

2023 Pudwell Dam Survey Summary

Water: Pudwell Dam

County: Corson

Legal Description: T23N-R23W-S27&28

GPS: 45.922282, -100.266923

Surface Area: 70 Acres

Class: Warm Water Semi-Permanent

Maximum Depth: 17 feet

Mean Depth: 10 feet

Pudwell Dam is a 70-acre impoundment on Iron Dog Creek, 4 miles east of the City of McIntosh in northcentral Corson County. A short gravel road with a cattle gate provides access to the lake's southeast shore from US HWY 12. A poured concrete ramp and wooden dock provide boat access. There are no other public use facilities at Pudwell Dam.

Primary game fish managed at Pudwell Dam are Largemouth Bass, Black Crappie, Yellow Perch, and Walleye. Northern Pike, Bluegill and Black Bullhead also have a historical presence. A combination of decreased water levels and snow cover during the winter of 2018-19 resulted in significant fish loss due to insufficient dissolved oxygen levels (winterkill). Restocking efforts included Largemouth Bass, Bluegill, Yellow Perch, Walleye and Black Crappie. Heavy snow depth and extended ice cover during the winter of 2022-23 again lead to winterkill. A fish consumption advisory on Walleye over 18 inches for elevated levels of mercury has been issued at Pudwell.

Pudwell Dam was surveyed on May 30-31, 2023, utilizing $\frac{3}{4}$ inch standard frame nets sets and AFS standard gill net sets. Northern Pike, Yellow Perch and Black Crappie were observed during the 2023 survey.

- **Northern Pike:** 40 individuals were sampled in frame nets and 17 in gill nets resulting in a catch per net of 8.5 and 4.4 respectfully. Length ranged from 23 to 30 inches indicating the population was mainly comprised of adult fish. Northern Pike relative condition (weight at length) was equal to the state average.
- **Yellow Perch:** Catch rates were low with 2 individuals observed in 2 gill nets and 5 perch in 9 frame nets. All perch were juveniles under 6 inches in length.
- **Black Crappie:** During the 2023 netting efforts only 1 small adult Black Crappie was sampled. This compares to 8.9 fish per net in 2020 and 2.1 in 2022.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Pudwell, Corson County

GRA-Lake-511-000

2023

Lake Information

Name: Pudwell **Maximum Depth:** 17 Feet
County: Corson **Mean Depth:** 10 Feet
Legal Description: T23-R23-S27
Surface Area: 70 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	May 30, 2023	2 net-nights
frame net (std 3/4 in)	May 30, 2023	9 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Northern Pike

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.
- **std 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.

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

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.

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

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

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.

$$Wr = \left(\frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(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**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Northern Pike	17	8.5	1.5	100		12	93	2	
	Yellow Perch	2	1.0	3.1	0		0	115	5	
frame net (std 3/4 in)	Black Crappie	1	0.1	0.2	100		100	103		
	Northern Pike	40	4.4	1.3	95		20	10	91	1
	Yellow Perch	5	0.6	0.6	0		0		110	4

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

Gear	Species	CPUE										Avg
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
AFS std gill net	Black Crappie						0.0	0.3		0.0	0.0	0.08
	Largemouth Bass						0.0	0.0		0.0	0.0	0.00
	Northern Pike						1.8	3.8		5.3	8.5	4.85
	Yellow Perch						0.3	4.8		0.5	1.0	1.65
boat shocker (night)	Largemouth Bass	17.0		41.0				9.0		3.0		17.50
	Walleye*	25.0		0.0				3.0		0.0		7.00
frame net (std 3/4 in)	Black Bullhead			0.2			0.0	0.0		0.0	0.0	0.04
	Black Crappie			7.1			0.0	8.9		2.1	0.1	3.64
	Bluegill			8.8			0.0	0.0		0.0	0.0	1.76
	Largemouth Bass			0.0			0.0	0.0		0.0	0.0	0.00
	Northern Pike			2.1			1.7	1.1		1.7	4.4	2.20
	Smallmouth Bass			0.0			0.0	0.0		0.0	0.0	0.00
	Walleye			1.1			0.0	0.0		0.0	0.0	0.22
	Yellow Perch			0.6			0.6	1.7		0.0	0.6	0.70
std exp gill net	Black Crappie			1.5								1.50
	Northern Pike			7.5								7.50
	Walleye			1.5								1.50
	Yellow Perch			17.5								17.50

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.

Gear	Species	Index	Year											
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		
AFS std gill net	Black Crappie	PSD								0				
		PSD-P								0				
		Wr								131				
	Largemouth Bass	PSD									0			
		PSD-P									0			
		Wr												
	Northern Pike	PSD								86	53		95	100
		PSD-P								14	7		5	12
		Wr								86	93		96	93
	Yellow Perch	PSD								0	47		0	0
		PSD-P								0	5		0	0
		Wr								106	117		112	115
boat shocker (night)	Largemouth Bass	PSD	65		71					0		100		
		PSD-P	59		44						0		67	
		Wr	119		120							123		132
frame net (std 3/4 in)	Black Crappie	PSD			92				0	0		95	100	
		PSD-P			92					0	0		90	100
		Wr			96							121		115
	Bluegill	PSD			100									
		PSD-P			75									
		Wr			127									
	Northern Pike	PSD			67					76	27		82	95
		PSD-P			5					0	9		29	20
		Wr			79					92	88		93	91
	Yellow Perch	PSD			50					0	88			0
		PSD-P			0					0	24			0
		Wr			93					105	109			110
	std exp gill net	Black Crappie	PSD			0								
			PSD-P			0								
			Wr			118								
Northern Pike		PSD			80									
		PSD-P			0									
		Wr			85									

