SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

BELL COW LAKE

2022

SURVEY REPORT

State: Oklahoma

Project Title: Bell Cow Lake Fish Management Survey Report

Period Covered: Changes in ODWC standard reporting occurred since the 2007 Survey Report. This report discusses survey results from 2007-2022.

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Bell Cow Lake

ABSTRACT

Bell Cow Lake was surveyed by spring electrofishing (2007, 2009, 2018, 2022), fall gill netting (2013, 2019), and fall trap netting (2022) techniques to monitor trends in fish populations. Survey results indicate a high abundance, and a quality fishery is present for Channel Catfish and White Bass. Total fish abundance for Largemouth Bass had decreased and was considered below that of a quality fishery, however, high abundance of quality size and larger Largemouth Bass were present. Crappie abundance remains low with slow but steady growth. Gizzard shad abundance was lower than desired. No regulation changes are recommended at this time.

INTRODUCTION

Bell Cow Lake impounds Bell Cow Creek two miles northwest of Chandler in Lincoln County, Oklahoma. Bell Cow Lake covers 1,070 surface acres and was constructed in 1990 by the City of Chandler. Bell Cow Lake has a secchi disc visibility of around 40 inches in the main pool in August, and turbidity is primarily from plankton. Fish habitat consists primarily of flooded timber and introduced aquatic vegetation (water willow).

Bell Cow Lake was opened to fishing in the fall of 1993 with a restriction of catch and release only for bass. Beginning January 1, 1994, a trophy bass slot length of 406-559 mm (16-22 inches) with only one bass >559 mm (22 inches) per day was implemented. Also, a creel limit of six catfish per day and a minimum length limit of 356 mm (14 inches) on catfish was imposed. The six creel limit of catfish was eventually changed to match the statewide creel of 15 but still maintains a 14 inch minimum length limit. Since lake impoundment, the main management problems consists of extremely high water turbidity in the spring, which hinders bass spawning success. Also, a lack of aquatic vegetation to provide escape cover was detrimental to survival of young bass. Due to the poor bass recruitment, the length limit on bass was changed in 1995 to a minimum length limit of 559 mm (22 inches) with a creel limit of only one bass per day of this size. Bell Cow Lake is being managed as a trophy bass fishery.

Introductions of aquatic vegetation such as water willow, white water lily, eel grass and coontail have been made in the past to improve recruitment conditions for fish. Water willow was established and successfully spread. In 1999, five welded wire enclosures (25 ft. x 100 ft.) were constructed, and American pondweed, water star grass, Illinois pondweed, arrowhead, pickerelweed, bullrush and bull tongue were planted in each. These planting were not successful.

Original fish stockings included Bluegill sunfish, Redear sunfish, Gizzard shad, Channel catfish, Northern largemouth bass, and introduction of Florida largemouth bass. Several stockings of northern and Florida bass have been made in recent years (Appendix 1).

Fish attractor sites have been constructed of spider blocks and brush piles to improve angler success and are periodically refurbished (Appendix 2). Fish attractor sites were most recently refurbished in 2018. A boating access project consisting of the installation of two double lane ramps, two boat docks with concrete sidewalks, cover fishing docks and paved parking areas were competed in 1993. Additionally ramp repairs were completed under another cooperative agreement in 2004, and two new boat docks were added to replace the old docks in 2012.

Bell Cow Lake was surveyed in 2007, 2009, 2018, 2022 by spring electrofishing, 2013, 2019 by fall gill netting, and 2022 fall trap netting to monitor trends in fish populations.

RESULTS

Largemouth Bass

Largemouth Bass (LMB) were surveyed in spring of 2007, 2009, 2018, and 2022 by means of boat electrofishing. Randomly selected shoreline units were sampled. It is important to note that the standard sampling procedures (SSP) for Largemouth Bass electrofishing surveys changed from 15 minute to 10-minute units in 2015. While this change decreased the amount of time sampled per unit, it is unknown how that would have affected catch rates. Catch per unit of effort (CPUE) can vary based on habitat types sampled. It is also important to note, electrofishing systems switched from Smith Roots system to an ETS System in 2022. The two systems differ in design and possibly efficiency. The 2022 results should be viewed as an estimate and not directly comparable to the 2018 survey. Future surveys will be comparable with 2022. Overall LMB abundance, CPUE has fluctuated over the years and showed a significant decrease from 2005 (CPUE =56.2) to 2007 (CPUE= 20.9) then increased significantly by the 2018 (CPUE=58.1) survey. The 2022 survey indicated an overall low abundance of LMB (CPUE =38.0), however, a high abundance of quality (CPUE=11.7) and preferred size (CPUE=16.7) fish were preset. The 2022 survey results were slightly below what is considered to be a quality (CPUE $\leq$ 40) fishery. All size classes showed a similar trend with a decrease in abundance during the 2007 and 2009 surveys but showed an increase during the 2018 survey and another decrease in all size classes except for preferred during the 2022 survey. Body condition or relative weights (Wr) for all size classes and years surveyed were above acceptable values of 90 (Table 1). The largest fish sampled was from the 2009 survey it measured 23.62 (in) in total length and weighed 9.8 (lbs). No fish of legal harvest length (22 inches or greater) were sampled in the 2022 survey.

Length frequency histograms showed an increase in overall size structure and a more even distribution of size classes from 2007-2018, then a slight decrease in 2022 (Figure 1). The 2018 histogram shows a little more than 29% of the fish sampled were eight inches or less, indicating successful recruitment. Recruitment appears to be lower during the 2022 survey with less than 10% of the fish sampled were less than eight inches, as indicated by the 2022 length frequency histogram. Gear bias with the new ETS system might be a possible reason for low catch rates of smaller fish. Proportional size distribution (PSD) values varied greatly since 2007, ultimately showing a decrease in memorable (PSD-M =5) and preferred (PSD-P = 52) size class in 2022 compared to the previous survey in 2005 (Table 2). A high PSD-Q indicates an increased proportion of quality size fish.

