Lynn Lake Survey Summary

Lynn Lake, located 10.0 miles northwest of Webster, is managed as a multiple species fishery including panfish (i.e., black crappie, bluegill, and yellow perch), muskellunge and walleye. As with most lakes in the area, other fish species (e.g., northern pike, smallmouth bass) also contribute to the fishery.

Frame netting, which is typically used to sample black crappie and bluegill populations in northeast South Dakota, was not completed in 2023. Thus, the following summary will focus on those fish species assessed using gill nets (e.g., walleye, yellow perch) and muskellunge, which were targeted using large-framed trap nets shortly after ice out.

- **Muskellunge.** Muskellunge were introduced into Lynn Lake in 2001 and subsequently stocked on eleven occasions from 2002 – 2023. Despite these stockings, relative abundance remains low. In 2023, Lynn Lake was used as an egg source for walleye spawning operations, large frame nets were used to collect walleye brood stock and muskellunge for an extended period following ice out. During this extended sampling period 11 muskellunge from 36.5 to 47.6 inches were netted, 64% were >38.0 inches and 36% were >42.0 inches. Few muskellunge have been sampled in standard fisheries surveys conducted from 2012 – 2023, with only one captured in the 2023 gill net survey that measured 37.6 inches.

- **Walleye.** At 5.1 per gill net, relative abundance of walleye was considered moderate for Lynn Lake in 2023. Sampled walleyes ranged in length from 7.9 to 28.6 inches, 75% were >15.0 inches and 35% were >20.0 inches. Eleven cohorts (2007, 2009, 2011 – 2013 and 2017 – 2022) contributed to the catch, none were particularly strong. Individuals from naturally produced cohorts in 2018 (age 5) and 2020 (age 3) were the most abundant accounting for 54% of walleyes in the sample. The 2023 sample suggests good walleye growth with a mean length at capture at age 3 of 17.9 inches.

- **Yellow perch.** The 2023 mean gill net CPUE of 74.8 was substantially higher than the 10.5 observed in 2022. Yellow perch ranging in length from 5.6 to 10.0 inches were netted, 8% were >8.0 inches and 0% were >10.0 inches. The catch was comprised of fish from two year classes (2021 and 2022), most (95%) were from the 2022 (age-1) cohort, which had a mean length at capture of 7.0 inches.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Lynn (Day; below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lynn, Day County
MUD-Lake-308-003
2023

Lake Information

Name: Lynn

County: Day

Surface Area: 1,607 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Sep 06, 2023	6 net-nights
AFS std gill net	Sep 07, 2023	6 net-nights

Common Fish Species Present

Black Crappie

Northern Pike

Muskellunge

Yellow Perch

Walleye

Smallmouth Bass

Rock Bass

Bluegill

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
AFS std gill net	Bluegill	1	0.1	0.1	100		0		144	
	Muskellunge	1	0.1	0.1	100		0		83	
	Northern Pike	3	0.3	0.2	100		33		82	9
	Rock Bass	4	0.3	0.2	50		25		112	6
	Smallmouth Bass	3	0.2	0.2	50		50		103	
	Walleye	65	5.1	2.3	80	8	38	9	88	1
	Yellow Perch	898	74.8	12.4	10	1	2	1	108	1

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std frame net	Black Crappie			1.0								1.00
	Bluegill			17.0								17.00
	Northern Pike			0.2								0.20
	Rock Bass			0.1								0.10
	Smallmouth Bass			0.2								0.20
	Walleye			1.5								1.50
	Yellow Perch			0.2								0.20
AFS std gill net	Black Bullhead			0.0	0.0	0.0	0.0		0.1	0.0	0.0	0.01
	Black Crappie			0.1	0.5	0.3	0.1		0.1	0.0	0.0	0.16
	Bluegill			0.5	0.0	0.1	0.0		0.2	0.0	0.1	0.13
	Muskellunge			0.1	0.1	0.0	0.0		0.0	0.0	0.1	0.04
	Northern Pike			0.3	0.5	0.3	0.1		0.8	0.8	0.3	0.44
	Rock Bass			1.3	0.9	0.4	0.0		0.7	0.2	0.3	0.54
	Smallmouth Bass			0.2	0.2	0.0	0.1		0.0	0.2	0.2	0.13
	Walleye			10.3	4.0	9.2	13.5		4.6	6.1	5.1	7.54
	Yellow Perch			1.5	4.8	9.1	8.0		6.5	10.5	74.8	16.46
boat shocker (night)	Muskellunge	0.0	0.0	0.0	0.0							0.00
	Walleye*	157.8	10.0	547.5	7.1							180.60
fall night EF-WAE*	Walleye					14.0						14.00
frame net (std 3/4 in)	Black Bullhead	0.1								0.0		0.05
	Black Crappie	0.3								0.1		0.20
	Bluegill	2.4								11.9		7.15
	Northern Pike	0.2								0.2		0.20
	Rock Bass	0.2								0.0		0.10
	Smallmouth Bass	0.1								1.0		0.55
	Walleye	1.2								1.9		1.55
	Yellow Perch	0.2								3.4		1.80
large frame net	Muskellunge						0.7					0.70
std exp gill net	Black Bullhead	0.2	0.0									0.10
	Black Crappie	0.0	0.2									0.10
	Bluegill	0.0	0.2									0.10
	Muskellunge	0.0	0.0									0.00
	Northern Pike	0.8	0.0									0.40

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
std exp gill net	Rock Bass	0.3	0.7									0.50
	Smallmouth Bass	0.3	0.0									0.15
	Walleye	8.7	4.8									6.75
	Yellow Perch	24.7	2.7									13.70

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std frame net	Black Crappie	PSD			39							
		PSD-P			39							
		Wr			121							
	Bluegill	PSD			2							
		PSD-P			0							
		Wr			110							
	Northern Pike	PSD			100							
		PSD-P			50							
		Wr			70							
	Rock Bass	PSD			100							
		PSD-P			0							
		Wr			111							
	Smallmouth Bass	PSD			67							
		PSD-P			67							
		Wr			113							
	Walleye	PSD			93							
		PSD-P			81							
		Wr			87							
	Yellow Perch	PSD			0							
		PSD-P			0							
		Wr			132							
AFS std gill net	Black Crappie	PSD			0	0	0	0		0		
		PSD-P			0	0	0	0		0		
		Wr			132	127	126	126		110		
	Bluegill	PSD			17		0			0		100
		PSD-P			0		0			0		0
		Wr			124		104			106		144
	Muskellunge	PSD			100	100						100
		PSD-P			100	0						0
		Wr			87	85						83
	Northern Pike	PSD			100	100	100	100		100	100	100
		PSD-P			100	67	100	100		0	22	33
		Wr			82	78	72	75		91	87	82

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Rock Bass	PSD			38	55	20			25	50	50
		PSD-P			0	9	0			0	0	25
		Wr			117	112	116			106	110	112
	Smallmouth Bass	PSD			0	50		100			0	50
		PSD-P			0	50		100			0	50
		Wr			119	108		112			104	103
	Walleye	PSD			44	79	35	40		67	58	80
		PSD-P			19	33	25	12		24	18	38
		Wr			85	90	86	97		85	87	88
	Yellow Perch	PSD			33	31	34	20		19	6	10
		PSD-P			0	0	9	1		14	1	2
		Wr			110	102	104	104		96	114	108
boat shocker (night)	Walleye	PSD	0	0	0	0						
		PSD-P	0	0	0	0						
		Wr	101	93	96	97						
frame net (std 3/4 in)	Black Crappie	PSD	100								0	
		PSD-P	100								0	
		Wr	111								123	
	Bluegill	PSD	2								12	
		PSD-P	0								2	
		Wr	114								120	
	Northern Pike	PSD	100								100	
		PSD-P	25								0	
		Wr	78								89	
	Rock Bass	PSD	25									
		PSD-P	25									
		Wr	121									
	Smallmouth Bass	PSD	100								72	
		PSD-P	100								72	
		Wr	101								107	
	Walleye	PSD	75								80	
		PSD-P	30								46	
		Wr	90								85	
	Yellow Perch	PSD	0								0	
		PSD-P	0								0	
		Wr	96								105	