Gear	Species	Index	Year										
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
std exp gill net	Yellow Perch	PSD				6							
		PSD-P				0							
		Wr				105							

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Yellow Perch

Year Class	Age	Mean back-calculated length (SE) at age										
		N	1	2	3	4	5	6	7	8	9	10
2021	2	5	84 (.6)	149 (2.7)								
Weighted Mean		5	84	149								
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2021	2	5										
Weighted Mean		5										

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+
2022	21			161 (1)	274 (2)	271 (15)	261 (4)				
2020	89	165 (89)									
2016	71		138 (3)	165 (3)		296 (5)	308 (22)	313 (25)	315 (3)	318 (9)	347 (1)

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	89	75 (1)		193 (27)	220 (32)	229 (21)	241 (2)	275 (1)	273 (4)	267 (1)	

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	54	182 (15)	248 (2)	304 (19)		390 (1)		473 (1)	447 (5)	446 (7)	469 (4)
2014	39	168 (26)	219 (2)	345 (1)				435 (5)	443 (1)	453 (3)	475 (1)

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	19	133 (4)	175 (3)	205 (10)		241 (1)	266 (1)				
2016	48	93 (12)	140 (11)	174 (23)	220 (2)						

Fish Condition

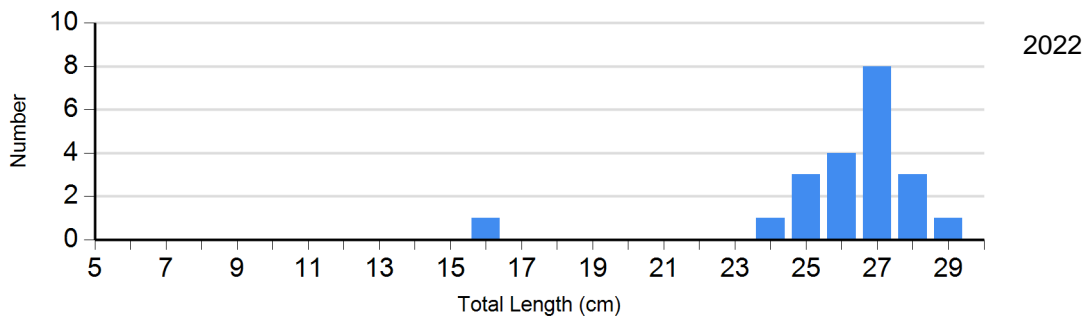
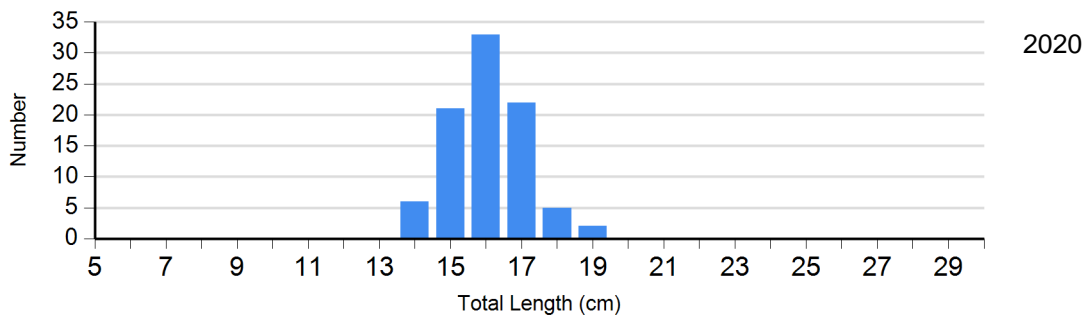
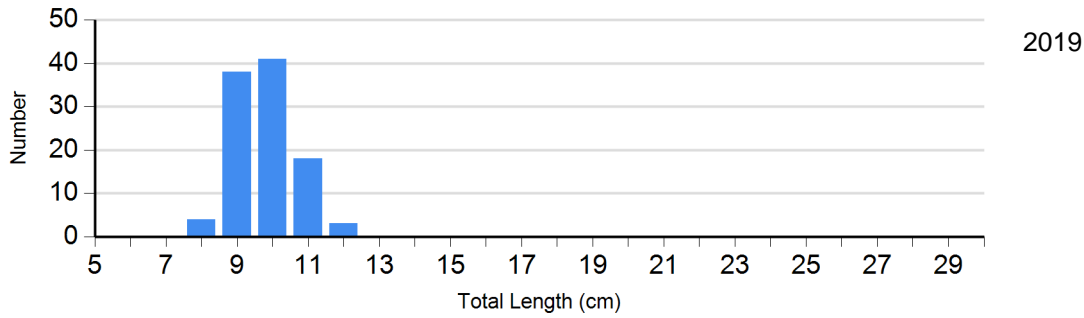
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2019	0		0		0		0	
	2020	89	121 (0.8)	0		0		0	
	2022	1	121	1	130	19	114 (1.0)	0	
	2023	0		0		1	103	0	
Largemouth Bass Electro Fishing	2020	9	123 (1.8)	0		0		0	
	2022	0		1	143	2	126 (2.1)	0	
Northern Pike Gill Net	2019	1	98	5	88 (1.9)	0		1	68
	2020	7	93 (2.3)	7	94 (2.7)	1	75	0	
	2022	1	99	19	96 (1.5)	1	87	0	
	2023	0		15	95 (1.2)	2	79 (5.8)	0	
Yellow Perch Gill Net	2019	1	106	0		0		0	
	2020	10	122 (3.2)	8	112 (2.7)	1	105	0	
	2022	2	112 (3.0)	0		0		0	
	2023	2	115 (4.2)	0		0		0	

