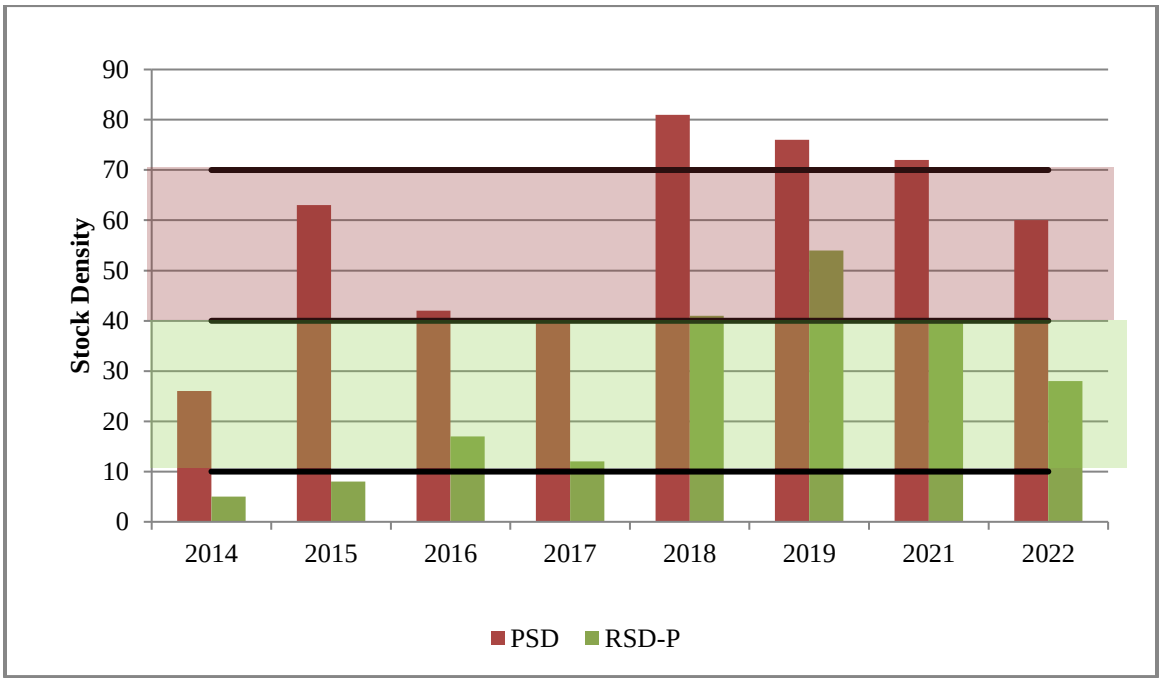

Figure 4. Largemouth Bass size-structure indices on Ivan Lake, LA for spring electrofishing samples from 2014 to 2022. Optimal PSD range is shaded in red, and optimal RSD-P range is shaded in green.

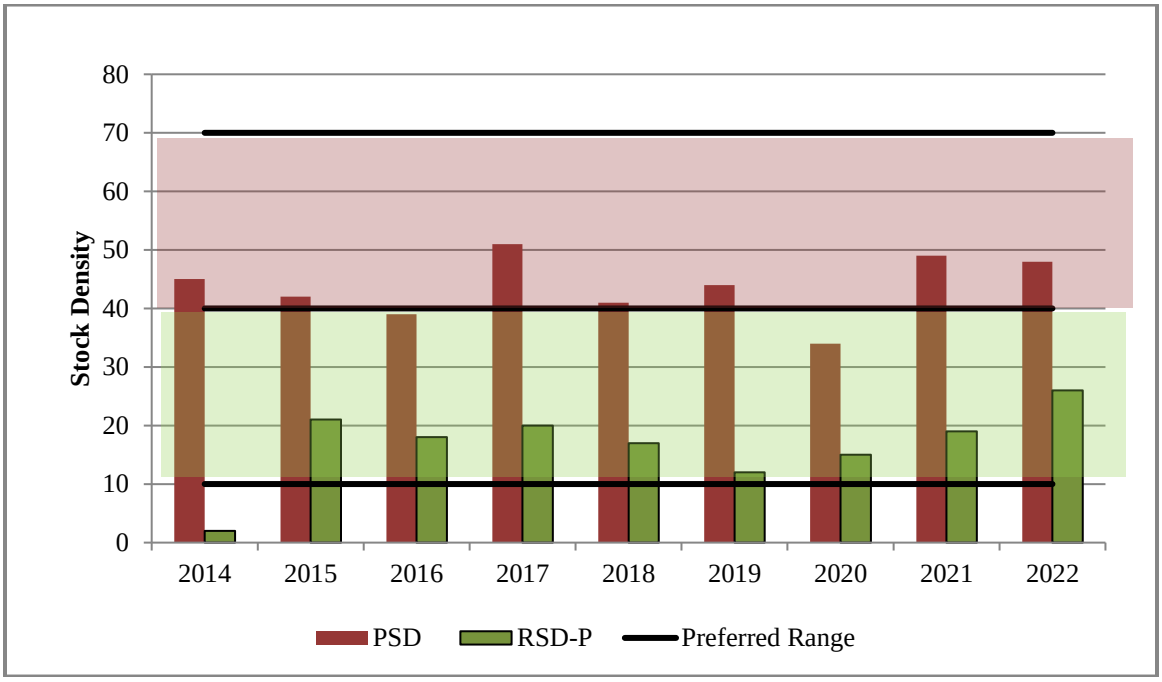

Figure 5. Largemouth Bass size-structure indices on Ivan Lake, LA, for fall electrofishing samples from 2014 to 2022. Optimal PSD range is shaded in red, and optimal RSD-P range is shaded in green.

Figures 6 and 7 illustrate the CPUE and size distribution of Largemouth Bass for the fall 2014 and 2016 electrofishing samples, along with the Relative weights (Wr) of fish collected during these samples. The relative weights indicate that abundant forage is available for all size ranges, and bass are more robust in 2022 than in 2014. Threadfin Shad have become established on the lake following the renovation, and may be providing a better forage base than was historically available. Samples taken in 1992 and 2001 indicated that forage availability was marginal (**Appendix I**).

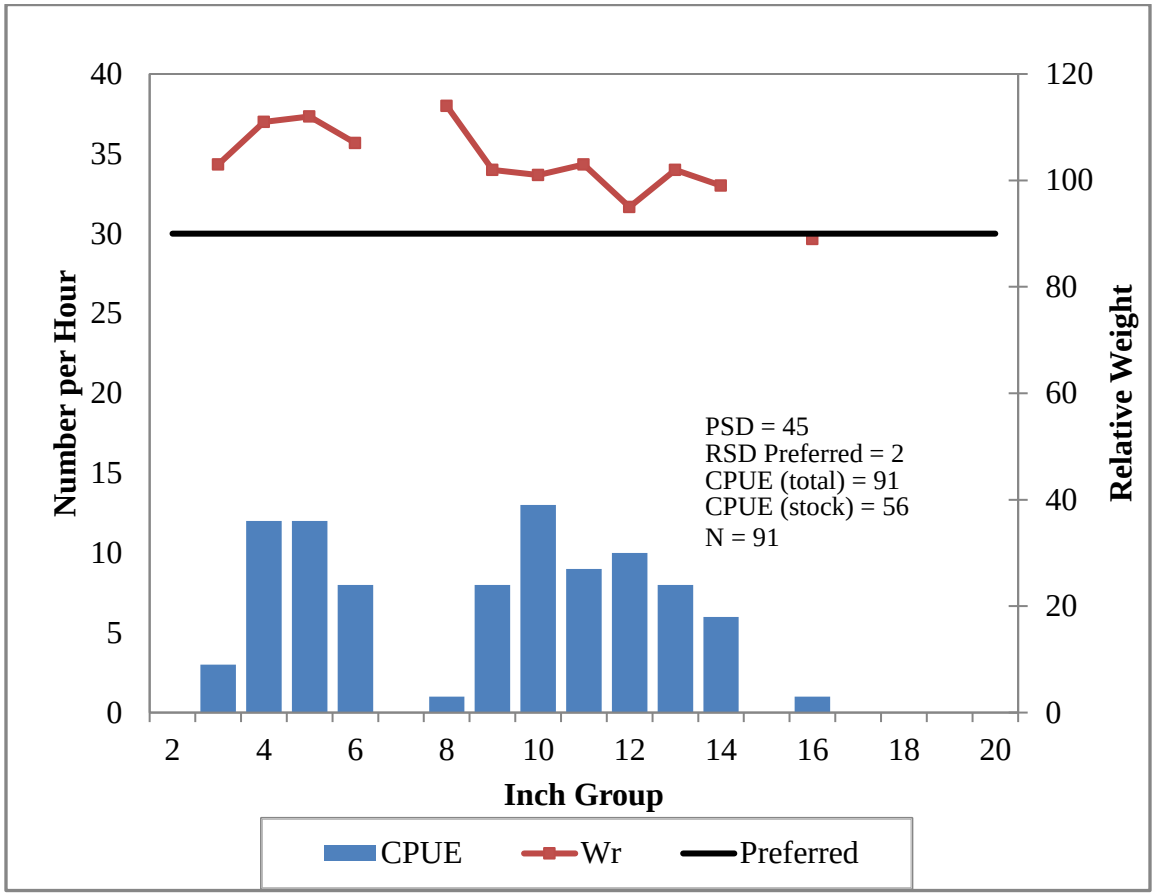

Figure 6. The CPUE, size distribution and relative weights for Largemouth Bass from fall 2014 electrofishing samples on Ivan Lake, LA.

