

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Herman, Lake County

LBS-Lake-136-000

2019

Lake Information

Name:	Herman	Maximum Depth:	13 Feet
County:	Lake	Mean Depth:	5 Feet
Legal Description:	T106N-R35W-Sec, 10-11, 14-15, 22-23	OHWM Elevation:	1,669
Surface Area:	1,279 Acres	Outlet Elevation:	1,668

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 09, 2019	6 net-nights

Common Fish Species Present

Walleye

Yellow Perch

White Sucker

Channel Catfish

White Bass

Bigmouth Buffalo

Common Carp

Black Bullhead

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.

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

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		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	Bigmouth Buffalo	11	0.7	0.3	25		0			
	Black Bullhead	2	0.3	0.3	100		0			
	Channel Catfish	8	1.3	1.1	88		0		92	3
	Common Carp	3	0.5	0.3	67		67			
	Walleye	8	0.7	0.7	100		0		92	4
	White Bass	8	1.3	1.0	75		75		93	3
	White Sucker	41	6.8	2.4	78	10	71	11		
	Yellow Perch	24	3.8	1.7	17		17		112	3

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.

Gear	Species	CPUE										Avg
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
AFS std gill net	Bigmouth Buffalo								0.8	0.3	0.7	0.60
	Black Bullhead								8.0	2.2	0.3	3.50
	Channel Catfish								0.5	1.5	1.3	1.10
	Common Carp								5.3	2.3	0.5	2.70
	Walleye								1.2	0.5	0.7	0.80
	White Bass								8.0	8.0	1.3	5.77
	White Sucker								10.2	4.5	6.8	7.17
	Yellow Perch								2.7	5.8	3.8	4.10
fall night EF-WAE	Walleye	1.0	26.5	42.5	18.5							22.13
	Yellow Perch	0.0	0.0	0.0	0.0							0.00
frame net (std 3/4 in)	Bigmouth Buffalo	9.5	4.4	4.5	6.4							6.20
	Black Bullhead	71.6	275.1	228.3	16.0							147.75
	Black Crappie	0.6	1.5	0.8	0.2							0.78
	Bluegill	0.2	0.1	1.0	0.2							0.38
	Channel Catfish	2.5	0.4	2.7	0.0							1.40
	Common Carp	0.5	7.3	2.2	0.7							2.68
	Green Sunfish	0.1	0.0	0.2	0.0							0.08
	Northern Pike	1.5	3.1	0.3	2.3							1.80
	Smallmouth Bass	0.3	0.0	0.1	0.0							0.10
	Walleye	1.0	0.4	0.3	1.1							0.70
	White Bass	1.7	3.4	0.9	3.7							2.43
	White Sucker	31.0	11.9	3.0	4.5							12.60
	Yellow Perch	0.8	0.0	8.9	0.1							2.45
std exp gill net	Bigmouth Buffalo	0.8	0.0	0.8	1.3	0.3	0.0	0.0				0.46
	Black Bullhead	14.0	18.0	32.0	12.3	35.0	40.0	14.0				23.61
	Black Crappie	0.0	0.0	0.0	0.0	0.0	0.0	0.3				0.04
	Channel Catfish	0.3	0.3	1.0	0.0	0.3	0.0	0.0				0.27
	Common Carp	0.0	9.3	1.5	1.3	1.3	0.0	0.3				1.96
	Green Sunfish	0.0	0.0	0.3	0.0	0.0	0.0	0.0				0.04
	Northern Pike	0.8	2.3	1.8	0.0	0.7	0.7	1.0				1.04
	Smallmouth Bass	0.0	0.3	0.0	0.0	0.0	0.0	0.0				0.04
	Walleye	4.5	6.0	12.0	2.0	4.0	1.0	6.3				5.11
	White Bass	1.5	1.3	6.0	0.7	0.3	2.0	7.3				2.73
	White Sucker	13.0	10.0	4.5	5.0	6.7	13.0	14.0				9.46

		CPUE										
Gear	Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
std exp gill net	Yellow Perch	31.0	26.3	33.3	0.7	4.0	8.3	18.0				17.37

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										
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
AFS std gill net	Bigmouth Buffalo	PSD									40	0	25
		PSD-P									0	0	0
	Black Bullhead	PSD									71	100	100
		PSD-P									48	69	0
	Channel Catfish	PSD									67	22	88
		PSD-P									33	11	0
		Wr									105	97	92
	Common Carp	PSD									6	100	67
		PSD-P									3	14	67
	Walleye	PSD									43	33	100
		PSD-P									29	33	0
		Wr									82	81	92
	White Bass	PSD									63	100	75
		PSD-P									46	54	75
		Wr									83	79	93
	White Sucker	PSD									97	96	78
		PSD-P									87	96	71
	Yellow Perch	PSD									81	80	17
		PSD-P									6	54	17
		Wr									105	97	112
fall night EF-WAE	Walleye	Wr	127	84	84	75							
frame net (std 3/4 in)	Bigmouth Buffalo	PSD	81	75	9	97							
		PSD-P	5	5	2	8							
		Wr	99	93	98	97							
	Black Bullhead	PSD	70	14	67	92							
		PSD-P	5	1	0	13							
		Wr	99	98	89	87							
	Channel Catfish	PSD	92	100	96								
		PSD-P	0	25	33								
		Wr	93	94	94								
	Common Carp	PSD	100	22	73	100							
		PSD-P	100	3	9	29							

Gear	Species	Index	Year												
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
frame net (std 3/4 in)	Common Carp	Wr	94	103	92	93									
		PSD	30	25	0	73									
		PSD-P	20	0	0	0									
	Walleye	Wr	86	79	85	91									
		PSD	88	97	100	100									
		PSD-P	71	74	100	100									
	White Bass	Wr	98	91	98	86									
		PSD	100	99	100	100									
		PSD-P	99	96	93	100									
	White Sucker	Wr	94	86	78	88									
		PSD	100	99	100	100									
		PSD-P	99	96	93	100									
	Yellow Perch	Wr	94	86	78	88									
		PSD	38		54	100									
		PSD-P	38		4	0									
std exp gill net	Bigmouth Buffalo	PSD	67	0	33	100	100								
		PSD-P	0	0	0	0	0								
		Wr	90		115	95									
	Black Bullhead	PSD	68	24	50	68	18	97	60						
		PSD-P	2	0	0	0	2	8	19						
		Wr	99	98	92	102									
	Channel Catfish	PSD	100	100	100		100								
		PSD-P	0	0	25		100								
		Wr	107	94	91		100								
	Common Carp	PSD		0	67	100	100		100						
		PSD-P		0	0	0	100		100						
		Wr		103	90	97									
	Walleye	PSD	28	56	58	50	67	33	21						
		PSD-P	0	11	8	0	17	0	5						
		Wr	84	86	93	93	95	79	85						
White Bass	PSD	50	75	100	100	100	83	95							
	PSD-P	33	75	96	100	100	67	14							
	Wr	96	91	99	91	89	88	93							
White Sucker	PSD	100	97	100	100	80	97	93							
	PSD-P	94	67	61	87	80	97	88							
	Wr	102	95	93	106										
Yellow Perch	PSD	51	41	71	0	100	40	33							
	PSD-P	45	0	3	0	0	36	11							

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
std exp gill net	Yellow Perch	Wr	107	102	91	112	100	106	104			

Length at Capture

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

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	5	204 (2)			335 (2)	537 (1)					
2013	7	219 (1)	330 (3)	412 (2)		483 (1)					
2012	53	260 (19)	396 (18)	430 (3)	413 (6)	474 (4)		499 (2)		525 (1)	
2011	18	275 (4)		400 (9)	430 (2)		542 (3)				
2010	19		276 (11)	349 (5)		470 (3)					

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	35	167 (7)	224 (5)	261 (16)	300 (5)		323 (2)				
2013	2	135 (1)	193 (1)								
2012	133	163 (35)	223 (76)	235 (24)							
2011	79	151 (44)	218 (33)	223 (2)							
2010	124	155 (60)	191 (1)	260 (63)							

Fish Condition

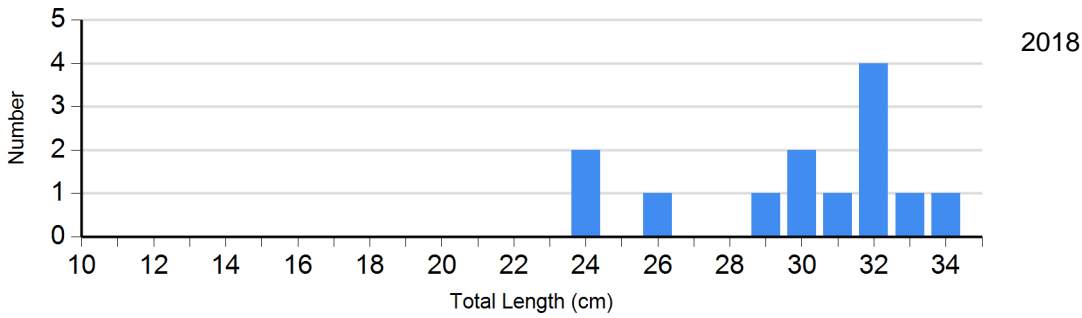
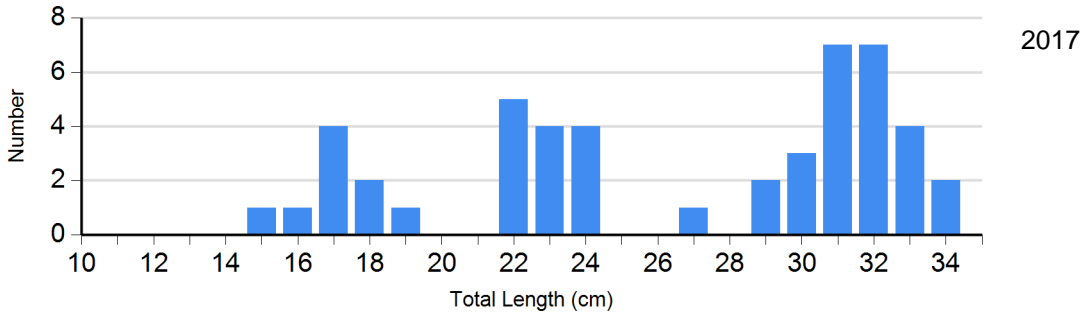
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Channel Catfish Gill Net	2017	1	119	1	92	0		1	102
	2018	7	98 (3.4)	1	90	0		1	101
	2019	1	95	7	92 (2.4)	0		0	
Walleye Gill Net	2015	2	74 (7.6)	1	89	0		0	
	2016	15	87 (1.2)	3	78 (8.2)	1	78	0	
	2017	4	82 (2.0)	1	82	1	87	1	80
	2018	2	74 (4.8)	0		1	95	0	
	2019	0		4	92 (2.8)	0		0	
White Bass Gill Net	2015	1	88	1	86	0		4	88 (2.0)
	2016	1	93	18	94 (1.4)	3	91 (3.2)	0	
	2017	18	89 (2.0)	8	87 (1.7)	22	77 (3.6)	0	
	2018	0		22	77 (1.0)	26	81 (1.3)	0	
	2019	2	102 (0.7)	0		5	89 (1.6)	1	91
Yellow Perch Gill Net	2015	15	106 (2.6)	1	108	9	104 (2.0)	0	
	2016	36	103 (1.5)	12	106 (0.6)	5	101 (1.1)	1	102
	2017	3	110 (4.8)	12	104 (3.8)	1	101	0	
	2018	7	95 (4.6)	9	99 (1.9)	14	99 (1.9)	5	89 (2.9)
	2019	19	114 (3.0)	0		3	105 (6.7)	1	101

