SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Bear Butte, Meade County
LBF-Lake-42-000
2019

Lake Information

Name: Bear Butte

County: Meade

Surface Area: 228 Acres

Surveys and Investigations

Survey methods used by gear type, date, and effort.

Gear	Date	Effort
frame net (std 3/4 in)	May 16, 2019	6 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Black Crappie

Black Bullhead

Walleye

Channel Catfish

Terminology

Catch per unit effort (**CPUE**) refers to the relative abundance of a species. It is defined as the number of fish captured per unit of effort (i.e., number of fish captured per net-night or number of fish captured per hour electrofishing). In this report CPUE is typically given for only stock-length fish (see length categories table for stock lengths).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- s**td experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

$$CPUE = \frac{number\ of\ fish}{effort}$$

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of\ fish \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

Relative weight (**Wr**) is used to quantify fish plumpness. Relative weight is the ratio of what a fish weighs (W) compared to a length-specific standard weight (Ws) multiplied by 100. Relative weight values of 95-105 are commonly cited as optimum values, but values in the 80s are common during summer sampling in South Dakota.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

Confidence intervals (**CI**) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (**S**), quality (**Q**), preferred (**P**), memorable (**M**) and trophy (**T**). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Walleye	10	25	15	38	20	51	25	63	30	76
White Bass	6	15	9	23	12	30	15	38	18	46
White Crappie	5	13	8	20	10	25	12	30	15	38
Yellow Bullhead	4	10	7	18	9	23	11	28	14	36
Yellow Perch	5	13	8	20	10	25	12	30	15	38

Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

*** Methods/Species that ignore stock length**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
frame net (std 3/4 in)	Black Bullhead	5436	906.0	462.8	0		0		67	1
	Black Crappie	242	40.3	10.9	100		60	4	99	1
	Channel Catfish	2	0.3	0.5	100		0		86	18
	Northern Pike	17	2.8	1.0	94		24		95	3
	Walleye	10	1.7	1.6	90		20		91	5

10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

		CPUE										
Gear	Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
AFS std frame net	Black Bullhead								58.8			58.80
	Black Crappie								9.0			9.00
	Bluegill								5.2			5.20
	Green Sunfish								0.4			0.40
	Walleye								0.1			0.10
	Yellow Perch								7.3			7.30
boat shocker (night)	Largemouth Bass	6.0	28.0			2.4	9.0	14.0				11.88
	Smallmouth Bass	0.0	0.0			0.0	1.5	0.0				0.30
	Walleye	0.0	4.0			1.2	22.5	13.0				8.14
frame net (std 3/4 in)	Black Bullhead	260.4	863.8	757.5	2,116.0	879.9	404.2	817.5		1,208.3	906.0	912.62
	Black Crappie	90.3	97.8	123.3	10.6	26.8	6.2	22.2		6.7	40.3	47.13
	Bluegill	0.0	0.0	0.0	0.4	0.0	0.3	1.0		0.0	0.0	0.19
	Channel Catfish	0.3	0.0	0.0	0.0	0.0	0.0	0.1		0.2	0.3	0.10
	Golden Shiner	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.00
	Largemouth Bass	0.0	0.0	0.0	0.1	0.0	0.0	0.0		0.0	0.0	0.01
	Northern Pike	0.0	1.0	0.5	0.4	0.1	0.6	0.1		2.2	2.8	0.86
	Walleye	0.0	0.0	0.0	0.1	0.0	0.2	0.1		0.2	1.7	0.26
	Yellow Perch	9.1	16.8	8.0	5.8	0.0	1.2	5.3		1.3	0.0	5.28
std exp gill net	Black Bullhead	42.0	9.5	138.0	79.0	220.5						97.80
	Black Crappie	13.0	6.0	7.0	1.0	0.0						5.40
	Channel Catfish	23.0	3.0	13.0	3.5	1.5						8.80
	Largemouth Bass	0.0	0.5	0.0	0.0	0.0						0.10
	Northern Pike	0.0	1.0	2.0	2.0	1.0						1.20
	Rainbow Trout	0.0	0.0	0.0	0.5	0.0						0.10
	Yellow Perch	4.0	0.0	3.0	0.0	11.5						3.70

10-Year Size Structure and Condition Statistics by Gear and Species

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years.

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std frame net	Black Bullhead	PSD								0		
		PSD-P								0		
		Wr								77		
	Black Crappie	PSD								87		
		PSD-P								69		
		Wr								106		
	Walleye	PSD								100		
		PSD-P								0		
		Wr								91		
	Yellow Perch	PSD								73		
		PSD-P								7		
		Wr								82		
boat shocker (night)	Largemouth Bass	PSD	40	32			50	0	64			
		PSD-P	0	29			0	0	7			
		Wr	109	109			120	110	109			
	Walleye	PSD		0			0	33	69			
		PSD-P		0			0	0	8			
		Wr					103	103	94			
frame net (std 3/4 in)	Black Bullhead	PSD	14	11	0	0	0	0	0		0	0
		PSD-P	0	0	0	0	0	0	0		0	0
		Wr		82		79	91	88	87		68	67
	Black Crappie	PSD	4	23	91	92	100	100	96		100	100
		PSD-P	0	2	0	0	0	13	95		73	60
		Wr	115	108	108	97	97	95	113		92	99
	Channel Catfish	PSD	100						100		0	100
		PSD-P	0						0		0	0
		Wr	98						79		89	86
	Largemouth Bass	PSD				100						
		PSD-P				0						
		Wr				103						
	Northern Pike	PSD		100	100	67	100	100	100		85	94
		PSD-P		0	75	33	0	67	0		23	24

