
Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Alabama

Name of Representative to Technical Committee: AJ Simmons

Date Submitted: 12/08/2022

Project Name or Description: Growth documentation of F1 “Titan Bass” from Red Hills Fish Hatchery

Contact Information:

Name: AJ Simmons

Co-Authors: N/A

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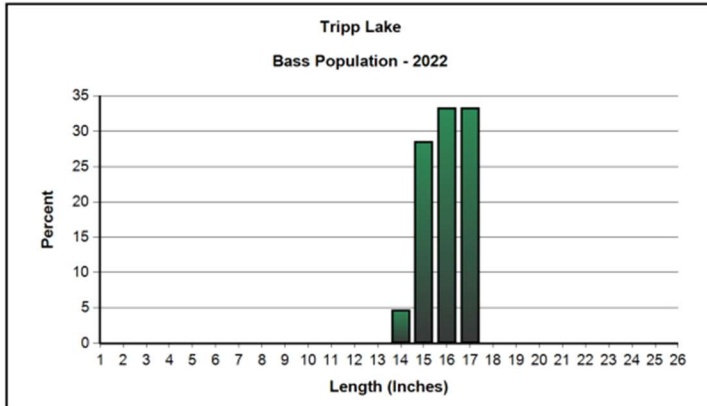
Objective: Document annual growth of F1 “Titan” Bass from Red Hills Fish Hatchery in small impoundments greater than 25 acres and exclusively managed by SEPOND.

Current Status: In the process of collecting data from lakes that were stocked in June of 2021 (the first year SEPOND began stocking F1 “Titan” bass from Red Hills Hatchery).

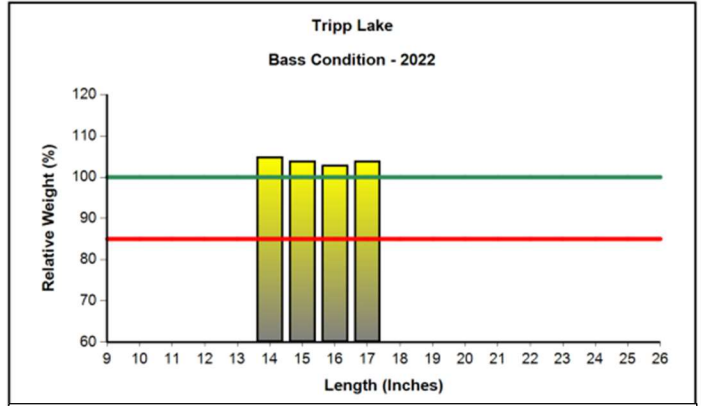
Abbreviated abstract: Only small impoundments greater than 25 acres that were originally stocked by SEPOND and actively managed by SEPOND were chosen for this study. Below you will find the data collected from “Tripp Lake” a 30-acre small impoundment located on a private farm in Attaplugus, Ga. The data was collected using standard boat-mounted electrofishing equipment. Construction of Tripp Lake was completed during the summer of 2020. Rotenone was applied to the lake basin immediately after impoundment. After detoxification, forage fish were stocked in the Fall of 2020 based on SEPOND’s recommended stocking rate for producing “Trophy Bass”. The lake was stocked with ~2-inch F1 “Titan Bass” fingerlings on June 14, 2021. The following data was collected on September 2, 2022:

Sample Size	Mean Length
21	16.02

Shock Time	Sample Size	CPUE (#/hr)	Mean Length	Mean Weight	Mean Wr
1800	21	42	16.02	2.38	103.86



Length distribution of F1 "Titan" largemouth bass collected from Tripp Lake in September 2022.



Relative weights (Wr) of F1 "Titan" largemouth bass collected from Tripp Lake in September 2022.

At roughly 15 months old, the largest weighed 1490 grams (3.28 pounds) with a length of 440mm (17.32 inches). The smallest bass in the sample weighed 711 grams (1.57 pounds) and measured 370mm (14.57 inches).

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Alabama

Name of Representative to Technical Committee: Graves Lovell

Date Submitted: 12/16/2022

Alabama Public Fishing Lake (PFL) Update by Graves Lovell

Of our 23 PFLs, we have continued to manage most for maximum yield of bass, bream, catfish and crappie. A few lakes are operated by the city and only advised by our agency. Most, however, have a contracted lake manager on site that manages the anglers, fertilizes the lake, and keeps grass cut and litter picked up. They are also responsible for collecting all harvest data. Since our goal for most lakes has been to maximize yield of multiple species, they typically result in a predator-crowded system and often become stagnant within 10 years. Over the last 15 years, we have been renovating, on average, about 1 lake per year. Renovation usually includes a new drainage system (old drain pipe often slip-lined), removing trees from the dam, habitat installed, and new fish stocked.

Fish habitat is deployed in most of the lakes, some offshore and some in reach of the bank, to provide concentrations of fish for anglers and to increase sampling efficacy. We have deployed all types of attractors, including artificial and natural. The natural reefs with seem to be the most attractive to fish by far. Natural materials with high surface area, such as cedar trees and recycled douglas fir seem to be the best. Each lake on average probably receives 1 tree per acre annually, often bunched in clusters in several areas around the lake. These fish reefs are marked and utilized heavily by anglers. The same reefs are supplemented annually.

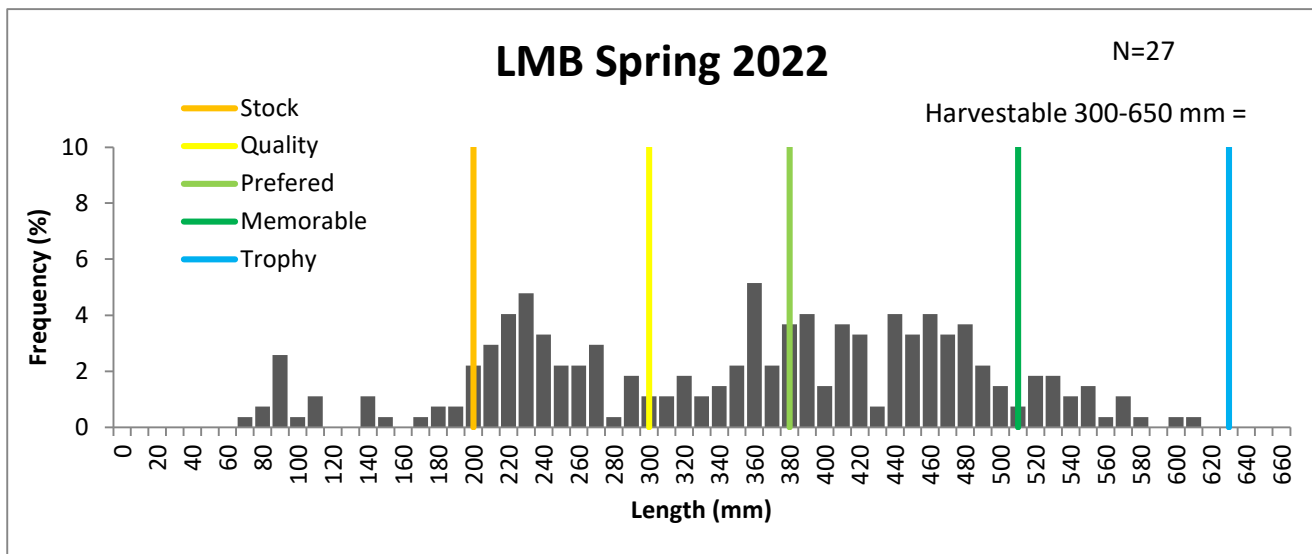
For years, we have been battling the predator-crowding issue. Attempts to correct this have included, more liberal predator harvest by anglers, increased electrofishing harvest, shoreline rotenone of YOY LMB, supplemental forage, etc. We have found that turning around a PFL in Alabama from a stagnant, predator-crowded condition is nearly impossible. Therefore, upon renovation of lakes, we have begun several strategies to reduce or post-pone this predator-crowded condition. The stocking strategies include, stocking bass relative to the littoral habitat in the lake rather than surface area, increased bluegill stocking rate, and establishing supplemental forage.

We have also found that it is very difficult to encourage anglers to remove small bass and return the larger ones. Even when length limits are in place, larger fish are often removed. When these larger fish are removed regularly on a popular lake, it doesn't take long for the bass distribution to become skewed toward smaller fish. With fewer large bass to control YOY production, recruitment just continues to increase.

Below is a summary of the management of DeKalb PFL using these new strategies following renovation (summarized by Nathan Aycock):

Dekalb County Public Fishing Lake is a 120 acre impoundment located in the northeast corner of Alabama. Dekalb PFL is now in its sixth year after being renovated and restocked in 2015. The bass fishery was catch-and-release only until 2020, and since then anglers may harvest up to 5 bass less than 13 inches per day. This regulation was designed to allow the harvest of all age-1 bass and the slower growing age-2 fish while protecting the faster growing age-2 fish and all preferred and memorable sized fish. This regulation was designed to facilitate meeting the stated goal for Dekalb County PFL of managing for a memorable bass angling experience where the possibility of catching large fish is high.

The bass and bream populations were sampled at Dekalb in both the spring and fall of 2022. During spring sampling, overall catch rates for bass increased slightly compared to 2021 and were near the lake average. The PSD value fell from 80 to 71, and this was driven by an increase in stock sized fish, as catch rates of stock sized fish nearly doubled from 2021 to 2022. CPE of preferred sized fish increased 60% in 2022, while CPE of sub-stock fish declined over 60%. Relative weight values were at or below the lake average for all size groups but remained > 90 for quality, preferred, and memorable sized fish. Catch rates of bass during fall electrofishing was over twice as high as spring sampling, and this was driven mainly by much higher numbers of sub-stock fish (fall sub-stock CPE = 129 fish/hr) and also a higher number of stock sized fish. However, there were still an abundance of large bass collected during fall sampling, including 18 fish over 5 pounds in weight, with the largest fish being 24.5 inches and 10.02 pounds.



Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Georgia

Name of Representative to Technical Committee: Tim Bonvechio

Date Submitted: 12/14/2022

Project Name or Description: Ocmulgee PFA

Contact Information:

Name: Tim Bonvechio

Co-Authors: Jackson Theimer

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Phone: 912-285-6484

Objective: Manage the current trophy bass lake.

Current Status:

- **Abbreviated abstract:** Ocmulgee PFA is a newer PFA (Impounded for a second time in January 2017), and is a 106-acre small impoundment. Over the past 6 years, the lake has received a low-density stockings (around 22 per acre total) of advance female Georgia strain largemouth bass (Florida allele percentages of 70 to 100%). These female bass average 10 inches or more in length when stocked. The lake is fertilized, and was initially stocked with bluegill, redear sunfish, golden shiners, threadfin shad, and lake chubsuckers for forage. The lake is stocked annually with bluegill, golden shiners and lake chubsuckers to increase largemouth bass growth. The bass are protected from harvest with a catch-and-release regulation to allow the fast-growing females to live long enough to reach trophy size. Unfortunately, reproduction and male bass were documented in the lake and those numbers are slowly growing. Each stocked female bass is PIT tagged to identify individual growth rates and document reproduction. With recruitment, there is approximately 30 or so bass per acre now in the small impoundment. All non-tagged fish will continue to be culled from the population to keep the population in check. Sampling with (Hook and line and Electrofishing) revealed 10 bass over in 10lbs in 2020. In 2021 & 2022, the same gear turned up 4 over 10lbs each year. The current lake record largemouth bass stands at 10lbs & 10.56 ounces, caught by Orville Newlin of Bonaire on May 29, 2020. Several bass larger than the current angling record have been sampled with electrofishing by DNR personnel and record growth has been documented. A year-long access creel survey is being conducted in 2022 and those results are not available at this time...The latest lake record White Crappie of 2lbs & 9.76

ounces was caught on November 2nd by Walter Bray of Warner Robins, GA. This fish broke the less than 1 year-old previous lake record of 2lbs 6 ounces set by Andrew Laney of Cochran, Ga, set back on December 26th, 2021.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Kentucky

Name of Representative to Technical Committee: Dane Balsman

Date Submitted: 11/28/22

Project Name or Description of Activities: Overview of the Fishing in Neighborhoods (FINs) Program

Co-Authors: Dane Balsman

Email: dane.balsman@ky.gov

Phone: 502-892-4480

Objective: To develop high quality urban fisheries in Kentucky that lead to high angler use, catch rates, and satisfaction.

Current Status: Ongoing

During 2022, 120,500 catfish (channel catfish and channel catfish x blue catfish hybrids) and 120,750 rainbow trout were stocked in the Fishing in Neighborhoods (FINs) lakes. These stockings of large keeper-size catfish (15 in avg), trout (10 in avg) provide anglers with quality fishing opportunities close to home. The program currently includes 45 lakes in 28 counties. A memorandum of agreement is in place with all lake owners enrolled in the FINs program giving Kentucky Department of Fish and Wildlife Resources (KDFWR) the authority to manage fish populations and set standardized regulations for all lakes in the program.

Advertising and marketing efforts were employed in a continuing attempt to raise awareness of the FINs program, increase participation, and recruit new anglers. Facebook and Twitter notifications were posted around stocking dates. District fisheries biologists also mentioned the FINs program and stocking schedules in their weekly fishing reports. Flyers promoting the FINs program were distributed at boat shows. A one-page advertisement for the FINs program appeared in Kentucky Fishing and Boating Guide. Additionally, a one-page stocking table appeared in the Kentucky Afield calendar. Newspaper, magazine and radio interviews, as well as press releases, were issued to promote the program. All lake owners were notified prior to fish being stocked so they could contact their followers via social media. The FINs website was routinely updated to convey the latest stocking information and list of lakes enrolled in the program. Kiosk posters promoting the FINs program and KDFWR's role in fish management and stocking was displayed at 25 of the 45 lakes. Information on the kiosk posters included the FINs logo, mission statement, fish stocking dates and quantities, license requirements, fishing

regulations, fish identification, poacher hotline, no littering graphic, brief overview of fishery and past sampling, basic knot tying and the location of a rod loaner program if present.

Spring electrofishing is conducted at every lake on an every other year basis. Samples are conducted to gather information on species composition, catch rates, and size structure. Furthermore, tandem hoop nets are used to sample catfish populations in the fall at every lake, every two to three years to monitor standing stock and condition of catfish.

Furthermore, exploitation studies, creel surveys, and use of time-lapse cameras to assess fishing pressure have been used to assess angling pressure at FINs lakes. Time lapse cameras have been deployed at 42 of the 44 lakes for a 12-month period to survey fishing pressure in recent years. Timelapse Image Analyzer was used to assist personnel with image analysis.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Kentucky

Name of Representative to Technical Committee: Dane Balsman

Date Submitted: 11/28/22

Project Name or Description: Can channel catfish nesting boxes replace stocking in small impoundments?

Contact Information:

Name: Tom Timmerman

Co-Authors: Jeff Crosby, Marcy Anderson, Jeremy Shiflet

Email: tom.timmerman@ky.gov

Phone: 606-783-8650

Objective: Because channel catfish are not able to produce self-sustaining fisheries in small impoundments, KDFWR has been experimenting with artificial nesting boxes as a replacement to stockings.

Current Status: Ongoing – Project is in its early phases with 4 of the 5 lakes in the project just completing their third season in the water. Usage of boxes for spawning is being observed. While the study is ongoing, catfish stockings have been paused at these study lakes. Catfish are being sampled with hoop nets and trot lines for age and growth to determine if recruitment is occurring.

Abbreviated abstract: In most small impoundments, channel catfish do not produce a self-sustaining population of fish and anglers are reliant on state agencies to stock fish in order to maintain a fishable populations. The limiting factor in most instances is a lack of spawning habitat such as: hollow logs, undercut banks and rock crevices. Several other states have experimented with adding artificial spawning habitat in the form of nesting boxes to their lakes and have had success in creating habitat necessary to have self-sustaining fish populations in small impoundments. With hatchery space limited and expense of raising and stocking these fish high, alternative strategies for providing fish to small impoundments is of particular interest to state agencies. If channel catfish can self-sustain through artificial nesting boxes, then hatcheries can be freed up to use space and funding for other projects. The goals of this project are to (1) determine if artificial nesting boxes can create a self-sustaining population of channel catfish and (2) if so what rate of boxes are needed to maintain high quality populations of channel catfish.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Louisiana

Name of Representative to Technical Committee: Bradley Launey

Date Submitted: 12/15/2022

Project Name or Description: LDWF Standard Small Impoundment Sampling for 2022

Contact Information:

Name: Brad Launey

Co-Authors: ---

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Phone: 337-735-8712

Objective: Update Louisiana's Small Impoundment Sampling for 2022

Current Status: Updated

Abbreviated abstract:

In Louisiana, technical advice to owners of ponds and small lakes is a part of the responsibility of the Inland Fish Division. Division biologists make several site visits assisting residents of the state on problems ranging from construction and stocking requirements, to harvest and disease identification. The biologists also answer numerous phone inquiries about various pond-related problems on a yearly basis.