Age data was collected on a subset of Largemouth Bass from the 2009 and 2022 surveys. Largemouth Bass growth was moderate taking approximately three years to reach a mean total length of 15.4 inches, 17.9 inches by age six and a harvestable size of 22.8 inches by age 11 in the 2009 survey (Table 3.). The 2022 survey indicated a slight decrease in growth rates reaching a mean total length of 13.2 inches by age three and 18.7 inches by age seven. The estimated mean maximum size (L infinity) for Largemouth Bass from Bell Cow lake in 2022 was estimated to be 20.4 inches in total length. The 2022 age frequency showed a strong 2019 (age 3), 2018 (age 4), and 2015 (age 7) year classes (Figure 2).

Overall abundance and size structure varied, but ultimately decreased since the 2005 survey, body conditions for all size classes and years surveyed were in good condition. Growth rates remained

moderated reaching a mean maximum length of 20.4 inches in 2022. The 2022 survey indicated a total fish abundance slightly below that considered as a quality bass fishery but maintained a high abundance of quality size and larger fish. No changes are recommended for Largemouth Bass regulations at this time.

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Largemouth Bass collected by spring electrofishing from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Substock 0-7.8 in	Stock 7.9 in		Quality 11.8 in		Preferred 15 in		Memorable 20.1 in		Trophy 24.8	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2000	97	38.8	8.8	7.2	89	4.8	91	13.2	87	4.8	100	.	.
2003	161	35.8	7.1	6.2	89	6.7	91	12.2	91	3.6	100	.	.
2005	253	56.2	20.4	9.1	87	4.9	88	19.6	91	2.2	99	.	.
2007	94	20.9	0.4	3.1	92	2.4	90	11.1	93	3.8	107	.	.
2009	106	23.6	5.8	4.4	95	1.6	94	8.4	95	3.3	104	.	.
2018	155	58.1	16.9	4.9	93	15.4	95	16.5	100	4.5	106	.	.
2022	114	38	2.7	5.3	92	11.7	98	16.7	100	1.7	103	.	.

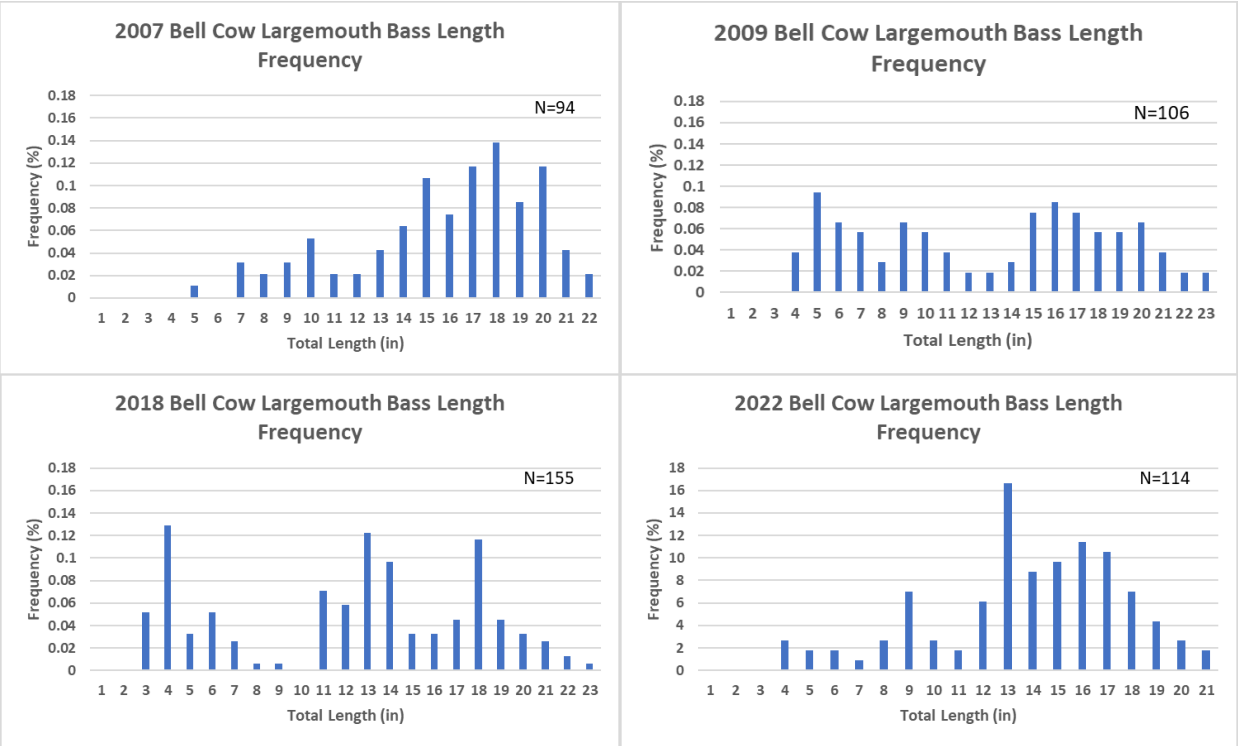


Figure 1. Largemouth Bass Length Frequencies for Bell Cow Lake 2007 -2022.

Table 2. Proportional Size Distribution (PSD) of Largemouth Bass. 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.

