SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-47

Name: Fate Dam **County(ies):** Lyman
Legal Description: T106N-R77W-Sec. 25, 36 **GPS:** 43°56'20.38"N 100°00'34.61"W
Location from nearest town: 2 miles east and 2 ½ miles north of Presho

Date of present survey: July 14-16, 2014 (netting); September 28, 2014 (electrofishing)
Date of last survey: July 18-20, 2011 (netting); October 2, 2012 (electrofishing)
Most recent lake management plan: F-21-R-40 (January 1, 2008 to December 31, 2012)
Management classification: Warmwater Semi-permanent

Primary Game Species	Secondary and Other Species
Walleye	Northern Pike
Black Crappie	Yellow Perch
Largemouth Bass	Pumpkinseed Sunfish
Bluegill	Black Bullhead

PHYSICAL DATA

Surface Area: 164 acres **Watershed:** 13,760 acres
Maximum Depth: 19 feet **Mean Depth:** 9 feet
Lake elevation at time of survey (field observations): Full
Contour map: Yes **Date:** 1992

Ownership of lake and adjacent lakeshore properties:

The majority of Fate Dam is located within a 320 acre Game Production Area that is owned by the Department of Game, Fish and Parks. The upper 1/6th of Fate Dam and the areas of the dam grade and spillway are on private land with easements to the State of South Dakota. Fisheries management activities at Fate Dam are completed by the Wildlife Division of the Game, Fish and Parks Department.

Watershed condition with percentages of land use types:

The watershed of Fate Dam is approximately 13,760 acres or 20.5 square miles primarily located along three creeks to the north and west of the lake. Almost the entire watershed is privately owned agricultural land and grassland. The watershed of Fate Dam is nearly level to gently rolling hills. Soil type is medium to deep clay. Land use is approximately 60% cultivated cropland used mostly for raising small grains, 38% native grasses utilized as pasture or hay land, and 2% farmsteads, tree belts and roads. The immediate shoreline is native grasses and wooded areas. Several small dams are located in the watershed that allows Fate Dam to fill only in years of heavy runoff. These small dams are beneficial in that they act as barriers to help inhibit silt from entering into Fate Dam itself.

Fishing access:

Access is available on the west side of Fate Dam via a good gravel road through the Game Production Area. There is a new (2005) boat ramp located at the end of the access road for access to the lake. There is also ample shoreline for shore fishing opportunities, although shore fishing may be limited during the middle of summer due to dense mats of submergent vegetation.

Condition of all structures (i.e. spillway, boat ramps, level regulators, etc.):

The dam and spillway are in good condition. A new boat ramp was installed in the spring of 2005.

Field observations of aquatic vegetation condition:

At the time of the survey, Fate Dam contained very little submergent vegetation. The emergent vegetation was mainly cattails with a few bulrushes around nearly 85% of the lake.

CHEMICAL DATA

Field observations of water quality and pollution problems:

No pollution problems were evident at the time of the survey. Water clarity was fair with a secchi disc reading of 2.5 feet. Other water quality characteristics were measured in the field on July 16, 2014, using a HACH water quality kit and a Hanna multiparameter meter. Results are found in Table 1.

Presence of a thermocline and depth from surface: No
Station for water chemistry located on attached map: Yes

Table 1. Water chemistry results from Fate Dam, Lyman County, July 16, 2014.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/L)	HRD (mg/L)	pH	Cond. (µS/cm)	TDS (ppm)	Sal.	ORP	Secchi (ft)
A	Surface	73.2	7.37	0.0	191	261	8.68	762	380	0.37	-163.3	2.5
A	15.5	72.0	2.70	18.4	216	245	7.98	776	389	0.38	-164.9	

BIOLOGICAL DATA

Methods:

Fate Dam was sampled on July 14-16, 2014, with ten overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. Two experimental gill nets were also set. The gill nets were 150ft x 6ft with 25ft panels of ½, ¾, 1, 1-1/4, 1-1/2, and 2-inch monofilament mesh. On the evening of September 28, 2014, Fate Dam was nighttime electrofished for 60 minutes (6-ten minute transects) to sample the largemouth bass population. Fish indices and statistics were completed using Winfin.

Results and Discussion:

Gill net catch

Table 2. Total catch of two, 150ft experimental gill nets at Fate Dam, Lyman County, July 14-16, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	380	84.6	190.0	± 212.4	10.3	25	5	93
Yellow Perch	41	9.1	20.5	± 29.2	11.5	27	0	102
Black Crappie	21	4.7	10.5	± 16.9	1.4	74	68	108
Walleye	7	1.6	3.5	± 10.8	3.0	14	0	94

*Eight year mean (1974, 1978, 1994, 2003, 2005, 2008, 2009, 2011)