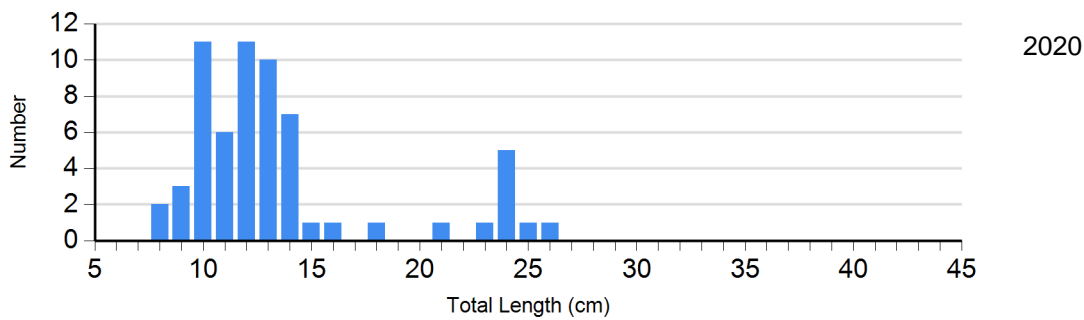
Length Frequency Distribution

Length frequency histogram of species sampled by year.

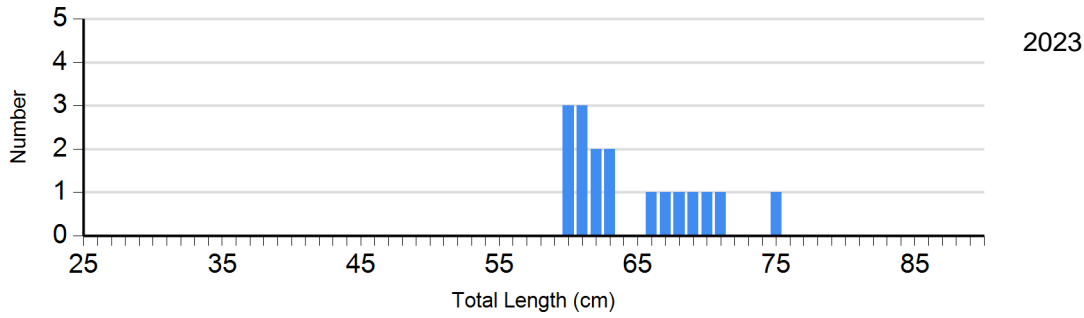
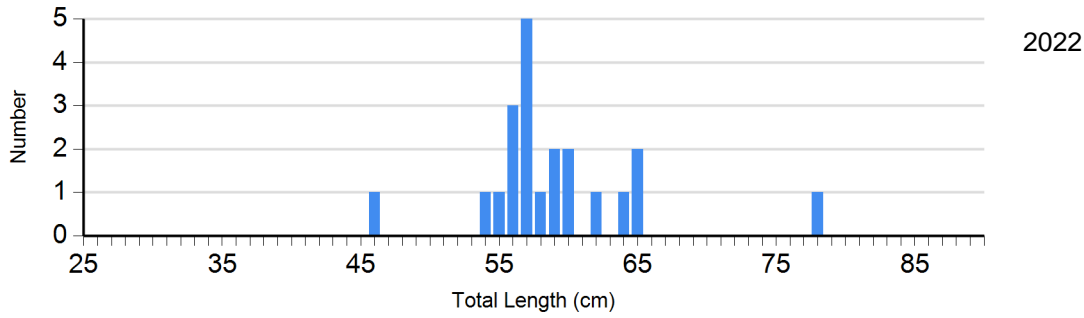
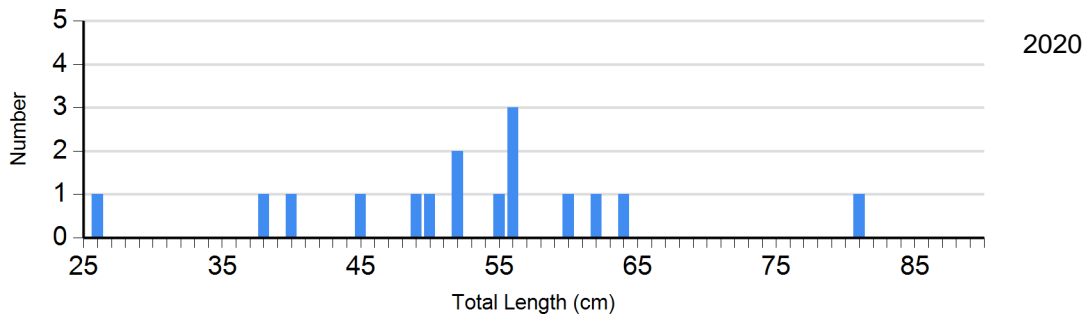
Species: Black Crappie
Gear: frame net (std 3/4 in)