Year Surveyed	PSD-Q (11.8 in)	PSD-P (15 in)	PSD-M (20.1 in)
2000	76	60	16
2003	78	55	12
2005	75	61	6
2007	85	73	18
2009	75	66	19
2018	88	51	11
2022	85	52	5

Table 3. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for Largemouth bass from Bell Cow Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	L inf.
2009	5.2	8.2	15.4	15.9	16.4	17.9	20.5	19.6	19.7	21.2	22.8	.	22.4
2022	5.5	9.6	13.3	15.2	16.8	.	18.7	.	.	.	.	.	20.4

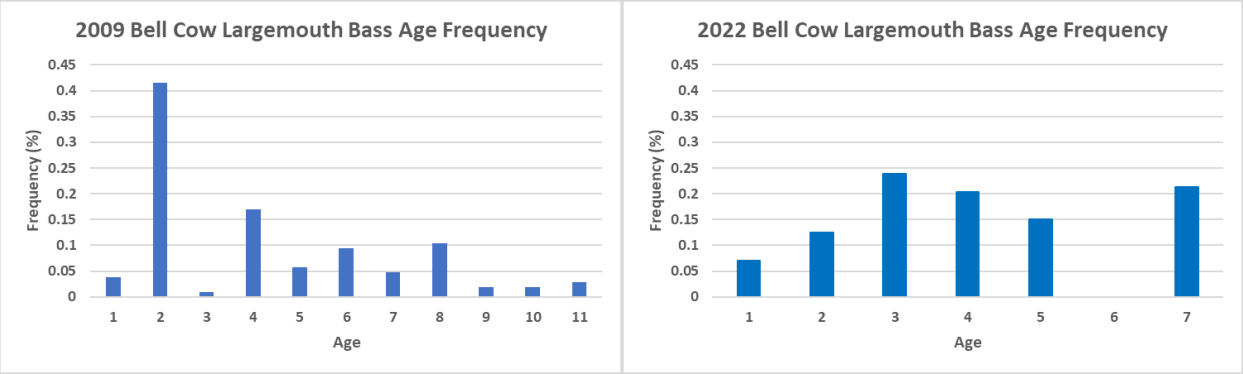


Figure 2. 2009 and 2022 Age Frequency of Largemouth Bass.

Spotted Bass

Spotted Bass were surveyed in spring of 2007, 2009, 2018, and 2022 by means of boat electrofishing. Randomly selected shoreline units were sampled. It is important to note that the standard sampling procedures (SSP) for Spotted Bass electrofishing surveys changed from 15 minute to 10-minute units in 2015. While this change decreased the amount of time sampled per unit, it is unkown how that would have affected catch rates. CPUE can vary based on habitat types sampled. It is also important to note, electrofishing systems switched from Smith Roots system to an ETS System in the spring of 2022. The two systems differ in design and possibly efficiency. The 2022 results should be viewed as an estimate and not directly comparable to the 2018 survey. Future surveys will be comparable with 2022. Overall Spotted Bass abundance increased significantly from 2005 (CPUE= 2.7) to 2018 (CPUE = 10.1), then showed a significant decrease in 2022(CPUE=2.7) (Table 4). Relative abundance for all size classes also varied between classes and years surveyed. Overall, abundance of Spotted Bass was considered low.

Body condition for all size classes and years surveyed between 2007 and 2022 were below acceptable values of 90 and considered to be in poor condition except for quality size fish in both the 2018 (Wr=91) and 2022 (Wr=98) surveys (Table 4). Length frequency histograms (Figure 3) indicate a slight increase in size structure in 2018 compared to 2007 but then decreases again for the 2022 survey. Only two Spotted Bass were collected in the 2009 survey. The largest fish sampled was from the 2018 survey. It measured 15.8 (in) in total length and 1.8 (lbs) in weight.

Spotted bass typically grow slower and obtain smaller sizes than Largemouth Bass, but they compete for the same food sources. For management reasons low abundance of Spotted bass is preferred. Spotted Bass follow statewide regulations at Bell Cow Lake, no minimum length or creel limit.

Table 4. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Spotted Bass collected by spring electrofishing from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Substock 0-7.7.0 in	Stock 7.1 in		Quality 11 in		Preferred 13.8 in		Memorable 16.9 in		Trophy 20.1	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2000	.	.	.	.	.	.	.	.	.	.	.	.	.
2003	5	1.1	0.2	0.2	81	0.4	95	02	84	.	.	.	.
2005	12	2.7	0.9	1.1	91	0.4	79	0.2	87	.	.	.	.
2007	12	2.7	.	1.1	84	1.3	85	0.2	78	.	.	.	.
2009	2	0.4	0.2	.	.	0.2	89	.	.	.	.	.	.
2018	27	10.1	2.6	3.0	87	1.1	91	3.4	89	.	.	.	.
2022	8	2.7	.	1.3	83	1.3	98	.	.	.	.	.	.