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
frame net (std 3/4 in)	Northern Pike	Wr		90	88	87	74	79			84	95
	Walleye	PSD				0		100	100		100	90
		PSD-P				0		0	0		0	20
		Wr				76		89	96		88	91
	Yellow Perch	PSD	56	31	55	43		83	85		88	
		PSD-P	11	7	2	0		17	19		25	
		Wr	88	81	83	81		85	91		62	
std exp gill net	Black Bullhead	PSD	14	37	0	0	0					
		PSD-P	0	0	0	0	0					
		Wr	90	92	91	83	87					
	Black Crappie	PSD	8	50	71	50						
		PSD-P	0	0	0	0						
		Wr	112	109	113	106						
	Channel Catfish	PSD	65	100	100	100	100					
		PSD-P	0	0	15	43	0					
		Wr	108	92	89	91	104					
	Largemouth Bass	PSD		0	0							
		PSD-P		0	0							
		Wr		108								
	Northern Pike	PSD		100	100	75	50					
		PSD-P		0	0	25	0					
		Wr		92	95	104	81					
	Yellow Perch	PSD	25		67		35					
		PSD-P	0		0		0					
		Wr	89		79		94					

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Black Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	440		180 (18)			256 (10)	267 (126)	270 (286)			
2014	428			188 (2)	211 (32)	220 (394)					

Fish Condition

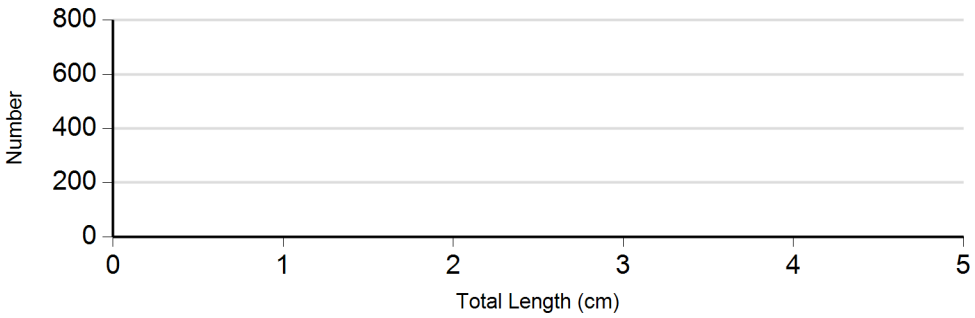
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2015	0		108	96 (0.6)	16	93 (1.3)	0	
	2016	16	110 (2.7)	4	112 (0.0)	424	113 (0.3)	0	
	2017	12	108 (5.6)	16	105 (1.8)	62	106 (0.9)	0	
	2018	0		11	89 (1.8)	28	93 (1.2)	1	94
	2019	0		96	100 (0.7)	145	99 (0.4)	1	
Largemouth Bass Electro Fishing	2015	12	110 (4.0)	0		0		0	
	2016	10	111 (3.4)	16	105 (2.2)	2	123 (0.0)	0	

Length Frequency Distribution

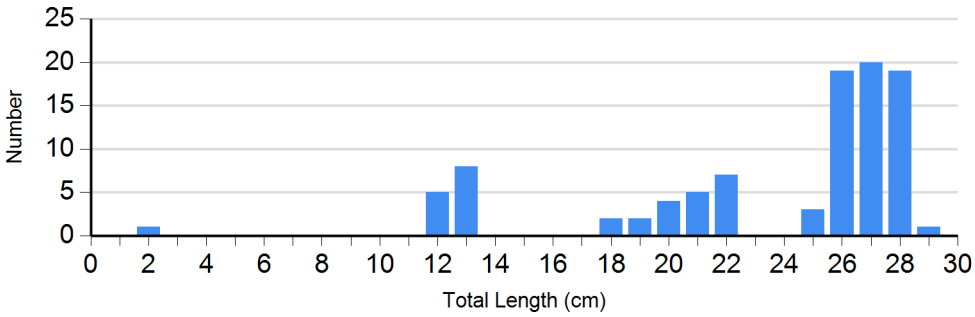
Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: std exp gill net