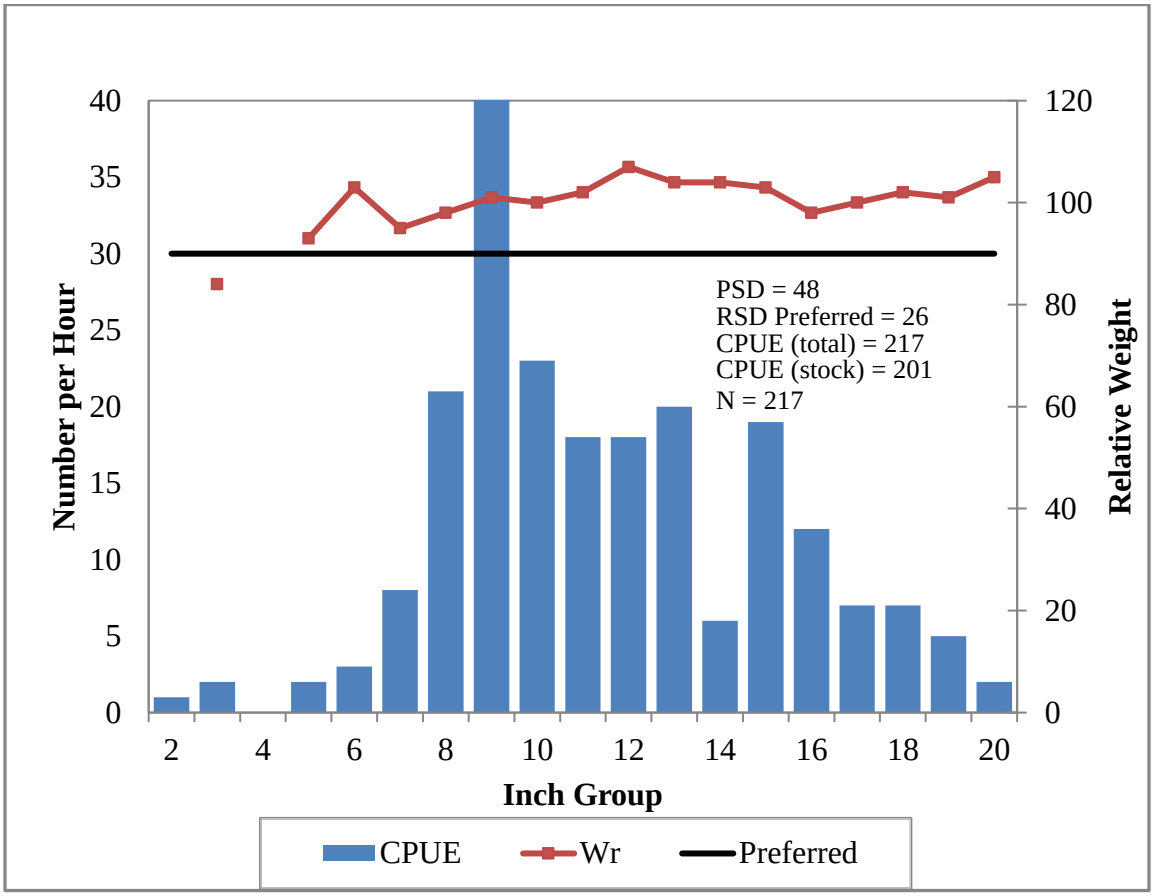

Figure 7. The CPUE, size distribution and relative weights for Largemouth Bass from fall 2022 electrofishing samples on Ivan Lake, LA.

Largemouth Bass Age and Growth

Age and growth information on Largemouth Bass was collected in the spring of 2014 and 2015. Due to the relatively young age of the population, little can be determined about the growth rates of larger size bass. The oldest fish collected during sampling were only three years old. However, the data indicates that bass in Ivan Lake are growing more quickly than the statewide average, at least until approximately 15 inches TL. The sample size of fish larger than 15 inches is somewhat limited and data is less reliable. Table 1 shows the estimated average length at age for Largemouth Bass in Ivan Lake and Figure 8 shows a comparison of the Von Bertalanffy growth curves for Ivan Lake and the Louisiana statewide averages.

Table 1. Length-at-age estimates for Ivan Lake Largemouth Bass collected during spring electrofishing sampling on Ivan Lake, LA. 2014-2015.

Inches Total Length	Age (Years)
5	0.74
6	0.89
7	1.05
8	1.23
9	1.43
10	1.64
11	1.89
12	2.16
13	2.48
14	2.87
15	3.34
16	3.96
17	4.86
18	6.56

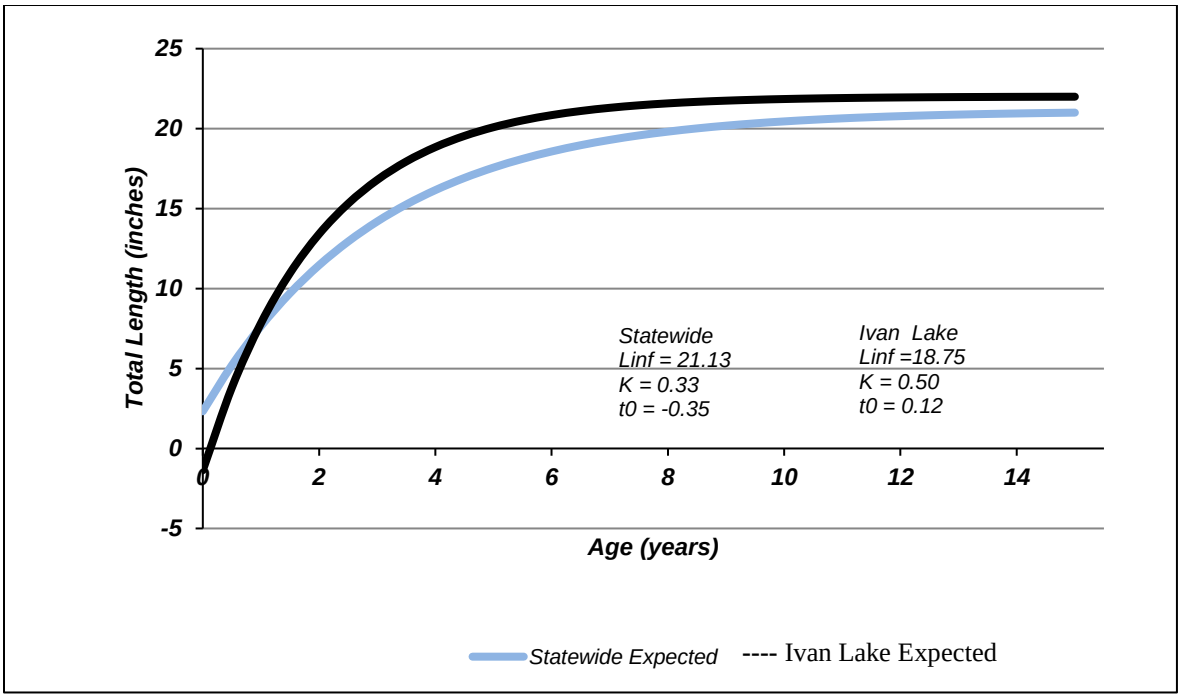

Figure 8. The predicted Largemouth Bass growth curve model (Von Bertalanffy) for Ivan Lake (2014-2015) compared to the Louisiana statewide average.

Forage

Forage availability is measured directly through fall forage electrofishing sampling and indirectly through measurement of Largemouth Bass body condition or relative weight (Wr). Relative weight is the ratio of a fish's weight to the weight of a ''standard'' fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth Bass Wr values below 90 indicate a potential problem with forage availability in the southern United States (Figures 6 and 7).

Forage samples were collected in conjunction with fall electrofishing samples from 2014-to 2022 (Figures 9 and 10). Only fishes $\leq$ 5 inches TL are considered as forage for the purpose

of evaluating the available forage in the reservoir. Bluegill (*Lepomis macrochirus)* are the primary forage species found in Ivan Lake, but Redear sunfish (*Lepomis microlophus*) and other sunfish are also abundant. Threadfin Shad (*Dorosoma petenense*) were stocked in the lake in 2012 and 2013 to establish a better forage base than was historically available. Based upon current sampling, the shad have become successfully established in the lake and are a sustainable population.

Much like crappie, Fliers (*Centrarchus macropterus*) were commonly observed during 2013 electrofishing. This species is typically found in small streams, but is well adapted as a "pioneer species" capable of expanding quickly when a new lake habitat exists. Their abundance typically declines quickly as other species become established. Interestingly, no fliers have been collected since 2014.

When compared to some other lakes in the area, Ivan Lake does not have a robust forage base. Since 2014, Ivan Lake forage sampling has yielded an average catch rate of 1,634 forage-size fish per hour, or 43.76 pounds of forage per hour. Nearby Cross Lake is much more fertile (1,712 fish/hour & 103 pounds/hour) and produces more available forage. However, available forage is much higher in Ivan Lake post-renovation than previous (historic) sampling revealed. Prior to 2001, Ivan Lake averaged 784 forage-size fish per hour or about 11.2 pounds per hour. Historically, brook silversides were the most abundant forage species in the lake, which likely limited the amount of quality forage available, especially for larger individual fishes.