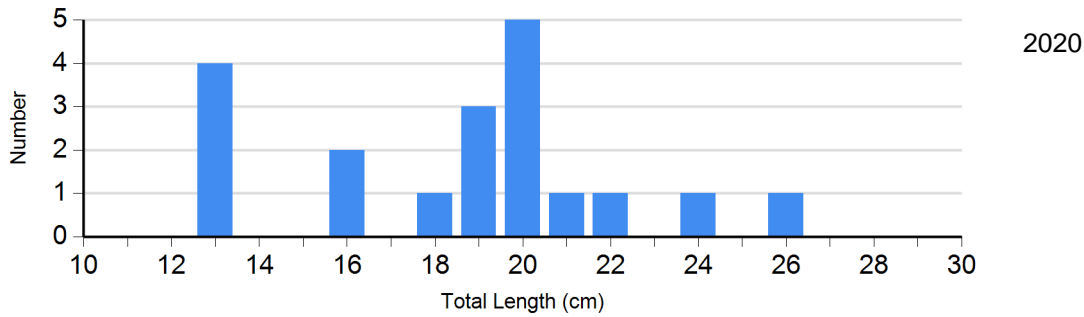
Species: Largemouth Bass
Gear: boat shocker (night)



Species: Northern Pike
Gear: AFS std gill net



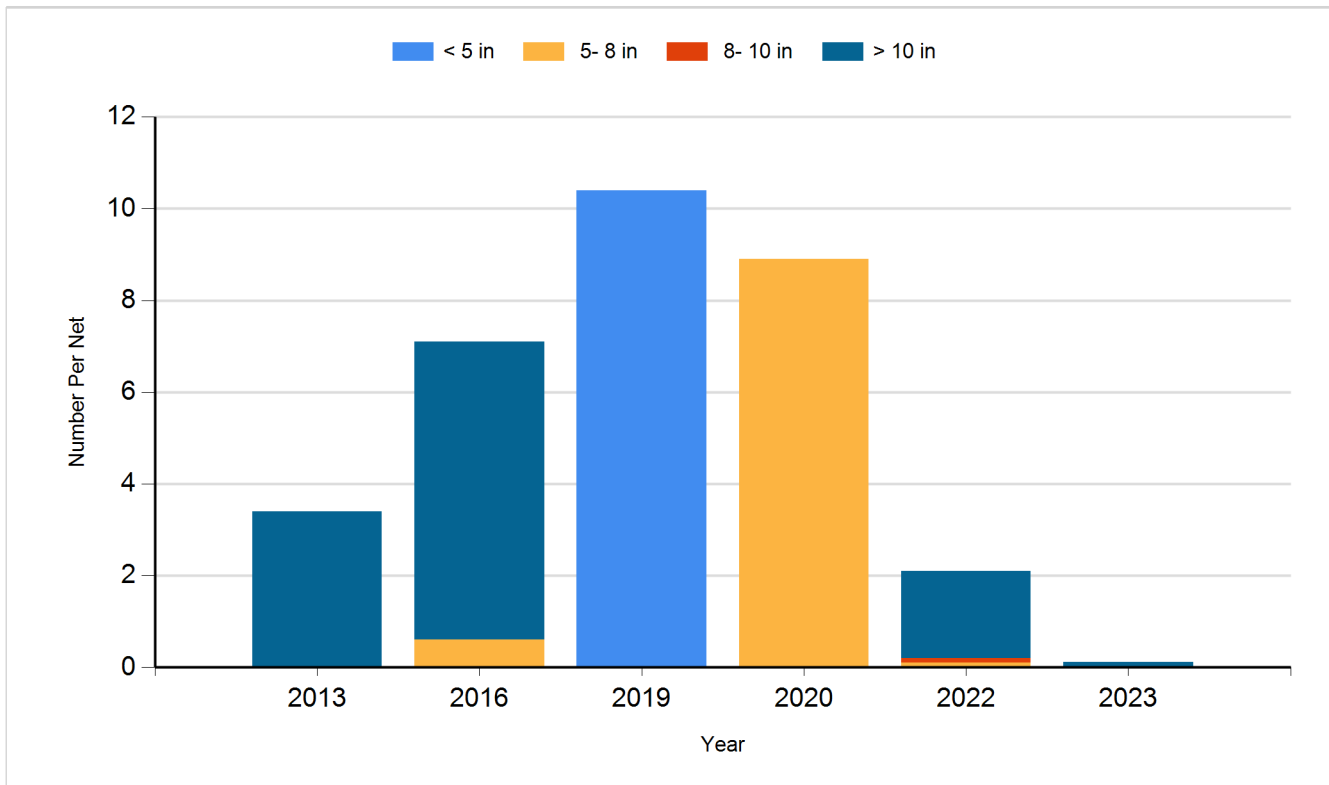
Species: Yellow Perch
Gear: AFS std gill net



