SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

LAKE ARCADIA

2025

SURVEY REPORT

State: Oklahoma

Project Title: Lake Arcadia Fish Management Survey Report

Period Covered: 2025

Prepared by: OFRL Research Biologists

Date Prepared: January 2026

Lake Arcadia

ABSTRACT

Lake Arcadia was surveyed with fall gill netting and trap netting in 2025 to monitor trends in fish populations. The fishery supports self-sustaining populations of Largemouth Bass, Channel, Blue, and Flathead Catfish, Black and White Crappie, White Bass, and a variety of Sunfish species. Hybrid Striped Bass and Saugeye are stocked on a biennial rotation (Hybrid Striped Bass one year, Saugeye the next) to provide additional angling opportunity. No regulation changes are recommended at this time.

INTRODUCTION

Lake Arcadia impounds the Deep Fork River and Spring Creek immediately East of Edmond in Oklahoma County, Oklahoma. It has a surface area of 1,676 acres, 26 miles of shoreline, a maximum depth of 48 feet, and was constructed in 1986 by the Army Corps of Engineers. The lake has a secchi disc visibility of around 20 inches and is considered hypereutrophic. The lake serves a multiuse purpose as water supply for the City of Edmond, flood control for the Deep Fork River basin, and recreational use including fishing, boating, and camping among other activities. Fish habitat consists of flooded timber, rocky main lake points, riprap, and natural and artificial brush piles (predominately cedar trees with a few PVC structures around fishing docks). Aquatic vegetation is limited (some water willow) and difficult to establish due to the flashy nature of the watershed (heavily urban/concrete). Primary forage species consist of Gizzard Shad and Inland Silversides.

Special regulations exist for Hybrid Striped Bass (5 per day of which only 2 can be 20 inches or longer) and fishing is not allowed on ponds or wetland areas adjacent to the lake. Otherwise, statewide regulations apply (Fishing Regulations | Oklahoma Department of Wildlife Conservation (wildlifedepartment.com)).

Fish attractor sites have been constructed of spider blocks and brush piles to improve angler success and are periodically refurbished. Fish attractor sites were most recently refurbished in 2025 (Fish Attractors Map (arcgis.com)).

Lake Arcadia has been previously surveyed by spring electrofishing (2002, 2010, 2011, 2019, 2024), fall nighttime electrofishing (2020, 2021), low-frequency electrofishing (2006, 2012, 2016, 2021), fall gill netting (2003, 2007, 2009, 2015, 2021, 2022, 2023, 2024, 2025), and fall trap netting (1993, 1995, 1999, 2002, 2005, 2016, 2025) to monitor trends in fish populations. Hybrid Striped Bass and Saugeye fingerlings are stocked on a biennial rotation (Hybrid Striped Bass one year, Saugeye the next) to provide and maintain additional angling opportunity (Appendix 1).

Aquatic Nuisance Species

Zebra Mussels were confirmed to be present Lake Arcadia in 2022.

RESULTS

Fall Experimental Gill Net (Gear 23)

Overview

The lake was sampled using fall experimental gill nets (gear 23) from December 8-9, 2025. Ten randomly selected sites were sampled for a total of 241 hours of effort. Mean water temperature was 8.3 °C and pool elevation was below normal at 305.6 m. A total of 352 fish were caught with 13 species represented. Channel Catfish (n = 79), Gizzard Shad (n = 57), White Bass (n = 52), Saugeye (n = 51), and White Crappie (n = 40) were the most commonly encountered species in the sample (Table 1).

Channel Catfish

Channel Catfish had a mean TL of 407 mm (range 162-575; Table 1). The length-frequency distribution peaks at 370 mm TL and the majority of fish in the sample fall between 330 and 450 mm TL (Figure 1). Channel Catfish had a mean catch per unit of effort (CPUE) of 8 and a standard error (SE) of 1, resulting in a 95% confidence interval (CI) ranging from 6 to 10 (Table 2). This was similar to the mean CPUE of 9 in 2024. Relative standard error (RSE) was 14.52, suggesting the gear may reliably track changes in relative abundance for the species. Across size categories only stock size fish (19.73) exhibited an RSE that may track relative abundance (Table 3). Mean relative weight (Wr) for all species was above acceptable (92.75) and higher than the statewide 50th percentile (87). Sub stock Channel catfish Wr (83.14) was below the acceptable threshold (i.e., ≥ 90); whereas, stock and quality size fish were above (Table 2).

Gizzard Shad

Gizzard Shad had a mean TL of 223 mm (range 150-360; Table 1). The length-frequency distribution for the sample is sporadic with peaks at 180 and 230 mm TL (Figure 1). Gizzard shad had a mean CPUE of 6 and a SE of 1, resulting in a CI ranging from 4 to 8 (Table 2). The RSE for Gizzard Shad was 17.81, suggesting the gear may appropriately track changes in relative abundance. However, RSE values for sub stock, stock, and quality size fish suggested relative abundance could not be tracked by size category (Table 3).

Hybrid Striped Bass

Hybrid Striped Bass were present in the sample. However, only two stockings have occurred thus far since re-stocking began in 2022 and only 9 fish were caught. As such, age-1 fish were the only fish encountered. A limited amount of older, large fish are potentially still in the system but would be a minimum of nine years old (previous stocking ended in 2016) and are unlikely to be encountered with this gear type. Fish from this sample had a mean TL of 396 mm (range 390-405). We plan on sampling with larger mesh sizes in the future, as it appears that fish > age 2 are essentially undetectable in standard experimental gill nets. As we move forward with continued stockings, additional information including age, growth, and mortality metrics will be added.