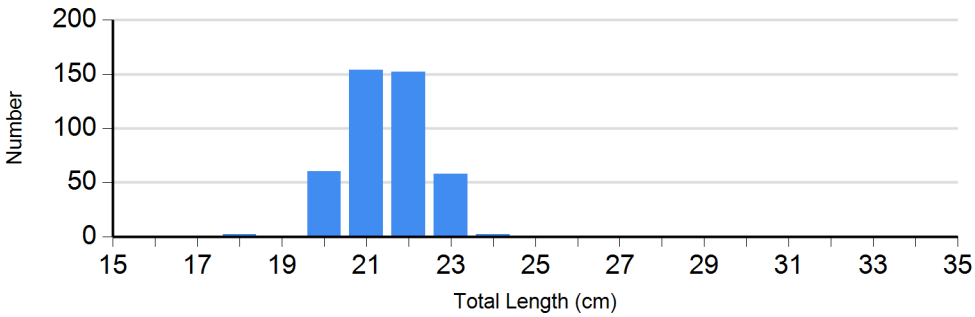
2014

Species: Black Crappie
Gear: AFS std frame net

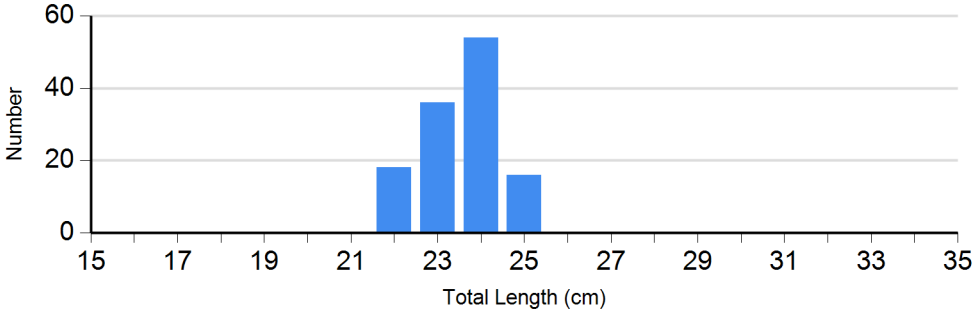


2017

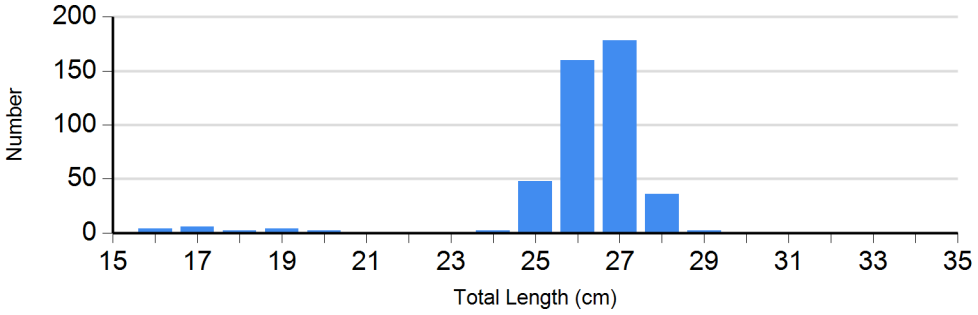
Species: Black Crappie
Gear: frame net (std 3/4 in)



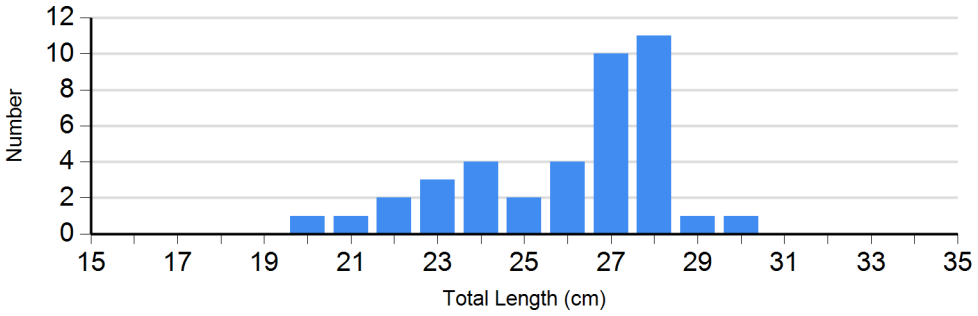
2014



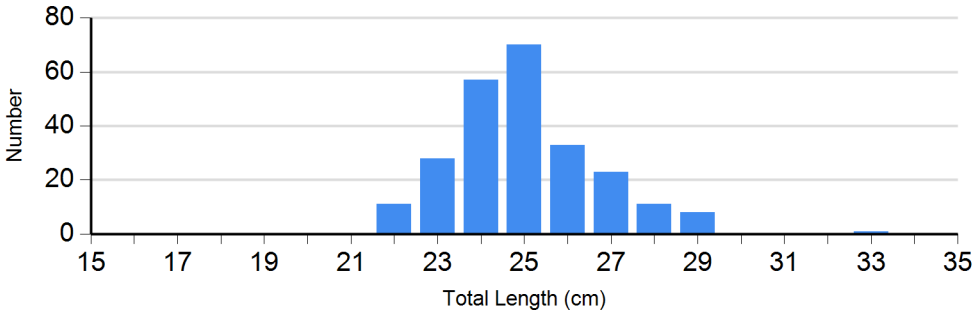
2015



2016

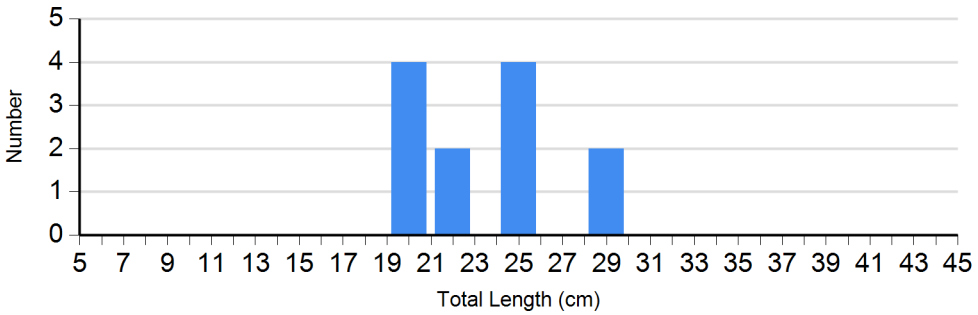


2018

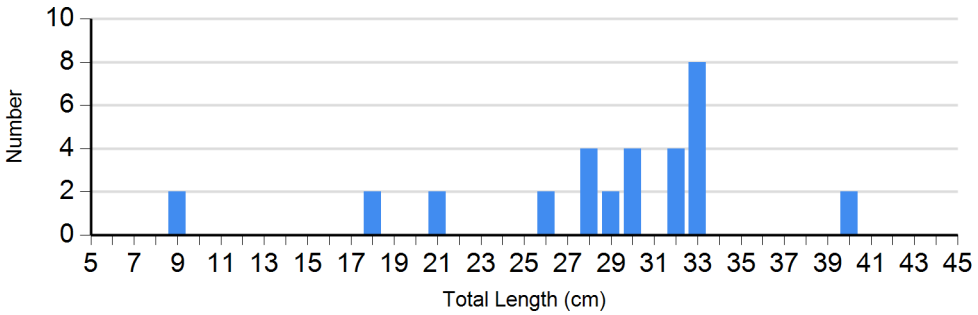


2019

Species: Largemouth Bass
Gear: boat shocker (night)

