Catfish Management Technical Committee
American Fisheries Society - Southern Division

SDAFS – Catfish Management Technical Committee – 2022 State Reports

Arkansas

Name of Representative to Technical Committee: Justin Homan

Project Name or Description: A Comparison of Two Low-Frequency Electrofishing Waveforms on Capture Efficiency and Length Distribution of Flathead Catfish in Felsenthal Reservoir, Arkansas.

Contact Information:

Name: Jacob Martin
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Objective: Compare waveforms to optimize sampling efforts for Flathead Catfish

Current Status: Completed/Will be expanded to other water bodies for further evaluation

Abbreviated Abstract: Understanding how varying duty cycle affects capture efficiency and length distributions of Flathead Catfish can aid fisheries managers in data collection. A total of 42 low-frequency electrofishing runs were conducted with a Midwest Infinity Electrofisher and a chase boat to collect Flathead Catfish at 21 randomly selected river kilometers within Felsenthal Reservoir. At each randomly selected river kilometer, two 10-minute long electrofishing runs were conducted using a duty cycle of 10% and a duty cycle of 30%, pulse-width was held constant at 15Hz. A Kolmogorov-Smirnov test revealed that length distributions for Flathead Catfish varied significantly with duty cycle ($D=0.27$, $P<0.001$). Catch per unit effort (CPUE) did not differ significantly among duty cycles for Flathead Catfish overall ($t=1.1$, $df=40$, $P=0.28$). However, CPUE of quality sized (≥ 510 mm) Flathead Catfish was significantly higher with a duty cycle of 10 (CPUE=20.83, SE=3.5) than a duty cycle of 30 (CPUE=8.49, SE=1.9; $t=3.1$, $df=40$, $P=0.004$). These data suggest that a length bias associated with duty cycle for Flathead Catfish may exist. Future research is needed to examine this relationship further. However, biologists may consider using a 15Hz/10% waveform to increase capture efficiency of larger fish.

Name of Representative to Technical Committee: Justin Homan

Project Name or Description: Evaluating pectoral spine microchemistry for identifying stocked Channel Catfish and inferring fish size at stocking in Arkansas lakes

Contact Information:

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Objective: To determine the contributions of stocked Channel Catfish to populations in AGFC lakes

Current Status: on-going

Abbreviated Abstract: Channel Catfish are present in most Arkansas waters and are important commercially and recreationally in many rivers, lakes, reservoirs, and streams. Approximately 18 percent of sport fishing efforts statewide are directed toward catfish, and AGFC hatcheries produce up to 1.3 million catfish each year to provide anglers with increased angling opportunities. The goals of this study are to determine the contributions of stocked Channel Catfish to populations in stocked lakes, and to assess the relative contributions of Channel Catfish stocked as fingerlings versus fish stocked at catchable size. Fish and water samples were obtained from three hatcheries and three lakes with natural differences in water strontium: calcium ratios (Sr:Ca). Sectioned pectoral spines were analyzed for Sr:Ca using laser ablation-ICPMS to determine whether location-specific water Sr:Ca signatures were reflected in spine samples and with accuracy in which fish could be assigned to their collection location using spine Sr:Ca. Fin spine Sr:Ca data were also used to identify stocked fish sampled from each of the three lakes. Identification of stocked Channel Catfish using spine core microchemistry was possible for all lakes, except for fish stocked from Joe Hogan Hatchery into Upper White Oak Lake. Initial results show that 93% of Channel Catfish collected from Bob Kidd and Overcup Lakes were stocked fish. The nest step of this project is to increase the samples size for each study lake. Spine microchemistry represents a non-lethal approach to identify stocked catfish and infer size at stocking, which will better inform allocation of hatchery-produced fish.

Name of Representative to Technical Committee: Justin Homan

Project Name or Description: Statewide TBHN Summary

Contact Information:

Name: Justin Homan
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Objective: Evaluate statewide catfish data and look for patterns in metrics by ecoregion

Current Status: Complete

Abbreviated Abstract: The first standard sampling protocol (SSP) for catfish in Arkansas was created in 2014 and biologists around the state have been using the SSP to collect catfish data since that time. The purpose of the SSP was to provide biologists with standard methods to sample catfish to provide reliable comparisons of populations from around the state. This study gathered catfish data collected using the SSP and summarized those data to provide statistics of population metrics (catch rate, size structure [PSD and PSD-P], growth, and mortality) from around the state. For Channel Catfish populations in lentic waters sampled with tandem baited hoop nets (TBHN), no significant difference due to ecoregion was found for any population metric (Median CPUE = 10 fish/set). Blue Catfish catch per unit effort (CPUE) from low frequency electrofishing (LFE) was highest for the Arkansas River (150 fish/h, SE = 27) versus 11-26 fish/h for lotic samples from other ecoregions of the state. Sample size was only high enough from pools of the Arkansas River to reliably evaluate PSD. Overall sample size of waterbodies sampled for Blue Catfish was low and more samples are needed from around the state to summarize population metrics. Similar to Blue Catfish, CPUE from LFE sampling of Flathead Catfish was highest for the Arkansas River (111 fish/h, SE = 31) but no significant differences were detected between ecoregions. The inability to detect a difference in CPUE was likely related to high variability in other samples and low sample size. Like Blue Catfish, sample size of waterbodies sampled from Flathead Catfish was low and additional samples from around the state are needed.

Florida

Name of Representative to Technical Committee: Andy Strickland

Project Name or Description: Spotted Bullhead Population Genetics and Status Assessment

Contact Information:

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Objective:

1) Evaluate genetic relationships among spotted bullhead populations statewide
2) Determine the extent of occurrence and relative abundance of Spotted Bullhead in river systems across Florida

Current Status: In progress

Abbreviated Abstract:

Spotted Bullhead are a handsomely patterned, small-bodied ictalurid that occupy a relatively restricted range, primarily within the Gulf Coast drainages of Florida. They generally occupy rivers and streams with moderate flow and an abundance of rocky habitat. There is some evidence of morphological variation between Suwannee drainage populations and populations from western drainages (Yerger and Relyea 1968), but genetic relationships within and among Spotted Bullhead populations are currently unknown. Population genetic information may help inform conservation efforts for this species, which has been considered at risk of becoming threatened in significant portion of its range due to habitat loss and predation from non-native Flathead Catfish populations (Jelks et al. 2008, Dobbins et al. 2012). There is also some uncertainty regarding in their occurrence in smaller rivers and tributaries (Cailteux and Dobbins 2005).

We plan to conduct targeted standardized surveys throughout the Spotted Bullhead range to facilitate relative abundance estimate comparisons across systems. During surveys we will collect all ictalurids encountered and record total length and weight for each. We will collect a fin clip tissue sample from each Spotted Bullhead for genetic analyses. Tissue samples will be preserved in 95% EtOH at stored at room temperature until processing. We will use published microsatellite markers developed for congeneric species to evaluate genetic relationships among and within river systems throughout the state.

Georgia

Name of Representative to Technical Committee: Jim Page

Project Name or Description: Noteworthy Recreational Angler Catches

Contact Information:

Name: Jim Page

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Objective: To report catches of noteworthy catfish captured by recreational anglers

Current Status: Ongoing

Abbreviated Abstract: The Georgia Dept. of Natural Resources (GADNR) is tasked with managing natural resources in our state, including those enjoyed for the purposes of fishing. In that realm, GADNR celebrates and promotes the diversity of fish species we have to offer to the fishing public, including several catfish species. During the reporting period, the following notable catfish catches were reported:

NEW LAKE RECORDS:

Lake Nottely – Channel Catfish – a new record 12lb channel catfish was caught in late August, 2021.

NOTEWORTHY CATCHES:

During the 2021 calendar year, Paradise Public Fishing Area saw anglers catch 26 channel catfish that qualified for youth angler awards, with fish weighing from 6 pounds to 11 pounds-11oz.

We congratulate each of the anglers who captured these impressive fish, and we are excited to see records continue to fall! For those who haven't done so yet, **GO FISH GEORGIA!!**

Project Name or Description: Flathead and Blue Catfish Removal on the Satilla River

Contact Information:

Name: Jim Page
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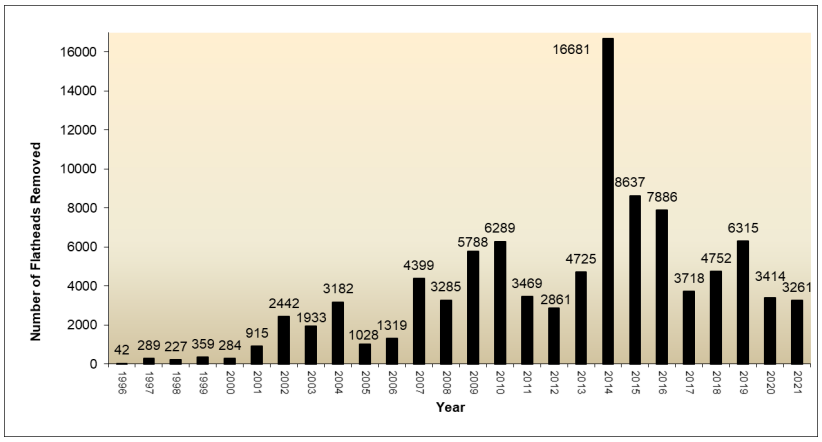
Objective: To evaluate the effects of long-term boat electrofishing removals on the survival, biomass, condition, relative abundance, size structure, and age structure of flathead catfish in the Satilla River, GA.