Saugeye

Saugeye sampled had a mean TL of 324 mm (range 233-601; Table 1). The length frequency distribution shows three clusters centered at roughly 270 mm, 510 mm, and 590 mm TL (Figure 1). Saugeye had an overall mean CPUE of 5 with a SE of 2, resulting in a CI ranging from 2 to 8 (Table 2). This is a negligible decrease from the mean CPUE of 7 in 2024 (Figure 2). Furthermore, the RSE for Saugeye (28.58) suggested the gear may only track large changes in relative abundance for the species (i.e., 58%). The same was noted for stock, preferred, and memorable size Saugeye (Table 3). No substock, quality, or trophy size fish were caught. However, this is not unexpected due to biennial stockings. Furthermore, trophy size fish are not likely to be caught in this gear type. The percentage of fish ≥ 356 mm TL decreased from 98 % in 2024 to 18 % in 2025 (Figure 2). This is due to the large proportion of age-0 fish in the sample that were stocked this year. The overall Wr was acceptable (106.7), considerably higher than the statewide 50th percentile (92). Stock, preferred, and memorable size fish had a Wr of 108.10, 93.95, and 107.76, respectively. PSD, PSD-P, and PSD-M were low at 18, 18, and 8 respectively while PSD-S-Q was high at 82. In total, 48 Saugeye were aged with 41 age-0 fish, 5 age-2 fish, 3 age-4 fish, and 1 age-7 fish. The mean TL for age-0, -1, -4, and -7 fish was 275, 514, 589, and 594 mm respectively (Figure 3). The von Bertalanffy predicted a theoretical maximum size (L_∞) of 608 mm TL, a Brody growth coefficient (K) of 0.64, and a theoretical time at length zero (t_0) of -0.94 (Figure 3). A catch-curve regression calculated an instantaneous mortality (Z) of 0.52, that resulted in an annual mortality of (A) of 40.7 % for Saugeye (Figure 4). These values were comparable to the 2024 sample.

White Bass

White bass sampled had a mean TL of 255 mm (range 172-398; Table 1). The length-frequency distribution was bimodal with peaks at 220 mm and 310 mm TL (Figure 1). White bass had a mean CPUE of 5 and a SE of 1, resulting in a CI ranging from 3 to 7 (Table 2). Mean CPUE decreased slightly from 7 in 2024. Relative standard error (RSE) was 18.88, suggesting the gear may reliably track changes in relative abundance for the species. However, RSE values for stock, quality, preferred, and memorable size fish suggested relative abundance could not be tracked by size category (Table 3). No substock or trophy sized fish were caught. The overall Wr for White Bass (104.41) was acceptable and higher than the statewide 50th percentile (93). PSD and PSD-P were moderate at 48 and 35 respectively. PSD-M was low at 2. In total, 51 White Bass were aged with 33 age-0 fish, 8 age-1 fish, and 10 age-2 fish. The mean TL for age-0, -1, and -2 were 213, 321, and 329 mm TL, respectively (Figure 3). The von Bertalanffy predicted a theoretical maximum size (L_∞) of 329 mm TL, a Brody growth coefficient (K) of 2.61, and a theoretical time at length zero (t_0) of -0.40 (Figure 3). A catch-curve regression calculated an instantaneous mortality (Z) of 0.78, that resulted in an annual mortality of (A) of 54.4 % for White Bass (Figure 4). It is important to note, due to small sample size, it is possible that this information may not wholly represent growth and mortality of the Lake Arcadia White Bass population.

Fall Trap Net (Gear 31.5)

Overview

Crappie were sampled at Arcadia Lake, Edmond, OK using modified fyke nets (hereafter trap nets) between the dates of Nov 17th to Nov 18th, 2025. The average water temperature was 16.4 °C. Sites were randomly chosen as specified by SSP for a total of 637 hours of effort resulting in the capture of 398 White Crappie and 229 Black Crappie.

White Crappie

The mean total length (TL) of White Crappie sampled was 193 mm with a range of 77-335 mm (Figure 5). The mean catch per unit effort (CPUE) of White Crappie was 15 with a SE of 2, resulting a 95% confidence interval ranging from 11 to 19 (Table 4). Relative standard error (RSE) for White Crappie was 13.2, suggesting the gear could properly index relative abundance for the species. However, RSE values for sub stock, stock, quality, and preferred sized fish suggested CPUE may not reliably track relative abundance for Whtie Crappie size categories (Table 4). A subsample (232) of White Crappie were aged, ranging from 0-5 years of age. Approximately 80% of fish were ages 0 and 1 years old. The mean TL at 0 was 110 mm, 1 year 246 mm, 2 years 272 mm, 3 years 274 mm. Only one individual was observed in the age-4 and -5 classes. The overall PSD of White Crappie was 94 and mean relative weight (Wr) was 100.2. All Wr for all size categories were at or above acceptable (i.e., ≥ 90) for White Crappie. A von Bertalanffy growth curve predicted a theoretical maximum length (L_∞) of 277 mm, a growth coefficient (K) of 1.7, and a theoretical length at time zero (t_0) of -0.3 (Figure 6). A catch-curve regression calculated an

instantaneous mortality (Z) of 0.90, that resulted in an annual mortality (A) estimate of 58.40% (Figure 7).