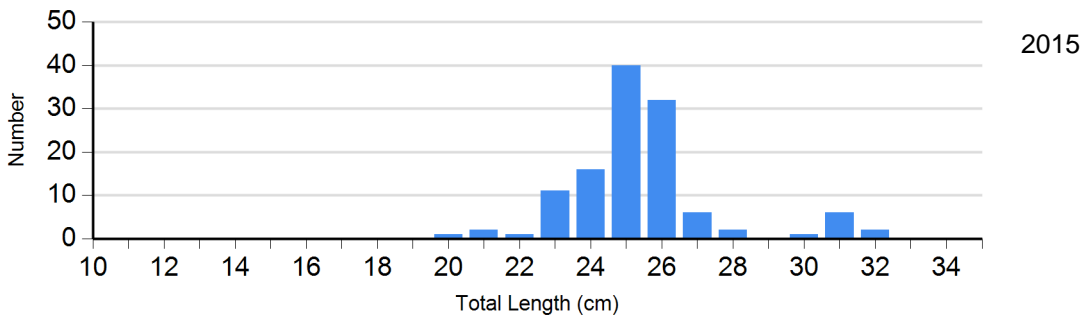
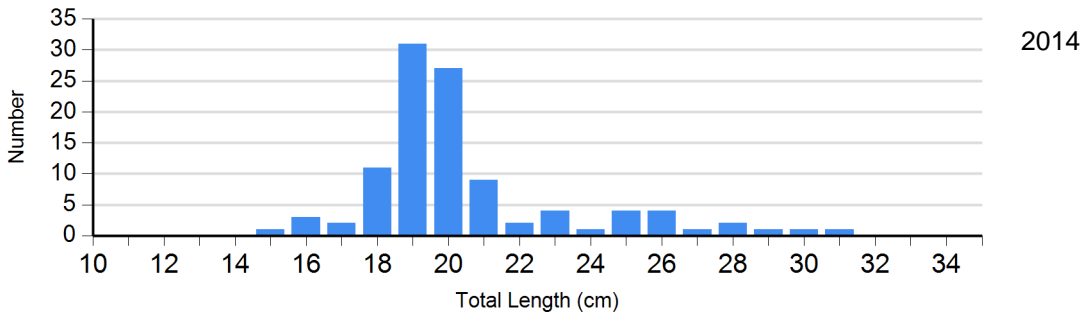
Length Frequency Distribution

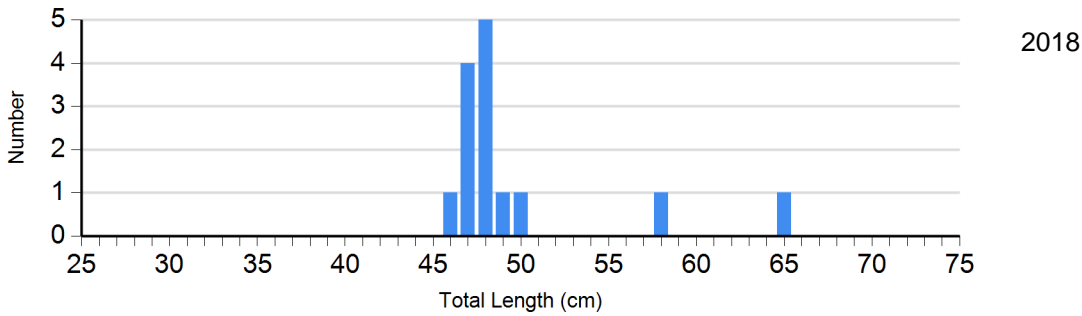
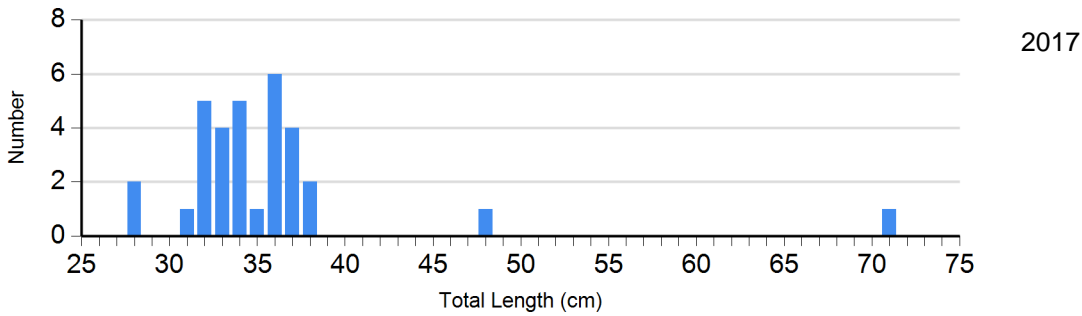
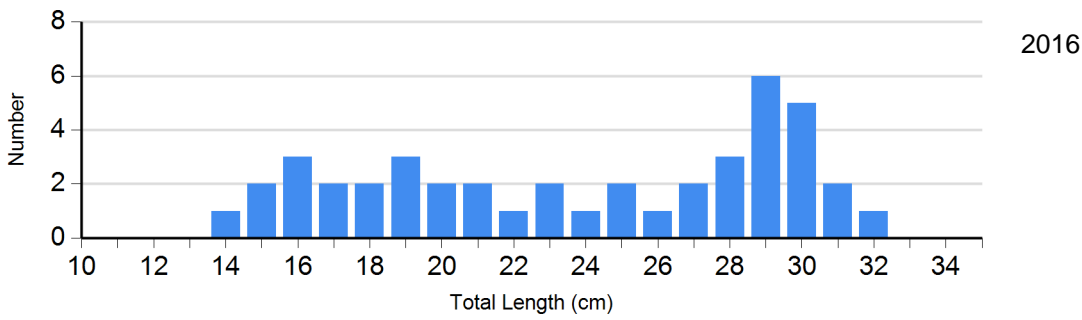
Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

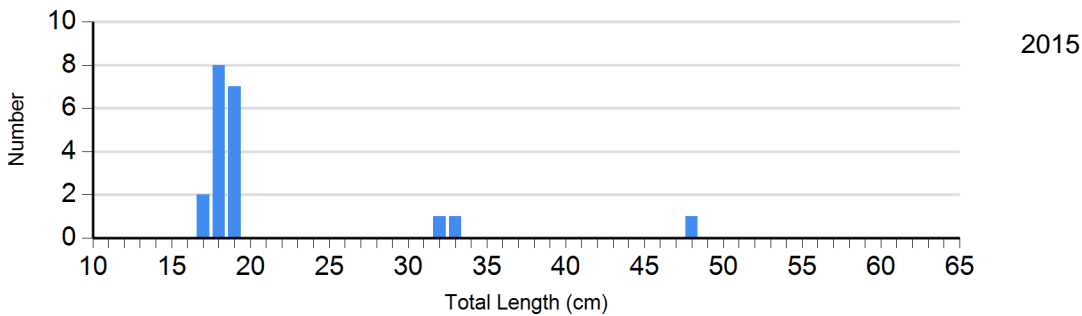
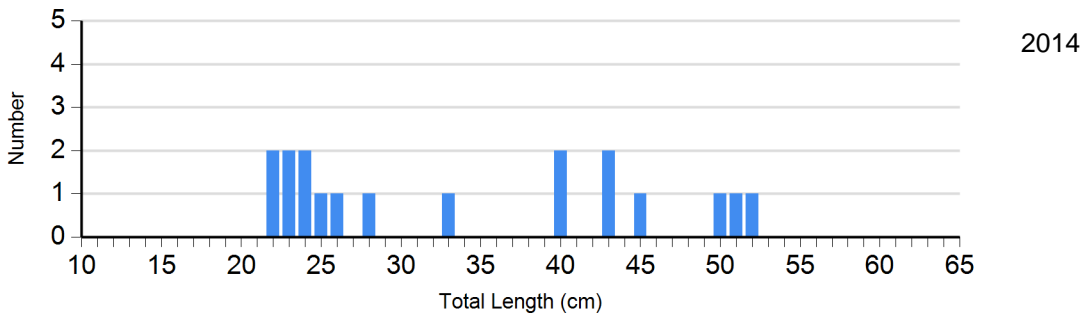


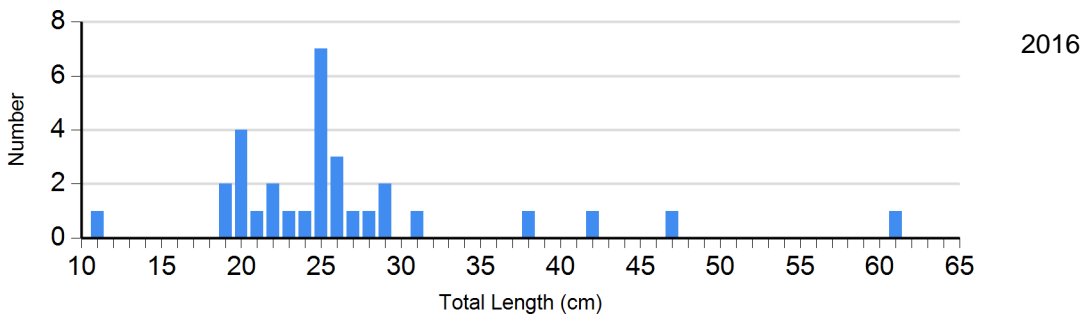
Species: Black Bullhead
Gear: std exp gill net