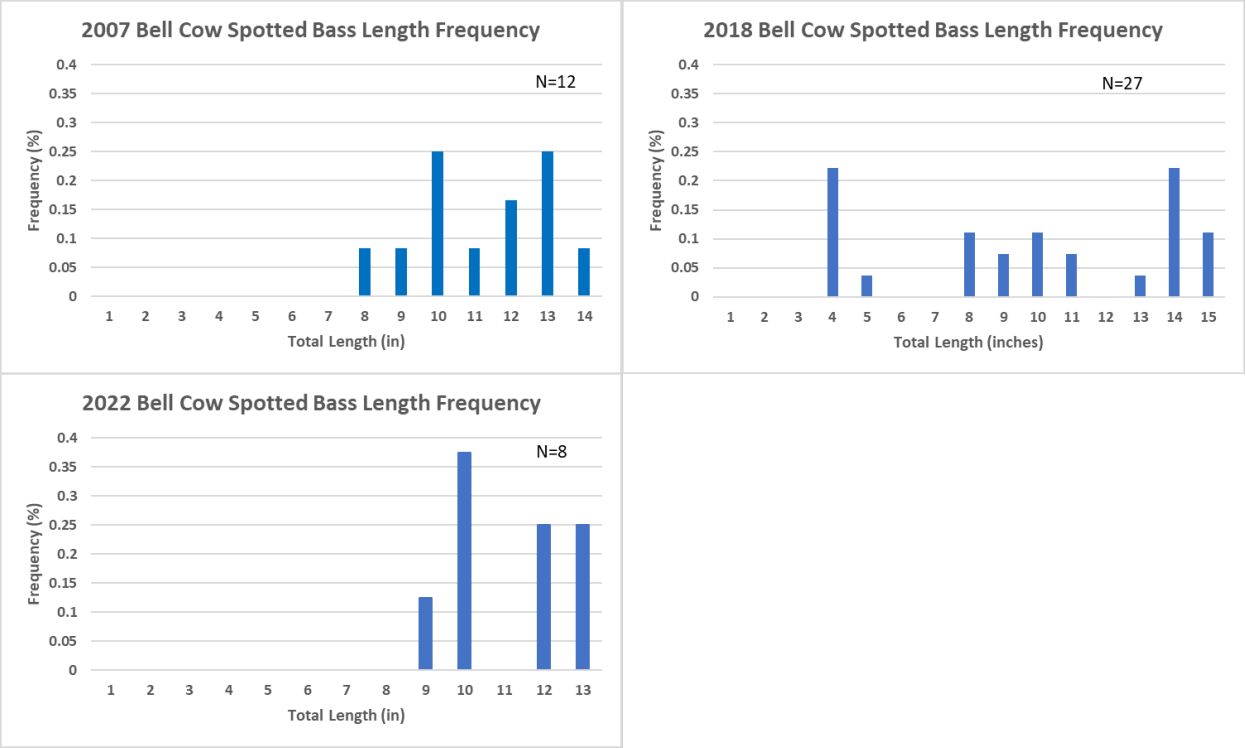


Figure 3. Spotted Bass Length Frequencies for Bell Cow Lake 2007, 2018 and 2022.

Channel Catfish

Channel Catfish were surveyed in 2013 and 2019 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in each survey. Both surveys showed an increase in abundance compared to 2006 (CPUE=9.6), with a high abundance of Channel Catfish observed in 2013 (CPUE = 11.0) and 2019 (CPUE = 13.2) (Table 5). Body conditions were considered acceptable for all size classes in 2019 except for stock size fish (Wr=87) (Table 5), body condition for all other sized classes had increased compared to the 2006 survey.

The 2019 Length frequency histogram (Figure 4) indicated an increase in size structure for Channel Catfish with nearly 60% of the fish sampled were quality size (16 inches) and greater. The proportional size distribution (PSD) values also indicated an increase in the overall size structure compared to 2006 and 2013, with increased PSD-Q = 67, PSD-P=4, and PSD-M=1 during the 2019 survey (Table 6).

Age data was collected on a subset of Channel Catfish in 2019. Growth rates were moderate, reaching legal harvest length of 14 inches between four and five years. The mean total length at age four was 13.7 inches and 16.3 inches at age five (Table 7). The mean maximum length estimated by the Von Bertalanffy growth curve (L inf.) (Table 7) for Bell Cow Lake was estimated at 26.6 inches, however, the largest fish sampled measured 28.11 (in) and weighed 8.4 (lbs) collected in the 2019 survey. The oldest Channel Catfish was aged at 13 years old. The 2019 age frequency indicates successful spawning and recruitment for nearly all age classes present, with the highest frequency from the five, seven, and eight year old classes (Figure 5).

Overall, relative abundance, body condition, and size structure increased since the 2006 survey. Channel Catfish stocking efforts from 1991-1993 have been successful in establishing a self-sustaining population. Channel Catfish abundance was considered high with a high-quality fishery present. No additional stockings are needed at this time. No changes to the Channel catfish regulations are recommended at this time.

Table 5. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Channel catfish collected by fall gill net from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 11 in		Quality 16.1 in		Preferred 24 in		Memorable 28 in		Trophy 35.8 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	95	9.6	4.4	81	2.2	84	0.1	97	.	.	.	.
2013	103	11.0	4.7	85	4.6	83	.	.	.	.	.	.
2019	131	13.2	4.0	87	7.3	92	0.4	99	0.1	95	.	.

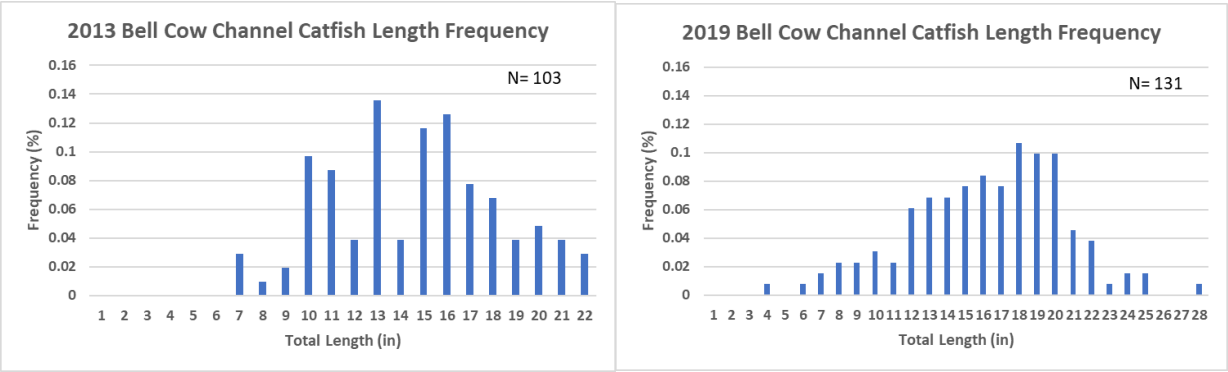


Figure 4. Channel Catfish Gill Net Length Frequency Histogram for Bell Cow Lake 2013-2019.