Current Status: Ongoing effort

Abbreviated Abstract: Modeling indicates that increased exploitation on the flathead catfish (*Pylodictis olivaris)* can be an avenue for native species recovery. After flatheads were introduced into the Satilla River in the 1990's, the GADNR initiated an intensive electrofishing removal effort in 2007. From 2007 to 2021, 85,480 flatheads (3,261 in 2021) totaling 72,576 kg (2,360 kg in 2021) were removed from roughly a 150-km stretch of the Satilla River. Size structure has changed substantially from containing many large individuals (≥510mm TL) in 2007 to mainly small fish (≤375 mm TL) in recent years. Total biomass per effort ranged from 57.05 kg/hr in 2007 to 10.9 kg/hr in 2012, totaling 15.4 kg/hr in 2021. The average weight of removed fish ranged from 2.6kg in 2007 to 0.4kg in 2013, equaling 0.9kg in 2021. Fish age structure continues to be truncated, and there is evidence for higher recruitment and earlier maturation, which would require that intensive harvest be maintained to prevent the population from rebuilding within 2-5 years. Catch-curves revealed total annual mortality (*A*) rates for the 10-year period (2007-2017) ranged from 37-63%, averaging 51%. For a long-lived species that presumably cannot withstand excessive rates of exploitation (i.e., >25% U), flatheads do seem to be responding to removal efforts. Our results indicate that an electrofishing removal program is a reasonable management option for state agencies aiming to control this apex predator, though continual removal will be required.



The discovery of 7 blue catfish (*Ictalurus furcatus*), a second non-native, in 2011 led to GADNR staff to remove this species as well. Zero fish were seen from 2012 – 2015. In 2016, 224 blue catfish were removed, including a large gravid female (840mm and Age 7), suggesting reproduction is occurring. In 2019, staff removed 663 blue cats, the most thus far. In 2021, only 80 individuals were removed.

Project Name or Description: Annual Standardized Sampling of Catfish on Various GA Rivers

Contact Information:

Name: Jim Page

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Objective: To Monitor and Manage Catfish Populations in Various Georgia Rivers

Current Status: Ongoing effort

Abbreviated Abstract: The GADNR conducts standardized sampling of catfish populations via electrofishing in several Georgia rivers. These include the Altamaha, Chattahoochee, Flint, Ogeechee, Satilla, and Savannah (all annually), along with the Ocmulgee (every 2 years) rivers in 2021. Catch rates varied by river, but were as follow (CPUE is #fish/hr):

Altamaha (CPUE): Blue Catfish (2021: 39.5; 2020: 63.5); Flathead Catfish (2021:114; 2020:111.9); Channel Catfish 2021:34.7; 2020:15.3)

Flint (CPUE): Flathead Catfish (2021: 84.5 fish/hr; 2020: 87.9 fish/hr)

Ocmulgee (CPUE): Flathead Catfish (2021: 76.2 fish/hr); Channel Catfish (2021: 16.5 fish/hr); Blue Catfish (2021: 2.4 fish/hr)

Ogeechee (CPUE): Snail Bullhead (2021: 57.2 fish/hr; 2020:41.0 fish/hr); White Catfish (2021: 32 fish/hr; 2020:36.0 fish/hr)

Satilla (CPUE): Flathead Catfish (2021: 42 fish/hr; 2020:26.3 fish/hr); Channel Catfish (2021:15.2 fish/hr; 2020: 25.3 fish/hr); White Catfish (2021: 28.8 fish/hr; 2020: 6.0 fish/hr)

Savannah (CPUE): Snail Bullhead (2021: 17.6 fish/hr; 2020: 24.75 fish/hr); White Catfish (2021: 17.6 fish/hr; 2020: 22.7 fish/hr); Flathead Catfish (2021:21.2 fish/hr; 2020: 10.0 fish/hr)

Major takeaways from 2021 sampling, as compared to 2020 sampling, were that blue catfish catches in the Altamaha were down but channel catfish numbers were up; flathead catfish and white catfish catches in the Satilla were up; and Savannah River flathead catches were up in 2021.

Kentucky

Name of Representative to Technical Committee: Jay Herrala

Project Name or Description: Evaluation of new recreational and commercial regulations on catfish in the Ohio River

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Objective: 1) Determine abundance (CPUE), size structure, and condition of blue catfish, channel catfish, and flathead catfish in the Ohio River. 2) Evaluate the effects of new regulation on blue catfish, channel catfish, and flathead catfish in the Ohio River, particularly trophy-size catfish. 3) Quantify age, growth, mortality of the three species.

Current Status: Ongoing

Abbreviated Abstract:

The conflict between commercial fishermen and recreational catfish anglers on the Ohio River has been apparent for nearly a decade, with the main issue being a perceived switch from a harvest market predominantly for flesh to a largely trophy fish harvest for sale to pay lakes component. In 2013, KDFWR standardized its catfish data collection methods and began expanding the effort river-wide to more accurately estimate population dynamics of blue catfish, channel catfish, and flathead catfish. On December 1, 2014 the following regulation became law:

> Recreational anglers on the main-stem Ohio River are allowed one blue catfish ≥35.0 in, one flathead catfish ≥35.0 in, and one channel catfish ≥28.0 in per day. Harvest of fish below their respective length limits is not regulated.
>
> The majority of commercial fishers fishing in the legal waters of the Ohio River and its tributaries are allowed one blue catfish ≥35.0 in, one flathead catfish ≥35.0 in, and one channel catfish ≥28.0 in per day. However, up to 50 commercial fishers (This number was reduced to 15 commercial fishers in 2019) that harvested over 10,000 lbs of catfish in at least 2 of the last 3 years along with an additional six commercial fishers, who are chosen by a lottery drawing, are allowed a daily harvest of four (in aggregate) blue catfish and flathead catfish ≥40.0 in and channel catfish ≥30.0 inches in Kentucky's portion of the Ohio River and its tributaries open to commercial fishing below Cannelton Lock and Dam. Harvest of fish below their respective length limits is not regulated.

Accusations by recreational anglers that overharvest was still occurring surfaced again in 2018. Multiple meetings were held with KDFWR staff, recreational anglers, commercial fishermen, and paylake owners all present to work towards another compromise. Several regulations were proposed and submitted for review. At the time of this report the following regulations have been made law:

The number of commercial fishers awarded trophy permits was reduced to 15 (previously 50).

There will be no more than two licensed commercial fisherman per boat. If more are present, they may only keep two limits of trophy catfish.

A possession limit (twice the daily limit) was placed on trophy catfish for commercial fishers. This applies when on the water and when trailering fish.

Hoop nets—Catch rate of channel catfish was 2.4 fish/net-night and has continually decreased since 2017. Flathead catfish CPUE was 0.8 fish/net night, a decrease from 1.8 fish/net night in 2019. Water temperatures were below average during the hoop netting sampling period. Additionally, water levels were highly variable during sets. These factors may have negatively affected catch rates.

Electrofishing—Blue catfish CPUE (17.9 fish/hr) was the lowest since 2016 and decreased for the third straight year; however, catch rate was still above the historical average (CPUE = 17.2 fish/hr). Catch rate of flathead catfish was a record high 41.7 fish/hr, which was a decrease from record highs in 2020, but still the third highest catch rate since 2004.

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

Contact Information:

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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: Projects is in its early phases with no processed results at this time.

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 population. 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.

Louisiana

Nothing to report / No future project planned

Mississippi

Name of Representative to Technical Committee: Samantha Bergeron

Project Name or Description: Flathead Catfish Introduction to Elvis Presley Lake

Contact Information:

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Objective: To create a Flathead Catfish fishery in a small impoundment

Current Status: Canceled due to lake renovation.

Abbreviated abstract:

MDWFP fisheries personnel stocked 9,600 fingerling Flathead Catfish in Elvis Presley Lake during the fall of 2018. Elvis Presley Lake is a 330 acre state fishing lake located near Tupelo, MS. Historically, the lake has received low fishing pressure due to subpar bass and bream populations. As supplemental forage for the catfish, as well as bass, 34,000 threadfin shad were also stocked. The catfish were stocked in an effort to create a flathead catfish fishery, which could boost angler trips to the lake. Study was canceled in 2021 when the lake was drawn down for renovation.

Name of Representative to Technical Committee: Samantha Bergeron

Project Name or Description: MS River Angler Catfish Tagging Project

Contact Information:

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Objective: To obtain recapture and movement data for large angler caught catfish in the MS River

Current Status: Ongoing

Abbreviated abstract:

MDWFP is cooperating with trophy catfish fishing guides to monitor large catfish recapture and movement on the Mississippi River. The fishing guides are collecting length (in) and weight (lbs) for catfish caught, along with GPS coordinates of the release locations. Catfish are caught using hook and line, double tagged with floy tags, and released at or near the capture locations. Fishing guides report the data to MDWFP on a monthly basis. The tagging project began in March 2020 and as of December 31, 2020 no recaptures have been reported. A total of 110 catfish fish have been tagged consisting of 109 Blue Catfish and one Flathead Catfish. The average total length of catfish tagged was 38.9 inches and the mean weight was 31.6 pounds.