Black Crappie

Black Crappie had a mean TL of 148 ranging from 76-285 mm (Figure 5). Black Crappie mean CPUE was 8 with a SE 2, that resulted in a CI ranging from 5 to 11 (Table 4). Relative standard error (RSE) for Black Crappie was 21.3, suggesting the gear may be able to detect changes in relative abundance for the species. However, RSE values for sub stock, quality, and preferred sized fish suggested CPUE may not reliably track relative abundance for Black Crappie size categories (Table 4). The overall PSD value was 100 with an overall Wr above acceptable (109). Values of Wr based on PSD size categories all fell above the acceptable threshold (range = 100 – 128). A total of 121 Black Crappie were aged, ranging from 0-4 years old, though only one 4-year old was observed. Mean TL at ages 0, 1, 2, and 3 were 104, 234, 254, and 256, respectively. A von Bertalanffy growth curve predicted a theoretical maximum length (L_∞) of 257 mm, a growth coefficient (K) of 1.9, and a theoretical length at time zero (t_0) of -0.3 (Figure 6). A catch-curve regression calculated an instantaneous mortality (Z) of 0.60, that resulted in an annual mortality (A) estimate of 44.70% (Figure 7). However, the coefficient of determination (R^2 = 0.47) suggested this may poorly describe mortality for Black Crappie.

RECOMENDATIONS

1. Continue to monitor Hybrid Striped Bass and Saugeye population dynamics and growth rates to evaluate stocking success using nets with additional mesh sizes to detect older individuals.
2. Continue to monitor population dynamics for self-sustaining sportfish species (Largemouth Bass, Crappie Spp., White Bass, Catfish Spp.)
3. Continue to monitor Gizzard Shad abundance and size distribution to gauge forage availability.
4. No regulation changes are recommended at this time.

Table 1. Sample size, mean TL (mm), mean weight (g), and associated ranges for each species represented in experimental gillnet data.

Species	Number	Mean TL (range)	Mean Weight (range)
Black Crappie	6	219 (110-261)	213 (10-300)
Blue Catfish	33	497 (345-769)	1210 (370-3865)
Bluegill Sunfish	1	151	-
Channel Catfish	79	407 (162-575)	632 (25-2205)
Common Carp	6	456 (408-501)	1245 (930-1585)
Freshwater Drum	6	207 (136-230)	122 (30-220)
Gizzard Shad	57	223 (150-360)	119 (40-460)
Largemouth Bass	2	366 (220-511)	1383 (145-2620)
River Carpsucker	10	404 (321-446)	1001 (455-1395)
Saugeye	51	324 (233-601)	501 (100-2490)
Striped Bass Hybrid	9	396 (390-405)	864 (800-970)
White Bass	52	255 (172-398)	279 (75-905)
White Crappie	40	212 (110-303)	192 (5-455)

Table 2. Total catch per unit effort for each species from experimental gillnet data.

Species	Mean	Count	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Black Crappie	0.60	10	52.46	0.32	-0.02	1.22	176	69
Blue Catfish	3.28	10	30.41	1.00	1.33	5.24	59	23
Bluegill Sunfish	0.10	10	100.00	0.10	-0.10	0.31	640	250
Channel Catfish	7.93	10	14.52	1.15	5.67	10.18	13	5
Common Carp	0.59	10	48.77	0.29	0.03	1.15	152	59
Freshwater Drum	0.59	10	81.53	0.48	-0.35	1.53	425	166
Gizzard Shad	5.67	10	17.81	1.01	3.69	7.65	20	8
Largemouth Bass	0.20	10	66.69	0.14	-0.06	0.47	285	111
River Carpsucker	1.02	10	32.89	0.34	0.36	1.68	69	27
Saugeye	5.06	10	28.58	1.45	2.23	7.89	52	20
Hybrid Striped Bass	0.94	10	52.51	0.49	-0.03	1.90	176	69
White Bass (Sand Bass)	5.23	10	18.88	0.99	3.30	7.17	23	9
White Crappie	3.98	10	41.15	1.64	0.77	7.20	108	42

Table 3. Catch per unit effort by size category from experimental gillnets.

Species	Size Category	Mean	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Channel Catfish	substock	0.10	100.00	0.10	-0.09	0.28	640	250
Channel Catfish	stock	4.10	19.73	0.81	2.51	5.68	25	10
Channel Catfish	quality	3.43	25.45	0.87	1.72	5.14	41	16
Gizzard Shad	substock	0.41	40.90	0.17	0.08	0.75	107	42
Gizzard Shad	stock	4.28	23.84	1.02	2.28	6.27	36	14
Gizzard Shad	quality	0.49	45.23	0.22	0.06	0.92	131	51
Saugeye	stock	4.06	33.91	1.38	1.36	6.76	74	29
Saugeye	preffered	0.49	60.37	0.30	-0.09	1.08	233	91
Saugeye	memorable	0.40	55.28	0.22	-0.03	0.83	196	76
Hybrid Striped Bass	stock	0.94	52.51	0.49	-0.03	1.90	176	69
White Bass	stock	2.70	20.93	0.57	1.59	3.81	28	11
White Bass	quality	0.71	31.60	0.23	0.27	1.16	64	25
White Bass	preffered	1.71	25.09	0.43	0.87	2.55	40	16
White Bass	memorable	0.10	100.00	0.10	-0.10	0.31	640	250
White Crappie	substock	1.30	83.50	1.09	-0.83	3.43	446	174
White Crappie	stock	0.20	66.82	0.13	-0.06	0.45	286	112
White Crappie	quality	0.49	44.27	0.22	0.07	0.92	125	49
White Crappie	preffered	1.89	44.50	0.84	0.24	3.54	127	49
White Crappie	memorable	0.10	100.00	0.10	-0.10	0.31	640	250

Table 4. Catch per unit effort (CPUE) of total sample and species size from trapnet data.

