

SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

HOLDENVILLE LAKE

2025

SURVEY REPORT

State: Oklahoma

Project Title: Holdenville Lake Fish Management Survey Report

Period Covered: 2025

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Holdenville Lake

ABSTRACT

Holdenville Lake was surveyed by fall gill netting techniques in 2025 to monitor trends in fish populations. Crappie, White Bass and Gizzard Shad all had a decrease in relative abundance, while saugeye had a significant increase. Relative weights also decreased for most fish and size classes sampled except for Channel Catfish and quality size saugeye. Sample size was considered too small to make reliable conclusions on most species sampled.

INTRODUCTION

Holdenville Lake impounds Bemore Creek, nine miles southeast of Holdenville in Hughes County, Oklahoma. Holdenville Lake covers 550 surface acres and was constructed in 1932 by the City of Holdenville. The lake has a mean depth of 20 feet and a maximum depth of 52 feet, a shoreline development ratio of 4.0, a water exchange rate of 0.36, and a secchi disc visibility of around 72 inches in the main pool in August; turbidity is primarily from plankton. Fish habitat consists primarily of aquatic vegetation (water willow) and some rock structures and riprap.

The main management problem for this lake in the past has been a stunted Crappie population. Saugeye have been stocked to reduce Crappie abundance and improve their growth rates. These stockings have been successful as the Crappie population size structure has improved. However, improvement in the Crappie size structure has plateaued and may have reached its max potential. Low Channel Catfish, Blue Catfish and Flathead Catfish recruitment has been a persistent problem. Low water levels have been a major problem in the past.

Saugeye, Channel Catfish, Blue Catfish, Flathead Catfish and Florida largemouth bass have been stocked in recent years (Appendix 1). Florida Largemouth Bass (FLMB) were stocked periodically in Holdenville Lake from 1995 to present in an effort to introduce FLMB genetics into the bass population. FLMB will grow quicker and larger than native Northern Largemouth Bass, given enough forage and the right conditions within the system.

Fish attractor sites have been constructed of spider blocks, starfish and brush piles to improve angler success and are periodically refurbished (Appendix 2). Fish attractor sites were most recently refurbished in December 2019. A boating access project consisting of the addition of a double lane ramp, a boat dock, and renovation the asphalt parking lot was completed in 1990. A handicapped-accessible covered fishing dock with paved parking area and access road was installed in 1993. Construction of a restroom was completed in 1995. A 16-22 inch slot length limit regulation for bass with only one bass per day larger than 22 inches was implemented in 1993 by the City of Holdenville in order to manage this lake as a trophy bass fishery. Also, a slot length limit of 30-40 inches on Flathead Catfish and Blue Catfish was implemented to protect broodstock. In 2023 Largemouth Bass regulations changed to follow statewide regulations: a creel limit of six (6) Largemouth Bass of which only one may be larger than 16 inches. In 2023 the Blue Catfish regulations were changed to a creel limit of three (3) fish of which only one may be greater than thirty (30) inches. Jug lines were also prohibited.

Holdenville Lake was surveyed by fall gill netting techniques in 2025 to monitor trends in fish populations.

Aquatic Nuisance Species

Holdenville Lake is the water supply for the Holdenville State Fish Hatchery located just below the dam. Public waters from across the state receive fish from the hatchery. Therefore, it is critical to prevent the spread of Aquatic Nuisance Species to Holdenville Lake. Main sources of potential spread include boat transfer, angler transfer and pump station from the Little River. Zebra Mussels are currently the main concern. They can be spread by attaching themselves to boats, transferred in the stomachs of Blue Catfish, and by water transfer through pump stations from rivers. Zebra Mussel sampling was occurs regularly by our ANS crew, all results have been negative.

RESULTS

Crappie

Crappie were surveyed in 2025 using suspended gill nets. Eight stations were randomly sampled for a period of 24 hours. The 2025 survey indicated a decrease in relative abundance with a catch per unit of effort (CPUE) of 1.3 Crappie per net night, compared to the 2020 survey (CPUE=4.2) (Table 1).

