SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Oak, Brookings County
LQP-Lake-68-000
2019

Lake Information

Name:	Oak	**Maximum Depth:**	6 Feet
County:	Brookings	**Mean Depth:**	4 Feet
Legal Description:	T110N- R48W-Sec 1, 12, 13; T112N-R47W-Sec 7, 18	**OHWM Elevation:**	1,802
Surface Area:	394 Acres	**Outlet Elevation:**	1,802

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 06, 2019	6 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Black Bullhead

Common Carp

Saugeye

Northern Pike

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	Black Bullhead	36	6.0	2.5	64	12	8			
	Common Carp	23	3.8	0.7	100		39	16		
	Northern Pike	1	0.2	0.2	100		0		80	
	Saugeye	7	1.2	0.7	86		43		97	4
	Yellow Perch	37	6.2	1.5	68	12	24	11	99	2

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 gill net	Bigmouth Buffalo								2.5		0.0	1.25
	Black Bullhead								18.2		6.0	12.10
	Common Carp								7.0		3.8	5.40
	Northern Pike								0.0		0.2	0.10
	Saugeye								0.0		1.2	0.60
	Walleye								11.3		0.0	5.65
	White Sucker								0.2		0.0	0.10
	Yellow Perch								10.8		6.2	8.50
frame net (std 3/4 in)	Bigmouth Buffalo			0.6								0.60
	Black Bullhead			87.8								87.80
	Common Carp			2.0								2.00
	Northern Pike			11.4								11.40
	Walleye			2.6								2.60
	White Sucker			2.6								2.60
	Yellow Perch			54.0								54.00
std exp gill net	Bigmouth Buffalo			0.0		1.3	0.0	0.3				0.40
	Black Bullhead			38.5		92.7	79.3	37.3				61.95
	Common Carp			10.0		5.0	0.7	15.7				7.85
	Northern Pike			2.0		1.3	0.3	1.0				1.15
	Walleye			13.0		6.3	2.7	58.7				20.18
	White Sucker			0.5		0.0	0.0	0.0				0.13
	Yellow Perch			71.0		40.3	55.3	92.7				64.83

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 gill net	Black Bullhead	PSD								53		64
		PSD-P								6		8
	Common Carp	PSD								95		100
		PSD-P								0		39
	Northern Pike	PSD										100
		PSD-P										0
		Wr										80
	Saugeye	PSD										86
		PSD-P										43
		Wr										97
	Walleye	PSD								44		
		PSD-P								10		
		Wr								90		
	Yellow Perch	PSD								38		68
		PSD-P								2		24
		Wr								100		99
frame net (std 3/4 in)	Black Bullhead	PSD			17							
		PSD-P			0							
		Wr			80							
	Common Carp	PSD			70							
		PSD-P			60							
		Wr			96							
	Northern Pike	PSD			67							
		PSD-P			16							
		Wr			83							
	Walleye	PSD			100							
		PSD-P			8							
		Wr			92							
	Yellow Perch	PSD			26							
		PSD-P			2							
		Wr			88							
std exp gill net	Black Bullhead	PSD			5		2	78	54			

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
std exp gill net	Black Bullhead	PSD-P			0		0	0	4			
		Wr			85							
	Common Carp	PSD			5		20	0	0			
		PSD-P			0		0	0	0			
		Wr			88							
	Northern Pike	PSD			0		50	100	67			
		PSD-P			0		0	0	0			
		Wr			85		94	88	82			
	Walleye	PSD			88		0	100	5			
		PSD-P			0		0	0	0			
		Wr			89		93	98	91			
	Yellow Perch	PSD			3		22	17	41			
		PSD-P			0		2	0	1			
		Wr			80		92	104	97			

Length at Capture

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

Species: Saugeye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	7		370 (4)	461 (1)	532 (2)						

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	37	166 (11)	217 (15)	246 (4)	262 (7)						
2014	123	140 (50)	162 (8)	186 (21)	204 (38)	226 (5)					

Fish Condition

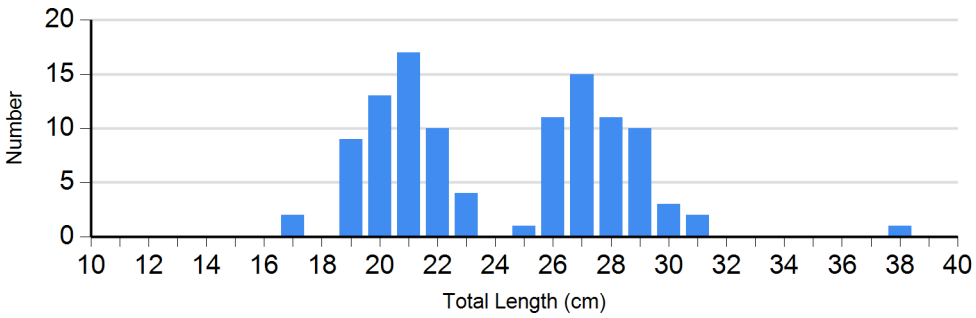
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2015	0		1	88	0		0	
	2016	1	82	2	82 (0.9)	0		0	
	2019	0		1	80	0		0	
Saugeye Gill Net	2019	1	106	3	100 (3.0)	3	91 (3.2)	0	
Walleye Gill Net	2015	0		8	98 (2.3)	0		0	
	2016	168	91 (0.5)	8	91 (0.8)	0		0	
	2017	38	89 (0.9)	23	92 (0.9)	7	86 (1.3)	0	
Yellow Perch Gill Net	2015	138	107 (1.3)	28	96 (1.2)	0		0	
	2016	163	98 (1.3)	112	95 (0.9)	3		0	
	2017	40	102 (1.2)	24	98 (1.4)	1	97	0	
	2019	12	98 (2.3)	16	99 (1.8)	9	99 (2.2)	0	

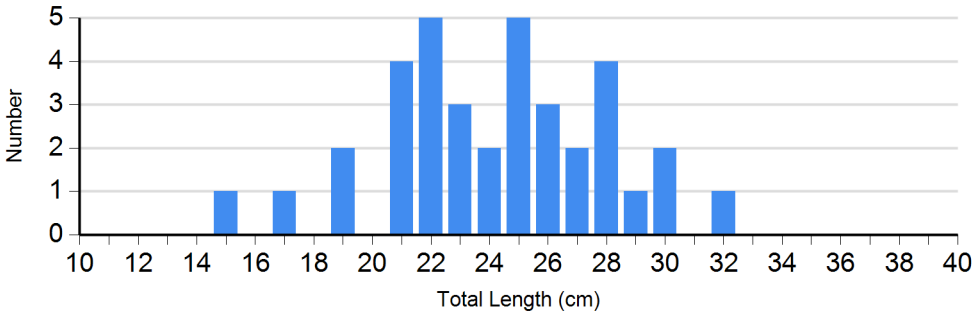
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