Table 6. 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.

Year Surveyed	PSD-Q (16.1 in)	PSD-P (24 in)	PSD-M (28 in)
2006	34	1	.
2013	49	.	.
2019	67	4	1

Table 7. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for Channel catfish from Bell Cow Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	L inf.
2019	.	12.9	12.5	13.7	16.3	18.4	18..3	21.6	18.7	25.3	21.4	18.1	21.5	26.6

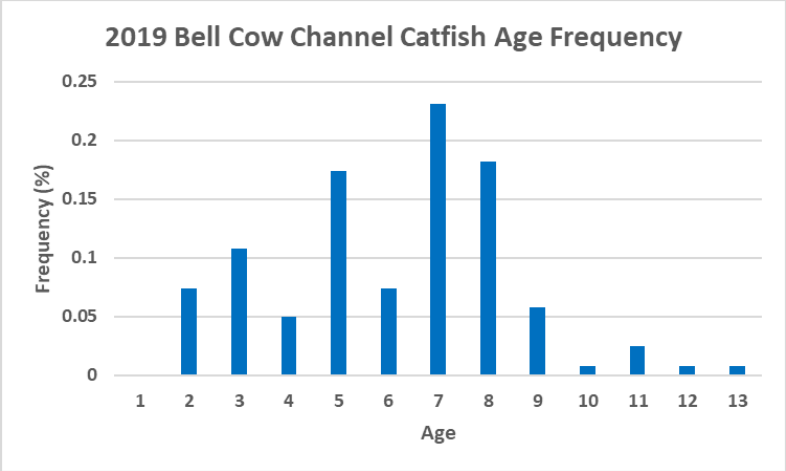


Figure 5. 2019 Age Frequency for Channel Catfish.

Flathead Catfish

Flathead Catfish were surveyed in 2013 and 2019 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in each survey. The 2019 survey indicated a low abundance of Flathead Catfish (CPUE=0.2)(Table 8) with only two fish surveyed in 2019 and none from the 2006 and 2013 surveys. Body conditions were considered excellent (Wr=109) for both fish. Sample size is considered too small to make accurate assumptions about population trends. Future surveys should be considered to better obtain population data.

Table 8. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Flathead catfish collected by fall gill net from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 13.8 in		Quality 20.1 in		Preferred 28 in		Memorable 33.9 in		Trophy 40.2 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	0	.	.	.	.	.	.	.	.	.	.	.
2013	0	.	.	.	.	.	.	.	.	.	.	.
2019	2	0.2	0.1	109	0.1	109	.	.	.	.	.	.

Crappie

Crappie were surveyed in 2013 and 2019 using suspended gill nets and in 2022 using trap nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten gill net and 30 trap nets stations were randomly sampled for a period of 24 hours during each survey. Crappie abundance was considered low during the 2019 (CPUE=3.8) gill net survey and 2022 (CPUE=24.0) trap net survey. A significant decreased was observed in 2013 (CPUE=5.3) and 2019 (CPUE=3.8) compared to the 2006 (CPUE=38.2) survey (Table 9 and Table 10). While overall abundance decreased, preferred (9.8 in) and memorable (11.8 in) size classes showed an increase in the 2013 and 2019 surveys compared to 2006. With an observed decrease in overall

abundance, Crappie body conditions improved. Relative weights increased in all size classes from 2006 to 2019 and were well above the minimum accepted value (≥90) during the 2019 survey (Table 9). Body conditions for all size classes in the 2022 survey were also considered acceptable, though a noticeable decrease was observed in the stock, quality and memorable size classes compared to the body conditions in 2019. Length frequency histograms (Figure 6.) also indicate an increase in size structure for 2013, 2019, and 2022 surveys compared to 2006. The largest fished sampled was from the 2022 survey and measured 14.65 inches in total length and weighed 1.67 pounds.

Age data was collected on a subset of Crappie from the 2019 and 2022 surveys. The 2019 sample size (n=37) was considered too small for reliable growth estimates, however data is listed for comparison to the 2022 survey (n=592). Growth was considered acceptable during the 2019 survey, however only ten fish sampled were older than age two. The 2022 age sample contains more reliable growth estimates and indicates a moderate but steady growth rates. Crappie in Bell Cow Lake grew to a mean length of 7.8 inches by age two, 8.7 inches by age three, 9.4 inches by age four, and 12.3 inches by age five during the 2022 survey (Table 11). The mean maximum length estimated by the Von Bertalanffy growth curve (L inf.) (Table 11) for Bell Cow Lake was estimated at 14.4 inches for the 2022 survey. The oldest Crappie collected was aged at seven years old and measured 14.7 inches in total length and weighed 1.67 pounds. The 2022 age frequency shows a strong 2019-year class, with 46% of the Crappie sampled were three years of age (Figure 7).

Overall, Crappie abundance at Bell Cow Lake was considered low, body conditions were acceptable in all size classes and growth rates were considered moderate but steady. Better growth rates would be ideal, however, growth is not stunted. A moderate abundance of quality size and greater fish are present with more than 18% of the surveyed population were ten inches or larger.