Missouri

Name of Representative to Technical Committee: Joe McMullen

Project Name or Description: Assessment of Vital Rates (Exploitation, Size Structure, Age and Growth, and Total Annual Mortality) to Evaluate the Current Harvest Regulations for Blue Catfish and Flathead Catfish in the Missouri and Mississippi Rivers.

Literature/Reports:

Big Rivers Blue Catfish Final Report

Big Rivers Flathead Catfish Final Report

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Status: Completed

Abbreviated Abstract: Big Rivers Catfish Assessment | MDC Research (mo.gov)

Our studies confirmed that current, low-intensity management approaches continue to support healthy and sustainable blue and flathead catfish populations in the Mississippi and Missouri rivers. Regulation changes do not appear to be necessary to maintain these populations or prevent overfishing. Opportunities to manage these catfish populations to better meet the desires of some fishers who prefer to catch larger fish (i.e., size favored over yield) were identified. However, public input indicates that catching catfish to eat is more important than catching 'trophy' sized catfish and that many anglers prefer to keep smaller catfish. While there is interest in catching 'trophy' size catfish and implementing more restrictive harvest regulations among some big rivers catfish anglers, that sentiment was not overwhelming, and public comments largely supported no change to the current regulations.

Project Name: Flathead Catfish Population Assessments in Several of Missouri's Large Reservoirs and Small Impoundments

Contact Information:

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Objectives:

1.) Sample Flathead Catfish populations in a suite of large reservoirs (ranging from 2,400 to 55,600 acres) and small impoundments (<200 acres) to determine population demographics (e.g., mean total length, proportional size distributions, age structure, total annual mortality, etc.).
2.) Examine the population genetic structure including genetic effective population size (N_e), level of inbreeding, population mixing/isolation, and predict the effects of low, medium, and high exploitation on N_e and reproductive variance of Flathead Catfish in each waterbody.
3.) Conduct modeling simulations of each Flathead Catfish population to assess existing regulations and explore the potential to improve or sustain each fishery.
4.) Develop long-term standard sampling protocols for managers to examine population trends.

Status: Low-frequency electrofishing (15 Hz/30% duty cycle pulsed DC) was conducted in 2021 in large reservoirs (Table 1) and small impoundments (Table 2) using standardized electrofishing outputs recommended by Thomas and Morris (2020). Processing and aging of >1700 total pectoral spines from sampled Flathead Catfish continue in 2022.

Table 1. Catch statistics for Flathead Catfish in each **reservoir** collected with boat electrofishing in 2021. Ranges are shown in parentheses. Effort is the time (h) electrofishing output power was on. CPUE is number of fish/hour. Proportional-size distributions (PSD) of Flathead Catfish collected in each waterbody were calculated using Flathead Catfish length categories described by Anderson and Neumann (1996) as follows: stock (14 in or 350 mm), quality (20 in or 510 mm), preferred (28 in or 710 mm), memorable (34 in or 860 mm), and trophy (40 in or 1020 mm).

Reservoir	Surface Acres	Year	Sample Runs[1] (N)	Fish Collected (N)	Total Effort (hrs)	Total CPUE	$CPUE_{<14"}$	$CPUE_{\geq 28"}$	Mean TL (in)	PSD_Q	PSD_P	PSD_M	PSD_T
Pomme De Terre[2]	7,820	2021	5	49	1.69	29.0	17.2	2.4	14.2 (3.3 – 39.9)	45	20	5	0
Smithville	7,190	2021	27	427	6.75	63.3	26.7	12.9	19.0 (3.3 – 46.3)	73	35	17	5
Stockton	25,900	2021	38	109	8.50	12.8	2.1	1.8	19.9 (6.8 – 46.8)	45	17	8	1
Table Rock	43,100	2021	10	100	3.09	32.3	4.2	1.6	19.6 (9 – 38.8)	53	6	2	0
Truman	55,600	2021	59	421	13.89	30.3	11.4	3.9	18.2 (4.1 – 51.25)	57	21	11	3

[1]Number of individual sampling runs conducted with electrofishing power on for a discrete amount of time (~3-15 minutes) across a range of sample dates and sites distributed throughout each reservoir.
[2]Pilot sampling conducted to explore habitats and examine electrofishing success for future sampling efforts.

Table 2. Catch statistics for Flathead Catfish in each **small impoundment** collected with boat electrofishing in 2021 during population marking (day 1) and recapture (day 2) runs where fish were marked with fin clips. Ranges are shown in parentheses. Effort is the time (h) electrofishing output power was on. CPUE is number of fish/hour. Proportional-size distributions (PSD) of Flathead Catfish collected in each waterbody were calculated using Flathead Catfish length categories described by Anderson and Neumann (1996) as follows: stock (14 in or 350 mm), quality (20 in or 510 mm), preferred (28 in or 710 mm), memorable (34 in or 860 mm), and trophy (40 in or 1020 mm).

Small Impoundment	Surface Acres	Day 1 Marking Run (N)	Day 2 Recap Run (N,%)	Total Fish Collected (N)	Total Effort (hrs)	Total CPUE	$CPUE_{<14"}$	$CPUE_{\geq 28"}$	Mean TL (in)	PSD_Q	PSD_P	PSD_M	PSD_T
Bilby Ranch	110	166	21 (12.7%)	307	1.70	180.6	96.5	20.0	16.4 (4.2 – 41.3)	66	24	11	4
Cameron #3 (Eagle Lake)	96	71	10 (14.1%)	120	1.67	72.1	11.4	39.0	28.4 (7.2 – 47.2)	91	64	42	21
Che-Ru Lake	160	44	13 (29.5%)	94	1.81	52.0	26.0	3.9	15.8 (7.5 – 40.5)	34	15	11	2
Higginsville City Lake	150	57	7 (12.3%)	86	3.04	28.3	2.6	9.5	24.7 (7.8 – 43.8)	77	37	17	5
Limpp Lake	29	6	2 (33.3%)	15	0.76	19.9	0	4.0	24.4 (18.8 – 30.2)	87	20	0	0
Little Compton Lake	40	7	3 (42.9%)	22	1.25	17.7	3.2	4.8	23.9 (10.3 – 35.8)	100	33	6	0
Willow Brook	100	72	4 (5.6%)	130	1.78	72.9	9.5	21.9	23.7 (8.2 – 38.8)	86	35	8	0

Project Name or Description: Population Assessment and Angler Exploitation of Blue Catfish in Mark Twain Lake

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Objectives:

1) To determine population demographics (i.e., size structure, age and growth, mortality) of blue catfish in Mark Twain Lake.
2) To determine angler exploitation of blue catfish in Mark Twain Lake.
3) To determine if new harvest regulations would improve the size structure of blue catfish in Mark Twain Lake.

Status: Completed. The Missouri Department of Conservation Commission gave initial approval during its August open meeting to the proposed regulation that sets a minimum length limit of 26-inches for blue catfish and flathead catfish on Mark Twain Lake in northeast Missouri. Comments collected during an October public comment period were considered by the Commission. In the December open meeting, the Commission approved the regulation to be effective February 28,2022.

Abbreviated Abstract: The Missouri Department of Conservation (MDC) completed a seven-year assessment of blue catfish and flathead catfish in Mark Twain Lake. Simulation modeling indicated that a 24- or 26-inch minimum length limit (MLL) would provide substantial increases in the number of catfish at least 35 inches long, while minimizing the risk of reducing yield. Over two-thirds of anglers who completed the mail-in and online surveys supported one of the suggested MLL. A 26-inch MLL was recommend because it provides the best combination of increasing the number of large catfish while limiting a reduction in yield. This rule provides a good compromise for anglers who prefer catching a large catfish and those who prefer keeping catfish to eat. In addition, no changes to daily limits or allowable fishing methods were recommended as these are generally not effective or supported by most anglers.

Simulation modelling yielded the following results for blue catfish:

EXPECTED RESPONSE TO A MINIMUM LENGTH LIMIT (MLL)

Variable	20-inch MLL	24-inch MLL	26-inch MLL	30-inch MLL
Yield (kg)	4% to 13%	0% to 13%	-6% to 18%	-25% to 7%
Harvested (N)	-24% to -21%	-48% to -38%	-57% to -54%	-74 to -63%
Number at least 35 inches long	18% to 29%	40% to 66%	55% to 93%	208% to 294%

Yield = total weight of blue catfish harvested, **Harvested (N)** = number of blue catfish harvested, **Number at least 35 inches long** = number of blue catfish in the population at least 35 inches long. A **negative** percent means a decrease.