Abundance for all size classes decreased from 2020 to 2025, no fish were sampled in the memorable or trophy size classes. Body conditions decreased as well for all size classes and remained in poor condition, except for the preferred size fish. Length frequency histograms (Figure 1) showed little changes in size structure. The largest fish sampled measured 10.1 inches in total length and weighed 0.5 pounds.

Age data was collected on Crappie from the 2025 survey, growth was considered fair with a mean length of 8.3 inches by age two, however, no crappie were sampled greater than 8.8 inches (Table 2). While we are able to make general comparisons to previous surveys, sample size was considered too small to make reliable conclusions. Gill nets don't adequately sample crappie populations, future trap net surveys are recommended to obtain more age and growth information.

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall gill netting from Holdenville Lake. Acceptable Wr values are ≥ 90 .

		Total CPUE	<u>Stock</u> 5.1 in		<u>Quality</u> 7.9 in		<u>Preferred</u> 9.8 in		<u>Memorable</u> 11.8 in		<u>Trophy</u> 15.0	
<u>Year</u>	<u>No.</u>	<u>CPUE</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>
<u>2007</u>	150	30.5	27.5	89	0.83	83	.	.	.	.	.	.
<u>2010</u>	101	19.9	16.3	87	1.6	73	0.6	93	1.0	105	.	.
<u>2016</u>	87	15.9	13.6	94	1.45	84	0.4	107	0.4	95	.	.
<u>2020</u>	21	4.2	2.8	88	0.8	80	0.4	100	0.2	99	.	.
<u>2025</u>	10	1.3	0.8	77	0.4	78	0.1	93	.	.	.	.

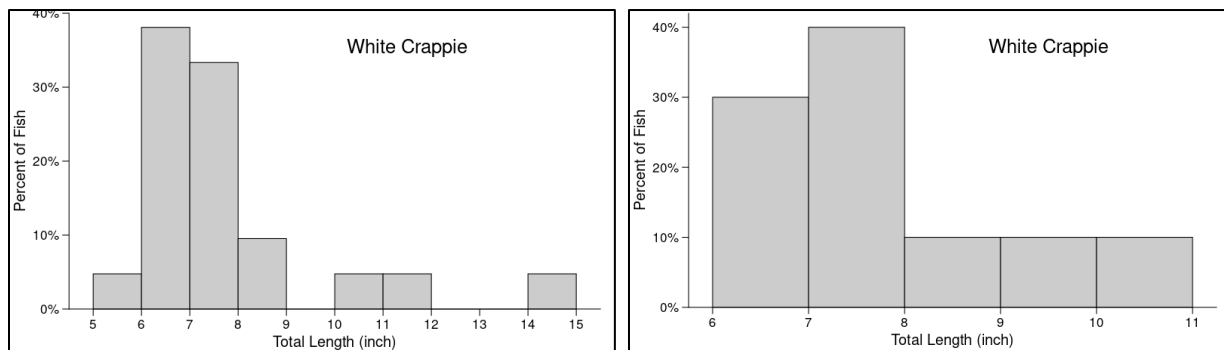


Figure 1. Crappie, Gill Net Length Frequency Histogram 2020 (Left) and 2025 (Right).

Table 2. Mean Total Length at age (inches) for Crappie collected using gill nets and trap nets from Holdenville Lake.

<u>Year</u>	<u>Age</u> <u>1</u>	<u>Age</u> <u>2</u>	<u>Age</u> <u>3</u>	<u>Age</u> <u>4</u>	<u>Age</u> <u>5</u>	<u>Age</u> <u>6</u>	<u>Age</u> <u>7</u>	<u>Age</u> <u>8</u>
<u>2009</u>	5.3	6.6	7.3	7.4	8.2	6.6	.	.
<u>2010</u>	5.2	6.3	6.5	7.1	7.3	8.2	.	.
<u>2016</u>	5.7	6.7	7.0	7.7	7.0	.	.	.
<u>2017</u>	5.6	6.7	7.8	7.1	8.1	8.2	.	.
<u>2020</u>	6.5	.	.	9.1	.	7.3	.	.
<u>2022</u>	5.6	7.5	8.7	.	.	11.9	.	7.7
<u>2025</u>	6.7	8.3	8.8	.	7.8	8.0	.	.

