Belvidere Lake Survey Summary

Belvidere lake is a 42-acre impoundment located on the east edge of the city of Belvidere. Belvidere is managed as a multi-species fishery but suffered a severe winterkill during the winter of 2022/2023. The only remaining fish species still present after the winterkill were Black Bullhead. In an effort, to get predators back in the lake, Northern Pike (adult), Walleye (fingerling) and Largemouth Bass (fingerling) were stocked in 2023. Adult Channel Catfish and Yellow Perch were also stocked to provide additional angler opportunity.

Black Bullhead. Twenty-five bullheads were sampled in the five net sample, compared to 7 during the last survey. Most fish were in the 11-12inch range.

Channel Catfish. Five thousand channel catfish fingerlings were stocked in 2024. Sixteen of these fish were sampled in the nets during the survey and were in the 6-7 inch range.

Largemouth bass. Fall electrofishing sampled 31 bass. These fish ranged from 11-15inches and were in great condition.

Walleye. Frame nets sampled 72 walleye from five nets. Then, in the October electrofishing survey, 37 walleye were sampled. These fish were stocked as small fingerlings in 2023. In the October survey, walleye ranged from 11-15inches, showing excellent growth.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Belvidere, Jackson County
BAD-Lake-1438-800
2024

Lake Information

Name: Belvidere

County: Jackson

Surface Area: 43 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 07, 2024	2400 seconds
frame net (std 3/4 in)	Jun 12, 2024	5 net-nights

Common Fish Species Present

Channel Catfish

Bluegill

Black Bullhead

Largemouth Bass

Green Sunfish

Walleye

Yellow Perch

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
boat shocker (night)	Largemouth Bass	31	46.5	22.8	58	14	0		122	3
	Walleye*	37	55.5	22.5	3		0		97	1
frame net (std 3/4 in)	Black Bullhead	25	4.8	3.1	79	14	4		137	3
	Channel Catfish	16	0.0	0.0	0		0			
	Green Sunfish	655	131.0	52.9	0		0		121	2
	Largemouth Bass	20	3.4	1.4	0		0		117	3
	Walleye	72	8.0	4.6	0		0		102	1
	Yellow Perch	2	0.4	0.4	100		0		89	3

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.

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

		CPUE										
Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
AFS std frame net	Black Bullhead			2.2								2.20
	Bluegill			9.8								9.80
	Common Carp			3.0								3.00
	Green Sunfish			0.2								0.20
	Largemouth Bass			0.2								0.20
	Yellow Perch			2.4								2.40
AFS std gill net	Black Bullhead			5.5								5.50
	Common Carp			35.5								35.50
	Yellow Perch			2.5								2.50
boat shocker (night)	Largemouth Bass		160.5								46.5	103.50
	Walleye*		0.0								55.5	27.75
frame net (std 3/4 in)	Black Bullhead		72.9			0.6	146.2			1.4	4.8	45.18
	Black Crappie		0.0			0.2	0.6			0.0	0.0	0.16
	Bluegill		38.0			0.4	48.6			0.0	0.0	17.40
	Channel Catfish		0.0			2.0	1.2			2.4	0.0	1.12
	Common Carp		14.6			1.6	0.0			0.0	0.0	3.24
	Green Sunfish		0.0			0.0	0.0			0.0	131.0	26.20
	Largemouth Bass		0.0			0.6	3.4			0.0	3.4	1.48
	Walleye		0.0			0.0	0.0			0.0	8.0	1.60
	White Sucker		0.1			0.0	0.0			0.0	0.0	0.02
	Yellow Perch		1.3			0.4	0.0			1.0	0.4	0.62

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	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std frame net	Black Bullhead	PSD			100							
		PSD-P			0							
		Wr			79							
	Bluegill	PSD			43							
		PSD-P			0							
		Wr			106							
	Green Sunfish	PSD			100							
		PSD-P			0							
		Wr			110							
	Largemouth Bass	PSD			100							
		PSD-P			0							
		Wr			95							
	Yellow Perch	PSD			83							
		PSD-P			17							
		Wr			82							
AFS std gill net	Black Bullhead	PSD			100							
		PSD-P			0							
		Wr			89							
	Yellow Perch	PSD			80							
		PSD-P			60							
		Wr			86							
boat shocker (night)	Largemouth Bass	PSD		41								58
		PSD-P		20								0
		Wr		104								122
	Walleye	PSD										3
		PSD-P										0
		Wr										97
frame net (std 3/4 in)	Black Bullhead	PSD		84			67	1			0	79
		PSD-P		0			33	0			0	4
		Wr		88			87	87			120	137
	Bluegill	PSD		68			100	1				
		PSD-P		0			0	0				

