Flat Creek Lake Survey Summary

Flat Creek Lake is a 203-acre impoundment located ten miles south of Lemmon on Highway 73. The primary species in the lake are Walleye, Black and White Crappie, Northern Pike, Black Bullhead, Yellow Perch and Common Carp. Gizzard Shad were introduced in 2022 as a forage species.

Black Bullhead. Black Bullhead numbers were up this year with 193.0 bullheads per frame net, compared to 7.5 last year. Fish were on the small side with the bulk of the sample being between 7 and 8 inches. Bullheads comprised of 97.7% of the fish in the frame net sample.

Walleye. Daytime electrofishing yielded an overall catch rate of 140 Walleye per hour. The adult Walleye catch rate was 76.6 per hour. Last year, catch rates were 34.5 and 22.5 respectively. Fish ranged in size from 4 to 19 inches. Flat Creek was stocked with 35,000 small fingerlings in the spring of 2023.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Flat Creek Dam, Perkins County
GRA-Lake-767-000
2023

<u>Lake Information</u>

Name: Flat Creek Dam

County: Perkins

Surface Area: 164 Acres

<u>Surveys and Investigations</u>

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

Gear	Date	Effort
frame net (std 3/4 in)	Jun 28, 2023	3 net-nights
frame net (std 3/4 in)	Jun 29, 2023	3 net-nights

<u>Common Fish Species Present</u>

Yellow Perch

Walleye

Northern Pike

Channel Catfish

Bluegill

Black Crappie

Black Bullhead

Common Carp

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.

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

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

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.

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

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 (in)	Stock (cm)	Quality (in)	Quality (cm)	Preferred (in)	Preferred (cm)	Memorable (in)	Memorable (cm)	Trophy (in)	Trophy (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
frame net (std 3/4 in)	Black Bullhead	1155	178.0	81.6	2	1	0		88	1
	Black Crappie	1	0.0	0.0	0		0			
	Common Carp	19	3.2	1.7	26		5		82	2
	Northern Pike	7	1.2	0.7	100		29		86	5
	Yellow Perch	1	0.2	0.2	100		0		80	

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 | | | | | | | | | | |
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std frame net	Black Bullhead				8.0							8.00
	Black Crappie				0.2							0.20
	Common Carp				1.3							1.30
	Northern Pike				0.1							0.10
	Smallmouth Bass				0.0							0.00
	Walleye				1.0							1.00
	White Crappie				0.9							0.90
	White Sucker				0.2							0.20
	Yellow Perch				0.1							0.10
AFS std gill net	Black Bullhead				18.8		6.5		3.0	4.0		8.08
	Channel Catfish				0.3		0.0		0.0	0.0		0.08
	Common Carp				23.0		9.5		4.5	12.0		12.25
	Northern Pike				1.3		1.0		0.5	1.0		0.95
	Walleye				1.8		0.5		0.0	0.5		0.70
	White Sucker				0.0		0.5		1.0	0.0		0.38
	Yellow Perch				0.3		0.0		0.0	0.0		0.08
boat shocker (day)	Walleye*									93.3		93.30
frame net (std 3/4 in)	Black Bullhead	63.8	80.1				9.7		0.7	7.0	178.0	56.55
	Black Crappie	0.1	0.5				0.5		0.3	0.3	0.0	0.28
	Channel Catfish	0.0	0.0				0.0		0.0	0.0	0.0	0.00
	Common Carp	2.9	4.9				0.3		4.5	8.8	3.2	4.10
	Green Sunfish	0.1	0.0				0.3		0.2	0.0	0.0	0.10
	Northern Pike	2.6	0.5				0.2		1.0	3.5	1.2	1.50
	Walleye	0.8	1.0				1.7		1.2	2.0	0.0	1.12
	White Crappie	0.0	0.4				0.0		0.7	0.3	0.0	0.23
	White Sucker	0.0	0.1				0.0		0.5	0.5	0.0	0.18
	Yellow Perch	1.3	0.1				0.7		0.0	0.3	0.2	0.43
std exp gill net	Black Bullhead	79.0	23.5									51.25
	Common Carp	17.0	7.5									12.25
	Northern Pike	2.5	2.0									2.25
	Walleye	1.0	0.5									0.75
	White Sucker	1.0	1.0									1.00
	Yellow Perch	0.0	0.0									0.00

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std frame net	Black Bullhead	PSD				0						
		PSD-P				0						
		Wr				76						
	Black Crappie	PSD				50						
		PSD-P				50						
		Wr				107						
	Common Carp	PSD				38						
		PSD-P				8						
		Wr				84						
	Northern Pike	PSD				100						
		PSD-P				0						
		Wr				77						
	Walleye	PSD				60						
		PSD-P				30						
		Wr				76						
	Yellow Perch	PSD				100						
		PSD-P				0						
		Wr				88						
AFS std gill net	Black Bullhead	PSD				0		0		17	13	
		PSD-P				0		0		0	0	
		Wr				78		88		82	80	
	Channel Catfish	PSD				100						
		PSD-P				0						
		Wr				89						
	Common Carp	PSD				12		32		67	50	
		PSD-P				1		0		0	0	
		Wr				85		82		80	81	
	Northern Pike	PSD				100		100		100	100	
		PSD-P				60		100		0	0	
		Wr				81		91		93	79	
	Walleye	PSD				100		0			0	
		PSD-P				71		0			0	
		Wr				86		85			79	

Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Yellow Perch	PSD					0					
		PSD-P					0					
		Wr				111						
boat shocker (day)	Walleye	PSD									38	
		PSD-P									2	
		Wr									90	
frame net (std 3/4 in)	Black Bullhead	PSD	3	0				0		0	11	2
		PSD-P	0	0				0		0	0	0
		Wr	75	77				88		82	75	88
	Black Crappie	PSD	100	100				100		0	100	0
		PSD-P	0	0				100		0	0	0
		Wr	91	98				92		108	107	
	Common Carp	PSD	9	0				0		37	31	26
		PSD-P	0	0				0		0	0	5
		Wr	82	85				82		85	81	82
	Northern Pike	PSD	100	100				100		83	100	100
		PSD-P	81	50				100		50	36	29
		Wr	88	84						87	83	86
	Walleye	PSD	50	63				20		100	25	
		PSD-P	50	25				10		100	0	
		Wr	83	87				82		86	85	
	Yellow Perch	PSD	10	0				100			0	100
		PSD-P	0	0				0			0	0
		Wr	76	95				92			95	80
std exp gill net	Black Bullhead	PSD	0	0								
		PSD-P	0	0								
		Wr	82	89								
	Common Carp	PSD	0	7								
		PSD-P	0	7								
		Wr	82	81								
	Northern Pike	PSD	100	75								
		PSD-P	80	75								
		Wr	96	88								
	Walleye	PSD	100	0								
		PSD-P	50	0								