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
large frame net	Muskellunge	PSD						100				
		PSD-P						29				
std exp gill net	Black Crappie	PSD	0	0								
		PSD-P	0	0								
		Wr		126								
	Bluegill	PSD		0								
		PSD-P		0								
		Wr		100								
	Northern Pike	PSD	100									
		PSD-P	60									
		Wr	78									
	Rock Bass	PSD	0	25								
		PSD-P	0	0								
		Wr	112	110								
	Smallmouth Bass	PSD	0									
		PSD-P	0									
		Wr	107									
	Walleye	PSD	69	31								
		PSD-P	29	14								
		Wr	84	84								
	Yellow Perch	PSD	1	81								
		PSD-P	0	0								
		Wr	105	101								

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	44	105 (28)	158 (10)				326 (4)	350 (2)			
2014	5				288 (2)	304 (3)					

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	213	119 (193)	182 (20)								
2016	316	101 (212)	125 (96)	155 (8)							
2014	41	107 (40)		182 (1)							

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	65	244 (7)	351 (11)	455 (18)	527 (1)	519 (17)	590 (2)				669 (9)
2022	75	275 (24)	389 (18)	449 (2)	486 (25)	524 (1)	578 (2)		543 (1)		663 (2)
2021	55	318 (17)	415 (5)	438 (15)	462 (4)	494 (1)	578 (1)	583 (1)			629 (11)
2019	165	287 (93)	398 (38)	460 (12)		502 (3)	526 (4)		575 (4)	543 (1)	614 (10)
2018	110	283 (56)	366 (22)		503 (3)	507 (4)		571 (5)	574 (3)	607 (14)	656 (3)
2017	48	304 (9)	389 (2)	452 (8)	469 (10)		527 (7)	574 (2)	600 (6)	515 (1)	614 (3)
2016	128	264 (30)	339 (43)	387 (20)		492 (12)	588 (3)	554 (10)	494 (1)	576 (1)	646 (8)
2015	52	227 (27)	310 (16)		423 (3)	479 (2)	565 (2)				687 (2)
2014	74	218 (24)	324 (2)	381 (27)	462 (2)	525 (11)	539 (2)			611 (2)	670 (4)

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	896	177 (849)	233 (47)								
2022	126	174 (120)	225 (6)								

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	78	169 (67)		280 (10)	311 (1)						
2019	96	187 (95)	267 (1)								
2018	105	193 (92)	256 (13)								
2017	58	192 (57)	221 (1)								
2016	13	195 (13)									
2015	16	183 (3)	227 (13)								
2014	148	168 (138)	176 (8)	230 (1)		244 (1)					

Fish Condition

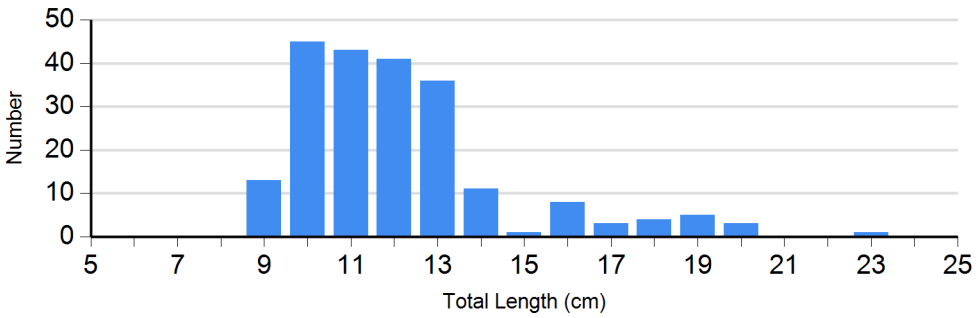
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2022	1	123	0		0		0	
Bluegill Frame Net	2022	189	120 (0.7)	21	125 (1.7)	4	100 (26.8)	0	
Northern Pike Gill Net	2019	0		0		1	75	0	
	2021	0		9	91 (2.5)	0		0	
	2022	0		7	88 (2.0)	2	81	0	
	2023	0		2	87 (7.0)	1	71	0	
Walleye Gill Net	2019	97	97 (0.7)	45	98 (1.1)	16	95 (2.0)	4	78 (7.6)
	2021	18	83 (2.4)	24	85 (1.4)	8	87 (1.9)	5	91 (2.7)
	2022	31	86 (1.2)	29	88 (1.2)	12	88 (1.6)	1	90
	2023	12	86 (1.6)	26	87 (1.6)	15	90 (1.2)	8	87 (3.9)
Yellow Perch Gill Net	2019	77	104 (0.8)	18	103 (1.4)	1	103	0	
	2021	63	96 (0.9)	4	96 (3.3)	10	97 (1.5)	1	89
	2022	119	114 (0.8)	6	109 (2.8)	1	105	0	
	2023	810	109 (0.4)	74	104 (1.0)	14	110 (1.2)	0	

Length Frequency Distribution

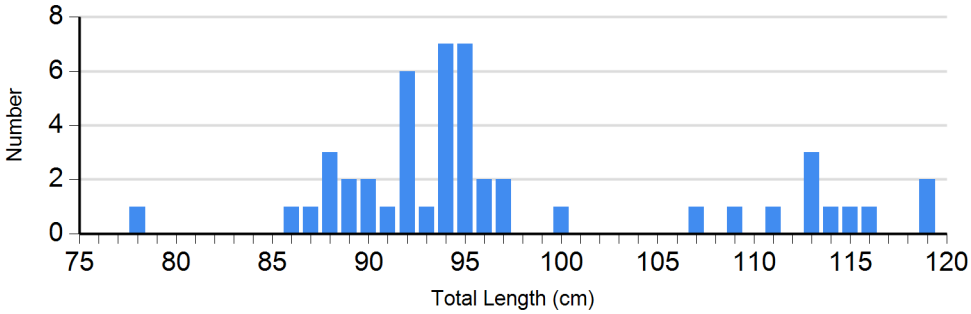
Length frequency histogram of species sampled by year.

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



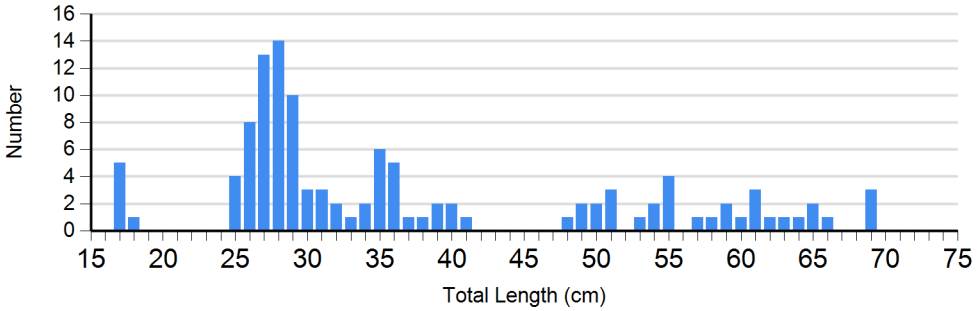
2022

Species: Muskellunge
Gear: large frame net



2019

Species: Walleye
Gear: AFS std gill net



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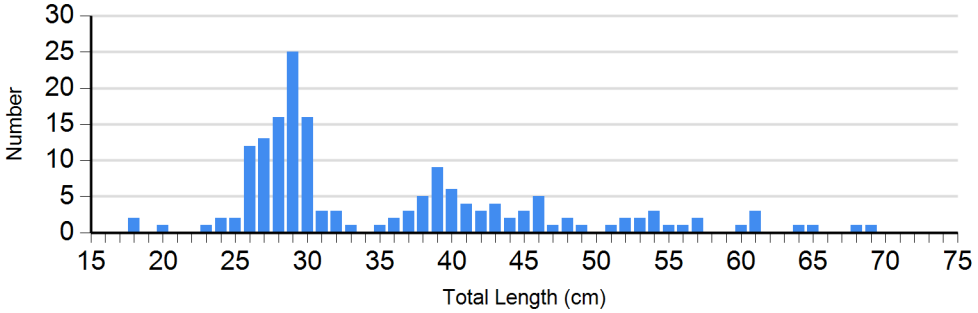