Channel Catfish

Channel Catfish were surveyed in 2025 using suspended gill nets. Eight stations were randomly sampled for a period of 24 hours. The 2025 survey indicated a decrease in relative abundance CPUE = 3.2 per net night, compared to the last survey in 2020 CPUE = 5.8. (Table 3). Stock size fish showed a significant decrease in abundance, no changes were observed in the rest of the size classes. While abundance decreased, relative weights slightly increased for all size classes present, though they still remained in fair to poor body conditions. The length frequency histogram (Figure 2) and the proportional size distribution (PSD) values (Table 4) showed an increase in overall size structure.

Age data was collected on a subset of Channel Catfish in 2025. Growth rates had increased for the age two and three year classes but had decreased for the rest of the year classes present, compared to the 2020 survey (Table 5). Channel Catfish would reach a mean length of 12.9 inches by age three. The largest fish sampled measured 23.9 (in) and weighed 6 lbs. The oldest Channel catfish during the 2025 survey was aged to be nine years old. Age frequency histograms (Figure 3) indicate most of the fish sampled came from the 2018, 2017, and 2016 year classes. Natural reproduction continues to occur.

Natural reproduction coupled with Channel Catfish stockings have resulted in moderate to high Channel catfish abundance and fair to poor body condition for most size classes. Harvest is recommended to reduce abundance and increase body conditions and growth rates. A history of poor recruitment has warranted past stockings. However, stockings should be reduced and continued monitoring of growth rates and body conditions is needed before additional stockings are made.

Table 3. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Channel Catfish collected by fall gill netting from Holdenville Lake. Acceptable Wr values are ≥ 90 .

		Total CPUE	<u>Stock</u> 11 in		<u>Quality</u> 16.1 in		<u>Preferred</u> 24 in		<u>Memorable</u> 28 in		<u>Trophy</u> 35.8 in	
<u>Year</u>	<u>No.</u>	<u>CPUE</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>
<u>2007</u>	77	15.6	6.7	92	2.1	92	.	.	.	.	.	.
<u>2010</u>	32	6.3	3.3	82	2.0	88	0.2	101	.	.	.	.
<u>2016</u>	43	7.7	3.6	87	3.4	93	0.2	86	.	.	.	.
<u>2020</u>	29	5.8	3.6	82	1.2	88	.	.	.	.	.	.
<u>2025</u>	24	3.2	1.7	83	1.2	89	.	.	.	.	.	.

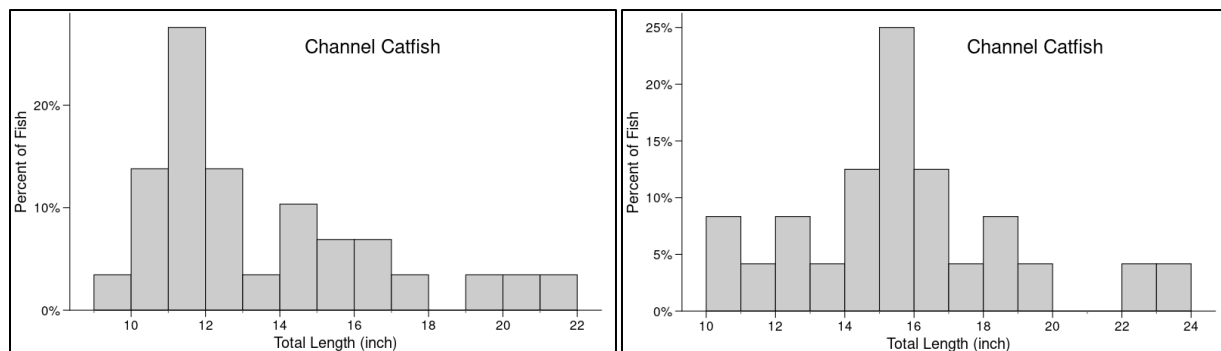


Figure 2. Channel Catfish Gill Net Length Frequency Histogram 2020 (Left) and 2025 (Right).

Table 4. Proportional Size Distribution (PSD) of Channel Catfish. Quality (PSD-Q), preferred (PSD-P) and memorable (PSD-M) lengths. PSD values indicate the proportion of fish in or above the quality, preferred or memorable size classes.