Gear	Species	Index	Year									
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
std exp gill net	Walleye	Wr	93	80								

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+
2017	1					258 (1)					

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	7			423 (2)	585 (1)		585 (1)	605 (1)	613 (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).

| | | Length Groups | | | | | | | |
| | | S-Q | | Q-P | | P-M | | M | |
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2019	13	88 (1.6)	0		0		0	
	2021	5	82 (3.8)	1	83	0		0	
	2022	7	80 (0.9)	1	82	0		0	
Black Crappie Frame Net	2019	0		0		3	92 (1.2)	0	
	2021	2	108 (1.1)	0		0		0	
	2022	0		1	107	0		0	
	2023	0		0		0		0	
Common Carp Gill Net	2019	13	82 (1.8)	6	82 (2.1)	0		0	
	2021	3	76 (4.4)	6	81 (1.8)	0		0	
	2022	12	80 (1.5)	12	81 (1.7)	0		0	
Northern Pike Gill Net	2019	0		0		0		2	91
	2021	0		1	93	0		0	
	2022	0		2	79 (4.4)	0		0	
Walleye Gill Net	2019	1	85	0		0		0	
	2022	1	79	0		0		0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

2019

Species: Common Carp
Gear: AFS std gill net

2019

2022
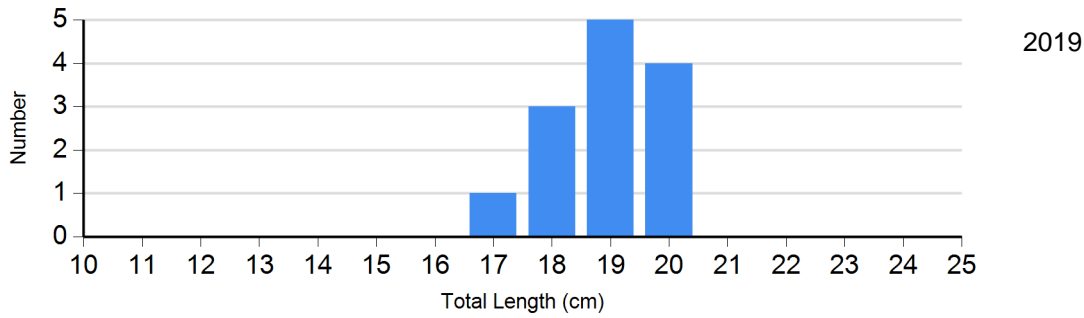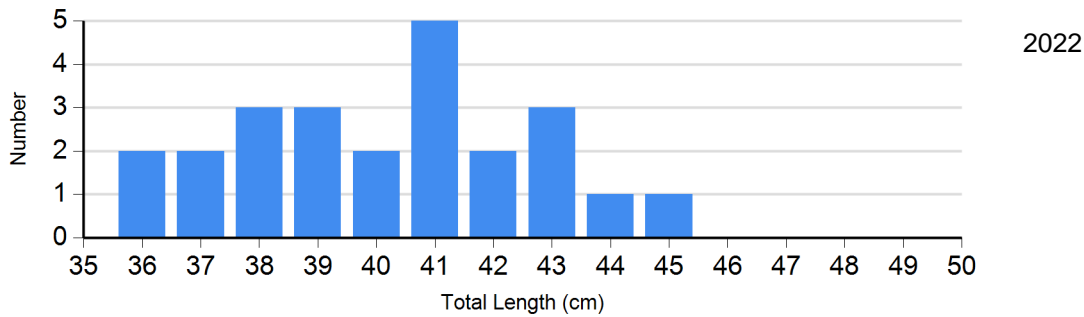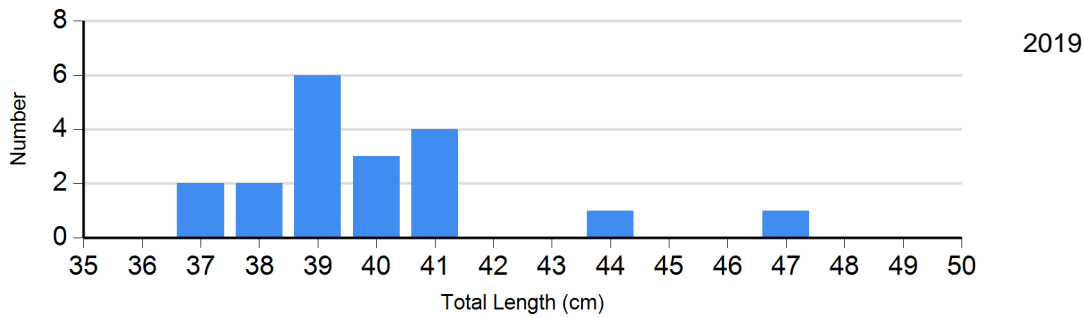
Historic Fish Sizes and Relative Abundance