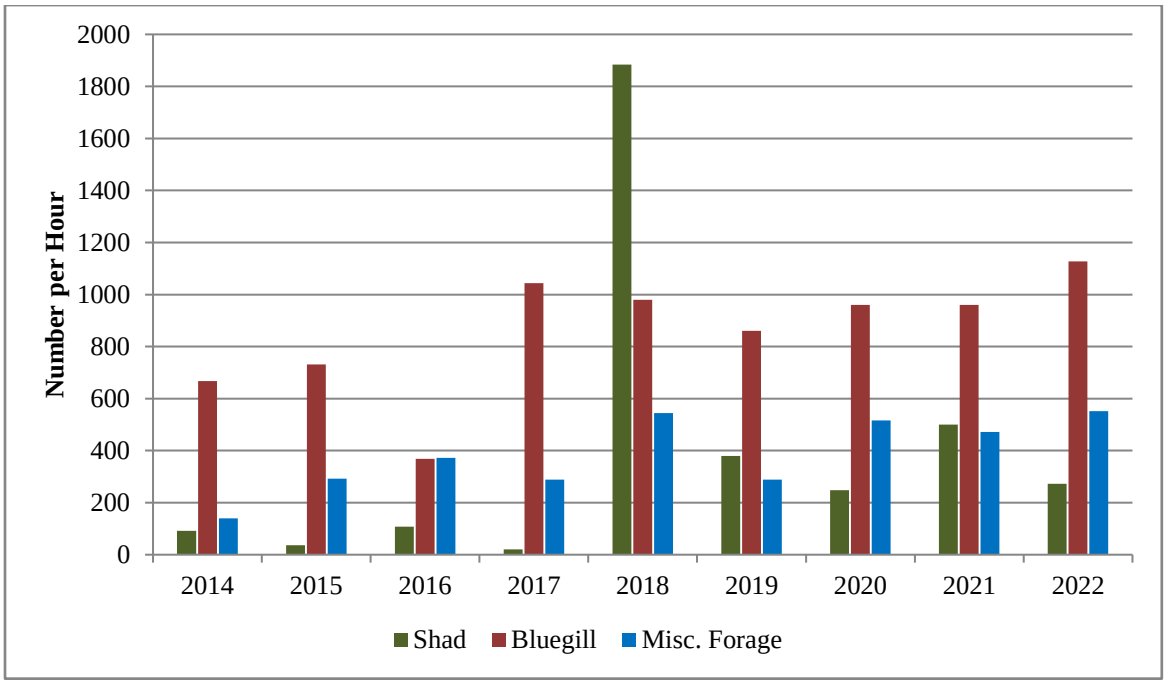

Figure 9. The CPUE in number per hour of fishes ≤ 5 inches TL from forage samples captured in Ivan Lake, LA from 2014 - 2022.

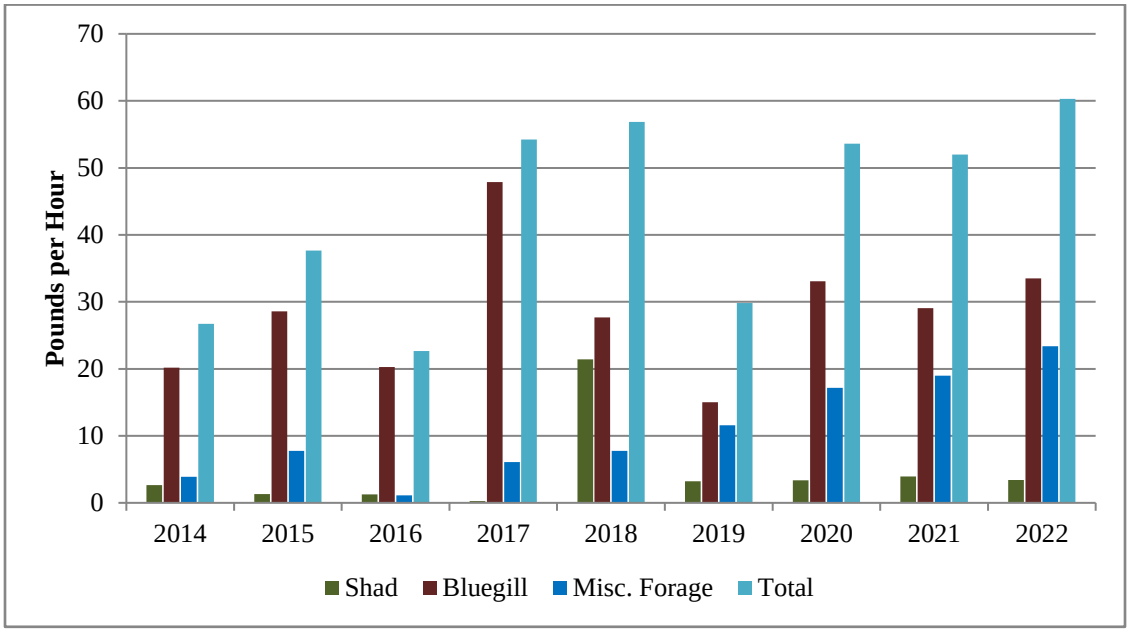

Figure 10. The CPUE in pounds per hour of fishes ≤ 5 inches TL from forage samples captured in Ivan Lake, LA from 2014 - 2022.

Crappie

Electrofishing collection success for crappie is quite variable. Catch rates are generally low, as was observed on Ivan Lake from 1992-2001. Anecdotal information from anglers indicated that the lake was a popular destination of crappie anglers in the earlier years of the reservoir.

The crappie population following lake renovation appears robust. During brief non-standardized sampling efforts in 2013, young-of-the-year (YOY) black crappies were observed to be more abundant than any other species. Recent observations indicate that more anglers are fishing for crappie than other species on the lake, and they are reporting good catch rates (especially in the fall and winter). Standardized electrofishing and lead net sampling since that time has revealed some expected trends in the crappie population.

Crappie electrofishing results are illustrated in Figures 11 and 12. Crappie were very abundant in 2014, and the population was dominated by size groups less than 10 inches TL. Crappie are prevalent in the Ivan Lake watershed, and the species is very difficult to eradicate with the pesticide rotenone. Based upon electrofishing data and reports from anglers, crappie rapidly expanded into the new habitat in 2013 and 2014. Over time, the relative abundance of crappie has declined, but the length distribution is shifting towards larger size crappie as seen in lead net sampling.

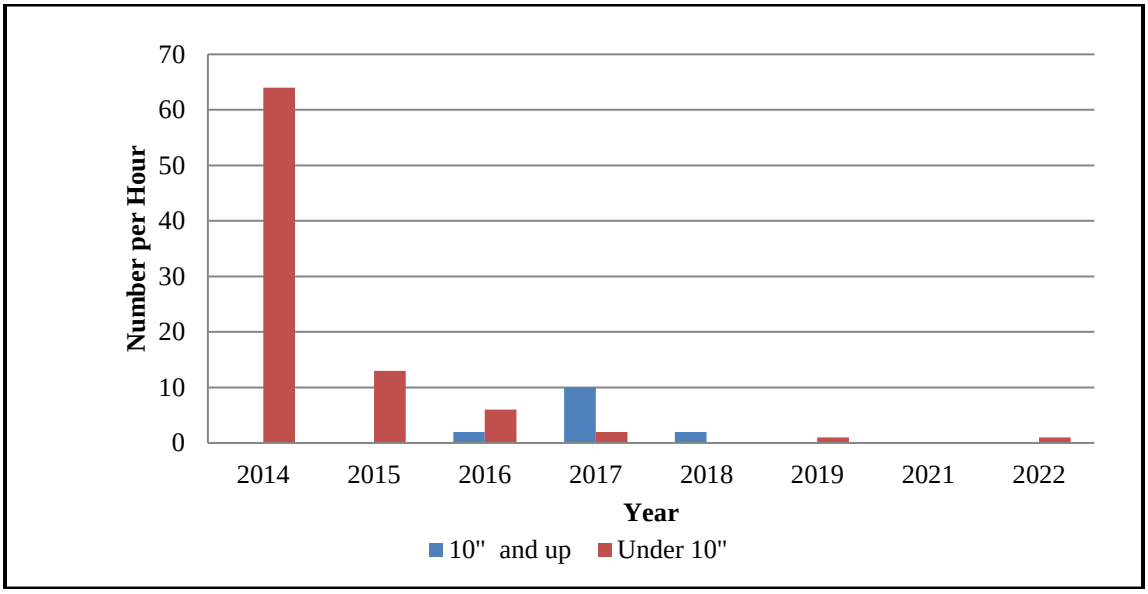

Figure 11. The CPUE of crappie captured during spring electrofishing samples from Ivan Lake, LA from 2014 - 2022.