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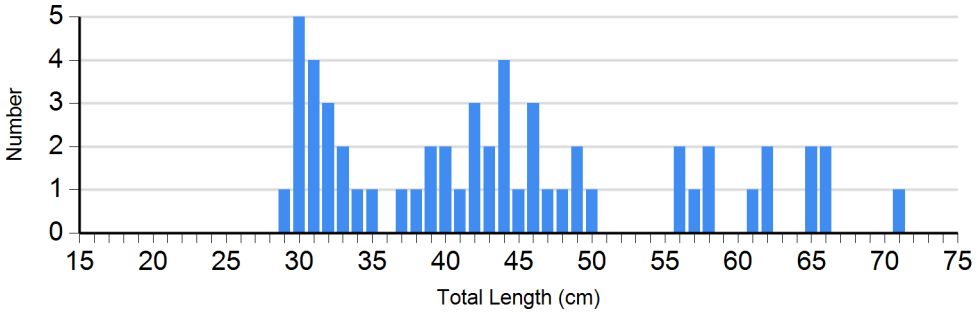
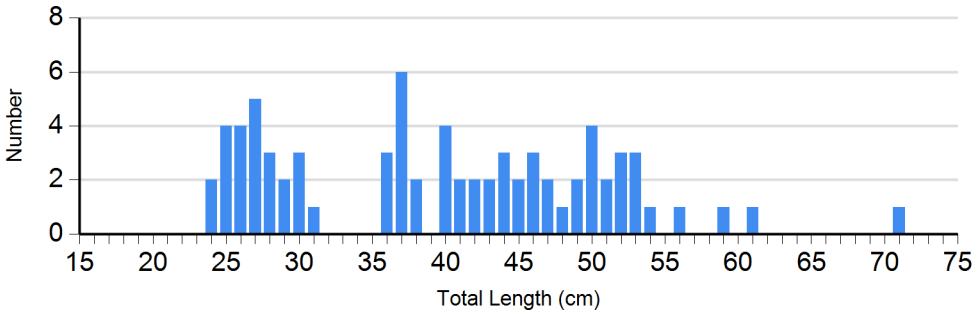
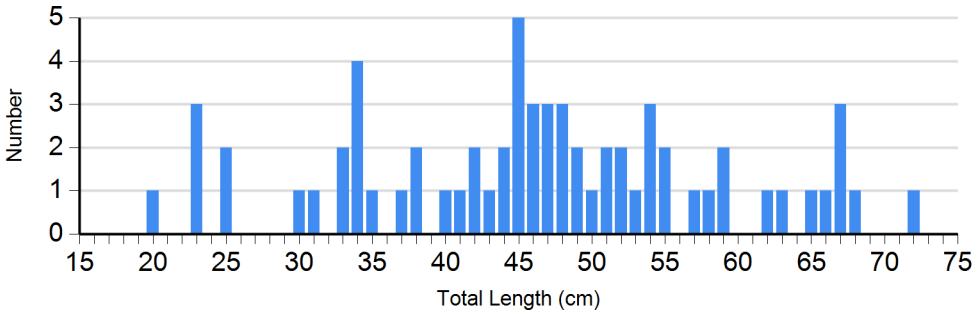


2021

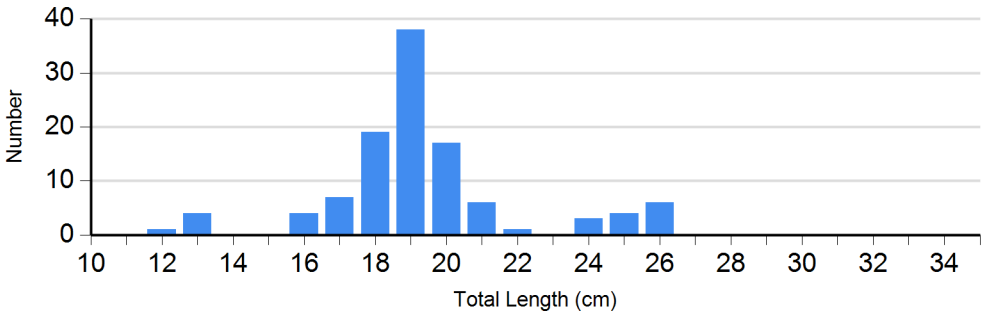


2022



2023

Species: Yellow Perch
Gear: AFS std gill net



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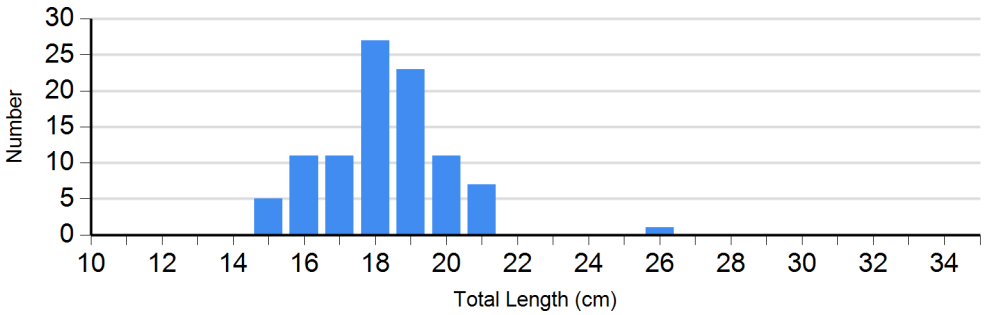
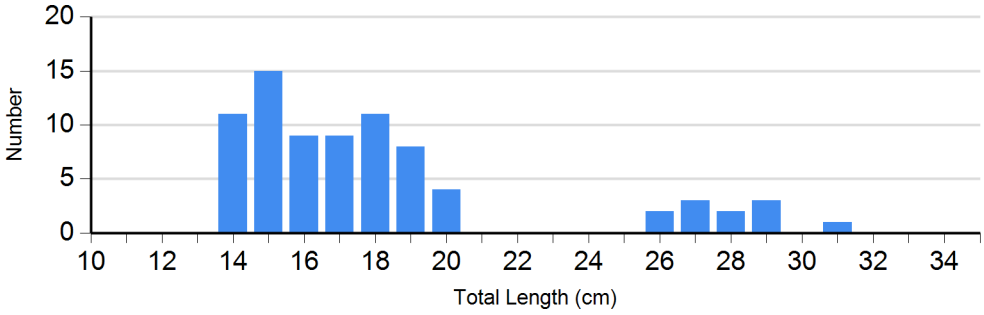
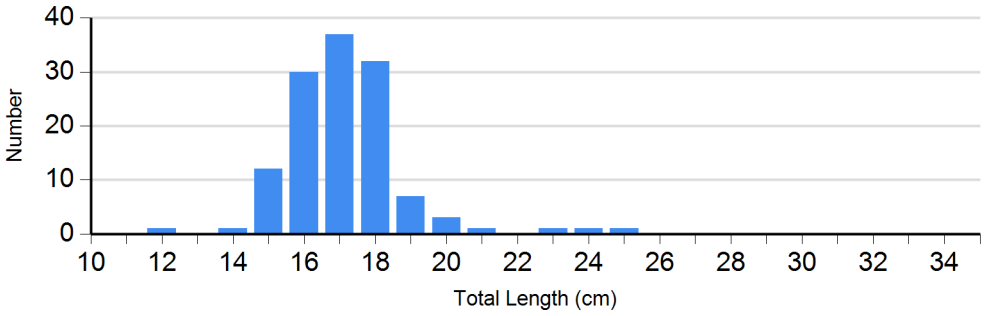