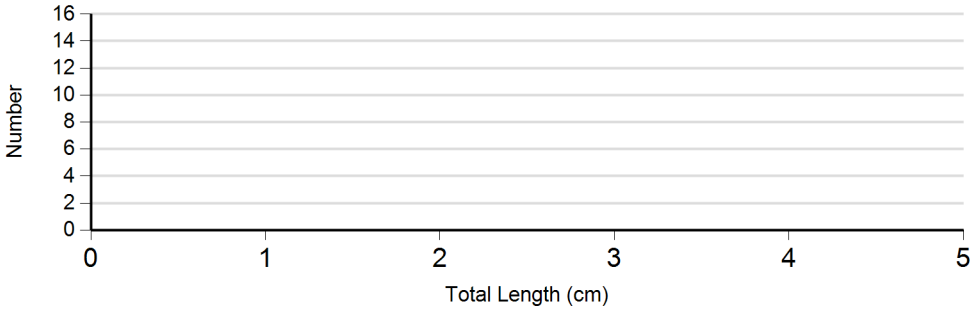


2015



2016

Species: Yellow Perch
Gear: std exp gill net

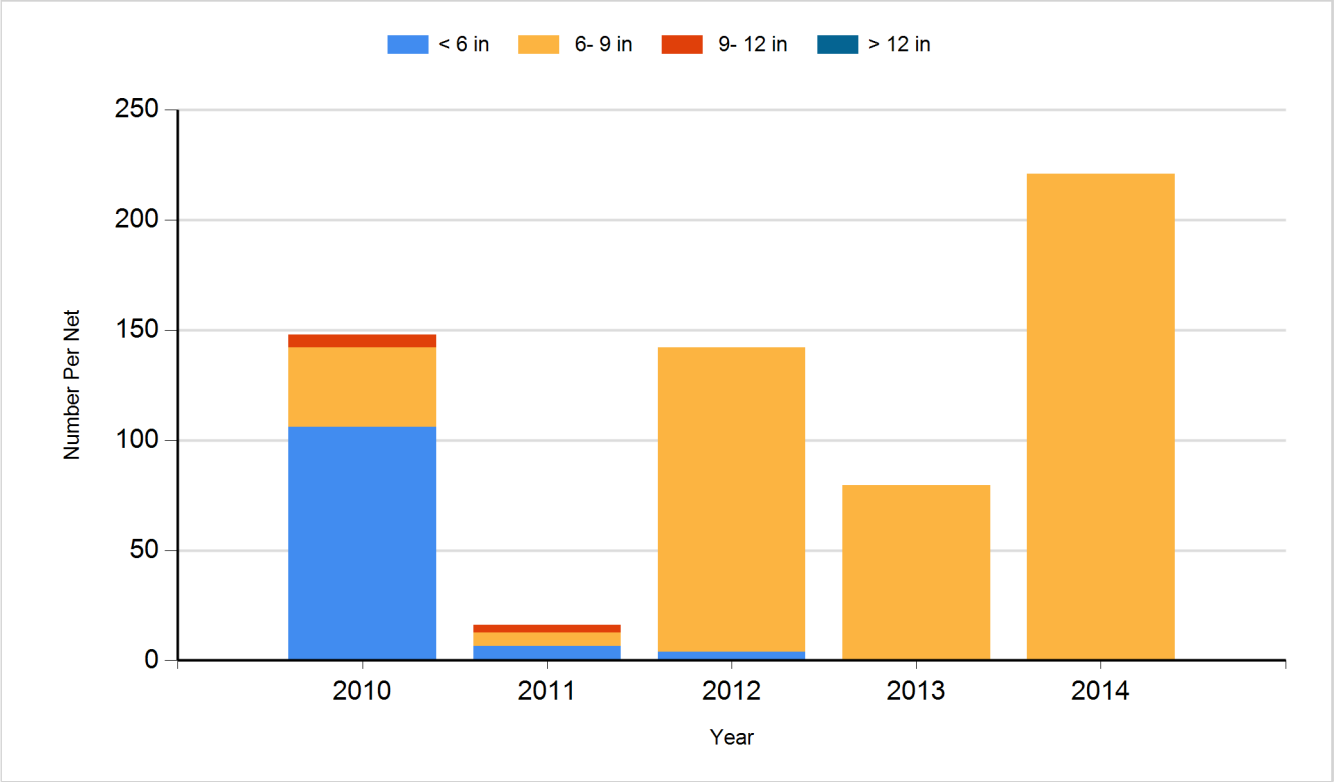


2014