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
frame net (std 3/4 in)	Bluegill	Wr		108			107	117				
	Channel Catfish	PSD					50	100			83	0
		PSD-P					0	0			0	0
		Wr					96	102			95	
	Green Sunfish	PSD										0
		PSD-P										0
		Wr										121
	Largemouth Bass	PSD					0	0				0
		PSD-P					0	0				0
		Wr					117	122				117
	Walleye	PSD										0
		PSD-P										0
		Wr										102
	Yellow Perch	PSD		30			0	0			0	100
		PSD-P		0			0	0			0	0
		Wr		93			93				93	89

Fish Condition

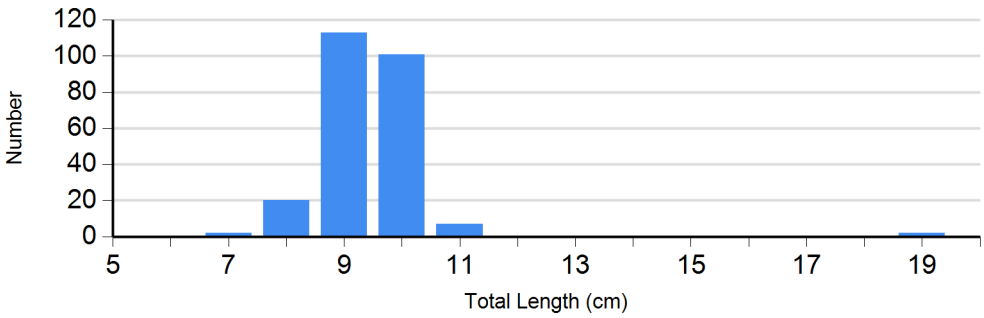
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2020	241	117 (1.0)	2	108	0		0	
Largemouth Bass Electro Fishing	2024	13	122 (3.0)	18	122 (2.7)	0		0	

Length Frequency Distribution

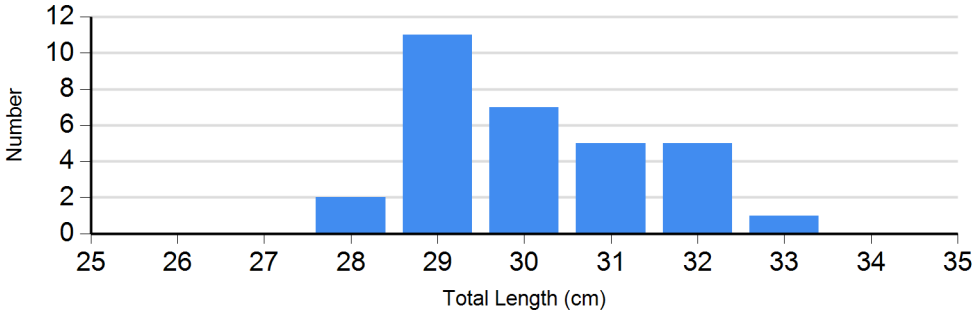
Length frequency histogram of species sampled by year.

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



2020

Species: Largemouth Bass
Gear: boat shocker (night)