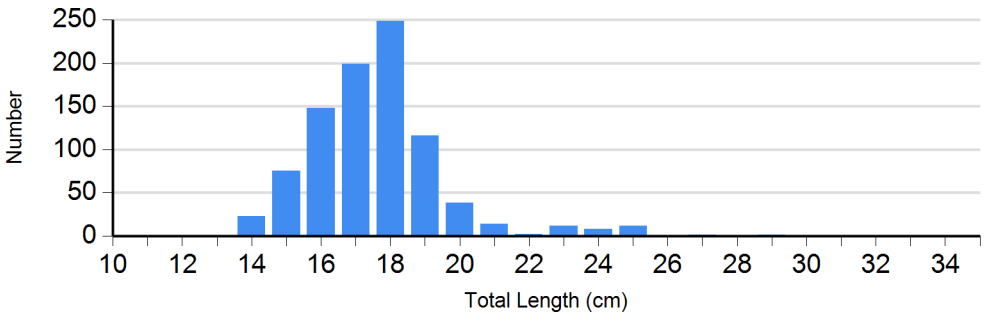
2019



2021



2022

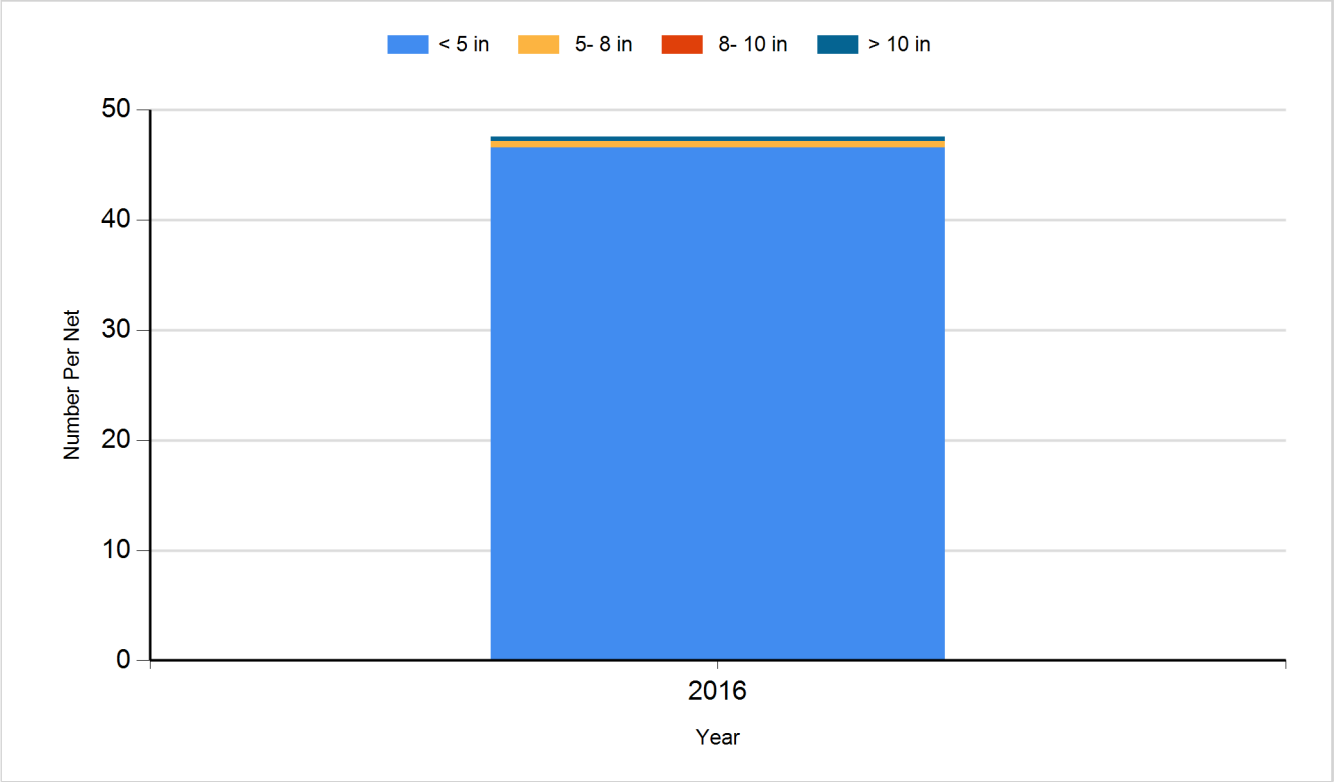


2023

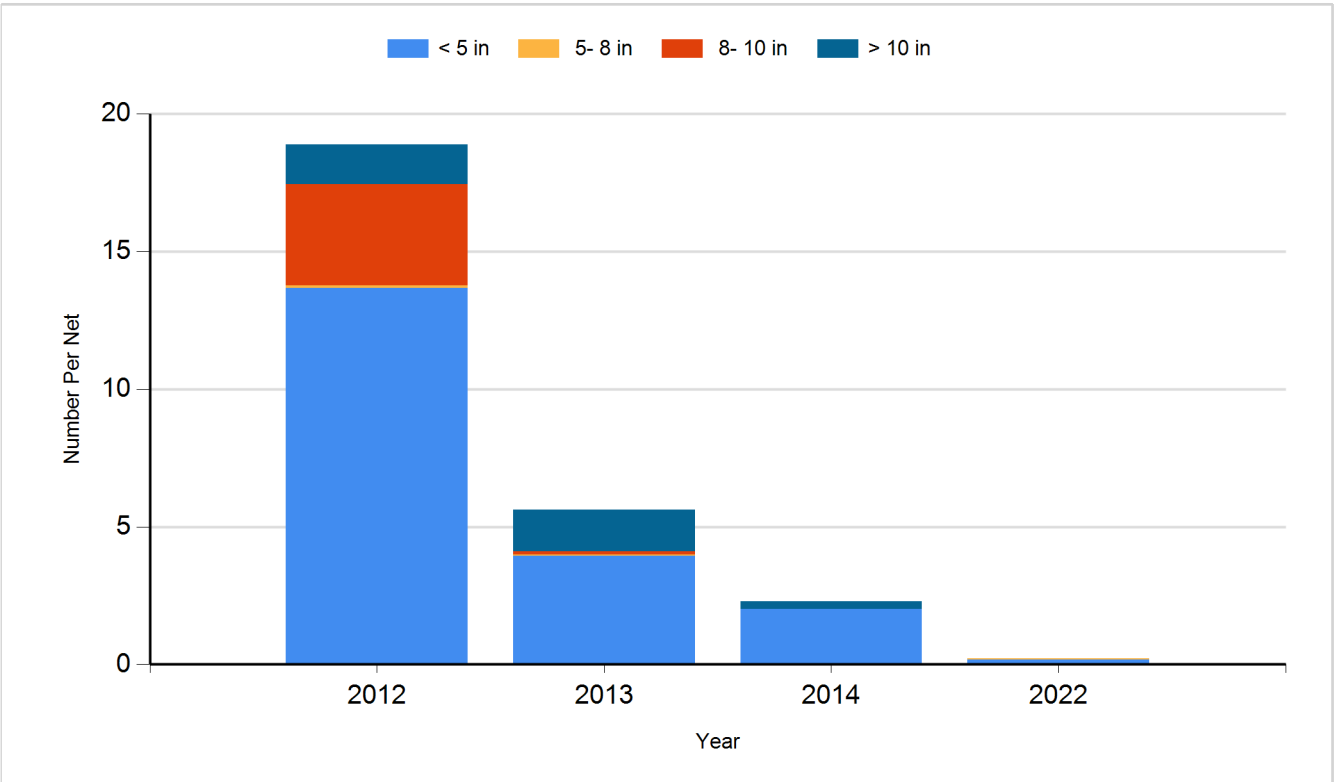
Historic Fish Sizes and Relative Abundance