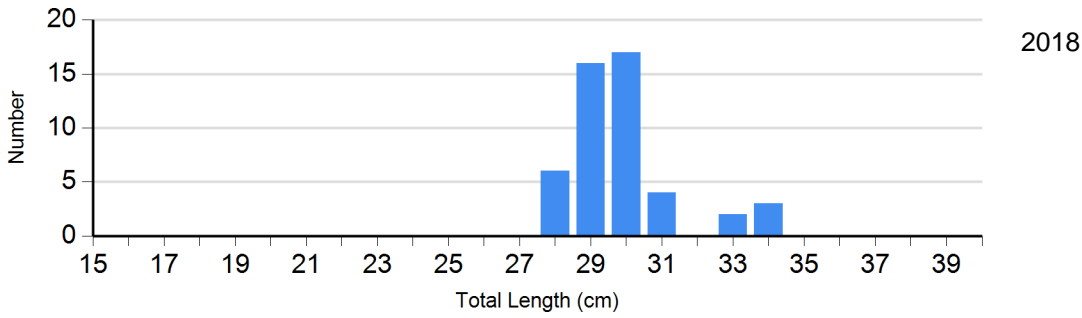
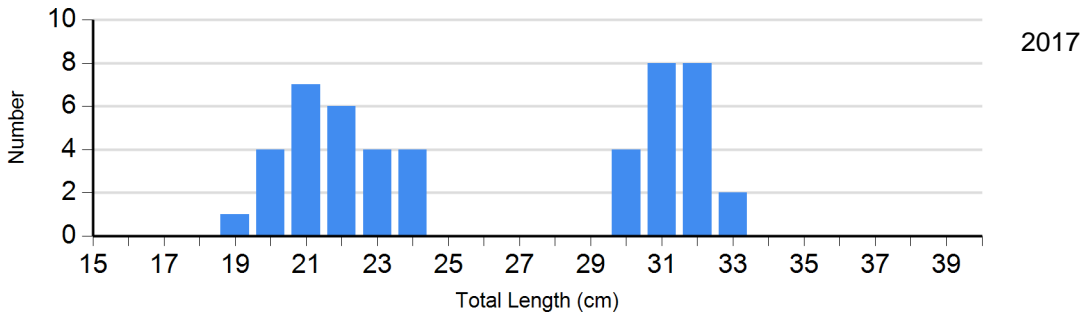


Species: Walleye
Gear: std exp gill net

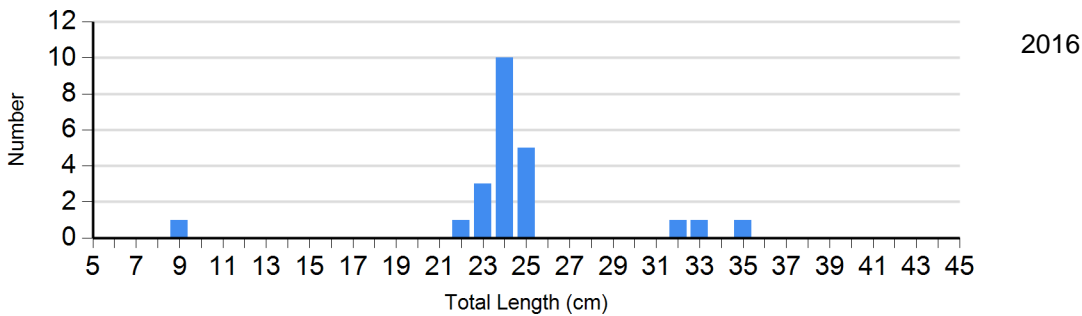
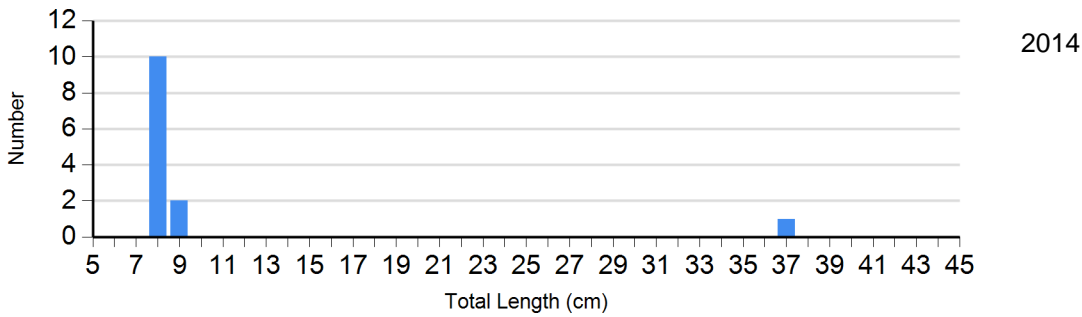




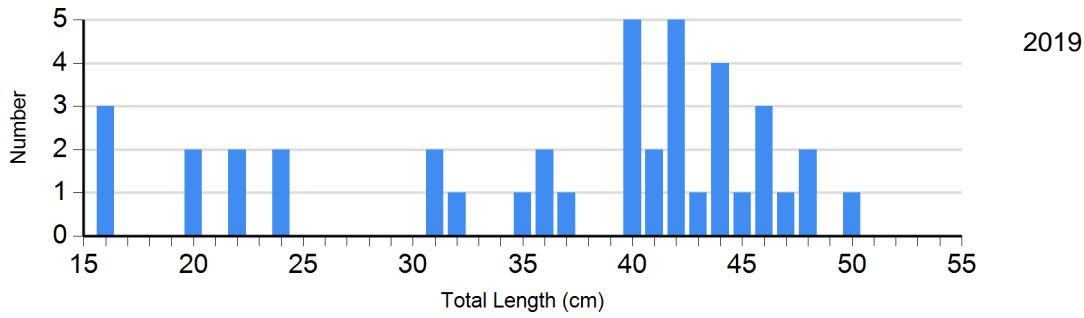
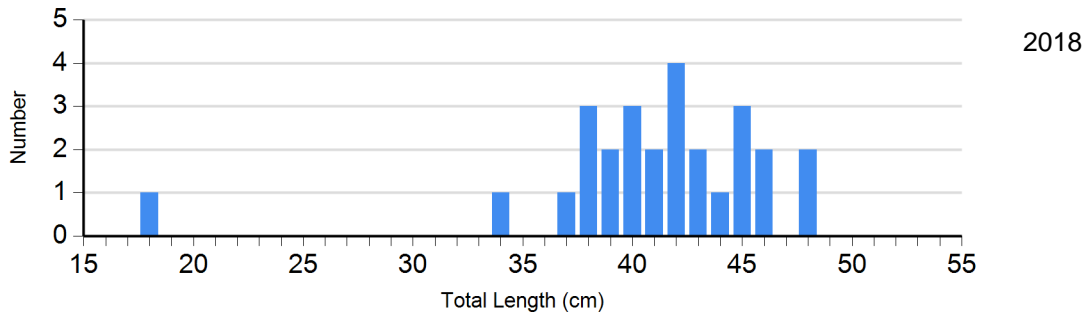
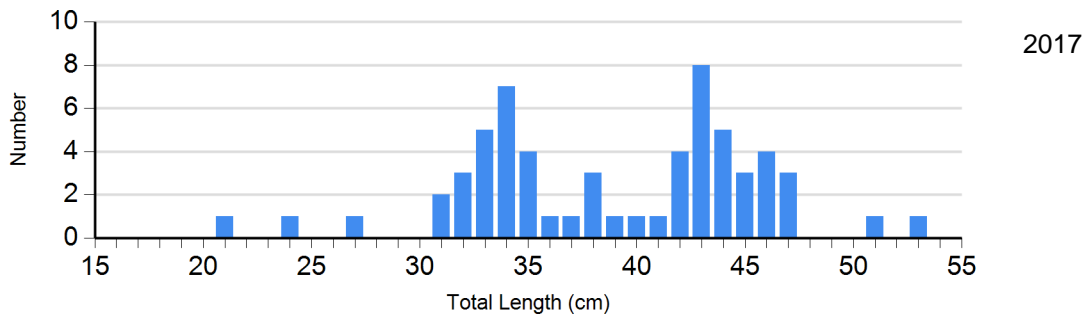
Species: White Bass
Gear: AFS std gill net



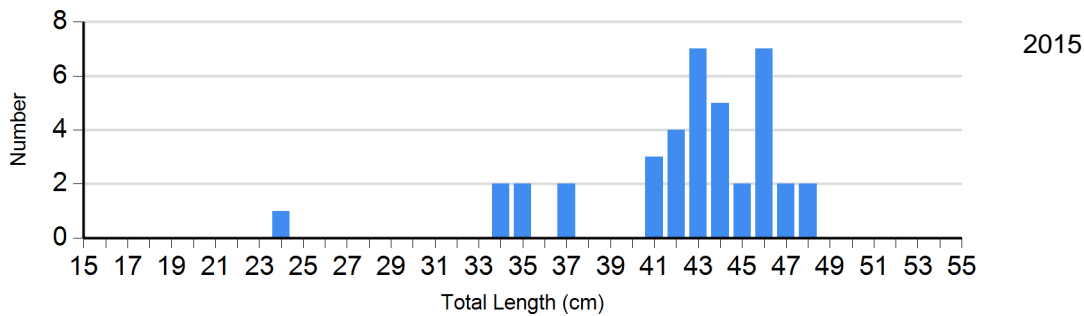
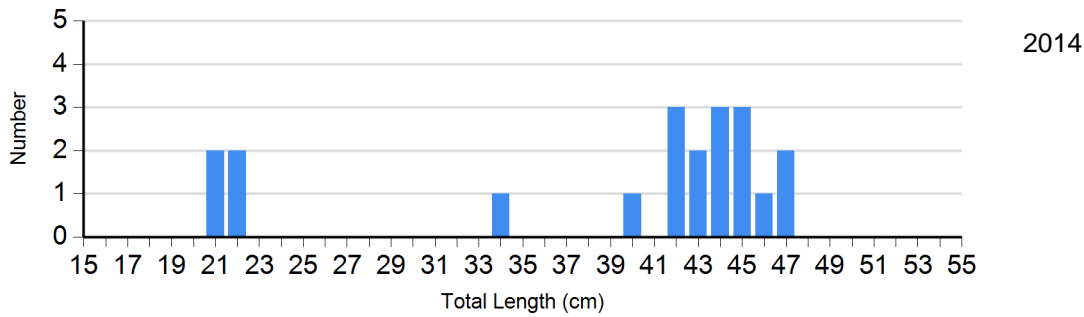
Species: White Bass
Gear: std exp gill net