<u>Year Surveyed</u>	<u>PSD-Q</u> <u>(16.1 in)</u>	<u>PSD-P</u> <u>(24 in)</u>	<u>PSD-M</u> <u>(28 in)</u>
2007	23	.	.
2010	39	4	.
2016	50	2	.
2020	25	.	.
2025	41	.	.

Table 5. Mean Total Length at age (inches) for Channel Catfish from Holdenville Lake.

<u>Year</u>	<u>Age</u> <u>1</u>	<u>Age</u> <u>2</u>	<u>Age</u> <u>3</u>	<u>Age</u> <u>4</u>	<u>Age</u> <u>5</u>	<u>Age</u> <u>6</u>	<u>Age</u> <u>7</u>	<u>Age</u> <u>8</u>	<u>Age</u> <u>9</u>	<u>Age</u> <u>10</u>	<u>Age</u> <u>11</u>	<u>Age</u> <u>12</u>
2016	11.4	10.6	14.6	15.6	17.3	.	23.6	.	22.5	.	.	18.0
2020	.	9.7	11.2	13.3	.	16.8	.	.	18.1	.	.	.
2025	10.6	12.1	12.9	.	.	14.7	16.7	17.7	17.4			

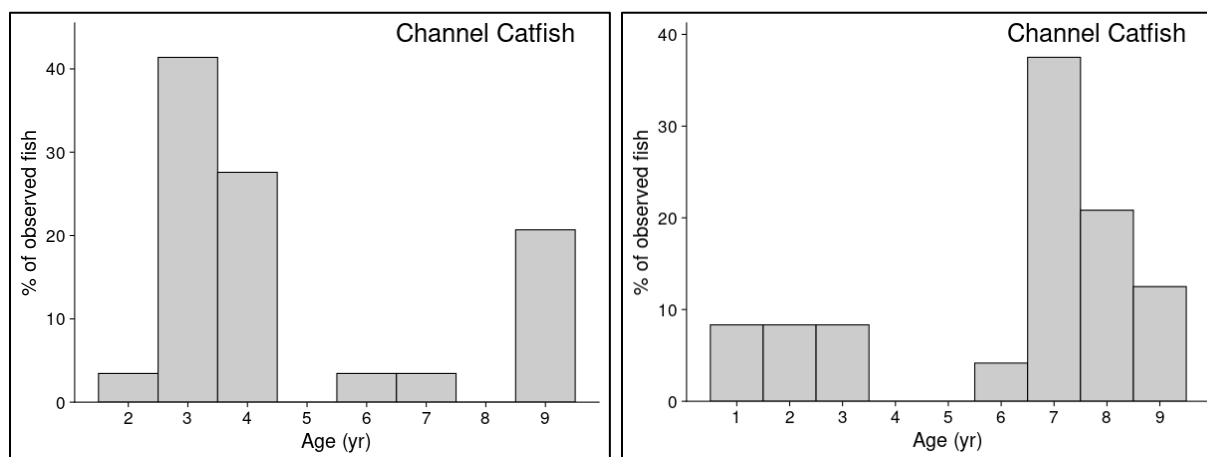


Figure 3. Age Frequency Histograms of Channel Catfish 2020 (Left) and 2025 (Right).

Saugeye

Saugeye were surveyed in 2025 using suspended gill nets. Eight stations were randomly sampled for a period of 24 hours. The 2025 survey indicated a significant increase in relative abundance in 2025 (CPUE = 2.8) compared to the 2020 survey (CPUE=1.2) (Table 6). Both stock and memorable size fish decreased slightly while abundance of quality size fish increased greatly. Body condition also decreased for both stock and memorable size fish but increased greatly for the quality size class. The largest fish sampled measured 24.1 inches and weighed 5.3 pounds.

Age data from the 2025 survey, indicated only three year classes were present, age one (2024), age two (2023) and age 6 (2019), all from recorded stockings. The mean length at age one was 15.7 inches, age two 15.6 inches and age 6 24.1 inches in total length (Table 7). Saugeye grew to the legal harvest limit of 14 inches during their first year at Holdenville Lake. The most recent stocking of Saugeye occurred in 2024 with a total of 21,321 fingerlings at 2 inches in size (Appendix 1).

