SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Byron, Beadle County
MJA-Lake-531-800
2019

Lake Information

Name:	Byron	**Maximum Depth:**	10 Feet
County:	Beadle	**Mean Depth:**	7 Feet
Legal Description:	T113N- R61W- Sec. 22-23, 25-26, 28, 34-35	**OHWM Elevation:**	1,250
Surface Area:	1,858 Acres	**Outlet Elevation:**	1,248

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 20, 2019	6 net-nights

Common Fish Species Present

Walleye

Bigmouth Buffalo

Freshwater Drum

Black Bullhead

Common Carp

Channel Catfish

River Carpsucker

Yellow Perch

Northern Pike

Shortnose Gar

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	Bigmouth Buffalo	35	5.8	3.6	91		6			
	Black Bullhead	9	1.5	1.0	100		78			
	Channel Catfish	4	0.7	0.5	100		25		90	6
	Common Carp	8	0.8	0.7	80		40			
	Freshwater Drum	12	2.0	1.3	100		33			
	Goldeye	1	0.0	0.0						
	Northern Pike	1	0.2	0.2	100		0		89	
	River Carpsucker	4	0.7	0.5	100		100			
	Shortnose Gar	6	0.0	0.0						
	Walleye	31	5.2	4.4	48	14	3		94	1
	Yellow Perch	2	0.3	0.3	100		100		94	11

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								12.8	9.2	5.8	9.27
	Black Bullhead								4.5	3.0	1.5	3.00
	Black Crappie								0.3	0.2	0.0	0.17
	Channel Catfish								0.2	0.2	0.7	0.37
	Common Carp								0.2	0.0	0.8	0.33
	Common Shiner								0.0	0.0	0.0	0.00
	Freshwater Drum								0.7	1.2	2.0	1.30
	Goldeye								0.0	0.0	0.0	0.00
	Northern Pike								0.3	0.0	0.2	0.17
	River Carpsucker								0.0	0.3	0.7	0.33
	Shortnose Gar								0.0	0.0	0.0	0.00
	Walleye								1.7	1.7	5.2	2.87
	White Sucker								0.2	0.0	0.0	0.07
	Yellow Perch								1.0	0.5	0.3	0.60
frame net (std 3/4 in)	Bigmouth Buffalo		4.0		0.2							2.10
	Black Bullhead		65.6		1,085.8							575.70
	Black Crappie		11.9		0.8							6.35
	Bluegill		1.1		0.0							0.55
	Channel Catfish		3.0		0.6							1.80
	Common Carp		3.6		2.0							2.80
	Freshwater Drum		1.1		0.8							0.95
	Gizzard Shad		0.0		0.0							0.00
	Green Sunfish		0.4		0.0							0.20
	Northern Pike		0.8		0.6							0.70
	Orangespotted Sunfish		0.0		0.0							0.00
	River Carpsucker		0.1		0.0							0.05
	Shorthead Redhorse		0.3		0.2							0.25
	Shortnose Gar		0.0		0.0							0.00
	Walleye		0.3		0.6							0.45
	White Sucker		2.3		2.8							2.55
	Yellow Bullhead		0.5		0.0							0.25
	Yellow Perch		0.1		0.0							0.05
std exp gill net	Bigmouth Buffalo		4.3		4.0	0.3	5.0	16.7				6.06
	Black Bullhead		20.7		94.0	26.7	18.3	19.7				35.88

		CPUE										
Gear	Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
std exp gill net	Black Crappie		1.7		0.0	0.3	1.3	0.0				0.66
	Channel Catfish		0.3		0.0	0.0	1.0	0.0				0.26
	Common Carp		0.3		1.0	0.3	0.7	0.7				0.60
	Freshwater Drum		0.7		0.5	0.0	1.7	2.0				0.98
	Gizzard Shad		0.0		0.0	0.0	0.0	0.0				0.00
	Northern Pike		0.7		2.0	1.0	0.0	1.0				0.94
	River Carpsucker		0.0		0.0	0.3	0.0	1.3				0.32
	Shorthead Redhorse		0.0		0.5	0.0	0.3	0.0				0.16
	Shortnose Gar		0.0		0.0	0.0	0.0	0.0				0.00
	Walleye		10.3		3.0	6.3	2.7	1.0				4.66
	White Sucker		2.7		4.5	1.7	3.7	1.7				2.86
	Yellow Perch		12.0		7.0	0.3	0.7	0.0				4.00

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.

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std gill net	Bigmouth Buffalo	PSD								87	91	91
		PSD-P								1	4	6
	Black Bullhead	PSD								100	100	100
		PSD-P								56	100	78
	Channel Catfish	PSD								100	100	100
		PSD-P								100	100	25
		Wr								100	77	90
	Common Carp	PSD								100		80
		PSD-P								100		40
	Northern Pike	PSD								100		100
		PSD-P								100		0
		Wr								82		89
	River Carpsucker	PSD									100	100
		PSD-P									100	100
	Walleye	PSD								50	40	48
		PSD-P								30	10	3
		Wr								84	88	94
	Yellow Perch	PSD								83	100	100
		PSD-P								50	100	100
		Wr								94	96	94
frame net (std 3/4 in)	Bigmouth Buffalo	PSD		59		0						
		PSD-P		6		0						
		Wr		95		120						
	Black Bullhead	PSD		45		34						
		PSD-P		0		0						
		Wr		90		87						
	Channel Catfish	PSD		25		100						
		PSD-P		0		0						
		Wr		94		101						
	Common Carp	PSD		62		100						
		PSD-P		48		70						
		Wr		91		97						
	Northern Pike	PSD		100		100						

			Year									
Gear	Species	Index	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
frame net (std 3/4 in)	Northern Pike	PSD-P		0		100						
		Wr		86		93						
	River Carpsucker	PSD		100								
		PSD-P		100								
		Wr		90								
	Walleye	PSD		50		100						
		PSD-P		50		0						
		Wr		88		98						
	Yellow Perch	PSD		0								
		PSD-P		0								
		Wr		93								
std exp gill net	Bigmouth Buffalo	PSD		54		0	100	0	6			
		PSD-P		0		0	0	0	2			
		Wr		91		110						
	Black Bullhead	PSD		55		39	99	80	92			
		PSD-P		0		0	0	0	3			
		Wr		95		95						
	Channel Catfish	PSD		100				100				
		PSD-P		0				100				
		Wr		114				117				
	Common Carp	PSD		100		100	100	50	100			
		PSD-P		100		0	100	0	0			
		Wr		77		109						
	Northern Pike	PSD		100		100	67		100			
		PSD-P		50		0	33		33			
		Wr		79		94	88		89			
	River Carpsucker	PSD					100		100			
		PSD-P					100		75			
	Walleye	PSD		61		50	42	63	67			
		PSD-P		0		0	11	0	0			
		Wr		97		102	97	93	91			
	Yellow Perch	PSD		56		71	100	100				
		PSD-P		0		21	0	100				
		Wr		105		112	93	92				

