SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Byron, Beadle County
MJA-Lake-531-800
2021

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 02, 2021	6 net-nights
frame net (std 3/4 in)	Aug 02, 2021	3 net-nights

Common Fish Species Present

Walleye

Black Crappie

Shortnose Gar

Bluegill

Bigmouth Buffalo

River Carpsucker

White Sucker

Yellow Perch

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.

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

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

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	46	6.5	1.3	67	11	15	9		
	Black Bullhead	12	1.8	0.5	100		36			
	Black Crappie	1	0.2	0.2	100		100		97	
	Channel Catfish	4	0.7	0.5	75		75		85	7
	Freshwater Drum	8	1.0	0.8	100		100			
	Northern Pike	2	0.3	0.3	100		0		92	12
	River Carpsucker	4	0.7	0.5	100		100			
	Shortnose Gar	3	0.0	0.0						
	Walleye	65	10.8	1.4	75	8	0		92	1
	White Sucker	12	2.0	1.0	100		100			
	Yellow Perch	12	2.0	1.1	100		42	24	97	3
frame net (std 3/4 in)	Black Bullhead	1	0.3	0.0						
	Black Crappie	251	82.7	20.1	40	4	23	4	102	1
	Bluegill	21	7.0	7.1	100		0			
	Channel Catfish	1	0.3	0.0						
	Common Carp	4	1.3	0.0						
	Northern Pike	1	0.3	0.0						
	River Carpsucker	8	2.7	0.0						
	Shorthead Redhorse	1	0.3	0.6	100		100		98	
	Shortnose Gar	22	7.3	1.1						
	Walleye	33	11.0	10.7	100		0		96	9
	White Sucker	5	1.7	0.0						
	Yellow Bullhead	3	1.0	1.1	100		100			
	Yellow Perch	1	0.3	0.0						

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**

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net	Bigmouth Buffalo						12.8	9.2	5.8		6.5	8.58
	Black Bullhead						4.5	3.0	1.5		1.8	2.70
	Black Crappie						0.3	0.2	0.0		0.2	0.18
	Channel Catfish						0.2	0.2	0.7		0.7	0.45
	Common Carp						0.2	0.0	0.8		0.0	0.25
	Common Shiner						0.0	0.0	0.0		0.0	0.00
	Freshwater Drum						0.7	1.2	2.0		1.0	1.23
	Goldeye						0.0	0.0	0.0		0.0	0.00
	Northern Pike						0.3	0.0	0.2		0.3	0.20
	River Carpsucker						0.0	0.3	0.7		0.7	0.43
	Shortnose Gar						0.0	0.0	0.0		0.0	0.00
	Walleye						1.7	1.7	5.2		10.8	4.85
	White Sucker						0.2	0.0	0.0		2.0	0.55
	Yellow Perch						1.0	0.5	0.3		2.0	0.95
frame net (std 3/4 in)	Bigmouth Buffalo		0.2								0.0	0.10
	Black Bullhead		1,085.8								0.3	543.07
	Black Crappie		0.8								82.7	41.75
	Bluegill		0.0								7.0	3.50
	Channel Catfish		0.6								0.3	0.47
	Common Carp		2.0								1.3	1.67
	Freshwater Drum		0.8								0.0	0.40
	Green Sunfish		0.0								0.0	0.00
	Northern Pike		0.6								0.3	0.47
	River Carpsucker		0.0								2.7	1.33
	Shorthead Redhorse		0.2								0.3	0.25
	Shortnose Gar		0.0								7.3	3.67
	Walleye		0.6								11.0	5.80
	White Sucker		2.8								1.7	2.23
	Yellow Bullhead		0.0								1.0	0.50
	Yellow Perch		0.0								0.3	0.17
std exp gill net	Bigmouth Buffalo		4.0	0.3	5.0	16.7						6.50
	Black Bullhead		94.0	26.7	18.3	19.7						39.68
	Black Crappie		0.0	0.3	1.3	0.0						0.40