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

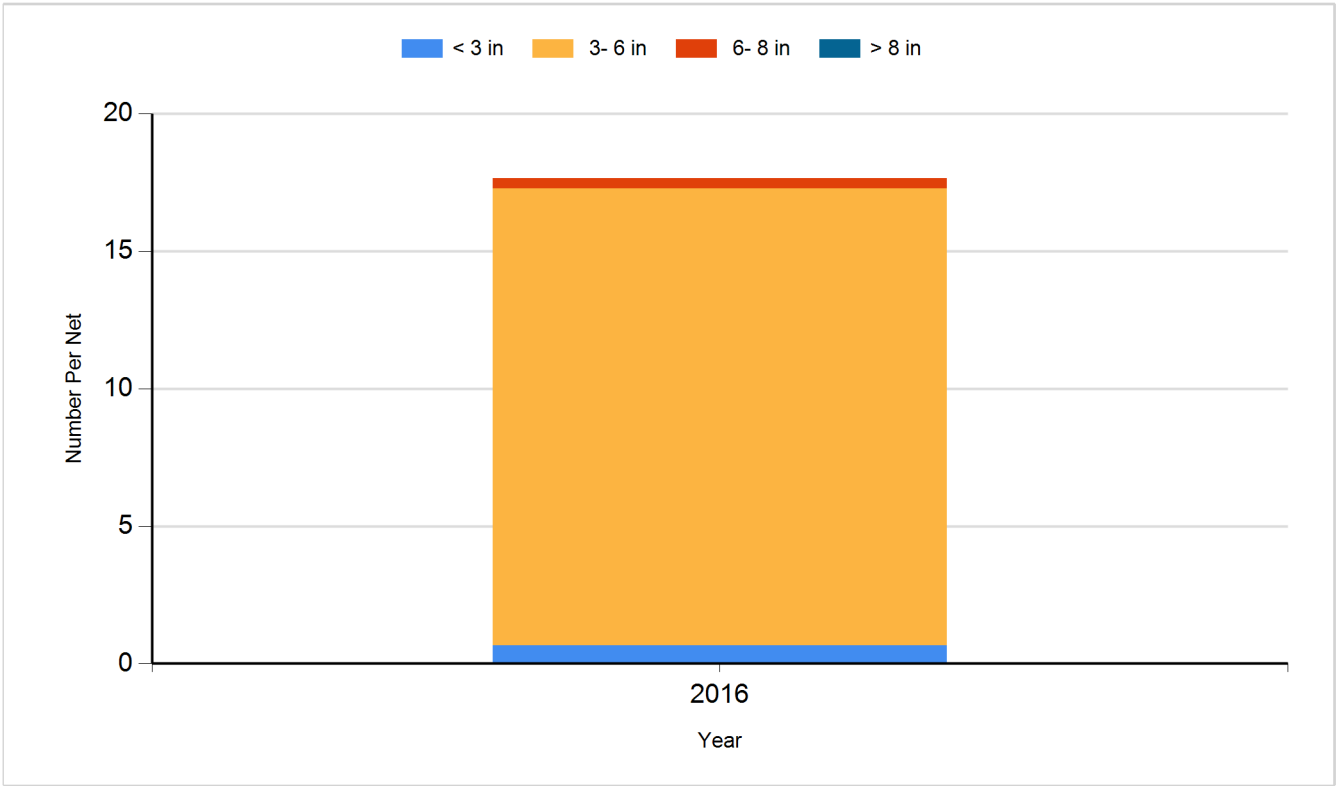
Species: Black Crappie
Gear: AFS std frame net



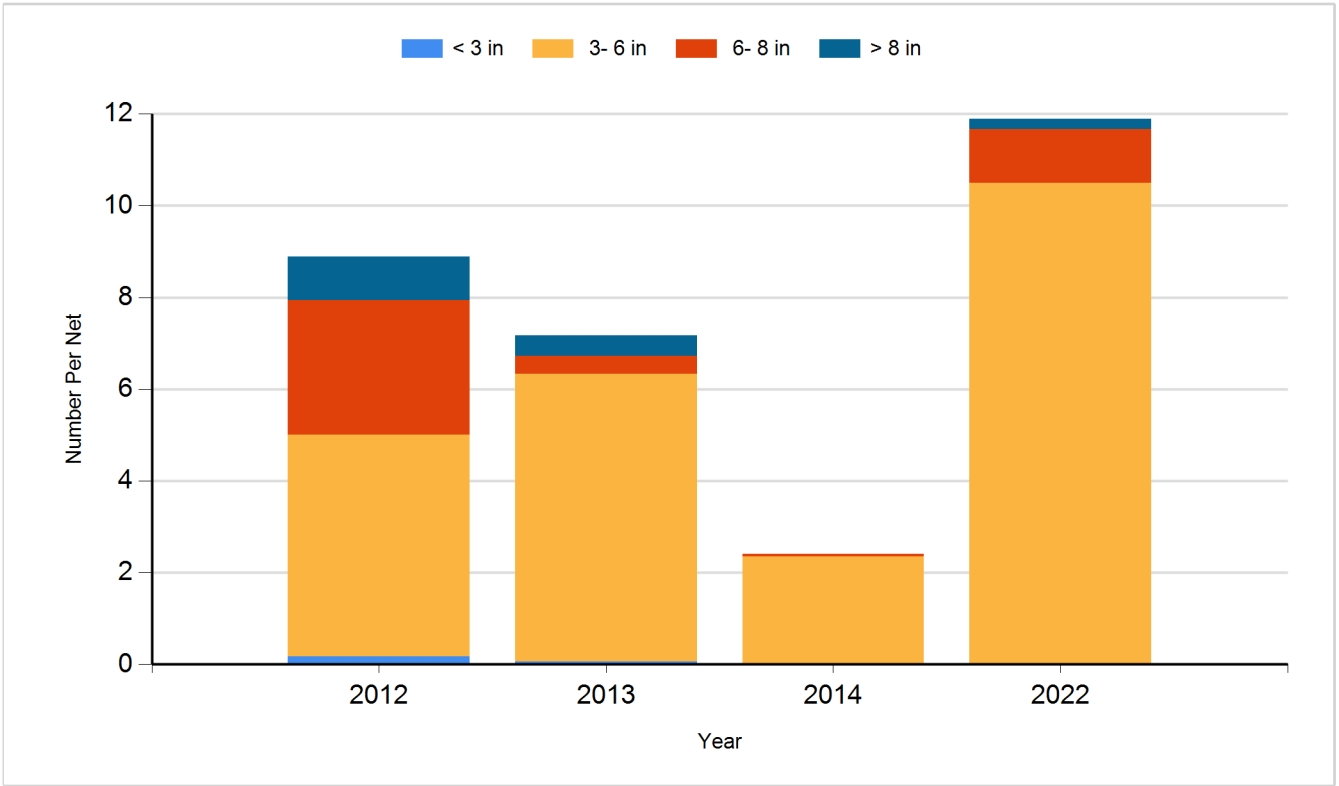
Species: Black Crappie
Gear: frame net (std 3/4 in)