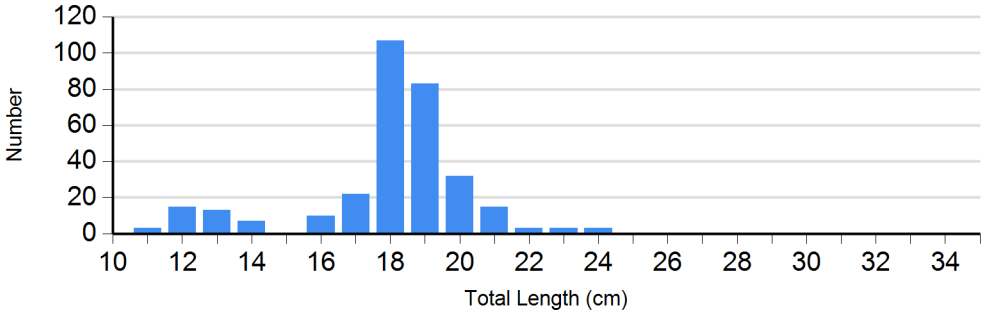


2017



2019

Species: Black Bullhead
Gear: std exp gill net



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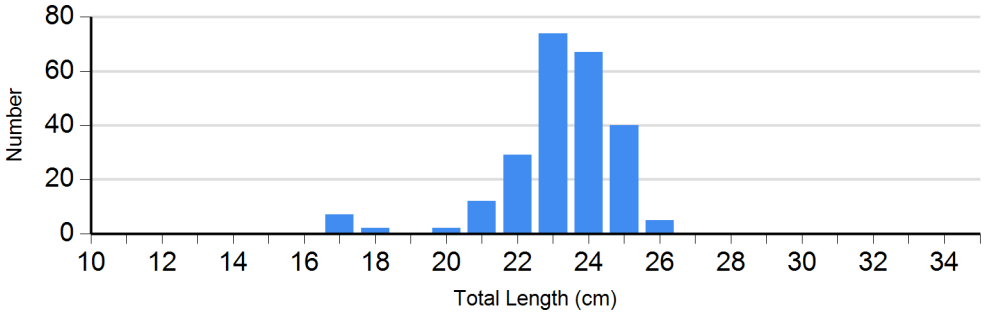
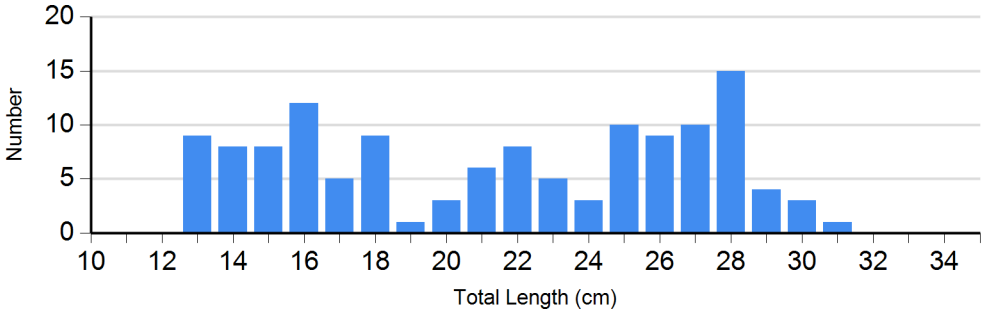
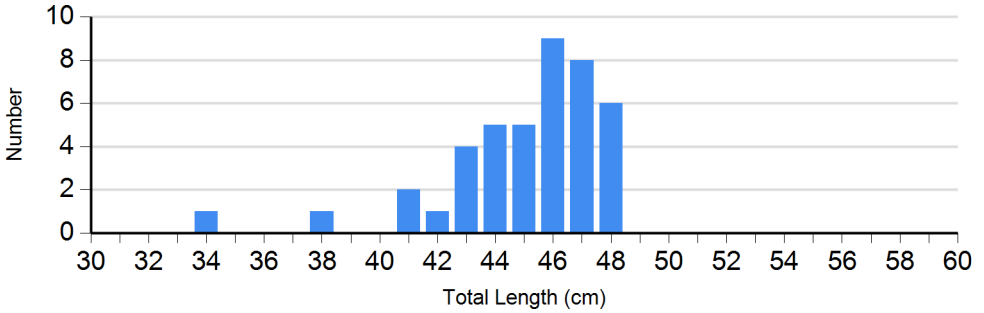