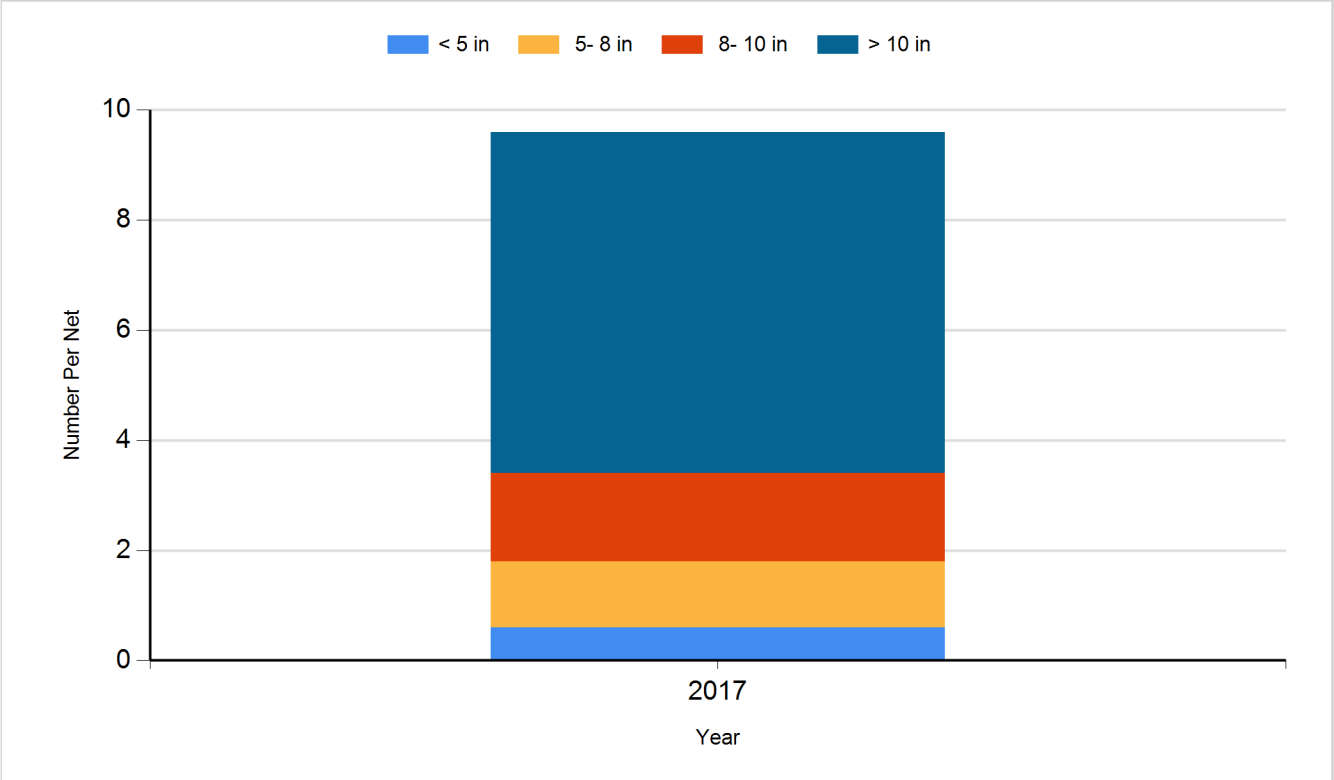
Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.

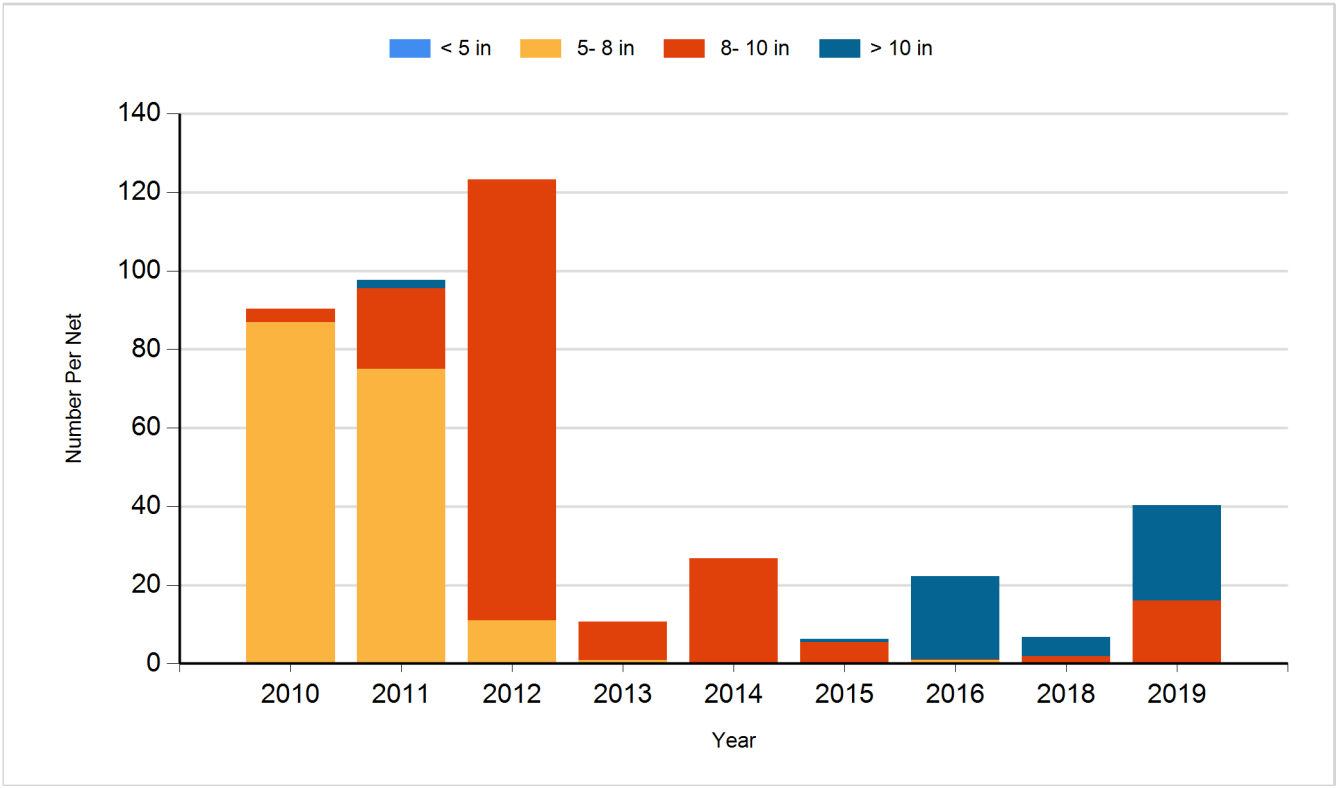
Species: Black Bullhead
Gear: std exp gill net



