SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Hwy 81 East, Brookings County
MBS-Lake-233-801
2019

Lake Information

Name: Hwy 81 East

County: Brookings

Surface Area: 468 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 15, 2019	6 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Common Carp

Black Crappie

Black Bullhead

White Bass

Smallmouth Bass

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	2	0.3	0.5	100		0			
	Black Crappie	5	0.8	0.7	0		0		117	7
	Common Carp	62	10.2	2.9	21	8	13	7		
	Smallmouth Bass	1	0.2	0.2	0		0		95	
	Walleye	12	2.0	0.8	67		50	25	90	3
	White Bass	12	0.2	0.2	100		100		99	
	Yellow Perch	22	3.7	2.8	32	16	23	15	97	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	Black Bullhead								1.2	1.3	0.3	0.93
	Black Crappie								0.0	0.0	0.8	0.27
	Common Carp								3.0	6.0	10.2	6.40
	Smallmouth Bass								0.0	0.2	0.2	0.13
	Walleye								1.8	3.8	2.0	2.53
	White Bass								1.7	2.2	0.2	1.37
	Yellow Bullhead								0.3	0.0	0.0	0.10
	Yellow Perch								3.3	6.0	3.7	4.33
std exp gill net	Black Bullhead							24.7				24.70
	Black Crappie							22.3				22.30
	Common Carp							2.0				2.00
	Northern Pike							1.0				1.00
	Walleye							2.7				2.70
	White Bass							2.3				2.30
	Yellow Bullhead							11.7				11.70
	Yellow Perch							15.7				15.70

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std gill net	Black Bullhead	PSD								86	88	100
		PSD-P								86	25	0
	Black Crappie	PSD										0
		PSD-P										0
		Wr										117
	Common Carp	PSD								78	42	21
		PSD-P								56	28	13
	Smallmouth Bass	PSD									100	0
		PSD-P									0	0
		Wr									95	95
	Walleye	PSD								82	83	67
		PSD-P								45	61	50
		Wr								89	84	90
	White Bass	PSD								100	100	100
		PSD-P								100	100	100
		Wr								90	87	99
	Yellow Perch	PSD								75	25	32
		PSD-P								15	14	23
		Wr								95	96	97
std exp gill net	Black Bullhead	PSD							84			
		PSD-P							45			
	Black Crappie	PSD							1			
		PSD-P							0			
		Wr							121			
	Common Carp	PSD							17			
		PSD-P							0			
	Walleye	PSD							75			
		PSD-P							25			
		Wr							94			
	White Bass	PSD							100			
		PSD-P							14			
		Wr							92			
	Yellow Perch	PSD							60			

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
std exp gill net	Yellow Perch	PSD-P							36			
		Wr							93			

Fish Condition

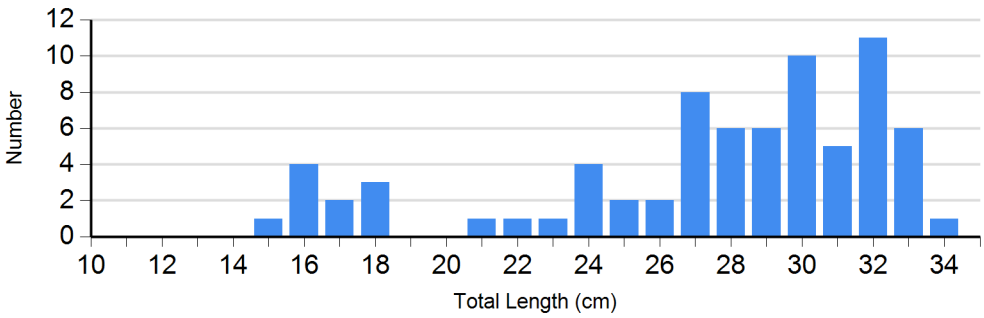
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2016	2	99 (3.6)	4	91 (3.2)	2	95 (0.0)	0	
	2017	2	92 (9.9)	4	88 (1.6)	4	89 (0.9)	1	88
	2018	4	85 (4.2)	5	87 (1.4)	8	84 (0.7)	6	82 (2.2)
	2019	4	87 (2.7)	2	101 (3.0)	4	88 (2.9)	2	91 (12.5)
White Bass Gill Net	2016	0		6	91 (1.0)	1	100	0	
	2017	0		0		6	89 (1.7)	4	92 (1.4)
	2018	0		0		8	88 (0.8)	5	85 (2.3)
	2019	0		0		0		1	99
Yellow Perch Gill Net	2016	19	100 (3.0)	11	89 (2.3)	17	88 (1.6)	0	
	2017	5	96 (6.2)	12	96 (1.9)	2	96 (8.7)	1	87
	2018	27	96 (1.4)	4	95 (2.5)	5	92 (3.2)	0	
	2019	15	99 (2.3)	2	96 (5.0)	5	90 (1.9)	0	

Length Frequency Distribution

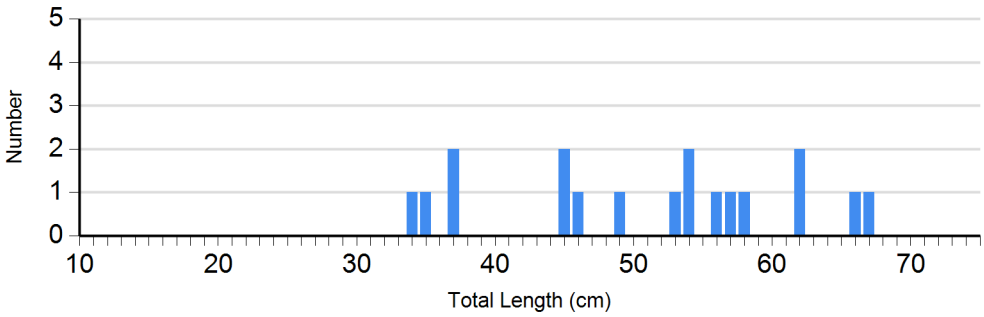
Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: std exp gill net