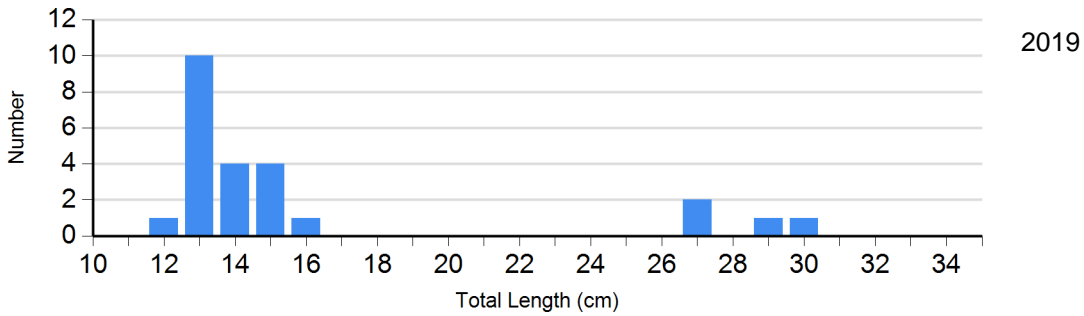
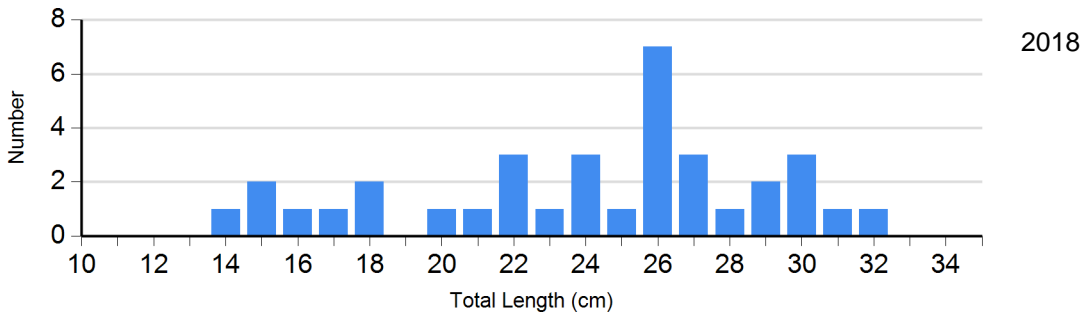
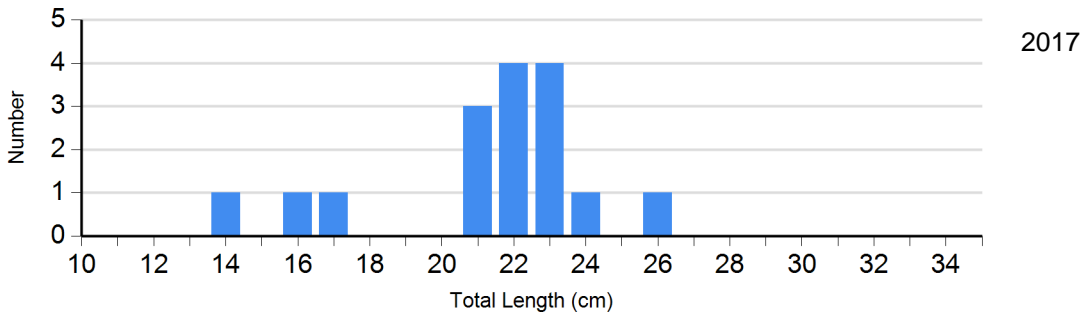
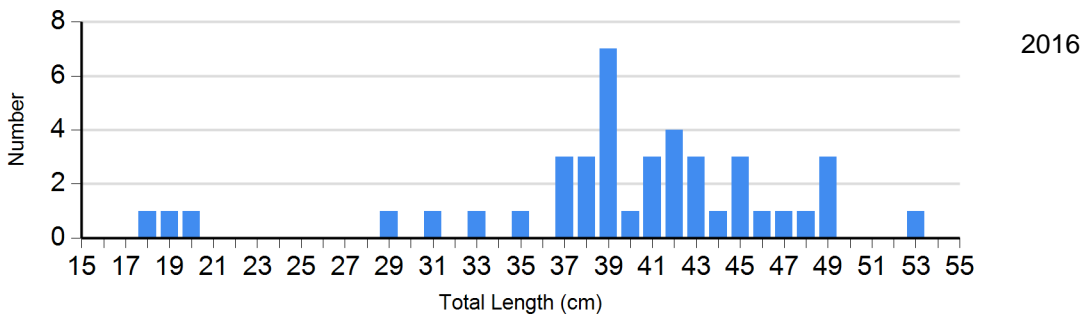


Species: White Sucker
 Gear: AFS std gill net

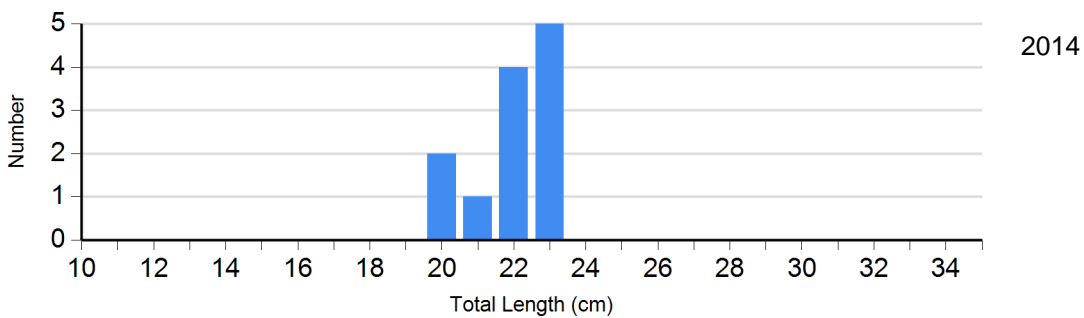


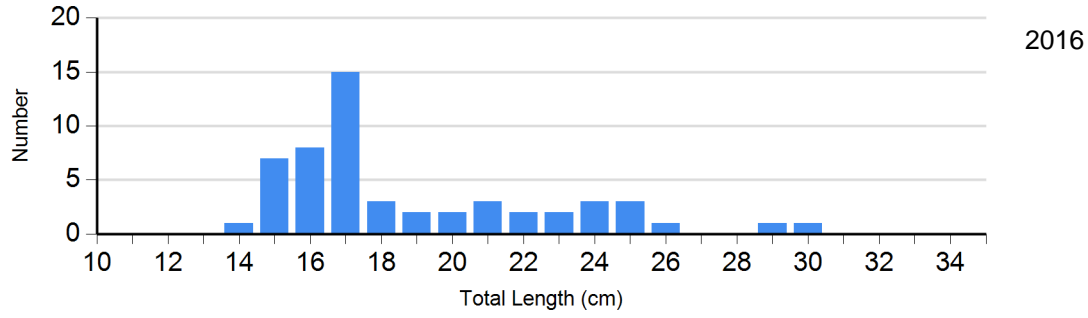
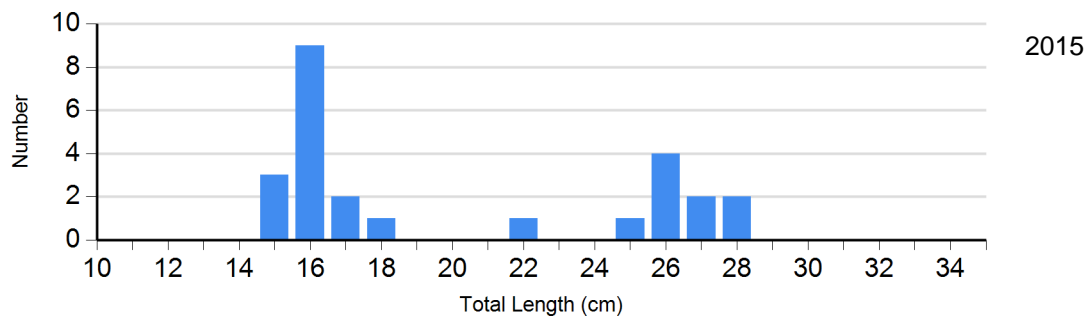
Species: White Sucker
 Gear: std exp gill net