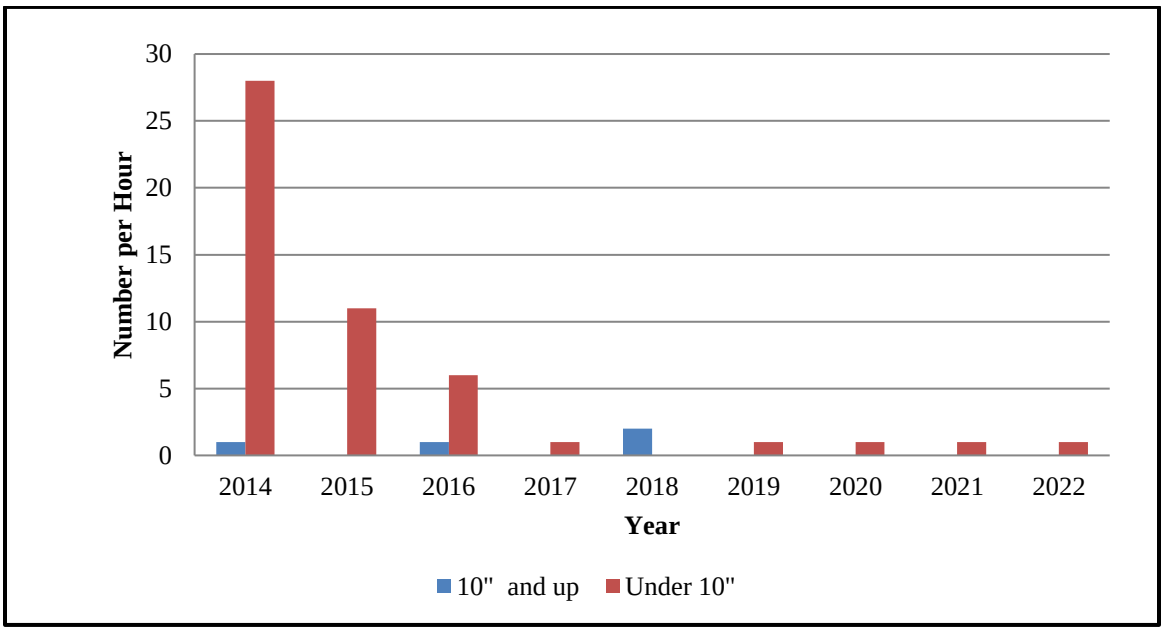

Figure 12. The CPUE of crappie captured during fall electrofishing samples from Ivan Lake, LA from 2014 - 2022.

Lead net sampling

The primary gear used to sample crappie is lead nets. These nets provide the opportunity to collect large numbers of crappie greater than stock-size (>5" TL); thereby, focusing effort on size groups frequently sought by crappie anglers. Lead nets have been used to sample the expanding crappie population in Ivan Lake since the renovation. Catch rates from the 2014 sampling effort were among the highest ever recorded in LDWF District 1 waters, both in total catch CPUE and for quality-sized crappie (8-10" TL). This was indicative of the tremendous spawn that was observed in 2013 as the lake returned to pool elevation. In subsequent years, the CPUE has declined overall, but the relative abundance of larger sized crappies has been increasing (Figures 13 & 15).

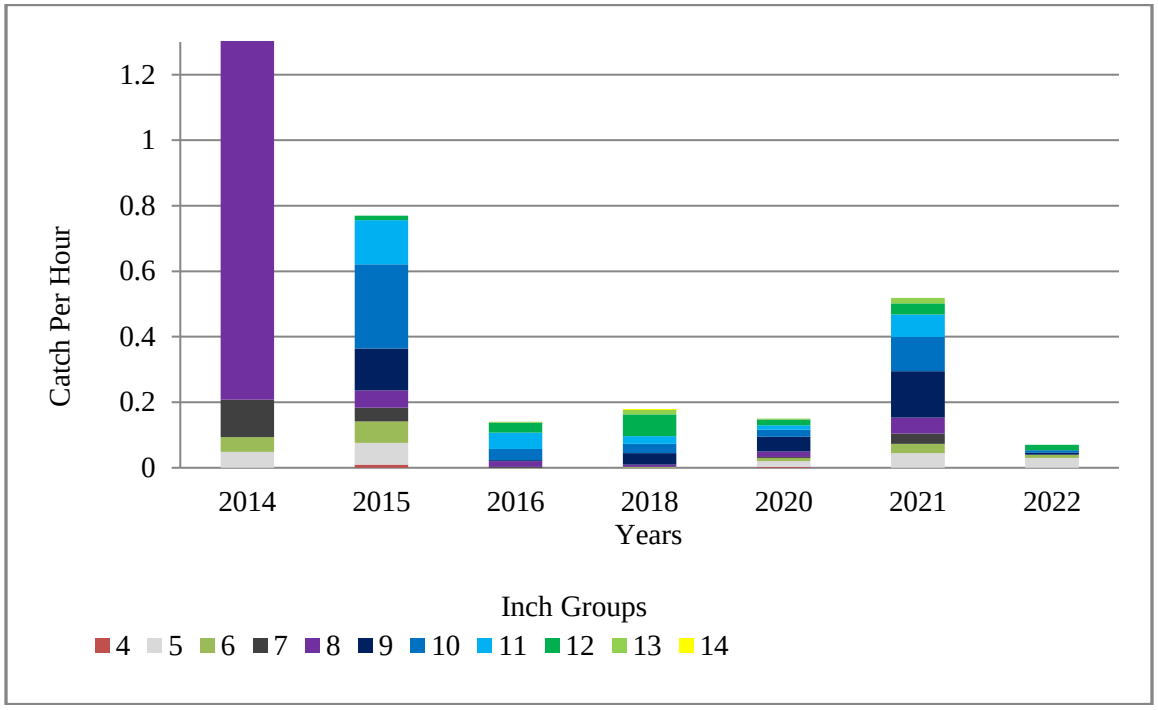

Figure 13. The CPUE by year by inch group for crappies collected from Ivan Lake, LA by lead net sampling from 2014 – 2018.

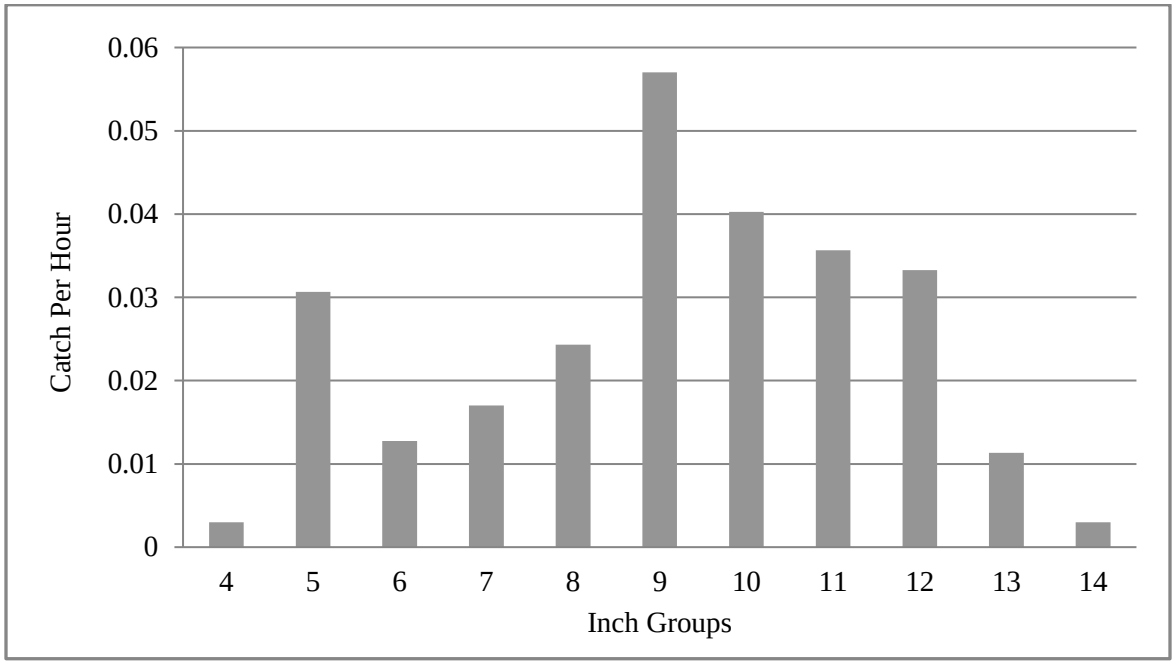

Figure 14. The Mean CPUE by inch group for crappies collected at Ivan Lake, LA by lead net sampling from 2018 – 2022.