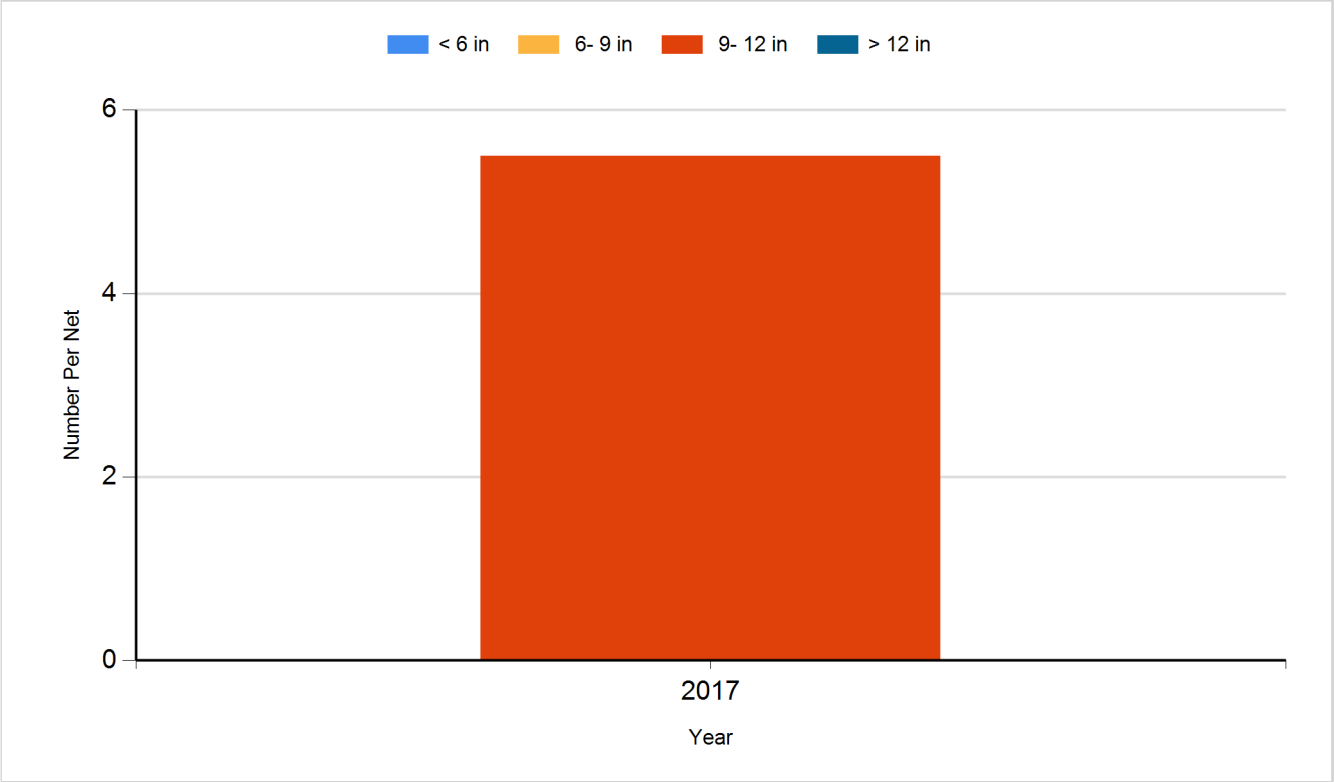


2024

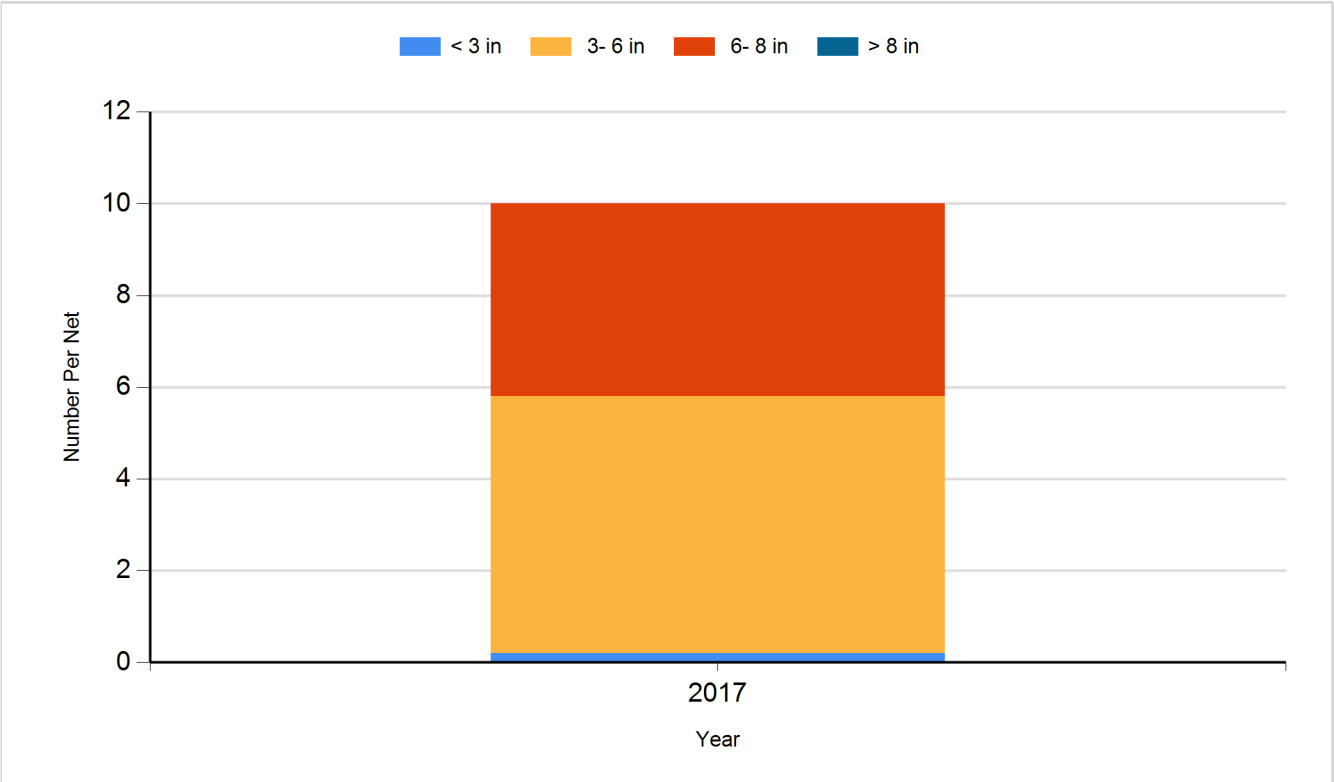
Historic Fish Sizes and Relative Abundance