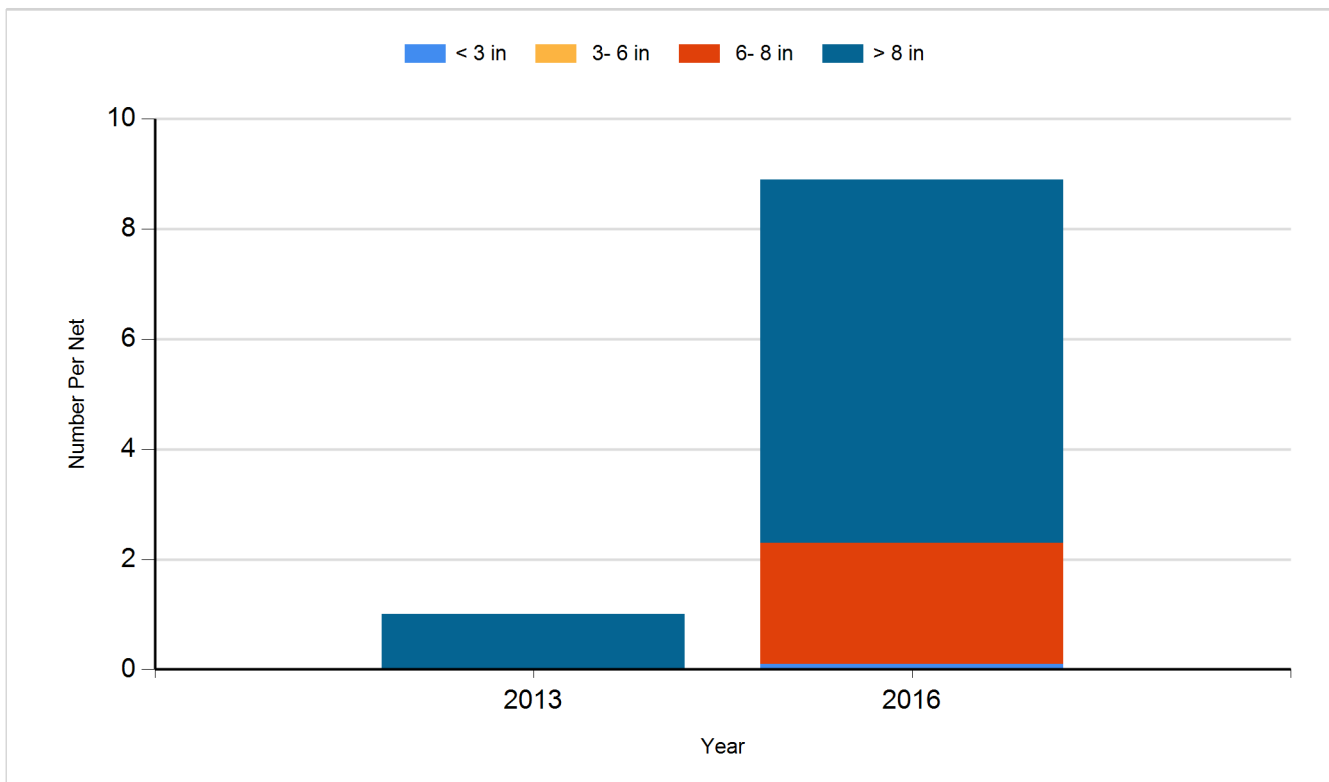
Historic Fish Sizes and Relative Abundance

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

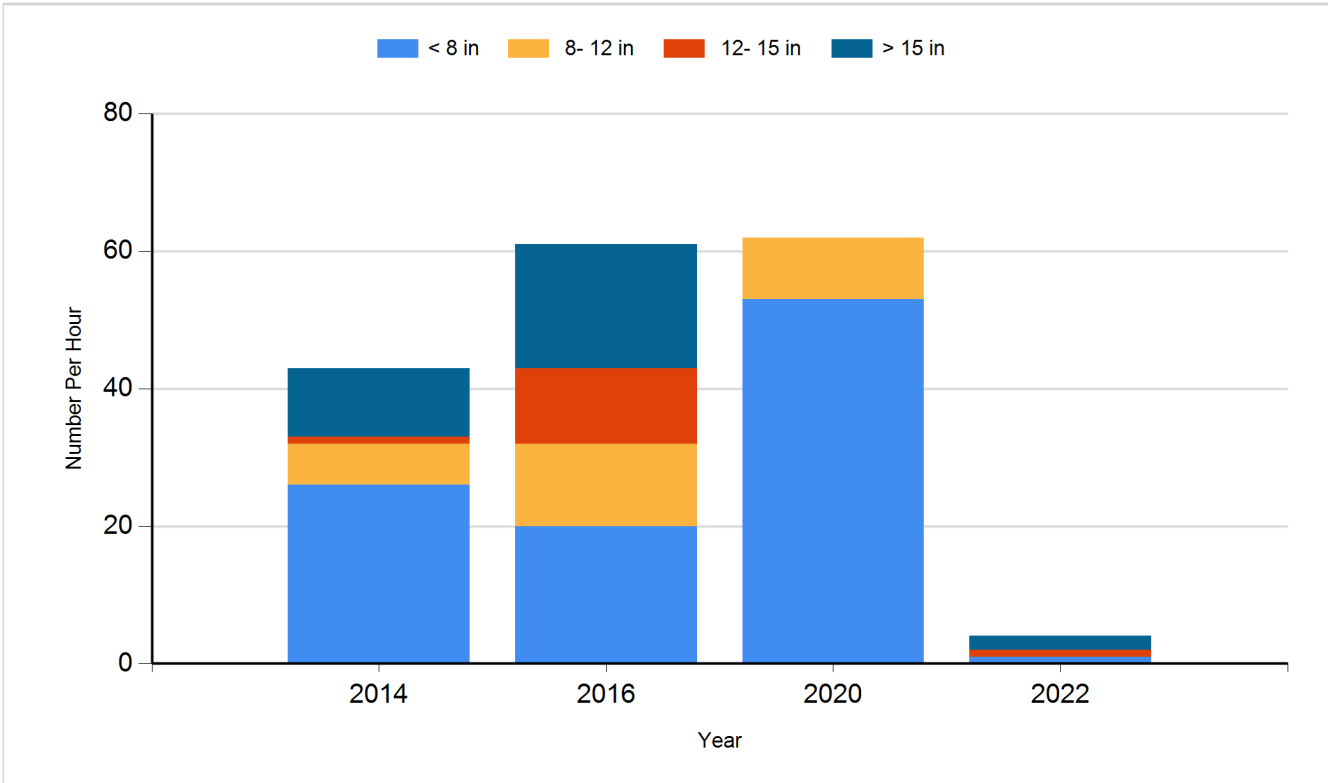
Species: Black Crappie
Gear: frame net (std 3/4 in)