Online Survey and Comments

- From July 1-August 1, 2020, online comments were provided by 109 people.
- Nearly all respondents considered themselves an angler.
- Respondents were predominately male.
- Respondents from 35-54 years old were most common.
- Respondents heard about the proposed regulations changes from social media, followed by the MDC website.
- Over 60 percent felt having an increased opportunity to catch a large catfish was most important when fishing for catfish at Mark Twain Lake, and 40 percent felt keeping blue catfish and flathead catfish to eat was more important.
- When asked which of the following potential harvest regulation changes best met their catfish fishing preferences at Mark Twain Lake:
    - 21 percent preferred a 24-inch minimum length limit
    - 21 percent preferred a 26-inch minimum length limit
    - 16 percent preferred a 20-inch minimum length limit
    - 15 percent referred a 30-inch minimum length limit
    - 15 percent preferred no change
    - Overall, 73 percent chose one of the minimum length limits
- The most common themes when asked to share additional thoughts pertaining to catfish on Mark Twain Lake include (see appendix for full comments and responses):
    - Support size limits for both blue catfish and flathead catfish
    - Manage for world-class blue catfish
    - Slot limits like Lake of the Ozarks and Truman Lake
    - Limit trot lines, jug lines and the number of hooks per person
    - Enforce regulations

Mail Survey

- 108 of 227 mailed surveys were returned.
- 86 percent of respondents considered themselves a catfish angler.
- Most anglers made one to ten fishing trips to Mark Twain Lake in the past 12 months.
- 68 percent rated blue catfish fishing as good or excellent.
- 67 percent rated flathead catfish fishing as fair or poor.
- 52 percent felt keeping catfish fish to eat was more important than the opportunity to catch a large catfish, and 33 percent felt the opportunity to catch a large catfish was more important.
- When asked which of the following potential harvest regulation changes best met their catfish fishing preferences at Mark Twain Lake:
    - 23 percent preferred a 24-inch minimum length limit
    - 18 percent preferred a 20-inch minimum length limit
    - 13 percent preferred a 26-inch minimum length limit
    - 12 percent preferred a 30-inch minimum length limit
    - 32 percent preferred no change
    - Overall, 66 percent chose one of the minimum length limits

North Carolina

Name of Representative to Technical Committee: Ben Ricks

Project Name or Description: White Catfish stocking following Hurricane Florence

Contact Information:
Name: Kyle Rachels
Coauthors: Jeff Evans
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Phone: 252-548-4938

Objective: Introduce White Catfish into areas where they have been extirpated by Flathead Catfish.

Current Status: Ongoing

Abbreviated Abstract: White Catfish have not been observed in the lower Cape Fear River Basin for almost 20 years. In 2018, extensive fish kills (including Flathead Catfish) were caused by Hurricane Florence. The temporary reduction in predatory pressure may allow native catfish species to persist for a short duration. In 2020 and 2021, a total of 190,000 White Catfish (4-6in) were stocked in areas impacted by Hurricane Florence. Future surveys will elucidate the presence and persistence of White Catfish in the stocked areas.

Project Name or Description: Growth and mortality of nonnative catfish in southeastern NC

Contact Information:
Name: Kyle Rachels
Coauthors: Michael Fisk
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Phone: 252-548-4938

Objective: Estimate growth and mortality rates of Blue, Channel, and Flathead catfish in 4 rivers in southeastern NC.

Current Status: Completed

Abbreviated Abstract: Extensive biological surveys were conducted in the Black, Cape Fear, Lumber, and Waccamaw rivers in 2015 and 2016. Overall, 300 Blue Catfish were aged (of 489 caught), 396 Channel Catfish were aged (of 558 caught), and 759 Flathead Catfish were aged (of 956 caught). Mortality rates and von Bertalanffy model parameters were estimated for each river and species. Results were included in a series of Federal Aid in Sport Fish Restoration Reports published by NCWRC in 2021.

Project Name or Description: Evaluation of the Blue Catfish Population in Lake Gaston

Contact Information:
Coauthors: David Belkoski
Email: David.belkoski@ncwildlife.com
Phone:

Objective: To assess the Lake Gaston Blue Catfish population.

Current Status: A thriving invasive population with four consecutive state records since 2015.

Abbreviated Abstract: Little is known about Lake Gaston Blue Catfish population metrics, such as growth rates, mortality rates, size structure, diet, and condition. We began collecting Blue Catfish with gill nets during the winters of 2016 through 2021 and have sampled approximately 650 fish. In 2021, we collected 122 Blue Catfish ranging in size from 387 to 990 mm. Condition seems to improve with increasing total length, suggesting some crowding for small to medium size fish. A comprehensive report for the six years of data is scheduled for completion in January 2022.

Oklahoma

Name of Representative to Technical Committee: Jeremy Duck

Project Name or Description: An Evaluation of limitations to Channel Catfish Recruitment in Small Impoundments – Oklahoma Fishery Research Lab

Contact Information:

Name: Austin D. Griffin - *Oklahoma Department of Wildlife Conservation, Oklahoma Fishery Research Laboratory, 500 East Constellation, Norman, OK 73072*
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Objective:

1. We are currently sampling small impoundments in the OKC region following SSP procedure to fulfill routine SSP sampling requirements, acquire age and sex data, and evaluate potential study lakes for this project by determining if natural recruitment is occurring per the ODWC Seven Inch Channel Catfish Criteria sheet (natural reproduction in non-stocked years).
2. We will map/quantify available potential spawning habitat in study lakes following the methods of Kaeser et al. (2013) and select lakes with relatively minimal spawning habitat.
3. We will evaluate the impact of various sizes of Pennsylvania catfish spawning boxes and opening diameters to determine the optimal box size/opening diameter combination (Porta and Smith 2013). With limited information available describing optimal cavity opening size, we will first attempt to correlate opening size to fish length by sampling fish in natural/existing cavities.
4. We will then alternate stocking and installment of spawning boxes every other year at varying densities to determine the best option for increasing recruitment and the feasibility of offsetting the need for supplemental stocking.

Current Status: Ongoing

Abbreviated Abstract: Due to the popularity of channel catfish throughout the United States, many natural resource agencies invest substantial effort stocking and managing channel catfish populations to provide harvest and trophy opportunities (Bodine et al. 2013). In lieu of inadequate natural recruitment, it is commonplace for natural resource agencies to maintain put-grow-take channel catfish fisheries in small impoundments (< 500 acres; Michaletsz and Dillard 1999, Michaletz et al. 2011) using advanced fingerling or larger fish to deter predation (Storck

and Newman 1988). Management and evaluation of stocking success of these populations requires reliable estimates of population rate functions (including recruitment), Variation in annual recruitment has been documented for channel catfish in reservoirs (Hubert 1999, Holley 2006, Settineri 2015) and recruitment can vary considerably between lakes (Tyszko et al. 2021). Griffin et al. (*in press*) associated higher recruitment with increased exchange rate and volume and lower recruitment with increased total water hardness. However, a follow up tank experiment revealed no significant differences in hatch rate or larval abnormalities associated with increasing total hardness for channel catfish (ODWC, unpublished data). Most of the previously mentioned factors that potentially effect recruitment are outside the control of fisheries managers. However, a major limiting factor that is likely within our power to manipulate is a lack of high-quality spawning habitat (Porta and Smith 2013).

To aid regional managers in the evaluation of fisheries stocked with seven-inch fish (per ODWC stocking criteria) and decrease the cost of stocking/rearing these fish we propose to evaluate spawning habitat in small impoundments and determine the feasibility of positively impacting recruitment with artificial nest boxes where needed.

Project Name or Description: Gear Bias of low-frequency electrofishing for sampling Blue Catfish populations in Oklahoma reservoirs

Contact Information:

Name: Graham Montague, Oklahoma Department of Wildlife Conservation, Oklahoma Fisheries Research Laboratory
Coauthors: Dan Shoup, Oklahoma State University, Department of Natural Resource Ecology & Management
Richard Snow, Oklahoma Department of Wildlife Conservation, Oklahoma Fisheries Research Laboratory
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Objective: Evaluate the accuracy of low-frequency electrofishing (LFE) size-structure data for Blue Catfish in Oklahoma Reservoirs

Current Status: Ongoing

Abbreviated Abstract: Blue Catfish *Ictalurus Furcatus* are a popular sportfish amongst anglers in the United States, particularly because they can reach trophy sizes and are highly edible. In Oklahoma, anglers can harvest 1 Blue Catfish over 30 inches and the goal of this regulation is increased abundance of these larger fish. Anecdotal evidence from Oklahoma Department of

Wildlife Conservation (ODWC) standardized sampling suggests that low-frequency electrofishing (LFE; 15 pulses per second) inaccurately samples the true population and may underrepresent the larger size classes of fish (>760 mm), making the assessment of this size limit on Blue Catfish populations difficult to interpret. Therefore, we designed a study to quantify the capture probability of Blue Catfish sampled with LFE by conducting a mark-recapture study in 5 Oklahoma reservoirs (Lake Arcadia, 2021; Wiley Post Reservoir, 2021; Lake Thunderbird, 2022; Lake Overholser, 2022; and Lake Ellsworth, 2023). We captured fish using LFE, gill nets, and juglines and tagged and released fish ≥ 200-mm TL with modified Carlin dangler tags. Each lake is then being sampled with LFE monthly following the OWDC LFE Blue Catfish standardized sampling protocol to collect recapture data. We used separate Cormack Jolly Seber (CJS) capture-recapture models for each lake to estimate the size specific capture probability for LFE. Preliminary results from sampling of these marked populations suggest that stock-size fish have a higher capture probability than trophy-size fish in Lake Arcadia; however, there is little difference in capture probabilities amongst size classes of fish in Wiley Post Reservoir. The other lakes do not yet have sufficient recaptures to analyze. We plan to continue our mark-recapture study throughout the next 3 years to compare the capture probabilities across reservoirs.