	Mean	Count	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Arcadia Lake								
White Crappie								
Total	15.3	30	13.2	2.0	11.4	19.3	33	13
Substock	2.6		28.4	0.7	1.2	4.0	388	151
Stock	0.2		34.9	0.1	0.1	0.4	585	229
Quality	1.1		25.3	0.3	0.5	1.6	307	120
Preferred	2.2		23.8	0.5	1.2	3.3	272	106
Memorable	0.1		42.0	<0.1	<0.1	0.2	847	331
Trophy	0.0							
Black Crappie								
Total	8.4	30	21.3	1.8	4.9	11.9	87	34
Substock	2.3		31.0	0.7	0.9	3.68	461	180
Stock	0.0							
Quality	0.4		28.9	0.1	0.2	0.7	401	157
Preferred	0.6		38.2	0.2	0.2	1.0	701	274
Memorable	0.0							
Trophy	0.0							

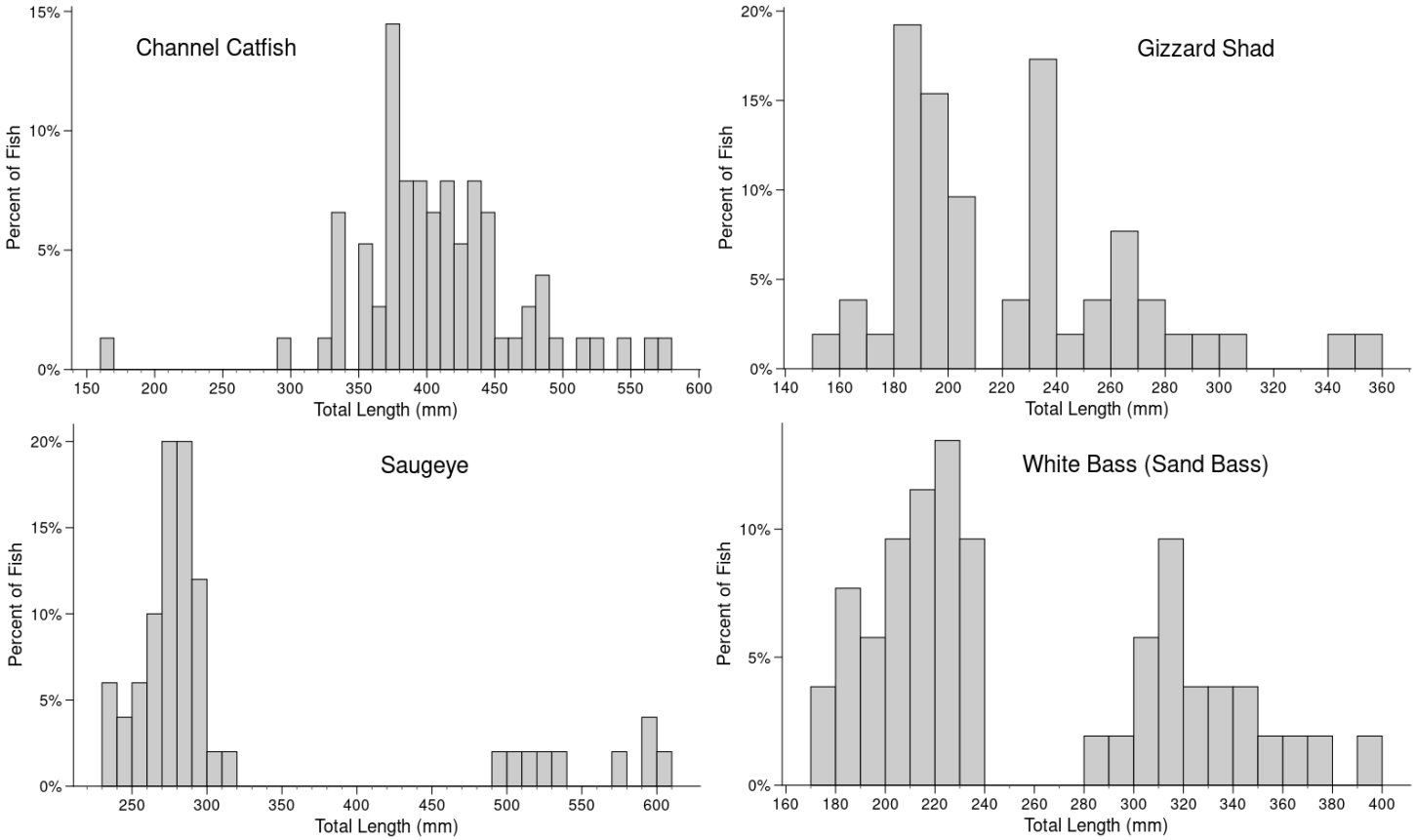

Figure 1. Length-frequency distributions for four fish species from Lake Arcadia.