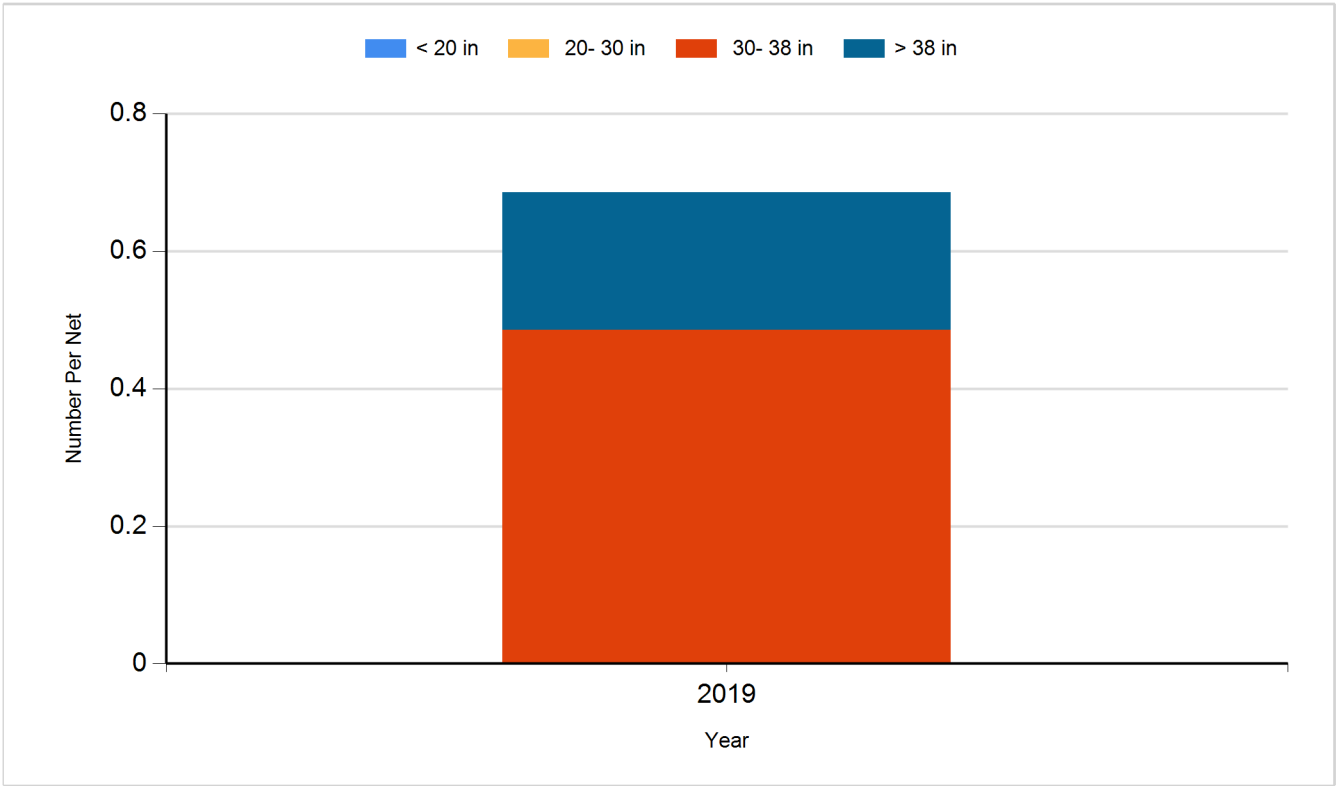
Species: Bluegill
Gear: AFS std frame net



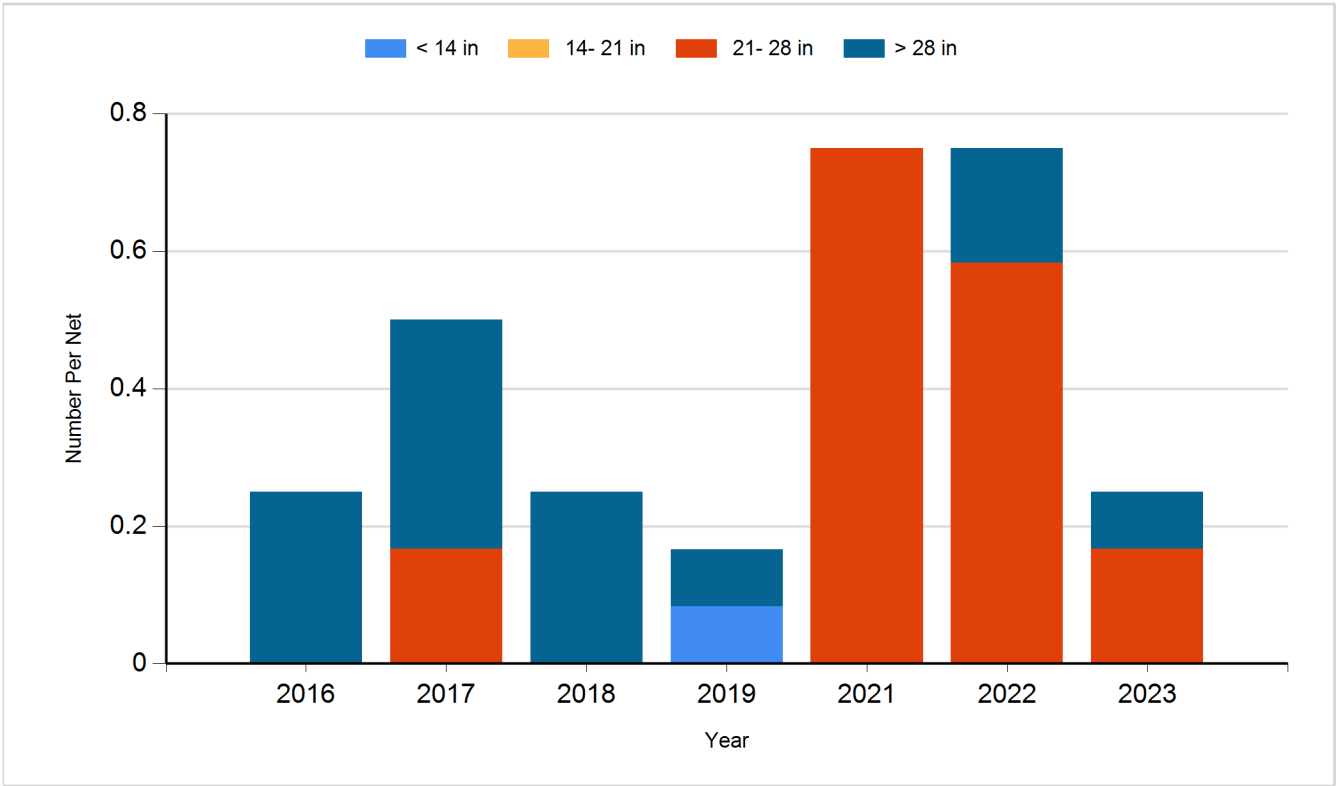
Species: Bluegill
Gear: frame net (std 3/4 in)



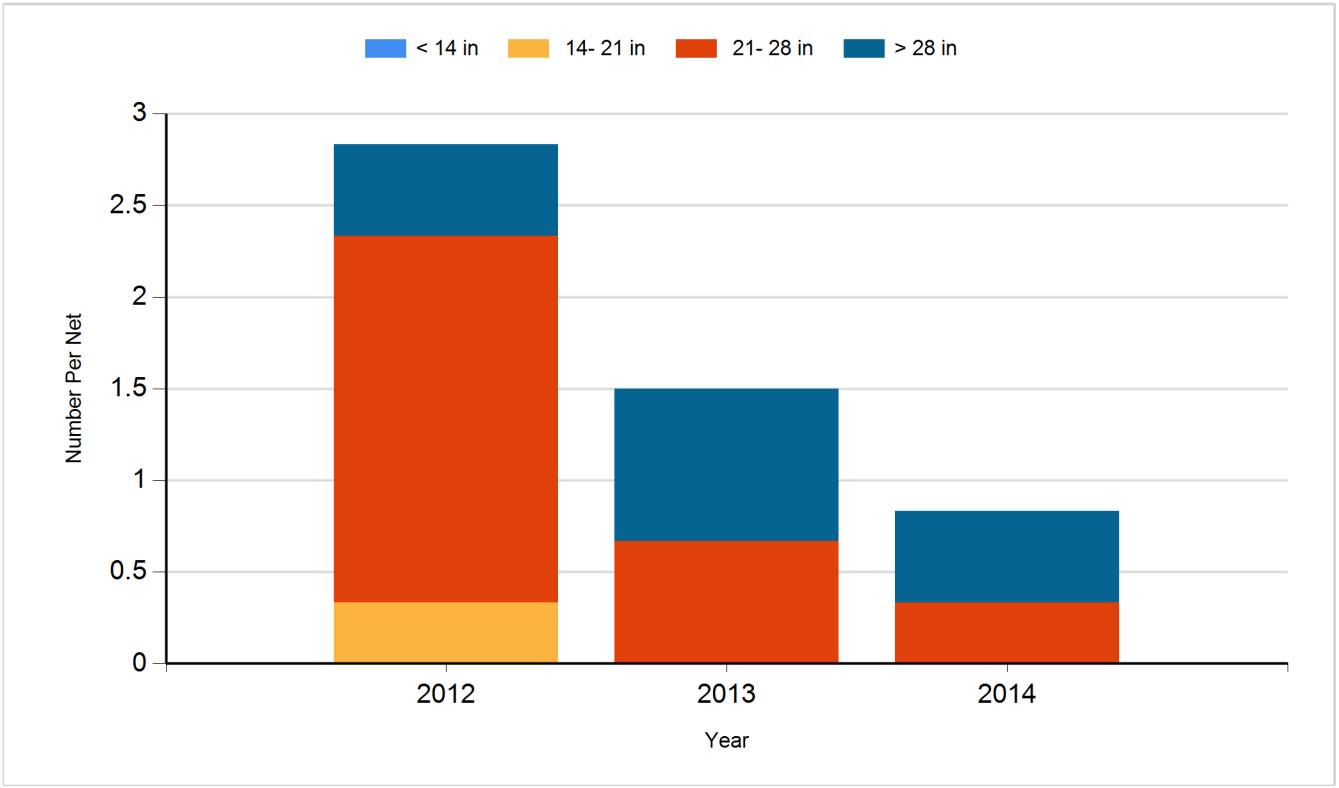
Species: Muskellunge
Gear: large frame net