Fish Condition

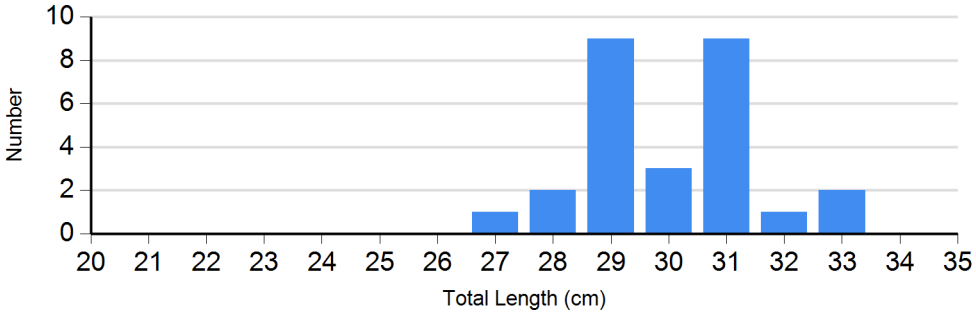
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Channel Catfish Gill Net	2015	0		0		3	117 (13.7)	0	
	2017	0		0		1	100	0	
	2018	0		0		1	77	0	
	2019	0		3	93 (5.6)	1	83	0	
Northern Pike Gill Net	2016	0		2	92 (11.8)	1	84	0	
	2017	0		0		2	82 (5.0)	0	
	2019	0		1	89	0		0	
Walleye Gill Net	2015	3	94 (0.9)	5	92 (1.8)	0		0	
	2016	1	95	2	90 (1.9)	0		0	
	2017	5	80 (3.1)	2	94 (14.0)	3	83 (4.7)	0	
	2018	6	87 (1.7)	3	90 (1.8)	1	91	0	
	2019	16	91 (1.2)	14	98 (1.4)	1	94	0	
Yellow Perch Gill Net	2015	0		0		0		2	92 (5.4)
	2017	1	95	2	96 (7.0)	3	92 (3.4)	0	
	2018	0		0		3	96 (2.1)	0	
	2019	0		0		2	94 (8.3)	0	

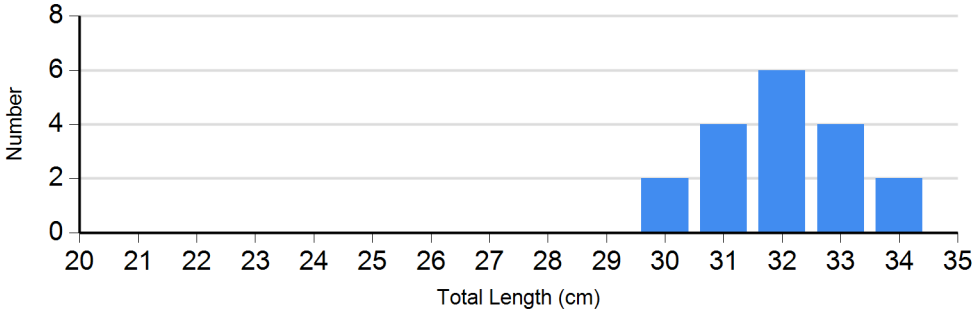
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

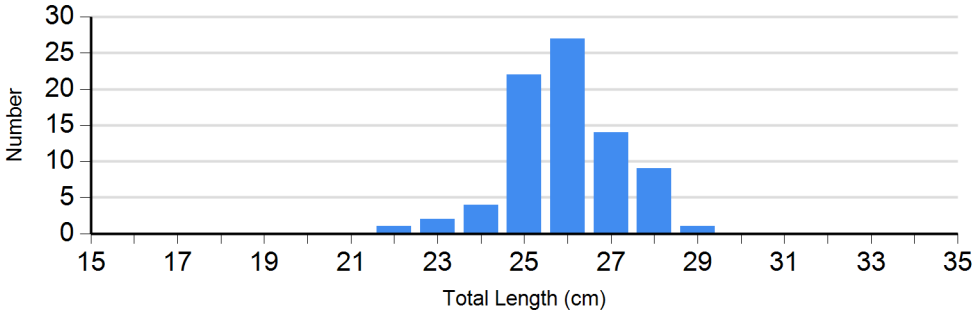


2017

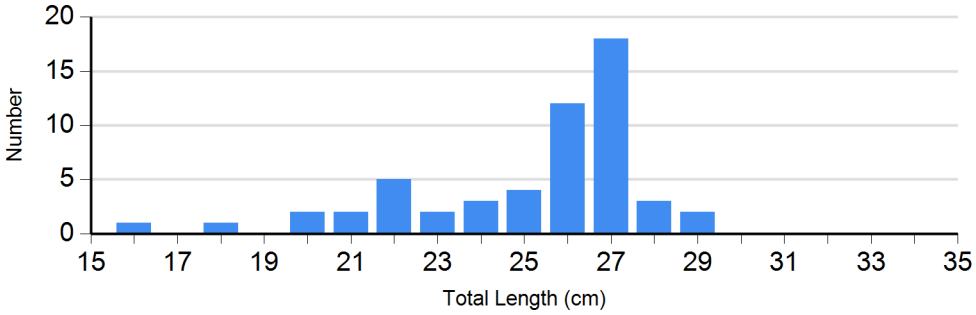


2018

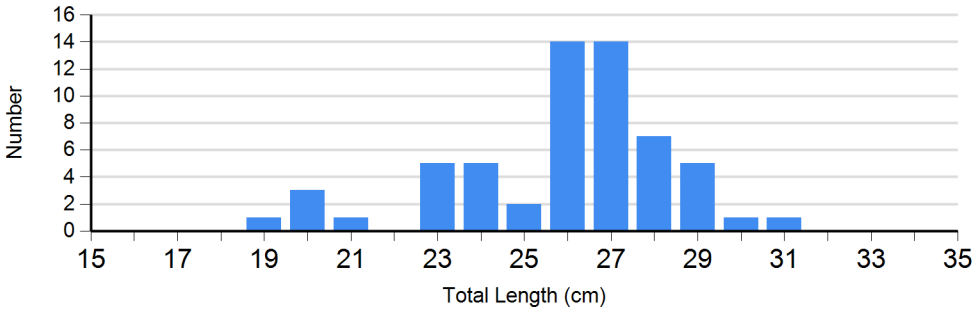
Species: Black Bullhead
Gear: std exp gill net