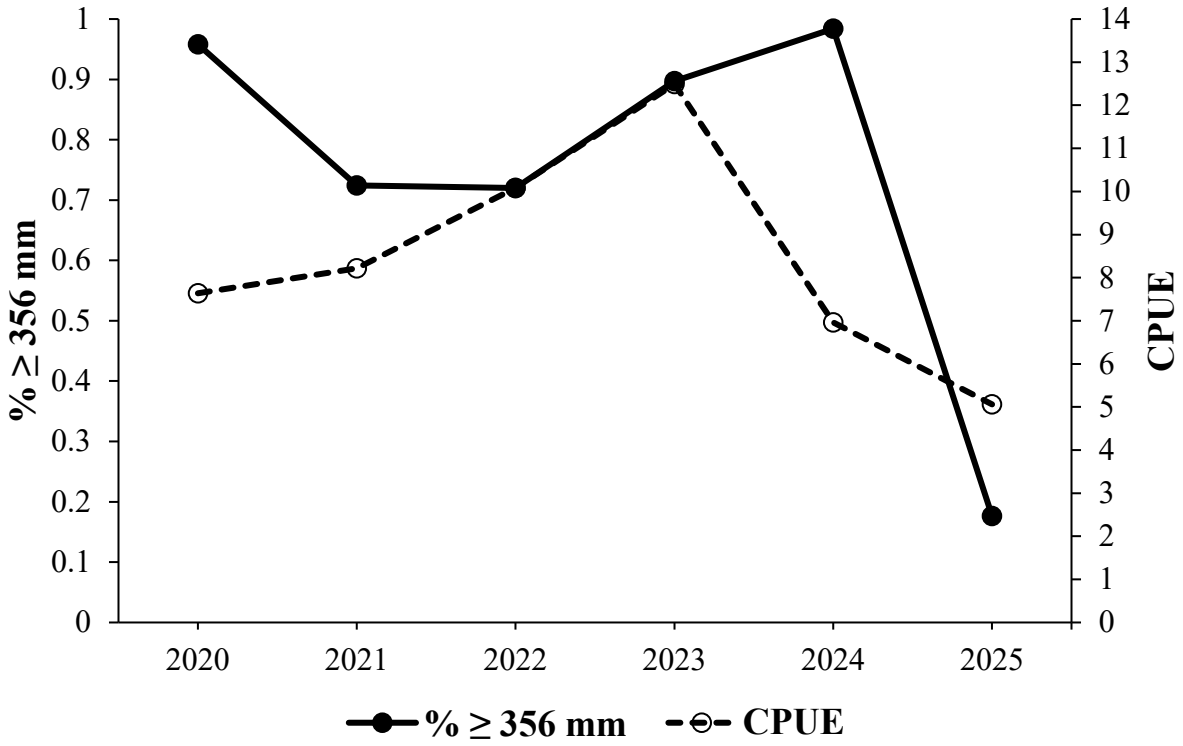

Figure 2. Percentage of Saugeye sampled greater than or equal to the minimum size limit (356 mm TL/14 inches) and catch per unit effort (CPUE) through time for Lake Arcadia.

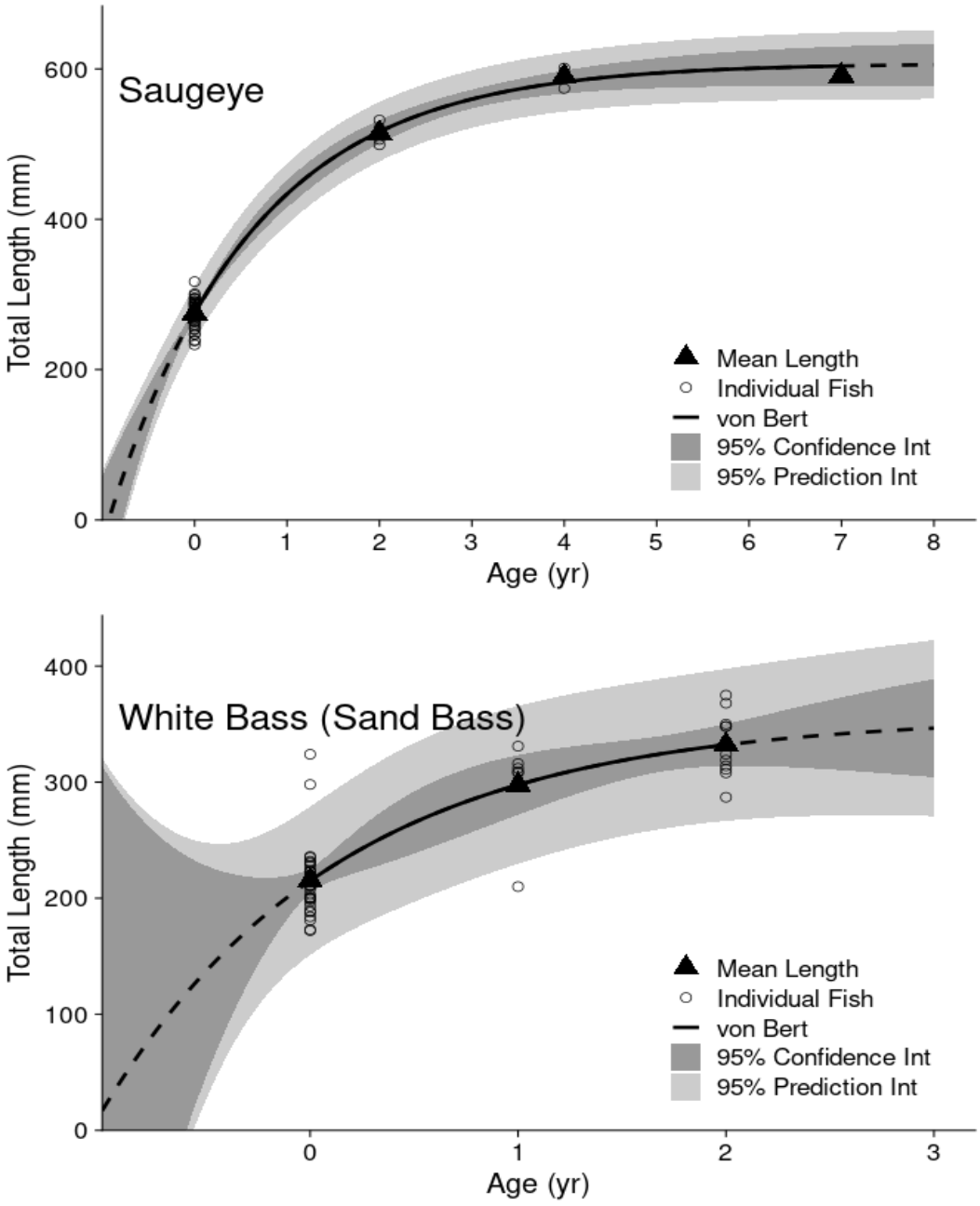

Figure 3. vonBertalnffy growth curve for Saugeye and White Bass collected from Lake Arcadia.