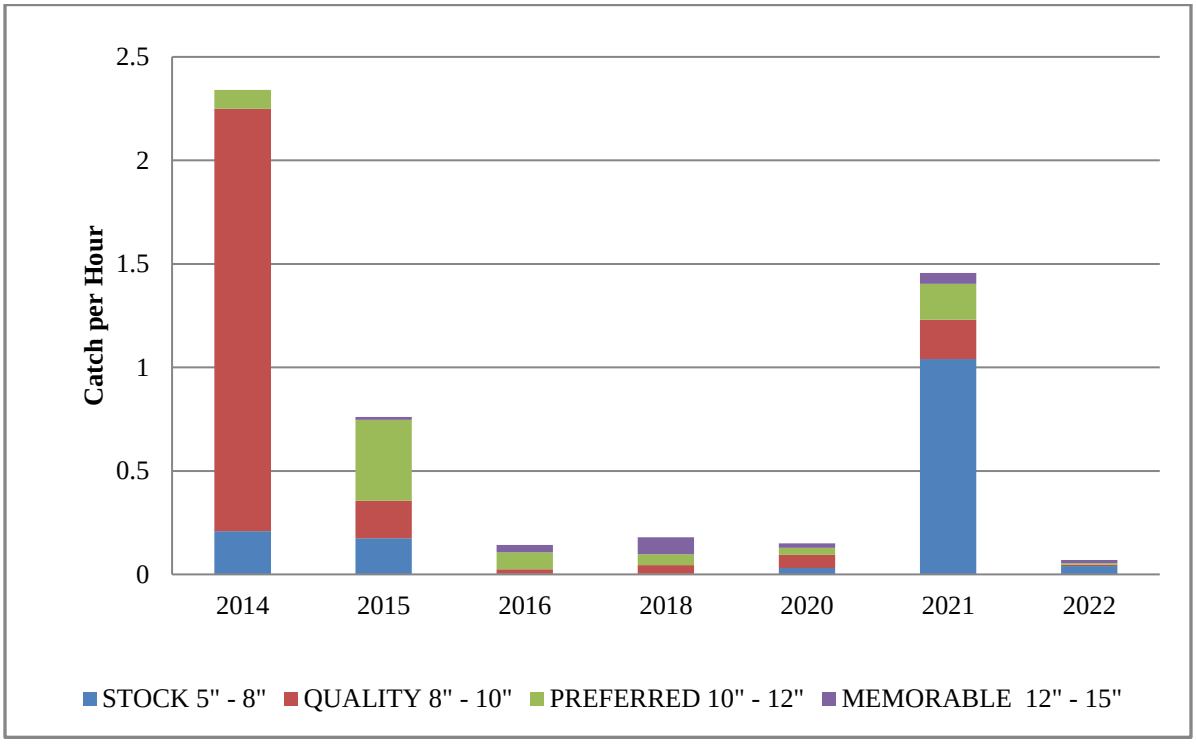

Figure 15. The CPUE (number per hour) of selected size groups of crappie for Ivan Lake, LA, caught in lead net samples from 2014 – 2022.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe size distribution (length) data of a fish population. Proportional stock density compares the number of fish of quality-size (≥8 inches for crappie) to the number of crappie of stock-size [≥5 inches in total length (TL)]. PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. Relative stock density compares the number of fish of a given size range to the number of fish of stock-size. Two common calculations used in fisheries management is for RSD-Preferred (RSD-P) and RSD-Memorable (RSD-M). Values for crappie PSD, RSD – Preferred (> 10 inches in TL) and RSD-Memorable (>12 inches in TL) are shown in Figure 16. The PSD values for healthy crappie range from 30-60 and indicate a balanced population with stable recruitment. PSD values for crappie in Ivan Lake exceed the "healthy range," but are relatively high due to the rapid growth rates that accompany an expanding population. If RSD-P values are greater than 10, then the population is assumed healthy. The calculated RSD-P value rose over the period of 2014 - 2018, and indicated a shift in the relative abundance of larger-sized crappie. Since 2018, values have declined somewhat and stabilized.

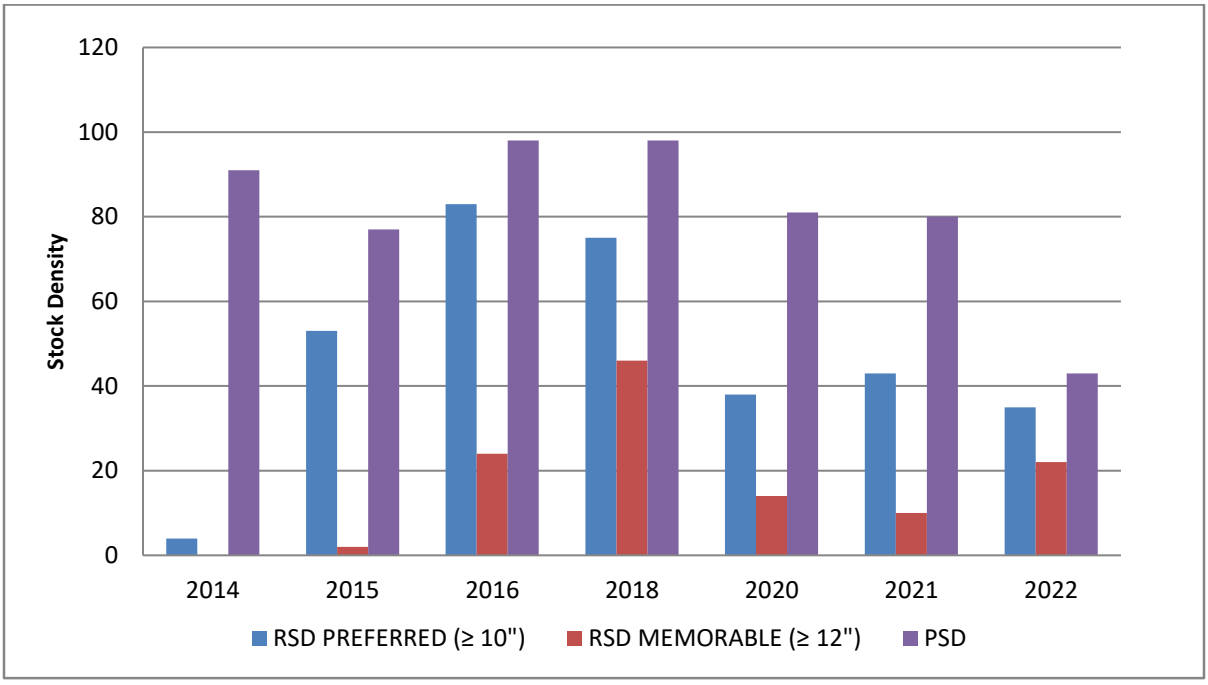

Figure 16. The proportional stock density (PSD) and relative stock density (RSD) for crappies caught in Ivan Lake, LA, by lead net sampling from 2014 – 2022. Preferred range for PSD is 30-60, and preferred range for RSD-P is >10.

Commercial

Rough fish species that normally comprise a commercial fishery were removed by rotenone treatments made during the fall 2011 and fall 2012. Ivan Lake has not historically supported commercial species in numbers adequate to support a commercial fishery. Commercial fishing is not allowed within the Bodcau WMA without a special permit from the Secretary of LDWF and the use of fish traps, and nets are banned on Ivan Lake.

HABITAT EVALUATION

Aquatic Vegetation

A vegetation assessment was conducted on 6/30/2022. The lake was approximately 4 inches below pool.

The following species were identified in Ivan Lake: American lotus (*Nelumbo lutea*), Eurasian milfoil (*Myriophyllum spicatum),* bladderwort (*Utricularia* spp.), southern naiad (*Najas guadalupensis*), primrose spp. (*Ludwigia* spp.), arrowhead (*Sagittaria* spp.), fragrant water lily (*Nymphaea odorata),* giant cutgrass (*Zizaniopsis miliacea),* common reed (*Phragmites australis),* common duckweed (*Lemna minor*), giant duckweed (*Spiroldela polyrhiza*), alligator weed (*Alternanthera philoxeroides*), watershield (*Brasenia schreberi*), American pondweed, filamentous algae (*spp. unknown*) and giant salvinia (*Salvinia molesta*).

The majority of the vegetation found on Ivan Lake was up the two main creek channels. In Caney Creek, the vegetation was sparse along the shoreline becoming thicker closer to the bridge on north end. In Philip's Creek, the vegetation increased in density from channel markers #11& #12 as one traveled up the creek arm. Submerged vegetation such as coontail, Eurasian milfoil, and bladderwort was most prevalent. Emergent vegetation such as American lotus, fragrant water lily, primrose, and alligator weed was very sparse. Marginal vegetation included cutgrass and arrowhead along the shorelines.

On the main lake, submerged vegetation was sparse in coverage and only growing out to a depth of 4 feet. Most of the submerged vegetation on the main lake was coontail and Eurasian milfoil with greater concentrations in the backs of small coves. Cutgrass was also found in the backs of several pockets off the main lake.

There was an estimated 10 acres of giant salvinia on Ivan Lake. Most of the giant salvinia was concentrated in the upper reaches of the two main creek arms. There were also some small clumps mixed in with matted out submerged vegetation throughout the lake. Most of the giant salvinia was brown and weakened from recent, foliar herbicide applications. No hydrilla or water hyacinths were observed during the survey.

This same general pattern for aquatic vegetation has persisted on Ivan Lake since renovation in 2013. Foliar herbicide applications appear to be sufficient to control the giant salvinia, fragrant water lilies, and American lotus present on the lake. If lotus and lilies were to become severe, aerial applications may be needed. Submersed aquatic vegetation (SAV) consistently persists in 80-100 acres of Ivan Lake despite triploid Grass Carp (TGC) introductions. This level of SAV should be suitable for fisheries production and does not pose an imminent threat to boating access in most locations. Additionally, this coverage of SAV if far less than the historical, problematic levels that existed prior to the lake renovation. TGC escapement from the lake is likely occurring, and therefore they should continue to be added at relative low numbers until such a time when SAV coverage changes significantly.

Substrate

The substrate of Ivan Lake is composed of sandy loam. Organic accretion from years of overabundant vegetation was greatly reduced during the lake renovation water fluctuations. The entire lakebed is firm and is considered to be suitable spawning habitat for nesting sport fish species.