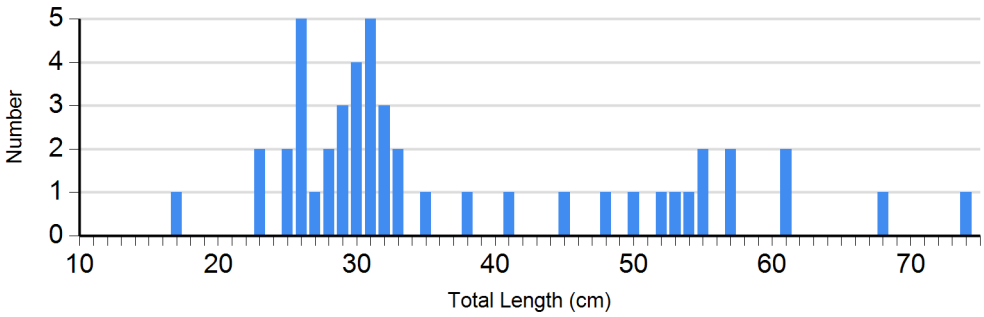


2016

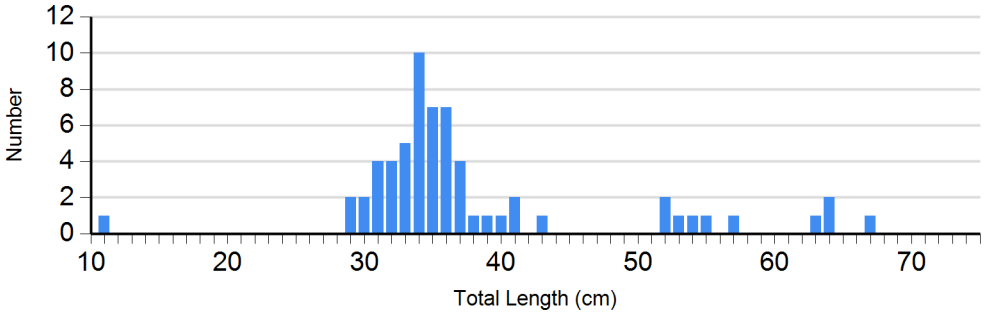
Species: Common Carp
Gear: AFS std gill net