Nuisance aquatic vegetation is a problem in most small impoundments. Biologists provide advice and technical assistance as well as aquatic plant identification assistance for pond owners on request. Upon request, Electro-fish sampling on private impoundments has been offered over the years to assist private pond owners. Inland Fish division also issues triploid grass carp permits to individuals that have nuisance submerged aquatic vegetation issues.

Louisiana has not provided fish to private pond owners since 1988. Private pond owners are given a fingerling producers list where they can purchase fish. In addition, a pond management guide is offered to these individuals for helpful management ideas. This producer's list and pond management booklet is on our web site www.wlf.louisiana.gov.

The Office of Fisheries has developed a community-fishing program for LDWF, called “Get out and fish”. Within this program, LDWF identifies potential opportunities to bring fishing access to municipal areas as well as suburban and rural communities. LDWF believes fishing should be a readily accessible activity to all Louisiana residents and that the development of community fishing opportunities significantly increases access to quality fishing. LDWF will only support community-fishing opportunities that allow open access to the public, with particular attention to access typically in short supply; shoreline angling and accessibility to the handicapped. For the purposes of this program, a public waterbody is one that is no more restricted to the public than to any other group or individual. The objectives of this program are as follows:

Increase the number of recreational fishing opportunities and participation in recreational fishing each year

1. Develop cooperative relationships with local government and community organizations to provide community fishing opportunities
2. Develop and/or maintain a fishery that will provide the opportunity to catch fish
3. Provide training and educational opportunities to teach children and adults how to fish and enjoy other related aspects of nature
4. Develop and increase anglers’ and nonanglers’ environmental awareness and conservation ethics in the community

To increase angler’s success, sites approved through the “Get out and Fish” program are stocked annually with channel catfish and rainbow trout. Catfish stockings are usually conducted late summer into fall. Rainbow trout are stocked in January/February when water temperatures are cool enough to prevent mortality.

Sampling and Stocking for Louisiana Small Impoundments managed by LDWF:

2022 LDWF Standardized Sampling

Sample Type	Waterbody	Acreage	Spring	Summer	Fall	LEAD	LMB Genetics	Stock
<i>STANDARDIZED ELECTRO FISHING</i>	CHATHAM LAKE	150						LMB
	Horseshoe Boeuf WMA	100	3		3 + F			
	Woolen	240						LMB
	University Lake B.R.	195						LMB
	NEW ORLEANS CITY PARK LAKE	120	4	4 + 4F				
	LITTLE ALABAMA BAYOU	45			2 + 2F			
	BAYOU ST JOHN	120	2		2 + 2F			
	Lake Buhlow	265						CCF
	Lake Dubuisson	200	2		2 + 2F			LMB
GILL NET	Horseshoe Mer Rouge	133			2			LMB
	Horseshoe Boeuf WMA	100			2			

F =
Forage
Samples

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Maryland

Name of Representative to Technical Committee: Matt Sell

Date Submitted: 12/14/22

Project Name or Description: Multiple sites ongoing

Contact Information:

Name: Matthew Sell

Co-Authors: N/A

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Phone: 301-334-8218

Objective/Current Status/Abbreviated abstract:

Bathymetry/Side Scan Sonar Habitat Mapping

During 2022, Maryland Freshwater Fisheries and Hatcheries Division (FFHD) staff began to collect bathymetric and habitat data using a Humminbird Helix 12 sonar unit. The purpose of the surveys was to generate bathymetric maps that would be downloadable for use in Google Earth as a tool for anglers as well as map the littoral habitats where fisheries surveys are conducted. Initially, the Sonar TRX software package was purchased for the analysis of the data, but a licensing issue forced us to find an alternative. Ultimately, Reefmaster was purchased and we are in the early stages of building bathymetric maps and side scan sonar image mosaics.

Broadford Lake

During 2021, mark-recapture population estimates for black basses were determined for Broadford Lake (Garrett County). The results of this survey indicated the populations were characterized by low densities and very high PSDs for both species present (largemouth bass and smallmouth bass). Predation by abundant panfish (bluegill, pumpkinseed, black crappie and yellow perch) likely contributed to poor recruitment. During 2022, 175 adult largemouth bass were collected from Greenbrier Lake (Washington County, very low PSD and high abundance) and released into Broadford Lake in an effort to improve densities and recruitment of black

basses while reducing densities in the contributing waterbody. Follow-up surveys will be conducted on a bi-annual basis to determine the success/failure of the effort.

Piney Reservoir

During 2022, FFHD staff deployed nearly 150 donated Christmas trees into Piney Reservoir as fish habitat structures. Piney Reservoir does not allow boating access for safety reasons, but is an extremely popular destination for bank and ice anglers. Side scan recordings and bathymetric data were also collected on Piney Reservoir.

Lake Habeeb and Savage River Reservoir

During 2022, FFHD staff conducted regular fishery monitoring on Lake Habeeb and Savage River Reservoirs. Full summaries of these surveys will be shared upon approval of the reports.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Mississippi

Name of Representative to Technical Committee: Keith Meals

Date Submitted: 12/14/2022

Project Name or Description: NE Region, NW Region

Contact Information:

Name: Keith Meals

Co-Authors: Dustin Rodgers

Email: keithm@wfp.ms.gov

Phone: 662-234-1437

Objective: Optimize fisheries benefits to public and recruit, retain, and reactivate anglers on agency and other public waters.

Current Status: Ongoing.

Abbreviated abstract:

MDWFP conducted their first fishing rodeos since 2019 since there were cancelled in 2020 and 2021 due to COVID-19.

Fall electrofishing (routine monitoring) was conducted on waters as reported. Technical guidance to private pond owners was done, but is not included in this report.

NE Mississippi, D. Rodgers

Community Fishing Assistance Program (CFAP) waters:

McAlpine Lake, Amory, 2.5 acres

Six hundred hybrid blue catfish were stocked for the annual fishing rodeo.

Ballard Park Lake, Tupelo, 3 acres

Fall electrofishing was conducted in 2022 to evaluate the current fish population.

MDWFP State Fishing Lakes:

Elvis Presley Lake, Tupelo, 322 acres

Elvis Presley Lake in Tupelo was drained and restocked for a scheduled renovation beginning in 2021. No sampling took place in 2022. Restocking included 8,035 Northern Largemouth Bass, 15,584 Channel Catfish, 500 Threadfin Shad, 79,030 Redear Sunfish, 257,706 Bluegill, 25,000 Black Crappie, and 1,000 triploid grass carp.

Lake Monroe, 99 acres

Lake Monroe received 5,217 Gulf-Coast Strain Walleye. Five large fish habitat structures were added to the lake. Fall electrofishing consisted of five random samples over a total of 5 km.

Lake Lamar Bruce, 300 acres

Lake Lamar Bruce received 5,200 Gulf-Coast Strain Walleye. Fall electrofishing was conducted over five randomly selected sample areas for a total of 5 km.

Lamar Bruce Pond, 2 acres

This small pond is separated from the main lake by a small dam and is used for fishing rodeos. In 2022, 350 hybrid blue catfish and 20 triploid grass carp were stocked in the pond. Variable-leaf pondweed, chara, and southern naiad were treated with fluridone, and two treatments of a diquat/copper mix.

Tippah County Lake, 145 acres

Fall electrofishing was conducted over five randomly selected sites for a total of 4 km.

MDWFP State Park Lakes:

Lake Lowndes State Park Lake, 150 acres

Lake Lowndes was stocked with 750 Triploid Grass Carp and 9,000 Black Crappie.

Tombigbee State Park Lake, 90 acres

Fall electrofishing consisted of five random samples for a total of 3 km.

Lake Topposha, 15 acres

Located at Legion Lake State Park, Lake Topposha received 450 hybrid blue catfish for the annual fishing rodeo.

NW Mississippi, K. Meals

Community Fishing Assistance Program (CFAP) waters:

Olive Branch City Park Lakes, Olive Branch (near Memphis, TN), 3 ponds, 9 acres

Three fall electrofishing samples (1/pond) totaled 1.25 hr and documented effects of high fishing pressure. Spotted gar were captured for the first time that likely entered during major flood events in recent years via downstream Camp Creek.

Mixed bluegill/redear sunfish (1,030 total) were stocked in 2 of the ponds to reestablish redear in bass crowded conditions. Channel catfish (600 total) were stocked in all ponds.

Ponds were mapped in Google Earth Pro to get more accurate acreages.

Lee's Summit Park Lake, Hernando, 1.5 acres

One fall electrofishing sample totaled 0.25 hr. Bass/bream balance improved. Channel catfish (150) were stocked. The first fishing rodeo here is planned in 2023.

Lake Patsy, Oxford, 8 acres

One fall electrofishing sample totaled 0.5 hr. Mixed bluegill/redear sunfish (2,000) and channel catfish (700) were stocked. Unlike other NW CFAPs, Lake Patsy is only open to youth and mobility handicapped.

White's Creek Lake, Eupora, 288 acres

Three fall electrofishing samples totaled 1.5 hr. Enough catfish were seen from rodeo fish stocked in 2021 that no additional catfish were stocked. Redear sunfish rebounded from a 2021 kill. Crappie otoliths were collected and read. Threadfin shad (stocked before enlistment in CFAP program) had negative impacts on fish reproduction and bream size.

MDWFP State Park Lakes:

Spring Lake, Wall Doxey State Park, Holly Springs, 45 acres

Parrotfeather continued to be problematic. A 2021/2022 winter drawdown was done, and a 2022/2023 drawdown was planned. Granular 2,4-D was broadcast around boat ramp and fishing pier areas (about 5 acres, total). Triploid grass carp (1,000) and channel catfish (2,400) were stocked. Fall electrofishing (1.5 hr) documented a slight expansion of lake chubsuckers, but also some improvement in bass and bluegill/redear sunfish size due to vegetation refugia.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Oklahoma

Name of Representative to Technical Committee: Keith Thomas

Date Submitted: 12/16/2022

Project Name or Description:

Contact Information:

Name: Douglass Zentner

Co-Authors: Graham Montague

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Phone: 405-325-7288

Objective: Trophy catfish sampling techniques evaluation

Current Status: Ongoing

Abbreviated abstract:

Wiley Post Lake, a 302-acre impoundment, located in south-central Oklahoma, was included as a part of an ongoing assessment of Blue and Flathead Catfish (hereafter catfish) sampling techniques at select lakes throughout Oklahoma. The overall goal of this project is to improve our understanding of sampling techniques required for successful management of trophy catfish (> 1000 mm) fisheries. The direct objectives of this project are to: (1) determine if low-frequency electrofishing (LFE; < 30 Hertz)) exhibits size bias against preferred-sized (> 600 mm mm) catfish and (2) determine the short- and long-term tag retention (e.g., >85%) of modified Carlin dangler tags placed between the catfish opercal bones. These objectives were addressed by creating known populations using a mark-recapture study design to assess the sampling accuracy LFE. Data collection for retention of modified Carlin dangler tags placed between the opercal bones was completed in 2022 and analysis is currently underway. Additional field data collection using LFE is scheduled to be completed in 2023.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: Oklahoma

Name of Representative to Technical Committee: Keith Thomas

Date Submitted: 01/12/2023

Project Name or Description: Ozzie Cobb Largemouth Bass population manipulation project

Contact Information:

Name: David Bogner

Co-Authors: Jay Barfield, Mike Williams, Madison Mitchell

Email: david.bogner@odwc.ok.gov

Phone: 918-297-0153

Objective: Investigate levels of biomass harvest to manipulate growth rates and abundance of Trophy size Largemouth Bass.

Current Status: Ongoing – early status

Abbreviated abstract:

In 2022 ODWC change its largemouth bass harvest regulation from a 14-inch minimum and 6 fish per day to 6 fish per day with only one over 16 inches. 95% of Bass anglers practice catch and release and this regulation change was to encourage harvest of smaller fish, reduce competition, and increase growth rates and ultimately size in remaining bass. To evaluate bass biomass removal needed to effect changes in growth rate, ODWC staff completed a mark recapture study to estimate population size and then removed every bass below 18 inches in subsequent sampling at Ozzie Cobb State Fishing Lake (58 acres). Culled Bass were measured, weighed and a subsample had otoliths pulled. Fish that had otoliths pulled were also sexed. Over the next 5-7 years staff will continue to remove fish below 18 inches and record total biomass removed as well as record CPUE of bass of all sizes to evaluate what level of removal is needed to influence growth rates and investigate the resulting ability of a reservoir to produce trophy sized fish.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Oklahoma

Name of Representative to Technical Committee: Keith Thomas

Date Submitted: January 12, 2023

Project Name or Description: Close to Home Fishing Program (CTHFP)

Contact Information:

Name: Keith Thomas

Co-Authors: Shelby Jeter

Email: keith.thomas@odwc.ok.gov

Phone: 405-325-7288

Objective: R3 - Recruit, retain and reactivate anglers

Current Status: Third year of five-year plan

Abbreviated abstract: Urban Fishing Program Update

Aquatic vegetation control via herbicide was performed at several program ponds (< 8 acres) during the summer. Objective was to increase bank access and open fishing lanes. Main species sprayed were coontail, lotus and cattails. Herbicides used included Aquathol Super K (spot treatment @ 3 ppm), and Aqua Neat at (0.75 %) correspondingly. An aeration system was purchased and installed to help with alga blooms and to reduce nutrient buildup from the adjacent neighborhood. Dam and spillway at Bickham - Rudkin Park pond in Edmond, OK and the Ten Acre Park pond in Choctaw, OK were surveyed and plans were made to fix both in 2023.

Fish populations at 2 program ponds (< 3 acres) were sampled during 2022. Sampling will help determine future stocking strategies. Methods included spring electrofishing, baited hoop nets and trap nets. Collected fish were sorted, counted, weighed, measured and hole punched. Raw data was entered into EXCEL spreadsheets and uploaded to the Oklahoma Fish Analysis Tool (OFAT) for further study. Analysis is ongoing.

Angler creel surveys were conducted at 2 CTHFP ponds from April through August to determine pressure, catch and harvest amounts. Ten Acre pond experienced heavy fishing pressure and harvest while the Bickham-Rudkin pond saw low numbers of anglers and harvest. Analysis is ongoing.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Oklahoma

Name of Representative to Technical Committee: Keith Thomas

Date Submitted: 01/12/2023

Project Name or Description: Evaluation of operculum punch marking of sunfish species to aid in future mark and recapture studies.

Contact Information:

Name: Shelby Jeter

Co-Authors: Doug Zentner

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Phone: 405-325-7288

Objective: Determine if operculum markings outlast fin clips or hole punches.

Current Status: Ongoing

Abbreviated abstract:

A field study performed at 6-acre Close to Home pond (NE Lions Park - Norman, OK) to investigate hole-punching operculums to mark sunfish and bass for mark-recapture studies. In the Fall field study portion, a total of 72 largemouth bass and 450 assorted sunfish were marked. Fish must have a minimum size of 127mm. They were sampled every 2-3 weeks from September 21 through November 17, 2022 in order to follow re-growth and tag new fish. This research has already been conducted in a lab setting with promising results. Sampling will continue in the Spring of 2023.



Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Oklahoma

Name of Representative to Technical Committee: Keith Thomas

Date Submitted: 01/12/2023

Project Name or Description: Mechanical aquatic vegetation removal

Contact Information:

Name: Keith Thomas

Co-Authors: Doug Zentner

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Phone: 405-325-7288

Objective: Remove nuisance vegetation for anglers at select urban fishing ponds as well as at state fishing lakes. Reduce herbicide use. Open up casting lanes and clear around fishing piers.

Current Status: Just started

Abbreviated abstract: Weedoo[®] aquatic weed harvester purchased in December 2022. Stationed at the Oklahoma Fishery Research Laboratory - Norman, OK. Attachments include a side cutter, skimmer bucket, root rake and loader bucket. Target species - duckweed, cattails, milfoil, lilies, willows and coontail.



Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: South Carolina

Name of Representative to Technical Committee: Preston Chrisman

Date Submitted: 12/14/2022

Project Name or Description: SCDNR State Lakes Program

Contact Information: Preston Chrisman

Co-Authors:

Email: chrismanp@dnr.sc.gov

Phone: 803-280-0922

Objective: Provide diverse angling opportunities for the public

Current Status: Ongoing

Abbreviated abstract: The South Carolina Department of Natural Resources (SCDNR) currently manages 20 lakes under the State Lakes Program. These lakes range in size from 1 to 400 acres and display an array of management intensity levels due to a host of factors. Of the 20 lakes, 9 are limed and fertilized and there have been recent nuisance vegetation issues (Cattails, Bladderwort, Primrose, Parrot Feather, and Water Hyacinth) at 6 lakes, but these were sprayed and appear to be under control. Two lakes received extensive damage from floods resulting from hurricanes in 2015 (Lake Ashwood) and 2016 (Dargans Pond) and their dams were compromised. Lake Ashwood's dam was repaired, and a new gate valve was installed; the lake was restocked in 2019-2020 and reopened to the public July 1, 2021. Dargans Pond is owned by Clemson and the decision was just recently made to repair the dam but is awaiting funding from the university. A third lake, Lake Johnson, is also experiencing erosion issues and the water level has been reduced until repairs can be made and a new spillway can be installed. Sunrise Lake received a new spillway in 2017 and reopened to fishing July 1, 2019. Lake Brown is hyper-eutrophic and had struggled with cyanobacteria blooms in summer; some were severe enough to cause SCDHEC lake advisories. But surprisingly, water quality was vastly improved in summers of 2021 and 2022 and no cyanobacteria blooms occurred. Fish attractor sites are maintained on most State Lakes and receive periodic replenishment in the form of Christmas trees, bamboo, or artificial structures. Small trees were removed off the back of the dam on 6 lakes and repairs were made to fishing piers at 6 lakes.

The lakes' sport fish populations receive varying levels of monitoring and management due to manpower and budgetary restrictions. Some lakes are sampled annually while others are not able to be sampled effectively at all. Of the lakes that have had their fish populations sampled in

recent years, most are displaying bass-crowded conditions. There are several trophy bass lakes in the State Lakes Program as well, but very few that display balanced conditions. Finally, there are a handful of impoundments that are little more than put-and-take catfish ponds. Many of the lakes receive annual Channel Catfish stockings as well as supplemental Bluegill and Redear Sunfish stockings to improve panfish fisheries and bass forage in the lakes. Threadfin Shad have been stocked into three of the lakes and early returns look promising.

Trying to combat the crowding of Largemouth Bass in these lakes is a top priority for lake managers but most efforts have been unsuccessful so far. However, SCDNR wants to provide wide array of angling opportunities and it is hoped that some lakes can be corrected to display balanced conditions while still maintaining some lakes in bass-crowded conditions for trophy panfish opportunities. Preliminary discussions have occurred within SCDNR to determine if we would like to try a female-only Largemouth Bass lake, following GADNR's recipe. Having clusters of State Lakes where there is at least one lake that is bass-crowded and one lake that is a trophy bass fishery should appeal to widest range of anglers and keep participation rates high.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: South Carolina

Name of Representative to Technical Committee: Preston Chrisman

Date Submitted: 12/14/2022

Project Name or Description: Largemouth Bass Removal Study

Contact Information:

Name: Preston Chrisman

Co-Authors: Dan Rankin (SCDNR), Dr. Chuck Cichra (University of Florida)

Email: chrismanp@dnr.sc.gov; rankind@dnr.sc.gov; cecichra@ufl.edu

Phone: 803-280-0922

Objective: Determine if heavy Largemouth Bass removal via electrofishing can be feasible as a short-term solution to bass-crowded impoundments.

Current Status: Completed

Abbreviated abstract: Declining angler harvest rates of largemouth bass (*Micropterus salmoides*) have increasingly led to small impoundments containing overcrowded largemouth bass populations. Various methods to correct or prevent crowded largemouth bass populations have been used by fisheries managers, with mixed results. Largemouth bass were removed from two small impoundments in South Carolina using boat electrofishing over two consecutive years. Relative weight (Wr) was used as the removal criterion: all largemouth bass displaying condition $Wr \geq 95$ were released and all other largemouth bass were removed. We set targets of removing 40-50% of the largemouth bass population each year at both impoundments. Population sizes were estimated in each impoundment using mark-recapture with a Chapman's modified Lincoln-Petersen framework for both large (≥ 200 mm TL) and small (< 200 mm TL) largemouth bass length groups. A total of 1641 largemouth bass (162.5 fish ha^{-1}) were removed from Jonesville Reservoir (10.1 ha) and 1022 largemouth bass (63.1 fish ha^{-1}) were removed from Lake Oliphant (16.2 ha) in 2020 and 2021. Proportions removed approached removal goals of 40-50% of the estimated population size for both length groups at both impoundments in 2020 but fell short of removal targets in 2021 at Jonesville Reservoir. Improved bluegill (*Lepomis macrochirus*) catch rates and reduced largemouth bass catch rates at Lake Oliphant following 2020 removal efforts led to reduced removal efforts in 2021. Catch rates, estimated population sizes, and estimated biomass ($kg\ ha^{-1}$) of large largemouth bass declined from 2020 to 2022 at both impoundments,

but results for small largemouth bass were variable. Largemouth bass condition increased at both impoundments and size structure increased at Lake Oliphant. Bluegill catch rates increased at Lake Oliphant but remained low at Jonesville Reservoir. Bluegill condition and size structure declined at both impoundments from 2020 to 2022. We speculate that the presence of an established threadfin shad (*Dorosoma petenense*) population contributed to more successful efforts at rebalancing the fishery at Lake Oliphant than at Jonesville Reservoir, which does not have a threadfin shad population. Removal efforts likely need to be repeated at both impoundments at regular intervals in the future, raising the question of whether these populations should be renovated and restocked using modified stocking rates or other innovative options to achieve management goals more efficiently.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: South Carolina

Name of Representative to Technical Committee: Preston Chrisman

Date Submitted: 12/14/2022

Project Name or Description: Outreach and inter-agency cooperation.

Contact Information:

Name: Preston Chrisman

Co-Authors:

Email: chrismanp@dnr.sc.gov

Phone: 803-280-0922

Objective: Provide pond management information to the public. Host youth fishing rodeos. Sample small impoundments that are not in the State Lakes Program.

Current Status: Ongoing

Abbreviated abstract: Budget reductions eliminated SCDNR's ability to conduct on-site pond management consult visits many years ago. Now, biologists can still perform nuisance vegetation identification and control sessions as well as water quality tests, but the pond owners must bring the samples to DNR offices. All regional offices perform these consulting sessions with pond owners and can provide recommendations on herbicide treatments, grass carp stocking rates, pond construction, and fish population management. Many pond owners are served every year in this fashion in-person or via email or phone conversations.

There are 33 youth fishing rodeos put on by SCDNR every year, including three that are hosted on lakes in the State Lakes Program. Nearly all these rodeos were canceled in 2020 and again in 2021 because of COVID-19. More events occurred during 2022, but some were still cancelled. Channel Catfish are stocked in the week leading up to each rodeo and all kids that participate receive a rod and reel and a tackle kit at no cost and lunch is served to all the kids and their parents. Prizes are awarded for the biggest and smallest catfish caught and raffle prizes are also given away during each event. 2023 is shaping up to be the first year where all fishing rodeos occur since before COVID-19.

SCDNR biologists also monitor sport fish populations and stock fish into small impoundments that are not within the State Lakes Program. These lakes can include lakes owned by SC State Parks, the US Forest Service, and/or local municipalities that provide angling opportunities for the public.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report

State Reporting: Tennessee (TWRA)

Name of Representative to Technical Committee: Mike Bramlett

Date Submitted: 12/14/2022

Project Name or Description: 2021 Small Impoundments Report

Contact Information:

Co-Authors: Regional Biologist/Managers

Email: Mike.Bramlett@tn.gov

Phone: 615-781-6592

Small impoundments in Tennessee consist of work with Agency Lakes, Community Fishing Program, along with the Winter Trout Program, Youth Fishing derbies, and Private Pond assistance.

Agency Lakes Program (ALP)

TWRA currently maintains 19 public family fishing impoundments ranging from 20 to 950 acres, and are managed for bass, bream, crappie, and catfish. Three impoundments have the addition of hybrid stripe bass, and walleye. Ten lakes are under concessionaire operations. Most of the activities were routine, such as sampling and maintenance. ADA improvements on walkways, restrooms and fishing piers were made at three lakes. Fish habitat/attractors were added, or sites refurbished on twelve lakes. Materials/designs consisted of corrugated PVC/concrete blocks, spider buckets, pea gravel, stone piles, plastics (i.e mossback), and stake beds. Trotlines, yo-yos and jugs were utilized on two lakes to evaluate population densities, recruitment and growth of catfish. Hoop nets have been used to evaluate catfish reproduction after catfish spawning structures were added. Bathymetric maps were completed for two lakes, which will hopefully be useful to anglers and for habitat improvements.

An Aquatic Plant study was done in the spring of 2022 at Whippoorwill Lake, (30 acre) of a distance (70 yards to 100 yards) of the primary bank from which anglers' fish was becoming heavily vegetated with "Water Pennywort". Small patches of Water Pennywort were likely present in 2021, but its rapid expansion in 2022 was surprising. The origin of Water Pennywort in Whippoorwill Lake is unknown, and previously hadn't been an impediment to bank

anglers. However, since it was an impediment to bank anglers in 2022, the following action was taken:

1.) Area with Water Pennywort was divided into two transects of approximately equal distances. Each transect was treated with a different aquatic herbicide. Transect one was treated with "CLIPPER" (Flumioxazin), which was rated as "good" for Water Pennywort. Transect two was treated with "HABITAT" (Imazopyr), which was rated as "excellent" for Water Pennywort. Both herbicides were applied with hand-held sprayers at manufacturers' recommended application rates.

2.) Results were "good" for Clipper and "excellent" for Habitat. In the area treated with Clipper, limited Water Pennywort survival was noted. In the area treated with Habitat, a complete eradication was noted. Cost per gallon sprayed was \$1.84 for Habitat and \$2.09 for Clipper. Total number of gallons used was eight (four gallons per area). Therefore, the most effective and cost efficient was Habitat.

While not directly in the ALP, fisheries staff assists with the management of state park lakes, which are under the control of the Department of Environment and Conservation (TDEC). Most of these impoundments are not intensively managed, and much of the work on them centers on surveys, creel/size limits, stocking, and aquatic vegetation control. Regulation changes were made on several of the state park lakes to reflect management goals and simplify fishing laws. Habitat improvements, mapping, fish stockings, and age and growth analysis will continue for 2023. The agency continues to partner with TDEC to intensively manage five lakes to improve the fisheries as part of the Tennessee fishing trail lakes, including the stocking of Coppernose Bluegill and Golden Shiner to several of the lakes. Work continues with fish population assessments, management plans, fish stockings, fish feeders, and habitat enhancements.

Community Fishing Program (CFP)

The CFP continues to bring fishing opportunities to municipal/urban areas as well as suburban and rural communities, by working with local/county government and community organizations. It seeks to increase the number of anglers with access to fishing "closer-to-home". There are currently 18 impoundments in the program ranging from 2 to 30 acres. Most are managed using statewide regulations for bass and bream, with stocked species consisting of channel catfish and/or trout. Bathymetric maps were also completed on two of these lakes. Our R3 coordinators still present multiple "how to and get out and fish" events at those lakes April through July. Work continues to add more habitat improvements, supplemental feeding/feeders, along with reviewing/renewing fish regulations.

Winter Trout Program

The program stocked approximately 32 small impoundments across the state with rainbow trout between the months of November through March. These lakes are generally less than 10 acres with easy access. Approximately 57,000 rainbow trout, averaging 10 inches are stocked during

this five-month period, with a daily creel limit of seven, and no size limit. However, there are still discussions to maybe reduce the creel to five at several lakes. A trout license is required in addition to a regular fishing license. Angler use has been steady or increasing, with trail cameras being used on multiple lakes to estimate angler effort/use. Creel surveys are also to be conducted on several impoundments.

Youth Fishing Derbies

Approximately 60,000 pounds of channel catfish (.75 – 2.0 lbs. each) were stocked into 72 waterbodies that had organized youth fishing derbies, along with eleven fishing lakes without an organized fishing event. An estimated 8,500 youth participated in the organized fishing derbies with approximately 70% catching at least one fish.

Private Pond Assistance

Technical assistance is provided to private pond owners over the phone, printed materials, and on the website. Onsite assistance is given on a case-by-case basis depending on the issue and can be limited based on the time and manpower. Otherwise, we give them contact information of private pond consultants. The agency no longer stocks fish into private waters but provides those requesting fish stockings the contact information of private pond stockers.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report

State Reporting: Texas

Name of Representative to Technical Committee: Cynthia Fox Holt

Co-Authors:

Email: cynthia.fox@tpwd.texas.gov

Phone: 817-732-0761

Date Submitted: 12/14/2022

Project Name or Description of Activities: Texas has over 1,000 public small impoundments that range in size from 0.1 – 500 acres. These are typically controlled by local governments (cities, townships and counties), who partner with us to manage recreational fishing opportunities across the state. Many small impoundments are focal points in small communities and serve as a great attraction for residents while, others are spread throughout major metropolitan areas and serve as close-to-home opportunities for our fastest-growing demographics. These waters play an important role in our state’s R3 initiatives. The degree of management varies among sites, ranging from simply “put-and-take” seasonal fisheries to intensively managed diversified angling opportunities. Many of these receive fish stockings to sustain fishing activity. Species stocked in small impoundments were mainly Channel Catfish, Rainbow Trout, Largemouth Bass, and sunfishes, providing excellent fishing opportunities for Texas anglers.

Texas Parks and Wildlife Department (TPWD) partners with waterbody controlling authorities, local vendors and interest groups and educational institutions to plan, fund and complete management activities on small impoundments across Texas. Management activities in small impoundments in 2021 consisted of fish community and vegetation surveys, vegetation treatments, fish stockings, construction and installation of spawning structures, shoreline stabilization, aerator installation to improve water quality, and habitat enhancement with native vegetation and various types of artificial structures. These projects are often partially or wholly supported by TPWD Conservation License Plate (CLP) or Habitat and Angler Access Program (HAAP) funds. Twenty-one HAAP funded projects were approved in 2021 and 11 CLP funded projects were approved in 2022. Of those 32 projects, 17 projects were for small impoundments. For more information about CLPs, HAAP, and the projects they fund, please visit: www.conservationplate.org and <https://tpwd.texas.gov/landwater/water/habitats/habitat-angler-access-program/>.

Objective: Small Lakes

Current Status: Small lakes are typically between 75 and 500 acres, excluding those completely enclosed within state parks. These reservoirs may have regulated access and more restrictions than our larger reservoirs to preserve water quality and wildlife populations. When necessary, TPWD will manage specific objectives in these small lakes, similar to large reservoirs, by monitoring, regulating, restoring fish habitat and improving angler access to enhance fishing opportunities. Supplemental stockings may not be required for these self-sustaining populations.

Management activities on small lakes in 2022 consisted of fish community assessments via nighttime and daytime electrofishing surveys, vegetation assessment and control projects, and habitat enhancement using native plants and various artificial structures.

Objective: Community Fishing Lakes (CFLs)

Current Status: These ponds are defined as a public impoundment ≤ 75 acres located totally within incorporated city limits, a public park, or any impoundment lying totally within the boundaries of a state park. There are approximately 850 known CFLs in the state, with numbers growing every year. Most CFLs are minimally managed for local anglers seeking a quick experience around their communities. Many CFLs receive annual stockings of Channel Catfish and Rainbow Trout, with many of these stockings tied to outreach fishing events, sponsored by partners. Fishing regulations for most CFLs align with statewide regulations, except those pertaining to catfish and fishing gear. Depending on size and popularity; some CFLs are managed more intensively to provide diverse fisheries objectives to attract a spectrum of angler preferences. Some have received supplemental Largemouth Bass and sunfish stockings, habitat and access enhancements, tailored regulations, and highlight less traditional species in smaller impoundments. This complexity has sprouted the need to revise the definition and regulatory approach for this designation of public waters. A special committee was formed to evaluate the need and strategies for this objective moving forward. The committee conducted a statewide CFL angler survey in 2021. The results listed below are a summary of the data based on angler attitudes related to catch, harvest and satisfaction and were used to develop a new harvest regulation for CFLs.

Survey

Total Number of Individual Responses Collected: **887**

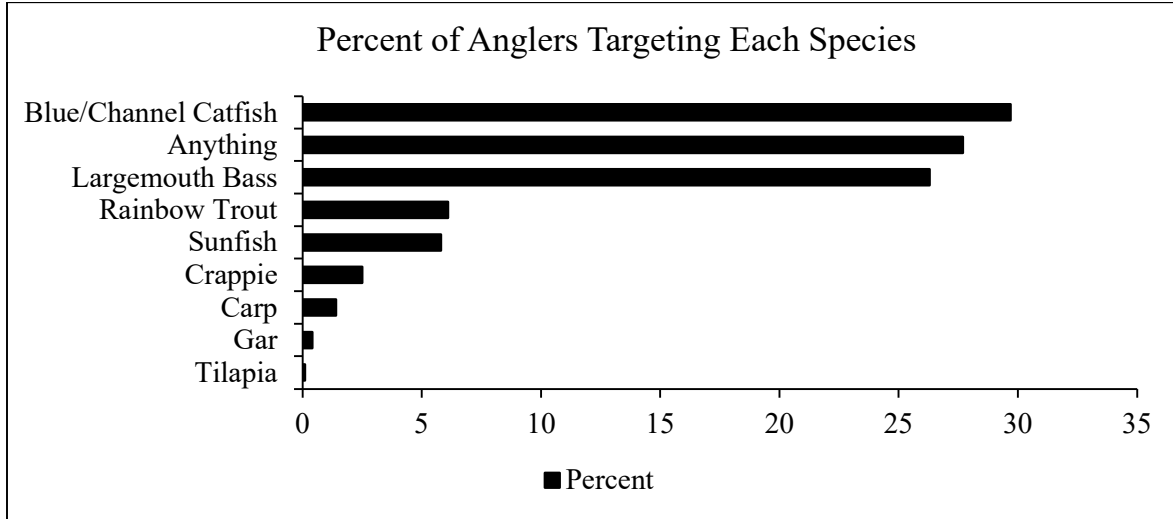
Surveyed **13 NFPs** and **139 CFLs (152 waterbodies total)**.