Complex Cover

The complex cover in Ivan Lake consists primarily of stumps and submersed aquatic vegetation. In an effort to increase angling success, artificial cover has been added to the lake. Detailed descriptions and photographs of these reefs can be found in the Ivan Lake Waterbody Management Plan-A.

CONDITION IMBALANCE / PROBLEM

Impounded in 1955, Ivan Lake provided excellent fishing opportunities for many years. The excellent fishing of past decades deteriorated due to an unbalanced fish population with undesirable species, habitat degradation and excessive aquatic vegetation.

Future LDWF efforts on Ivan Lake should include slowing or preventing the return to undesirable environmental conditions. Despite annual TGC stockings since 2013, approximately 100 acres of SAV has persisted. SAV has historically caused significant problems on the lake, limiting access and contributing to an unbalanced fish population.

CORRECTIVE ACTION NEEDED

Drawdowns should be considered as a method to boost fertility, balance fish populations, improve spawning conditions, and control SAV, if needed, once the "new lake boom" effect diminishes.

Closely monitor the aquatic vegetation present on Ivan Lake. Herbicide efforts should be directed at controlling giant salvinia, American lotus, and fragrant water lily. Continue stocking TGC at low rates to prevent the spread of SAV.

RECOMMENDATIONS

1. Survey the fish population annually using standardized sampling techniques to document and describe the developing, post-renovation fishery.

2. Stock Florida Largemouth Bass fingerlings annually at a rate of 15 fish per acre of bass habitat (total of 9,260 fish), until total influence of Florida bass percentage is greater than 40%. Genetic sampling should be conducted annually during spring electrofishing sampling. If total influence of 40% is achieved, then stockings should become biennial at the same rate.

3. Aquatic vegetation control: due to the shallow nature and history of aquatic vegetation problems associated with Ivan Lake, an integrated approach to control and maintain desirable aquatic habitat is recommended. Control measures available to LDWF for Ivan Lake include water level fluctuation, stocking of TGC, and herbicide applications. Since Ivan Lake is newly renovated, drawdowns will not likely be implemented as a management tool to control vegetation for the next few years. TGC will serve as the primary management tool to control SAV. If SAV acreage exceeds 80 acres (15% total coverage) by August, then TGC will be stocked at a rate of 2.5 carp per vegetated acre in the winter of following year. There are no plans to use herbicides to control SAV at this time.

4. Giant salvinia coverage will be monitored, and herbicide applications will be conducted as needed in accordance with the LDWF Aquatic Herbicide Application Procedures.

5. American lotus and water lily should be aggressively treated with herbicides on Ivan Lake. An aerial application using glyphosate (0.5 gal/acre) and a non-ionic surfactant (0.25 gal/acre) should be the first treatment option. This application should take place after the leaves are fully emerged from the water, but prior to the plants flowering. This will likely occur in May and should require only one-half day of aerial application labor. The current aerial application contract may be a limiting factor since it requires at least one day of labor. LDWF has an approved waiver from the Louisiana Department of Agriculture and Forestry to apply 2,4-D on Ivan Lake. If an aerial application is not possible, then boat applications should be made using 2,4-D (0.5 gal/acre) and Red River 90 (1 pint/acre) in the spring or early summer. Follow up treatments should be made throughout the year to treat new growth as necessary.

6. Drawdowns will be considered in the future to boost lake fertility, balance fish populations, improve spawning habitat and combat the negative effects of eutrophication when the sportfish populations in the lake appear to have stabilized and/or begun to decline.

7. A drawdown to boost lake fertility, vegetation control, bottom oxidation, and fisheries production is planned for the summer of 2023. Ivan Lake shall be lowered to a level 5 foot

below pool stage beginning July 17, 2023 and maintained until October 16, 2023.

Appendix I –
(return to historical)
Historical Fisheries Data (Pre-2012) for Ivan Lake prior to Renovation

Recreational

Largemouth Bass
Largemouth Bass are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain. Electrofishing sampling results are the best indicator of Largemouth Bass abundance and size distribution, with the exception of large fish (i.e.,> 5 lbs.). Sampling with gill nets provides better assessment of large bass and other large-bodied fish species (e.g., bowfin or carp).

Largemouth Bass Catch Per Unit Effort and Size Distribution
Electrofishing has been the primary sampling technique utilized on Ivan Lake. Results from electrofishing samples for stock-size Largemouth Bass from 1992 – 2001 are presented in Figure 4 below. The trend line from data collected during this time period indicates a moderate decline in stock-size fish in Ivan Lake.

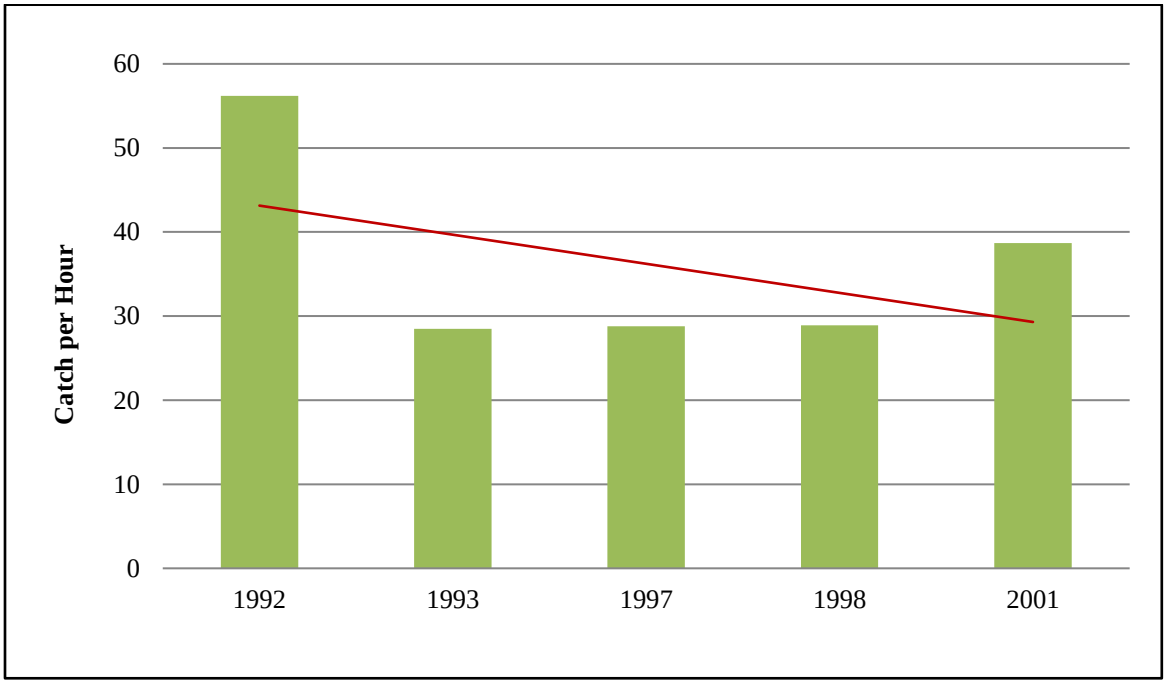

Figure 4. Spring electrofishing catch-per-unit-of-effort (CPUE) for stock-size (8" and up) Largemouth Bass on Ivan Lake, LA from 1992-2001. The trend line indicates a moderate decline in stock-size fish over this time period.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe size distribution (length) data. Proportional stock density compares the number of fish of quality-size (greater than 12 inches for Largemouth Bass) to the number of bass of stock-size [greater than 8 inches in total length (TL)]. PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. Relative stock density compares the number of fish of a given size range to the number of bass of stock size. A common calculation used in fisheries management is for RSD-Preferred or RSD-P. This value compares the number of Largemouth Bass > 15 inches TL to the number of stock-size Largemouth Bass in the population. This ratio is also commonly referred to as RSD-15 values. Values for PSD

and RSD – Preferred (> 15 inches in TL), are shown in Figure 5 below. Healthy PSD and RSD-P values for Largemouth Bass range from 40-70 and 10-40, respectively. There was a decrease in the proportion of both stock-size and preferred-size fish in Ivan Lake from the period 1992 to 2001.