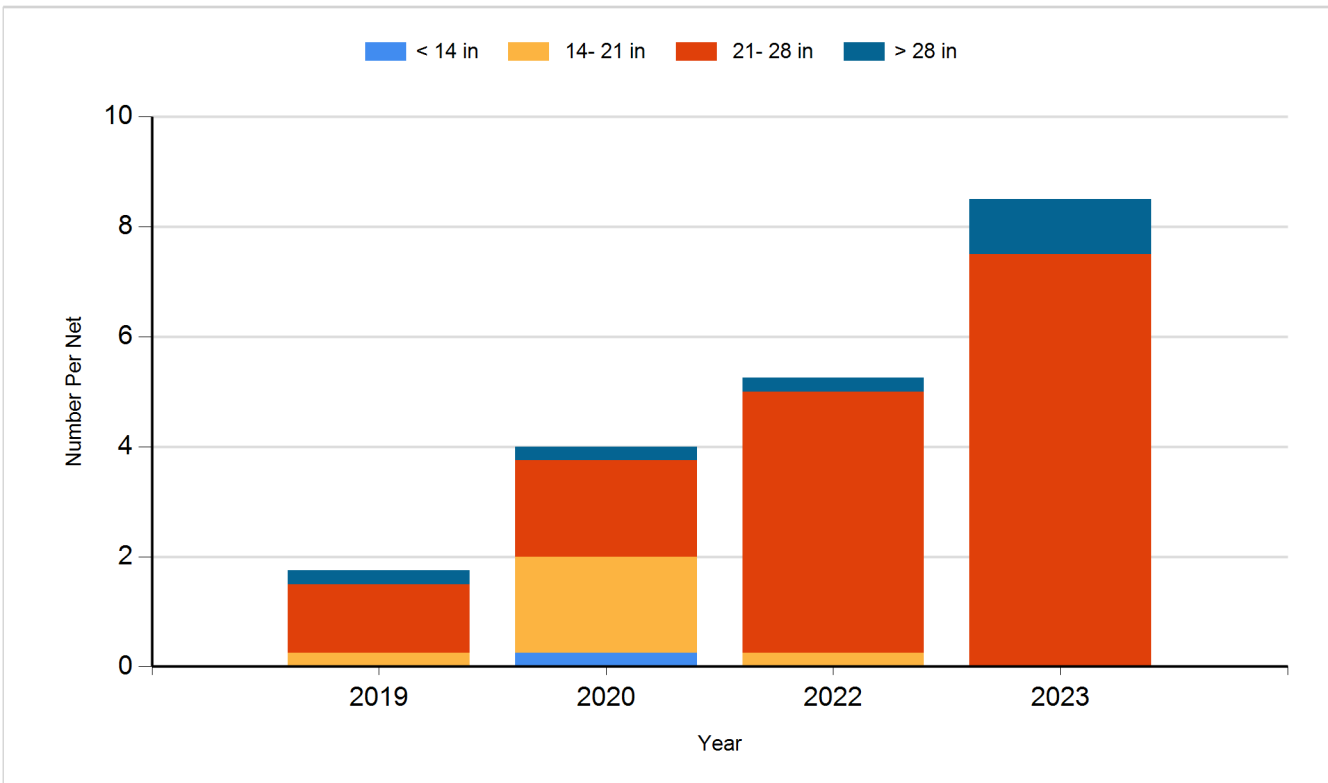
Species: Bluegill
Gear: frame net (std 3/4 in)