Most, if not all, of the surveys were incomplete trips, so it's possible that anglers' opinions, catch and harvest rates, and satisfaction may have been different after a completed trip.

Survey period was 01 March 2021 – 30 June 2021. As March is the end of Rainbow Trout stocking and fishing season, the results related to Rainbow Trout anglers may not be an accurate representation of angler use and views of the species.

Targeted Species

Blue/Channel Catfish (29.7%), Anything (27.7%), and Largemouth Bass (26.3%) were the three most sought after species among CFL anglers (including NFPs). For the rest of the results, we focused on anglers targeting the catfish, anything, largemouth bass, rainbow trout and sunfish.



Angler Catch

Estimated catch rates, split them out between CFL and NFPs since they tend to be managed differently. These were incomplete trips as we caught the anglers while they were fishing, we used mean of ratios estimator and excluded shorter trips (30 mins) as recommended in the literature. Compared using ratio of means and had similar results.

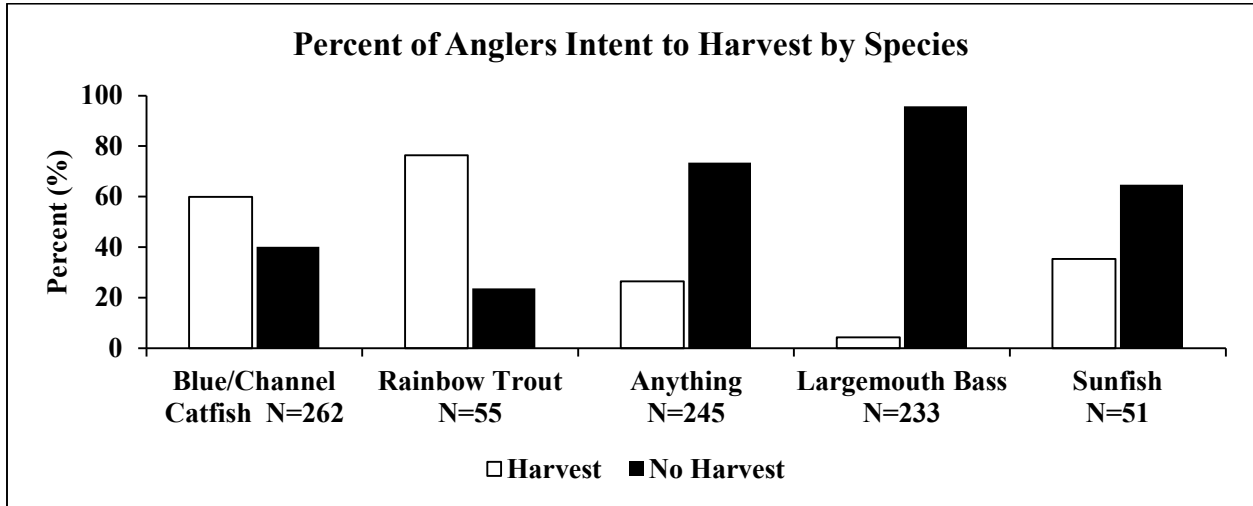
Across all lakes and species average angler catch rate was 0.85 fish/hr (N = 628). Other states have reported catch rates in the literature, Nevada, Minnesota, Kentucky, and others tended to be between 0.3-1.5 fish/hour.

Species	CFL		NFP		Average
	CPUE	N	CPUE	N	
Anything	1.00	126	0.47	18	0.94
Catfish	0.86	83	0.82	107	0.84
Largemouth Bass	0.57	145	0.00	7	0.56
Sunfish	2.43	27	4.03	3	2.72
Rainbow Trout	0.15	24	0.63	12	0.31

Intent to Harvest

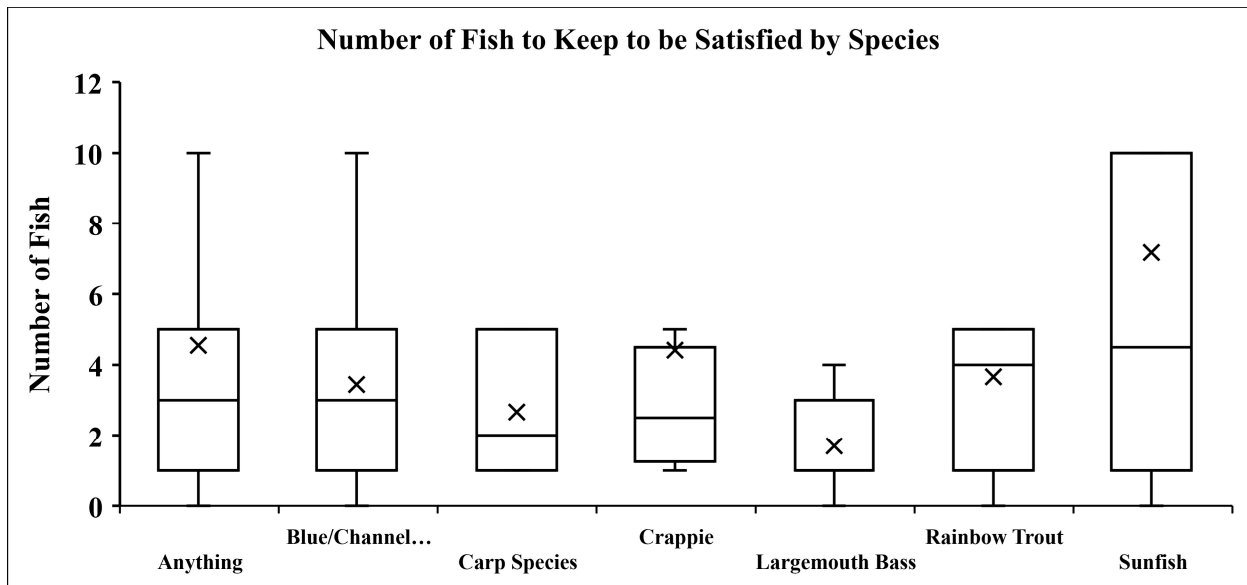
Blue/Channel Catfish (59.9%) and Rainbow Trout (76.4%) anglers were the most likely to harvest, while Anything (73.5%), Largemouth Bass (95.7%), and Sunfish (64.7%) anglers did

not intend to harvest. – This suggests that harvest-oriented anglers are primarily focused on the put and take fisheries of catfish and rainbow trout.



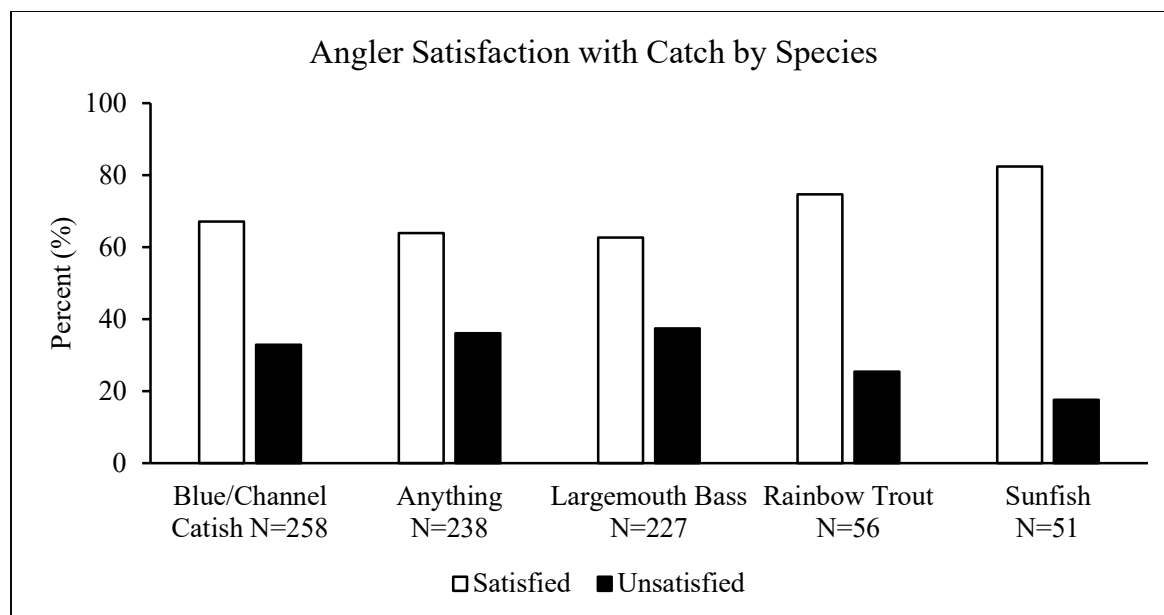
Number of Fish to Keep to be Satisfied:

Of anglers who indicated intent to harvest, our anglers typically desired between 3-10 fish, dependent on species. Desired numbers are below current bag limits for all species examined. The box and whisker plots shown here show, mean (x), median (horizontal line within box), and the interquartile range (ends of box).



Angler Satisfaction

The figure below shows the percentage of anglers who were satisfied or unsatisfied with their catch rate of targeted species at the time of their interview. The data used for this figure did not take any additional variables (time spent fishing, distance traveled, etc.) into account.



Catch Rate and Angler Satisfaction

Mean catch rates for satisfied anglers were at 1.21 fish per hour and mean catch rates for unsatisfied anglers were at 0.21 fish per hour.

Harvest Rate and Angler Satisfaction

Mean harvest rates for satisfied anglers were at 0.88 fish per hour (excluding the two outliers over 25 fish per hour) and mean harvest rates for unsatisfied anglers were at 0.08 fish per hour.

Time Spent Fishing and Angler Satisfaction

Of the anglers surveyed, those who fished between 60 and 90 minutes were the least satisfied (54%), while anglers fishing less than 60 minutes were moderately satisfied (65%) and anglers fishing more than 90 minutes were the most satisfied (73%).

Summary and Proposed CFL Definition and Harvest Regulations:

Community fishing lake proximity to urban areas and ease of access can cause CFLs to be heavily utilized by both recreational and subsistence anglers leading to heavy fishing pressure on these small waterbodies. With more energy and resources being committed to R3 and urban fisheries initiatives, we are trying to develop a regulation that would be easy to understand and enforce with the goal of enhancing fishing opportunities in growing communities by protecting fish stocks. Literature (Eades et al. 2008) shows that small water bodies, specifically those that are intensely marketed in urbanized areas, get overfished very quickly, leading to a poor recreational angling resource. It is believed, a more restrictive regulation could help reduce effects of overfishing and potentially improve fisheries in CFLs. We recognize it is not a guarantee, but we hope that with biologist support, law enforcement buy-in, and angler support, a new regulation would enhance and diversify the overall fishing experience of CFL anglers.

Proposed Definition

All public impoundments 75 acres or smaller located totally within incorporated city limits or a public park (including municipality, city, county, or state parks).

Proposed Regulation

Daily bag limit of all species in aggregate = 5, with only 1 black bass >14 inches allowed to be retained.

Fishing is by pole and line only. Anglers may use no more than two poles while fishing.

Expected Benefits

- Improved angler satisfaction at urban ponds by reducing effects of overfishing and protecting fish stocks
- Enhance and diversify fishing opportunities in urban areas.
- Reduce angler confusion about bag limits.

Potential Problems

- Change in harvest regulation does little to alleviate confusion among license requirements for CFLs, NFPs, and State Park ponds.
- Reduced harvest could lead to stunted and crowded fish populations.

Management activities on CFLs in 2022 consisted of fish community assessments via nighttime and daytime electrofishing surveys, vegetation assessment and control projects, and habitat enhancement using native plants and various artificial structures.

Objective: Neighborhood Fishin' Program

Current Status: Neighborhood Fishin' -is our premiere urban fishing program developed to bring quality fishing close to home. It consists of 18 (1-6 acre) CFLs located in parks of 11 major metropolitan areas. Ponds are stocked on a seasonal, biweekly schedule with Channel Catfish or Rainbow Trout eleven months of the year to maintain a 'put-and-take' fishery. This program is supported by numerous local government and private partners, including Gulf States Toyota and Sport Fish Restoration. Total program operating costs are ~\$550K per year at current levels. Fishing regulations are restrictive, intended to ensure success among as many anglers as possible. Sites have been carefully selected to provide diverse amenities to attract families and recruit new anglers to fishing. The program has been running strong for 20 years. For more information on NFPs, please visit: www.neighborhoodfishin.org.

Objective: Outreach and Research

Current Status: TPWD participates in a few hundred public outreach events each year, many of which pertain to youth and family fishing, continuing education courses for Master Naturalist groups, "How to Fish" workshops, and career and field days at elementary, middle, and high schools. In addition to these in-person outreach activities, most Inland Fisheries districts utilize social media (Facebook and/or Instagram) as a tool to reach and educate our current and future anglers about Texas' natural resources. Since management reports are not often written for small impoundments, social media is a great way to communicate with Texas anglers about management activities for CFLs and small impoundments.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: Virginia

Name of Representative to Technical Committee: Steve Owens

Date Submitted: 12/16/2022

Stunted Bass Management in DWR managed impoundments

Small public impoundments throughout Virginia may suffer from Largemouth Bass stunting as can be found elsewhere throughout the South. Largemouth Bass removal projects have been in place for several years to rectify stunting that has adversely affected the size structure at multiple locations. DWR hopes to understand what management decisions may or may not work and how DWR staff may better address undesirable population metrics. The following removal projects have shown promise in manipulating the size structure to better meet angler desires.

VDWR Region 2 East – 2022 LMB Thinning Summary

- **Amelia Lake**
 - 100 acre DWR owned lake with high fishing effort and expansive shallow water flats throughout.
 - Long history of extremely high abundance and poor size structure
 - Removals sporadically attempted with limited effort and frequency in the past.

Table 1. General summary of annual Largemouth Bass removal efforts at Amelia Lake from 2020-2022 including number of trips, total fish removed, and % of fish ≤ 32 cm age 4 or older

Year	Trips	# Removed	% \geq Age 4
2020	3	1,156	-
2021	4	1,281	0
2022	3	898	10
TOTAL	10	2,970	-

Table 2. Date, effort, numbers of fish collected and removed (< 320 mm) as well as size specific relative abundance (fish/hr) for Largemouth Bass removal trips to Amelia Lake in 2020-2022.

Grey highlighted rows represent annual samples for each year.

Date	Effort	Removed	Collected	CPUE	Young	Stock	Quality	Preferred	Memorable
5/12/2020	5998	275	380	226.90	63.60	115.80	41.4	3.00	3.00
5/27/2020		395							
9/22/2020	7398	486	528	316.90	253.9	36.00	19.80	7.20	0.00
4/23/2021	5191	356	407	282.26	145.64	56.87	71.43	4.85	1.39
4/29/2021	5827	293	341	210.67	77.23	61.78	64.25	4.94	1.85

5/17/2021	5897	304	327	199.63	106.83	54.33	32.36	4.88	0.61
10/15/2021	7190	328	390	195.27	105.65	42.56	37.55	8.01	1.50
3/24/2022	6966	414	499	257.88	125.58	45.99	74.42	9.30	2.58
5/2/2022	3742	119	150	144.30	45.22	27.90	60.61	8.66	0.96
10/24/2022	6119	365	418	245.92	145.91	51.18	35.30	11.77	1.18

Table 3. Proportional Size Distribution for quality (PSD), preferred (PSD-P), and memorable (PSD-M) size Largemouth Bass from Amelia Lake from 2000-2022. The red dotted line represents the start of removal efforts.