Species: Yellow Perch
Gear: std exp gill net

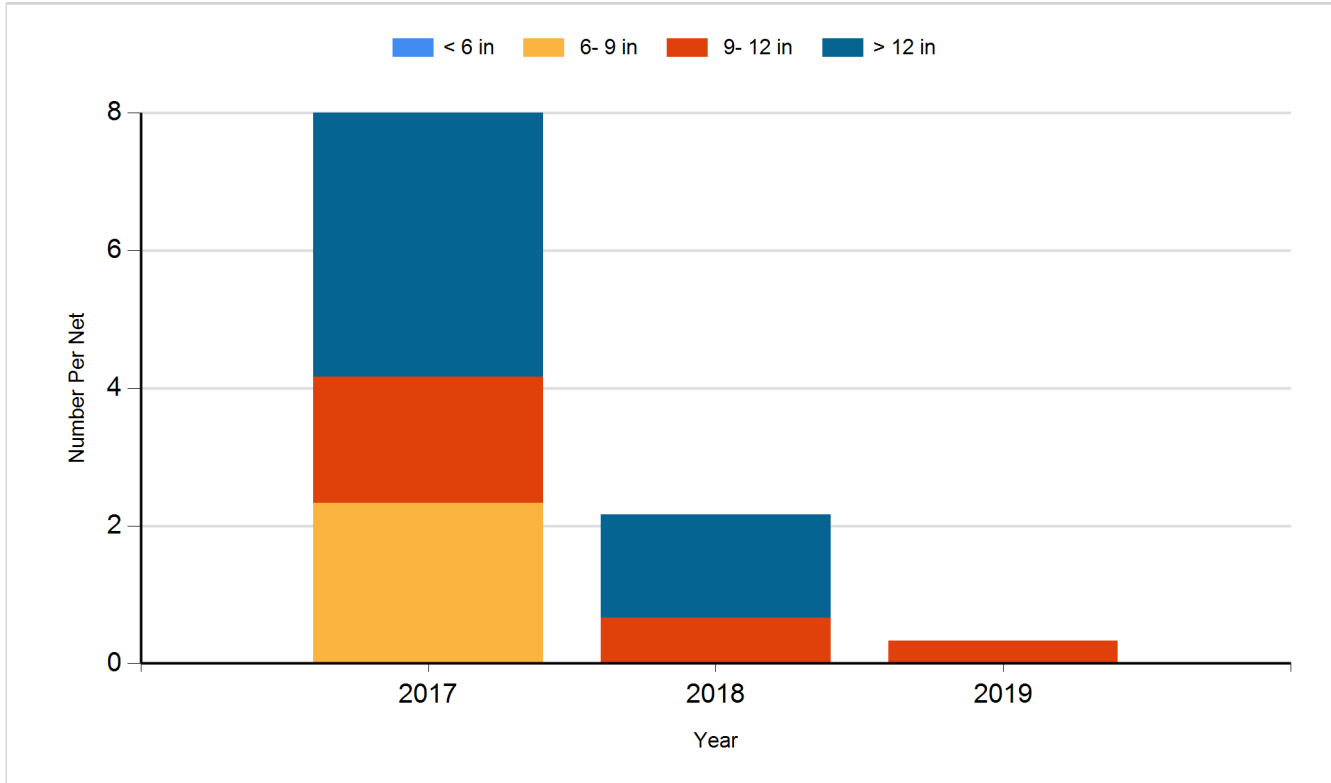




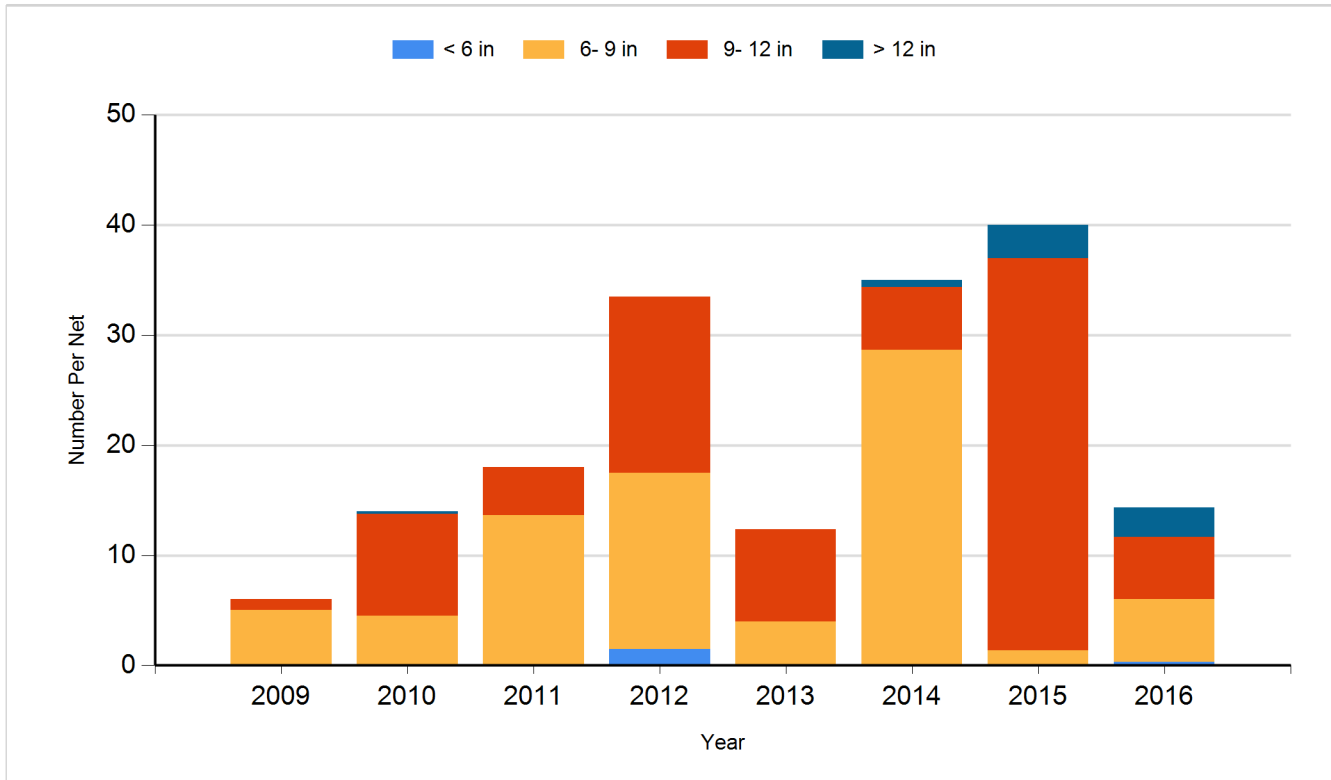
Historic Fish Sizes and Relative Abundance

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

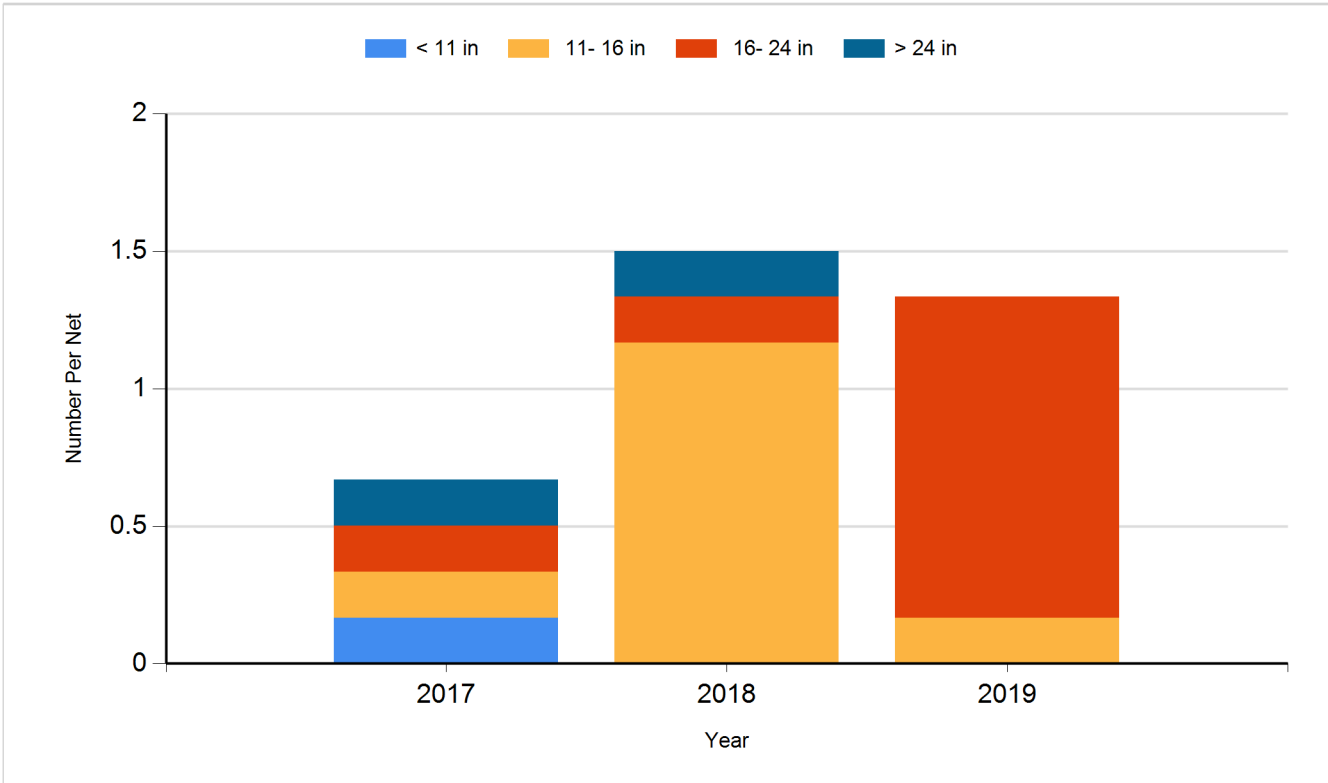
Species: Black Bullhead
Gear: AFS std gill net



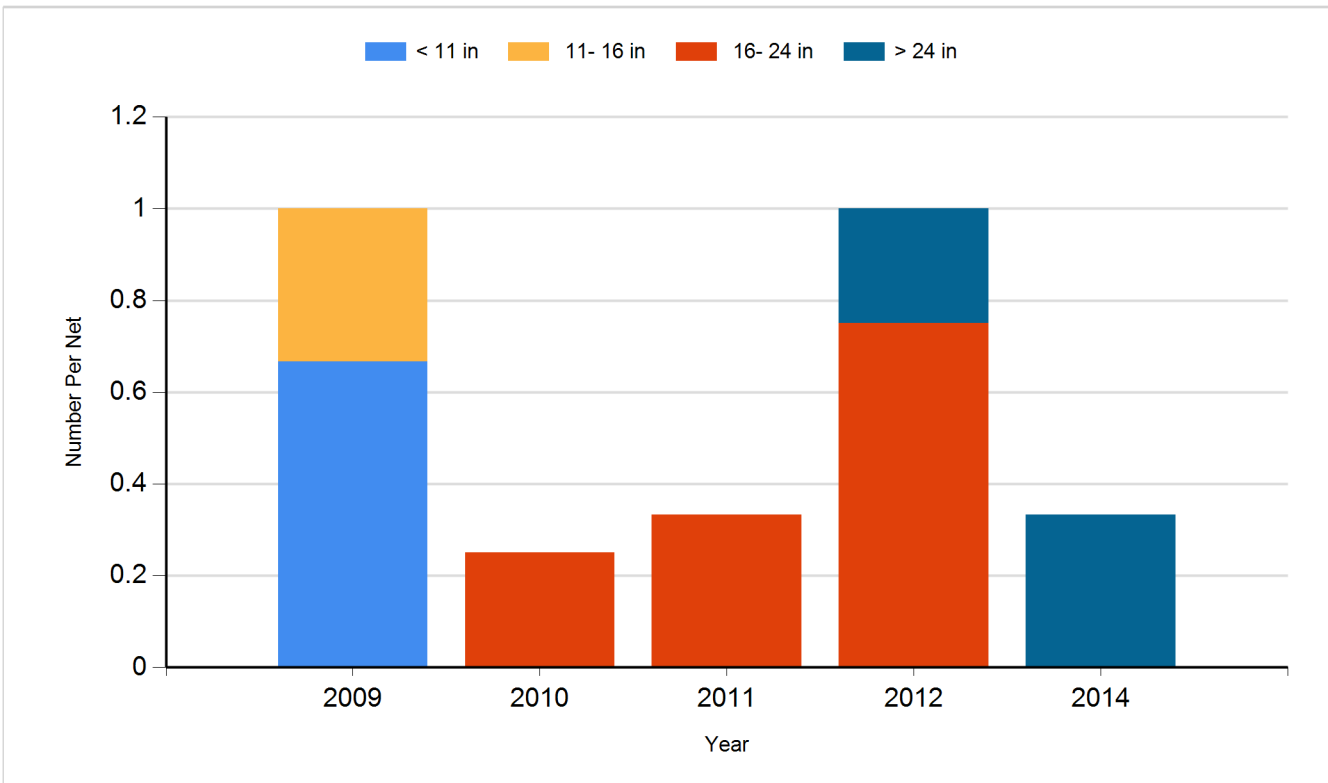
Species: Black Bullhead
Gear: std exp gill net