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
std exp gill net	Channel Catfish		0.0	0.0	1.0	0.0						0.25
	Common Carp		1.0	0.3	0.7	0.7						0.68
	Freshwater Drum		0.5	0.0	1.7	2.0						1.05
	Gizzard Shad		0.0	0.0	0.0	0.0						0.00
	Northern Pike		2.0	1.0	0.0	1.0						1.00
	River Carpsucker		0.0	0.3	0.0	1.3						0.40
	Shorthead Redhorse		0.5	0.0	0.3	0.0						0.20
	Shortnose Gar		0.0	0.0	0.0	0.0						0.00
	Walleye		3.0	6.3	2.7	1.0						3.25
	White Sucker		4.5	1.7	3.7	1.7						2.90
	Yellow Perch		7.0	0.3	0.7	0.0						2.00

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Bigmouth Buffalo	PSD						87	91	91		67
		PSD-P						1	4	6		15
	Black Bullhead	PSD						100	100	100		100
		PSD-P						56	100	78		36
	Black Crappie	PSD						100	100			100
		PSD-P						50	0			100
		Wr						102	100			97
	Common Carp	PSD						100		80		
		PSD-P						100		40		
	River Carpsucker	PSD							100	100		100
		PSD-P							100	100		100
	Walleye	PSD						50	40	48		75
		PSD-P						30	10	3		0
		Wr						84	88	94		92
	White Sucker	PSD						100				100
		PSD-P						100				100
	Yellow Perch	PSD						83	100	100		100
		PSD-P						50	100	100		42
		Wr						94	96	94		97
frame net (std 3/4 in)	Bigmouth Buffalo	PSD		0								
		PSD-P		0								
		Wr		120								
	Black Bullhead	PSD		34								
		PSD-P		0								
		Wr		87								
	Black Crappie	PSD		75								40
		PSD-P		25								23
		Wr		129								102
	Bluegill	PSD										100
		PSD-P										0
	Common Carp	PSD		100								
		PSD-P		70								
		Wr		97								

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
frame net (std 3/4 in)	Walleye	PSD		100								100
		PSD-P		0								0
		Wr		98								96
	White Sucker	PSD		100								
		PSD-P		93								
		Wr		105								
std exp gill net	Bigmouth Buffalo	PSD		0	100	0	6					
		PSD-P		0	0	0	2					
		Wr		110								
	Black Bullhead	PSD		39	99	80	92					
		PSD-P		0	0	0	3					
		Wr		95								
	Black Crappie	PSD			0	0						
		PSD-P			0	0						
		Wr			122	119						
	Common Carp	PSD		100	100	50	100					
		PSD-P		0	100	0	0					
		Wr		109								
	River Carpsucker	PSD			100		100					
		PSD-P			100		75					
	Walleye	PSD		50	42	63	67					
		PSD-P		0	11	0	0					
		Wr		102	97	93	91					
	White Sucker	PSD		89	100	91	100					
		PSD-P		89	100	82	100					
		Wr		132								
	Yellow Perch	PSD		71	100	100						
		PSD-P		21	0	100						
		Wr		112	93	92						

Fish Condition

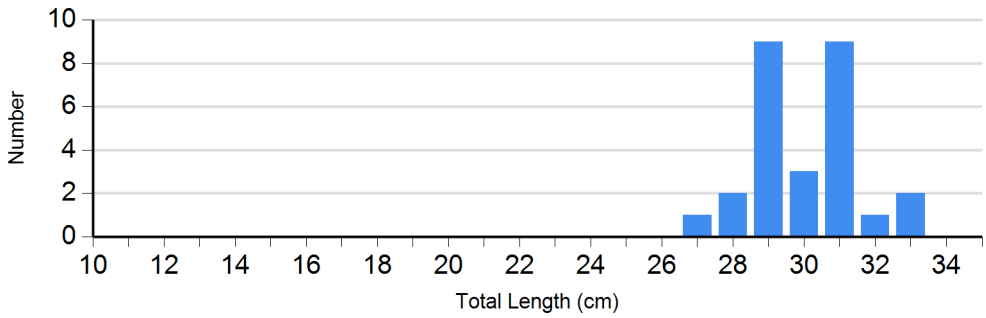
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2021	149		41	106 (1.0)	52	102 (0.6)	6	94 (1.0)
Walleye Gill Net	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	
	2021	16	96 (1.0)	49	91 (0.8)	0		0	
Yellow Perch Gill Net	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	
	2021	0		7	98 (1.9)	4	96 (6.3)	1	98