2017

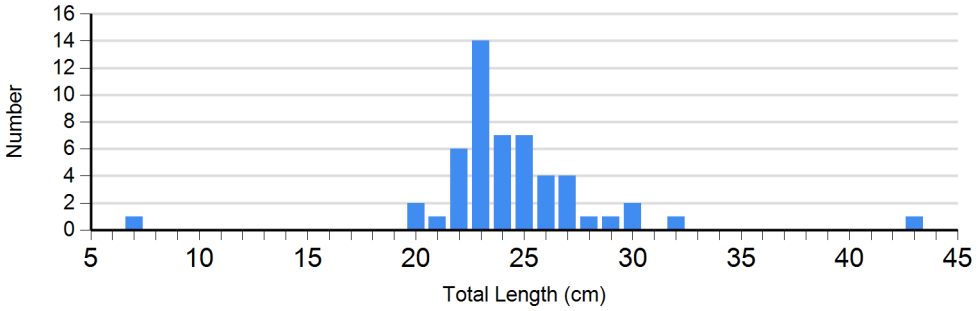


2018



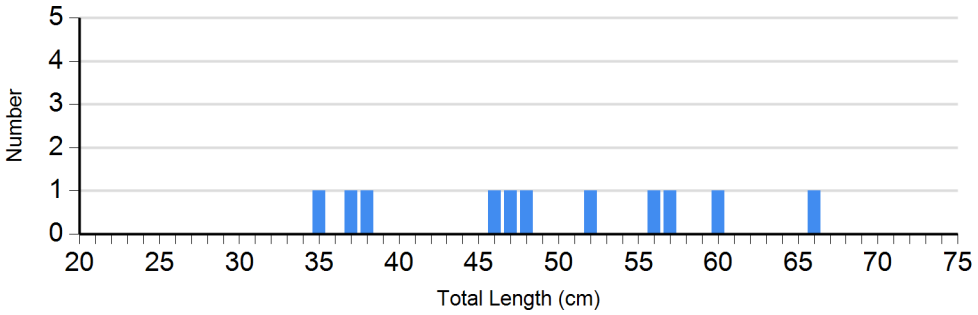
2019

Species: Common Carp
Gear: std exp gill net

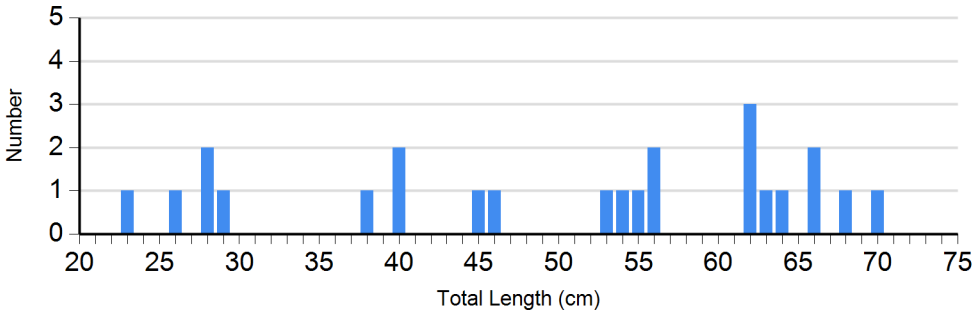


2016

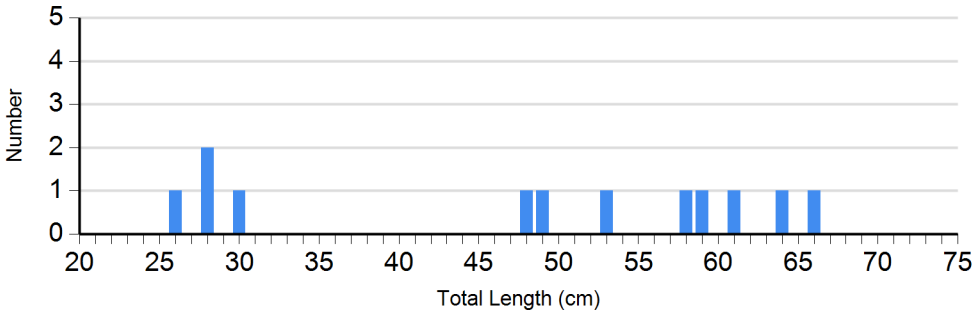
Species: Walleye
Gear: AFS std gill net



2017

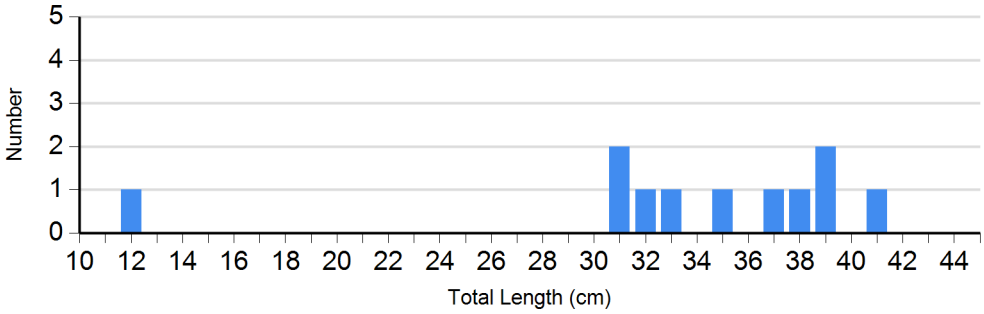


2018

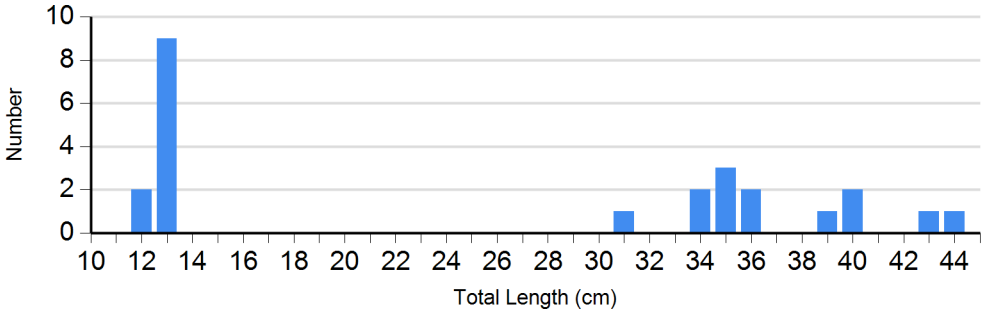


2019

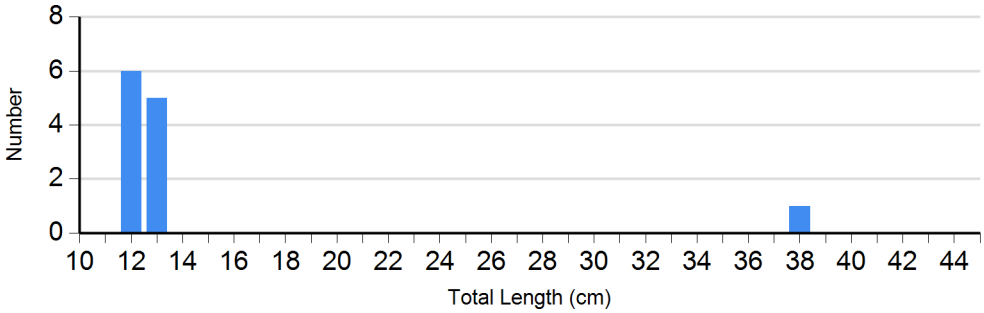
Species: White Bass
Gear: AFS std gill net



2017

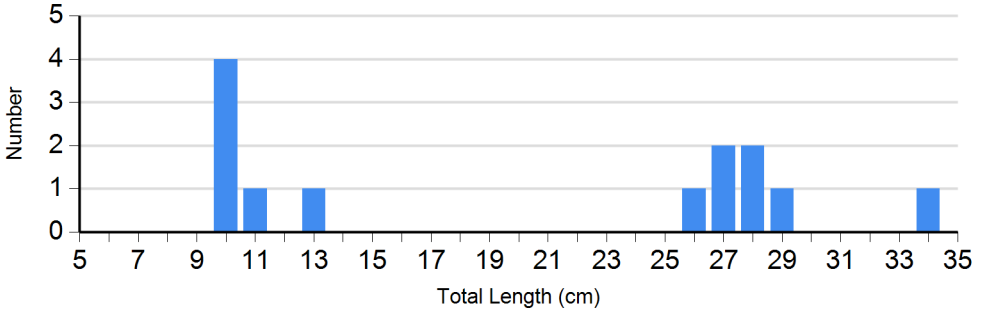


2018



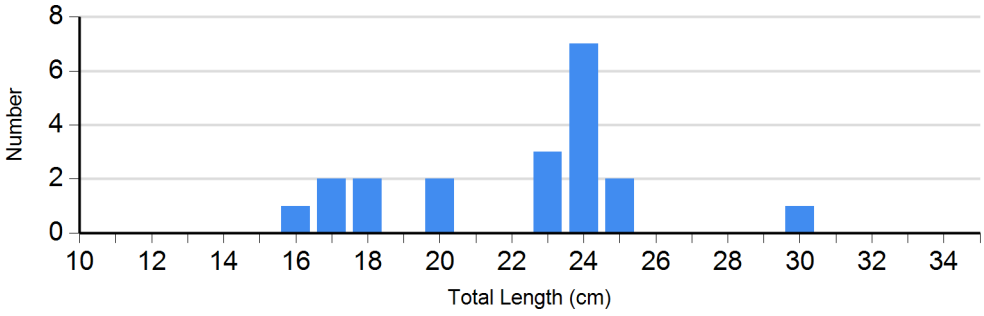
2019

Species: White Bass
Gear: std exp gill net

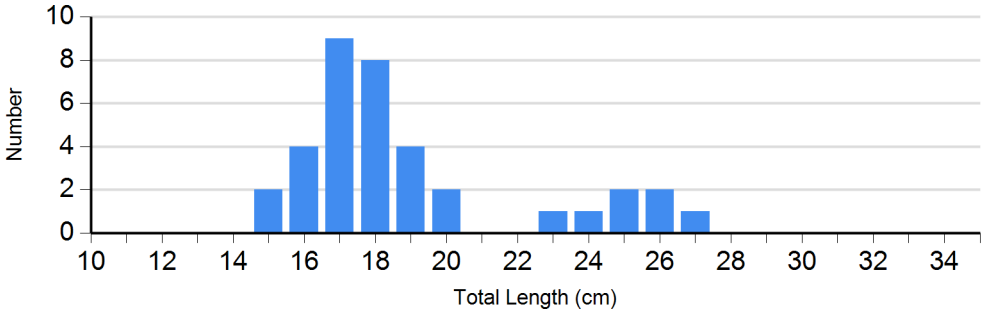


2016

Species: Yellow Perch
Gear: AFS std gill net



2017



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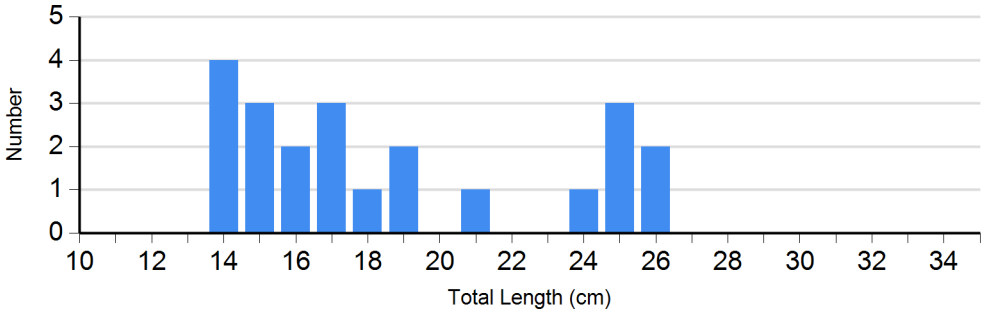
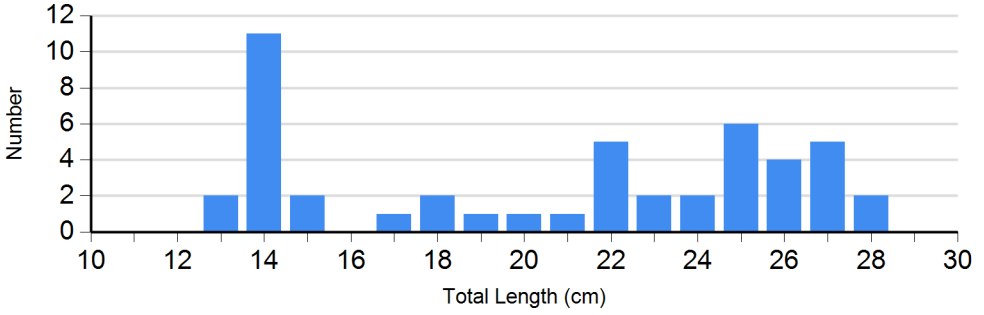