2014

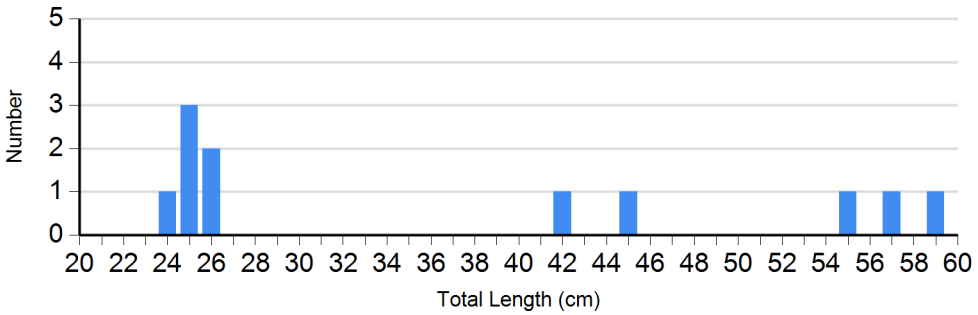


2015



2016

Species: Walleye
Gear: AFS std gill net



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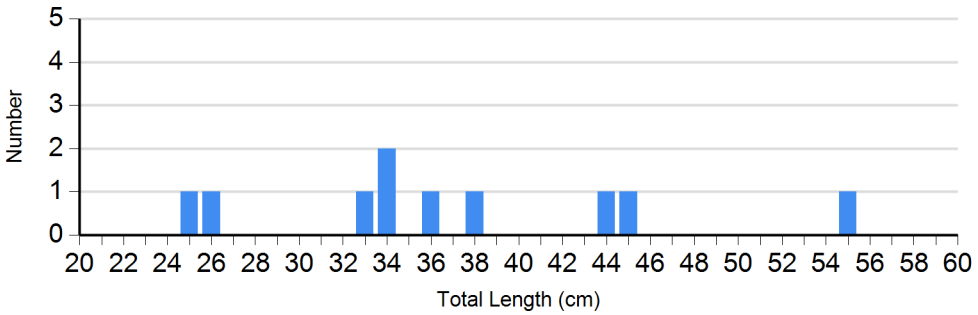
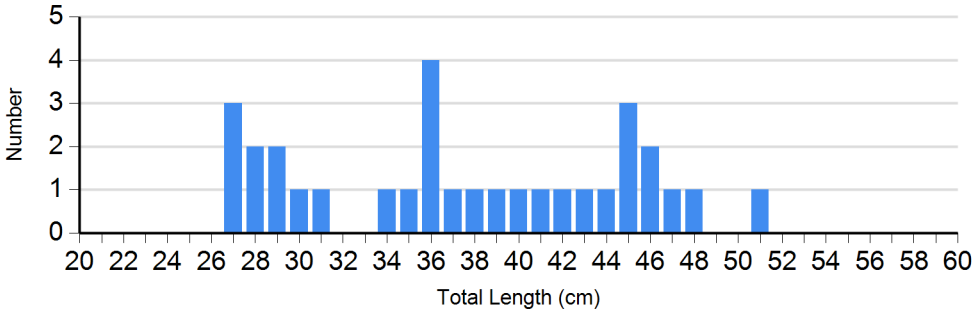
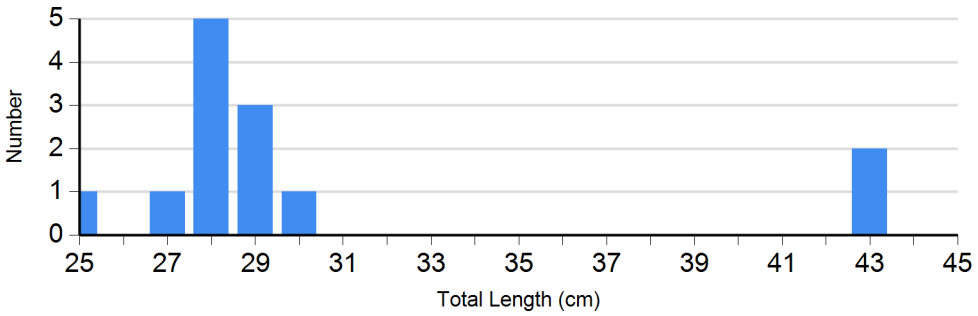