Project Name or Description: Immobilization threshold of Blue Catfish exposed to low-frequency electrofishing

Contact Information:

Name: Graham Montague, Oklahoma Department of Wildlife Conservation, Oklahoma Fisheries Research Laboratory
Coauthors: Dan Shoup, Oklahoma State University, Department of Natural Resource Ecology & Management
Richard Snow, Oklahoma Department of Wildlife Conservation, Oklahoma Fisheries Research Laboratory
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Objective: Quantify the minimum power level needed to elicit a surfacing response by Blue Catfish when sampling with low-frequency electrofishing.

Current Status: Ongoing

Abbreviated Abstract: Standardizing electrofishing power output is important because it makes catch per unit effort (CPUE) more consistent such that changes in CPUE reflect

population changes rather than changes in the gear's effectiveness. Many management agencies use low-frequency electrofishing for sampling Blue Catfish populations however, the power output required to elicit a surfacing response of Blue Catfish is unknown, making it difficult to pick a standardized power level. Therefore, we have been conducting electrofishing trials to determine the minimum power level needed to elicit a surfacing response by Blue Catfish. Blue Catfish were collected from Lake Arcadia, Lake Thunderbird, and Wiley Post Reservoirs in Oklahoma using low-frequency electrofishing and gill nets. Fish were transported to the Oklahoma Fisheries Research Laboratory's wet laboratory and held for 48 hours in a 3.63-m (long) x 0.6-m (wide) x 0.75-m (deep) fiberglass tank with 2 metal plates serving as the cathode and anode at either side that were 363 cm apart. All trials were conducted with a Smith Root APEX electrofishing unit operating at 15 Hz pulsed DC current and 25% duty cycle. The water temperature of each shocking trial was 24 $\pm$ 1°C. Trials are conducted on groups of 10-14 fish. Surfacing was described as a fish swimming erratically at the surface of the water for at least 2 seconds and becoming immobilized (such that they could be dip netted). To date, we have tested a total of 332 Blue Catfish at a range of power levels (0.0000113 - 1.093 $\mu W/cm^3$ of power applied to the fish). Not all fish in a group respond the same way, but we have found power settings where at least 33% of the fish surface on repeated trials. Preliminary results suggest that the minimum power level applied to the fish for a surfacing response is between 0.0000113 - 0.0000214 $\mu W/cm^3$. We plan to continue our wetlab study by testing additional fish to fine tune the power level needed to elicit a surfacing response of Blue Catfish.

Project Name or Description: Effect of temperature and seasonality on low-frequency electrofishing data for Flathead Catfish

Contact Information:

Name: Graham Montague, Oklahoma Department of Wildlife Conservation, Oklahoma Fisheries Research Laboratory
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Objective: Evaluate the accuracy and precision of low-frequency electrofishing (LFE) CPUE and size-structure data for Flathead Catfish to determine the best time to conduct LFE surveys

Current Status: Completed

Abbreviated Abstract: Flathead Catfish *Pylodictis olivaris* are popular among anglers, however; information about sampling Flathead Catfish is limited. Low-frequency electrofishing (LFE; 15 pulses per second) is the most used method for sampling Flathead Catfish. Therefore,

we evaluated the precision, optimal sampling duration, and accuracy of LFE sampling for Flathead Catfish. CPUE (all sizes combined, $CPUE_{Total}$; fish over 610 mm TL, $CPUE_{610}$; and fish over 710 mm TL, $CPUE_{710}$) was highest in three sampled lakes from May-September when the water temperature was $\geq$23°C. Precision estimates (relative standard error, RSE) were not significantly impacted by water temperature but varied by month. $CPUE_{Total}$, $CPUE_{610}$, and $CPUE_{710}$ and their precision estimates did not significantly differ between 5-, 10-, and 15-minute samples. At warmer temperatures (i.e., >23° C), 15-minute samples only required 10-16 samples whereas 5-minute samples required 14-23 samples to achieve RSE = 25. Using a known Flathead Catfish population (i.e., fish marked in Lake Carl Blackwell, Lake McMurtry, and Boomer Lake with operculum Carlin Dangler tags), we calculated capture probabilities with a Cormack Jolly Seber model. LFE is size biased, but the bias varied among lakes. Capture probability decreased as fish length increased in Lake Carl Blackwell and Lake McMurtry and increased as fish length increased in Boomer Lake. Capture probability was the highest in July for Lake Carl Blackwell and Boomer Lake and August for Lake McMurtry. Capture probability was highest and most consistent when the water temperature was $\geq$26°C in both Lake Carl Blackwell and Lake McMurtry, but temperature was not in the top models from Boomer Lake. The probability of a fish surfacing in wetlab trials was inversely related to the power applied to the fish indicating that low power application is most successful for Flathead Catfish LFE, but we believe our trials were conducted well above the threshold for electrofishing response (we tested 1.0 – 13.9 $\mu W/cm^3$ of power applied to the fish), so additional work is needed to determine the minimum power requirements for capturing this species. Only 9.8% of fish surfaced in trials suggesting that only some fish exhibit a surfacing response when exposed to LFE. We recommend sampling Flathead Catfish in July and August when the water temperature is $\geq$26°C as this sampling design will maximize catch rates, have high precise and minimize the size bias during the sampling season.

Project Name or Description: Population Dynamics of lotic Blue Catfish and Flathead Catfish in Oklahoma

Contact Information:

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Objective: Establish a baseline contemporary dataset to monitor trends in dynamic rate functions, generate statewide standards for growth and size structure to facilitate population comparisons, and evaluate harvest regulations under an adaptive management framework.

Current Status: Ongoing

Abbreviated Abstract: Surveys of Oklahoma angler preferences have revealed that Blue Catfish *Ictalurus furcatus* and Flathead Catfish *Pylodictis olivaris* are the most sought-after species by anglers in rivers and streams. Therefore, catfish represent an important natural stream resource warranting management in Oklahoma. Despite their popularity, catfish population management has received very little attention in lotic Oklahoma systems. Consequently, lotic catfish population dynamics data are almost non-existent. Beginning in 2016, the Oklahoma Department of Wildlife Conservation Streams Program instituted a catfish monitoring effort for Blue Catfish and Flathead Catfish. In the spring of 2021, we resurveyed the Poteau River to augment catfish sample sizes. Three sites were surveyed in 2016, which resulted in total sample sizes of 90 and 87 Blue Catfish and Flathead Catfish, respectively. An additional 10 surveys were conducted for Blue Catfish and 12 surveys for Flathead Catfish in 2021. We saw a 97% increase in our overall Blue Catfish sample size, including a 74% increase in individuals greater than or equal to stock size. Relative abundance estimates remained relatively constant; however, we saw a 51% decrease in the relative standard error around this estimate. Flathead Catfish sample sizes increased by 152% overall with a 150% increase in individuals greater than or equal to stock size. Similar to Blue Catfish, Flathead Catfish relative abundance estimates remained constant, but there was a 73% decrease in the relative standard error. At this point, the ODWC Stream Program has sampled 7 rivers since 2016 with cumulative sample sizes of 1,385 Blue Catfish and 537 Flathead Catfish. Max size, max age, fecundity, sex ratios, catch-per-unit effort, proportional size distributions, von Bertalanffy growth parameters, and annual mortality rates have been estimated for the rivers surveyed to inform management decisions for lotic catfish populations. Going forward we plan on adding additional rivers to this statewide dataset and supplementing sampling sizes in rivers where necessary. compare the catch rates over a range of temperatures.

Tennessee

Nothing to report / No future projects planned

Texas

Name of Representative to Technical Committee: Kris Bodine

Project Name or Description: Revised Catfish Regulations in Texas

Contact Information:

Name: John Tibbs

Coauthors: Greg Binion, Kris Bodine, Greg Cummings, Cynthia Fox, Nate Smith, Lynn Wright, Ken Kurzawski, Richard Ott, and Dave Terre
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Objective: Revise, reduce, and simplify current regulation with new regulations reflecting improvements in the science and changes in angler attitudes.

Current Status: Ongoing; the new suite of regulations has been proposed and submitted to our commission. Additional formal angler feedback will be gathered through March, when our commission will make a final decision.

Abbreviated Abstract: These efforts were completed by a committee that reviewed the state of the science and recent angler attitude and opinion surveys. The committee developed a draft set of regulations, including a new statewide as well as a standardized set of special regulations. These regulations were presented to a large group of anglers statewide using a virtual town hall format, followed by a statewide rollout for public comment. The regulations were enacted September 1, 2021. The number of special catfish regulations were reduced from 11 to 8 which by necessity included interjurisdictional regulations. Blues and channels were combined to eliminate violations due to identification errors. Lastly the statewide regulation was changed from a 25 fish bag, 12" minimum to a 25 fish bag, only 10 of which can be more than 20" long. This process identified several data needs, some of which are being addressed with new research projects within the state.

New regulations:

1) Statewide: Channel, blue, their hybrids & subspecies. No minimum length limit; daily bag limit = 25 fish in any combination. Of the 25-fish bag, no more than 10 can be 20 inches or longer. Most Texas reservoirs larger than 500 acres will be managed with this regulation (about 85% of the total).

2) Channel, blue, their hybrids & subspecies. Minimum length limit: 14 inches. Daily Bag = 15 in any combination. Proposed for Braunig, Calaveras, Choke Canyon, Fayette and Proctor. This regulation is appropriate where excessive harvest is indicated, and spawning/recruitment is an issue.