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

Species: Black Bullhead
Gear: AFS std gill net
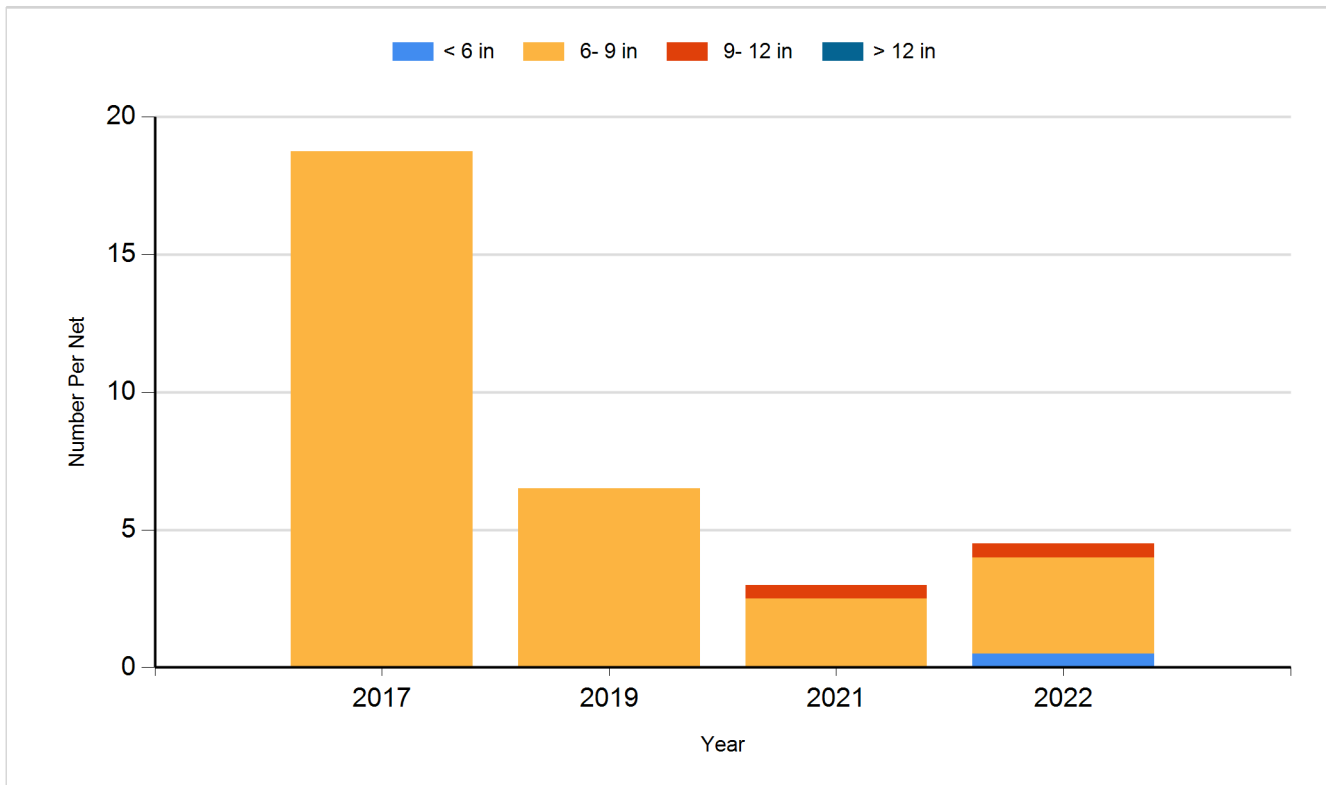
Species: Black Bullhead
Gear: std exp gill net
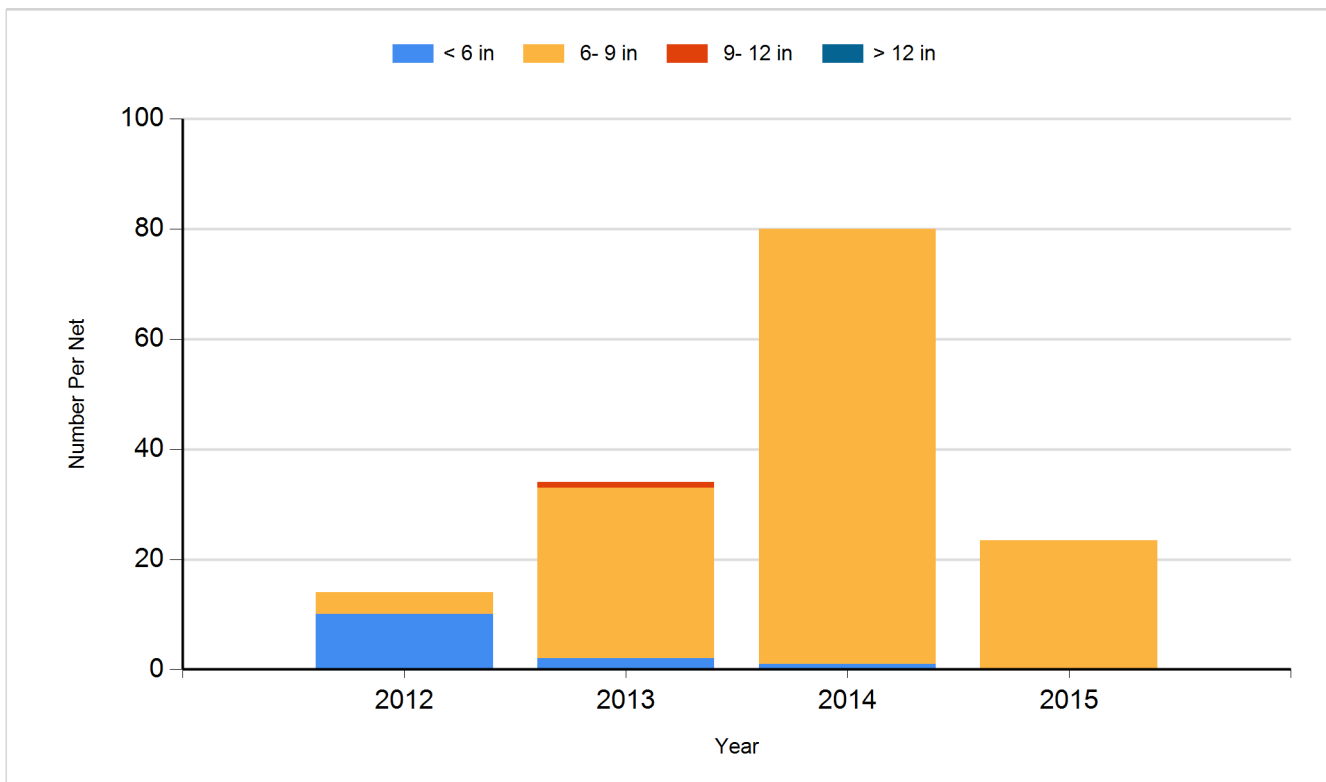
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Gear: AFS std frame net