Year	PSD	PSD-P	PSD-M
2022	65	9	2
2021	58	6	3
2020	30	4	3
2019	33	8	5
2015	53	6	3
2011	17	2	0
2009	29	6	0
2007	10	0	0
2005	15	2	1
2002	12	0	0
2001	7	2	1
2000	8	2	1

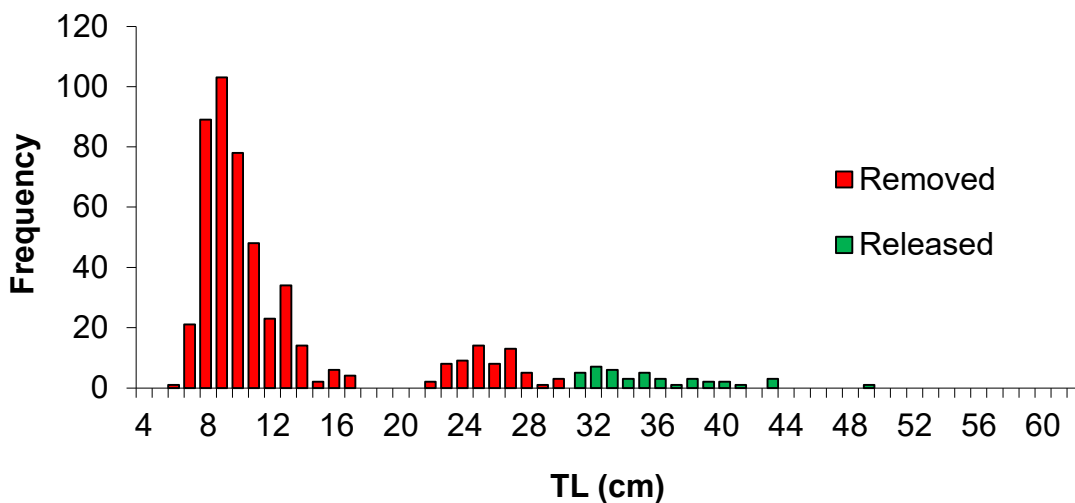


Figure 1. Length Frequency distribution from Fall 2020 Largemouth Bass removals on Amelia Lake, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

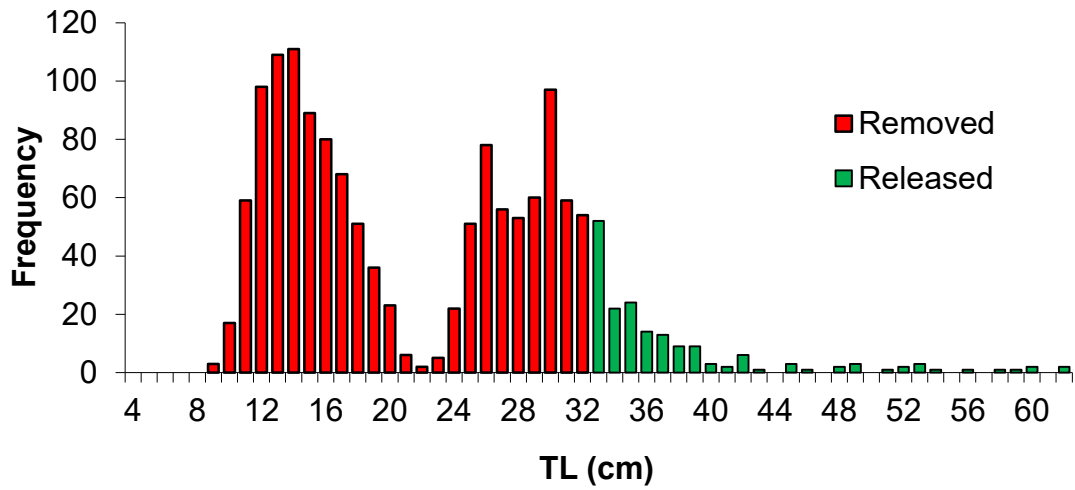


Figure 2. Length frequency distribution for all Largemouth Bass collected across four sampling trips to Amelia Lake in 2021, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

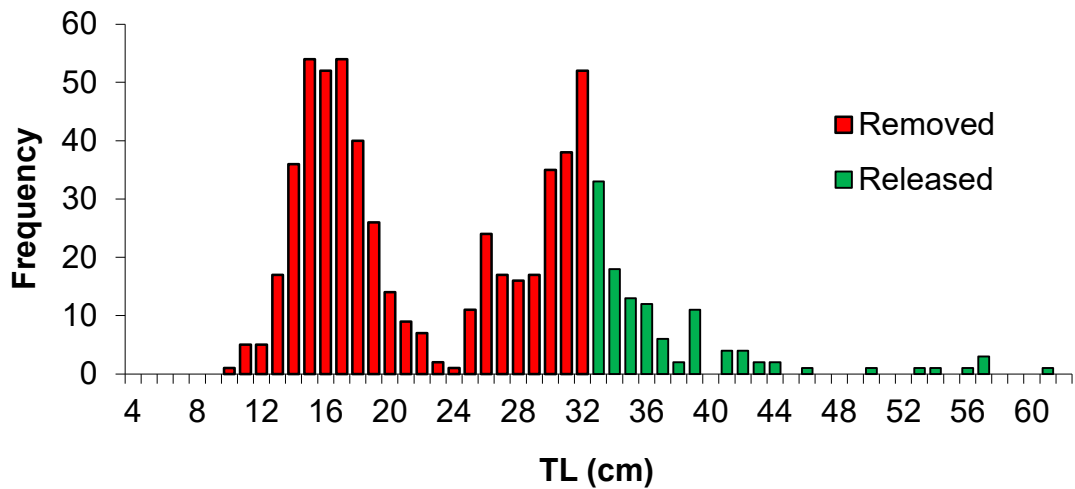


Figure 3. Length frequency distribution for all Largemouth Bass collected during two sampling trips to Amelia Lake in 2022, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

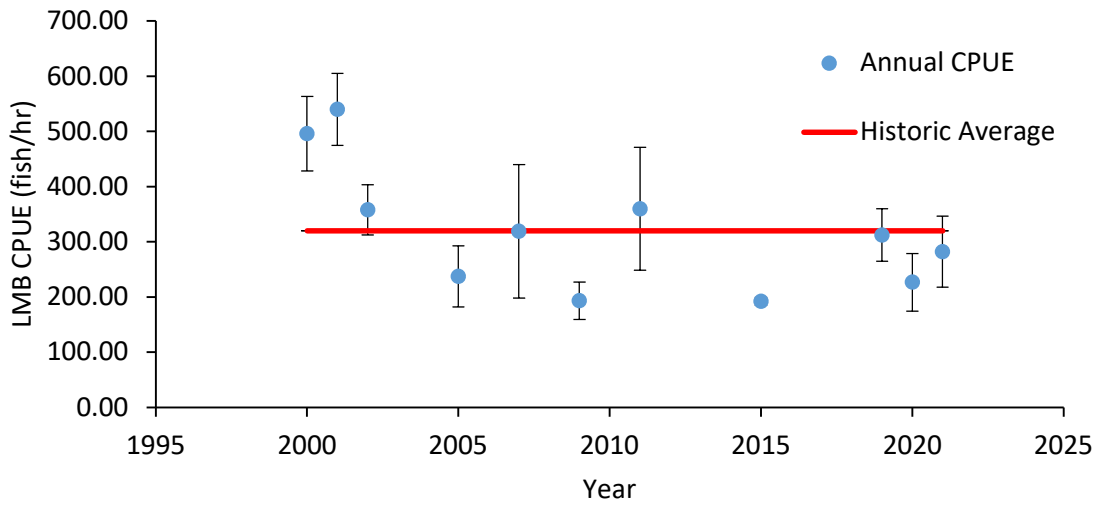


Figure 4. Annual catch rates for Largemouth Bass in Amelia Lake from 2000-2021 with error bars represent 90% confidence interval, relative to long-term average catch rates.

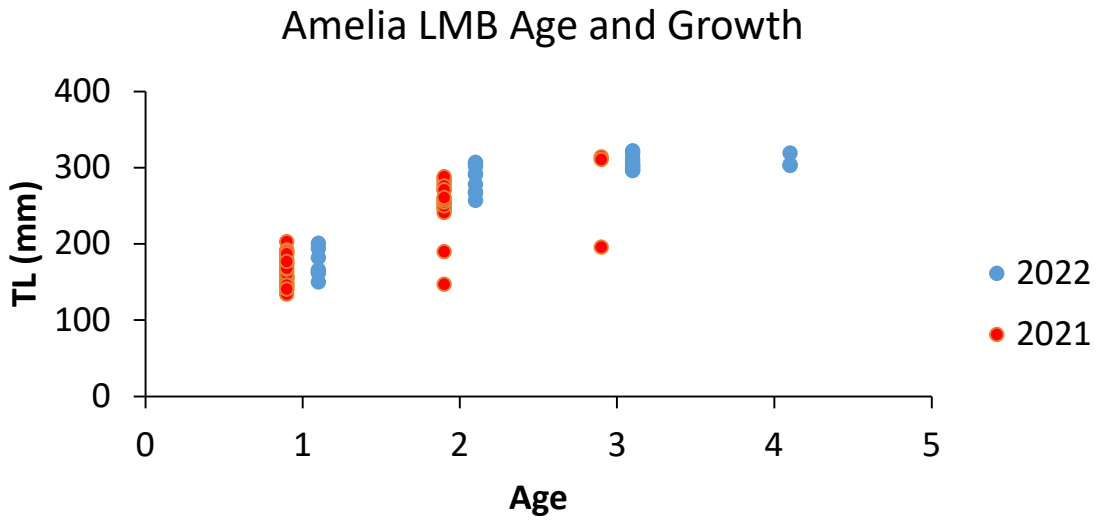


Figure 5. Largemouth Bass age and growth from 2021 and 2022 removals at Amelia Lake.

- **Nottoway Lake**

- 188 acre DWR owned impoundment with high to moderate fishing effort and abundant standing timber.
- Change in abundance and size structure first detected in 2018 following several years without sampling (workforce shortage).
- Nottoway showed signs of bass crowding with an uptick in recruitment and incredibly high numbers of age-1 bass observed in samples. This led to the decision to begin removals in an effort to remedy potential crowding.

Table 4. General summary of annual Largemouth Bass removal efforts at Nottoway Lake from 2020-2022 including number of trips, total fish removed, and % of fish ≤ 32 cm age 4 or older

Year	Trips	# Removed	% \geq Age 4
2020	3	1,243	-
2021	4	1,402	0
2022	3	1,160	0
TOTAL	7	3,286	-

Table 5. Date, effort, numbers of fish collected and removed (<320 mm) as well as size specific relative abundance (fish/hr) for all four Largemouth Bass removal trips to Nottoway Lake in 2020-2022. Grey highlighted rows represent annual samples for each year.

Date	Effort	Removed	Collected	CPUE	Young	Stock	Quality	Preferred	Memorable
4/10-22/2020	10712	0	684	229.50	113.90	57.80	38.60	16.80	2.40
5/15/2020		255							
5/26/2020		300							
9/23/2020	8185	688	709	311.80	279.70	22.00	6.60	3.50	0.00
4/27/2021	6359	322	409	231.55	103.60	55.48	45.86	24.34	2.26
5/14/2021	6714	319	377	202.14	107.24	49.33	23.59	17.69	3.75
5/24/2021	6185	302	339	197.32	142.02	23.86	20.37	10.48	0.58
10/21/2021	5595	459	492	316.57	254.80	33.46	18.66	4.50	0.00
3/25/2022	7280	358	459	226.48	106.32	53.90	38.08	24.73	3.46
5/18/2022	5501	283	323	211.38	160.33	17.02	18.32	15.71	0.00
11/3/2022	7560	519	570	273.81	201.43	40.00	13.33	15.71	3.33

Table 6. Proportional Size Distribution for quality (PSD), preferred (PSD-P), and memorable (PSD-M) size Largemouth Bass from Nottoway Lake from 2002-2021.

Year	PSD	PSD-P	PSD-M
2022	55	24	3
2021	57	21	2
2020	54	18	3
2018	40	12	0
2015	73	19	3
2011	40	10	3
2009	33	3	0
2007	41	11	1
2005	57	16	1
2002	39	8	1

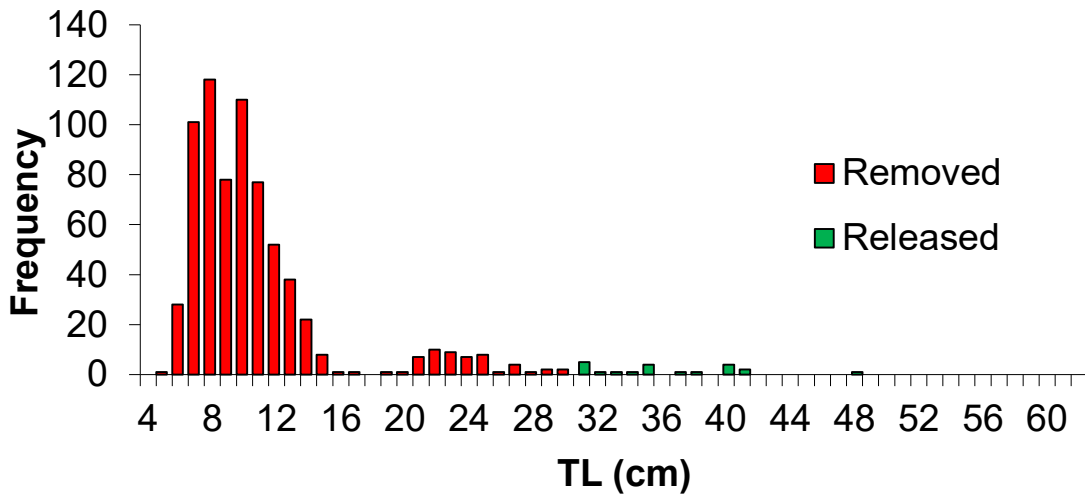


Figure 6. Length frequency distribution for Largemouth Bass collected fall sampling trip to Nottoway Lake in 2021, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

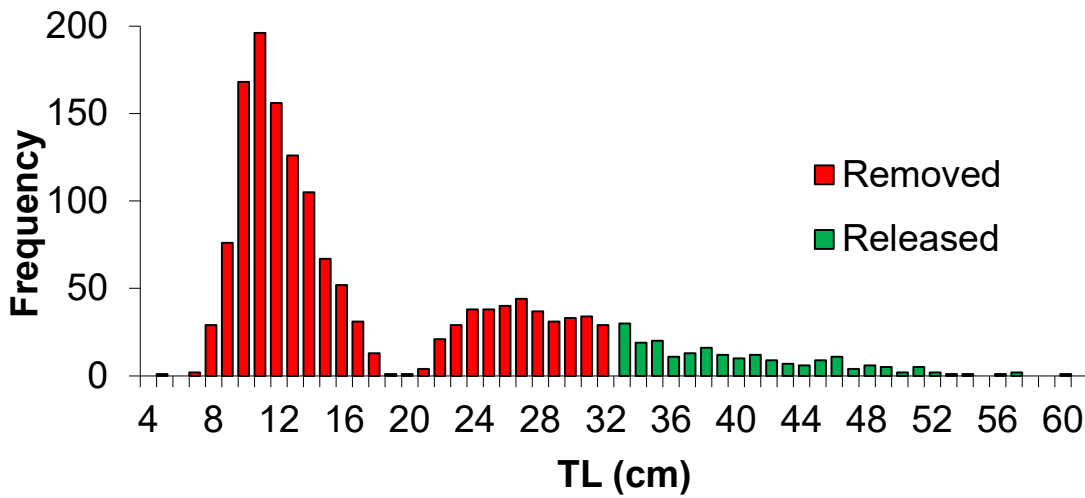


Figure 7. Length frequency distribution for all Largemouth Bass collected across four sampling trips to Nottoway Lake in 2021, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

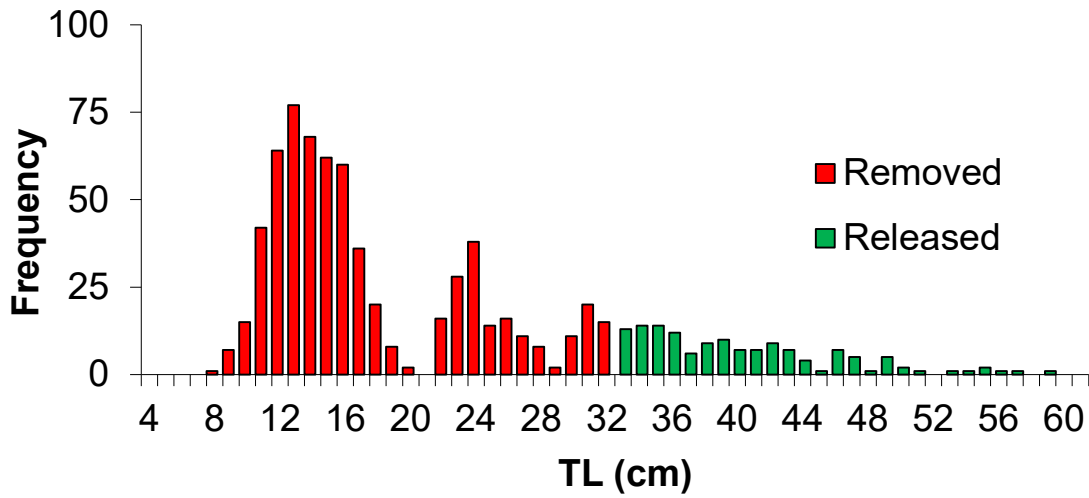


Figure 8. Length frequency distribution for all Largemouth Bass collected across four sampling trips to Nottoway Lake in 2022, red denotes fish removed from the lake to remedy bass crowding and green denotes fish released.