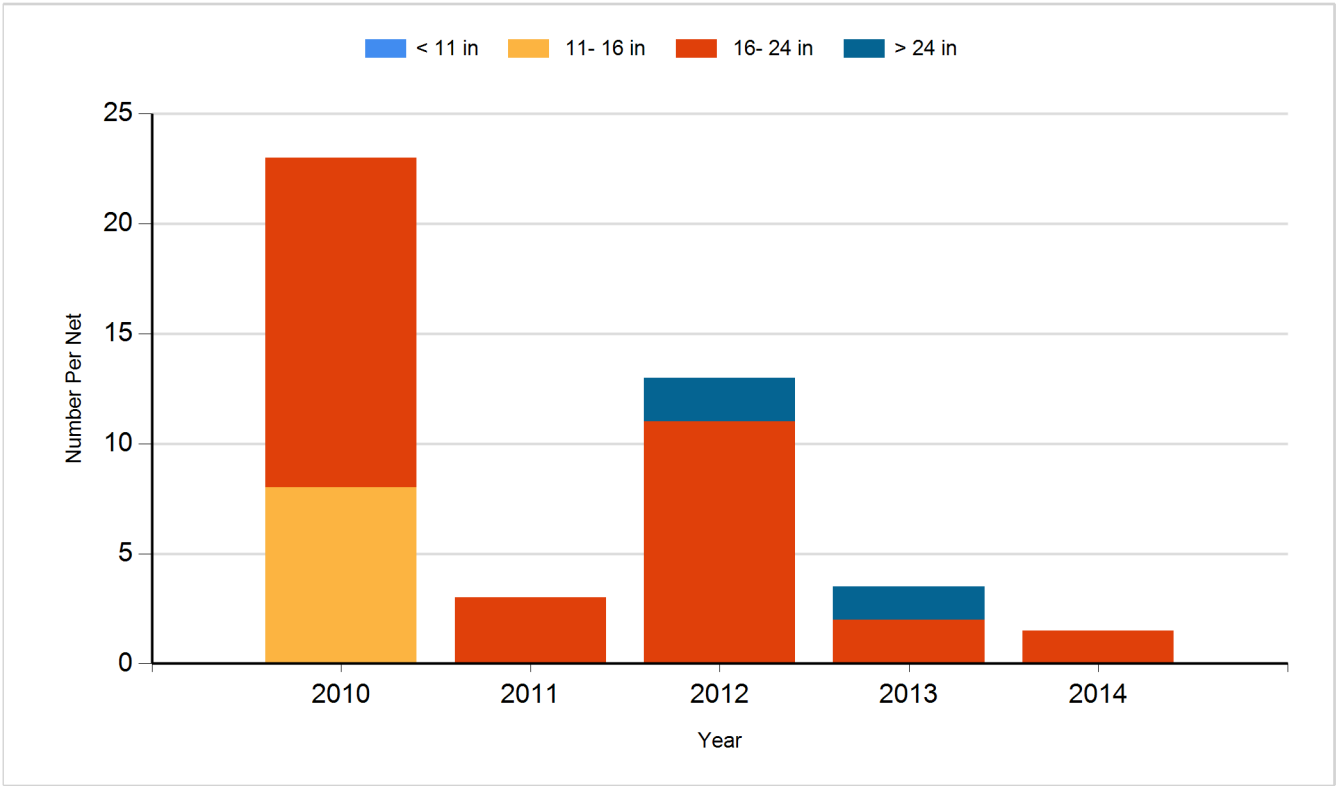
Species: Black Crappie
Gear: AFS std frame net