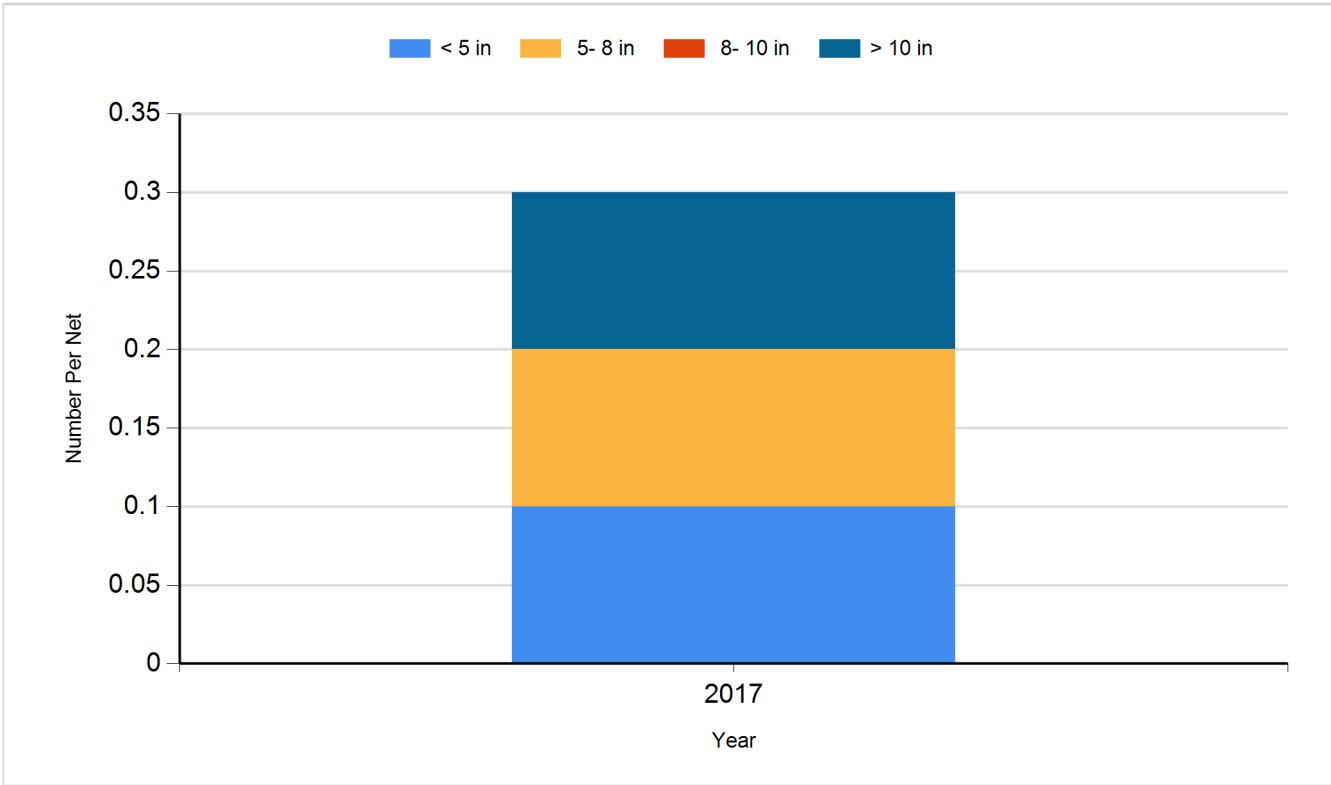
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Gear: frame net (std 3/4 in)
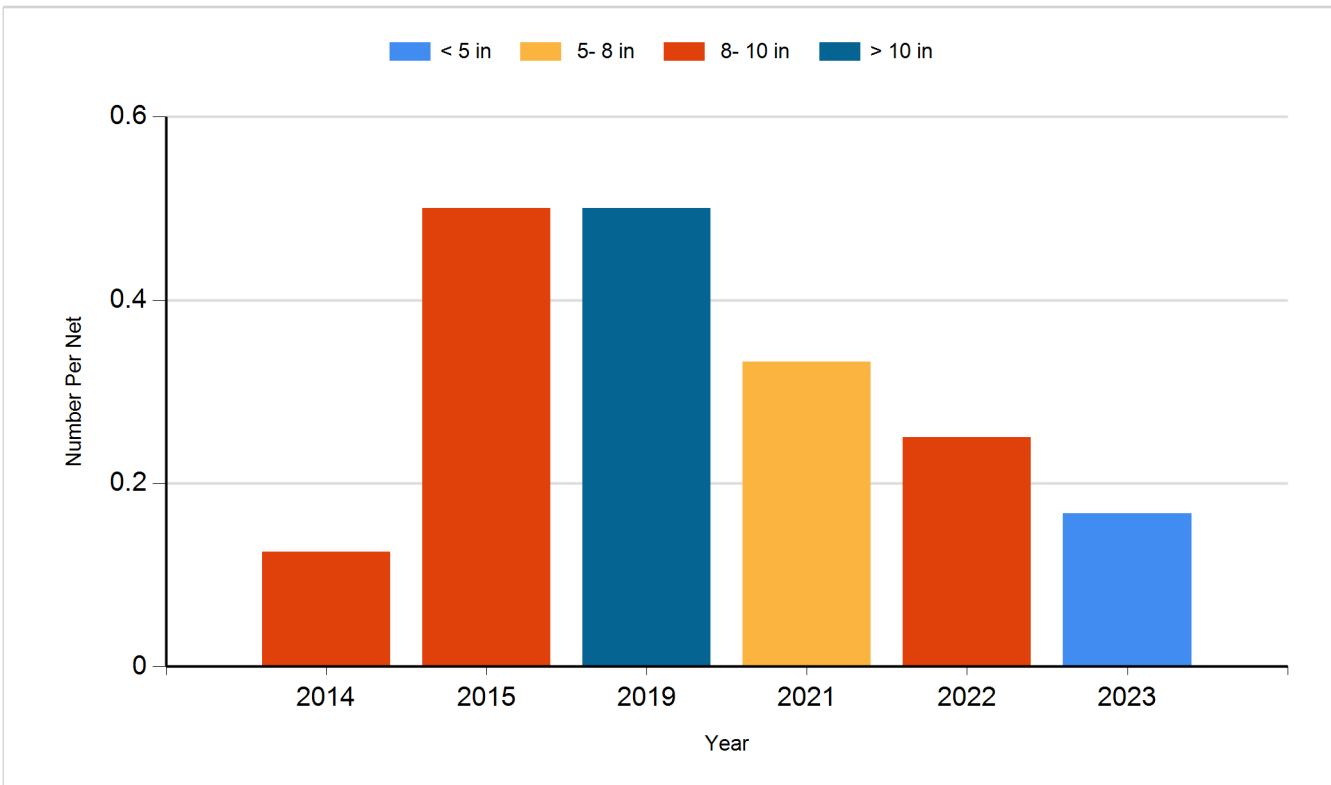
Species: Channel Catfish
Gear: AFS std gill net
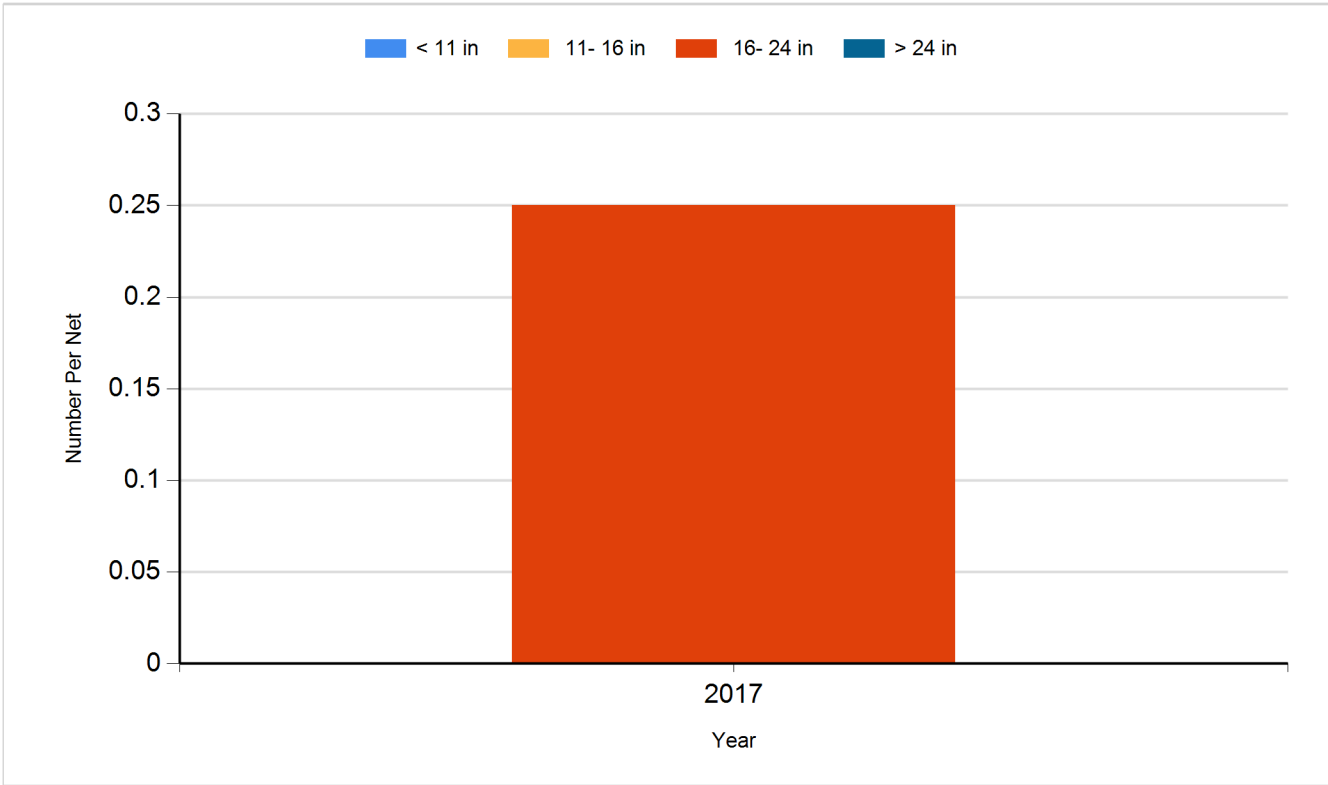