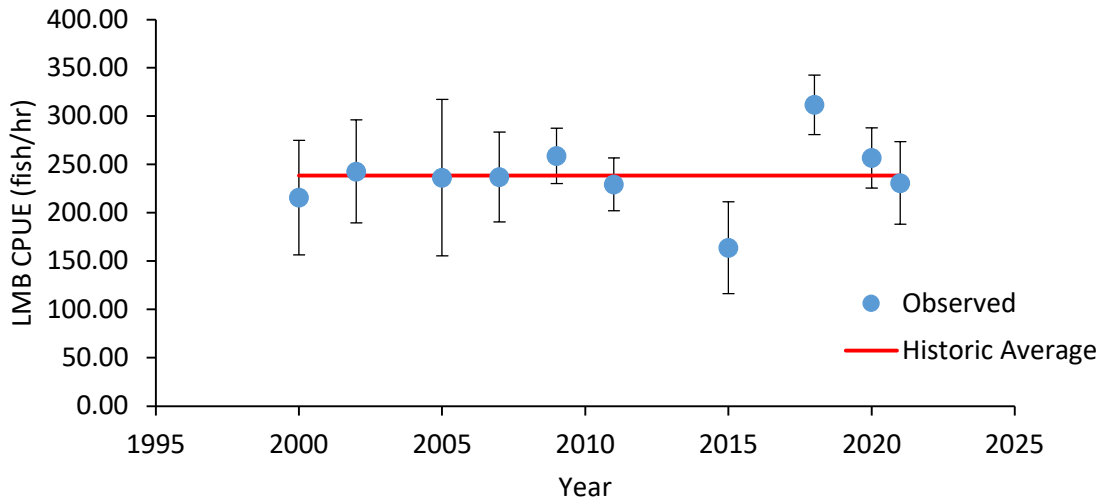


Figure 9. Annual catch rates for Largemouth Bass in Nottoway Lake from 2000-2022 with error bars represent 90% confidence interval, relative to long-term average catch rates.

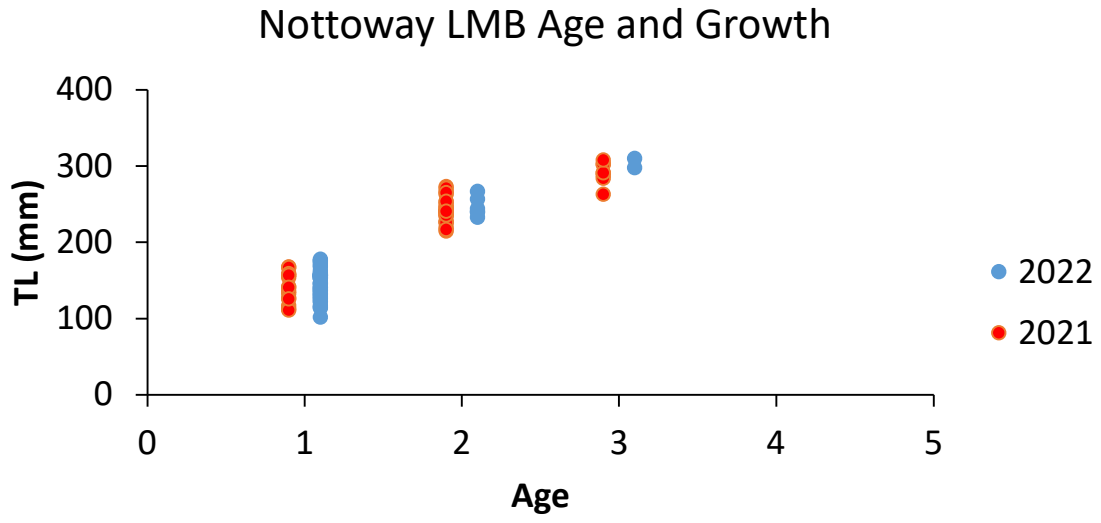


Figure 10. Largemouth Bass age and growth from 2021 and 2022 removals at Nottoway Lake.

- Summary
 - The literature is limited and inconclusive on this so we're learning as we go.
 - In order to have an impact on larger systems (>20 acres) repeated removals need to be conducted over multiple years (multiple trips a year over multiple years).
 - A large size range of bass also needs to be removed, up to and over 300 mm.
 - If they're crowded it's really hard to take too many, just leave them alone for a year and you'll have as many as you did before.
 - Fall removals produced incredibly high numbers of YOY and age-1 fish on both lakes in 2020 and on Nottoway in 2021.
 - Benchmarks for bass crowding:
 - CPUE levels vary from system to system
 - PSD and general size structure seem to be the best indicators (<30-35 = crowded)
 - Age and growth samples (% fish \geq age 4 \leq 320-350 mm)
- Things I'm keeping track of:
 - Tally counts of fish by CM group for each trip
 - This lets me track size specific CPUE as well as PSD
 - Subsample of fish (~50) to age from both Amelia and Nottoway in 2021 and 2022.
 - We'll likely change this to full age and growth samples in 2023.
 - I hope to repeat the mark-recap pop estimate on Nottoway and potentially Amelia in 2023 if time allows.
- Moving Forward:
 - Continued application to R2 resources on an as-needed basis.
 - Potential SEAFWA paper based on findings
 - More concrete guidelines for application of removals as a management tool

Region 2 West – Lake Thrasher, Lake Nelson, and Mill Creek Lake

BY the number and simplified verses length frequencies.

There are limitations as seen in 2000 where the lake was overharvested, so the indices have some limitations, but the 2000 scenario isn't very common anymore. That one was an obvious overharvest with almost no larger fish, low LMB densities, and no older fish found in age & growth sample, but we didn't kill the couple decent size fish we found while sampling. Only 70 LMB total were collected in 0.8 hrs. (88/hr) of sampling in 2000 and CPUE was 105/hr in 1999. After the regulation change in 2001, the lake did well and was stable for over 10 years until hydrilla took over about 2013.

The hypothesis of higher PSD and low abundance of small Age-4+ LMB indices to maintain balance, thin if either PSD or % of Age-4+ LMB are not within the goal

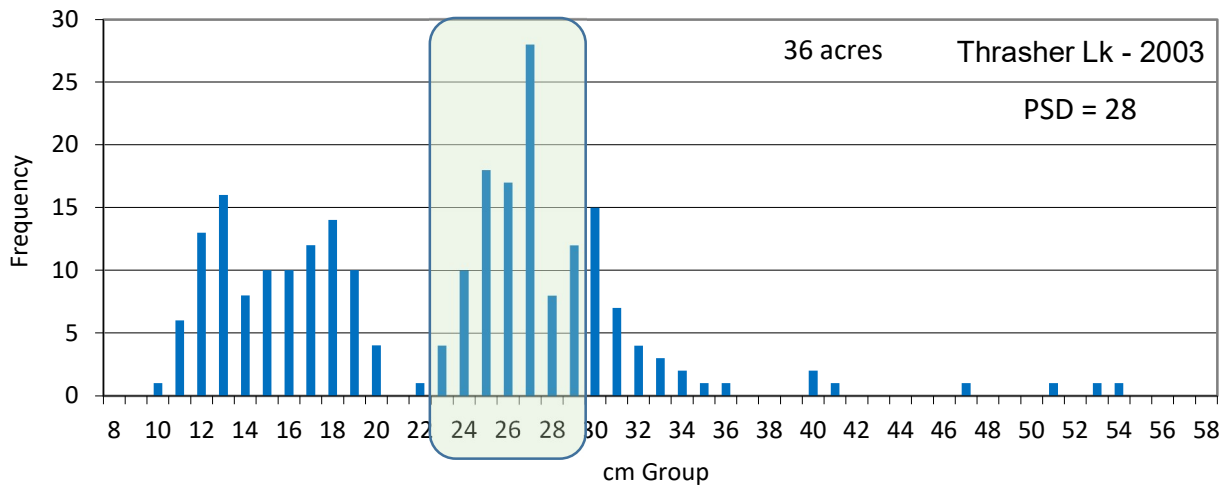
<u>Year</u>	<u>PSD</u>	<u>% of LMB \geq Age-4 that were < 350mm</u>	<u>LMB Removed</u>	<u>Notes</u>
Goal	≥ 35	<30%		

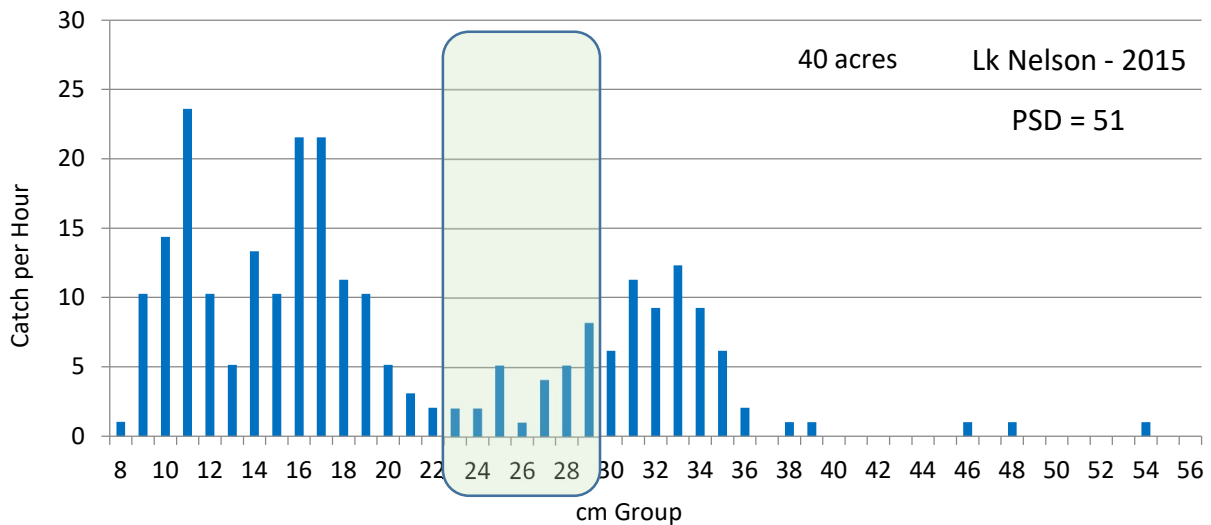
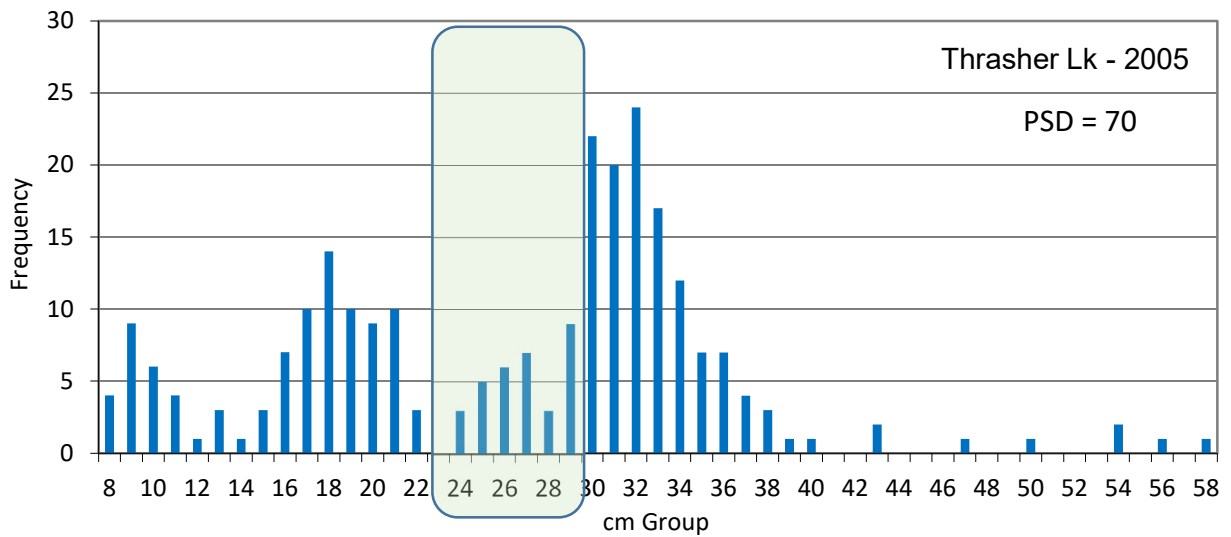
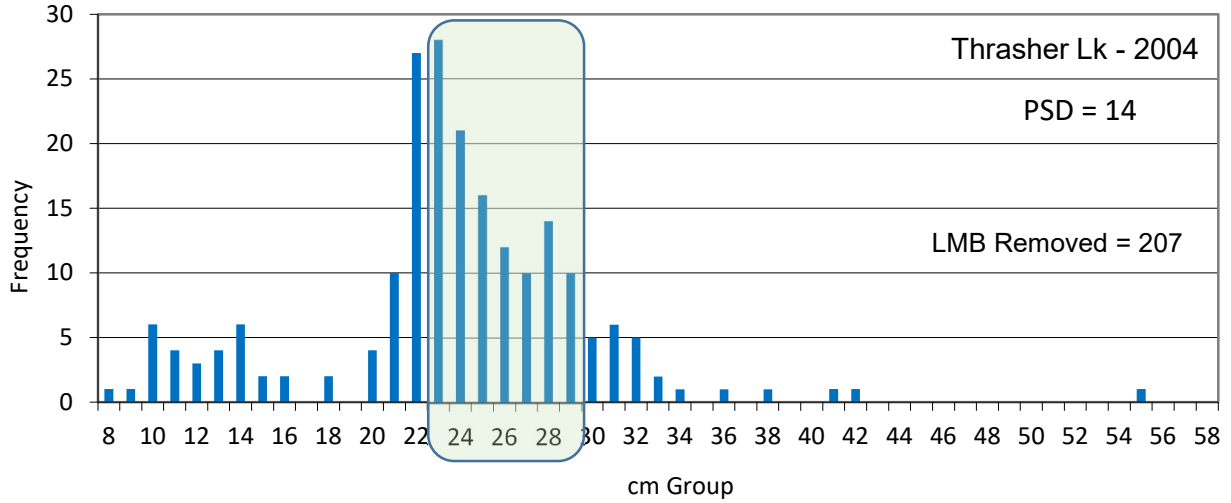
2000	24	<2%	27	only a few LMB
sampled over 300 mm with 0 LMB over Age-3 in A&G sample, lake was overharvested, and regulations changed				
2015	18	60%	930	
2016	41	NA	701	
2017	33	NA	0	
2018	12	NA	0	Stop thinning after removing some LMB in fully stunted population didn't work, removal starts again in 2019
2019	21	39%	2,164	
2020	34	28%	1,091	
2021	23	11%	2,311	
2022	69	14%	311	This was primarily to sample Age-4+ LMB and not a serious removal effort, once sample was analyzed removal was discontinued

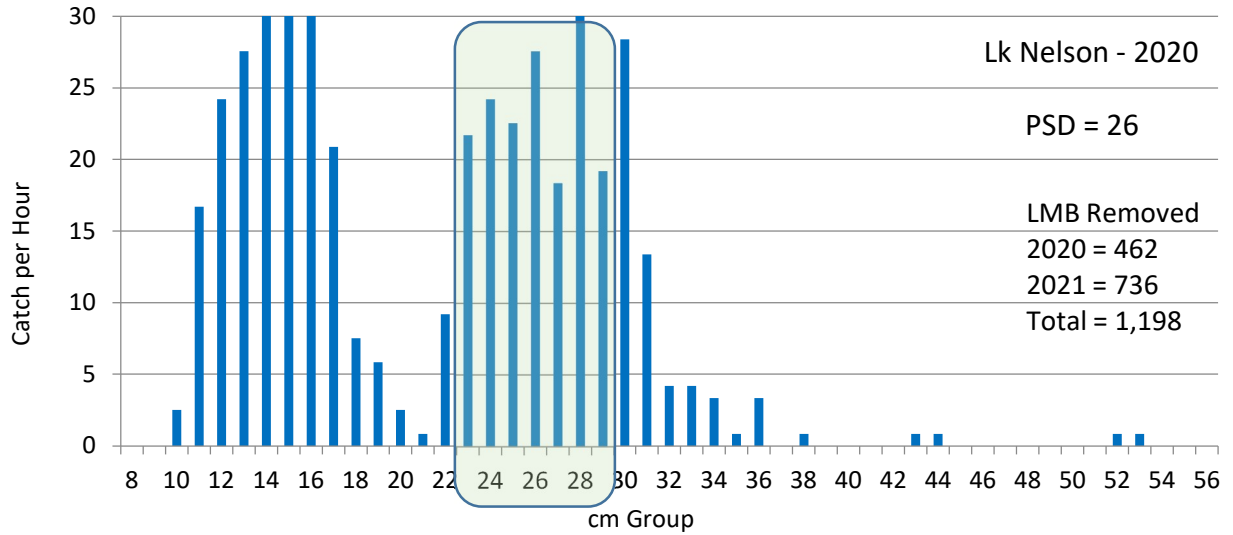
2022 - Both goals achieved so wait and see if corrections hold and lake stays balanced.