Trap Net Catch

Table 3. Total catch of ten, overnight ¾-inch frame nets at Fate Dam, Lyman County, July 14-16, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	4816	88.0	481.6	± 307.1	21.6	40	17	96
Black Crappie	494	9.0	49.4	± 21.4	19.5	48	38	111
Yellow Perch	126	2.3	12.6	± 4.5	1.0	59	7	99
Largemouth Bass	16	0.3	1.6	± 1.1	0.4	20	0	124
Northern Pike	9	0.2	0.9	± 0.6	1.3	100	44	82
Bluegill	7	0.1	0.7	± 0.5	11.1	86	0	118
Walleye	4	0.1	0.4	± 0.4	1.2	25	0	89

* Thirteen year mean (1974, 1978, 1985, 1988, 1991, 1994, 1997, 2000, 2003, 2005, 2008, 2009, 2011)

Electrofishing Catch

Table 4. Total catch from six, ten-minute runs of fall nighttime electrofishing at Fate Dam, Lyman County, September 28, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	36	83.7	36.0	± 30.0	30.9	0	0	113
Walleye	7	16.3	7.0	± 4.2	4.1	100	0	91

* Seven year mean (1994, 2000, 2003, 2005, 2008, 2009, 2012)

Largemouth Bass

Fate Dam used to contain a quality largemouth bass population. But a partial kill at some time has reduced the population to one that is dominated by stocked fish. The electrofishing CPUE of 36.0 is below the 45.0 from the 2012 survey (Table 10) but is slightly above the 30.9 seven year mean (Table 4). The current population is dominated by one year class of fish that are 1 year olds. Table 5 illustrates this and it shows that growth on these young fish is good with means above statewide, regional and SLI means. These fish are more than likely a result of the stockings that have taken place the last couple years (Table 9). Figures 1 and 2 illustrate the length frequency histograms from the last two surveys and show how different the two are. Condition is good with a mean Wr of 113.

Table 5. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Fate Dam, Lyman County, 2014.

			Back-calculated Age
Year Class	Age	N	1
2014	0	2	
2013	1	34	122
All Classes		**36**	**122**
Statewide Mean			96
Region II Mean			105
SLI* Mean			99

* Small Lakes and Impoundments

Figure 1. Length frequency histogram for largemouth bass sampled from Fate Dam, Lyman County, 2014

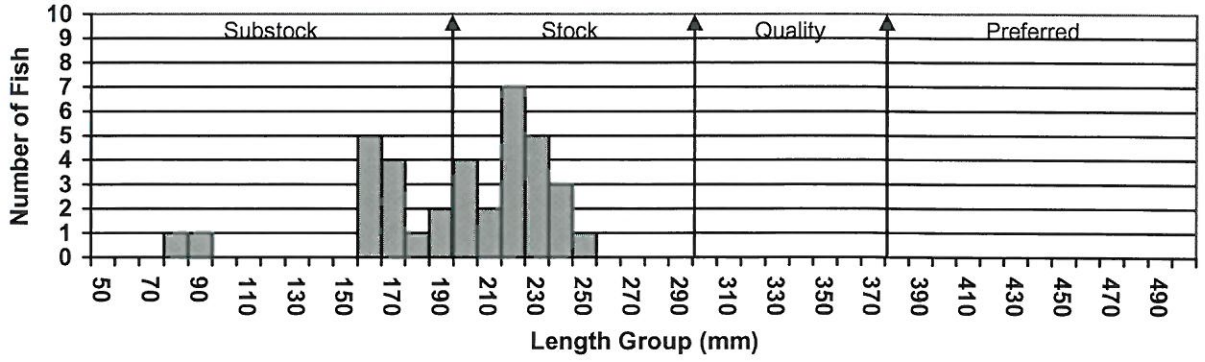
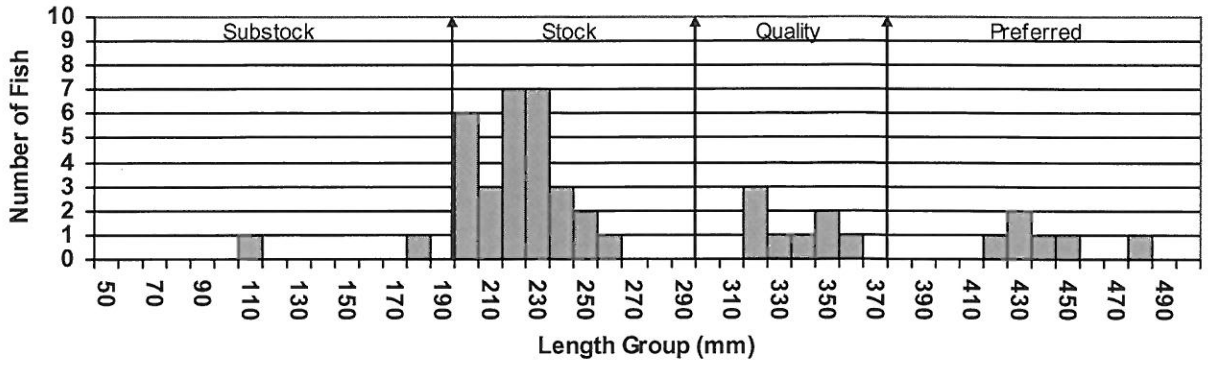


Figure 2. Length frequency histogram for largemouth bass sampled from Fate Dam, Lyman County, 2012