Table 9. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall gill net from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	**Stock 5.1 in**		**Quality 7.9 in**		**Preferred 9.8 in**		**Memorable 11.8 in**		**Trophy 15.0**	
Year	**No.**	**CPUE**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**
2006	378	38.2	32.1	92	1.9	90	0.2	87	0.3	94	.	.
2013	49	5.3	3.2	94	0.4	83	0.9	95	0.8	92	.	.
2019	37	3.8	1.9	112	0.5	96	0.7	97	0.6	113	.	.

Table 10. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall trap net from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 5.1 in		Quality 7.9 in		Preferred 9.8 in		Memorable 11.8 in		Trophy 15.0	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2022	682	24.0	11.5	92	7.3	90	3.2	99	1.1	100	.	.

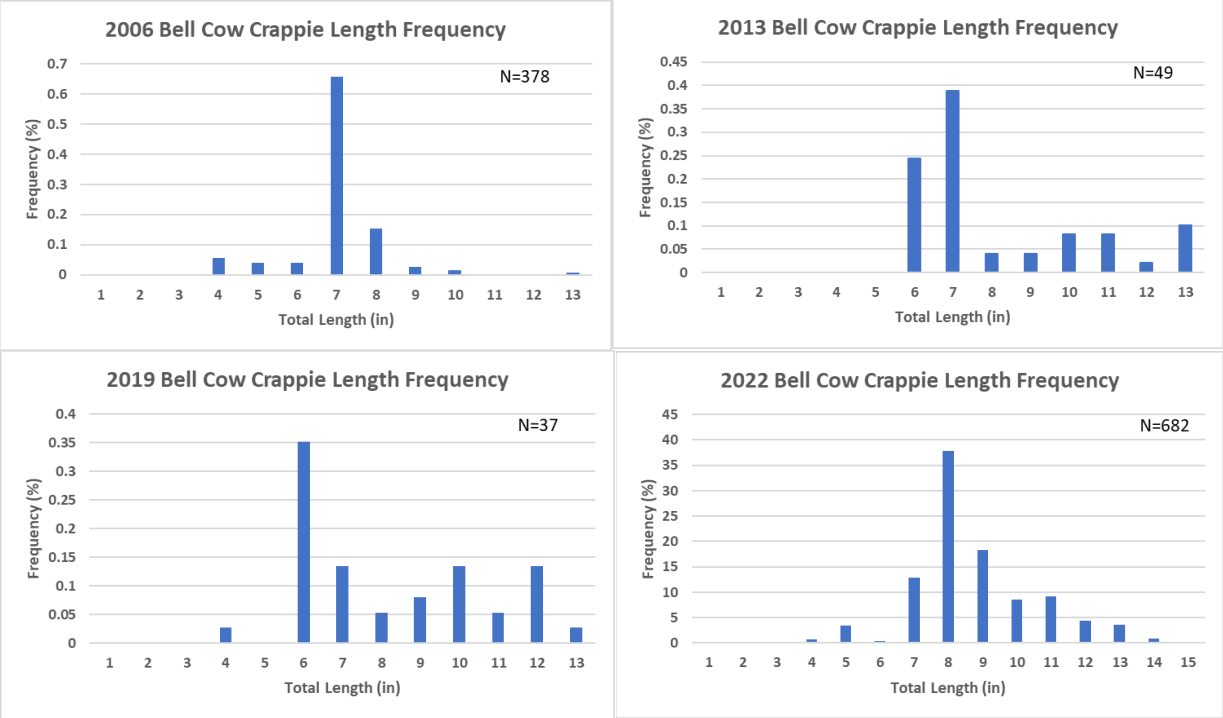


Figure 6. Crappie, Gill Net Length Frequency Histogram for Bell Cow Lake 2006-2022.

Table 11. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for Crappie from Bell Cow Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	L inf.
2019	6.7	8.9	12.6	11.1	13.3	.	.		14.8
2022	6.1	7.8	8.7	9.7	12.3	.	14.7		14.4

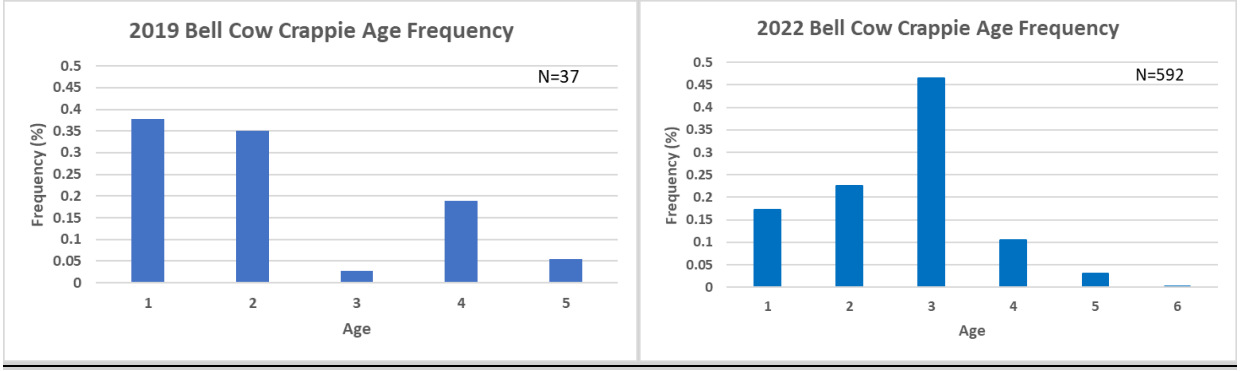


Figure 7. 2019 and 2022 Crappie Age Frequencies for Bell Cow Lake.