2019

Species: Yellow Perch
Gear: std exp gill net

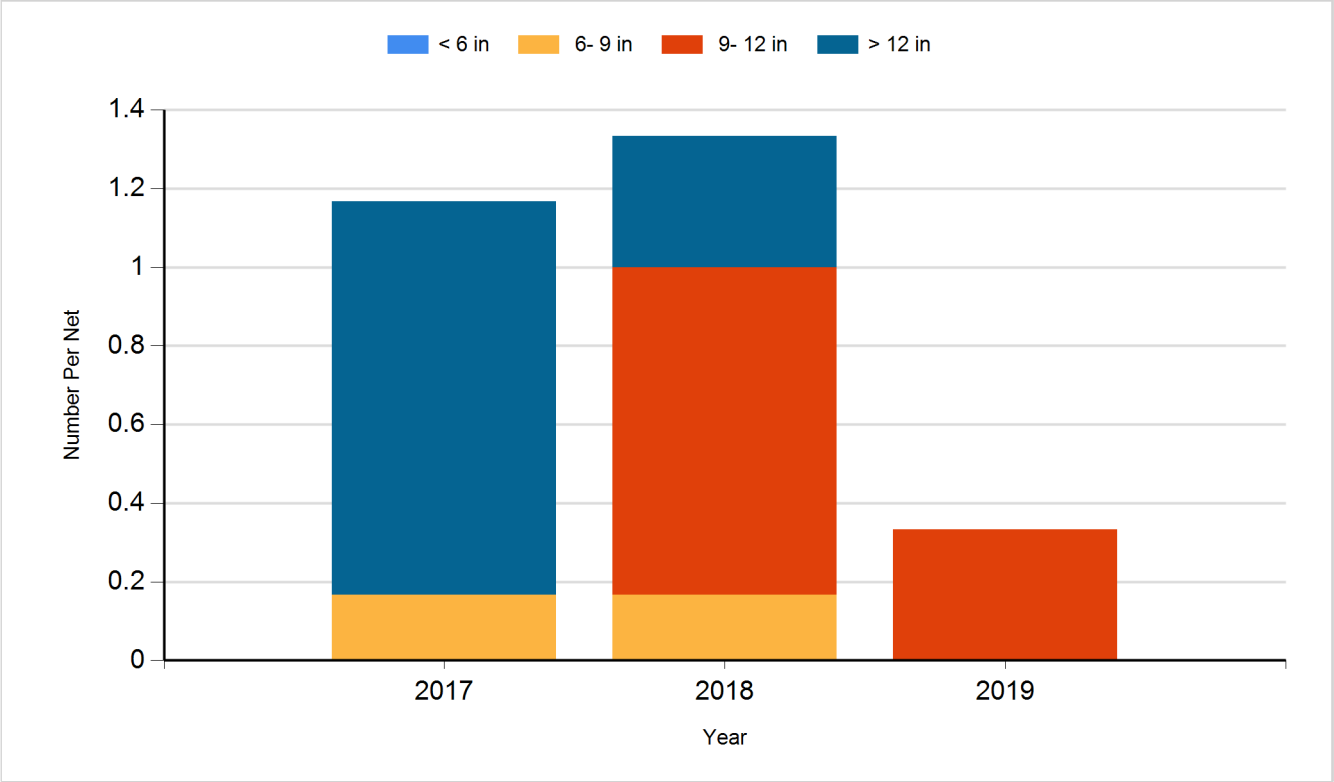


2016

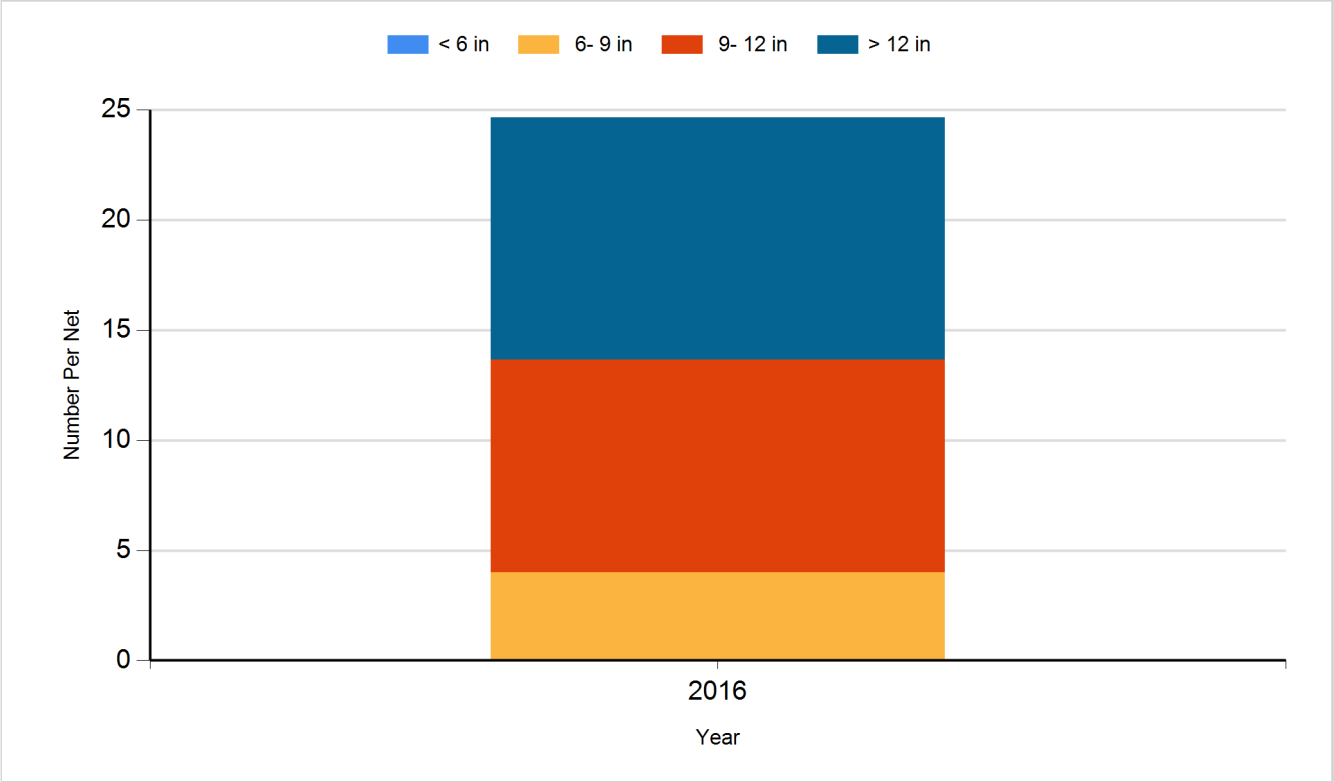
Historic Fish Sizes and Relative Abundance