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

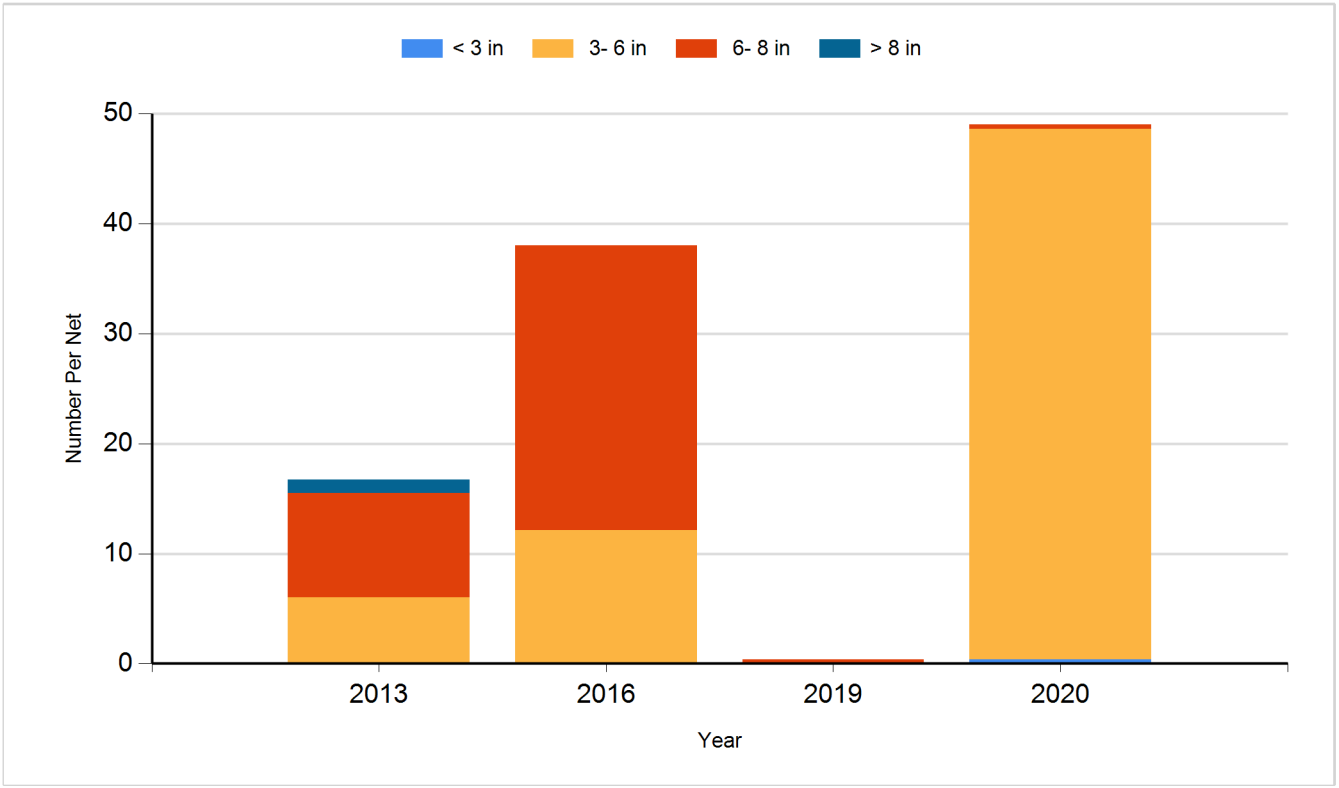
Species: Black Bullhead
Gear: AFS std gill net