3) Channel, blue, their hybrids & subspecies No minimum length limit; daily bag limit = 25 fish in any combination. Of the 25-fish bag, no more than five can be 20 inches or longer, and no more than one of those can be 30 inches or longer. Proposed for Belton, Bob Sandlin, Conroe, Hubbard Creek, Kirby, Lavon, Lewisville, Palestine, Ray Hubbard, Richland Chambers, Tawakoni and Waco. This regulation is designed to increase the numbers of quality and trophy-sized Blue Catfish. It is appropriate for reservoirs with good to excellent Blue Catfish

populations that exhibit average to fast growth, have existing trophy fish or trophy potential, and a supportive angler base that desire a population with more larger fish.

Retained regulations (Interjurisdictional)

4) For Blue and Channel Catfish, no MLL and daily bag = 15. Only one Blue Catfish 30" or greater by be retained each day. For Flathead Catfish, no MLL and daily bag = 5 (Texoma and the Red River below Texoma).

5) For Blue and Channel Catfish, no MLL and daily bag and possession limit = 50 in any combination of which no more than 5 Blue or Channel Catfish 30" or greater may be retained. (Toledo Bend, Caddo). Livingston and Sam Rayburn are also proposed for this regulation. This regulation is appropriate for large east Texas reservoirs where blue catfish are abundant and there is stable recruitment and good growth. There is also low exploitation by mostly passive gear anglers who are harvest-oriented.

Project Name or Description: Blue and Channel Catfish growth, mortality, and gill net selectivity in Texas reservoirs

Contact Information:

Name: Lynn Wright
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Objective: 1) Estimate instantaneous mortality and growth rates for Blue and Channel Catfish populations, 2) Estimate size selectivity of TPWD experimental gill nets for Blue Catfish and Channel Catfish, 3) Compare estimates of size structure and instantaneous mortality rates from unadjusted gill net data and size-bias corrected data within and among reservoirs.

Current Status: Ongoing. Sampling has been completed for Blue Catfish on Choke Canyon, Hubbard Creek, Kirby, and Livingston Reservoirs resulting in over 1,800 Blue Catfish sampled to date. Nine additional reservoirs are scheduled to be sampled over the next two springs (2022 and 2023) to complete field sampling. Otoliths have been retained from each population and aging of otoliths is ongoing. We are on schedule to collect age data on 10 Blue Catfish and 5 Channel Catfish populations.

Abbreviated Abstract: The TPWD catfish regulation committee identified a lack of robust estimates on dynamic rate functions (i.e., growth and mortality) for Texas Blue and Channel Catfish populations. This project will provide a significant number of needed growth and mortality estimates across a wide spatial scale and help fill a vital data gap. We plan to collect

growth and mortality data on approximately ten Blue Catfish and four Channel Catfish populations. This data would be enabled fisheries managers to conduct more robust population and regulation modelling and ultimately make more informed decisions regarding appropriate catfish regulations. Gill nets are one of the most widely used fisheries sampling gears and are deployed by biologists statewide in Texas to assess various metrics in catfish populations. However, gill nets have inherent size biases that can result in catfish size structure data that is not representative of the population. Evaluating size bias in our TPWD standard gill nets and creating a size-bias correction factor can improve the quality of our catfish gill net data. Biologist statewide would be able to use this size-bias correction to improve estimates of size structure related metrics.

Project Name or Description: Determining factors limiting establishment of a Channel Catfish fishery at Lake Raven in Huntsville, Texas.

Contact Information:

Name: Carl Vignali
Coauthors: None
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Objective: Determine if barriers to natural reproduction or to recruitment limit the Channel Catfish fishery at Lake Raven in Huntsville, Tx.

Current Status: Completed third year of the study with natural reproduction observed all years. Population and year class surveys was conducted in the spring 2020 and will continue to determine recruitment into Channel Catfish population.

Abbreviated Abstract: Lake Raven in Huntsville State Park, in Huntsville, Tx is an aging reservoir with high levels of siltation and little habitat appropriate for Channel Catfish spawning. Lake Raven has also been utilized for experimental Largemouth Bass selective breeding and high-intensity stocking programs and hosts a robust Largemouth Bass population. Natural Channel Catfish recruitment has never been observed in Lake Raven and it is unclear if the lack of recruitment is due to a lack of natural reproduction or excessive predation on young fish. Seventy-eight spawning barrels were installed in the spring of 2018. Reproduction was observed in the barrels in all years (2019-2021). In October, 2021, baited-tandem hoop nets were used to survey the catfish population, but no catfish were collected. Subsequent hoop-net surveys will be conducted in spring 2022. We will continue monitoring reproduction events for several more years; recruitment will be evaluated based on catch data from annual hoop-net surveys and other alternative sampling techniques.

Virginia

Name of Representative to Technical Committee: Margaret Whitmore

Project Name or Description: James River Blue Catfish Movement Ecology

Contact Information:

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Objective: 1) Identify spatiotemporal patterns of Blue Catfish movement and distribution and drivers of those patterns 2) Identify spawning, overwintering, and summer aggregation areas 3) Evaluate transboundary movements and spillover from commercially unexploited areas 4) Evaluate behavioral response to low frequency electrofishing

Current Status: Ongoing

Abbreviated Abstract:

Non-native Blue Catfish (*Ictalurus furcatus*) were intentionally introduced into the James River in the 1970's to create a recreational fishery. The success of these efforts has led to increasing abundance and spatial distribution of Blue Catfish within the James River watershed and has prompted concern over the impacts of Blue Catfish on native species. The James River supports an active recreational fishery and a commercial low-frequency electrofishing (LFEF) fishery, with the commercial zone limited to a 100-rkm section of the tidal mainstem. The purpose of this project is to identify movement and distribution patterns and assess Blue Catfish response to LFEF in an effort to inform guidance, management decisions, and angler outreach.

In October 2021, 40 Blue Catfish ranging in size from 319 to 1134 mm total length were tagged with V13 and V16 acoustic tags, with a tag life of three and 10 years, respectively. An additional 40 fish will be tagged in October 2022, pending an assessment of signal collisions within Blue Catfish aggregation areas and with other species of tagged fish in the James system. This project uses existing passive receiver arrays in the James and Chickahominy Rivers and is expanding this array into five James River tributaries to assess movement into and out of the mainstem. Active tracking methods are being used to identify overwintering and spawning areas. Tracking efforts to identify overwintering habitats commenced in December 2021 and efforts to identify spawning habitat will commence in spring 2022.

Project Name or Description: Predation Impacts of Invasive Blue Catfish on Blue Crabs in Estuarine Environments

Contact Information:

Name: Mary C. Fabrizio
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Phone:

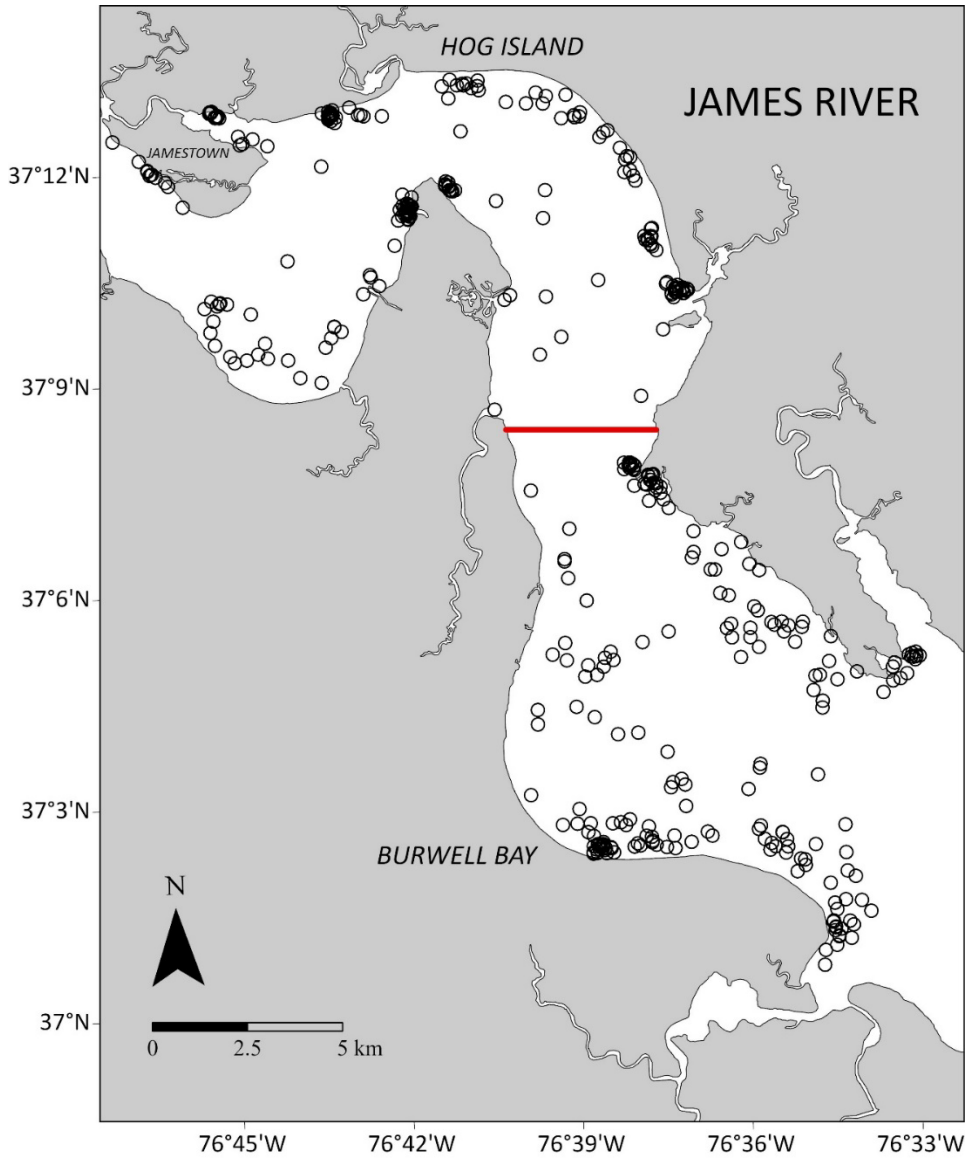
Objective:

Current Status: Complete

Abbreviated Abstract:

The frequency of occurrence by number and weight of blue crabs in the diet of blue catfish in the mesohaline (5 – 18 psu) portion of the James River was greater than that previously reported for tidal freshwater reaches of this subestuary. Blue crab predation likelihoods varied spatially, temporally, and with blue catfish size; although blue crabs were consumed throughout the year, we were unable to detect a seasonal signal in blue crab predation. Blue catfish were 1.75 times (95% confidence interval [CI]: 1.25 – 2.45) more likely to consume blue crabs in Burwell Bay than in Hog Island, suggesting that higher salinity reaches are areas of greater predation intensity on blue crabs. Indeed, the likelihood of observing any type of prey in the stomach of blue catfish from Burwell Bay was 2.08 times greater (95% CI: 1.62 – 2.67) than the likelihood of observing prey in the stomach of blue catfish from Hog Island. Intermediate (301 – 500 mm fork length, FL) and large (> 501 mm FL) blue catfish were more likely to consume blue crabs than were small (200 – 300 mm FL) blue catfish. Large blue catfish were 1.68 times (95% CI: 1.37 – 2.04) more likely to consume blue crabs than intermediate sized fish, and 7.65 times (95% CI: 3.32 – 17.66) more likely to consume blue crabs than small blue catfish. Among the blue catfish that consumed crabs, the average number of blue crabs consumed per day by an individual varied between 0.98 and 1.57, depending on fish size, season, and salinity zone (Burwell Bay or Hog Island). Annually, about 2.3 million blue crabs were removed through predation by blue catfish in the study area which comprises 199.2 km2 and includes the Burwell Bay and Hog Island areas. The estimated overall predation impact of blue catfish reflected the relative abundance of size classes of blue catfish in the lower James River such that fish of intermediate size (301 – 500 mm FL) removed a greater number of blue crabs through predation because of the relatively greater number of intermediate size blue catfish in the James River population.

Figure. Gillnet sampling locations (open circles; N = 416) for blue catfish in the Hog Island and Burwell Bay regions in the James River, VA, from August 2018 to June 2020. Division of the study area into two strata is indicated by the red line.



Project Name or Description: Application of Low-Frequency Electrofishing for Commercial Harvest of Introduced Catfishes in Virginia Coastal Rivers.

Contact Information:

Name: Dr. Matthew Balazik

Coauthors: Greg Garman, William Shuart, Steve McIninch, David Hopler, George Trice

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Objective: Use environmental remote sensing technologies to quantitatively assess experimental commercial harvest of non-native Blue Catfish and Flathead Catfish by a novel gear—low-frequency electrofishing—in large coastal rivers of Virginia.

Current Status: Ongoing

Abbreviated Abstract: We apply environmental remote sensing technologies, including UAVs, side-scan sonar, and BioSonics echosounders, coupled with AI-based enumeration algorithms, to generate synoptic geospatial data (surface and below-surface) estimating numbers and size distributions of catfish during commercial, low-frequency harvest operations. Remotely sensed data are ground-truthed using data generated from harvested catfish. Information will be used to evaluate and potentially improve catch and harvest efficiency for this novel application of low-frequency electrofishing to commercial harvest of introduced catfishes.

West Virginia

Name of Representative to Technical Committee: Nate Taylor

Project Name or Description: Ohio River Catfish Population Assessment

Contact Information:

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Co-Authors: Stephen Floyd
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Objective: Assessment of Catfish Population Characteristics in Various Ohio River Pools

Current Status: Ongoing

Abbreviated abstract: Beginning in 2018, our annual catfish population assessment protocol was altered to coincide with KDFWR's pool-wide, multi-gear sampling approach. Previous lock and dam tailwater low frequency boat electrofishing surveys focused primarily on Flathead Catfish populations, and with the growing popularity of Blue Catfish it was necessary to move to a multi-gear approach to allow for the assessment of Blue, Channel and Flathead Catfishes.

Trotlines, and shore-line low-frequency pulsed DC boat-mounted electrofishing surveys were conducted in the Hannibal and New Cumberland pools of the Ohio River from May to June 2021. Hoop nets (15; baited with Zote soap) were set at three locations (upper, middle, and lower sections) within the Hannibal pool, strategically positioned in outside bends and river margins. Hoop nets were fished for three consecutive nights. Trotlines (25 hooks (125-ft.) or 50 hooks (250-feet)) were set at three sections of the New Cumberland and Hannibal pools. Trotline length depended on river conditions, ensuring 250 hooks per location; fifty hook lines were prioritized to better reach deeper sections of the river. Hooks were baited with cut rough fish, set in the evening, and fished overnight. Lines were pulled, rebaited and reset for a second night. Low-frequency electrofishing surveys (DC output ~200V, 2 amps, 15 pulse/second) were conducted at five sites throughout the two pools, focusing on areas with outside bends and/or rocky shorelines. Surveys consisted of five 15-min transects at each location with an associated chase boat. All catfish collected were identified to species and measured for total length (mm).

Four years after changing annual catfish surveys, results continue to suggest that this methodology effectively samples all species of catfish. Flathead Catfish CPUE via boat electrofishing surveys ranged from 39.2 ± 12.9 fish/hr in the New Cumberland Pool to 48.6 ± 15.13 fish/hr in the Hannibal Pool. Catch rates for Channel Catfish (0.6 ± 0.32 fish/net night) in hoop nets was lower than previous years; this is likely due to low flow and reduced precipitation throughout sampling season. Hoop nets continued to capture memorable and trophy Flathead Catfish (n = 4). Trotline catch rates were comparable to previous years, however, continue to underperform compared to Fall/Winter sampling; this disparity is likely due to suboptimal water temperatures. In the Hannibal pool, Blue Catfish (n=5) are most effectively sampled using trotlines. Despite a collaborative effort with the Pennsylvania Fish and Boat Commission (PFBC), no Blue Catfish were collected throughout the shared New Cumberland Pool. Statistics for all gear types are summarized below in Table 1.

Table 1. Summary of data collect from hoop net (HONT), boat electrofishing (BTEF), and trotline (TROT) surveys targeting catfish in two Ohio River pools in 2021. CPUE is reported as fish/hr. (BTEF), fish/net night (HONT), and fish/hook (TROT).

New Cumberland						
Gear Type	**Effort**	**Species**	**CPUE**	**Size Range**	**N**	**PSD**
BTEF	1.25 Hours* (5 transects)	Channel	3.2 (4.6)	111-344	4	0
		Flathead	39.2 (12.9)	144-664	49	25
		Blue	-	-	-	-
TROT	32 Lines (1225 Hooks)	Channel	0.05 (0.04)	398-678	56	98
		Flathead	0.02 (0.01)	468-1071	23	96
		Blue	-	-	-	-
Hannibal						
Gear Type	**Effort**	**Species**	**CPUE**	**Size Range**	**N**	**PSD**
HONT	132 Net Nights	Channel	0.6 (0.32)	221-640	81	57
		Flathead	0.13 (0.07)	478-1133	18	78
		Blue	-	-	-	-

BTEF	5 Hours (20 transects)	Channel	20.45 (9.24)	91-495	119	18
		Flathead	48.6 (15.13)	83-1020	244	51
		Blue	-	-	-	-
TROT	28 Lines (1400 Hooks)	Channel	0.03 (0.01)	302-640	40	90
		Flathead	0.006 (0.004)	393-1005	9	78
		Blue	0.004 (0.003)	373-719	5	60

* Some BTEF datasheets for New Cumberland pool were lost.

Project Name or Description: Population Characteristics and Seasonal Movement of Blue and Flathead Catfish in the R.C. Byrd Pool of Ohio River and Kanawha River

Contact Information:

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Objectives:

1. Assess size structure, age and growth of Blue Catfish and Flathead Catfish populations within the Robert C. Byrd Pool of Ohio and Kanawha Rivers.
2. Determine population management units for Blue Catfish and Flathead Catfish by assessing movement within and between pools using acoustic telemetry

Current Status: Completed

Abbreviated abstract: Catfish angling is rapidly growing in popularity throughout the United States, including the Mid-Ohio River Valley. Tournaments and guide services are increasing annually within the West Virginia stretch of Ohio River mainstem. Due to an increase in angler interest of catfish fisheries, the West Virginia Division of Natural Resources (WVDNR) has been dedicating effort to monitoring catfish populations more closely in recent years. This study began in 2016 and has been focused on Blue Catfish and Flathead Catfish populations in the Robert C. Byrd Pool of Ohio River (61 km) and lower Kanawha River (51 km). Flathead Catfish populations in this pool are naturally occurring and reproducing. Blue Catfish were reestablished via fingerling stockings from 2004 through 2014.