Table 6. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Saugeye collected by fall gill netting from Holdenville Lake. Acceptable Wr values are ≥ 90 .

		Total CPUE	<u>Stock</u> 9.1 in		<u>Quality</u> 13.8 in		<u>Preferred</u> 18.1 in		<u>Memorable</u> 22 in		<u>Trophy</u> 27.2 in	
<u>Year</u>	<u>No.</u>	<u>CPUE</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>
<u>2007</u>	5	1.0	0.2	80	0.6	85	0.2	85	.	.	.	.
<u>2010</u>	2	0.4	.	.	.	.	.	.	0.4	83	.	.
<u>2016</u>	3	0.5	0.4	88	.	.	.	.	.	.	.	.
<u>2020</u>	6	1.2	0.8	96	0.2	75	.	.	0.2	100	.	.
<u>2025</u>	21	2.8	0.1	79	2.6	93	.	.	0.1	94	.	.

Table 7. Mean Total Length at age (inches) for Saugeye collected from Holdenville Lake.

<u>Year</u>	<u>Age</u> <u>1</u>	<u>Age</u> <u>2</u>	<u>Age</u> <u>3</u>	<u>Age</u> <u>4</u>	<u>Age</u> <u>5</u>	<u>Age</u> <u>6</u>	<u>Age</u> <u>7</u>
<u>2010</u>	.	.	.	24.4	24.5	.	.
<u>2016</u>	13.6	.	16.7	.	.	.	.
<u>2020</u>	13.3	.	.	.	23.8	.	.
<u>2025</u>	15.7	15.6	.	.	.	24.1	.

White Bass

White bass were surveyed in 2025 using suspended gill nets. Eight stations were randomly sampled for a period of 24 hours. The 2025 survey indicated a significant decrease in relative abundance in 2025 (CPUE = 1.8), compared to the last survey in 2020 (CPUE = 8.8) (Table 8). Overall abundance was considered low and decreased in all size classes present. Body conditions also decreased for all size classes except for preferred size fish. The length frequency histogram shows an even distribution of sizes, however with only 10 fish surveyed, sample size is small (Figure 5). The largest fish sampled measured 15.5 inches and weighed 1.7 pounds.

Age data was collected on the White bass from the 2025 survey, growth had decreased for age one fish but increased for age two fish compared to the 2020 survey. White Bass at Holdenville Lake grew to a meant length of 13.8 inches in total length by age two (Table 9). The age frequency histogram (Figure 5) indicated age 0 and age two were the most prevalent fish however, sample size is too small to make reliable conclusions.

Table 8. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of White Bass collected by fall gill netting from Holdenville Lake. Acceptable Wr values are ≥ 90 .

		Total CPUE	<u>Stock</u> 5.9 in		<u>Quality</u> 9.1 in		<u>Preferred</u> 11.8 in		<u>Memorable</u> 15 in		<u>Trophy</u> 18.1 in	
<u>Year</u>	<u>No.</u>	<u>CPUE</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>	<u>CPUE</u>	<u>Wr</u>
<u>2007</u>	6	1.2	0.2	97	.	.	1.0	93	.	.	.	.
<u>2010</u>	.	.	.	.	.	.	.	.	.	.	.	.
<u>2016</u>	3	0.5	.	.	0.4	90	.	.	0.2	111	.	.
<u>2020</u>	44	8.8	0.8	94	3.6	85	4.2	94	0.2	100	.	.
<u>2025</u>	10	1.4	0.3	80	0.4	82	0.5	95	0.1	90	.	.