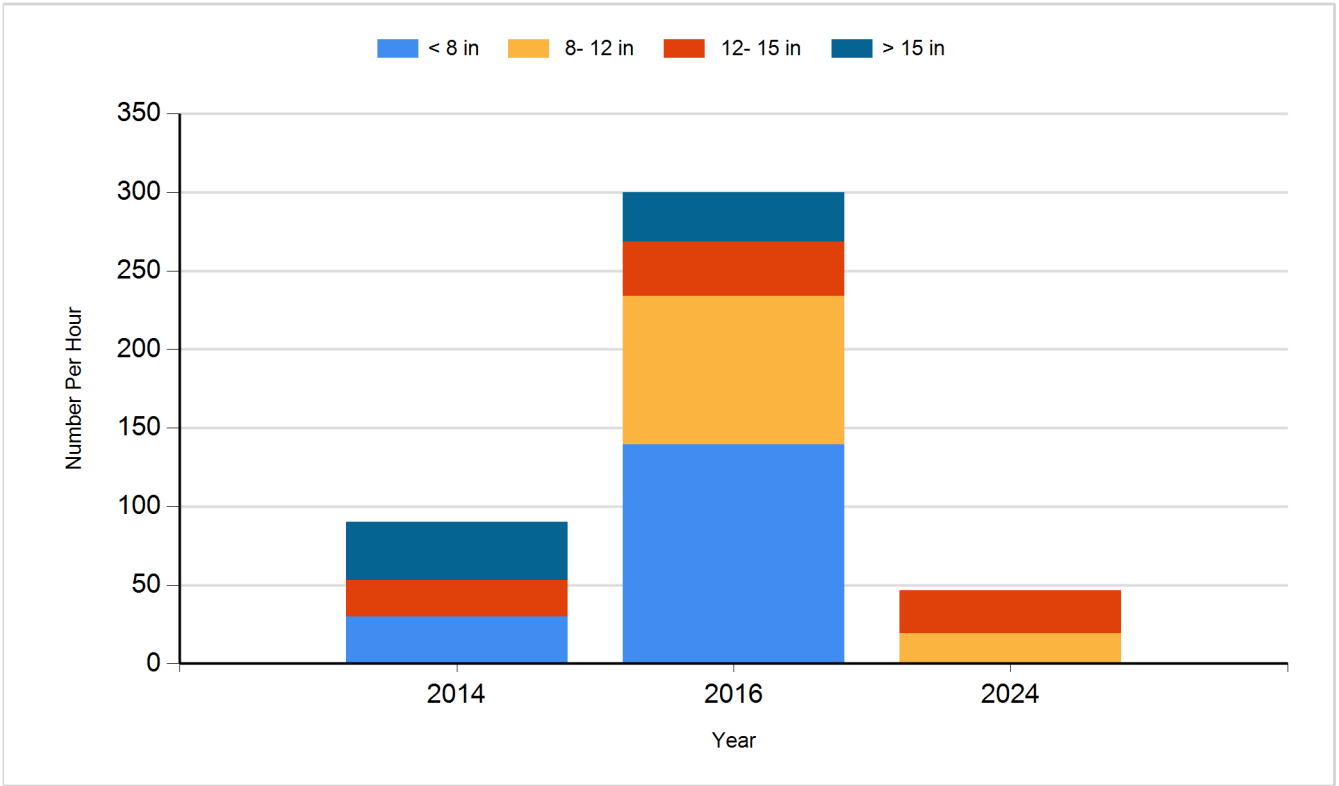
Species: Bluegill
Gear: AFS std frame net