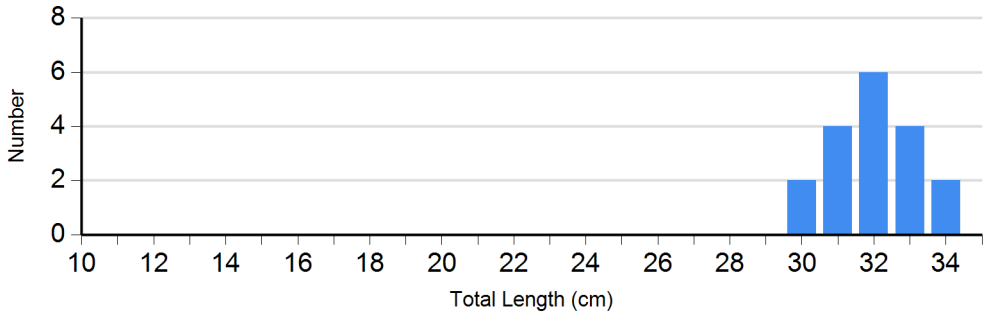
Length Frequency Distribution

Length frequency histogram of species sampled by year.

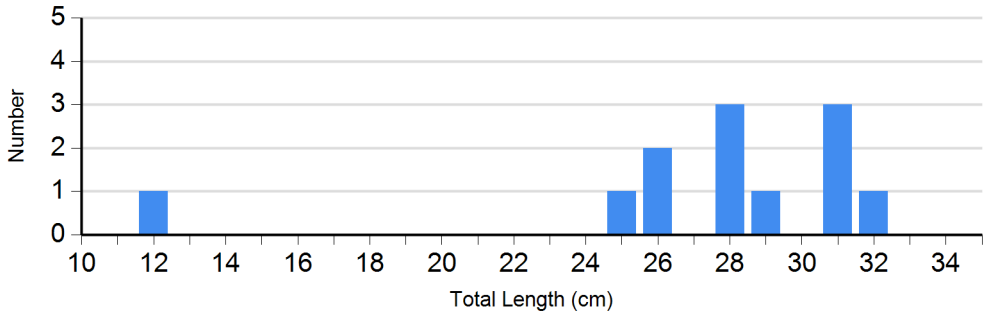
Species: Black Bullhead
Gear: AFS std gill net