2018



2019

Species: Walleye
Gear: std exp gill net

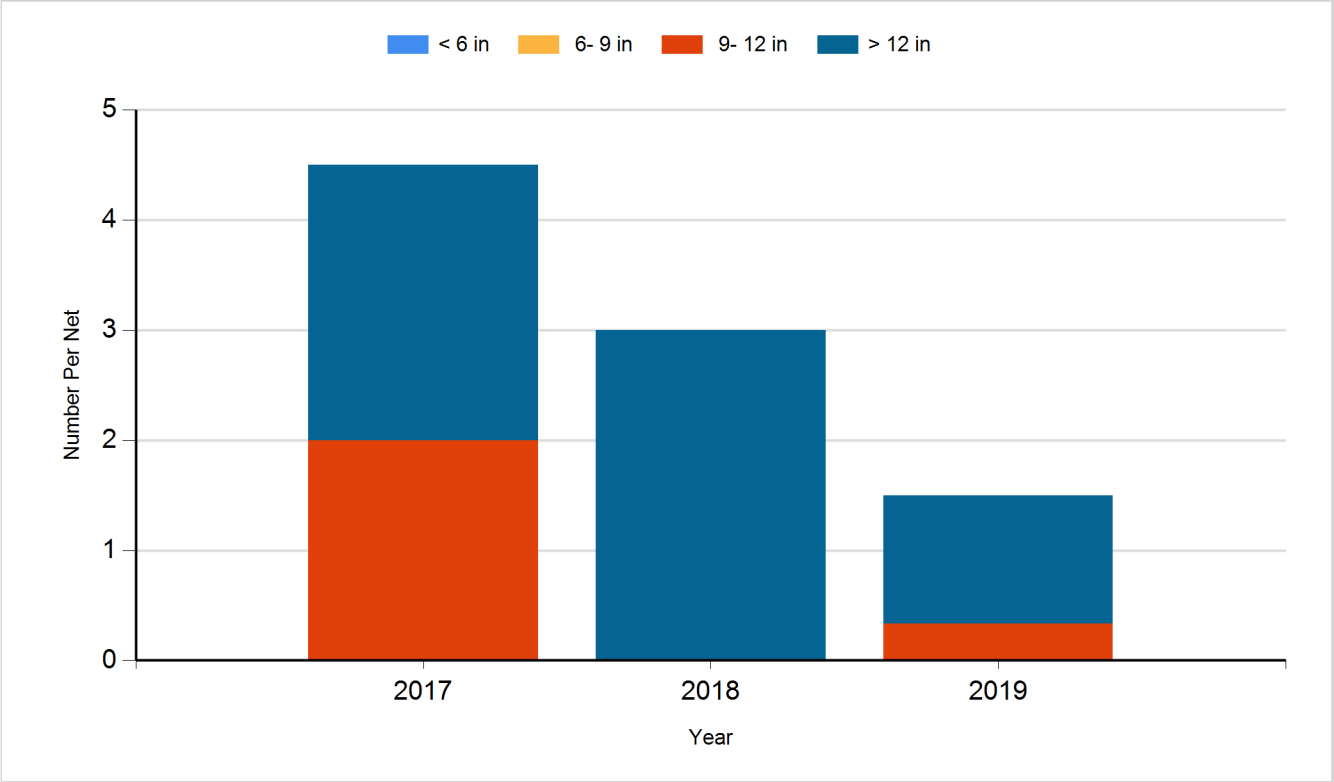


2014

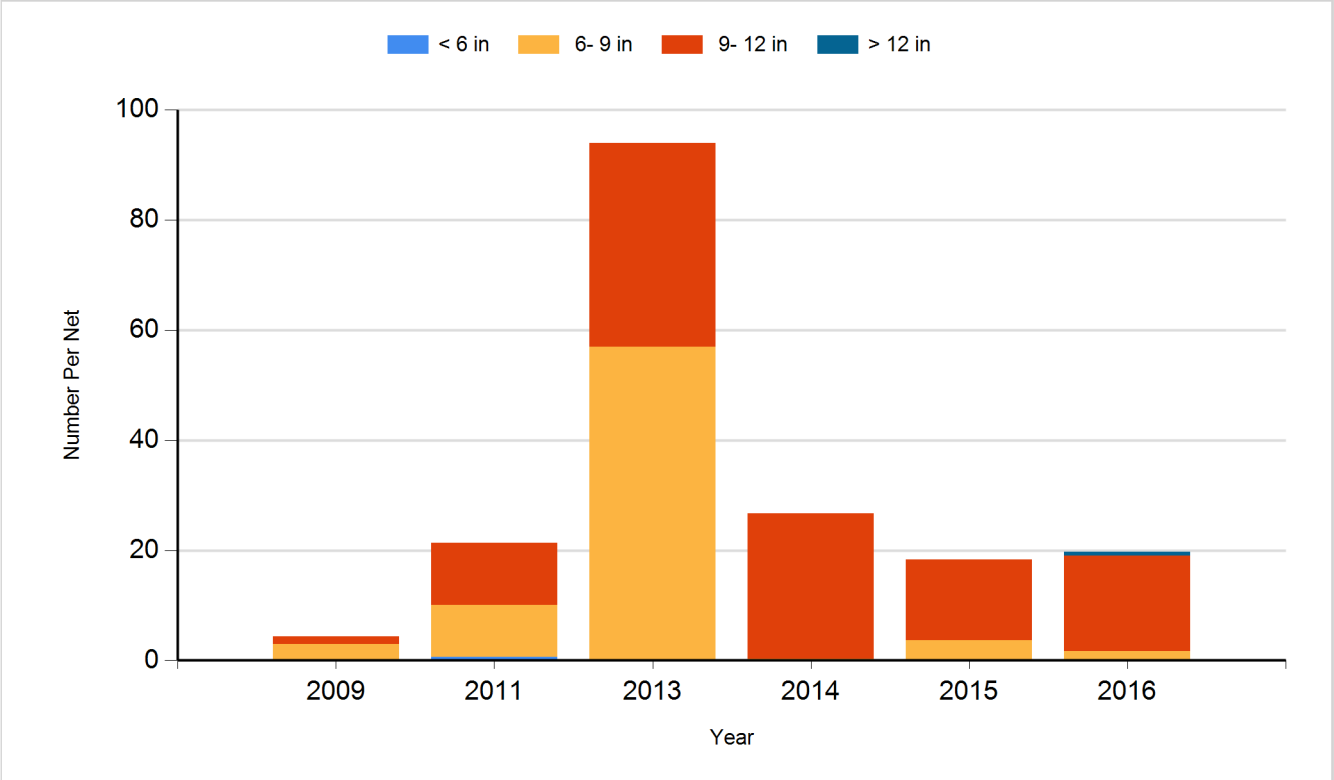
Historic Fish Sizes and Relative Abundance

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

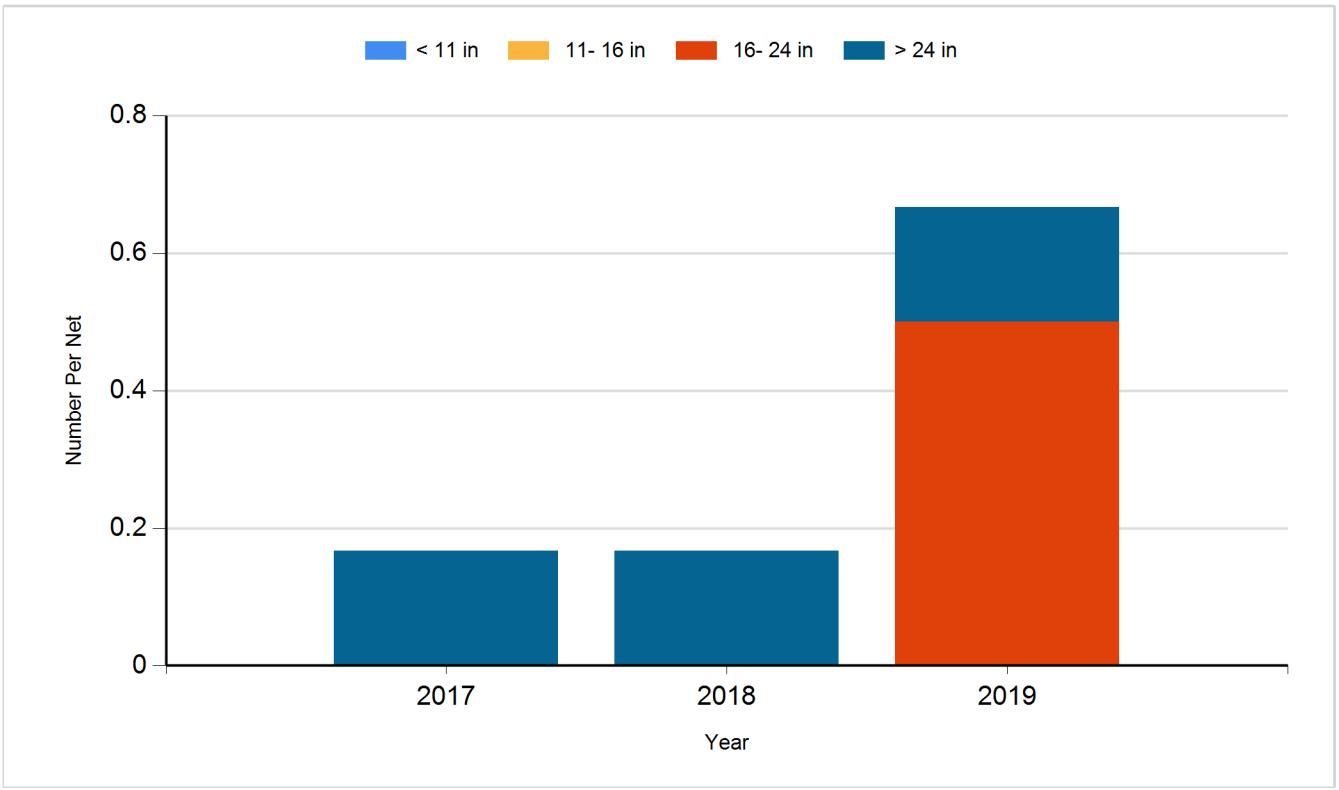
Species: Black Bullhead
Gear: AFS std gill net



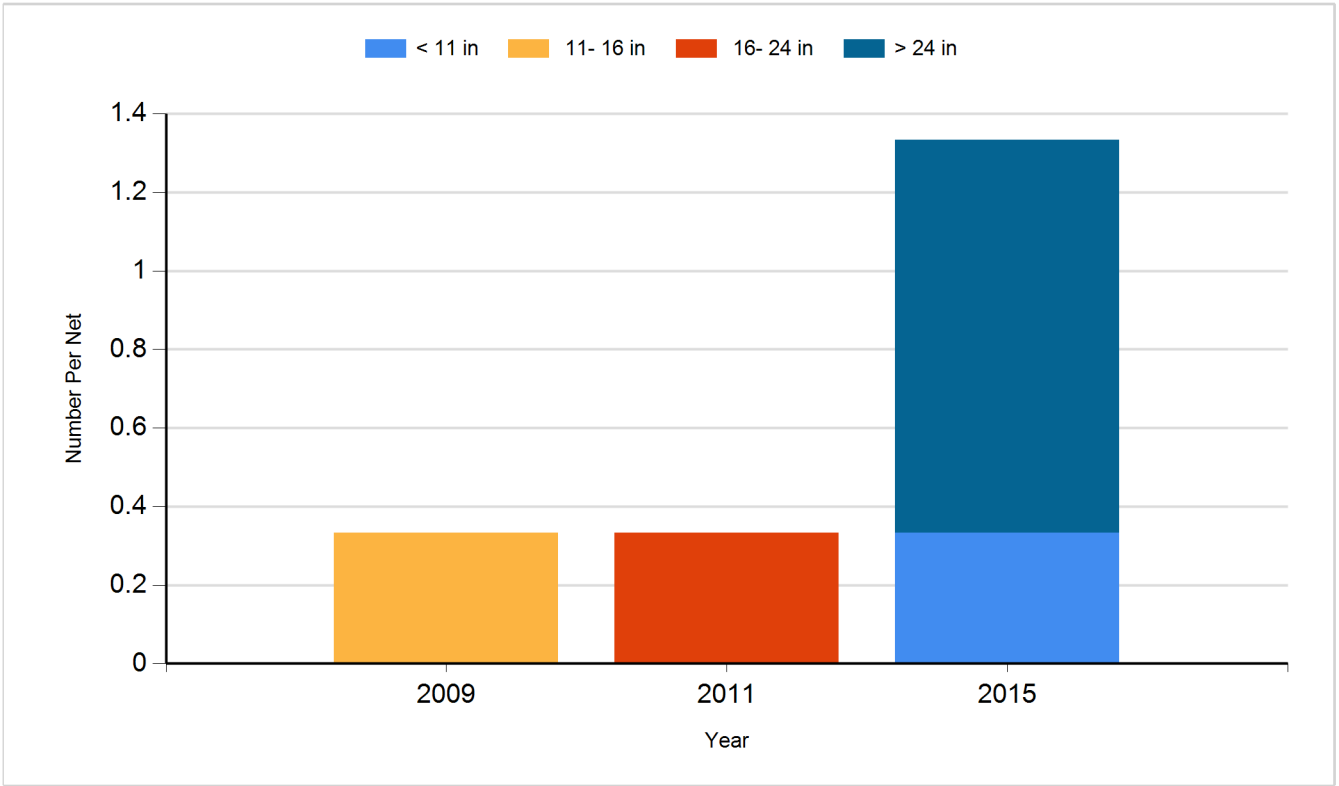
Species: Black Bullhead
Gear: std exp gill net