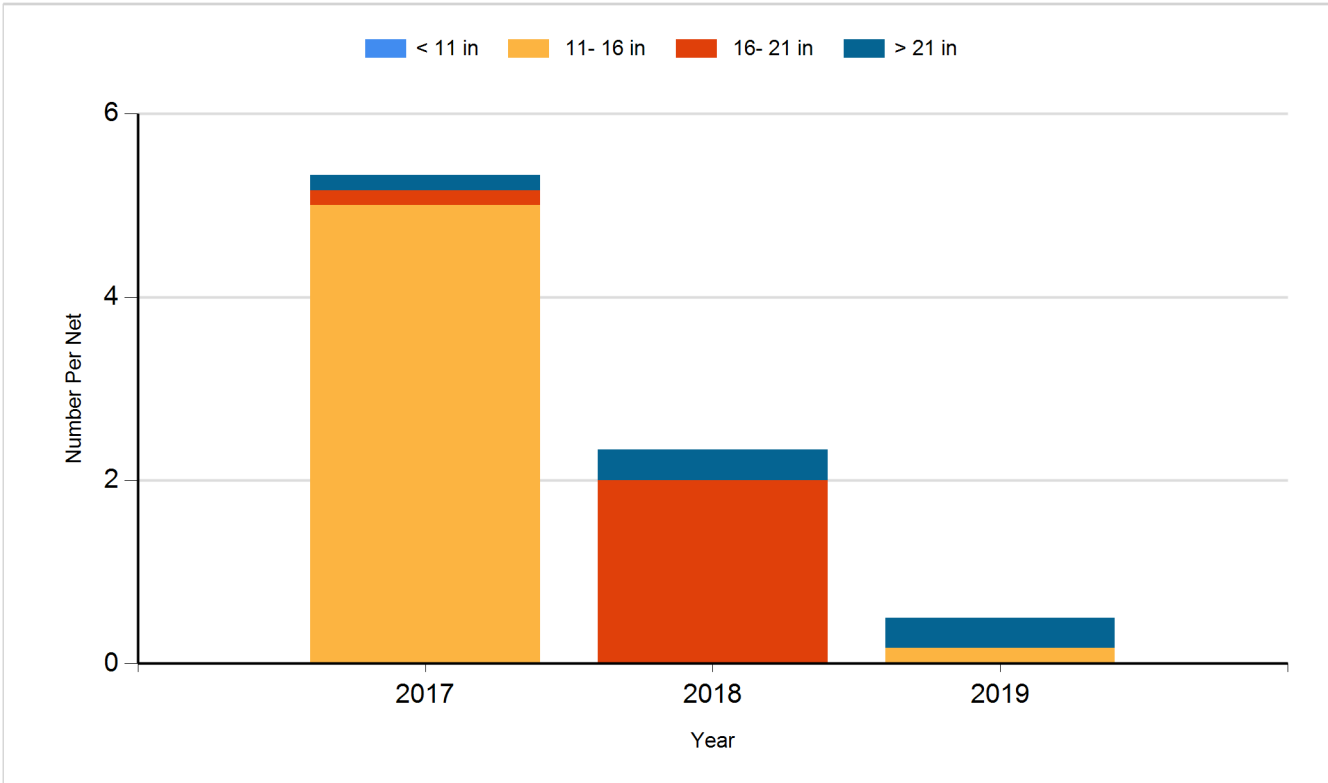
Species: Channel Catfish
Gear: AFS std gill net



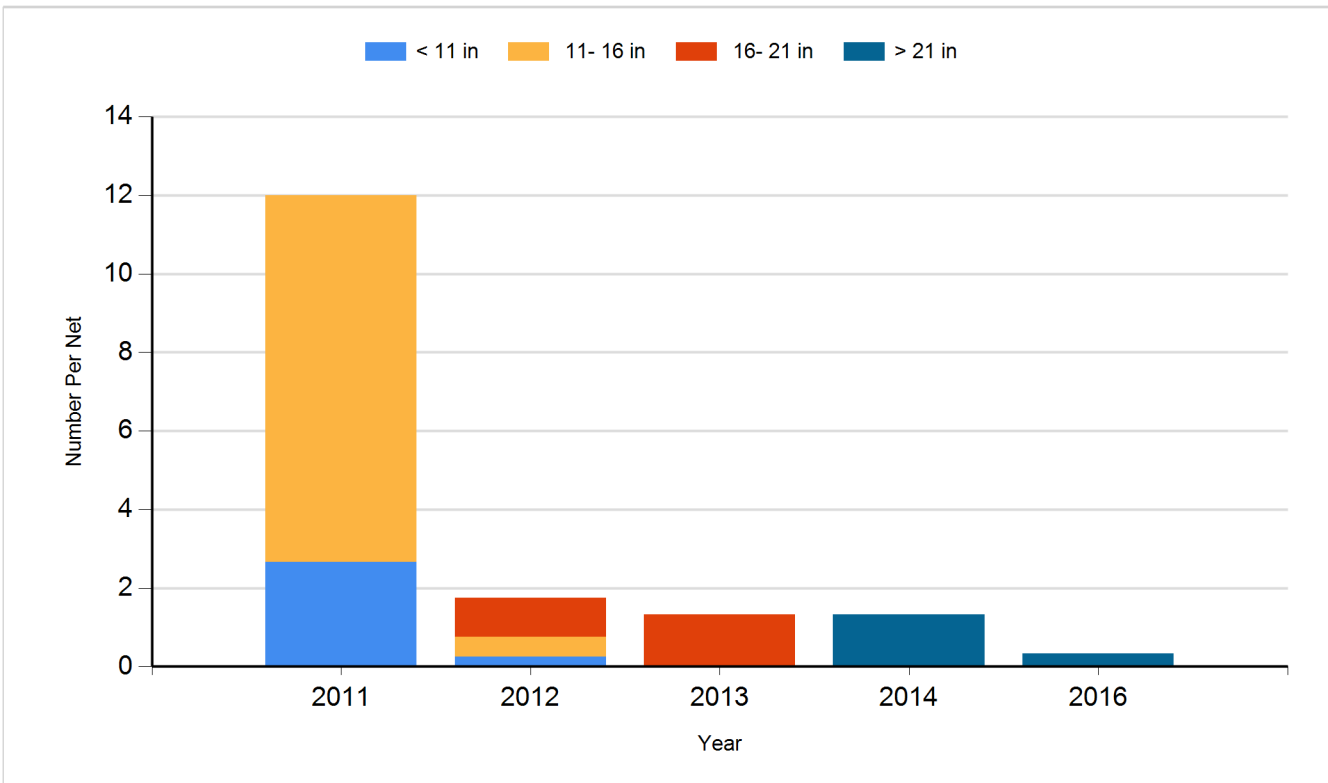
Species: Channel Catfish
Gear: std exp gill net



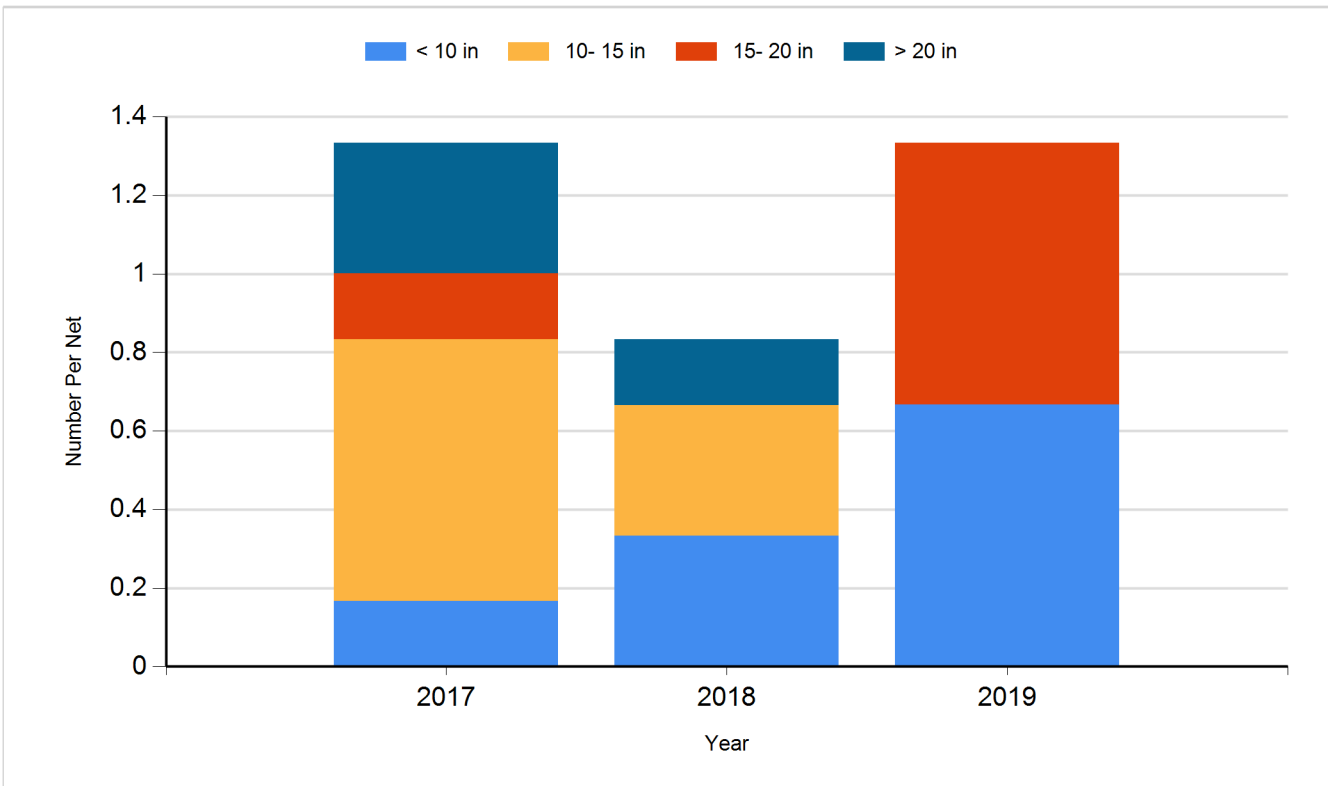
Species: Common Carp
Gear: AFS std gill net



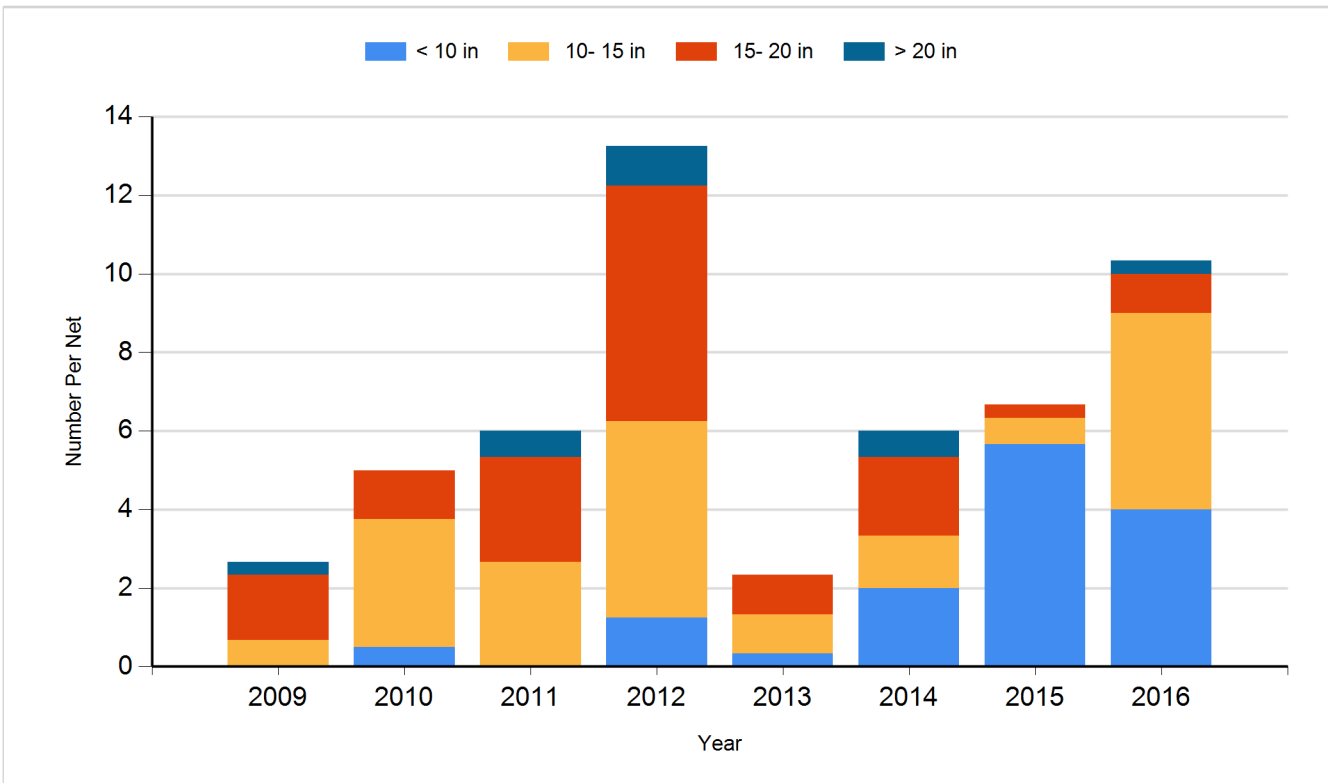
Species: Common Carp
Gear: std exp gill net