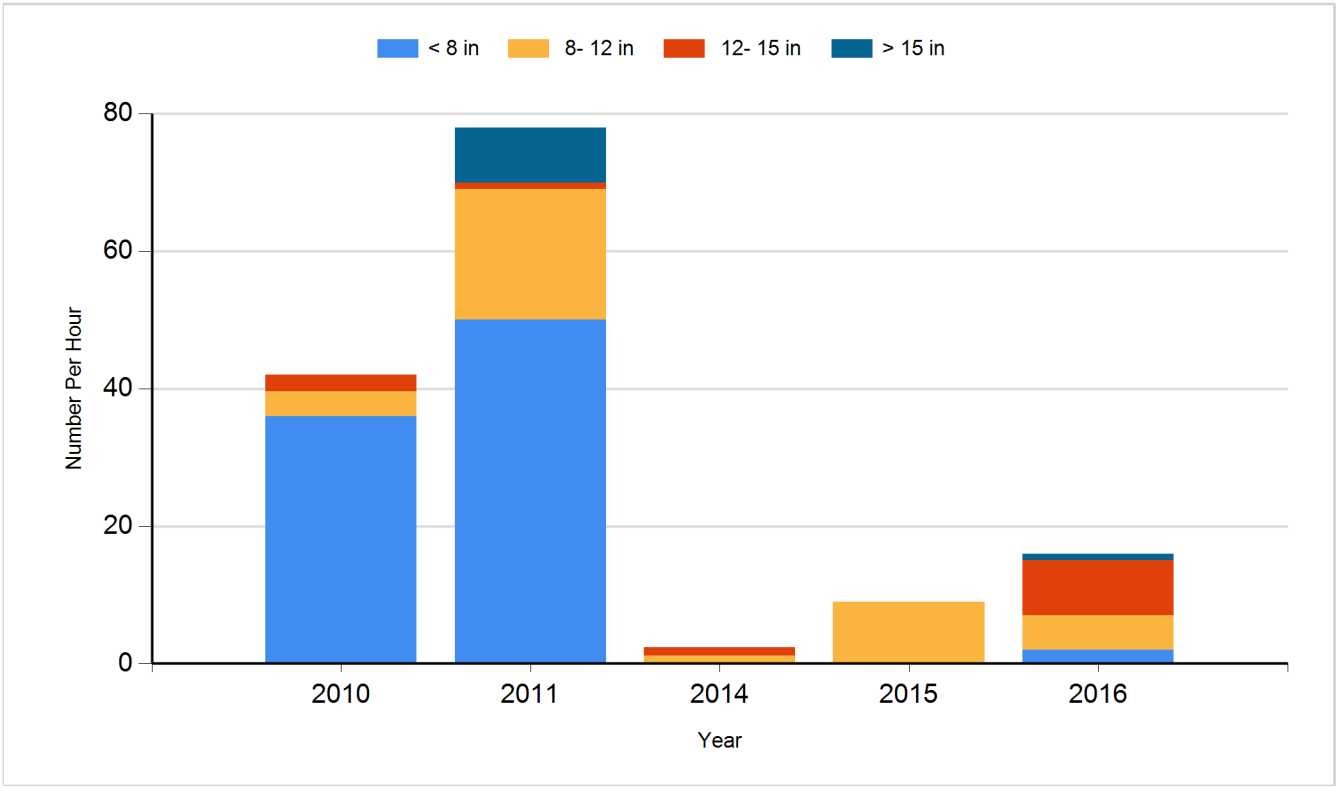
Species: Black Crappie
Gear: frame net (std 3/4 in)



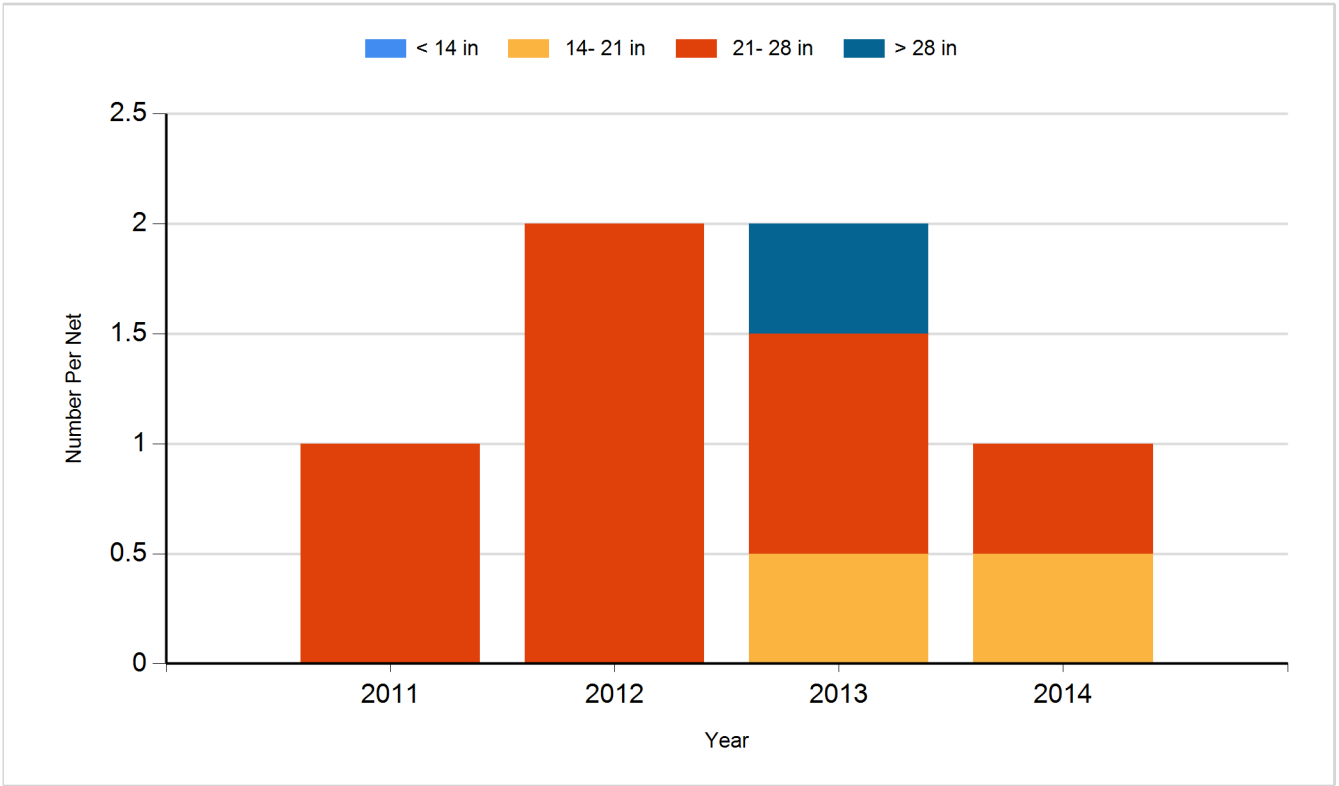
Species: Channel Catfish
Gear: std exp gill net