2017

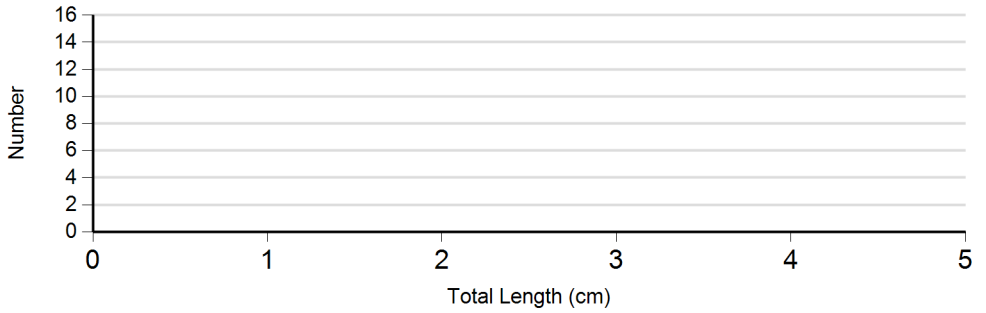


2018



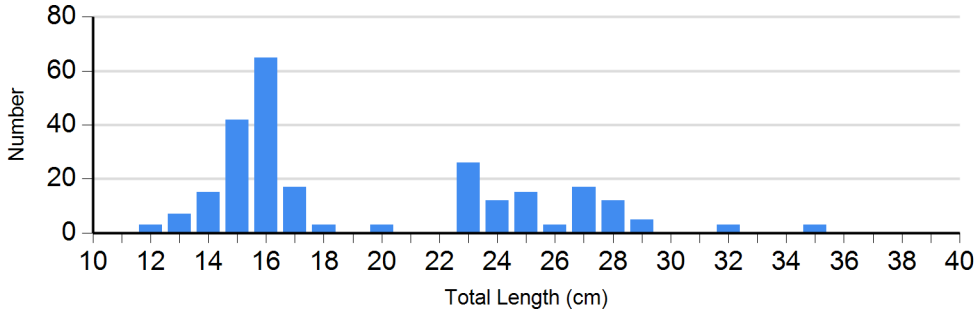
2021

Species: Black Bullhead
Gear: std exp gill net



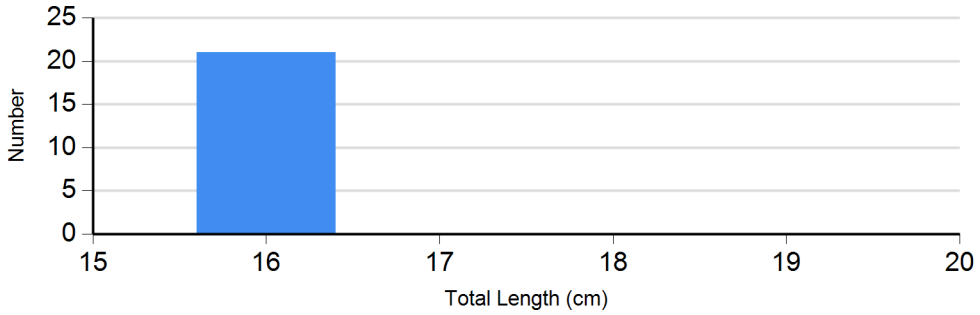
2016

Species: Black Crappie
Gear: frame net (std 3/4 in)



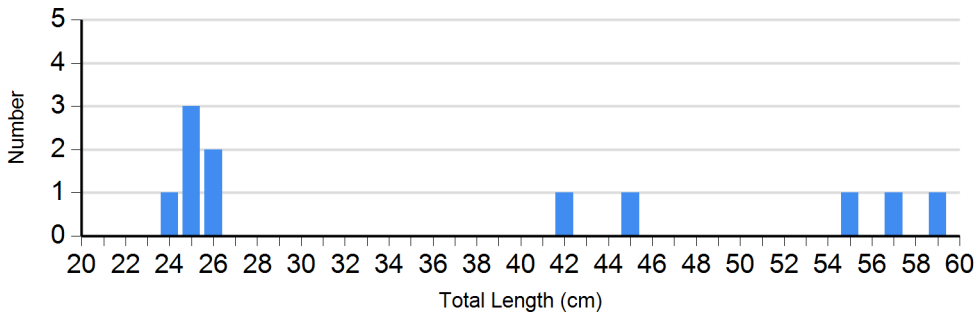
2021

Species: Bluegill
Gear: frame net (std 3/4 in)