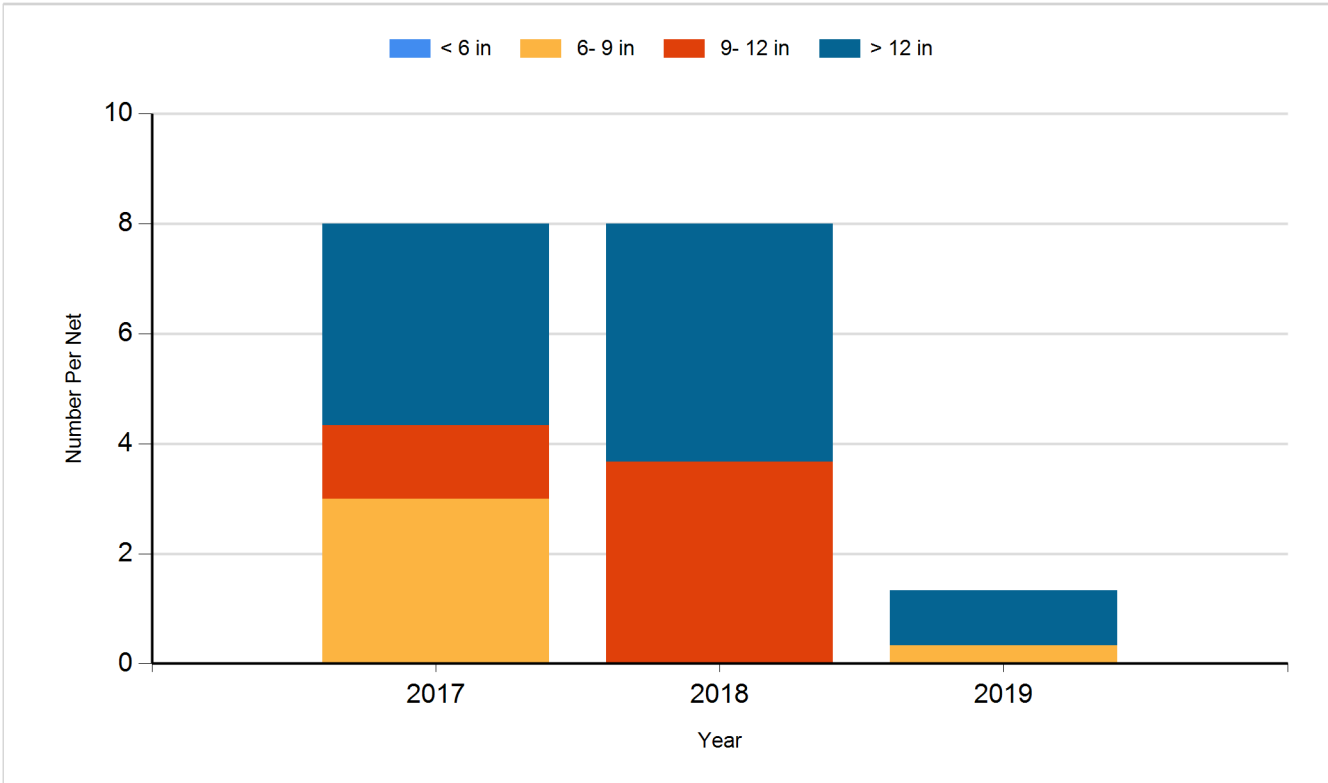
Species: Walleye
Gear: AFS std gill net



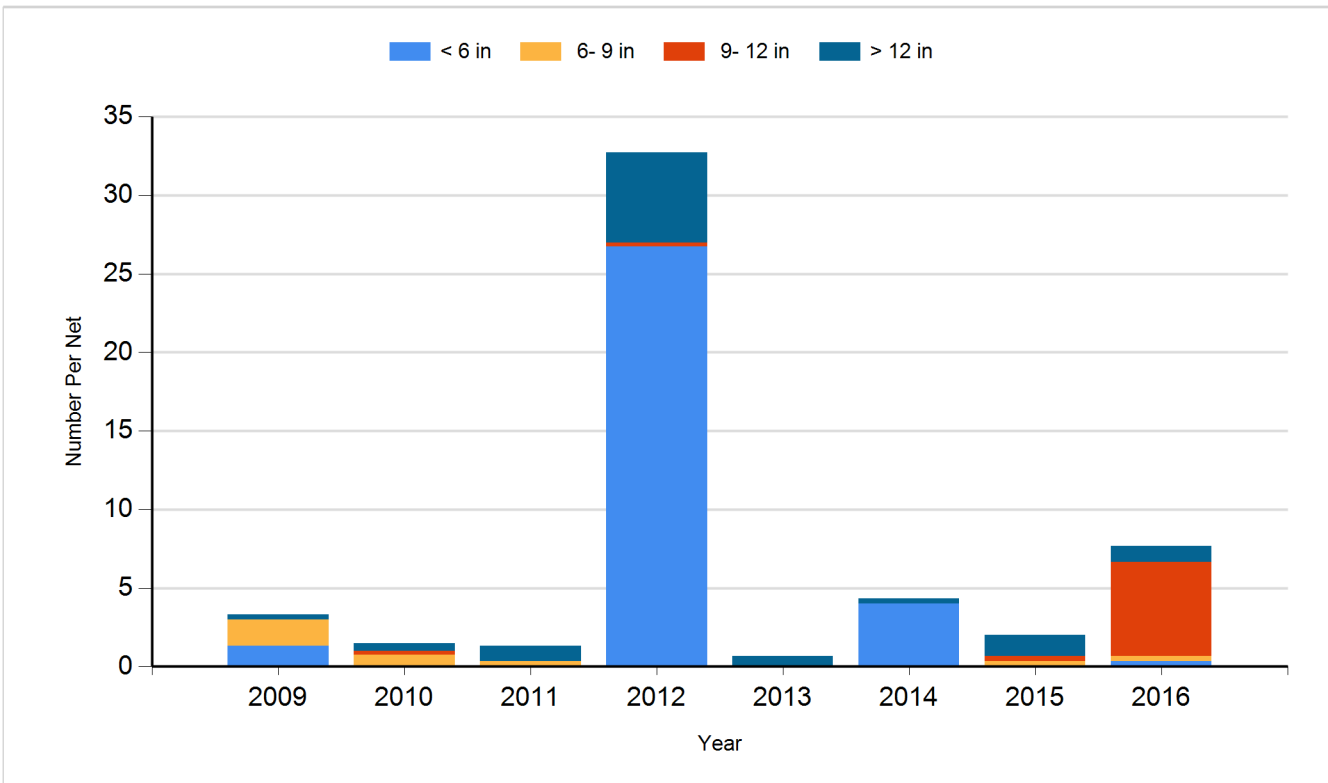
Species: Walleye
Gear: std exp gill net



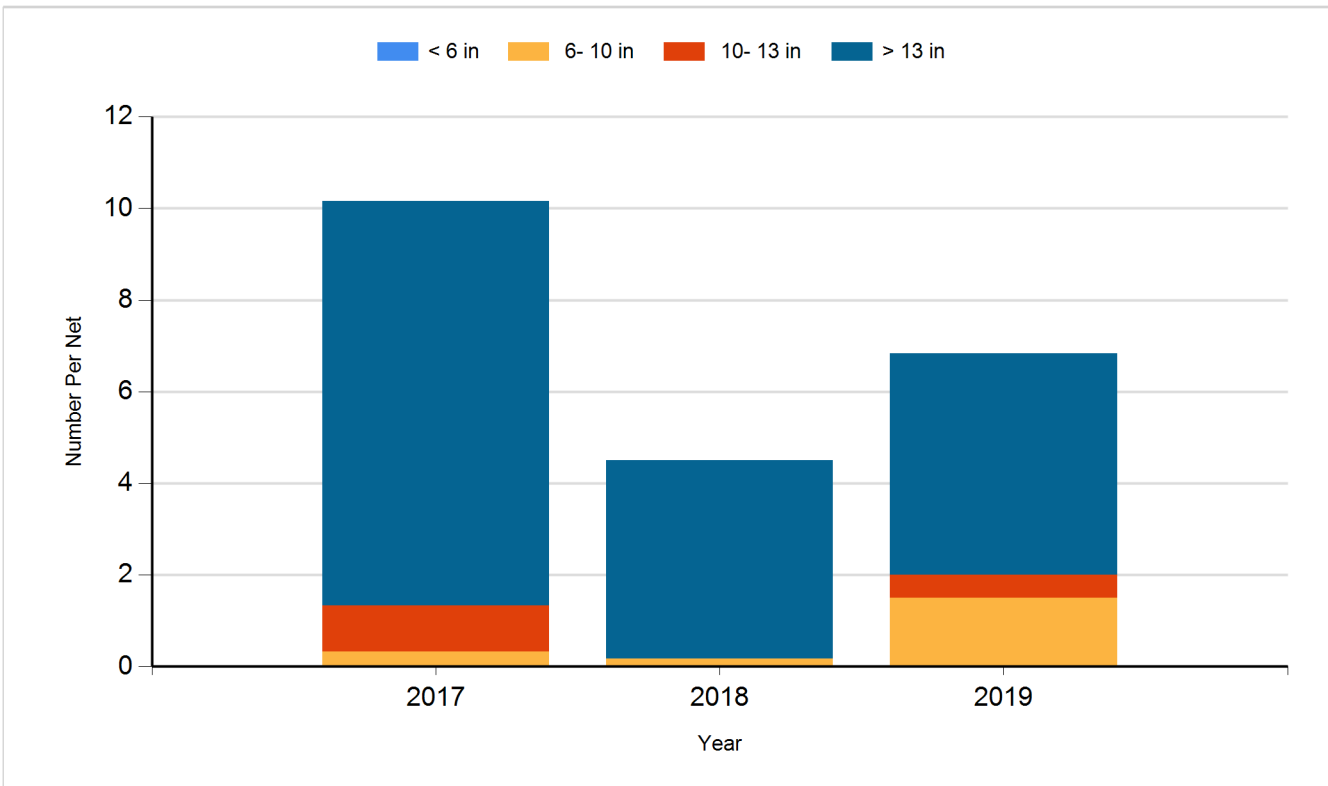
Species: White Bass
Gear: AFS std gill net