Walleye

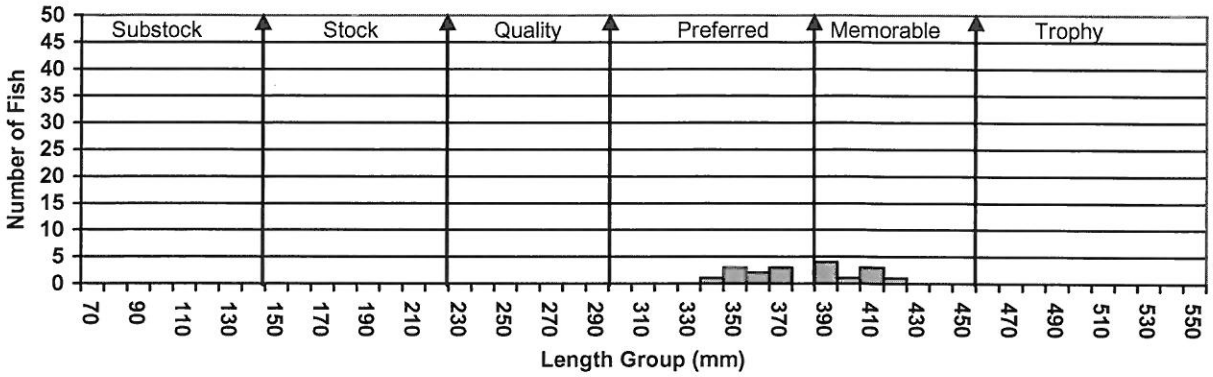
Fate Dam now contains a small walleye population. Walleyes were void in the last couple surveys, but the stockings have started to take to rebuild this population. The gill net CPUE of 3.5 is right on with the eight year mean of 3.0 (Table 2). The trap net CPUE of 0.4 is below the thirteen year mean of 1.2 (Table 3). And the electrofishing CPUE of 7.0 fish per hour is above the 4.1 seven year mean (Table 4). Growth appears to be fine at this stage of the game with means right on with statewide, regional and SLI means (Table 6). Figure 3 illustrates the length frequency histogram for the fish sampled this survey period. Condition is good with a mean Wr of 91.

Table 6. Average back-calculated lengths (mm) for each age class of walleye sampled from Fate Dam, Lyman County, 2014.

			Back-calculated Age		
Year Class	Age	N	1	2	3
2012	2	6	226	496	
2011	3	12	132	215	330
All Classes		**18**	**179**	**356**	**330**
Statewide Mean			168	279	360
Region II Mean			169	282	346
SLI* Mean			176	271	384

* Small Lakes and Impoundments

Figure 3. Length frequency histogram for walleye sampled from Fate Dam, Lyman County, 2014.



Yellow Perch

Fate Dam continues to contain a yellow perch population that appears to be on the rise. The gill net CPUE of 20.5 is above the 5.5 from the 2011 survey (Table 10) as well as the 11.5 eight year mean (Table 2). The trap net CPUE of 12.6 is also well above the 1.5 from the 2011 survey (Table 10) and the 1.0 thirteen year mean (Table 3). Figures 4 through 6 illustrate the length frequency histograms for the fish sampled over the last three surveys. Growth is good with means right on with statewide, regional and SLI means (Table 7). Condition is good with a mean Wr of 101.

Table 7. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Fate Dam, Lyman County, 2014.

			Back-calculated Age				
Year Class	Age	N	1	2	3	4	5
2013	1	38	99				
2012	2	77	79	155			
2011	3	9	88	146	213		
2010	4	1	61	92	155	237	
2009	5	2	71	118	186	224	272
All Classes		**127**	**80**	**128**	**185**	**231**	**272**
Statewide Mean			86	145	190	220	242
Region II Mean			91	152	196	219	242
SLI* Mean			87	142	185	205	219

* Small Lakes and Impoundments

Figure 4. Length frequency histogram for yellow perch sampled from Fate Dam, Lyman County, 2014.

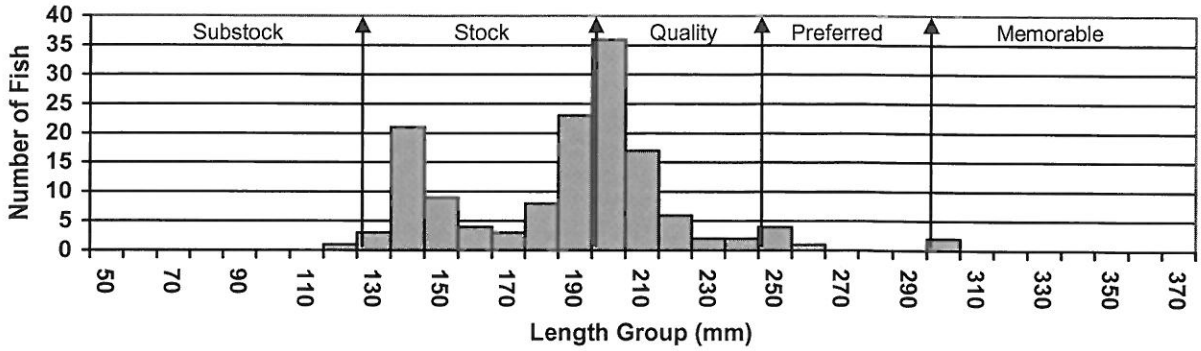


Figure 5. Length frequency histogram for yellow perch sampled from Fate Dam, Lyman County, 2011.