Species: Common Carp
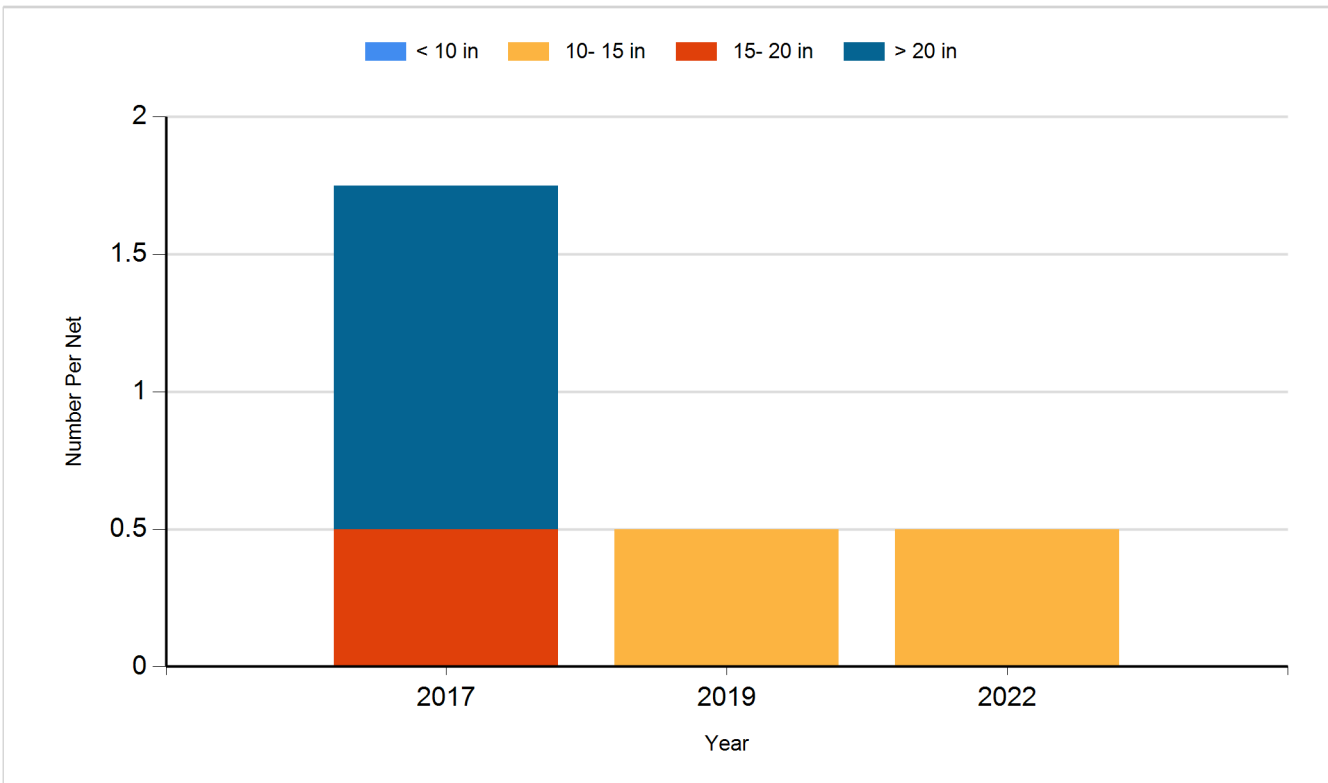Gear: AFS std gill net
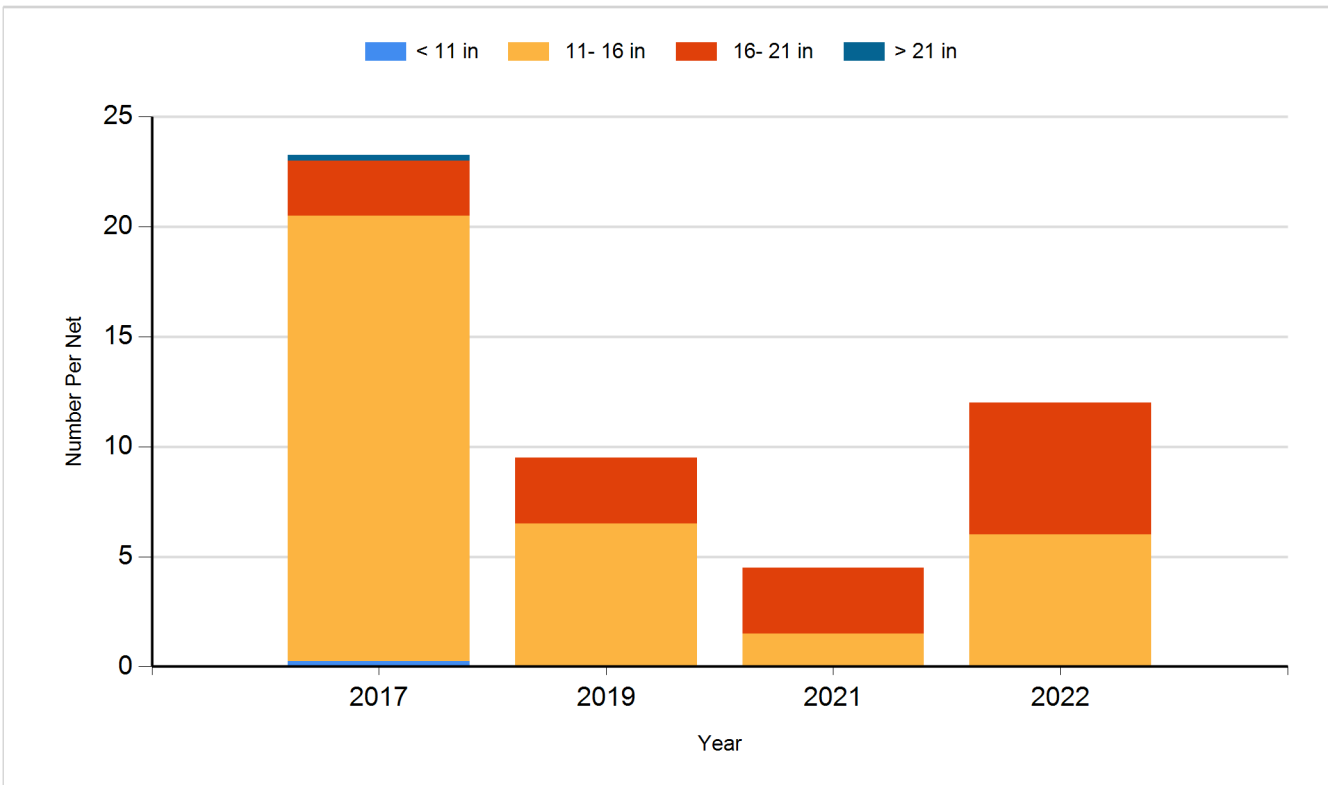
Species: Common Carp
Gear: std exp gill net
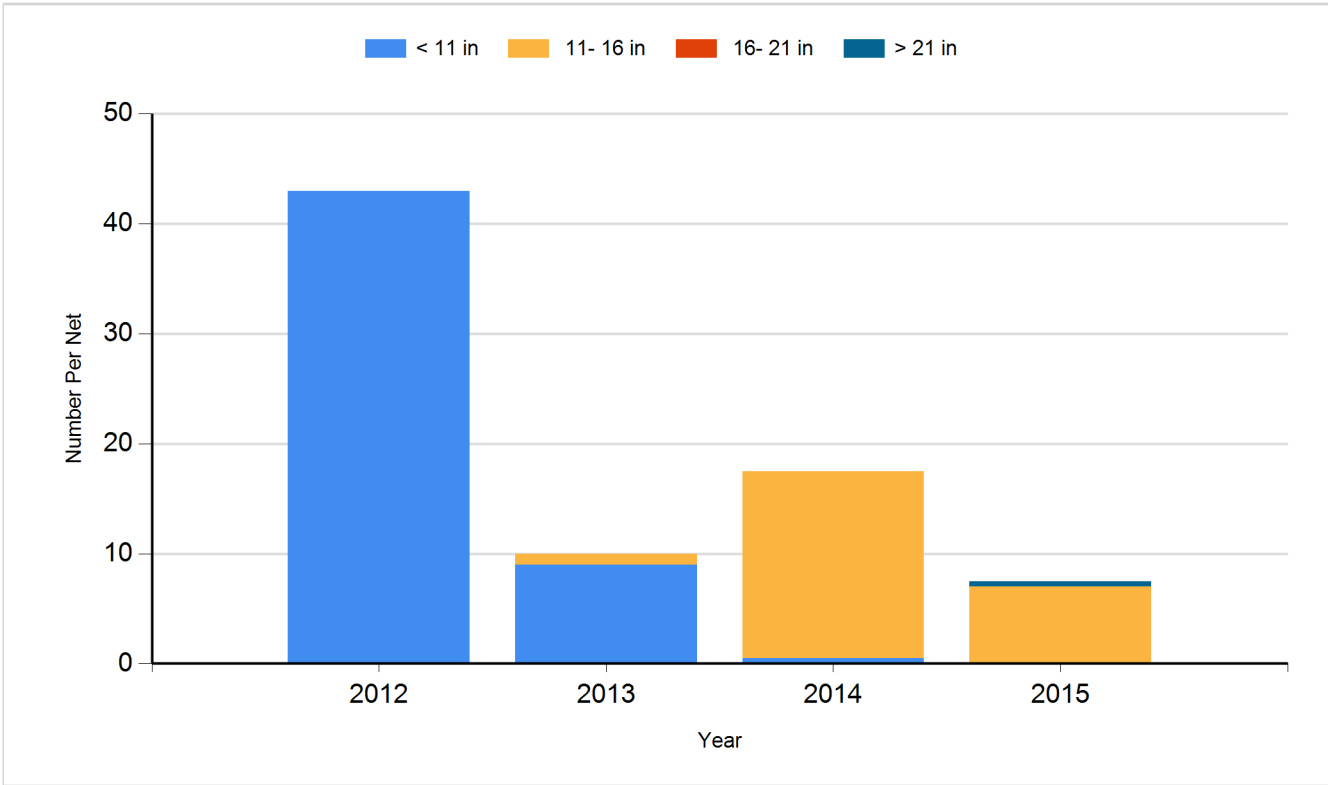
Species: Northern Pike