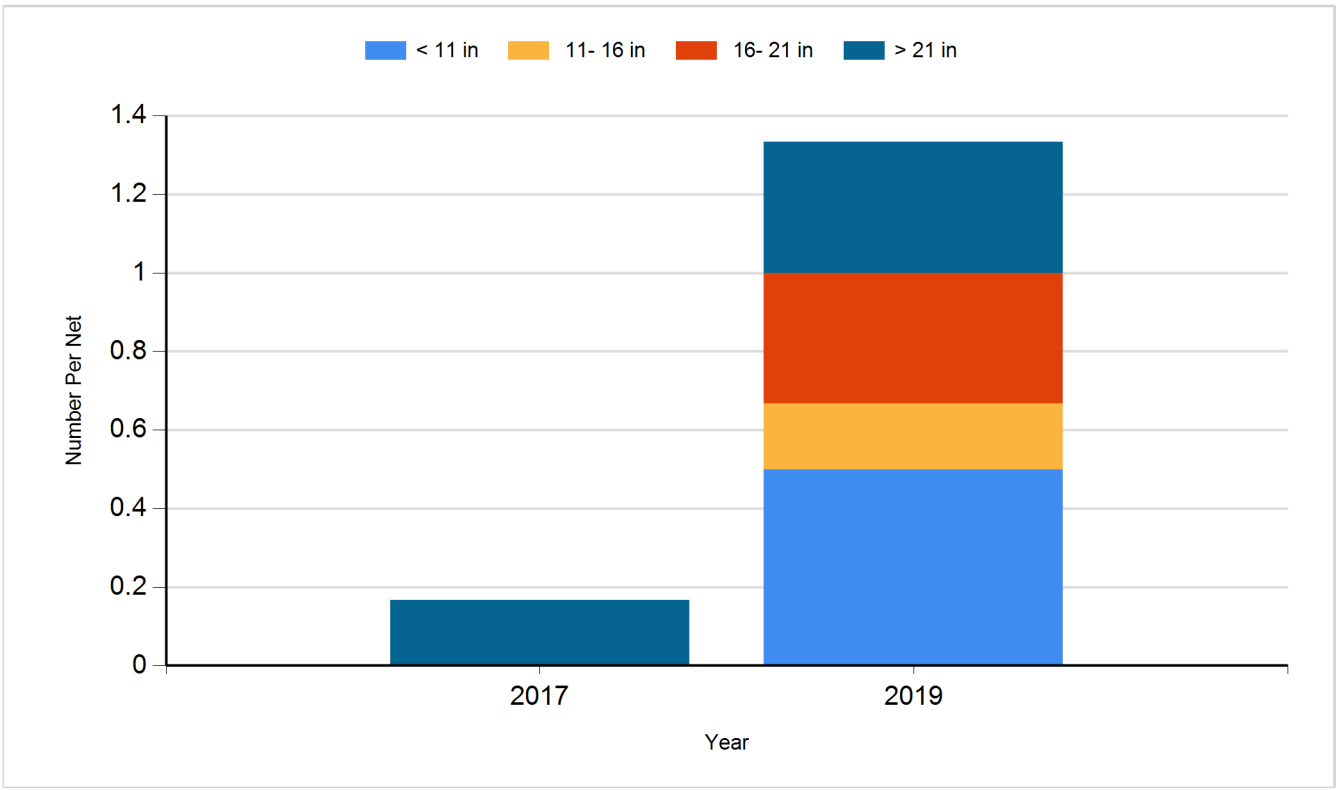
Species: Channel Catfish
Gear: AFS std gill net



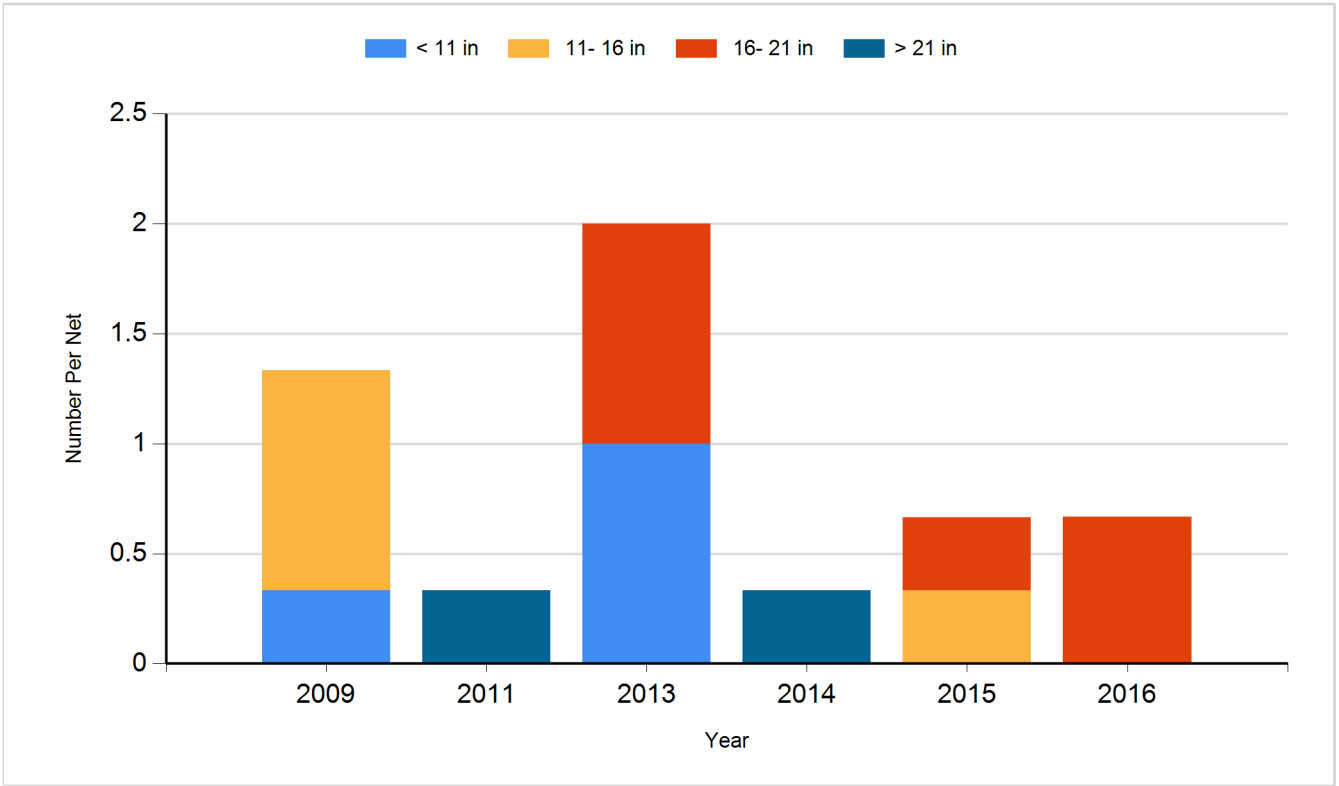
Species: Channel Catfish
Gear: std exp gill net