2015

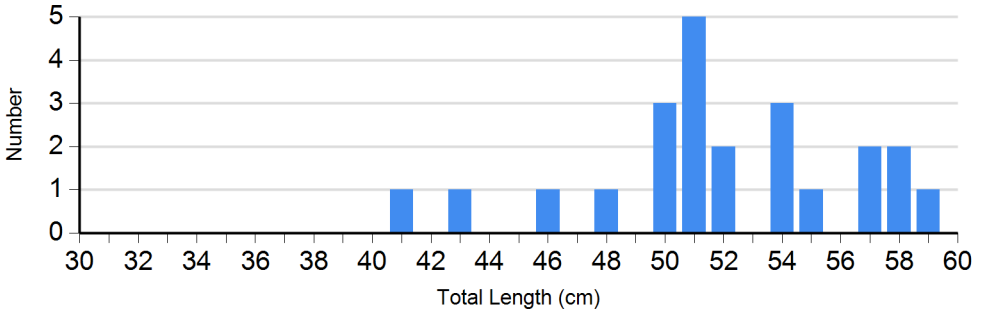


2016

Species: Common Carp
Gear: AFS std gill net

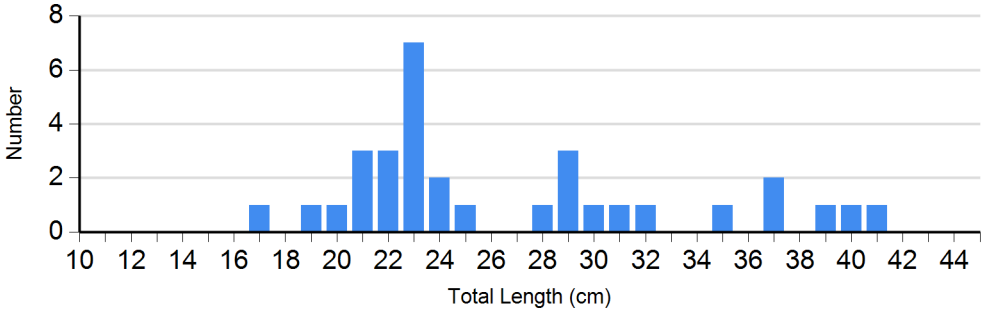


2017

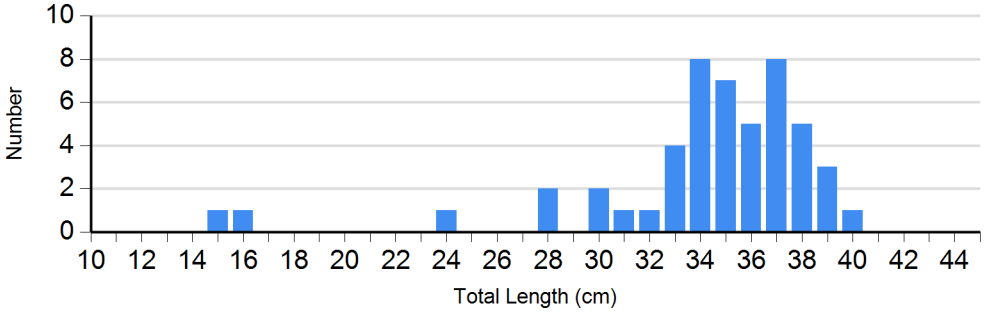


2019

Species: Common Carp
Gear: std exp gill net

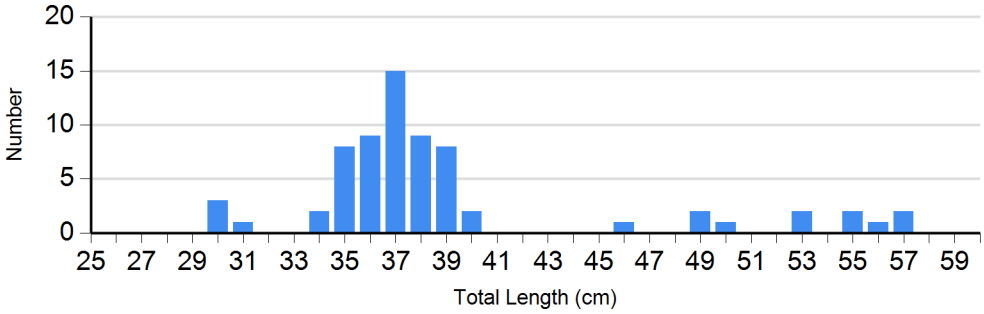


2014



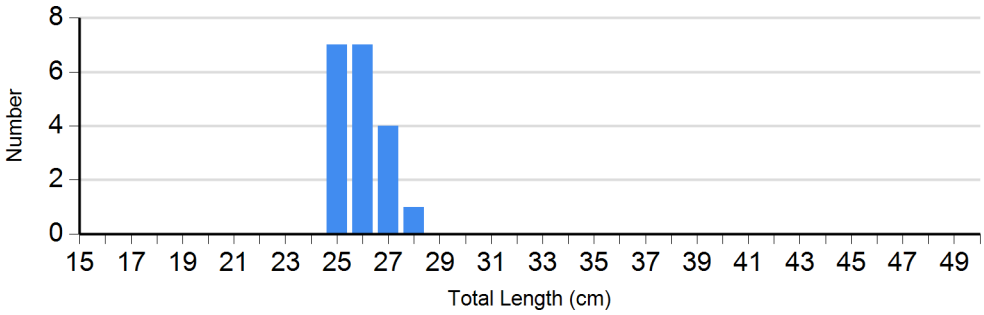
2016

Species: Walleye
Gear: AFS std gill net

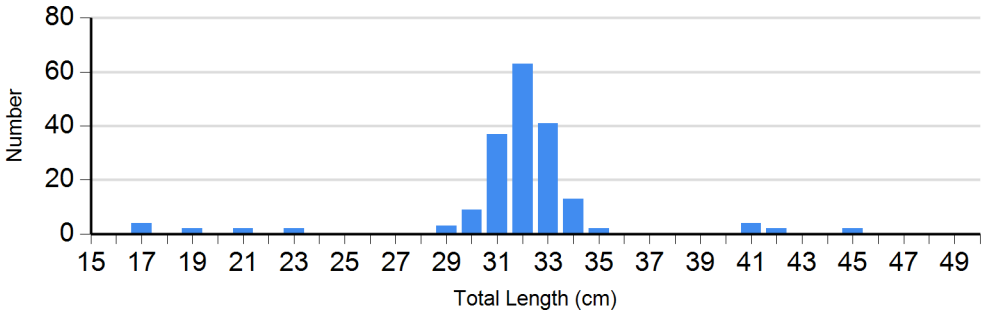


2017

Species: Walleye
Gear: std exp gill net

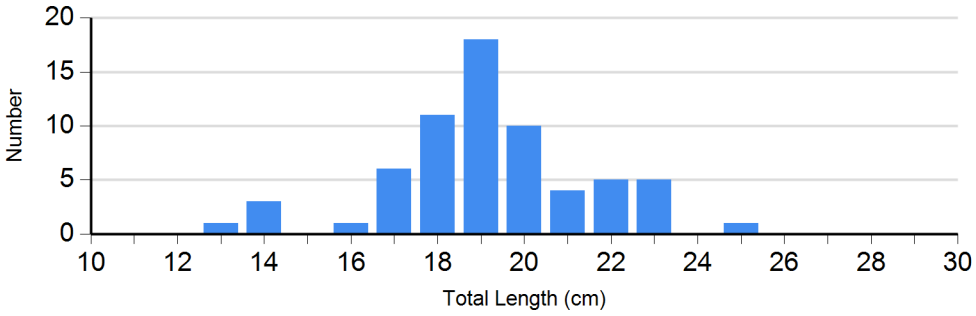


2014



2016

Species: Yellow Perch
Gear: AFS std gill net



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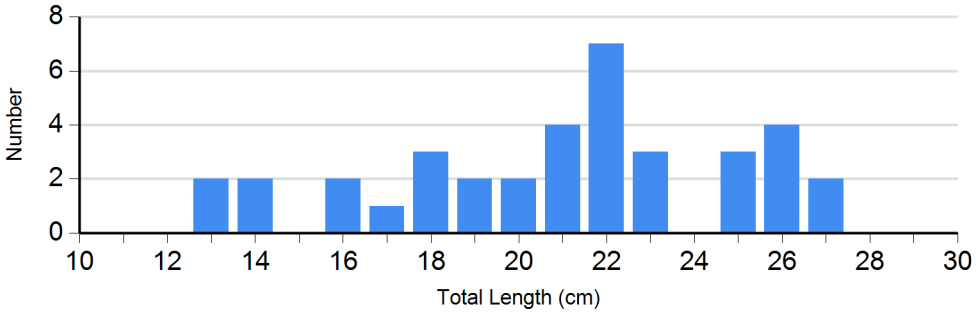
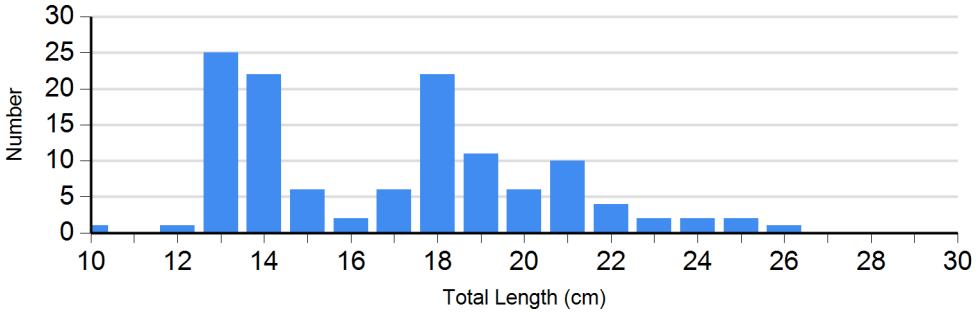


2019

Species: Yellow Perch
Gear: std exp gill net



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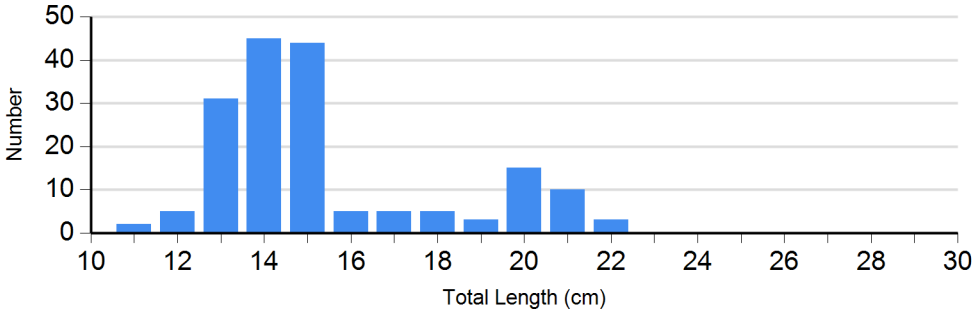