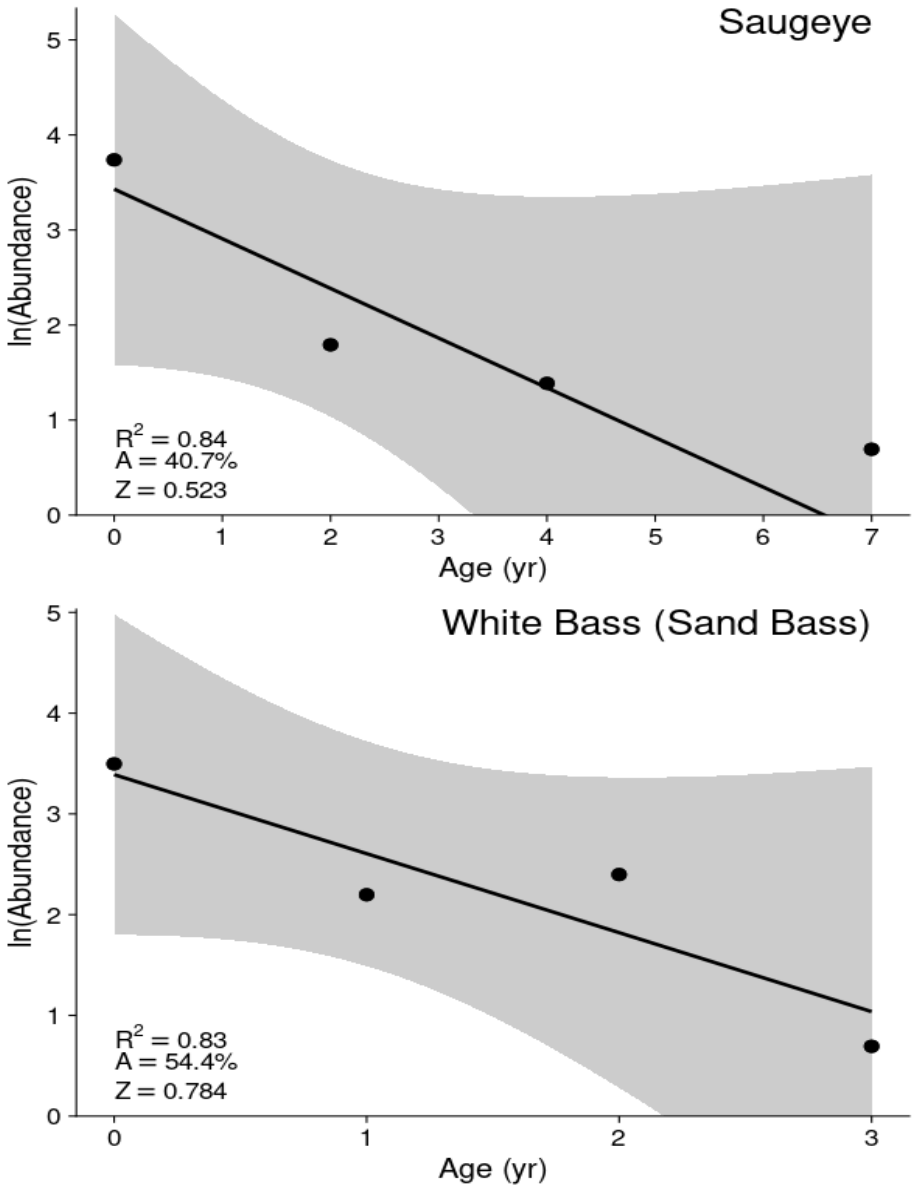

Figure 4. Catch-curves, instantaneous mortality (Z), and annual mortality (A) for Saugeye and White Bass collected from Lake Arcadia.