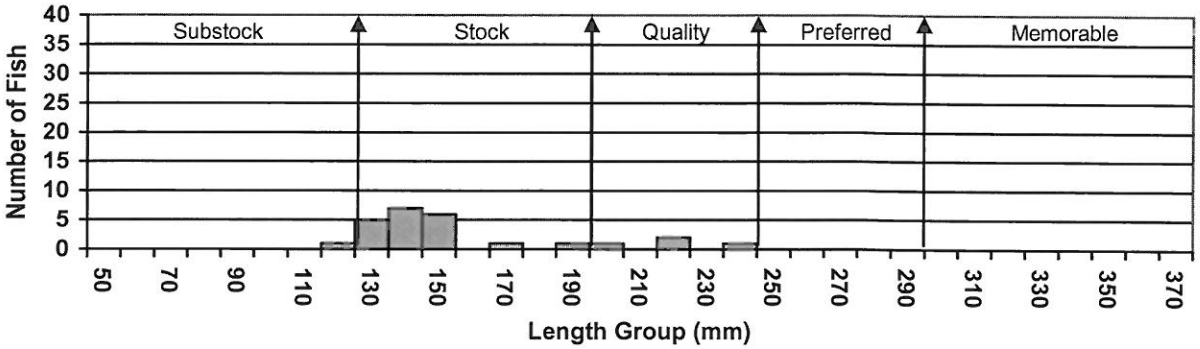
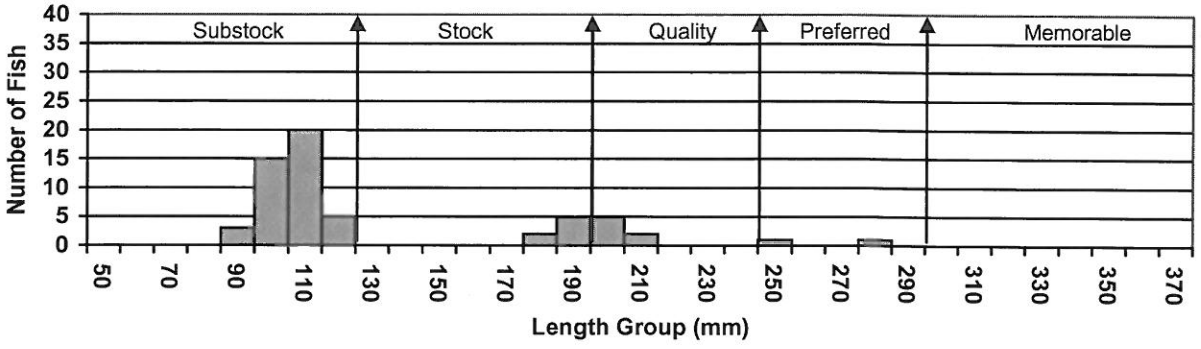


Figure 6. Length frequency histogram for yellow perch sampled from Fate Dam, Lyman County, 2009.



Black Crappie

The black crappie population in Fate Dam appears to be on the rise. The gill net CPUE of 10.5 is well above the 0.0 from the 2011 survey (Table 10) as well as the 1.4 eight year mean (Table 2). The trap net CPUE of 49.4 is also well above the 3.0 from the 2011 survey (Table 10) and the 19.5 thirteen year mean (Table 3). Figures 7 through 13 illustrate the length frequency histograms for the fish sampled over the past seven surveys. They all look pretty similar except this survey has a large number of fish in the substock to stock size categories. Growth is good with means at or above statewide, regional and SLI means (Table 8). Condition is good with a mean Wr of 110.

Table 8. Average back-calculated lengths (mm) for each age class of black crappie sampled from Fate Dam, Lyman County, 2014.

			Back-calculated Ag						
Year Class	Age	N	1	2	3	4	5	6	7
2013	1	63	85						
2011	3	11	87	149	218				
2010	4	6	90	183	235	271			
2009	5	12	79	146	201	239	268		
2008	6	16	73	138	198	243	260	282	
2007	7	1	75	165	221	247	265	279	291
All Classes		**109**	**82**	**156**	**215**	**250**	**264**	**281**	**291**
Statewide Mean			83	147	195	229	249		
Region II Mean			75	132	177	209	235		
SLI* Mean			78	134	180	209	226		

* Small Lakes and Impoundments

Figure 7. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2014.