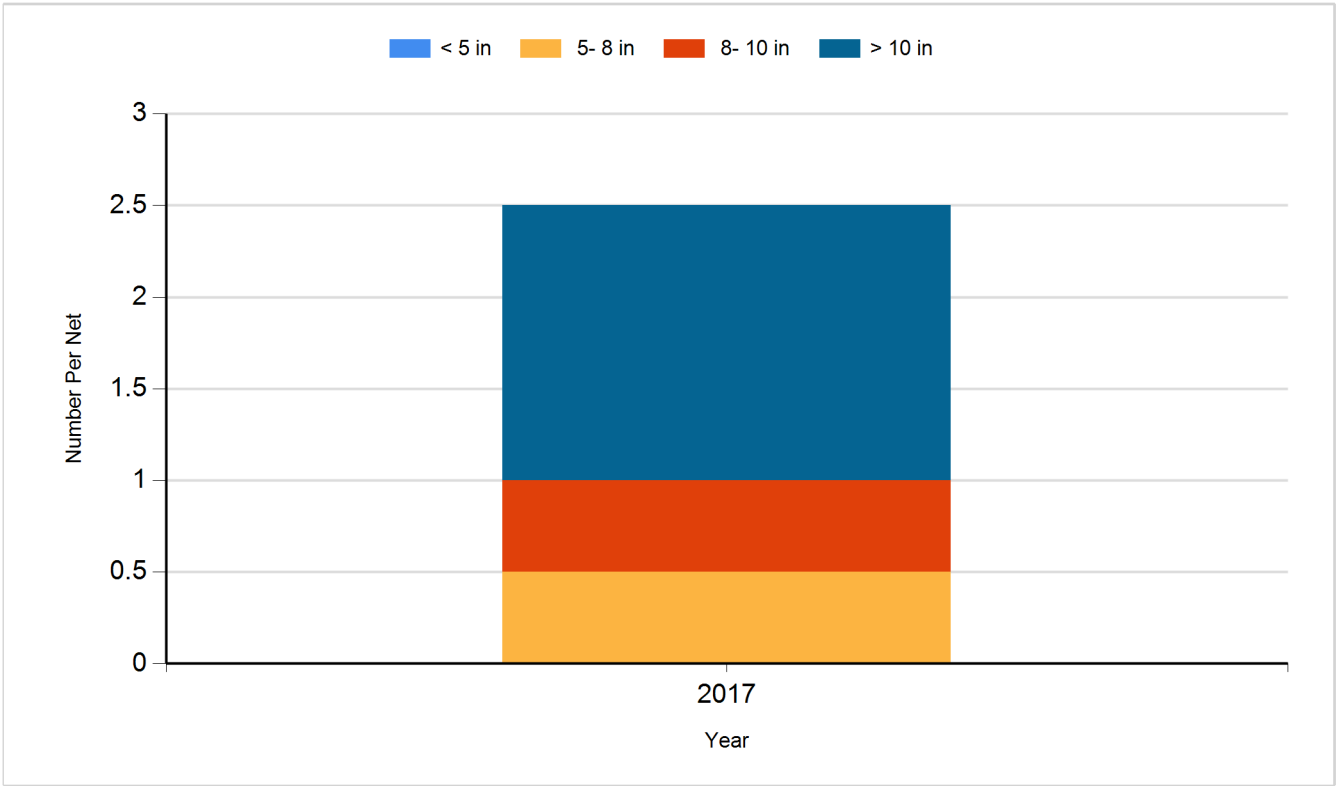
Species: Bluegill
Gear: frame net (std 3/4 in)



Species: Largemouth Bass
Gear: boat shocker (night)



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

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

Year	Species	Size	Number
2014	Channel Catfish	Adult	100
2019	Black Crappie	Adult	46
2019	Bluegill	Adult	67
2019	Channel Catfish	Adult	520
2019	Largemouth Bass	Adult	15
2019	Largemouth Bass	Juvenile	90
2019	Yellow Perch	Adult	300
2020	Largemouth Bass	Small Fingerling	9,125
2021	Channel Catfish	Adult	200
2021	Northern Pike	Adult	30
2023	Channel Catfish	Adult	277
2023	Largemouth Bass	Juvenile	1,300
2023	Northern Pike		75
2023	Walleye	Juvenile	14,000
2023	Yellow Perch		2,500
2024	Largemouth Bass		100
2024	Largemouth Bass	Adult	100