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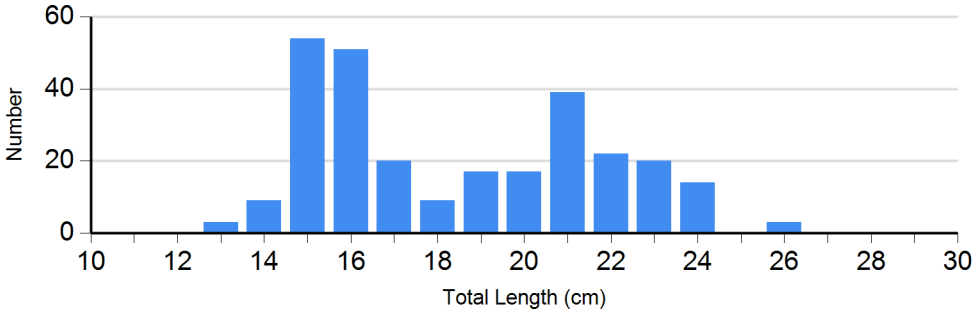
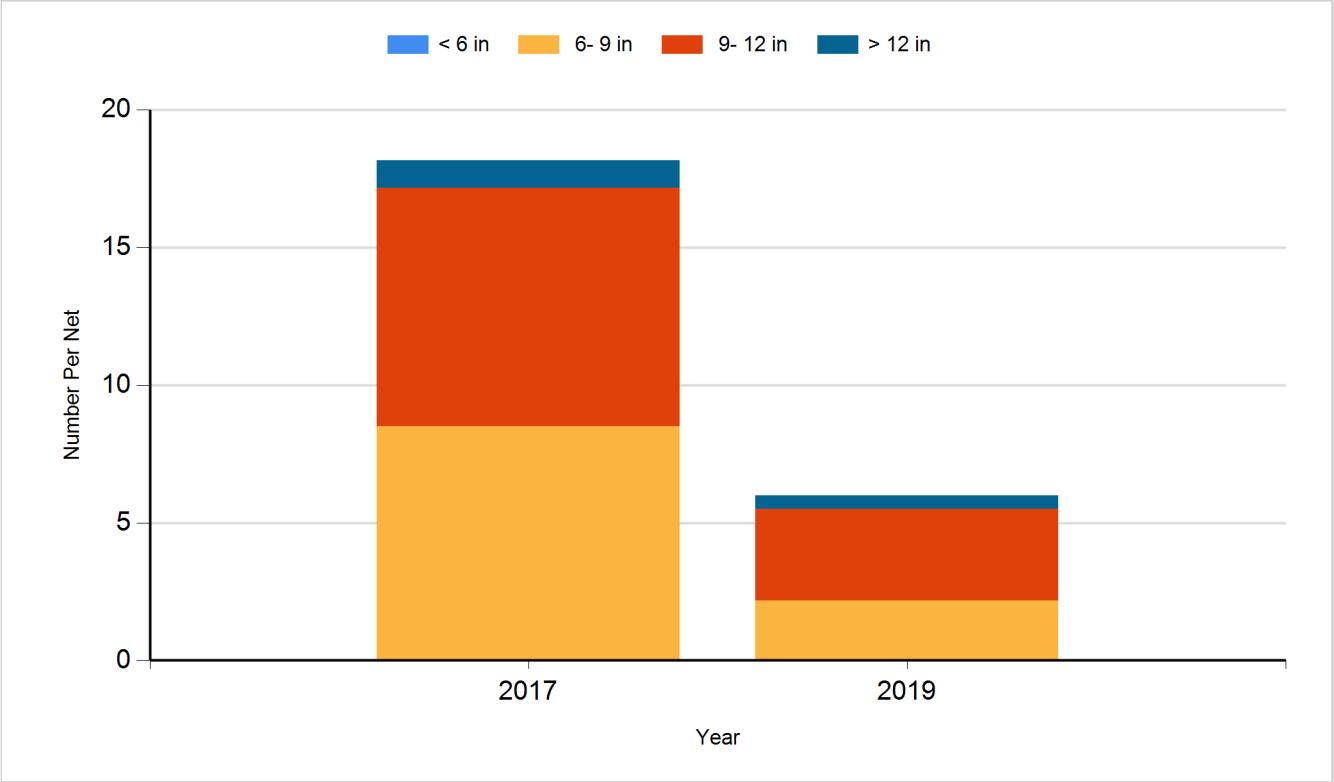


2016

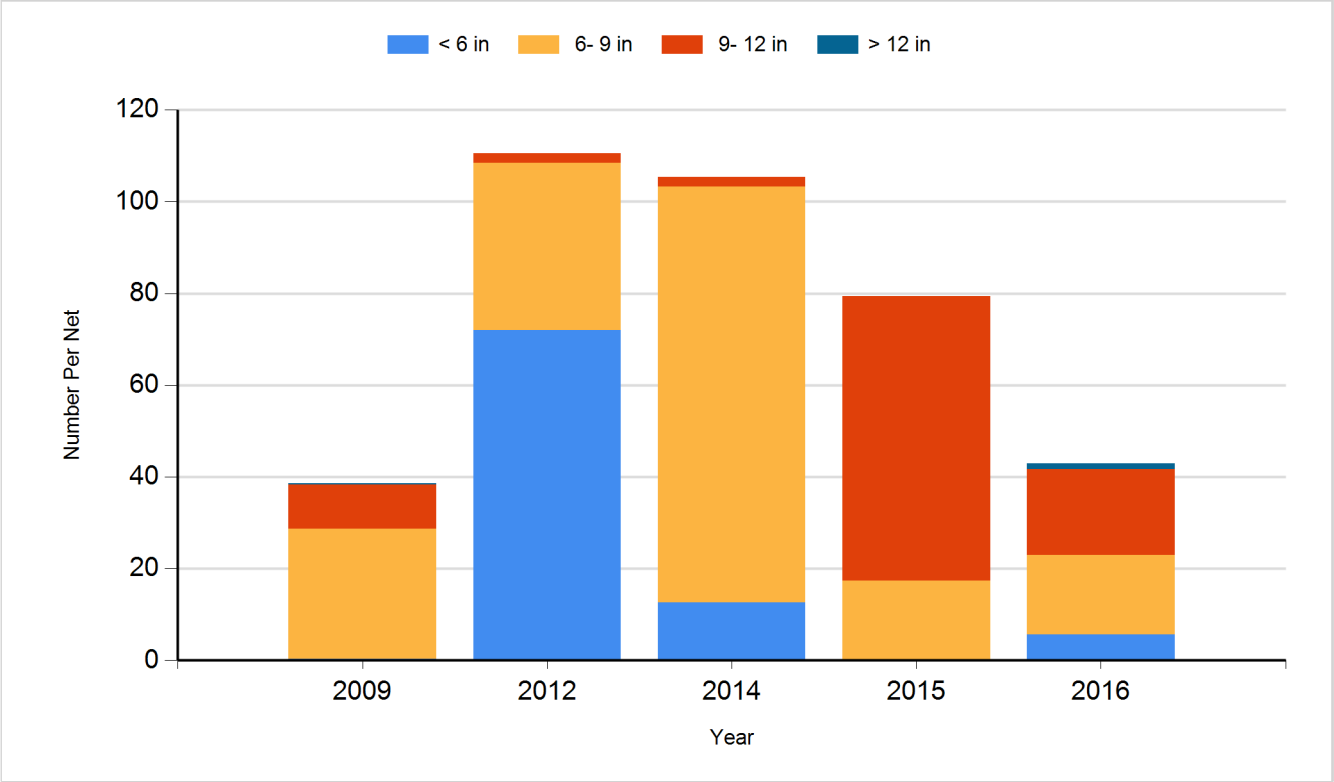
Historic Fish Sizes and Relative Abundance