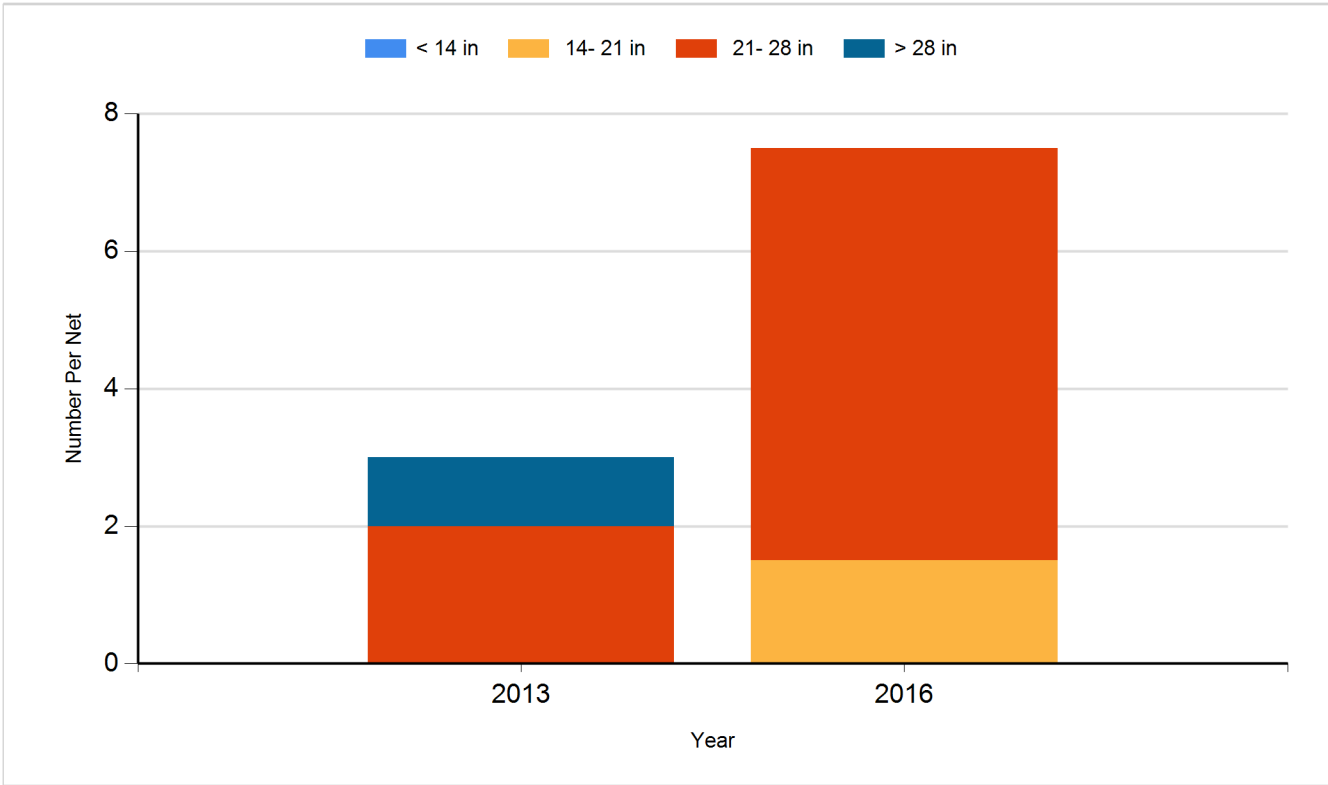
Species: Largemouth Bass
Gear: boat shocker (night)



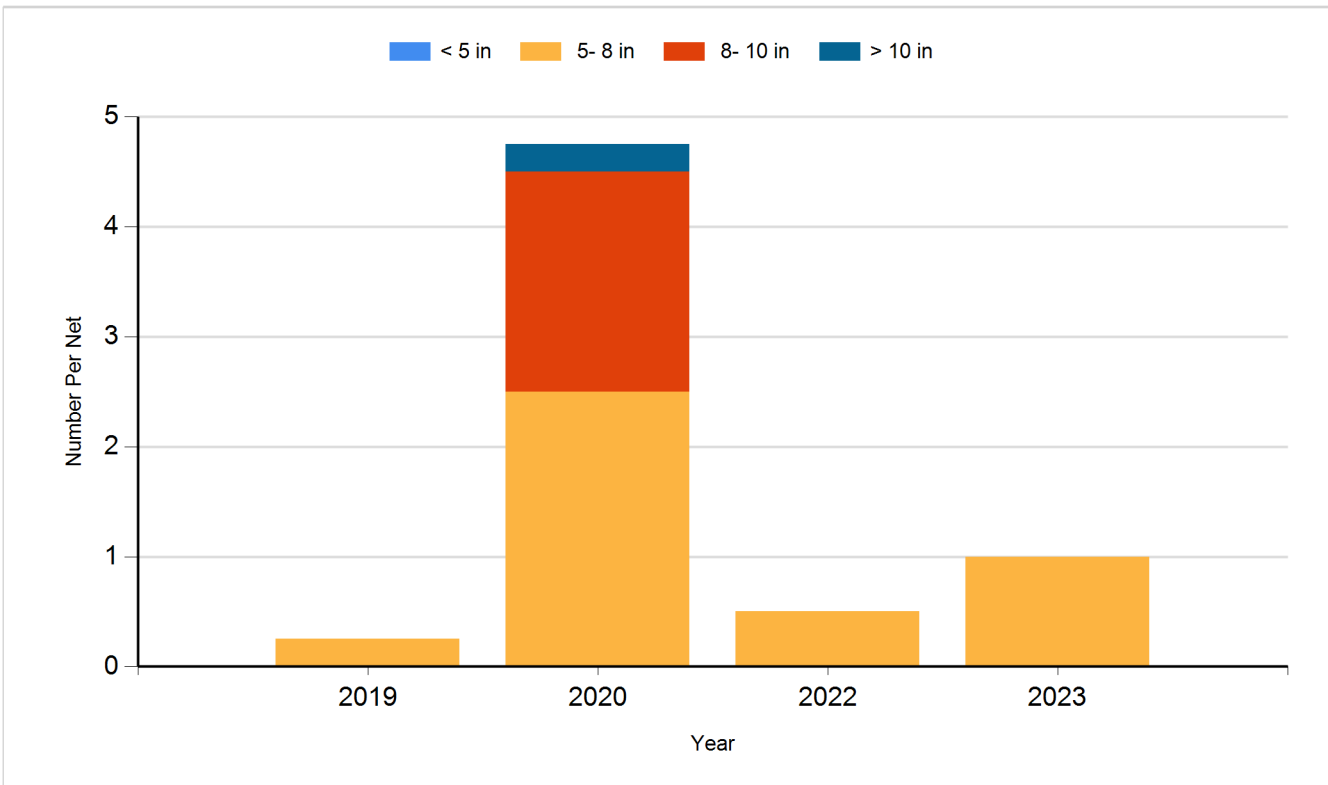
Species: Northern Pike
Gear: AFS std gill net