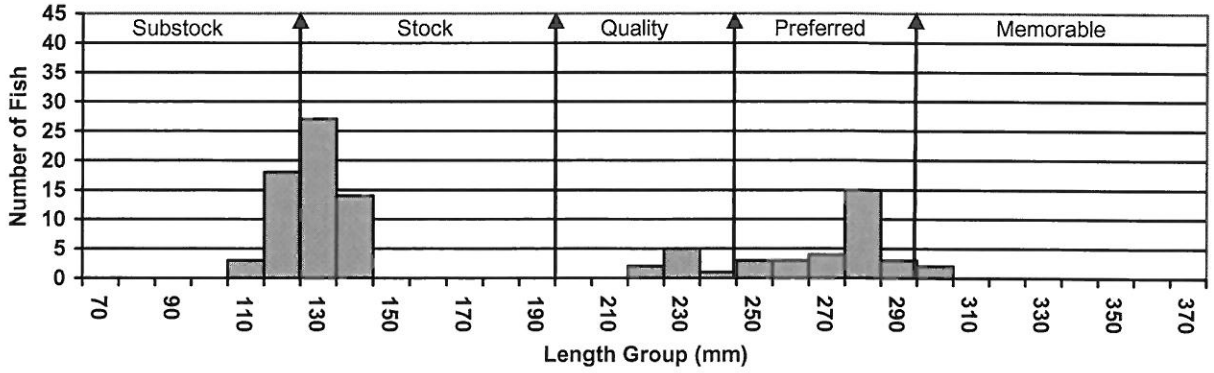


Figure 8. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2011.

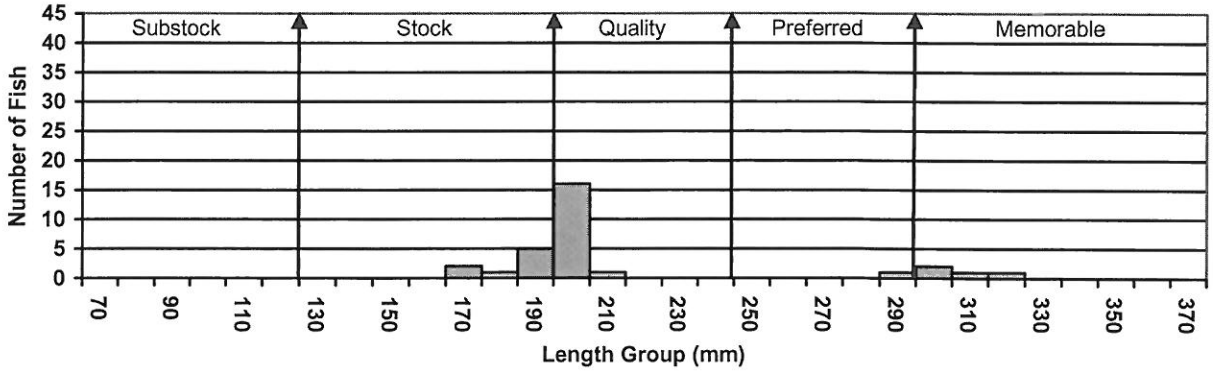


Figure 9. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2009.

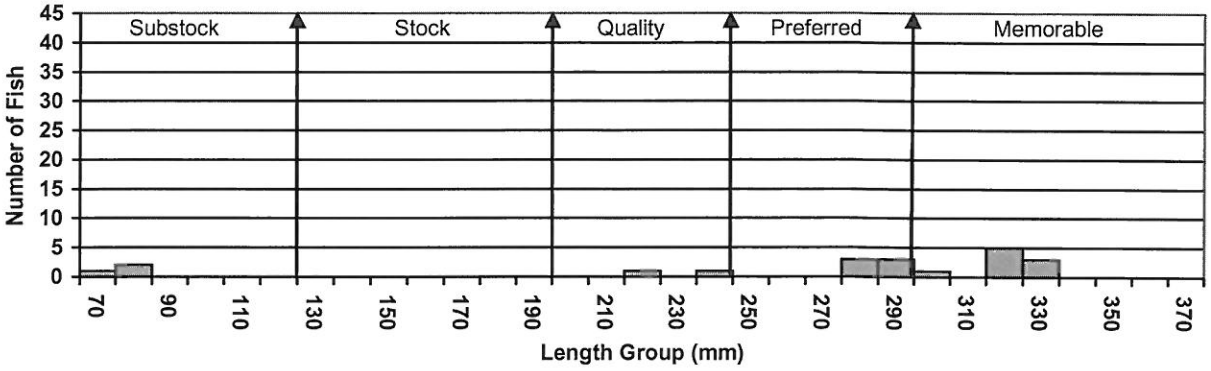


Figure 10. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2008.