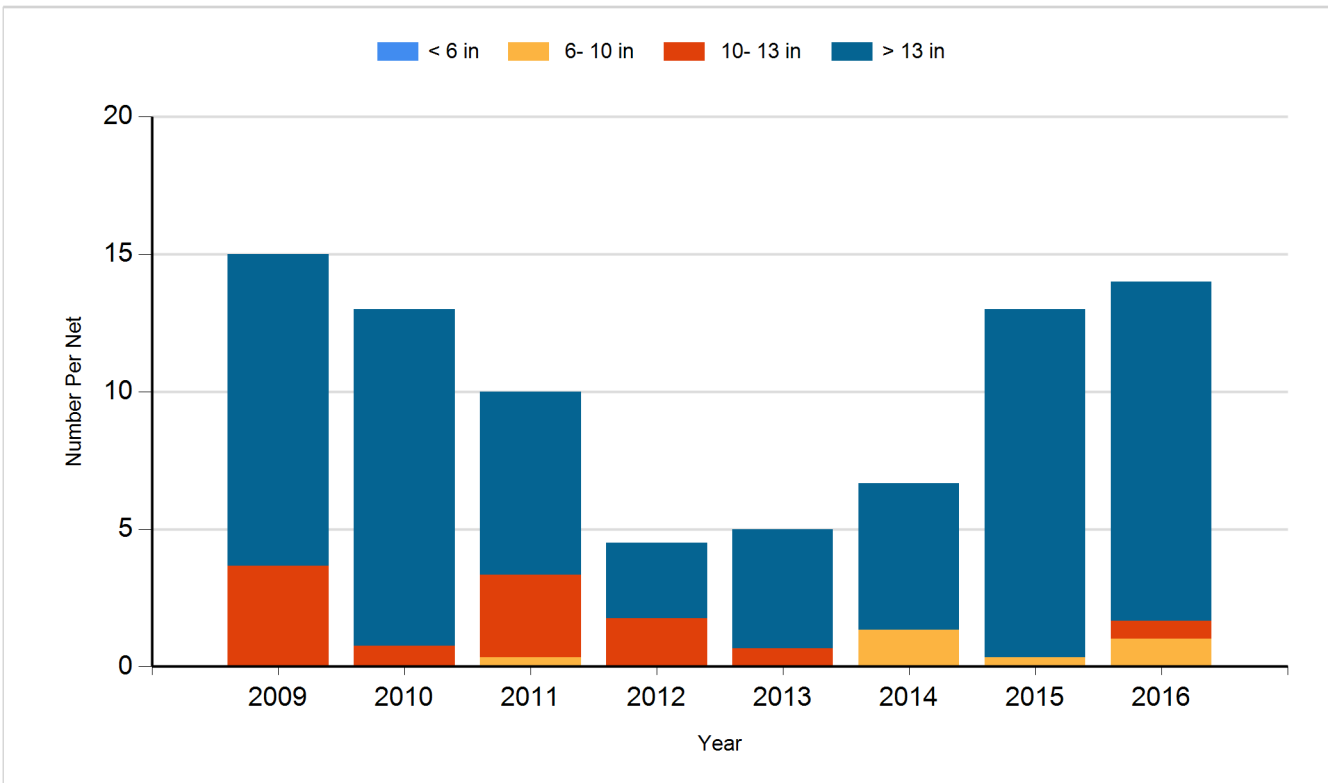
Species: White Bass
Gear: std exp gill net



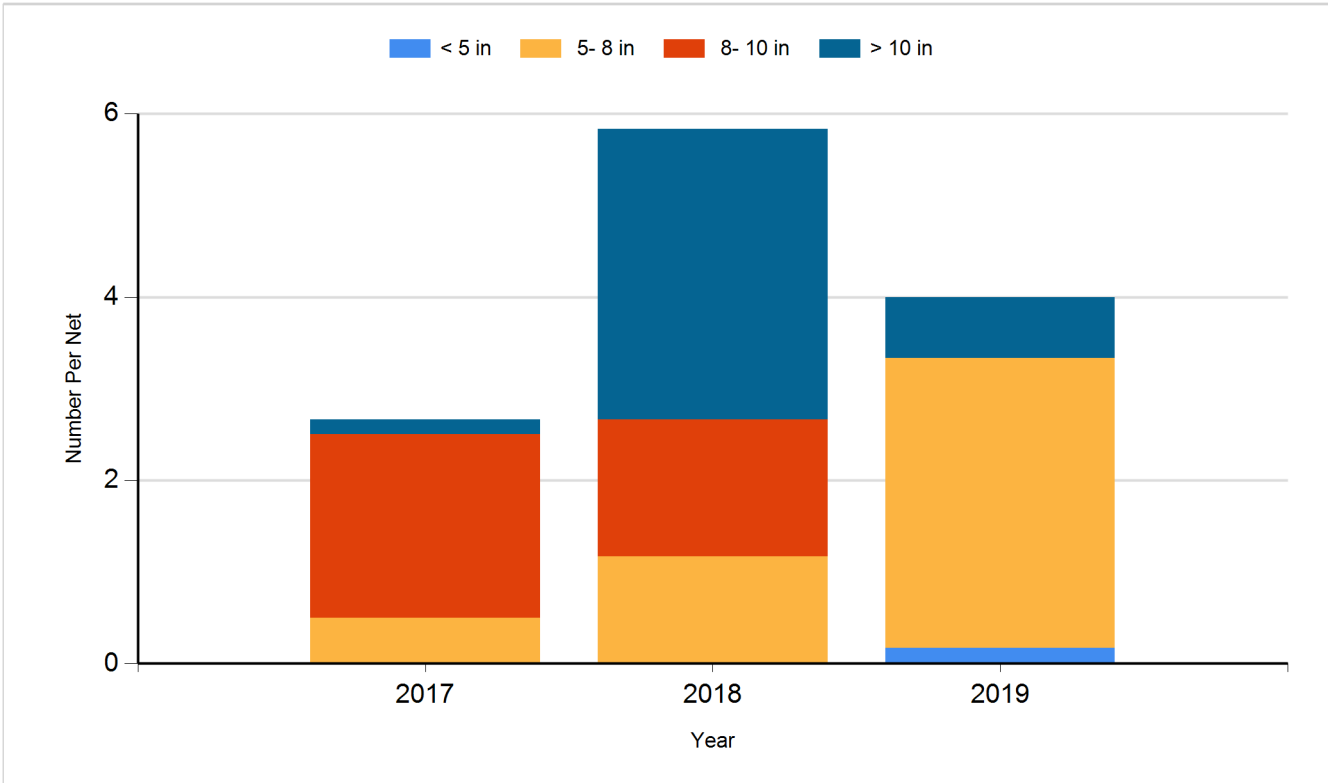
Species: White Sucker
Gear: AFS std gill net



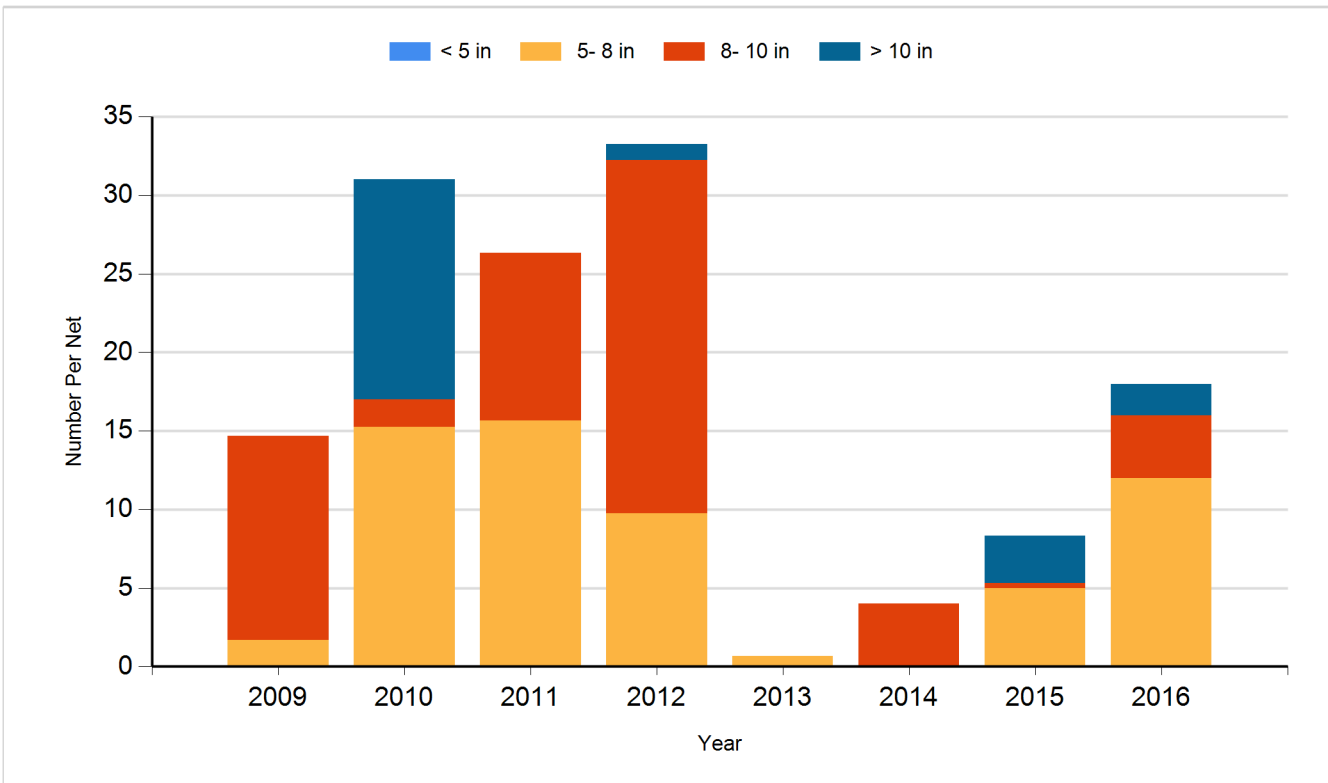
Species: White Sucker
Gear: std exp gill net



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
2008	Walleye	Fry	1,400,000
2009	Yellow Perch	Fry	7,539,000
2010	Walleye	Large Fingerling	1,312
2011	Walleye	Small Fingerling	135,790
2012	Walleye	Small Fingerling	130,130
2013	Walleye	Small Fingerling	135,200
2014	Walleye	Small Fingerling	95,920
2015	Walleye	Fry	337,604
2016	Walleye	Fry	340,000
2017	Walleye	Fry	340,000
2018	Walleye	Fry	340,000
2019	Walleye	Fry	340,000