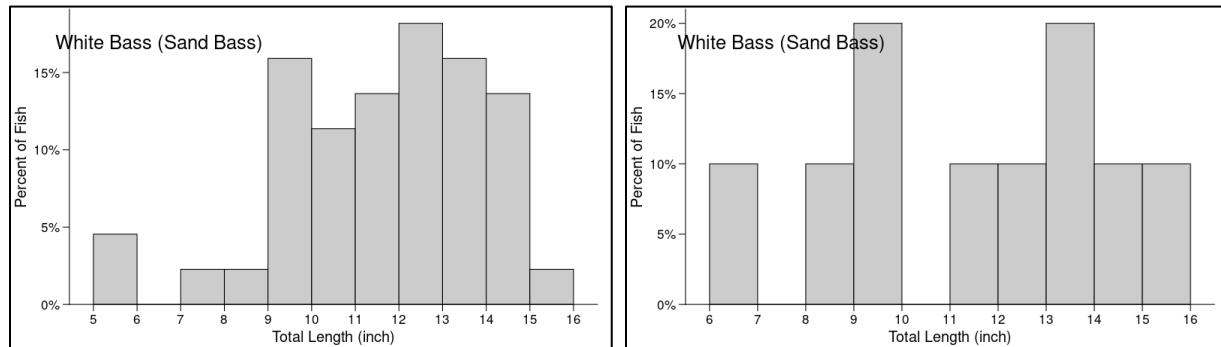


Figure 4. White Bass Gill Net Length Frequency Histogram 2020 (Left) and 2025 (Right).

Table 9. Mean Total Length at age (inches) for White Bass collected using gill nets from Holdenville Lake.

<u>Year</u>	<u>Age</u> <u>1</u>	<u>Age</u> <u>2</u>	<u>Age</u> <u>3</u>	<u>Age</u> <u>4</u>	<u>Age</u> <u>5</u>	<u>Age</u> <u>6</u>	<u>Age</u> <u>7</u>	<u>Age</u> <u>8</u>
<u>2020</u>	11.3	11.7	14	.	.	.	.	.
<u>2025</u>	10.6	13.8	.	.	.	.	.	.

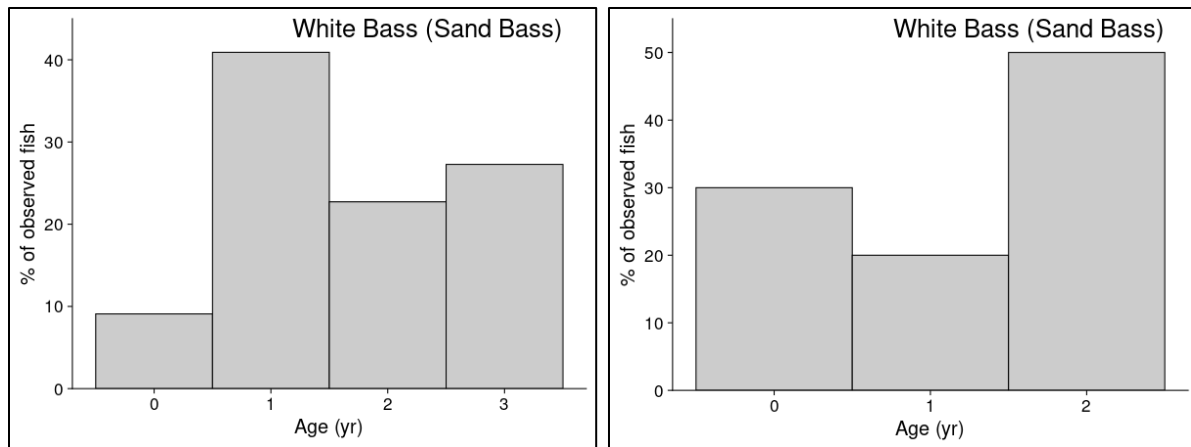


Figure 5. Age Frequency Histogram of White Bass from Holdenville Lake 2020 (Left) and 2025 (Right).

Shad

Gizzard Shad were surveyed in 2025 using suspended gill nets. Eight stations were randomly sampled for a period of 24 hours. The 2025 survey indicated a decrease in abundance with a catch per unit of effort (CPUE) of 0.9 Gizzard Shad per net night, compared to the 2020 survey (CPUE=1.8) (Table 10). Overall abundance was considered low and had decreased for both size classes, less than six inches and greater than six inches. The length frequency histogram (Figure 6) shows the majority of Gizzard Shad sampled in 2025 were larger than six inches in length. Optimal forage size for most species is six inches or less.

Gizzard Shad are a major part of most sport fish species diets. Shad abundance should be monitored. While boom and bust years for most fish species are common, continued low abundance of Gizzard Shad will have negative effects on Holdenville Lake fish populations.