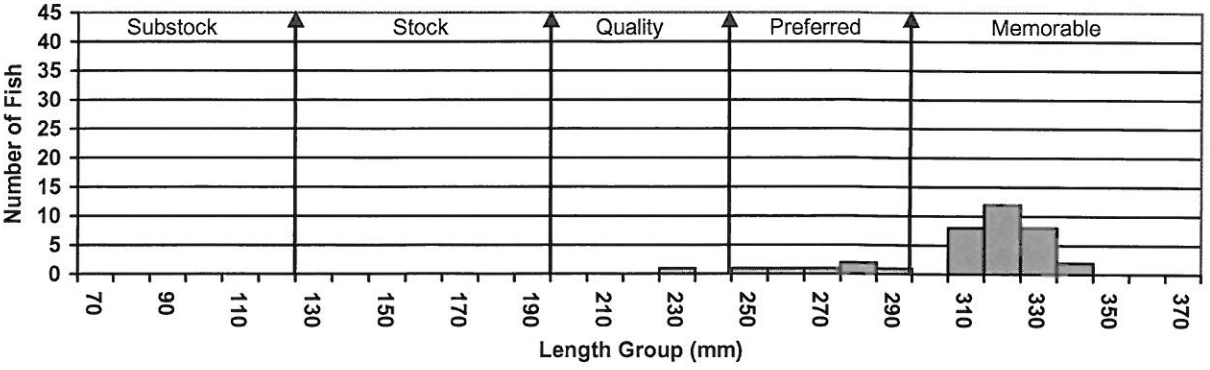


Figure 11. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2005.

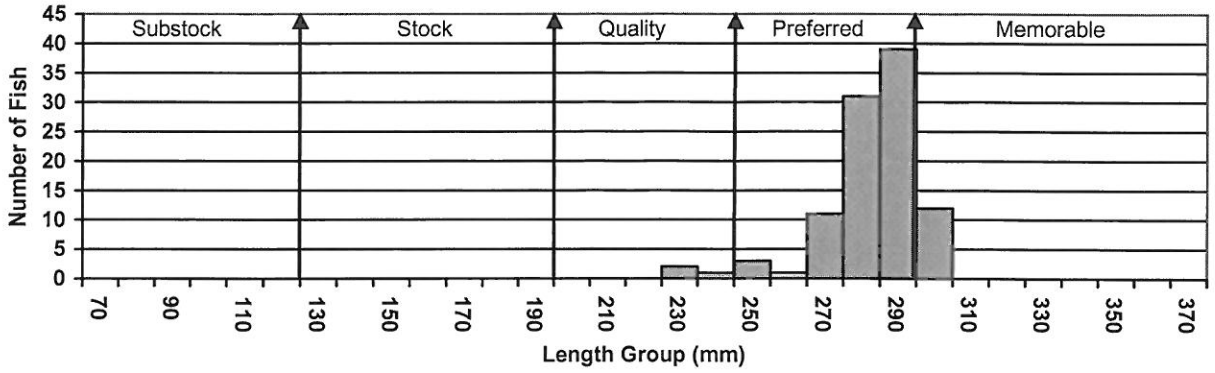


Figure 12. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2003.

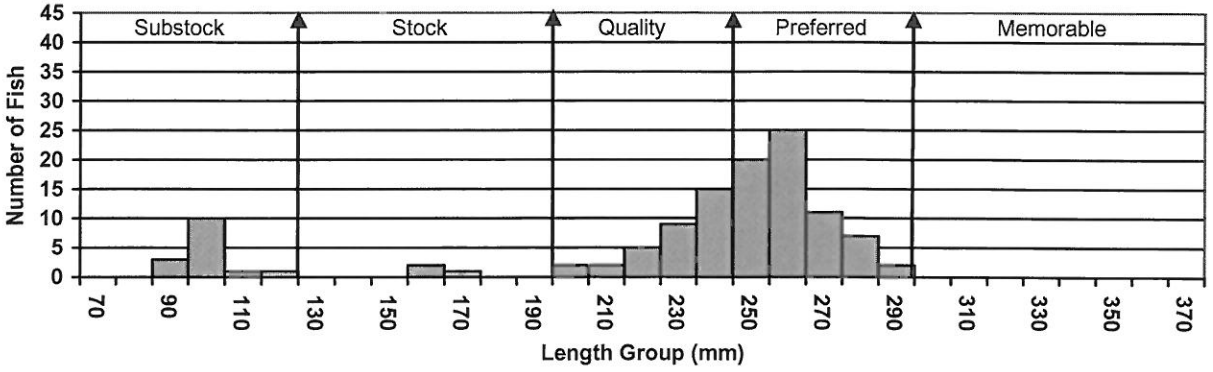
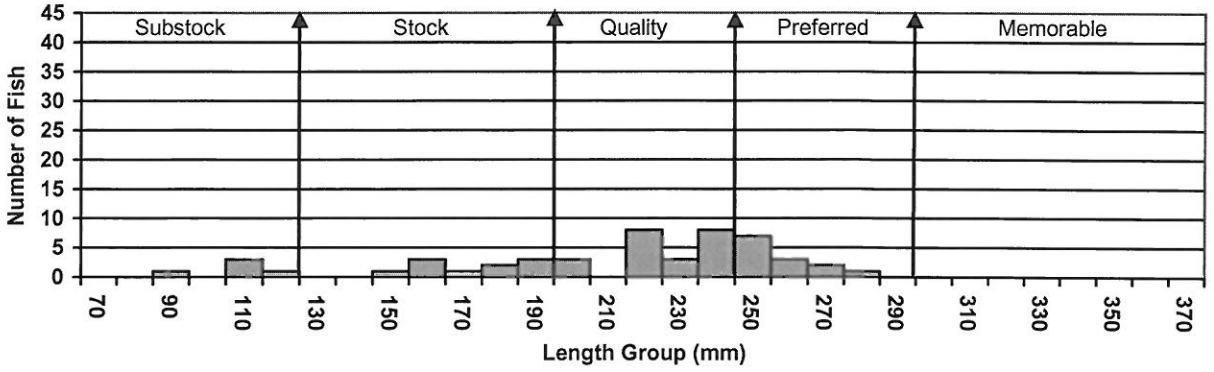


Figure 13. Length frequency histogram for black crappie sampled from Fate Dam, Lyman County, 2000.