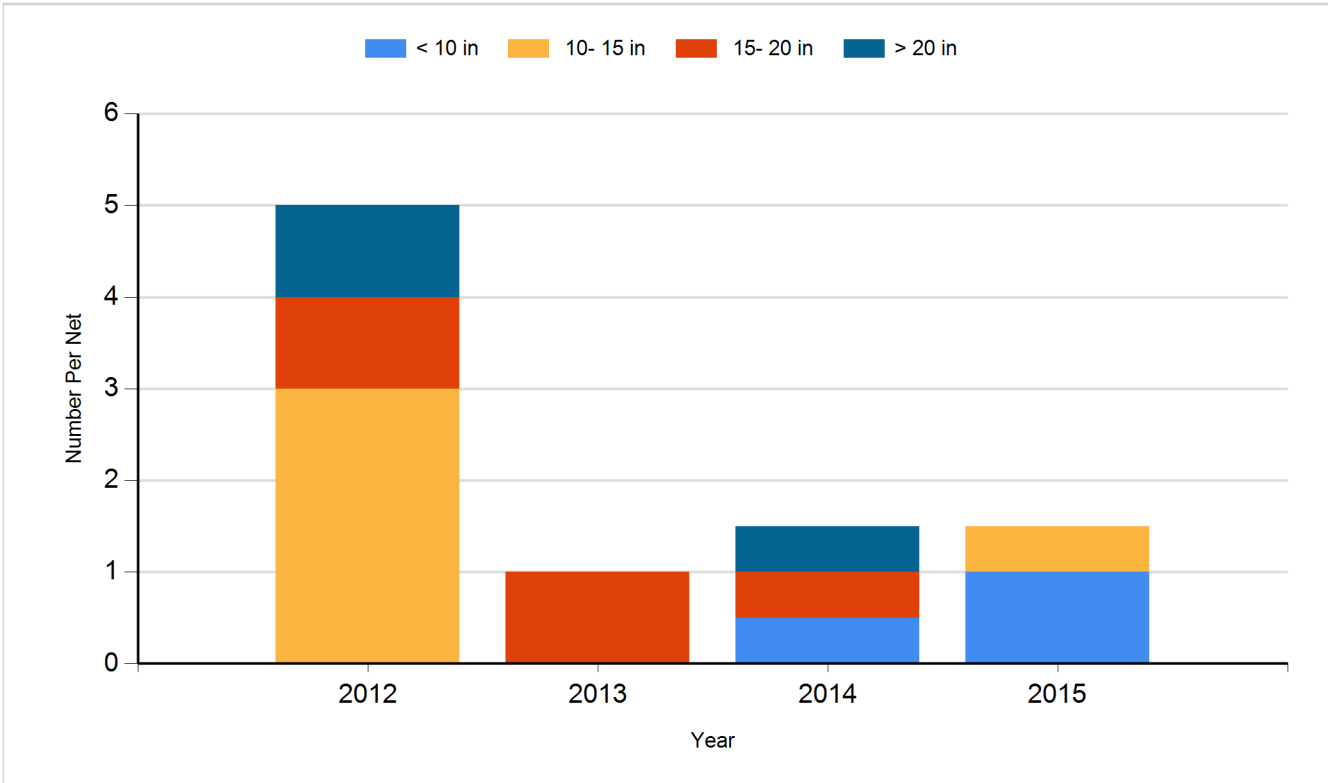Gear: AFS std gill net
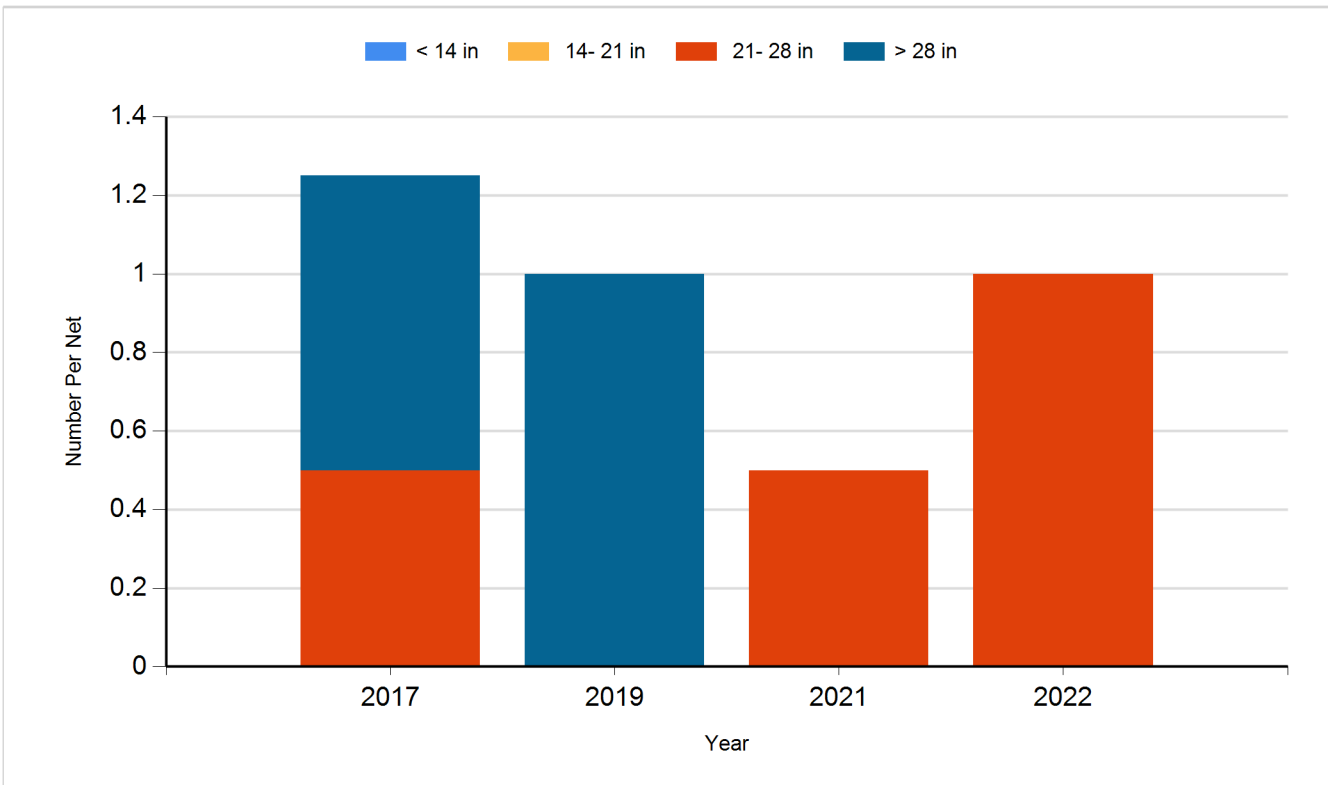
Species: Northern Pike
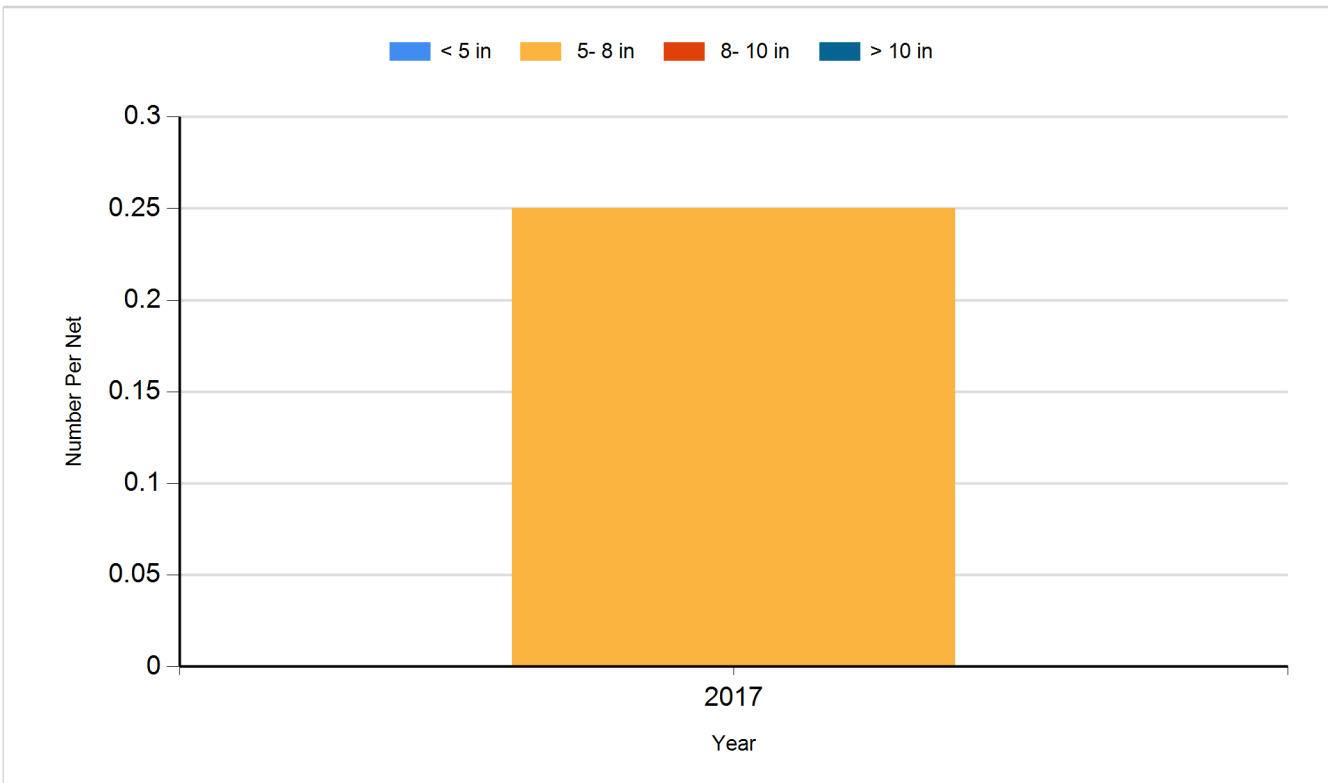Gear: std exp gill net
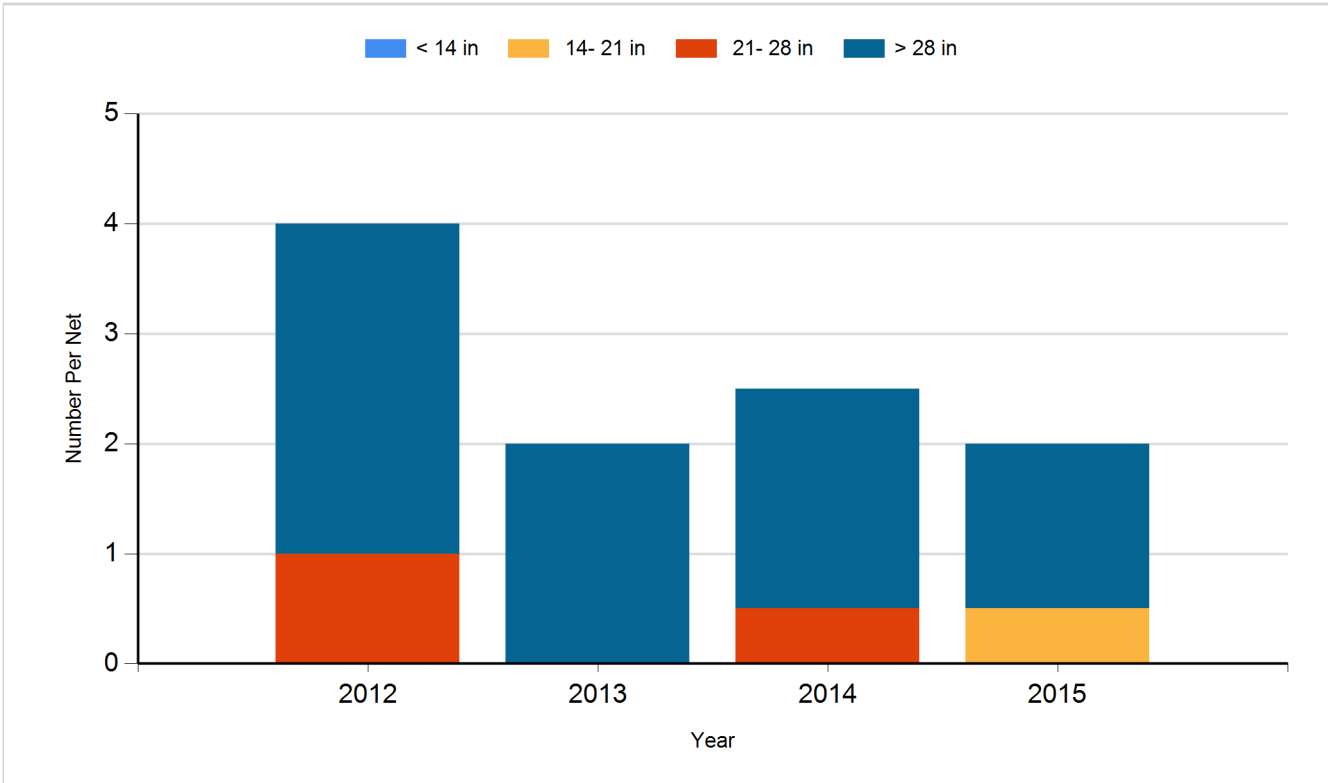
Species: Walleye
Gear: AFS std gill net

Species: Walleye
Gear: std exp gill net

Species: Yellow Perch
Gear: AFS std gill net

Fish Stocking

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

Year	Species	Size	Number
2012	Largemouth Bass	Fingerling	14,460
2013	Walleye	Large Fingerling	4,000
2014	Largemouth Bass	Adult	100
2014	Walleye	Small Fingerling	19,800
2016	Walleye	Fingerling	25,500
2017	Walleye	Small Fingerling	29,700
2018	Walleye	Small Fingerling	29,600
2019	Walleye	Small Fingerling	30,600
2021	Walleye	Juvenile	30,000
2022	Gizzard Shad	Adult	27
2022	Walleye	Juvenile	32,160
2023	Walleye	Juvenile	35,000