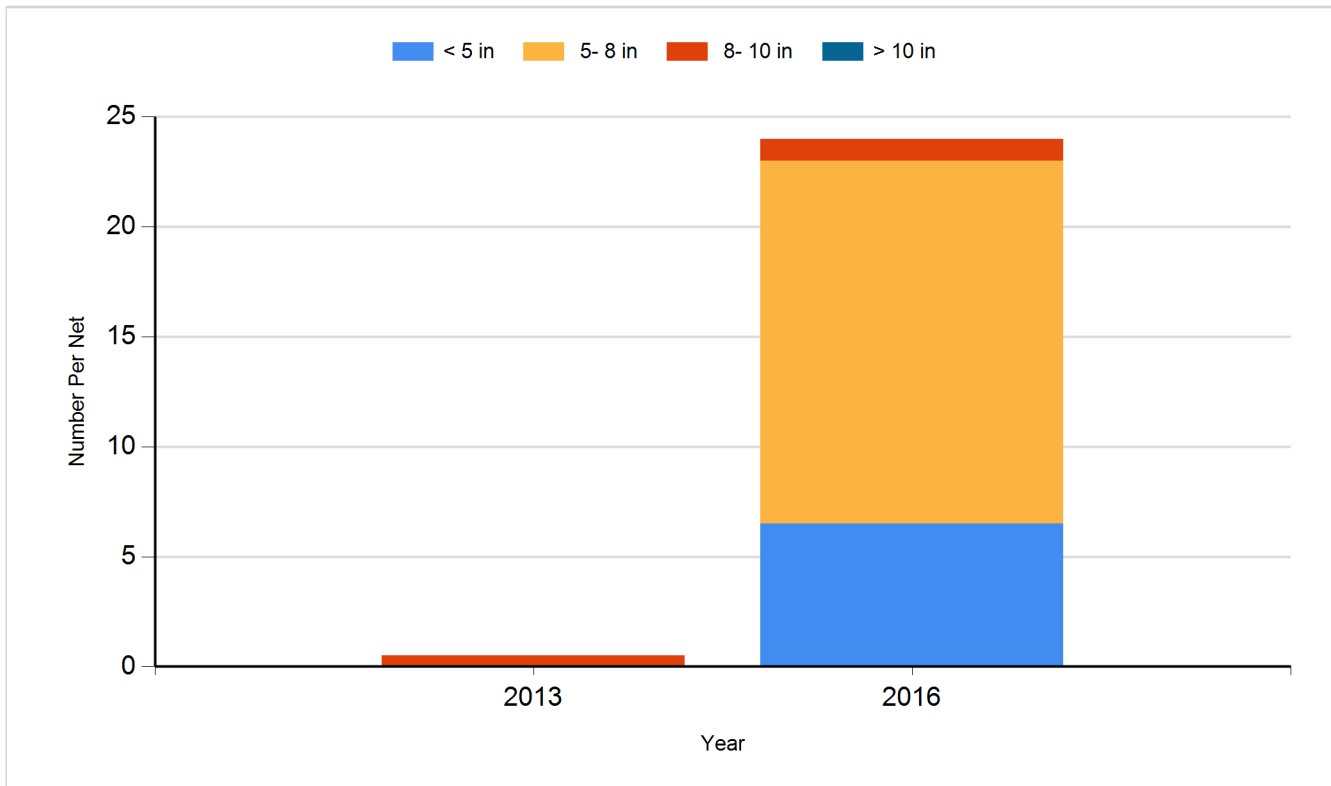
Species: Northern Pike
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std 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
2013	Walleye	Large Fingerling	920
2015	Walleye	Large Fingerling	1,890
2017	Walleye	Large Fingerling	4,480
2019	Bluegill	Adult	48
2019	Largemouth Bass	Adult	149
2019	Largemouth Bass	Juvenile	105
2019	Walleye	Large Fingerling	3,396
2019	Yellow Perch	Adult	17
2020	Largemouth Bass	Juvenile	112
2021	Black Crappie	Adult	250
2021	Walleye	Juvenile	1,000
2022	Bluegill	Adult	100
2022	Largemouth Bass	Juvenile	1,000
2022	Walleye	Juvenile	1,750
2023	Largemouth Bass	Juvenile	100
2023	Walleye	Juvenile	1,940
2023	Yellow Perch	Adult	1,000