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

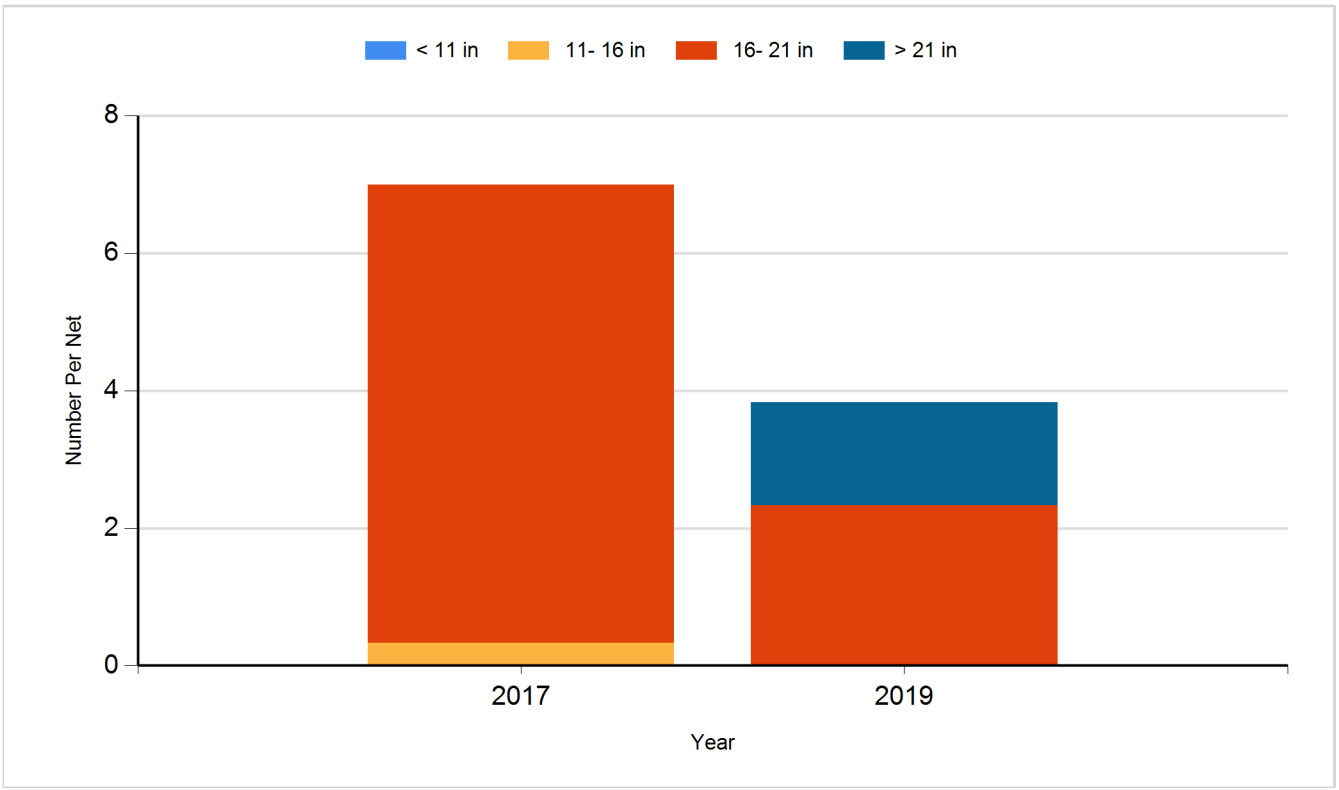
Species: Black Bullhead
Gear: AFS std gill net



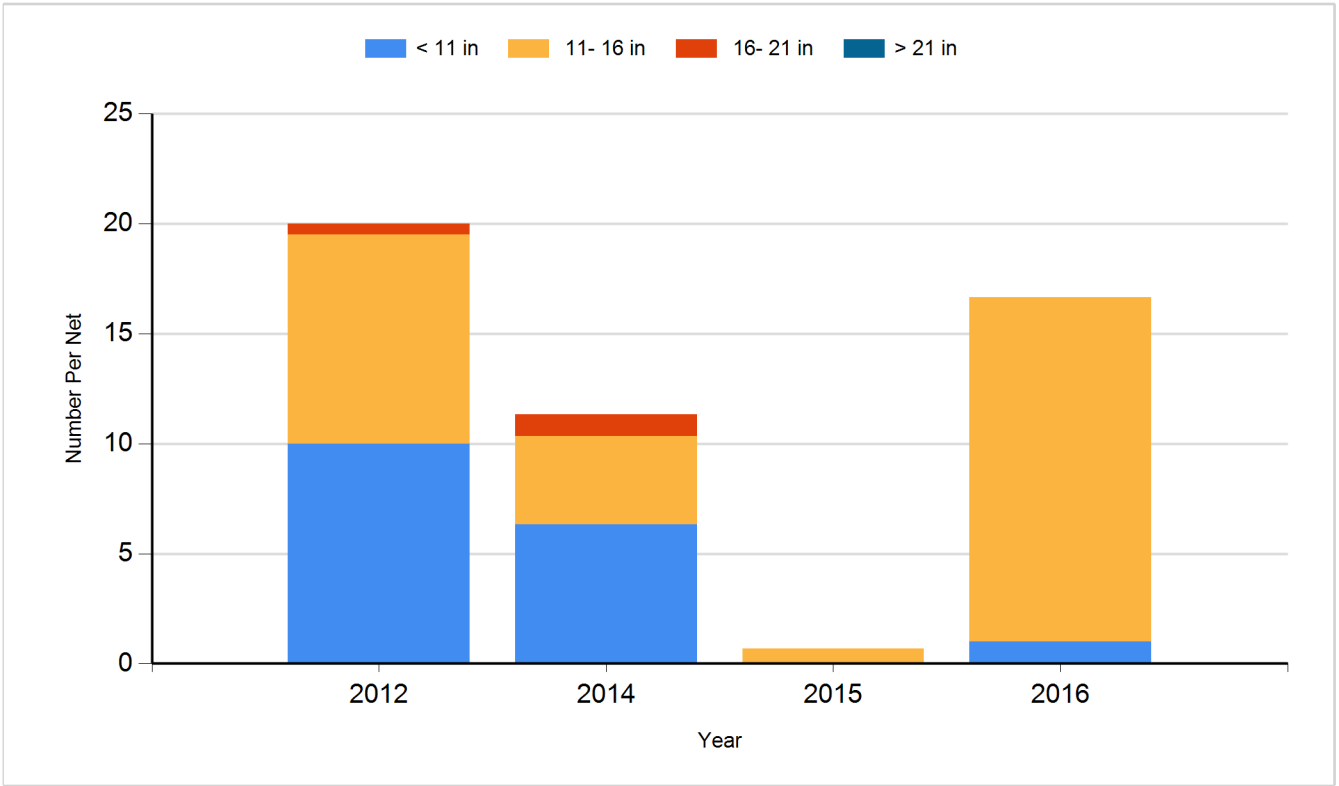
Species: Black Bullhead
Gear: std exp gill net



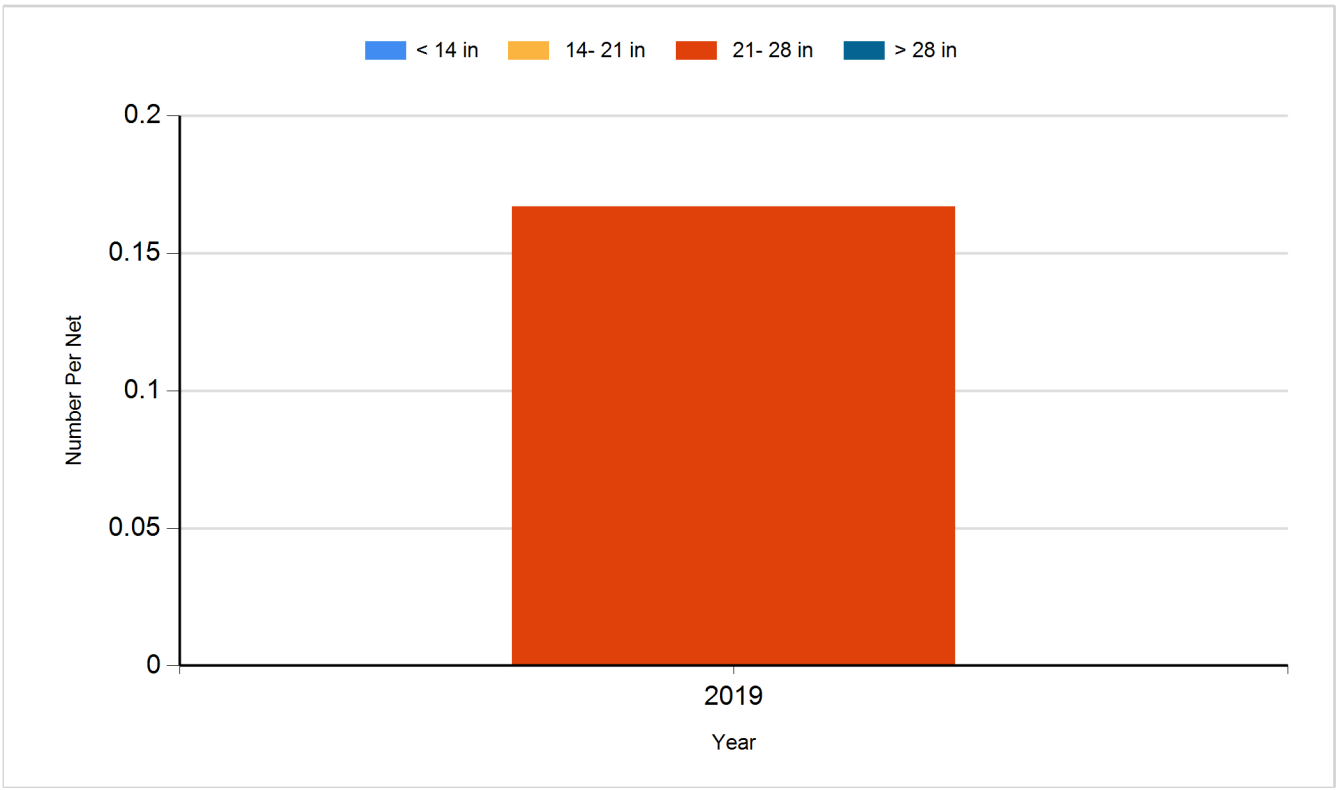
Species: Common Carp
Gear: AFS std gill net