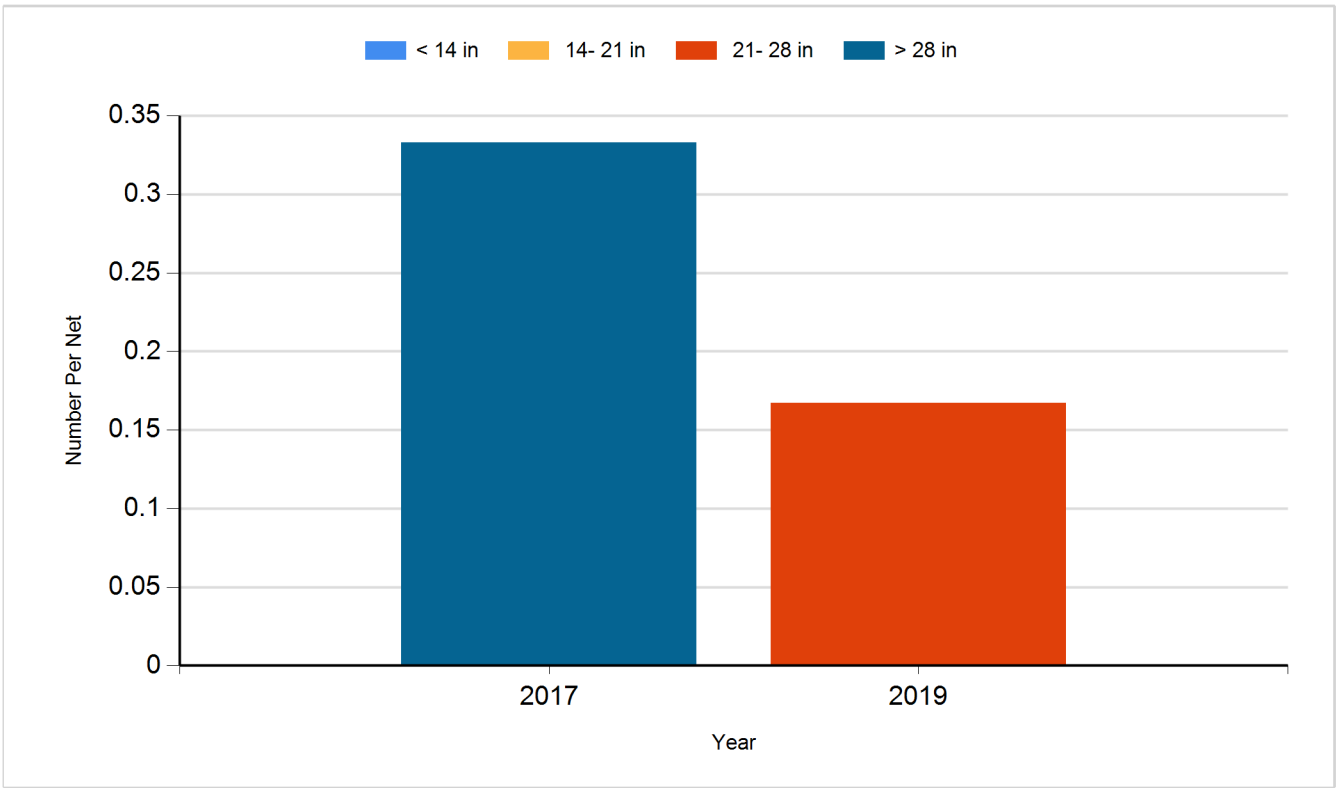
Species: Common Carp
Gear: AFS std gill net



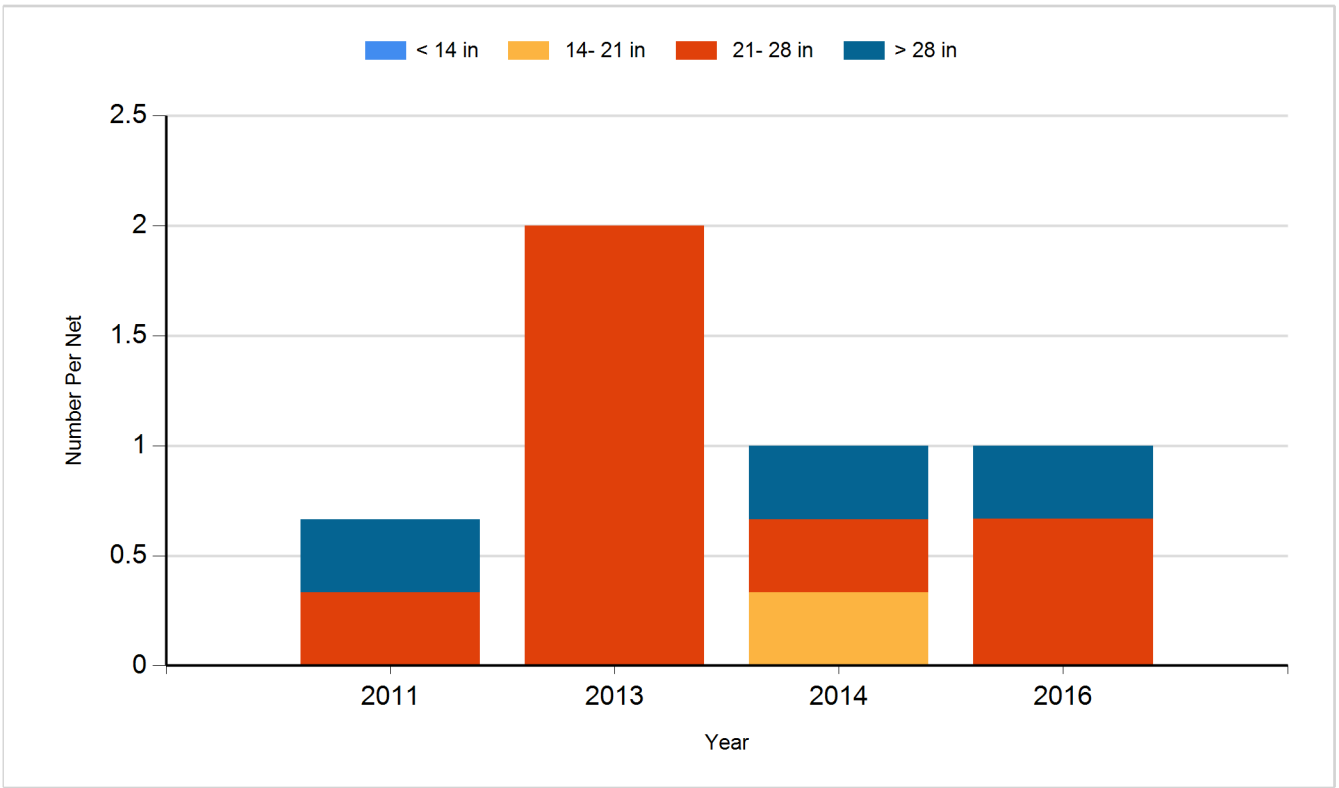
Species: Common Carp
Gear: std exp gill net