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

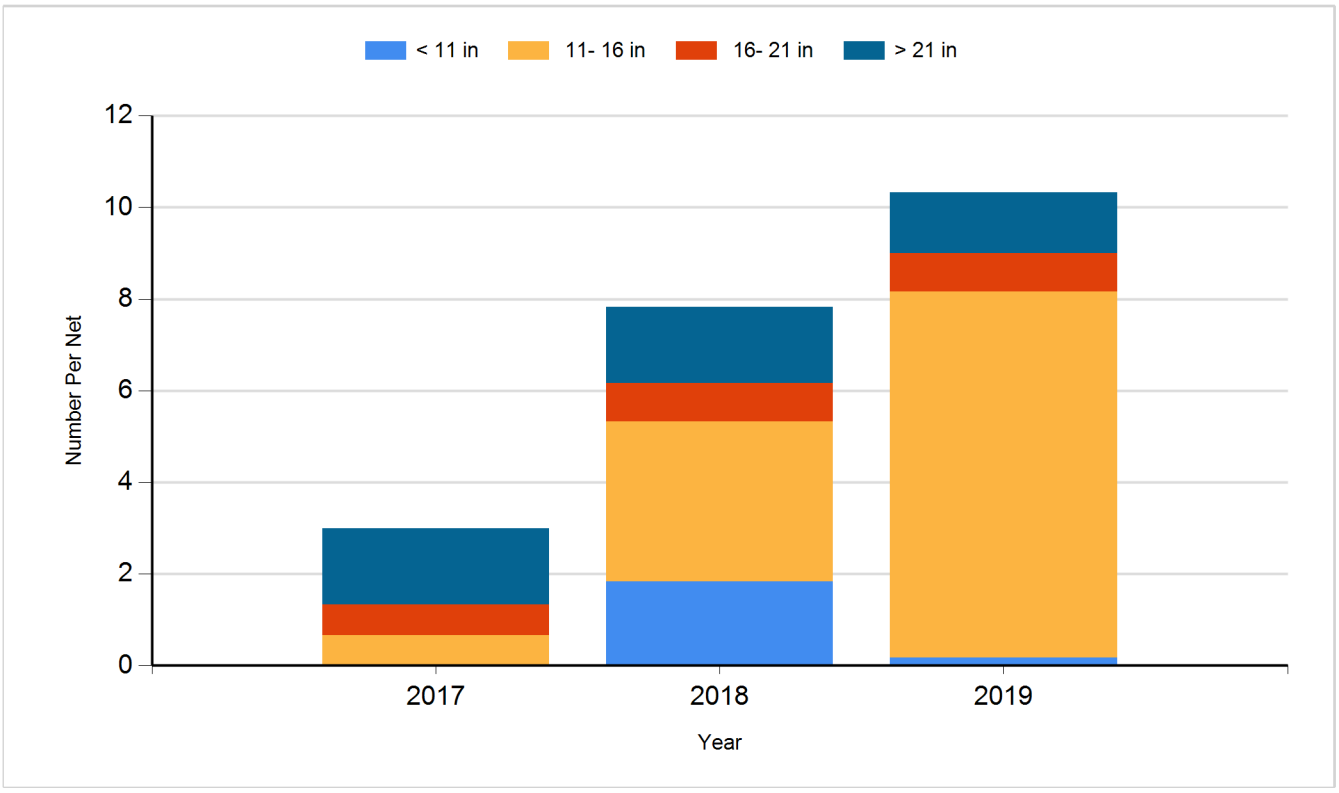
Species: Black Bullhead
Gear: AFS std gill net



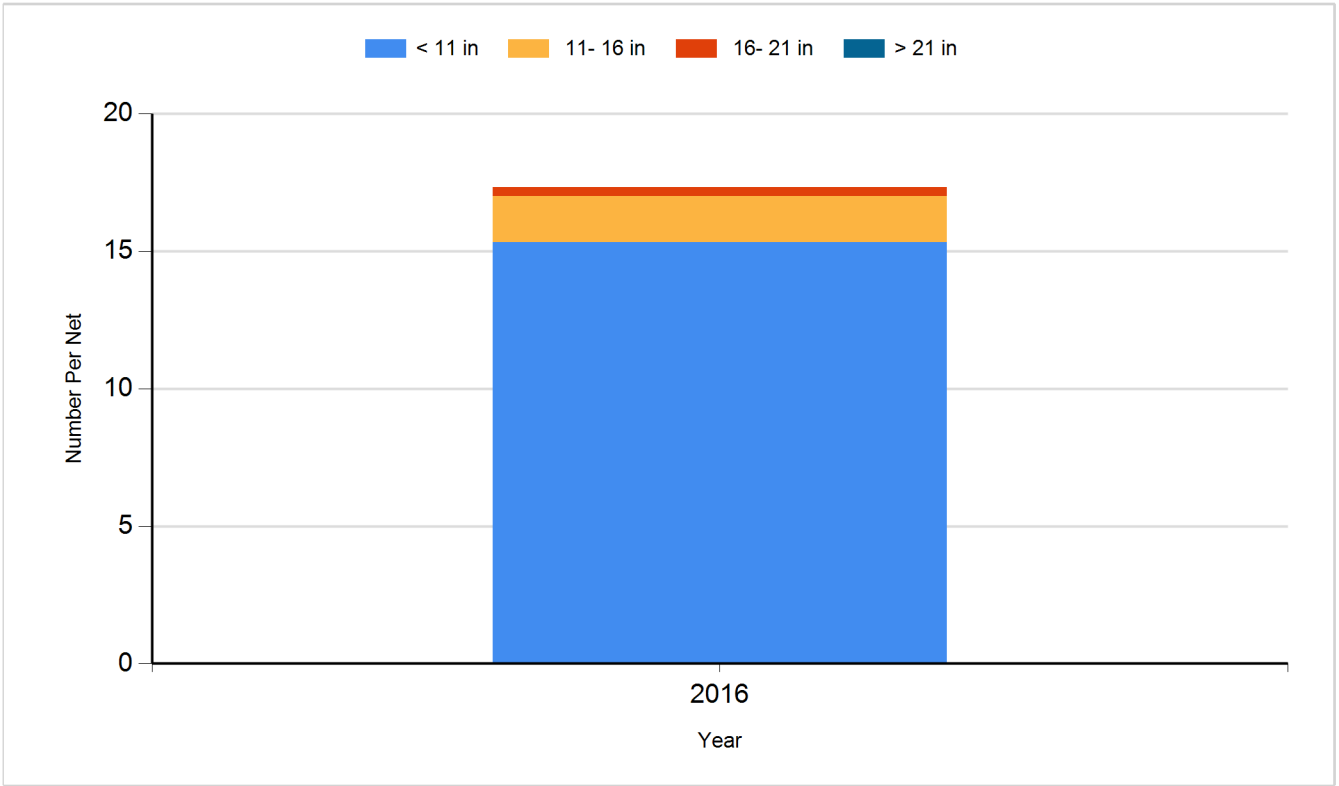
Species: Black Bullhead
Gear: std exp gill net