Black Bullhead

The black bullhead population was the biggest disappointment of the survey as their numbers have exploded since the last survey. The gill net CPUE of 190.0 is well above the 35.0 from the 2011 survey (Table 10) as well as the 10.3 eight year mean (Table 2). The trap net CPUE of 481.6 is also well above the 51.2 from the 2011 survey (Table 10) and the 21.6 thirteen year mean (Table 3). Figures 14 through 16 illustrate the length frequency histograms for the fish sampled over the past three surveys. This survey and the last one have been dominated by new year classes of bullheads recruiting into the population, which means we could be dealing with a bullhead problem for several years unless the predator populations rebound quickly.

Figure 14. Length frequency histogram for black bullhead sampled from Fate Dam, Lyman County, 2014.

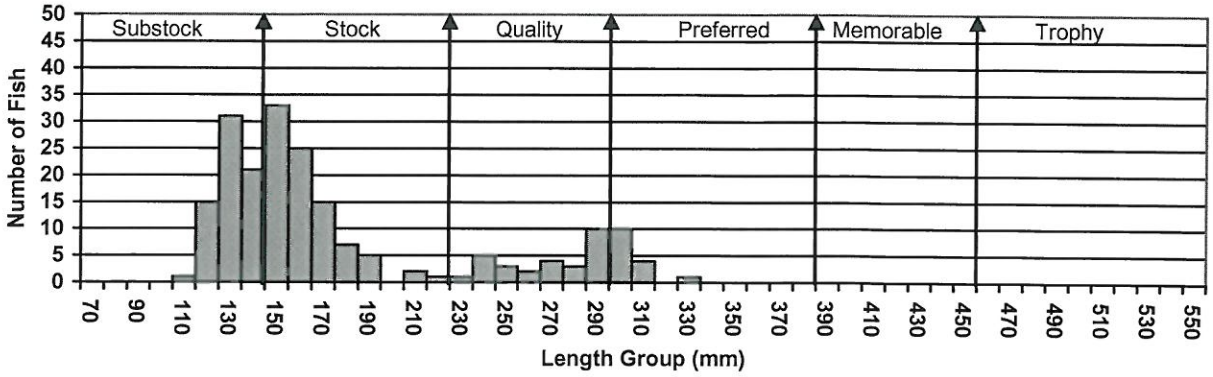


Figure 15. Length frequency histogram for black bullhead sampled from Fate Dam, Lyman County, 2011.

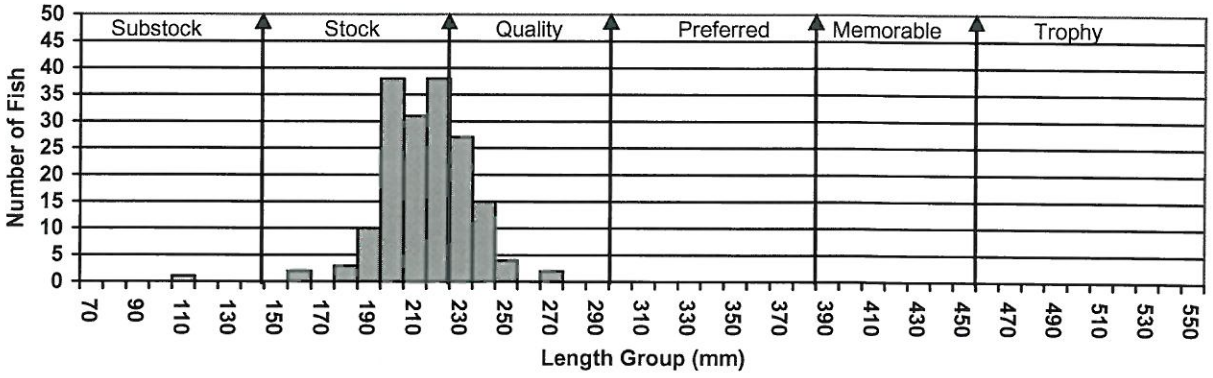
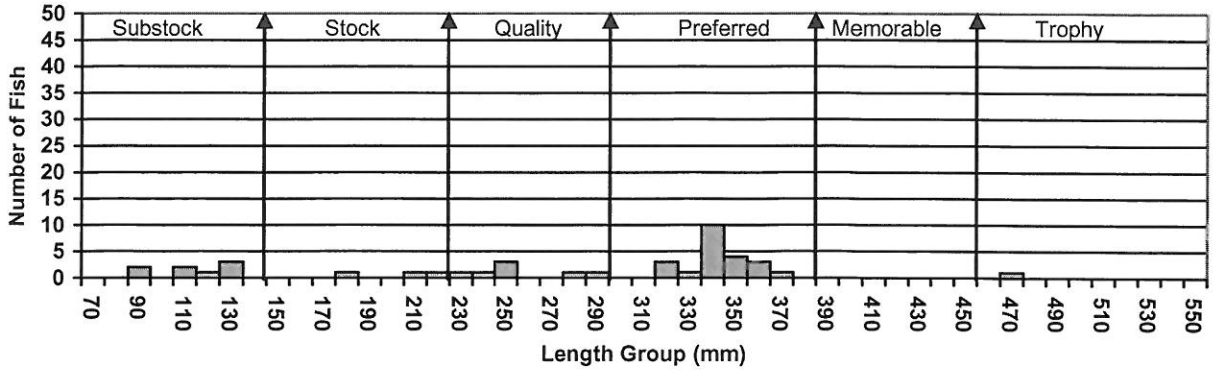