Fish were collected during both springtime electrofishing surveys and fall/winter trotline surveys. Springtime electrofishing was more effective for sampling Flathead Catfish, as Blue Catfish catch rates were comparatively much lower and more variable. However, the presence of sub-stock Blue Catfish among electrofishing collections are likely an indicator of natural reproduction in this recently reestablished fishery. Trotline surveys were conducted during October/November 2016–2018 but were pushed back to December/January from 2019-2021 to specifically target Blue Catfish based on observations relating to catch rates during the first few years of this study.

All Blue Catfish and a subset of 4 randomly selected Flathead Catfish from each transect were sacrificed during the 2019 spring electrofishing surveys for age and growth analyses. Additionally, Blue Catfish collected during 2019 and 2020 trotline surveys were sacrificed to reach sample size objectives. Flathead Catfish in this pool are growing slow and achieving older ages than many other populations (Figure 1). The oldest Flathead Catfish from this study was estimated to be 32 years old. Blue Catfish growth appears to be moderate with fish achieving sizes much smaller than observed in the James River, Virginia (Figure 2). The oldest Blue Catfish was estimated to be 21 years old, predating the initial 2004 fingerling stockings.

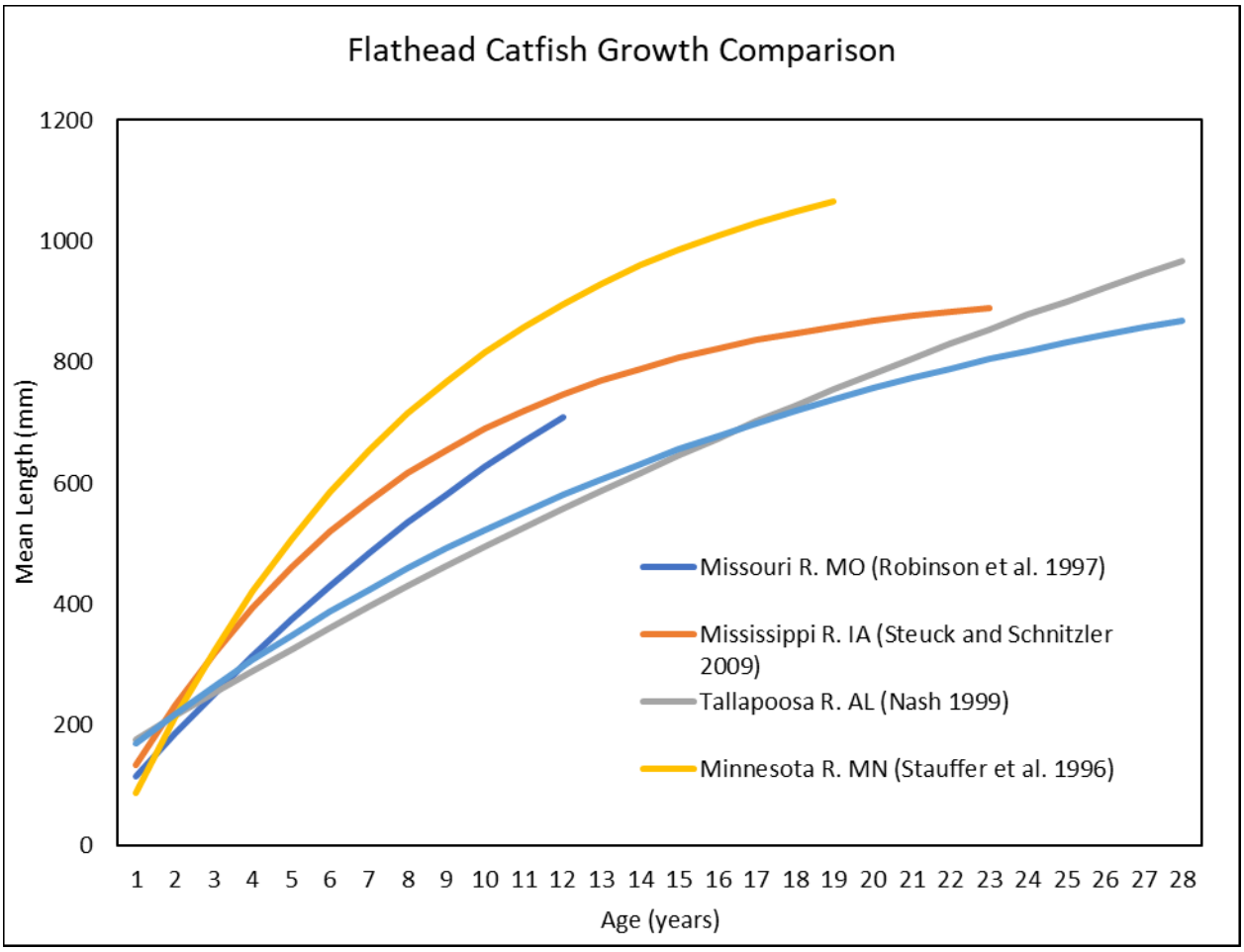

Figure 1. Comparison of growth rates for Flathead Catfish from mean length-at age data.

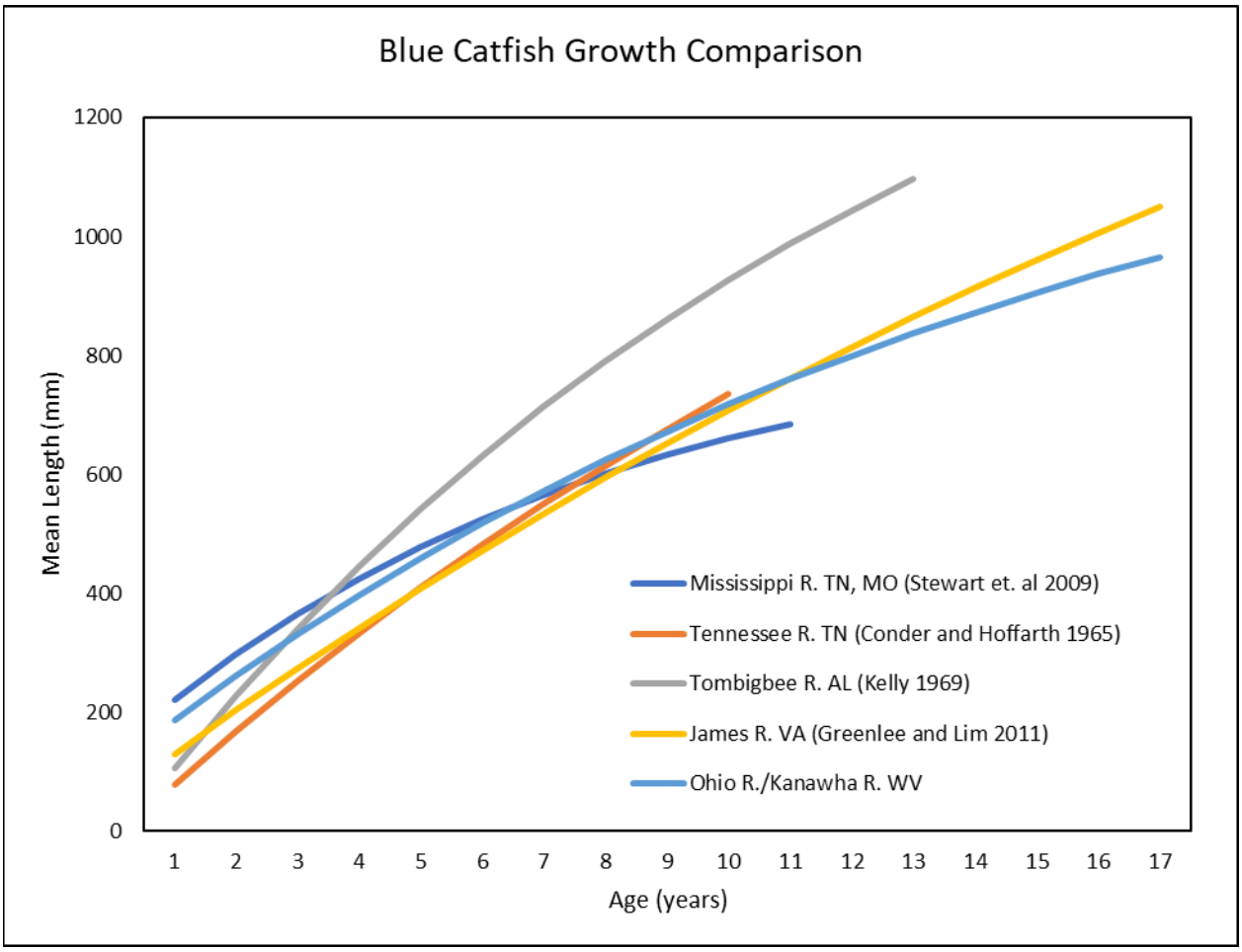

Figure 2. Comparison of growth rates for Blue Catfish based on mean length-at age data.

This project is coming to an end as all field work has been completed and the graduate student who was working on this project has completed and defended his thesis. Movement data from this project is currently being analyzed, and population data is being used to evaluate regulation changes on West Virginia's Ohio River catfish fishery.