White Bass

White Bass were surveyed in 2013 and 2019 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in each survey. Overall relative abundance of White bass decreased from 2006 (CPUE=16.7) to 2013 (CPUE=9.2) then increased again slightly in 2019 (CPUE=11.4) (Table 12). While overall abundance decreased in 2013, abundance of quality (9.1 in), preferred (11.8 in), and trophy (18.1 in) size fish increased compared to 2006. The 2019 survey showed an increase in stock (5.9 in) and memorable (15 in) size fish compared to 2013, all other size classes, except for quality, had decreased compared to 2006. Body conditions for all size classes increased above acceptable levels (≥90) for the 2019 survey compared to 2006 where all size classes except for stock size (5.9 in) were below acceptable conditions. The length frequency histograms (Figure 8.), also showed a slight increase in size structure compared to 2013 with an increase in percent of 15 plus inch fish. The largest fish sampled was collected from the 2013 survey and was the only trophy size class (18.1in) White bass of the three surveys. It measured 19.2 inches in total length and weighed 2.1 pounds.

Age data was collected on a subset of White Bass from the 2019 survey. White Bass in Bell Cow Lake grew to a mean length of 10.3 inches by age one, 12.4 inches by age two, and 15.7 inches by age three (Table 13). Growth slowed after age three taking rough five years to reach a mean length of 16.5 inches. The mean maximum length estimated by the Von Bertalanffy growth curve (L inf.) (Table 13) for Bell Cow Lake was estimated at 17 inches for the 2019 survey. The oldest White Bass collected was aged to be six years old. The 2019 age frequency shows a strong 2018-year class with roughly 80% of White Bass sampled were aged to be one (Figure 9).

Overall, White Bass abundance was considered high with a high-quality fishery present. Body conditions and growth rates were acceptable.

Table 12. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of White Bass collected by fall gill net from Bell Cow Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 5.9 in		Quality 9.1 in		Preferred 11.8 in		Memorable 15 in		Trophy 18.1 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	165	16.7	4.1	93	1.5	86	4.7	84	2.1	80	.	.
2013	86	9.2	0.8	92	3.1	90	5.1	92	0.1	87	0.1	.
2019	111	11.4	2.9	92	2.8	93	4.4	95	0.8	103	.	.

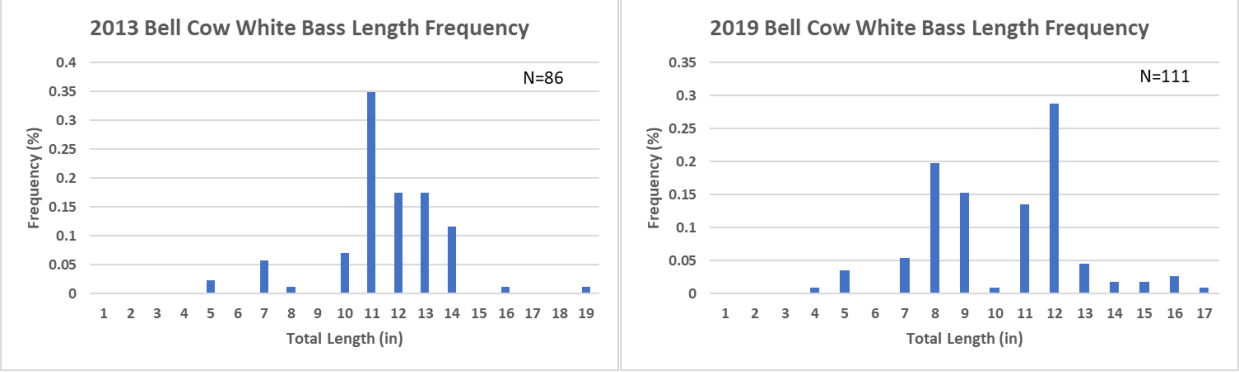


Figure 8. White Bass Gill Net Length Frequency Histogram 2013 and 2019.

Table 13. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for White Bass from Bell Cow Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	L inf.
2019	10.3	12.4	15.7	15.0	16.5	15.3	.	.	17.0

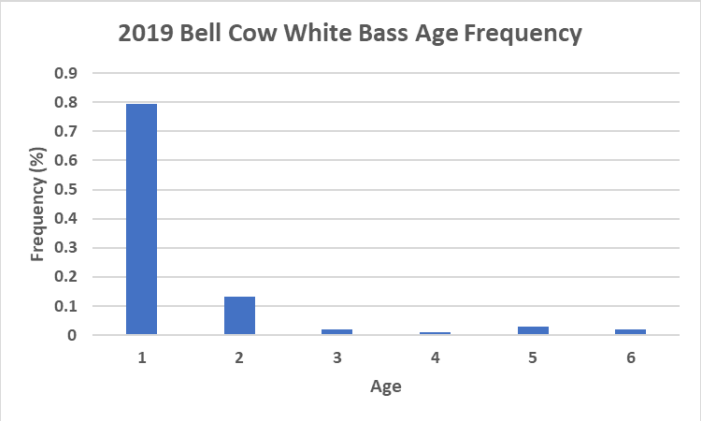


Figure 9. 2019 Age Frequency for White Bass.

Shad

Gizzard Shad were sampled by suspended gill nets in 2013 and 2019. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours during each surveys. Both 2013 (CPUE = 1.7) and 2019 (CPUE = 0.7) showed a significant decrease in relative abundance of Gizzard Shad compared to the 2006 survey (Table 14). The 2013 length frequency histogram (Figure 10), indicates nearly 90% of the Gizzard Shad collected were larger than six inches in length. Optimal forage size for most species is six inches or less. Only 16 Gizzard Shad were collected from the 2013 survey and seven from 2019. Sample size is considered too small to make reliable conclusions.

Table 14. Total number (No.) and catch per unit of effort (CPUE) by size groups of Gizzard Shad collected by fall gill net from Bell Cow Lake.