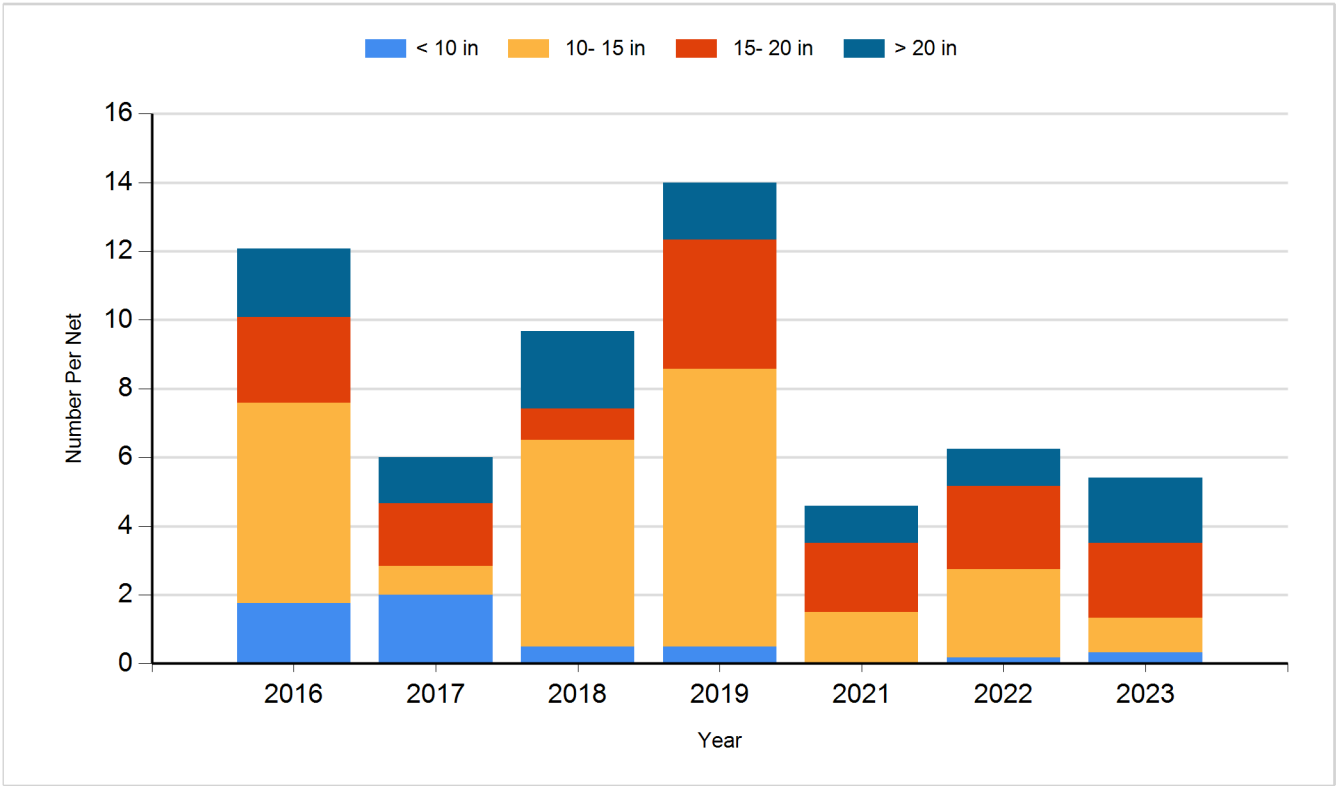
Species: Northern Pike
Gear: AFS std gill net



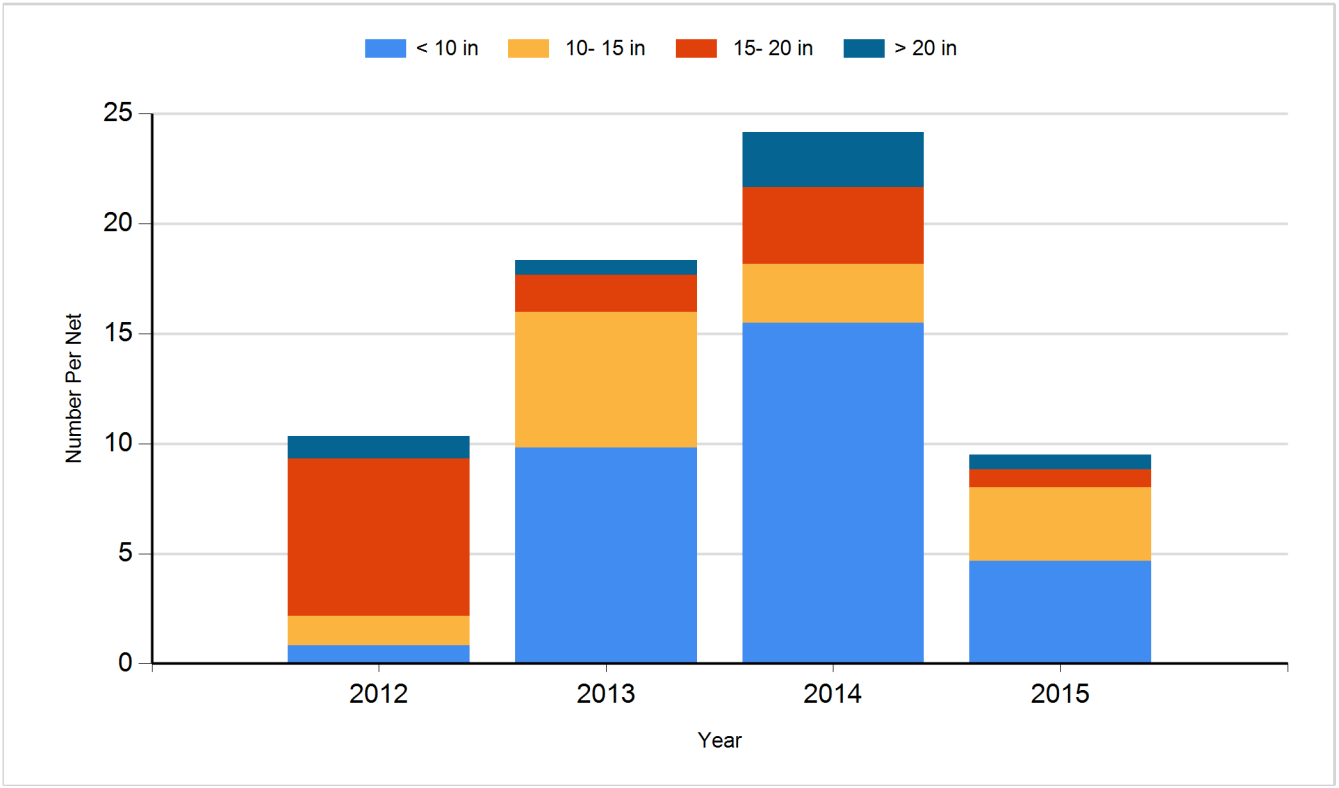
Species: Northern Pike
Gear: std exp gill net