Figure 16. Length frequency histogram for black bullhead sampled from Fate Dam, Lyman County, 2009.



Other Species

Northern pike and bluegill were the only other species sampled this survey. While green sunfish, pumpkinseed sunfish, and golden shiners were the species not sampled this survey that have been in surveys past (Table 10).

Table 9. Stocking records for the last 10 years for Fate Dam, Lyman County.

Year	Number	Species	Size
2003	4,401	Walleye	Fingerling
2005	2,675	Walleye	Fingerling
2009	15,000	Largemouth Bass	Fingerling
2010	21,400	Walleye	Small Fingerling
2011	159	Largemouth Bass	Fingerling
2011	15	Largemouth Bass	Juvenile
2012	160	Largemouth Bass	Juvenile
2012	1,500	Walleye	Large Fingerling
2014	1,568	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2017 to monitor the fish populations.

2. Stock walleye fingerlings in 2016 and 2018 to supplement the existing population.

3. Stock juvenile and/or adult largemouth bass to supplement the existing population

Table 10. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Fate Dam, Lyman County.

Species	1974	1978	1985	1988	1991	1994	1997	2000	2003	2005	2008	2009	2011	2012	2014
BLB (GN)	2.0	--	--	--	--	45.0	--	--	0.5	--	--	--	35.0	--	190.0
BLB (TN)	2.2	14.8	99.3	10.0	2.8	46.5	41.0	4.8	2.0	0.6	1.5	4.1	51.2	--	481.6
BLC (GN)	1.0	--	--	--	--	8.0	--	--	7.5	--	--	1.0	--	--	10.5
BLC (TN)	5.5	3.5	12.1	16.9	12.9	50.5	93.1	23.6	12.5	12.6	4.6	2.2	3.0	--	49.4
YEP (GN)	2.0	1.0	--	--	--	8.0	--	--	44.0	--	2.0	29.5	5.5	--	20.5
YEP (TN)	0.8	0.6	1.0	0.3	0.6	1.6	3.8	1.1	0.6	0.1	--	0.6	1.5	--	12.6
LMB (EF)	--	--	--	--	--	94.5	--	14.0	38.0	21.0	0.0	4.0	--	45.0	36.0
LMB (GN)	1.0	--	--	--	--	1.0	--	--	--	--	--	--	--	--	--
LMB (TN)	--	0.3	0.9	0.6	0.4	0.4	0.1	--	0.1	0.2	1.8	0.2	--	--	1.6
NOP (GN)	--	9.0	--	--	--	1.0	--	--	2.5	6.5	9.0	1.0	17.5	--	--
NOP (TN)	--	2.5	2.3	1.4	1.8	0.3	1.4	1.5	0.8	0.6	0.5	1.2	2.6	--	0.9
WAE (EF)	--	--	--	--	--	--	--	3.0	26.0	--	--	--	--	--	7.0
WAE (GN)	1.5	4.0	--	--	--	--	--	--	4.5	5.0	7.0	1.6	--	--	3.5
WAE (TN)	--	0.3	2.8	1.3	3.9	1.0	0.5	0.1	1.7	2.7	1.8	--	--	--	0.4
GSF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GSF (TN)	--	4.8	--	--	--	--	--	--	--	--	--	0.2	--	--	0.7
PUS (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PUS (TN)	3.8	--	2.6	2.3	--	5.4	4.4	0.6	1.1	--	--	--	--	--	--
GOS (GN)	--	--	--	--	--	--	--	--	0.5	--	--	--	0.5	--	--
GOS (TN)	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--
BLG (GN)	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLG (TN)	9.8	5.4	2.9	6.4	2.9	80.6	15.1	4.8	12.0	1.1	1.8	--	1.8	--	--

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, WAE-Walleye, GSF-Green Sunfish, PUS-Pumpkinseed Sunfish, GOS-Golden Shiner, BLG-Bluegill