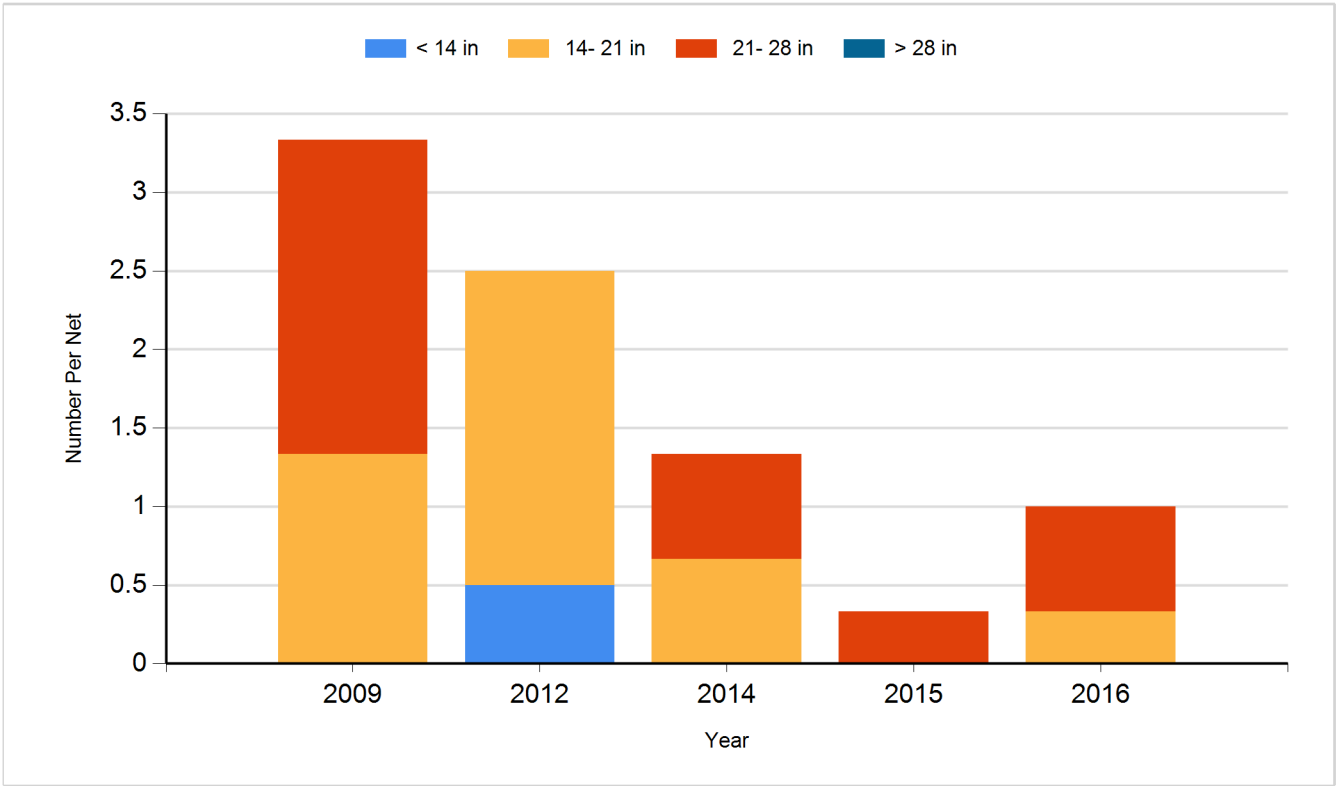
Species: Common Carp
Gear: std exp gill net



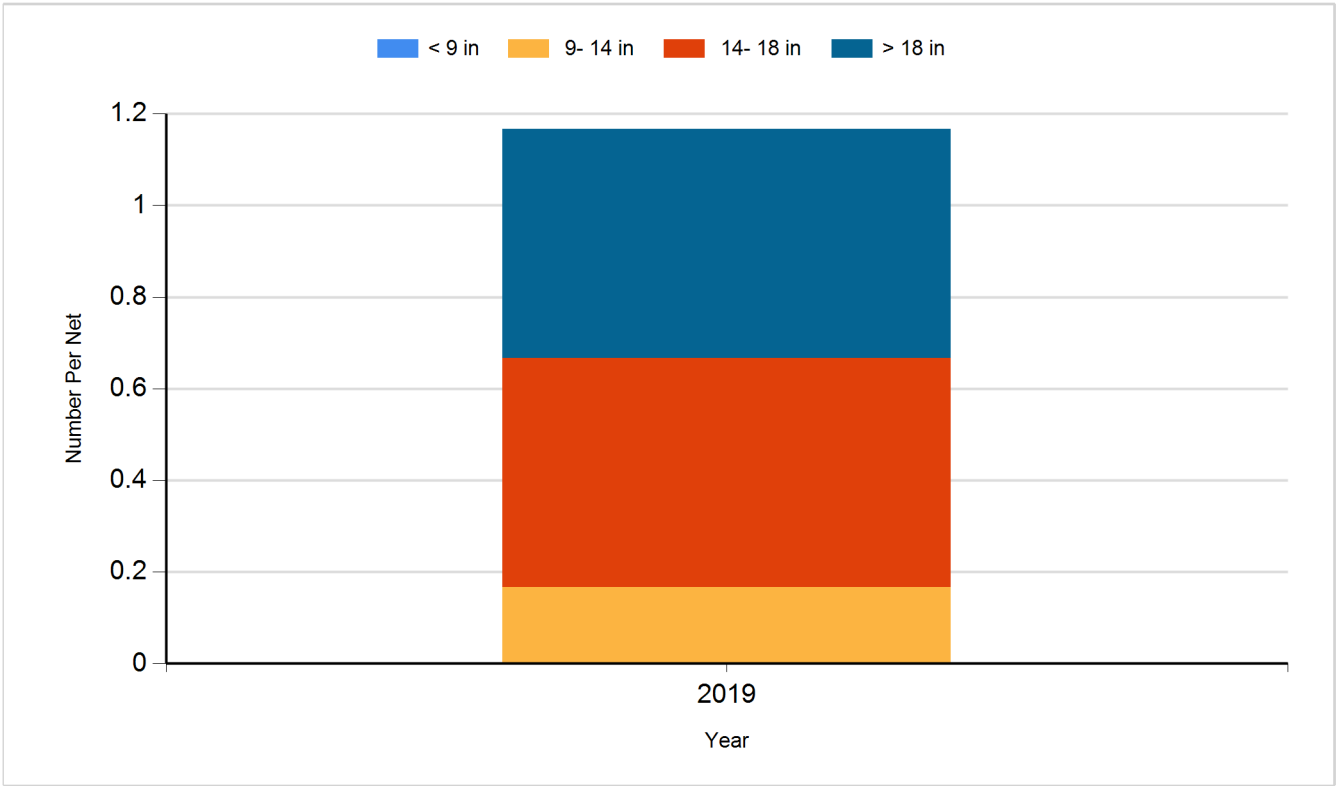
Species: Northern Pike
Gear: AFS std gill net