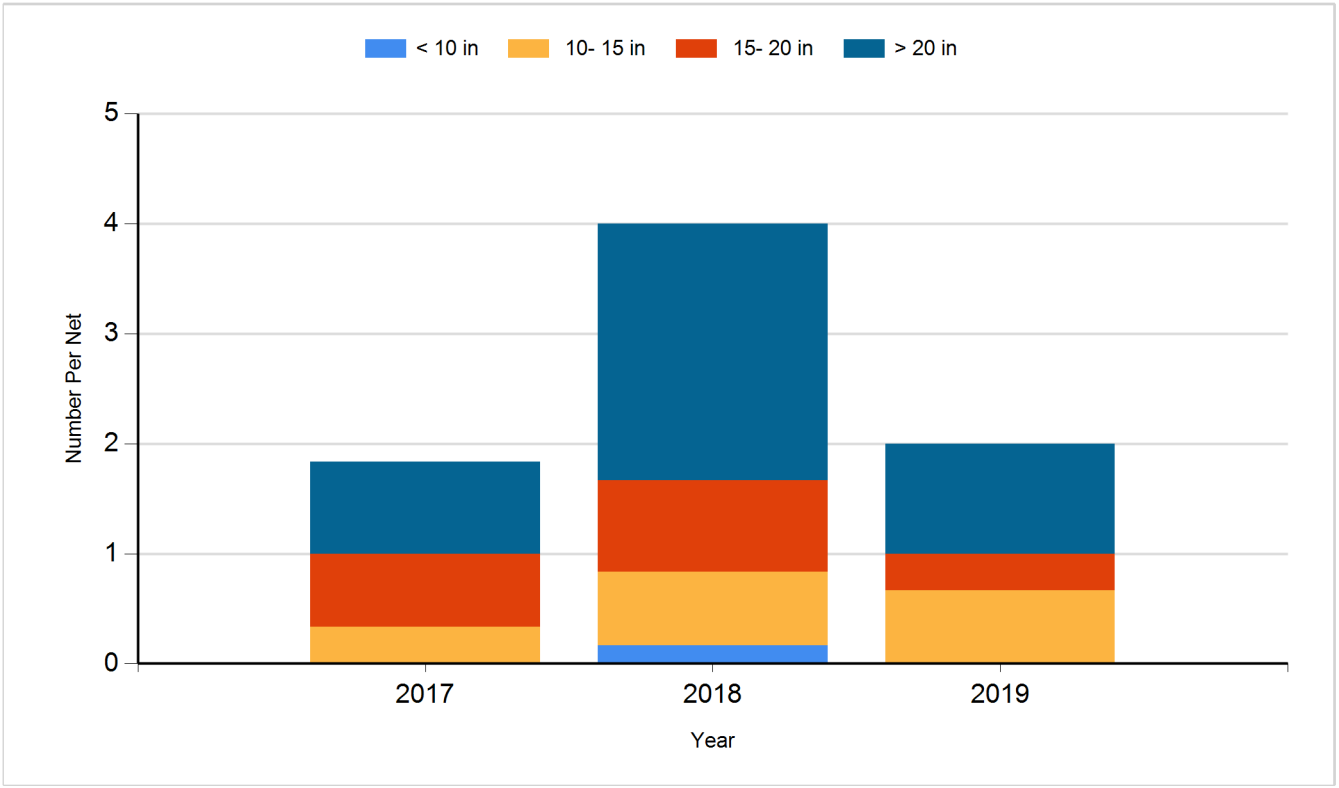
Species: Common Carp
Gear: AFS std gill net



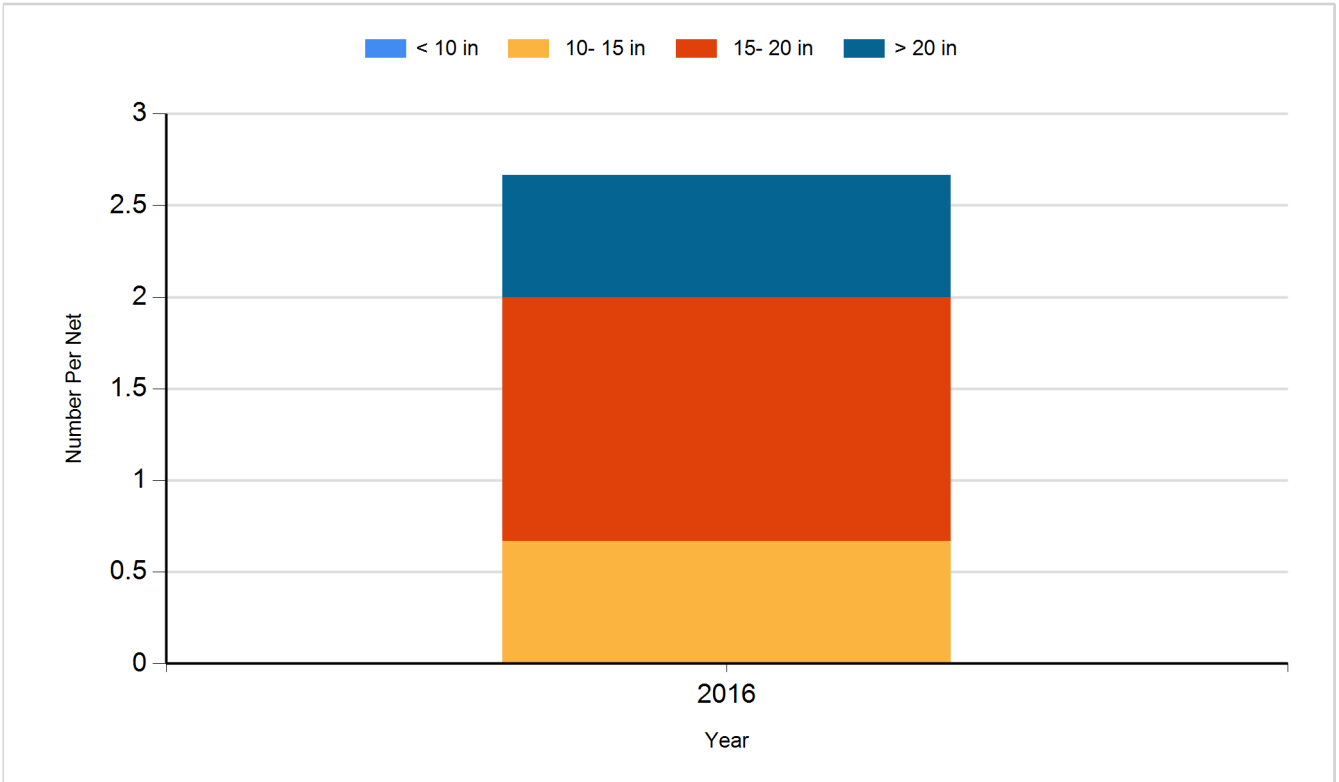
Species: Common Carp
Gear: std exp gill net