Stunted Bass Population? : PSD < 35 and/or high % of older bass 20-34 cm groups (% LMB ≥ Age-4 that are <350 mm >30% for

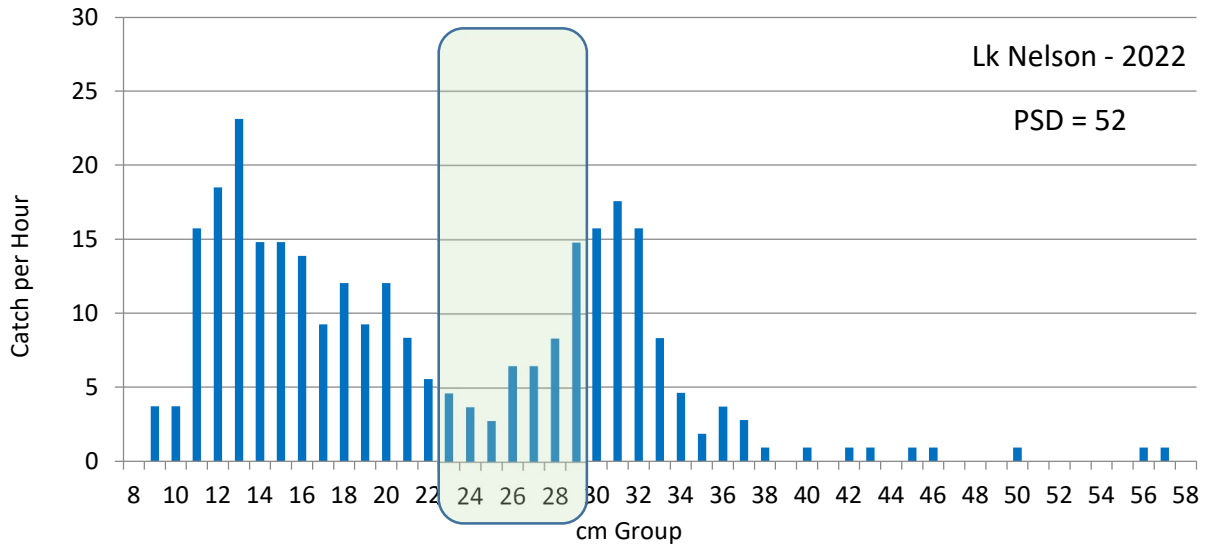
VA)



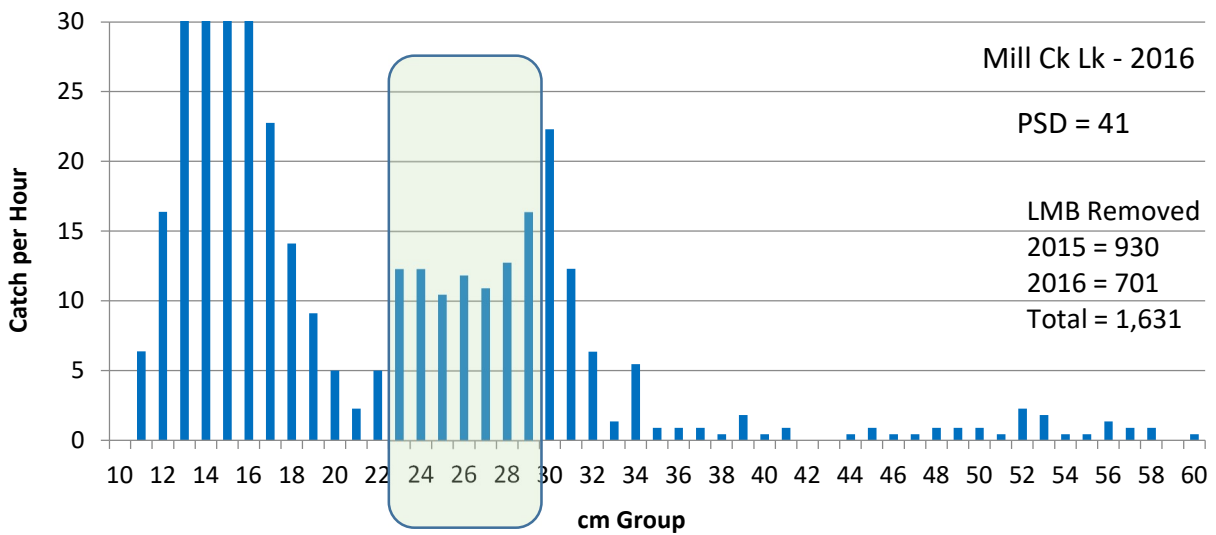
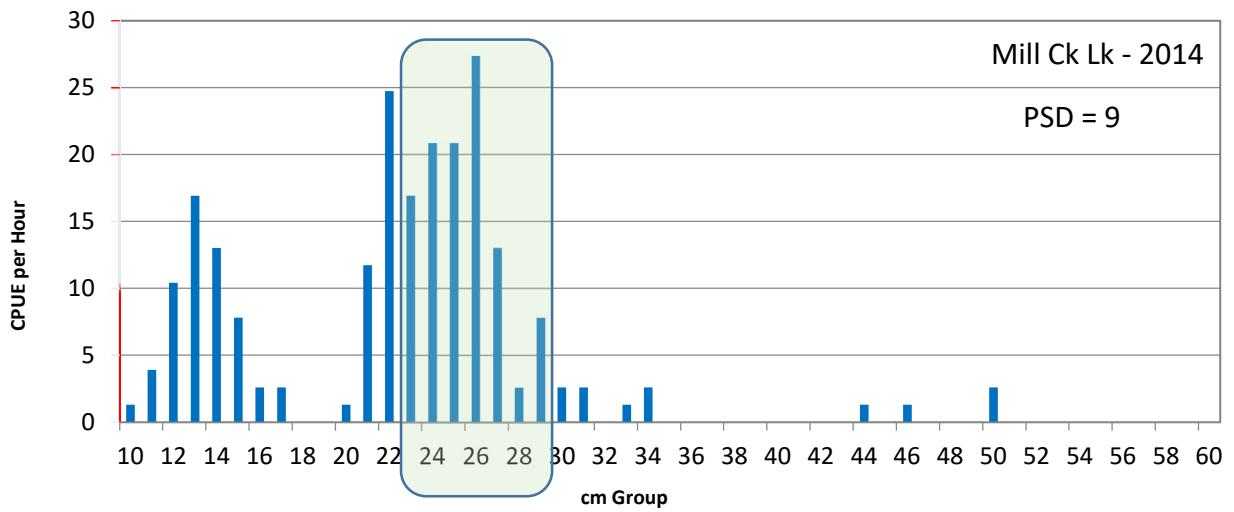
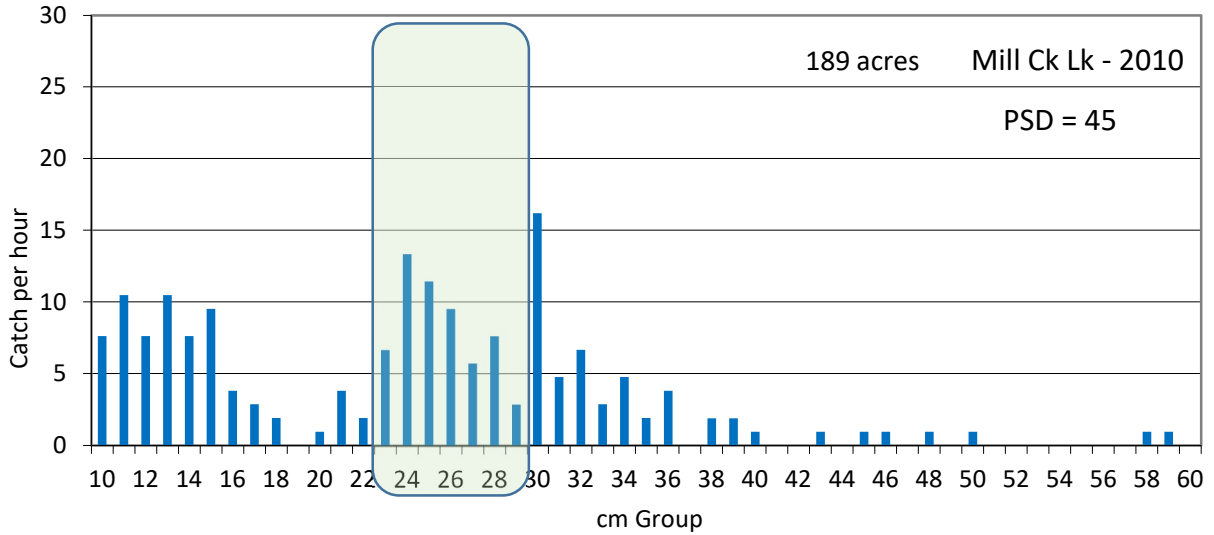




2020-2021 Low % of older bass <350 mm but low PSD, thinning continues

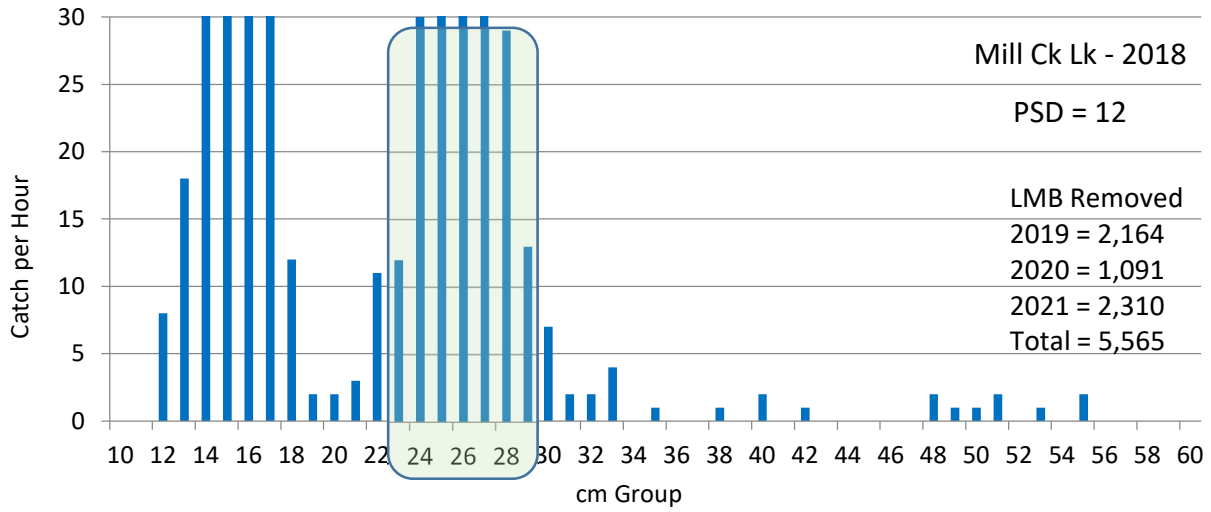


2022 Low % of older bass <350 mm & high PSD, thinning stopped

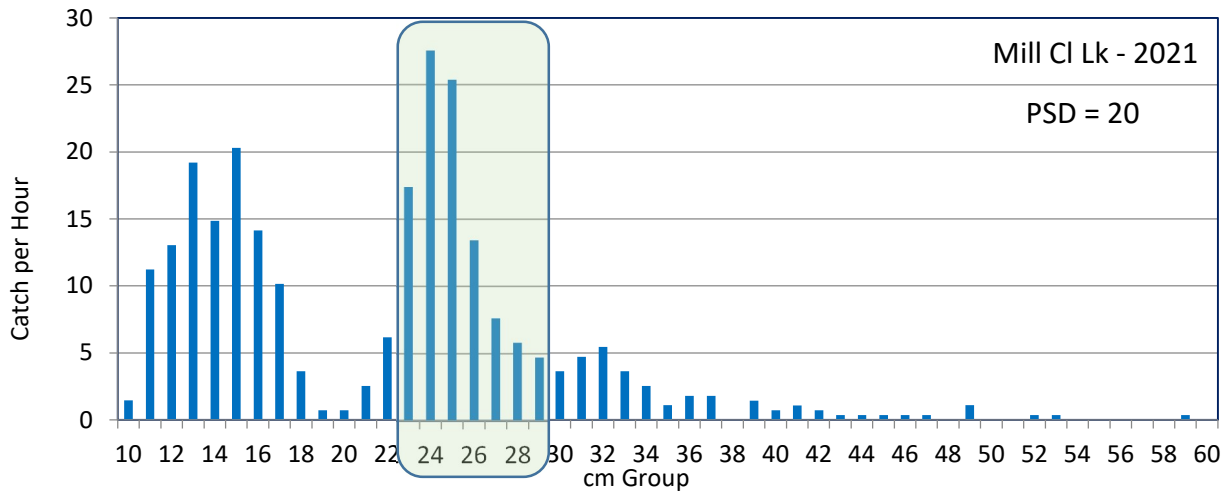


2016 High % of older bass < 350 mm

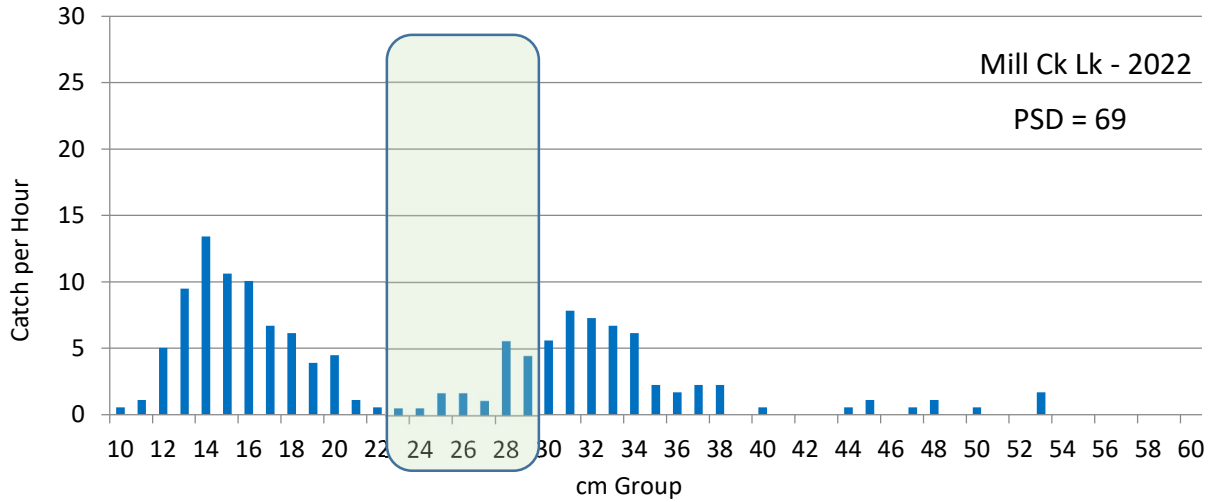
2017 looked better with reduced #'s 23-29 cm but PSD still low (PSD=33), thinning stopped but stunting persisted and worse in 2018