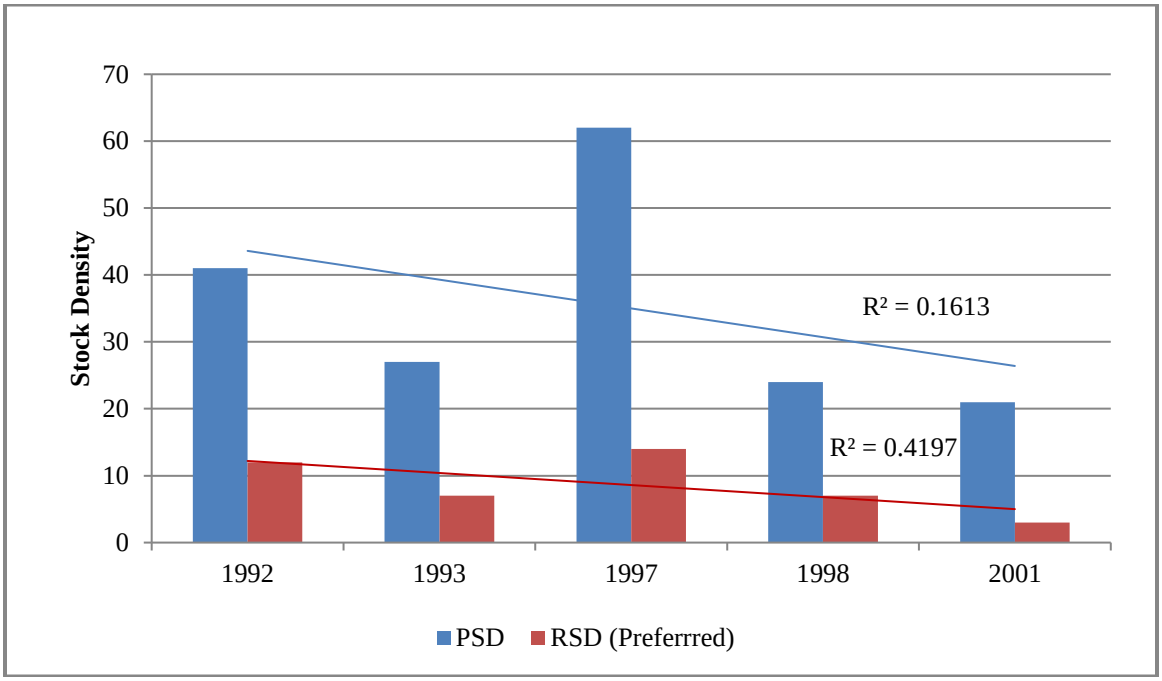

Figure 5. Largemouth Bass size-structure indices on Ivan Lake, LA, from 1992 to 2001 for spring electrofishing samples. The trend lines indicate that there is a minor decrease in the proportion of stock-size and preferred-size fish over time ($R^2 < 0.60$).

Figure 6 illustrates the CPUE and size distribution of Largemouth Bass for the fall 1992 electrofishing sample along with the Wr for stock-size fish collected during this sample. The relative weights indicate that forage availability was marginal for most size groups of fish during this time. Relative weights and CPUE for the 2001 fall electrofishing sample are shown in Figure 7. Relative weights for stock- size Largemouth Bass were slightly higher than the 1992 sample indicating sufficient forage was available at that time.

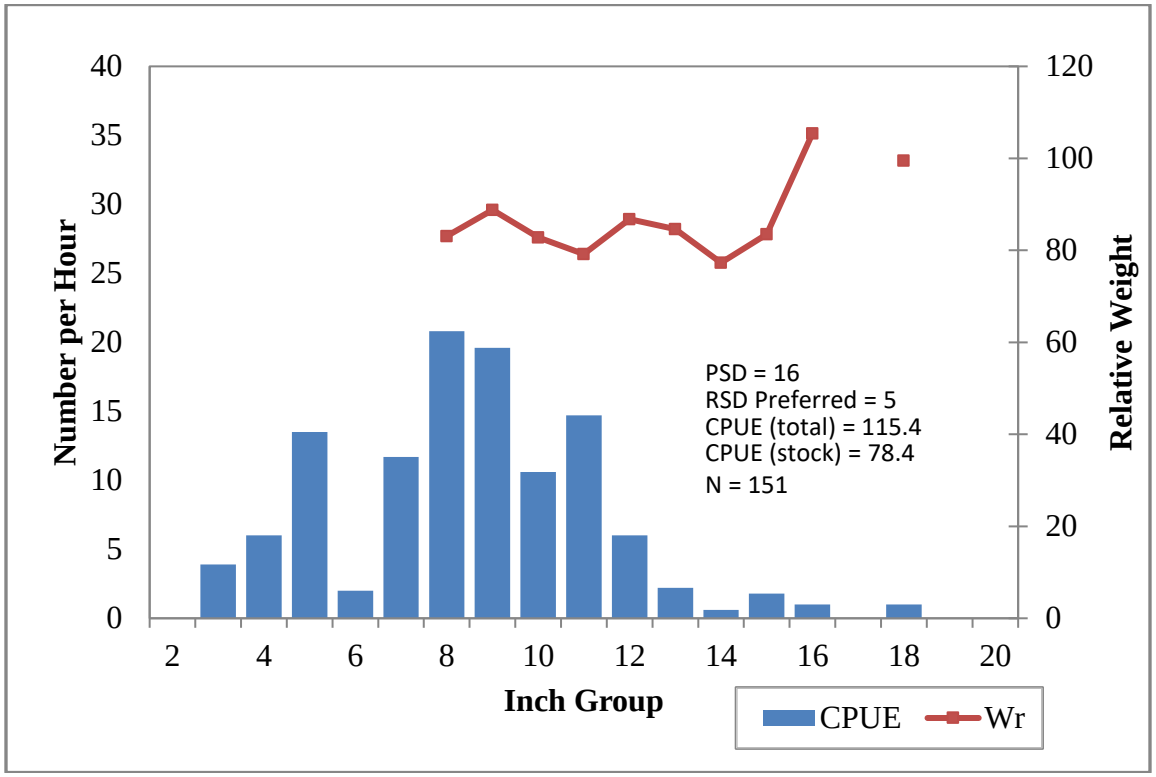

Figure 6. The CPUE, size distribution and relative weights for Largemouth Bass from fall 1992 electrofishing samples on Ivan Lake, LA. Relative weights indicate marginally adequate forage availability for the stock-size Largemouth Bass in the reservoir.

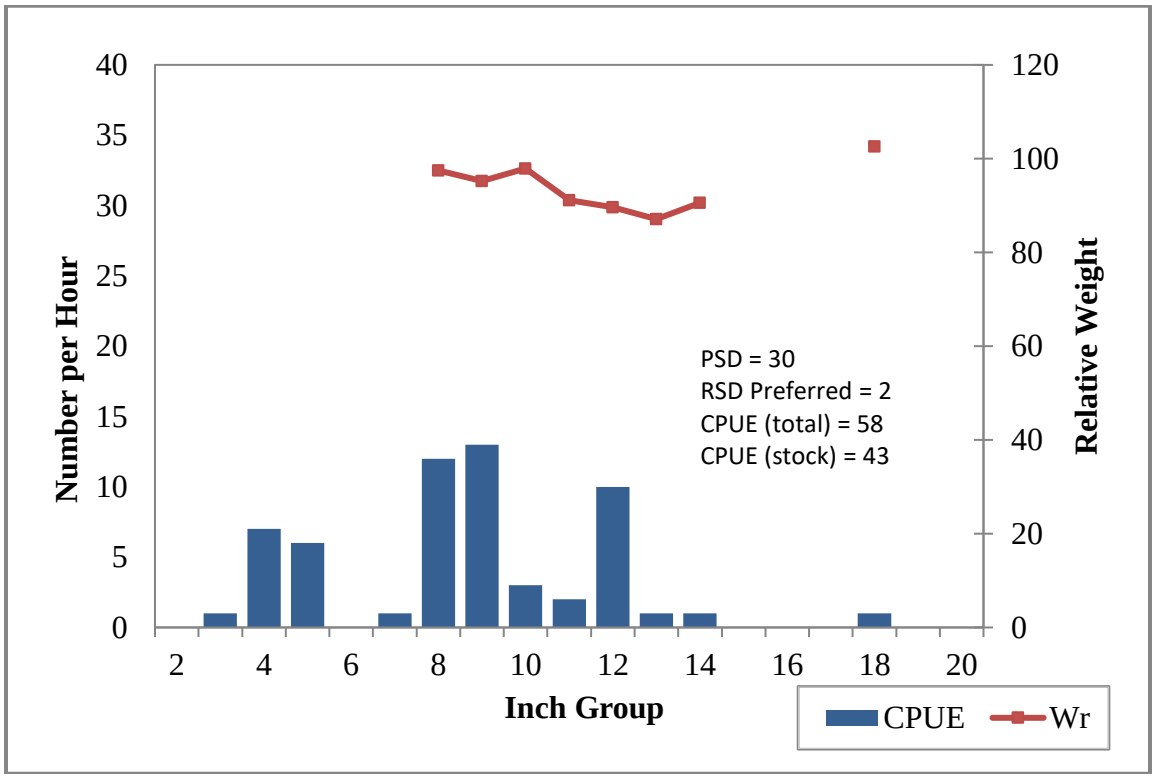

Figure 7. The CPUE, size distribution and relative weights of Largemouth Bass from fall 2001 electrofishing samples on Ivan Lake, LA. Relative weights indicate sufficient forage availability for the stock-size fish present in the lake at this time.

Age and growth information on Largemouth Bass was collected in 2001; however, the data set was limited. As the post renovation Largemouth Bass population matures, a stock assessment (age, growth and mortality) will be conducted beginning in 2014.

Forage

Forage availability is measured directly through fall forage electrofishing sampling and indirectly through measurement of Largemouth Bass body condition or relative weight (Wr). Relative weight is the ratio of a fish's weight to the weight of a ''standard'' fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth Bass Wr values below 80 indicate a potential problem with forage availability.