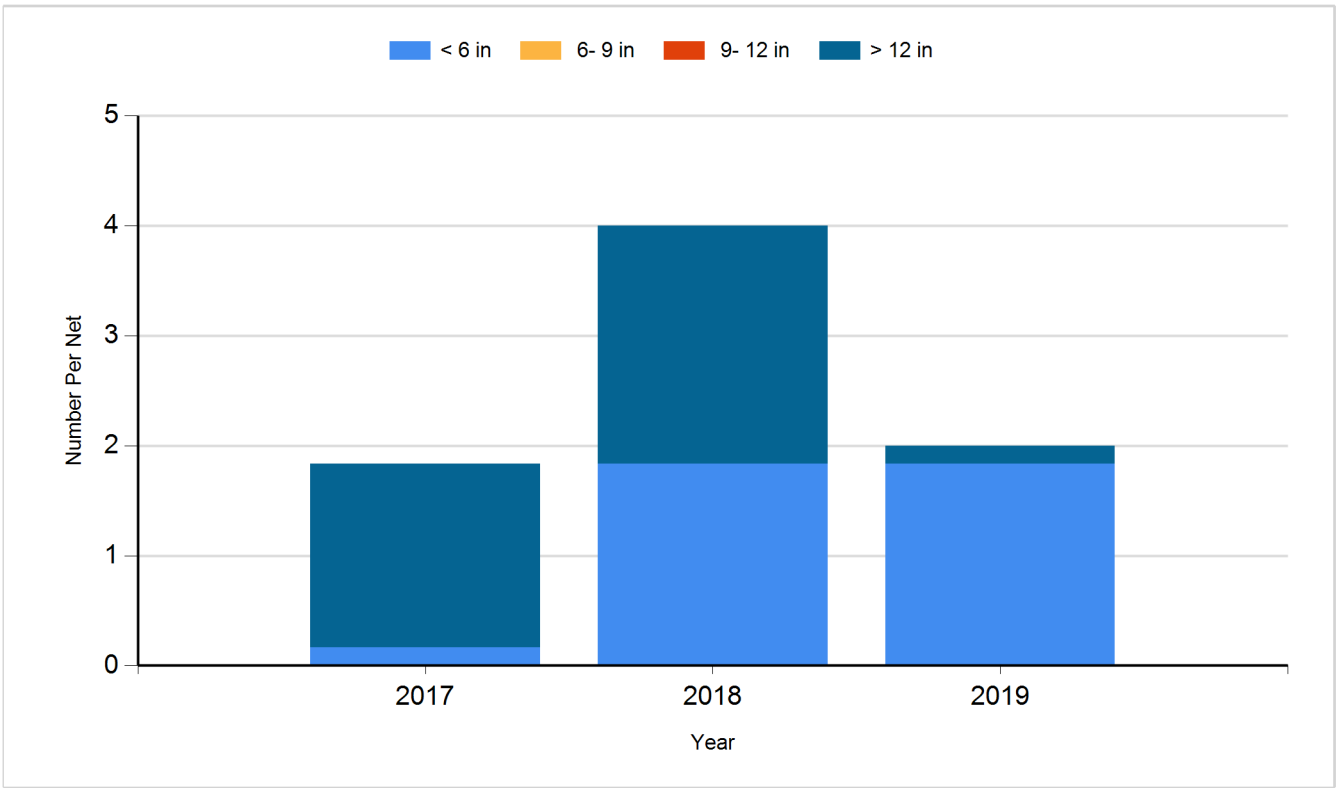
Species: Walleye
Gear: AFS std gill net



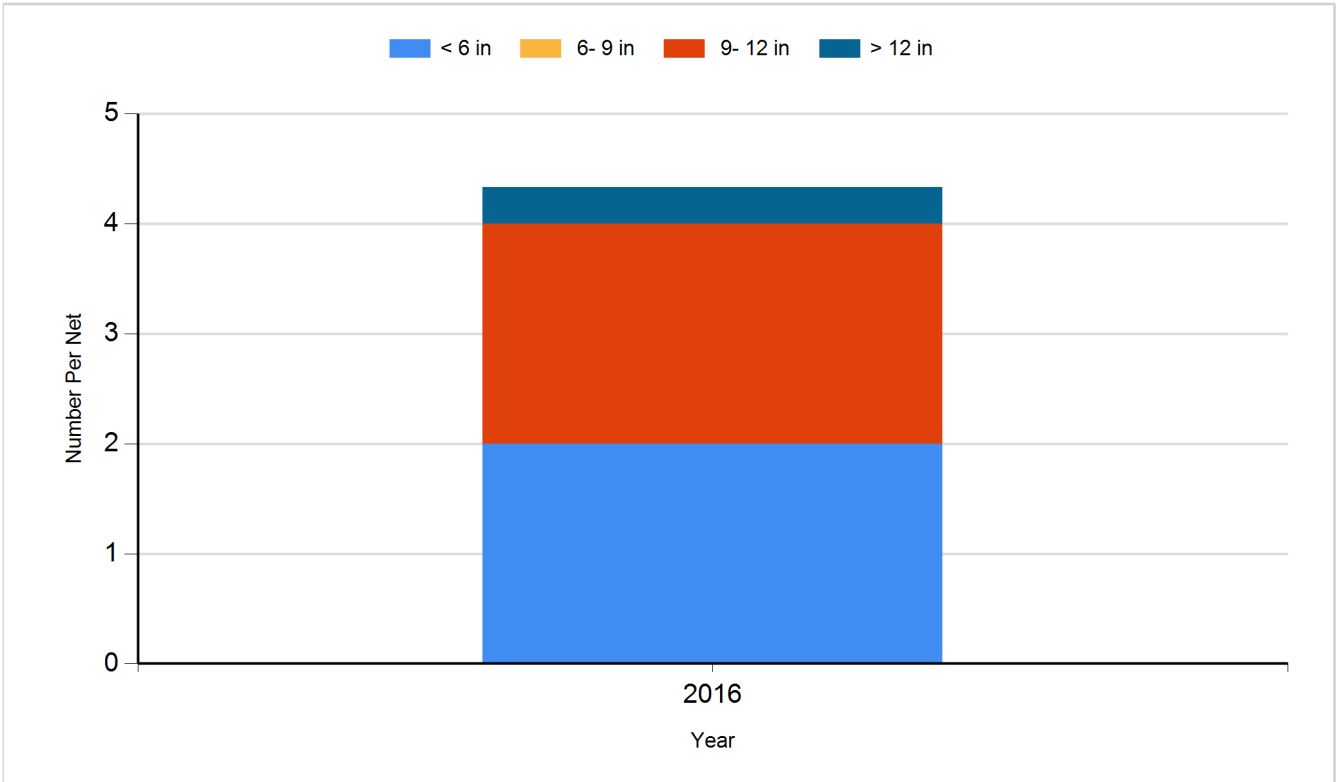
Species: Walleye
Gear: std exp gill net



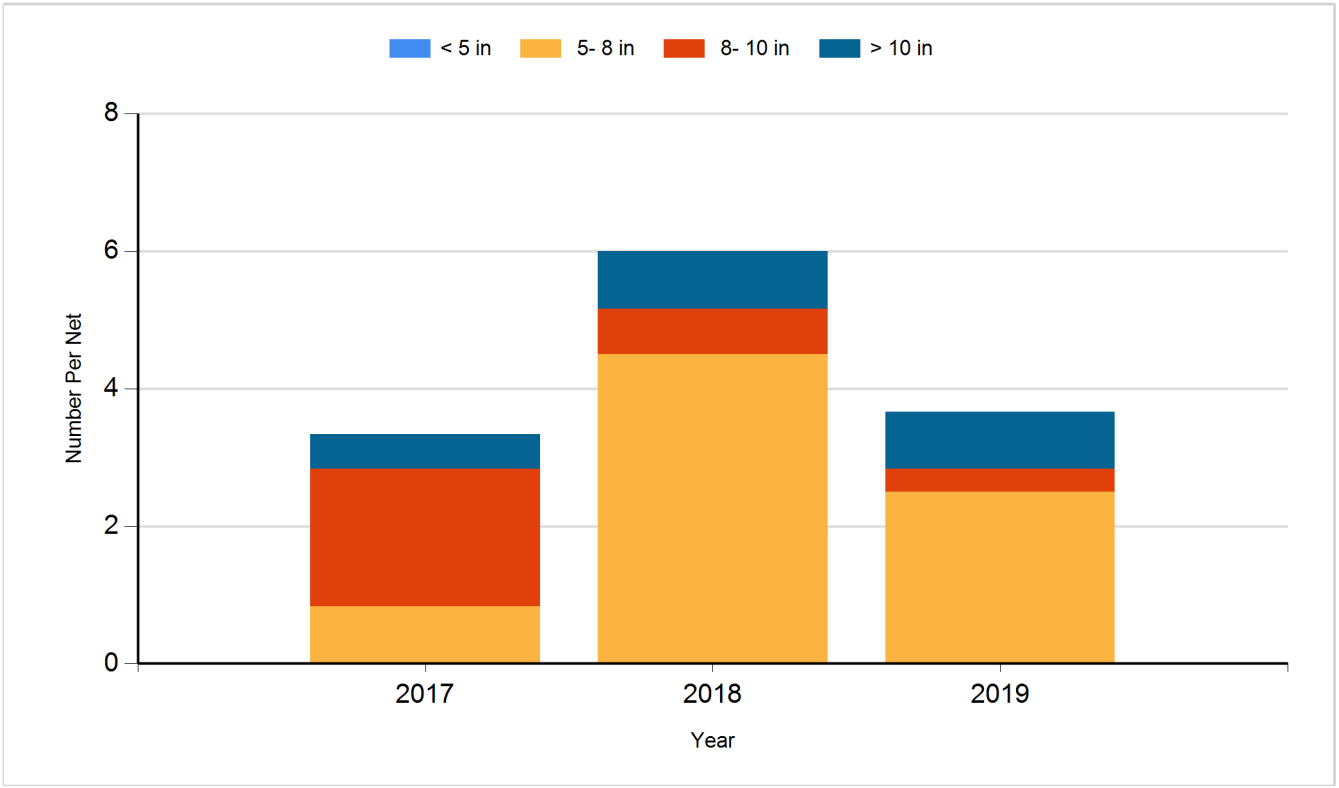
Species: White Bass
Gear: AFS std gill net



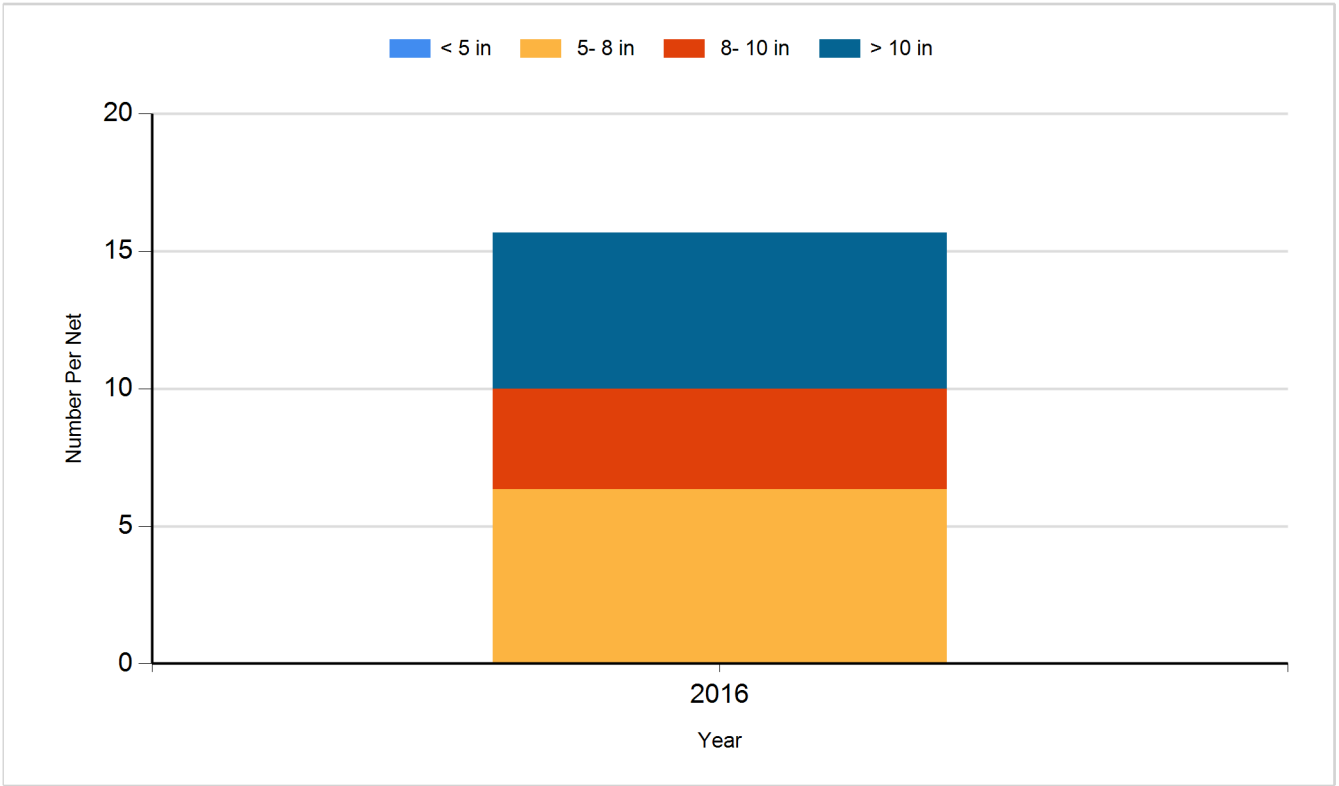
Species: White Bass
Gear: std exp gill net



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	Yellow Perch	Fingerling	319,000
2011	Walleye	Small Fingerling	50,560
2013	Walleye	Small Fingerling	49,000
2014	Walleye	Fry	487,000
2015	Walleye	Small Fingerling	23,040
2017	Walleye	Small Fingerling	23,200
2018	Walleye	Small Fingerling	22,680
2018	Yellow Perch	Small Fingerling	200,000
2019	Walleye	Small Fingerling	23,380
2019	Yellow Perch	Small Fingerling	164,145