Table 10. Total number (No.) and catch per unit of effort (CPUE) by size groups of Gizzard Shad collected by fall gill netting from Holdenville Lake.

<u>Gizzard Shad</u>				
<u>Year</u>	<u>No.</u>	<u>Total CPUE</u>	<u><6 inches</u>	<u>≥6 inches</u>
<u>2007</u>	172	35.2	2.4	32.8
<u>2010</u>	127	25.3	9.6	15.8
<u>2016</u>	33	5.9	2.3	3.6
<u>2020</u>	9	1.8	0.4	1.4
<u>2025</u>	7	0.9	0.3	0.7

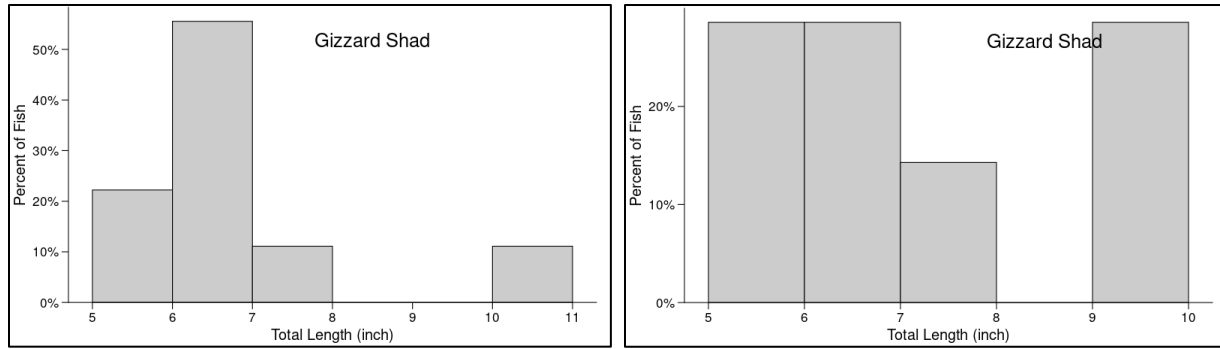


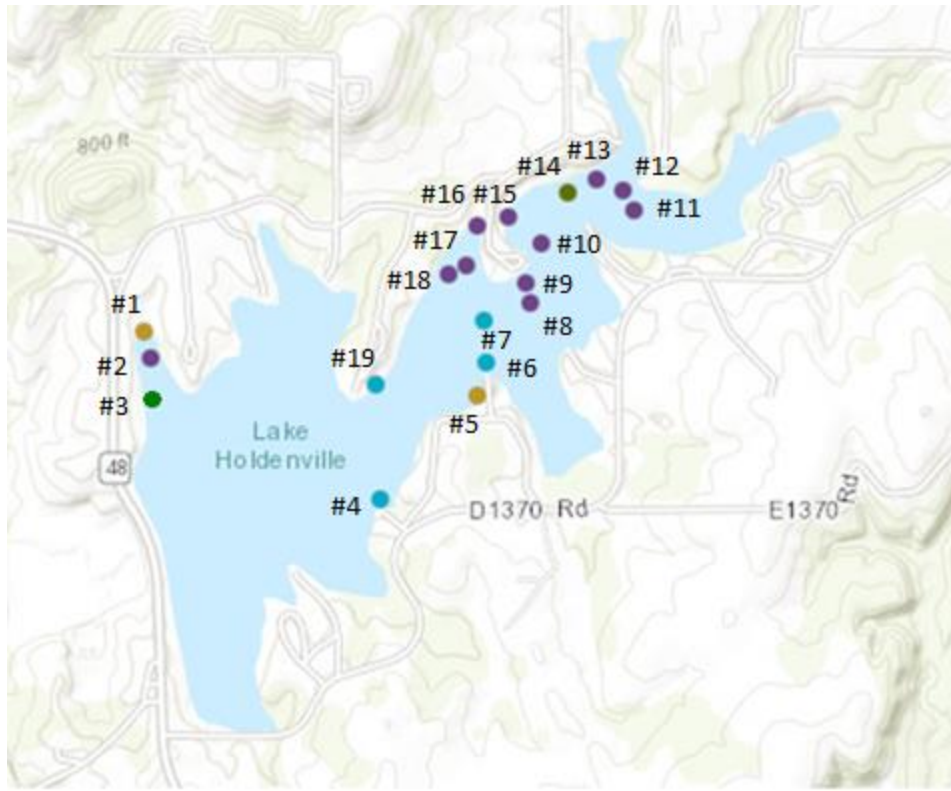
Figure 6. Gizzard Shad Length Frequency Histogram from suspended gill nets 2020 (Left) and 2025 (Right).