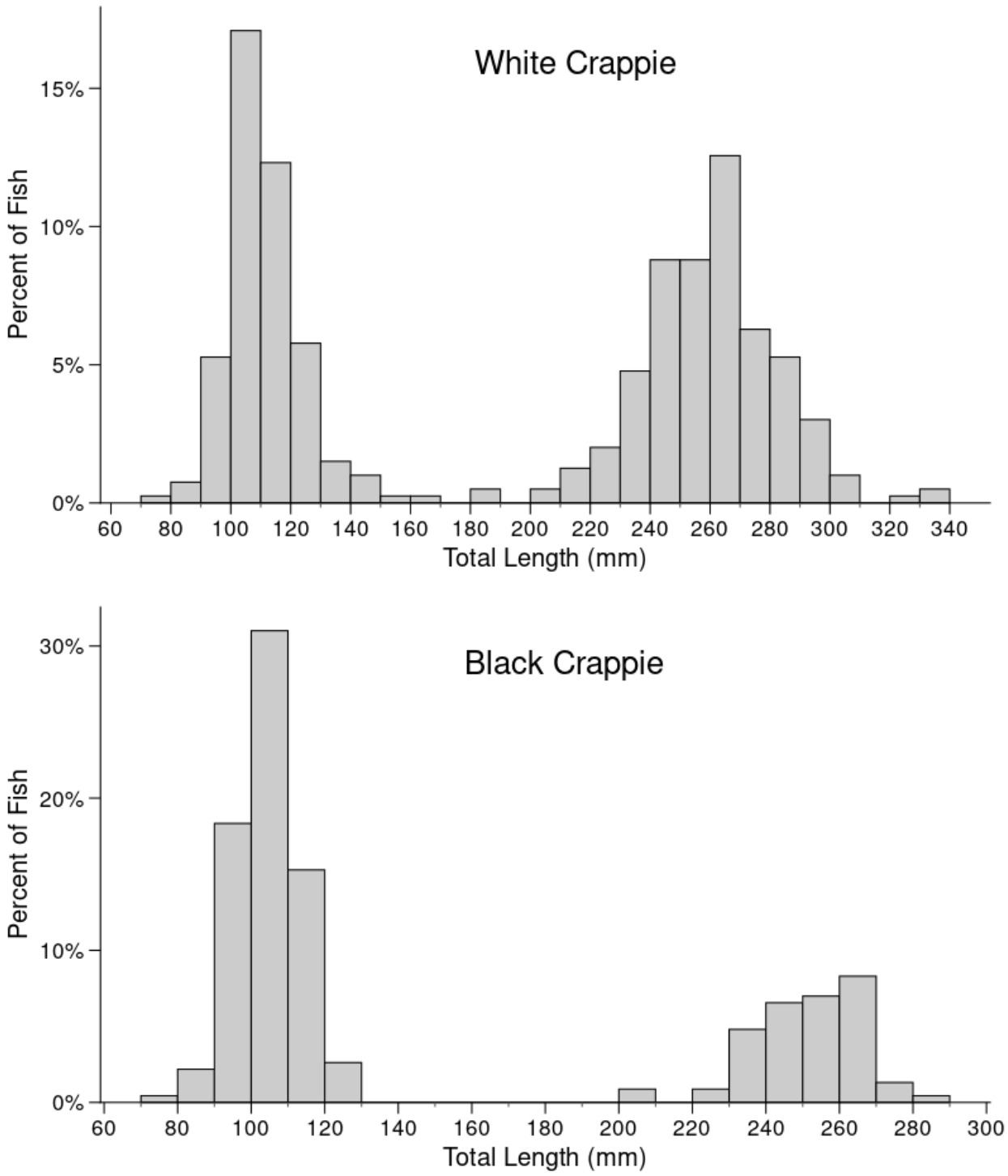

Figure 5. Length-frequency distributions of Black and White Crappie from Arcadia Lakes. Length bins are 10-mm.

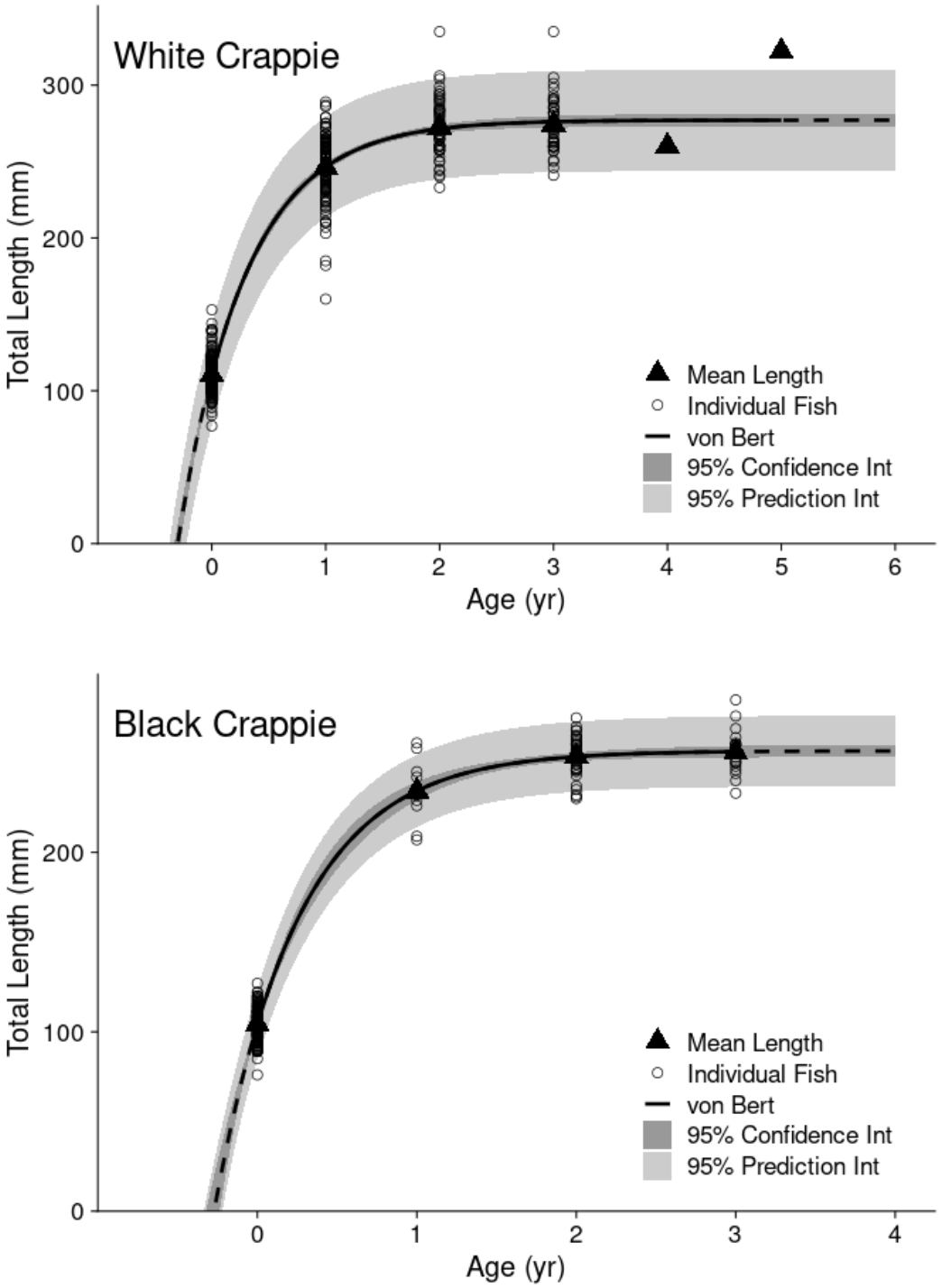

Figure 6. VonBertalanffy Growth Curves of crappie species from Arcadia Lake.