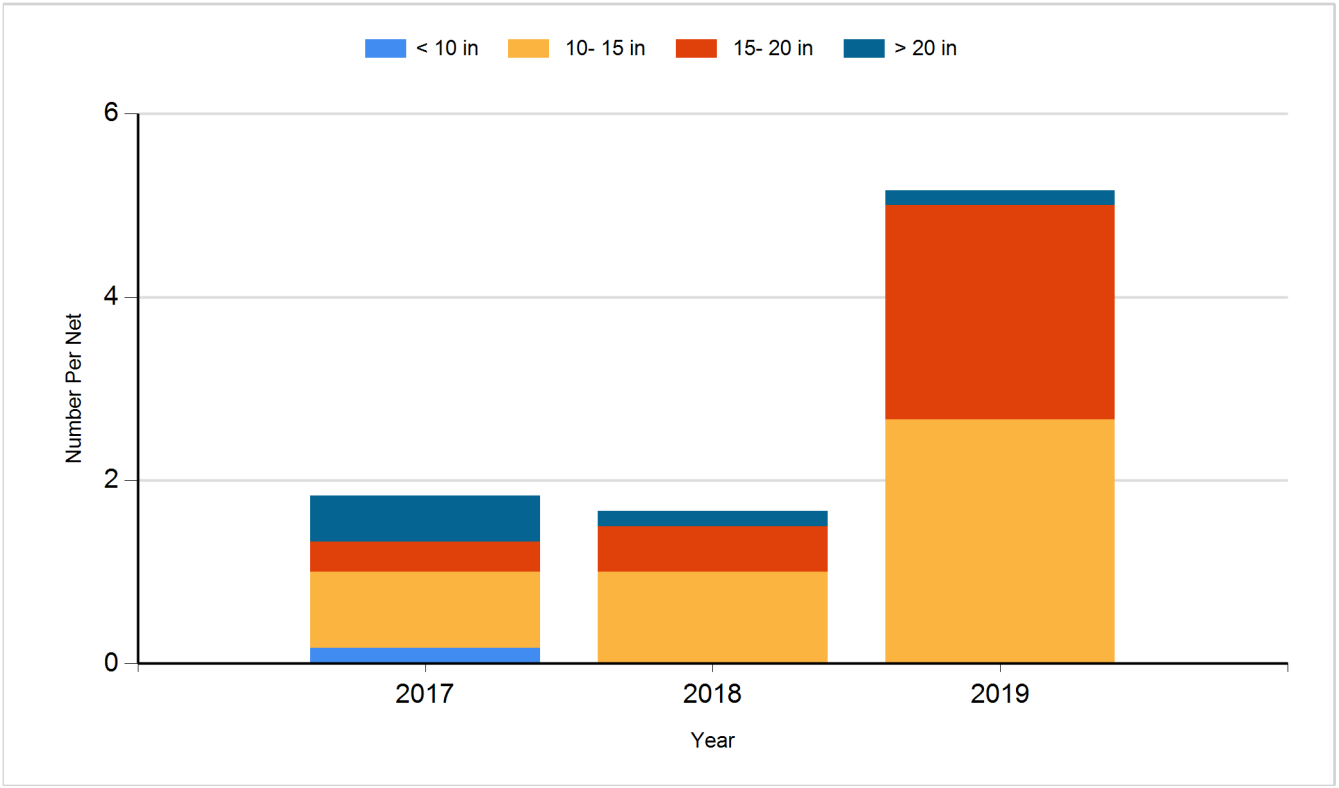
Species: Northern Pike
Gear: AFS std gill net



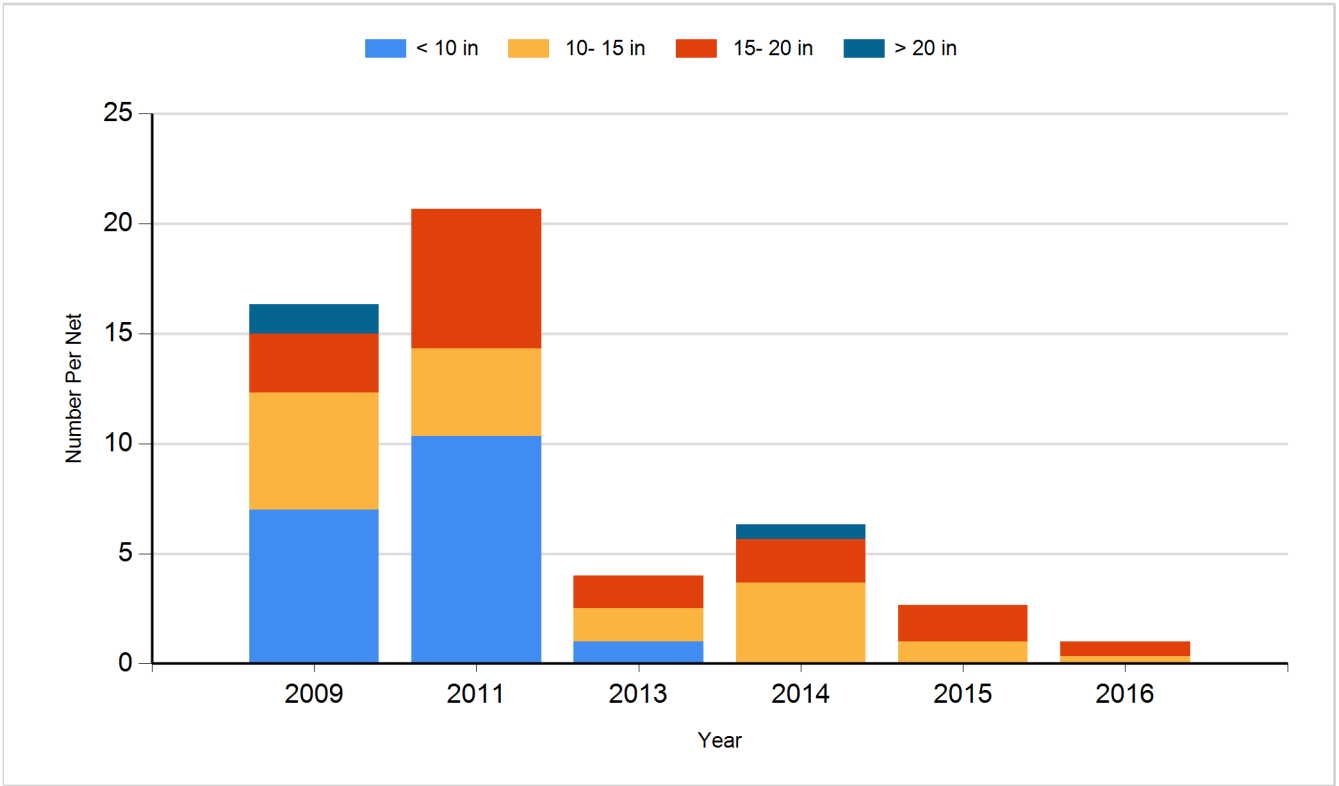
Species: Northern Pike
Gear: std exp gill net