RECCOMENDATIONS

1. Monitor Channel catfish populations to determine future stocking needs.
2. Sample Holdenville Lake for Zebra mussels at least once annually.

Appendix 1. Species, number and size of fish stocked in Holdenville Lake since 2010.

Date	Species	Number	Size (inches)
2010	Saugeye	11,000	2
2012	Florida Largemouth Bass	77,004	1.25
	Saugeye	20,323	1.5
2013	Florida Largemouth Bass	30,240	1.5
2015	Saugeye	12,540	1.5
2016	Florida Largemouth Bass	7,315	1.5
	Saugeye	13,200	1.5
	Channel Catfish	35,846	2.5
2017	Florida Largemouth Bass	24,435	1.5
	Channel Catfish	10,164	2
2018	Florida Largemouth Bass	27,666	2
2019	Florida Largemouth Bass	50,148	1.5
	Saugeye	20,250	1.5
2021	Florida Largemouth Bass	60,116	1.5
	Saugeye	11,155	1.5
2023	Saugeye	18,304	1.5
2024	Saugeye	21,321	2
2025	Florida Largemouth Bass	52,208	1.5



Appendix 2. Holdenville Lake Fish Attractor Locations

Fish Attractor Site Information for Holdenville Lake.

Area Name	Site #	Latitude	Longitude	Habitat Type	Marked	Bank Access	Date
Boat Dock Cove	1	35.03442	-96.36969	Brush Pile	Y	Y	12/18/2019
Fishing Dock	2	35.03355	-96.36938	Brush/ Spider Blocks	N	Y	12/18/2019
Metal Retaining Wall S. of Fishing Dock	3	35.03291	-96.36965	Spider Blocks	N	Y	12/18/2019
Indian Church Area	4	35.02908	-96.36053	Starfish/Brush	Y	Y	12/18/2019
Indian Cemetary Cove	5	35.03239	-96.35676	Brush Pile	Y	Y	12/18/2019
Cemetary Point	6	35.03347	-96.35632	Starfish	N	N	9/11/2014
Shallow Flat in back half of Lake	7	35.03474	-96.35643	Starfish	N	N	9/11/2014
Mid lake Flat Site 1	8	35.0353	-96.35463	Brush/ Spider Blocks	Y	N	12/18/2019
Mid Lake N. Point Site 1	9	35.03604	-96.35469	Brush/Spider Blocks	Y	Y	12/18/2019
Mid lake Flat site 2	10	35.03717	-96.35422	Brush/Spider Blocks	Y	N	12/18/2019
SW Point of back Island	11	35.03823	-96.35062	Spider Blocks	N	N	4/9/2010
E. Point Mouth Wingo Neck	12	35.03887	-96.35102	Brush/Spider Blocks	Y	N	12/18/2019
W. Point Mouth Wingo Neck	13	35.03925	-96.35198	Brush/Spider Blocks	Y	N	12/18/2019
Old R.Bed W. of Wingo Neck	14	35.03858	-96.35328	Spider Blocks	N	N	4/9/2010
Mid Lake N. Point Site 2	15	35.03802	-96.35548	Spider Blocks	N	Y	4/9/2010
Mid lake N. Cove Site 2	16	35.03783	-96.35667	Brush/ Spider Blocks	Y	Y	12/18/2019
Mid lake N. Cove Site 3	17	35.0365	-96.3571	Brush/Spider Blocks	Y	N	12/18/2019
Mid lake N. Cove Site 1	18	35.03623	-96.35773	Brush/ Spider Blocks	Y	Y	12/18/2019
N. Bank halfway up Lake	19	35.03275	-96.3606	Starfish	N	N	9/11/2014