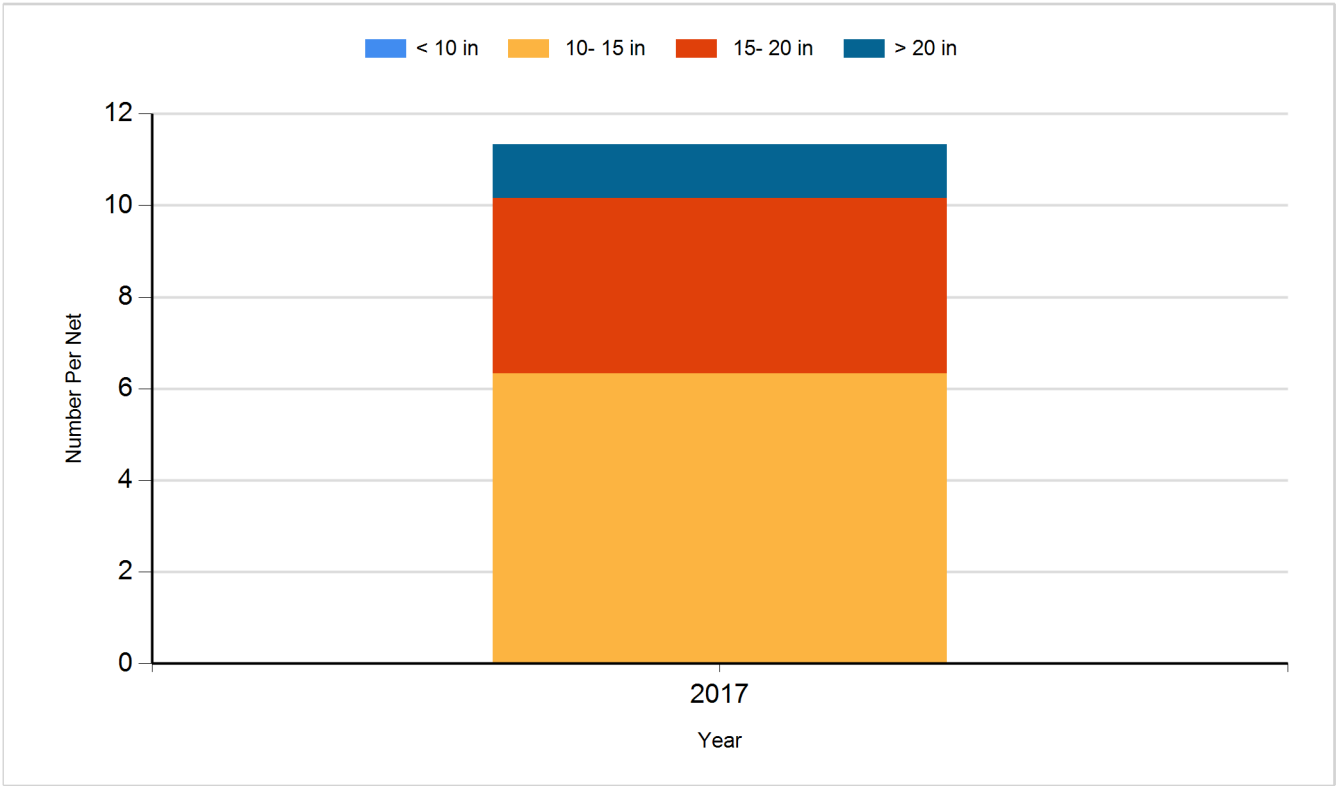
Species: Northern Pike
Gear: std exp gill net