Gizzard Shad				
Year	**No.**	**Total CPUE**	**<6 inches**	**≥6 inches**
2006	167	16.9	6.0	10.8
2013	16	1.7	0.1	1.2
2019	7	0.7	0.7	.

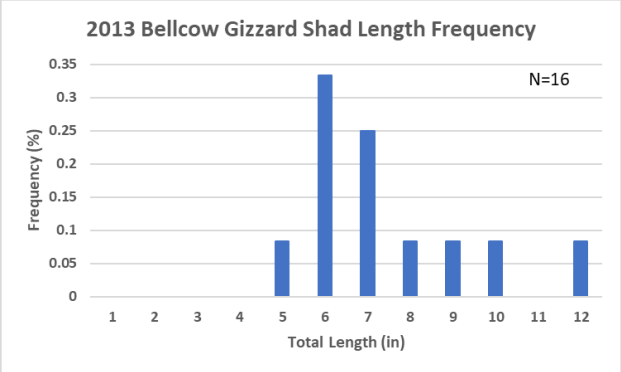


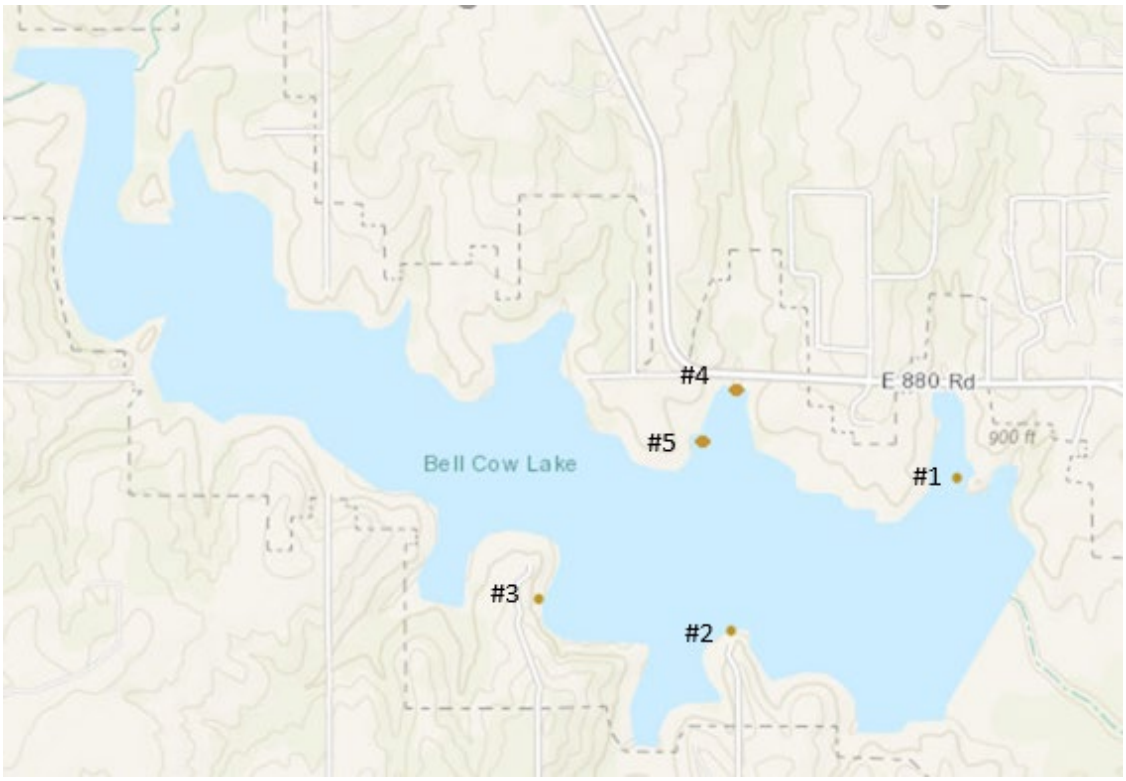
Figure 10. Gizzard Length Frequency Histogram from suspended gill nets 2007-2016.

RECCOMENDATIONS

1. Continue to monitor black bass population dynamics to evaluate trophy bass regulations.
2. Continue to monitor Crappie population dynamics and growth rates.
3. No regulation changes are recommended at this time.

Appendix 1. Species, number and size of fish stocked in Bell Cow Lake since 2000.

Date	Species	Number	Size (inches)
2000	**Florida Largemouth Bass**	**22,391**	**3**
2002	**Florida Largemouth Bass**	**22,370**	**3**
2004	**Florida Largemouth Bass**	**22,020**	**3**
2006	**Florida Largemouth Bass**	**22,100**	**3**
2007	**Northern Largemouth Bass**	**136**	**Adult**
2009	**Northern Largemouth Bass**	**57,000**	**1**
2013	**Northern Largemouth Bass**	**19,040**	**1.25**
2015	**Northern Largemouth Bass**	**30,000**	**1.5**
2019	**Northern Largemouth Bass**	**60**	**18-20**



Appendix 2. Bell Cow Lake Fish Attractor Locations

Fish Attractor Site Information for Bell Cow Lake.

Area Name	Site #	Lattitude	Longitude	Habitat Type	Marked	Bank Access	Date
NE island	1	35.73563	-96.91925	Brush Pile	Y	Y	3/22/2018
Fishing Dock	2	35.73028	-96.929033	Brush Pile	N	Y	3/22/2018
Area C east bank	3	35.73137	-96.937366	Brush Pile	N	Y	3/22/2018
Road riprap just east of Area B entrance	4	35.7391	-96.928733	Brush Pile	N	Y	3/22/2018
Area B boat ramp	5	35.73718	-96.930338	Brush Pile	N	Y	3/22/2018