Forage samples were collected in conjunction with fall electrofishing samples in 1992 and 2001. Only fishes $\leq$ 5 inches TL are considered as forage for the purpose of evaluating the available forage in the reservoir. *Lepomis* spp. and fishes in the "Forage" category which consisted almost entirely of brook silversides, (*Labidesthes sicculus*) comprised the majority of the forage available in the lake by number (Figure 8). *Lepomis* spp. comprised the majority of the biomass collected in these samples with nearly 6 pounds of bream $\leq$ 5 inches TL captured in the fall 1992 forage sample and over 10 pounds collected in the 2001 sample (Figure 9).

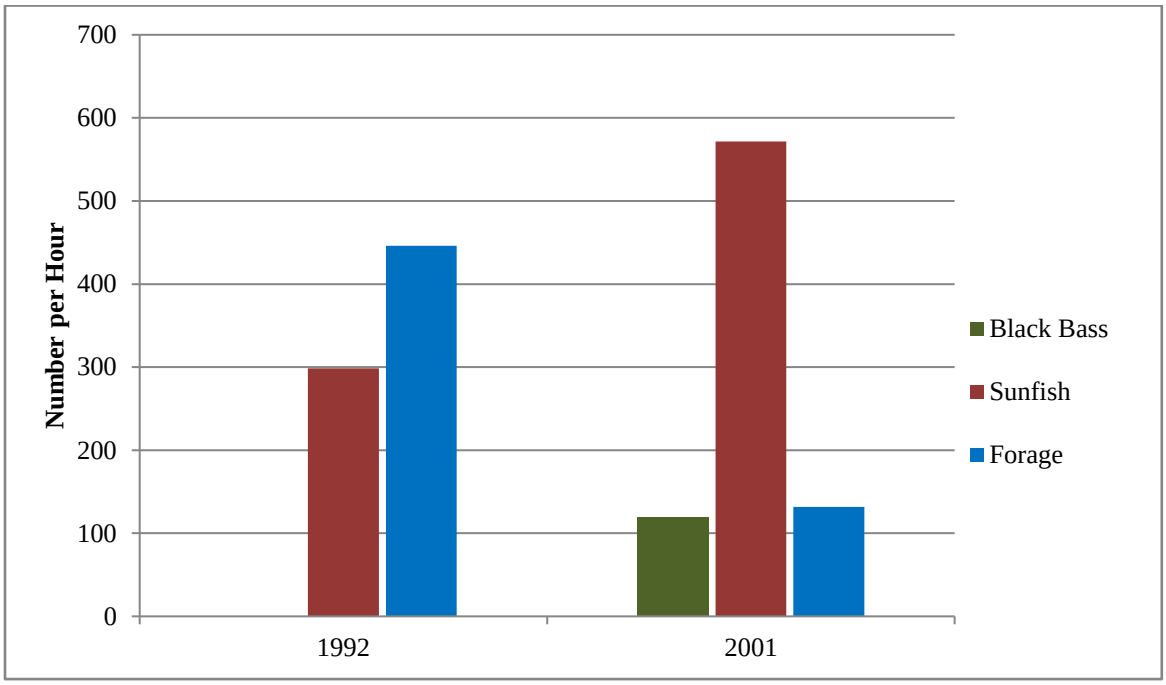

Figure 8. The CPUE in number per hour of fishes $\leq$ 5 inches TL from forage samples captured in Ivan Lake, LA in 1992 and 2001. Sunfishes (*Lepomis spp.*), and Brook Silversides comprised the majority of the species available as forage for the Largemouth Bass in the reservoir.

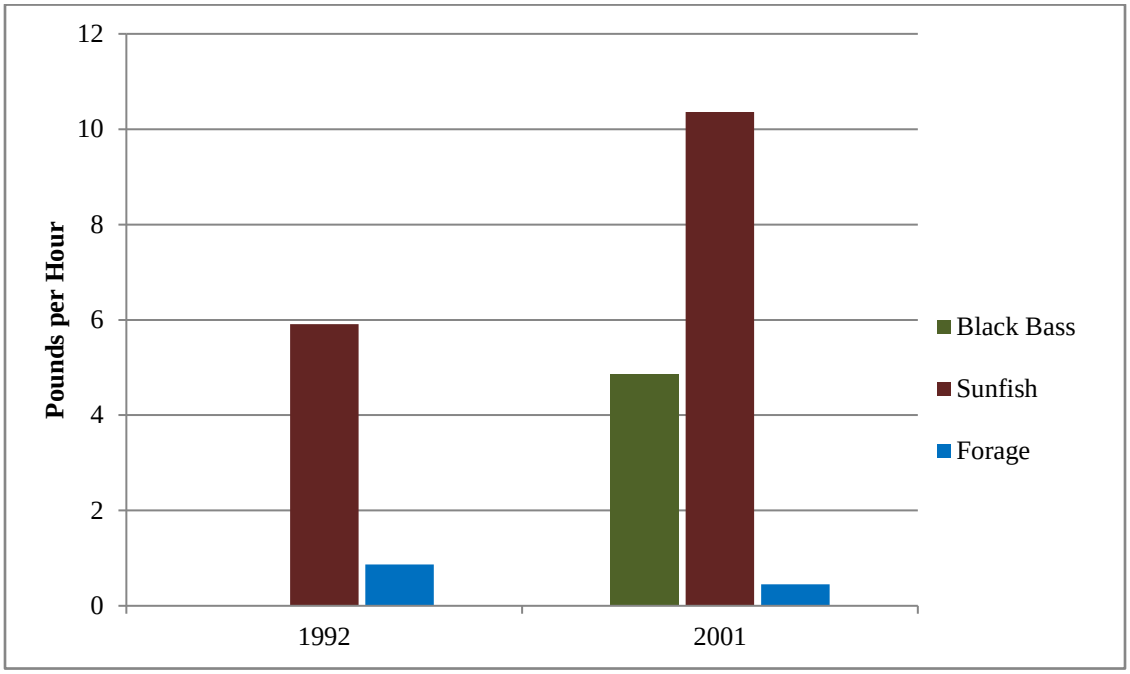

Figure 9. The catch in pounds per hour of fishes ≤ 5 inches TL from forage samples captured in Ivan Lake, LA in 1992 and 2001. Sunfish comprised the largest component by weight of the available forage in the lake. Fishes in the "Forage" category consisted primarily of brook silversides.

Crappie

Few crappies are collected during spring electrofishing samples from 1992 – 2001 as depicted in Figure 10. The population consisted primarily of black crappie. Anecdotal information from fishermen indicates that Ivan Lake was a popular lake for crappie anglers in the earlier years of the reservoir.

The crappie population following the lake renovation appears robust. During brief non-standardized sampling efforts in 2013, young of the year (YOY) crappies were observed to be more abundant than any other species. Standardized sampling in 2014 will provide data to further evaluate the crappie population.

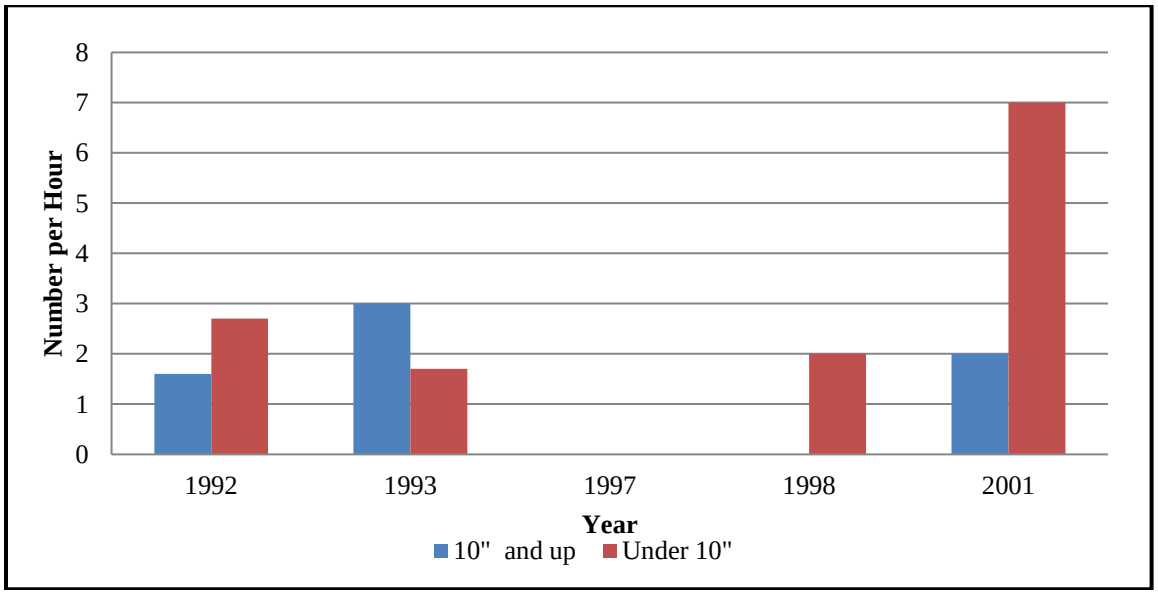

Figure 10. The CPUE of crappie captured during spring electrofishing samples from Ivan Lake, LA from 1992 to 2001.

Commercial

Rough fish species that normally comprise a commercial fishery were removed by rotenone treatments made during the fall 2011 and fall 2012. Ivan Lake has not historically supported commercial species in numbers adequate to support a commercial fishery. Commercial fishing is not allowed within the Bodcau WMA without a special permit from the Secretary of LDWF.