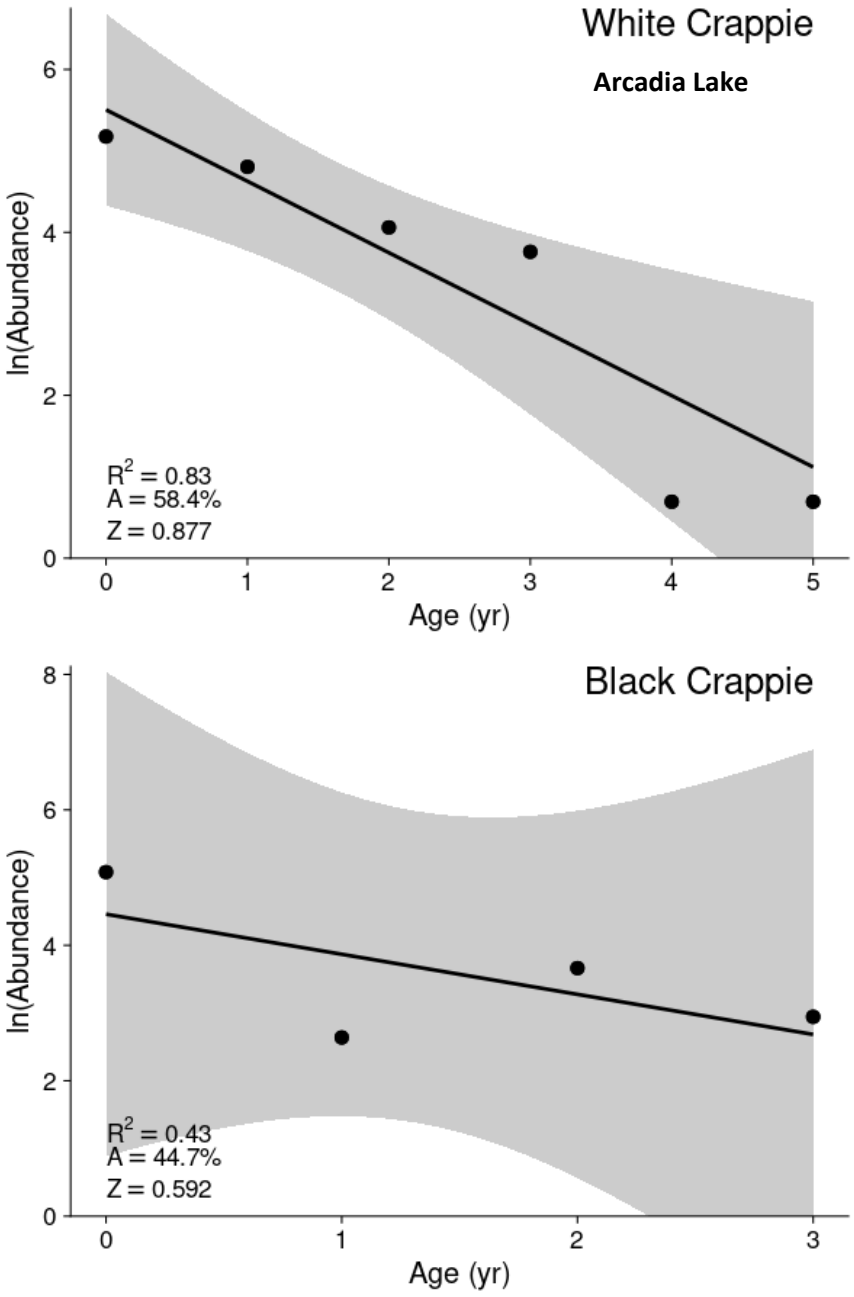

Figure 7. Catch curves showing instantaneous (Z) and annualized (A) mortality for Black and White Crappie from Arcadia Lake.

Appendix 1. Species, number, and size of fish stocked in Lake Arcadia since 2012.

Date	Species	Number	Size (inches)
2012	Hybrid Striped Bass	9100	1.5
2013	Hybrid Striped Bass	9100	1.5
2014	Hybrid Striped Bass	9100	1.5
2014	Hybrid Striped Bass	9,250	2
2014	Channel Catfish	100	11
2015	Hybrid Striped Bass	9,100	1.5
2015	Hybrid Striped Bass	9,108	1.5
2016	Hybrid Striped Bass	9,100	1.5
2016	Hybrid Striped Bass	9130	1.5
2017	Saugeye	36,400	3
2017	Saugeye	38,110	1.5
2018	Saugeye	146,086	fry
2018	Hybrid Sunfish	200	6
2019	Saugeye	36,520	1.5
2021	Saugeye	37,095	1.5
2022	Hybrid Striped Bass	170,000	fry
2023	Saugeye	37,420	1.5
2024	Hybrid Striped Bass	13,870	1.5
2025	Saugeye	36,000	1.5