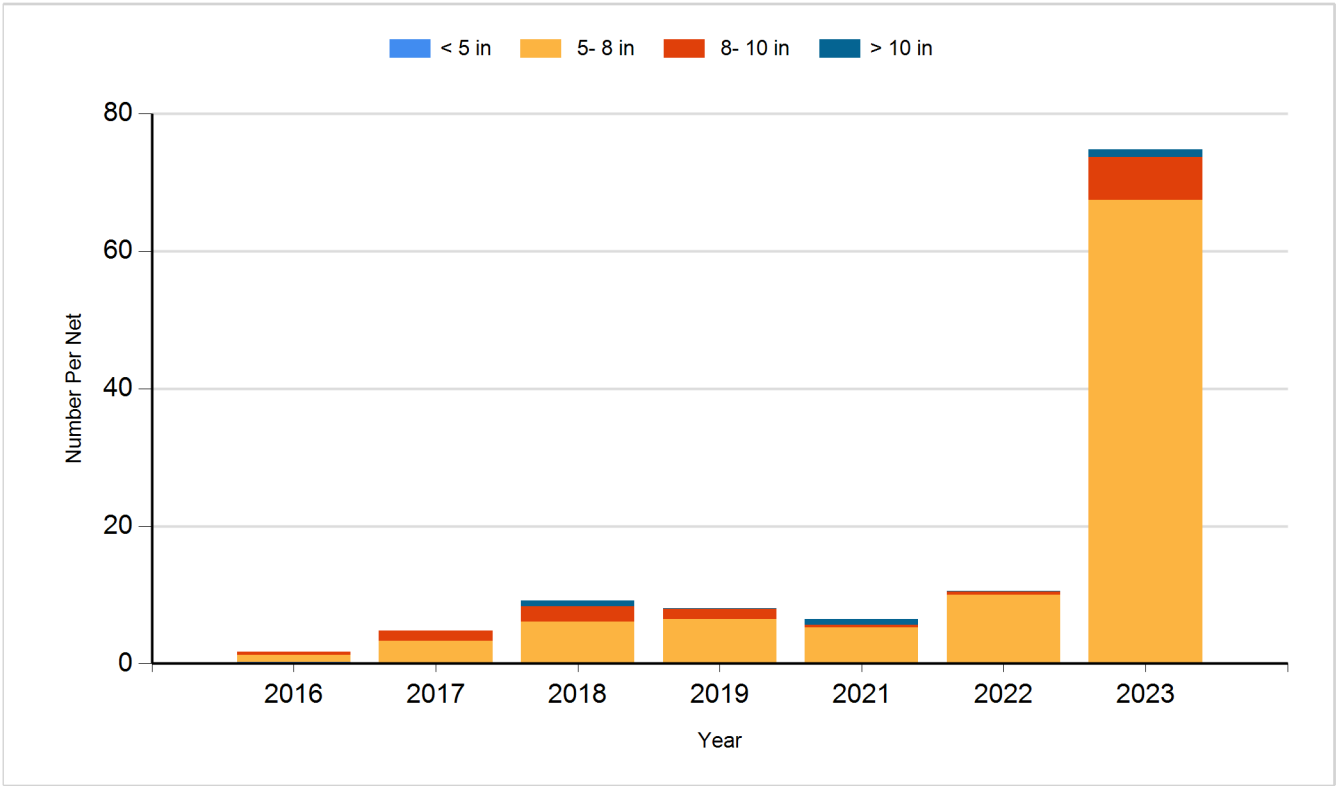
Species: Walleye
Gear: AFS std gill net



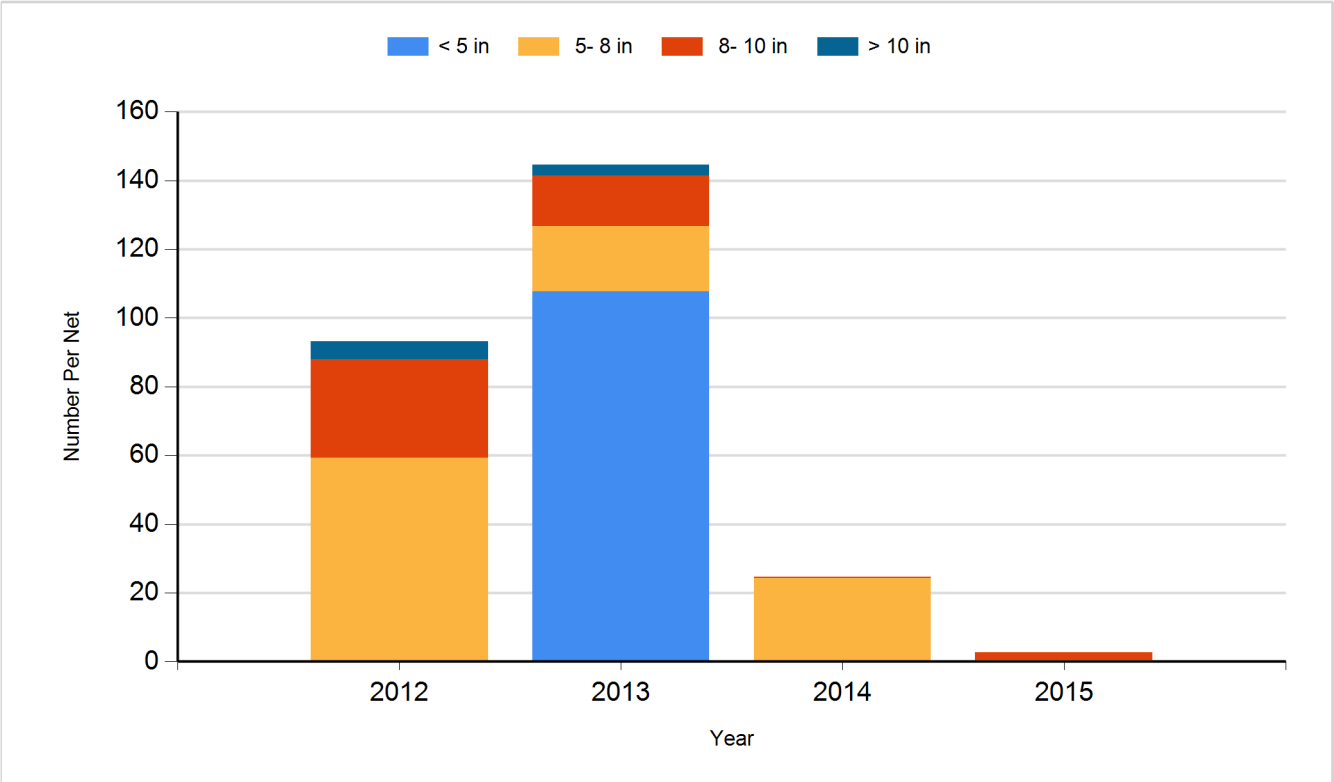
Species: Walleye
Gear: std exp gill net



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
2012	Muskellunge	Large Fingerling	3,018
2013	Walleye	Fry	750,000
2014	Muskellunge	Large Fingerling	1,600
2016	Muskellunge	Large Fingerling	1,577
2016	Walleye	Fry	800,000
2019	Walleye	Fry	650,000
2020	Muskellunge	Juvenile	26
2021	Muskellunge	Juvenile	1,048
2021	Walleye	Fry	800,000
2022	Walleye	Fry	800,000
2023	Muskellunge	Adult	85