2018-2019 High % of older bass < 350 mm

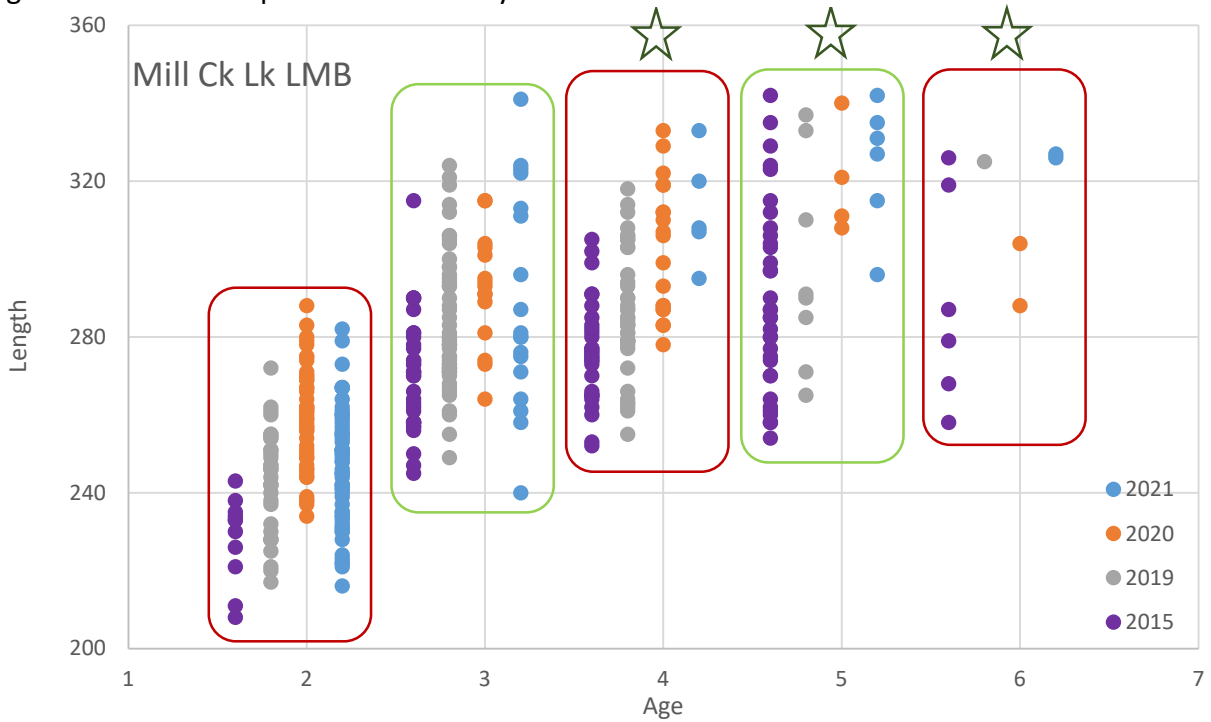


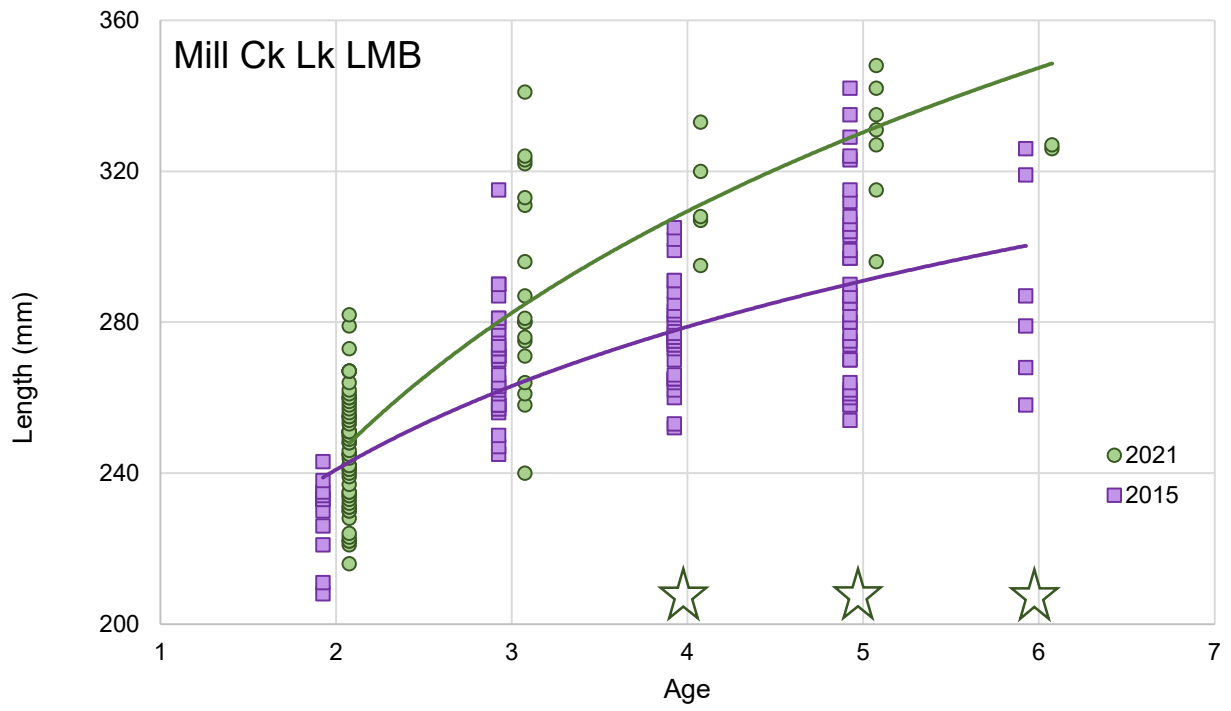
2021 Low % of older bass <350 mm but still low PSD so thinning continued



2022 Low % of older bass <350 mm & high PSD, thinning stopped to see if lake recovers

Age and Growth samples from LMB only < 350 mm





Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: West Virginia

Name of Representative to Technical Committee: Cory Hartman

Date Submitted: 11/30/2022

Project Name or Description: WVDNR Warmwater Stocking Program

Contact Information:

Name: Jim Hedrick

Co-Authors:

Email: jim.d.hedrick@wv.gov

Phone: (304) 637-0245

Objective: R3 - Recruit, retain and reactivate anglers

Current Status: Ongoing

Abbreviated abstract: Small impoundment stocking program update

To fulfill aspects of the WVDNR's R3 strategy, the WVDNR began stocking commercially produced, catchable sized, Channel Catfish into State Park lakes and ponds in recent years. These stockings were completed before annual Free Fishing Days as both a recruiting tool, but also to attract users to the State Park system. Additional impoundments were also stock as part of the Free fishing days stockings. Stockings were continued this year with a total of 14,559 pounds stocked into 56 waters ranging in size from 2 to 237 acres.

Additional Stockings:

Fingerling Channel Catfish 5051 pounds to 56 waterbodies

Hybrid Striped Bass: 1343 advanced fingerlings in 2 waterbodies

Muskellunge 450 advanced fingerling in 4 waterbodies, 209 advanced tiger muskies in 2 waters

Walleye 436 advanced fingerlings in one waterbody

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: West Virginia

Name of Representative to Technical Committee: Cory Hartman

Date Submitted: 11/28/2022

Project Name or Description: Long-Term Response of a Largemouth Bass Population to a Protected Slot Limit Regulation in a Small West Virginia Impoundment

Contact Information:

Name: Brandon J. Keplinger - West Virginia Division of Natural Resources

Co-Authors: Quinton E. Phelps, James D. Hedrick

Email: brandon.j.keplinger@wv.gov

Phone: (304) 822-3551

Objective: Determine the effectiveness of a protected slot limit regulation

Current Status: Completed

Abbreviated abstract: South Mill Creek Lake in Grant County, West Virginia, is a 19 ha, centrarchid dominated, eutrophic small impoundment. The largemouth bass *Micropterus salmoides* population was regulated by a minimum size limit of 305 mm until 2007. Consistently low PSD values, low quality-size CPUE, high mortality despite high recruitment, and poor population size structure typified the population under the minimum size limit regulation. In 2007 a protected slot limit regulation (305–406 mm) was implemented to bolster the fishery. Boat electrofishing surveys were conducted pre and post regulation (2003-2022) to evaluate fishery performance during both regulatory regimes. The aforementioned sampling methods were also employed in a similar control system (i.e., Kimsey Run Lake) during the same time period. We found relative abundance of quality size fish, overall size structure, survival, and von Bertalanffy growth coefficients (K) increased significantly after the establishment of a protected slot limit for largemouth bass (305-406 mm) at South Mill Creek Lake. Further, our control system (Kimsey Run Lake) being evaluated over the same timeframe (pre and post regulation) did not experience any appreciable differences in population metrics. This suggests that the implementation of the protected slot limit at South Mill Creek Lake produced its intended effect. Our results suggest that angler compliance with regulations may be enhancing the quality of this population. The protected slot limit regulation was considered successful and could be applied to other fisheries where largemouth bass populations exhibit poor size structure. Future investigations should focus on monitoring the stability of this population's size structure and abundance of larger size distribution categories.

Small Impoundments Technical Committee

American Fisheries Society – Southern Division

State Report Format

State Reporting: West Virginia

Name of Representative to Technical Committee: Cory Hartman

Date Submitted: 11/30/22

Project Name or Description: Black Bass Survey

Contact Information:

Name: Bob Knight

Co-Authors:

Email: bob.l.knight@wv.gov

Phone: 304-256-6947

Objective: Study the health of the Largemouth bass population

Current Status:

Abbreviated abstract:

Plum Orchard Lake is a 175-acre lake in Fayette County near the community of Pax, WV. The maximum depth of Plum Orchard Lake is approximately 38 feet and minimum depth is 2 feet with a maximum volume of water of 5,489 acre-feet. There is a deficiency of dissolved oxygen content below depths greater than 10 feet. Plum Orchard Lake supports game fish populations of Channel Catfish (*Ictalurus punctatus*), Largemouth Bass (*Micropterus salmoides*), Black Crappie (*Pomoxis nigromaculatus*), White Crappie (*Pomoxis annularis*) and several other species in the sunfish family (*Centrarchidae*).

A black bass survey was conducted in September of 2022 using an electrofishing boat to survey six random plots for ten-minute intervals. Black bass species were collected, and data was recorded for both length and weight at each plot. The total effort was 60 minutes, the catch per unit effort (CPUE) was 19, PSD (44), relative weight (88). All three of these indices indicate that the Largemouth Bass populations are in poor quality and warrant further investigations to determine the cause(s).

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: West Virginia

Name of Representative to Technical Committee: Cory Hartman

Date Submitted: 11/30/2022

Project Name or Description: District 6 Crappie Population Characteristics

Contact Information:

Name: Cory Hartman

Co-Authors: Nate Taylor

Email: cory.m.hartman@wv.gov

Phone: 304-420-4550

Objective: The objective of our study is to collect baseline population characteristics (size structure, age and growth etc.) and exploitation estimates in the impoundments of our district through gill netting and electrofishing sampling efforts. With this data, we will be able to model how different regulations affect the population dynamics. If the population shows a potential for improved angler satisfaction with larger individuals with a regulation change, we may propose an experimental regulation on the waters.

Current Status: Ongoing, year 1 of 2 data collection

Abbreviated abstract:

In West Virginia Black Crappie *Pomoxis nigromaculatus* and White Crappie *Pomoxis annularis* provide a harvest-oriented fisheries throughout the state. As a result of the species' perceived abundance, and delicate meat, they are often vulnerable to overfishing, slow growth, and stockpiling of individuals at small sizes. Most anglers prefer to selectively harvest larger individuals, rather than numerous smaller individuals. Selective exploitation of a narrow range of age groups may acutely affect crappie population dynamics and fisheries. If selective exploitation is severe, appropriate management strategies may be needed to enhance or weaken the effect of size selectivity in favor of crappie populations and fisheries. Fisheries managers have long sought to improve the size structure of crappie populations and yield from crappie fisheries by applying minimum length limits (MLL) and daily limits. Crappie can be sensitive to

these changes, with outcomes being a mixed bag. While some MLLs have shown an improvement to the size structure and reduced mortality. Whereas these same MLL regulations changes have had negative effects on different population including slower growth and stockpiling at small. These slower growth rates lead to lower exploitation and in turn, reduced angler satisfaction.

In District 6 we have four managed small impoundments with known crappie populations. North Bend Lake is a 235-acre lake in Ritchie County, constructed in 2003 as the result of the West Virginia Soil Conservation Agency damming the North Fork of the Hughes River. O'Brien Lake located in Jackson County is a 197-acre reservoir constructed by the city of Ripley on Mill Creek to provide adequate water supply for the city's municipal water needs. Elk Fork Lake is another West Virginia Soil Conservation Agency watershed project in Jackson County. This 209-acres impoundment was created in 1997 by damming the Elk Fork of Mill creek. Woodrum Lake, also in Jackson County, was built in 1988 by West Virginia Soil Conservation Agency and encompasses 240-acres. This lake was completely drained in 2005 when a sunken log became lodged in Woodrum Lake's outflow structure, preventing the gate from being closed. Efforts to remove the tree were unsuccessful, and Woodrum Lake was drained completely. The lake was refilled and restocked in 2007 with a variety of species, including crappie. All these impoundments are under the general regulations for crappie with no minimum size limit and a 30 fish in aggregate (black and white) daily limit.

Small Impoundments Technical Committee
American Fisheries Society – Southern Division
State Report Format

State Reporting: West Virginia

Name of Representative to Technical Committee: Cory Hartman

Date Submitted: 11/30/2022

Project Name or Description: WVDNR District 6 Black Bass Monitoring

Contact Information:

Name: Cory Hartman

Co-Authors: Nate Taylor

Email: cory.m.hartman@wv.gov

Phone: 304-240-4550

Objective: To monitor/manage our District 6 Black Bass populations

Current Status: Ongoing

Abbreviated abstract: In District 6 we have four “large” managed small impoundments with known largemouth bass populations. North Bend Lake is a 235-acre lake in Ritchie County. North Bend Lake was constructed in 2003 as the result of the West Virginia Soil Conservation Agency damming the North Fork of the Hughes River. O’Brien Lake located in Jackson County is a 197-acre reservoir constructed by the city of Ripley on Mill Creek to provide adequate water supply for the city’s municipal water needs. Elk Fork is another West Virginia Soil Conservation Agency watershed project in Jackson County. This 209-acres impoundment was created in 1997 by damming the Elk Fork of Mill creek. Woodrum Lake, also in Jackson County, was built in 1988 by West Virginia Soil Conservation Agency and encompasses 240-acres. This lake was completely drained in 2005 when a sunken log became lodged in Woodrum Lake’s outflow structure, preventing the gate from being closed. Efforts to remove the tree were unsuccessful, and Woodrum Lake was drained completely. The lake was refilled and restocked in 2007 with a variety of species, including Largemouth Bass.

Annual Black Bass surveys are conducted in our district to monitor the Black Bass populations of our various state owned/managed lakes and impoundment on a rotating cycle. Length and mass measurements are taken on each individual and a subset of fish are sacrificed for age and growth analysis. We are considering proposing several regulation changes to the Natural Resources Commission for several impoundments. These proposals would include removing the catch and release designation from two of our small impoundments, Woodrum Lake and Elk

Fork Lake. Below is a summary table to outline the various aspects of the fisheries in these small impoundments (Table 1) and a visual representation of the age and growth data collected on these populations (Figure 1).

Table 1. Brief summarization of the four impoundments sampled

	Woodrum	Elk Fork	North Bend	O' Brien
Max Length(mm)	452	582	387	543
Max Weight(g)	1474	3270	880	2512
CPUE (fish/hr)	192	192	109	142
PSD	24	47	14	45
Wr	0.969	0.960	0.956	0.964

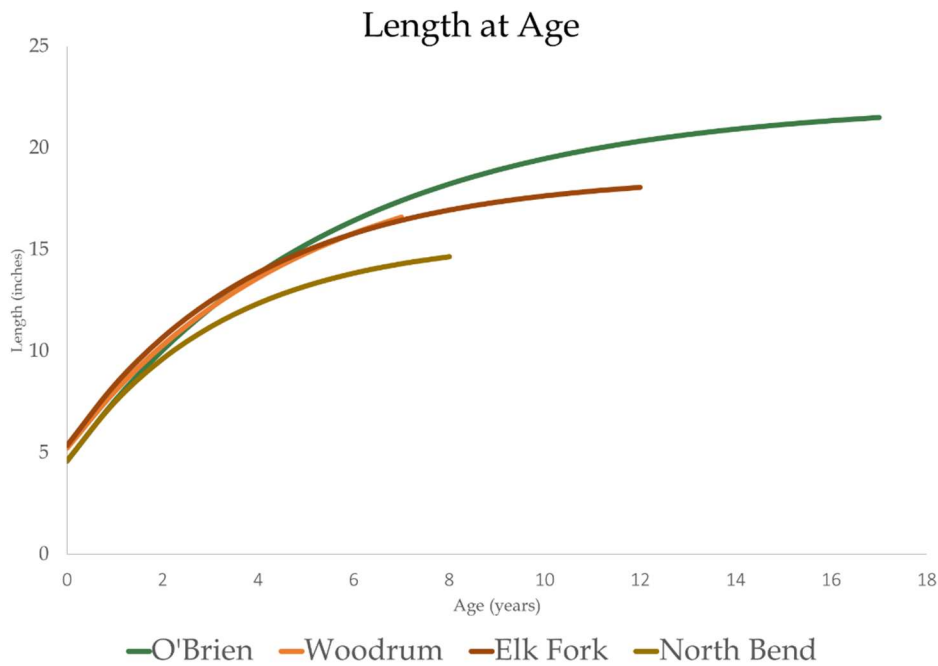


Figure 1. Graphical representation of the collected age and growth data WVDNR District 6 Bass surveys.