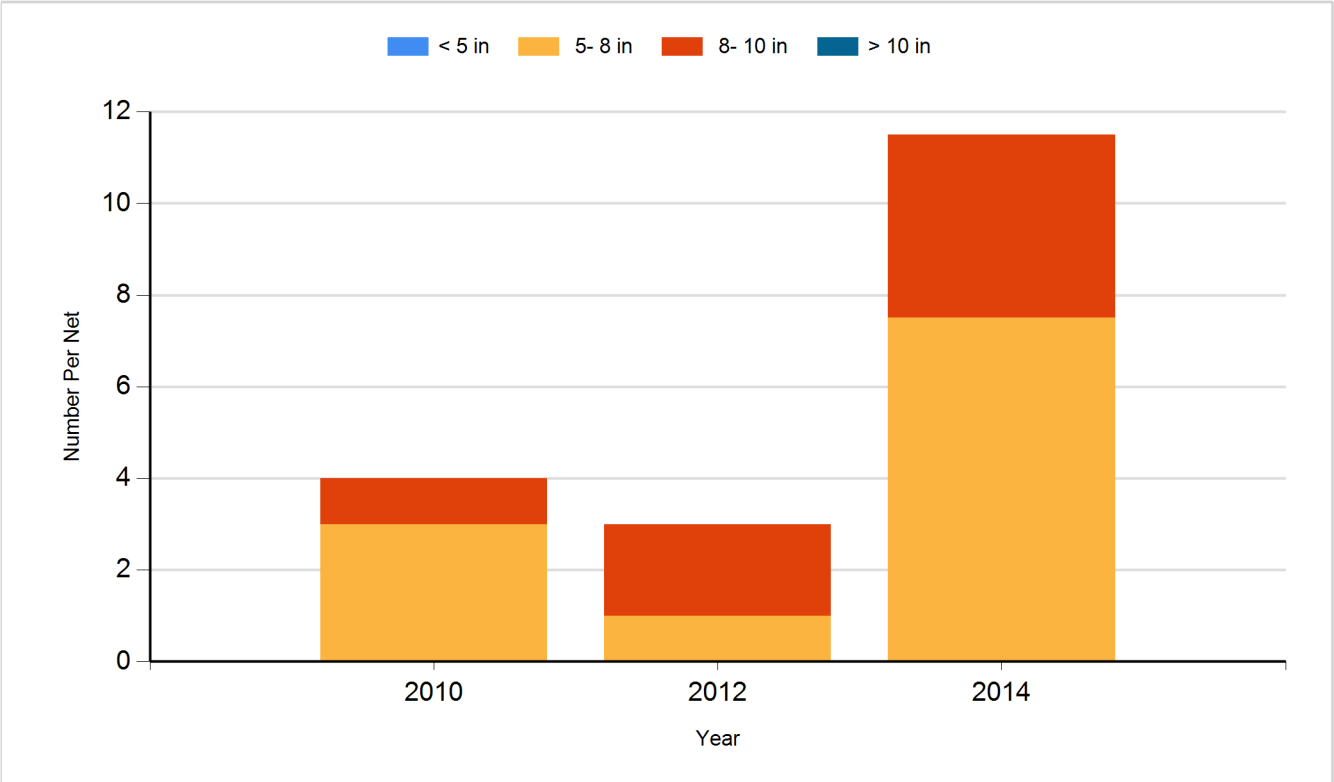
Species: Largemouth Bass
Gear: boat shocker (night)



Species: Northern Pike
Gear: std exp gill net



Species: Yellow Perch
Gear: std exp gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2008	Black Crappie	Adult	230
2008	Fathead Minnow	Large	2,400
2008	Largemouth Bass	Fingerling	5,620
2009	Channel Catfish	Adult	570
2009	Largemouth Bass	Fingerling	13,000
2009	Yellow Perch	Adult	500
2010	Golden Shiner	Adult	50
2010	Northern Pike	Adult	110
2010	Walleye	Small Fingerling	20,000
2010	Yellow Perch	Adult	900
2011	Channel Catfish	Adult	200
2011	Largemouth Bass	Adult	150
2011	Largemouth Bass	Fingerling	10,000
2011	Northern Pike	Fry	77,600
2011	Yellow Perch	Adult	700
2012	Largemouth Bass	Adult	378
2012	Yellow Perch	Adult	341
2014	Largemouth Bass	Adult	100
2014	Largemouth Bass	Fingerling	1,875
2014	Northern Pike	Adult	305
2014	Rainbow Trout	Catchable	100
2014	Walleye	Large Fingerling	3,238
2015	Channel Catfish	Adult	55
2015	Gizzard Shad	Adult	29
2015	Largemouth Bass	Adult	190
2015	Northern Pike	Adult	20
2015	Rainbow Trout (Ennis)	Catchable 11"	600
2015	Walleye	Fingerling	900
2016	Channel Catfish	Adult	180
2016	Gizzard Shad	Adult	32
2016	Rainbow Trout (Shasta)	Catchable 11"	963
2016	Walleye	Fingerling	25,500
2017	Gizzard Shad	Adult	199
2017	Northern Pike	Adult	138
2017	Rainbow Trout (Shasta)	Catchable 15"	1,000
2017	Walleye	Small Fingerling	29,700

2018	Channel Catfish	Adult	300
2018	Gizzard Shad	Adult	43
2018	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2019	Channel Catfish	Adult	240
2019	Gizzard Shad		20
2019	Gizzard Shad	Adult	25
2019	Northern Pike	Adult	26
2019	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2019	Walleye	Small Fingerling	32,130