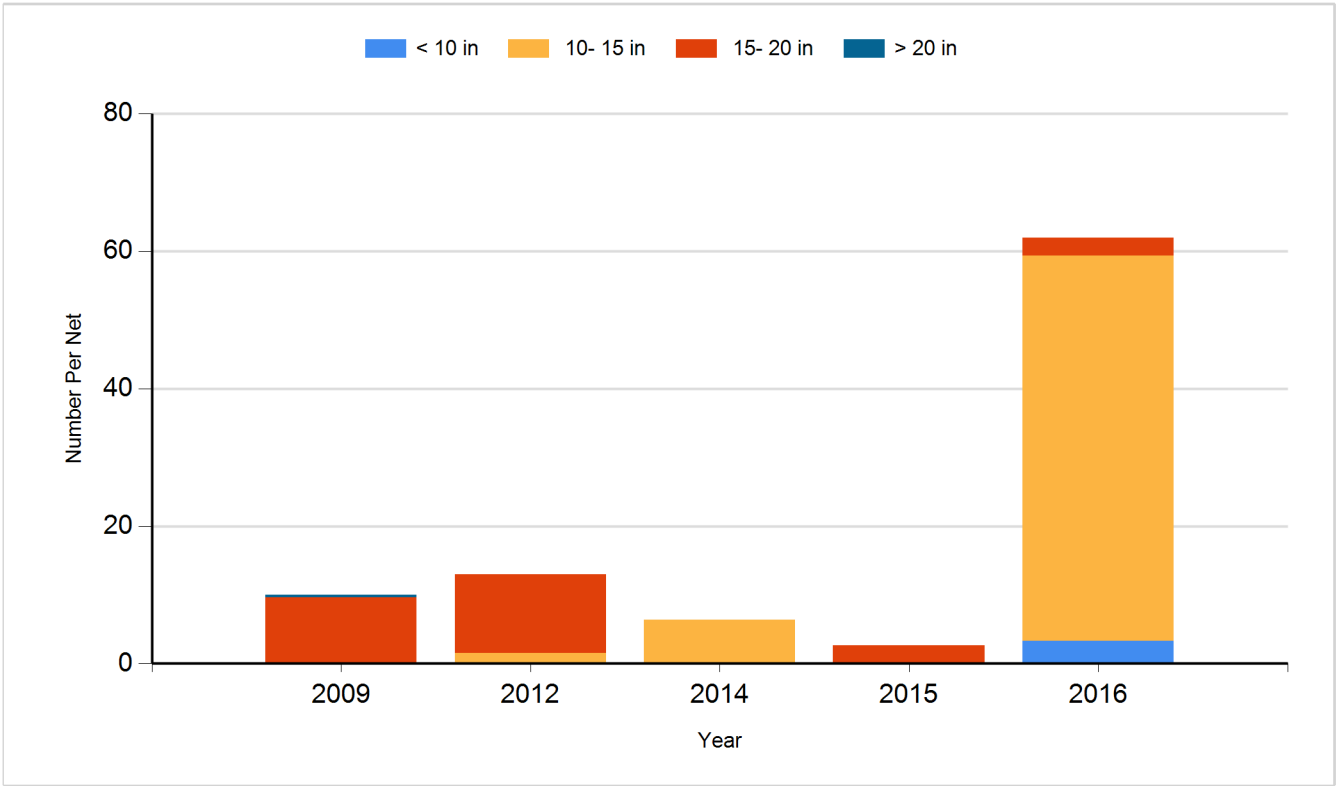
Species: Saugeye
Gear: AFS std gill net



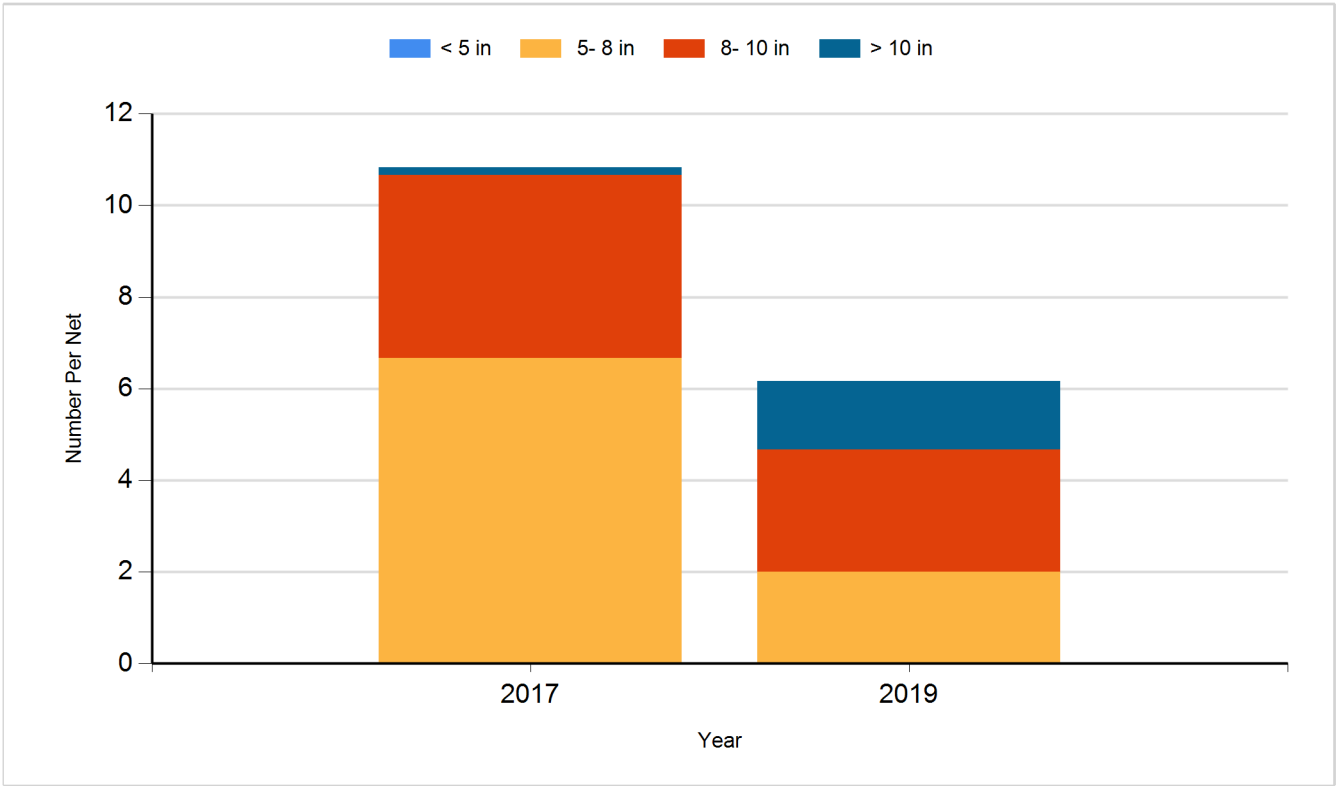
Species: Walleye
Gear: AFS std gill net



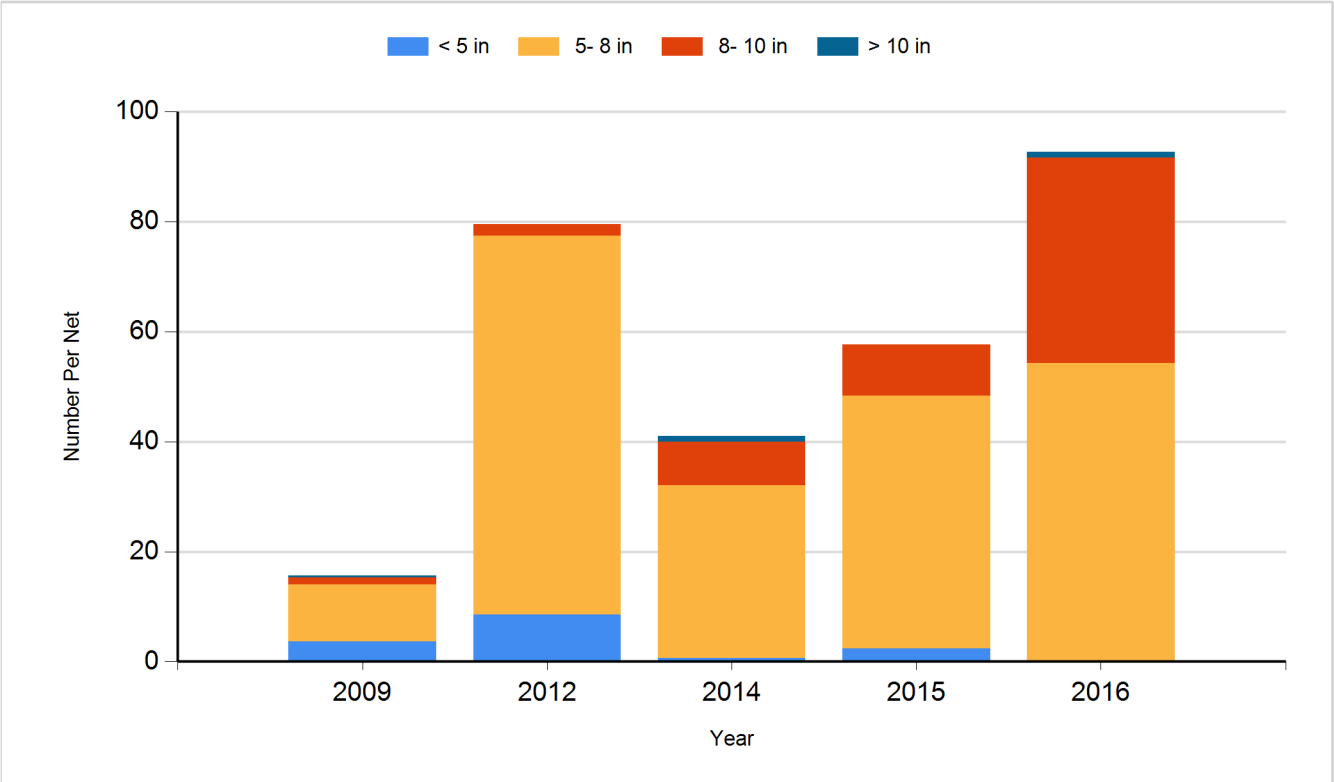
Species: Walleye
Gear: std exp gill net



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
2009	Largemouth Bass	Fingerling	4,050
2009	Walleye	Fingerling	20,000
2009	Yellow Perch	Adult	7,153
2009	Yellow Perch	Fingerling	63,360
2009	Yellow Perch	Small Fingerling	135,020
2010	Walleye	Small Fingerling	40,800
2011	Yellow Perch	Small Fingerling	2,560
2012	Yellow Perch	Adult	3,053
2012	Yellow Perch	Fingerling	3,950
2013	Walleye	Small Fingerling	39,930
2013	Yellow Perch	Fry	1,440,000
2013	Yellow Perch	Small Fingerling	5,170
2014	Walleye	Fry	400,000
2014	Yellow Perch	Small Fingerling	5,700
2015	Walleye	Small Fingerling	28,160
2016	Saugeye	Small Fingerling	28,000
2018	Saugeye	Small Fingerling	27,400
2019	Saugeye	Small Fingerling	28,000