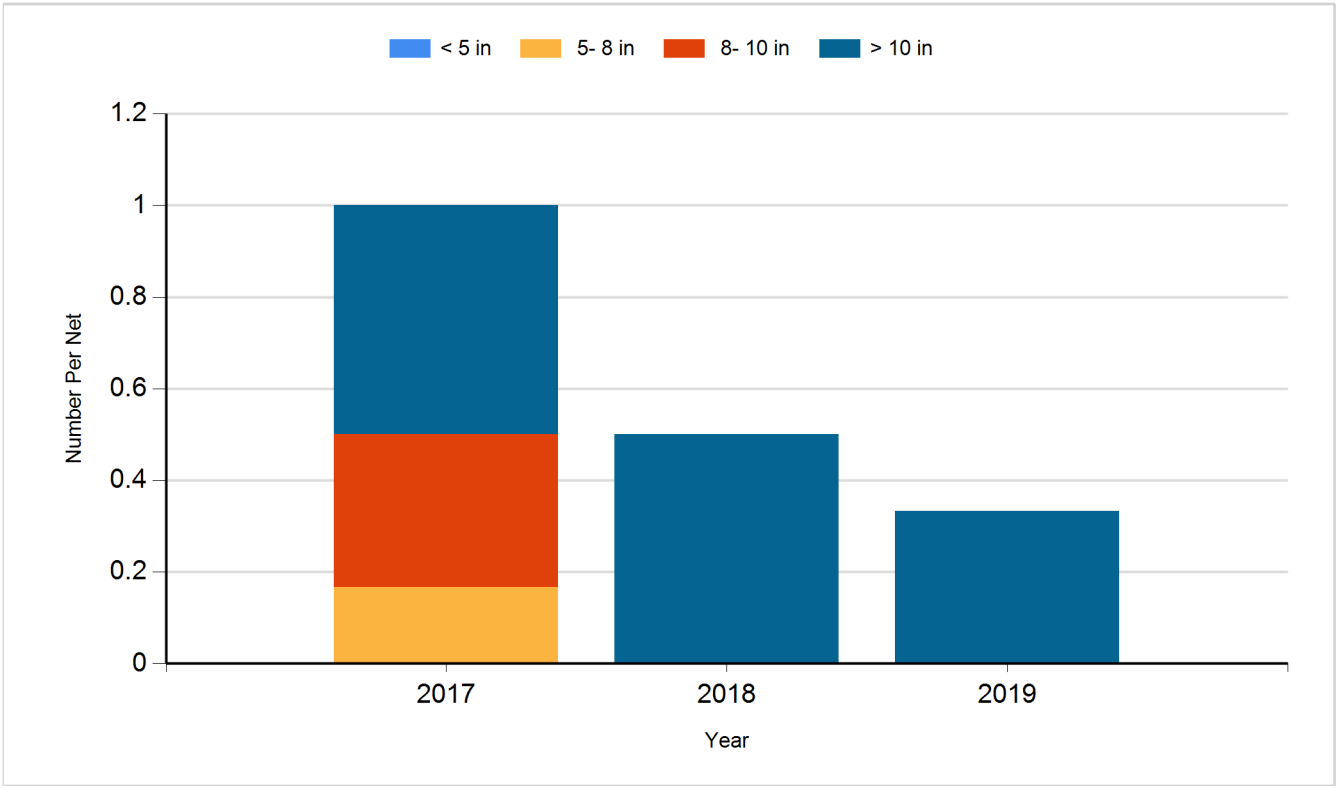
Species: Walleye
Gear: AFS std gill net



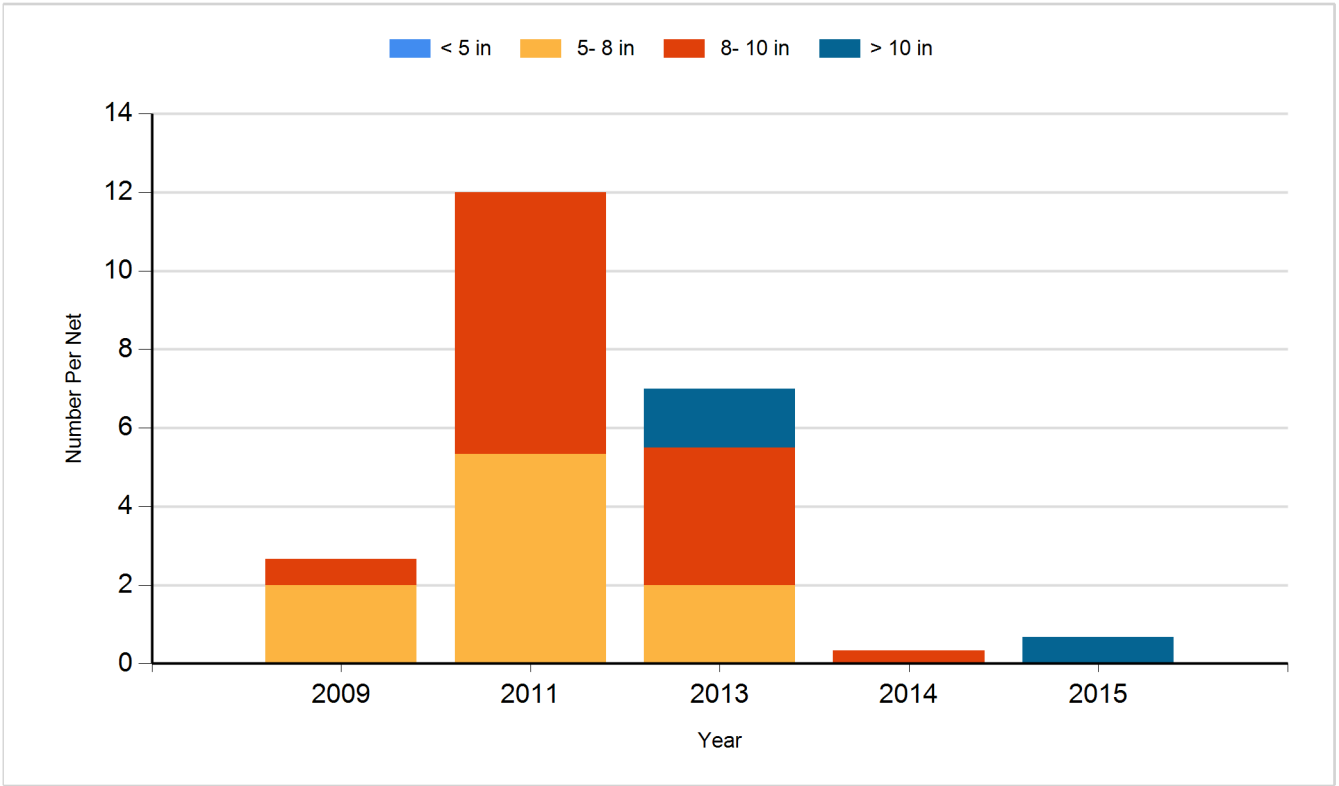
Species: Walleye
Gear: std exp gill net



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
2008	Walleye	Fry	2,000,000
2010	Walleye	Fry	2,000,000
2012	Walleye	Fry	1,003,118
2013	Walleye	Fry	950,000
2014	Walleye	Fry	950,000
2015	Walleye	Fry	891,071
2016	Walleye	Fry	900,000
2017	Walleye	Fry	1,600,000
2018	Walleye	Fry	2,000,000
2019	Walleye	Fry	1,900,000