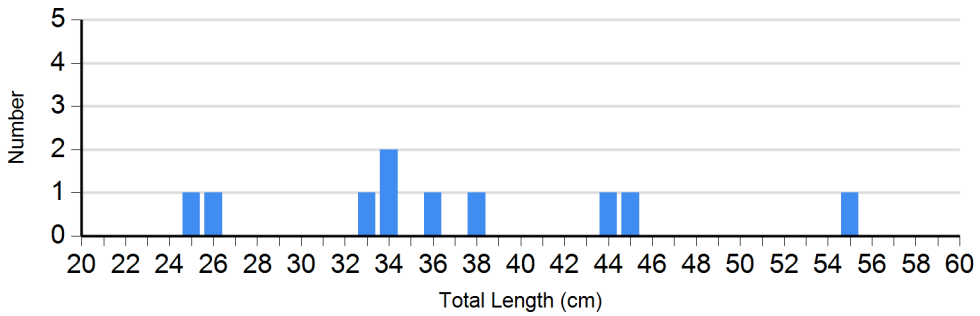


2021

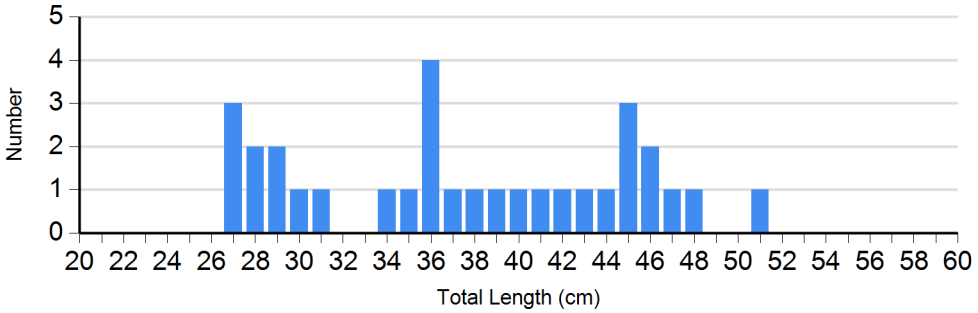
Species: Walleye
Gear: AFS std gill net



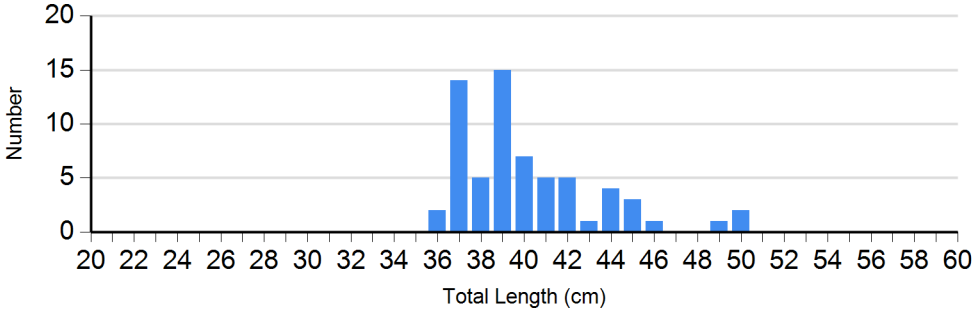
2017



2018

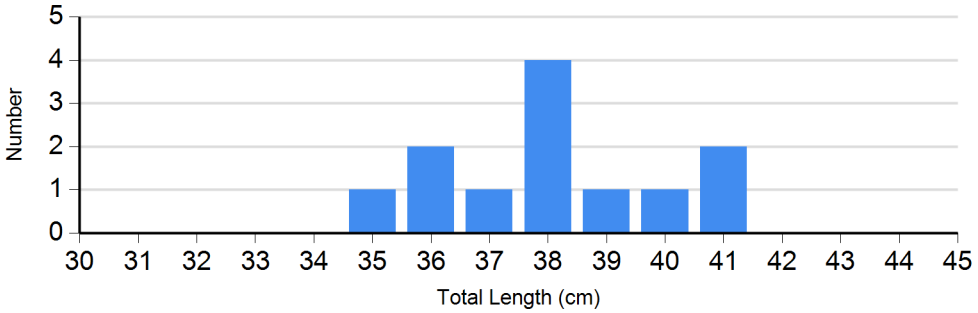


2019



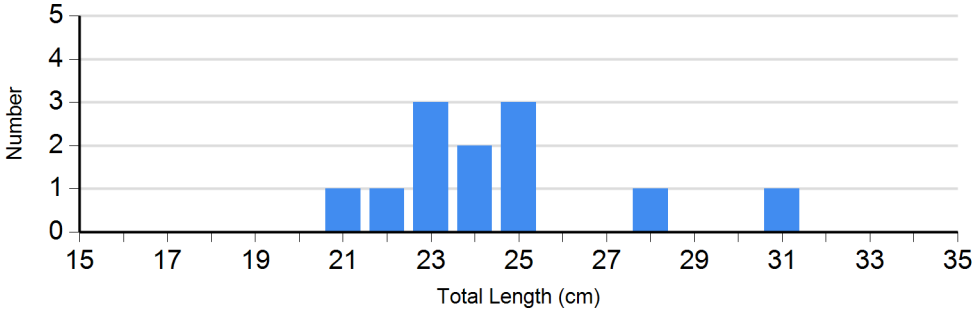
2021

Species: White Sucker
Gear: AFS std gill net



2021

Species: Yellow Perch
Gear: AFS std gill net

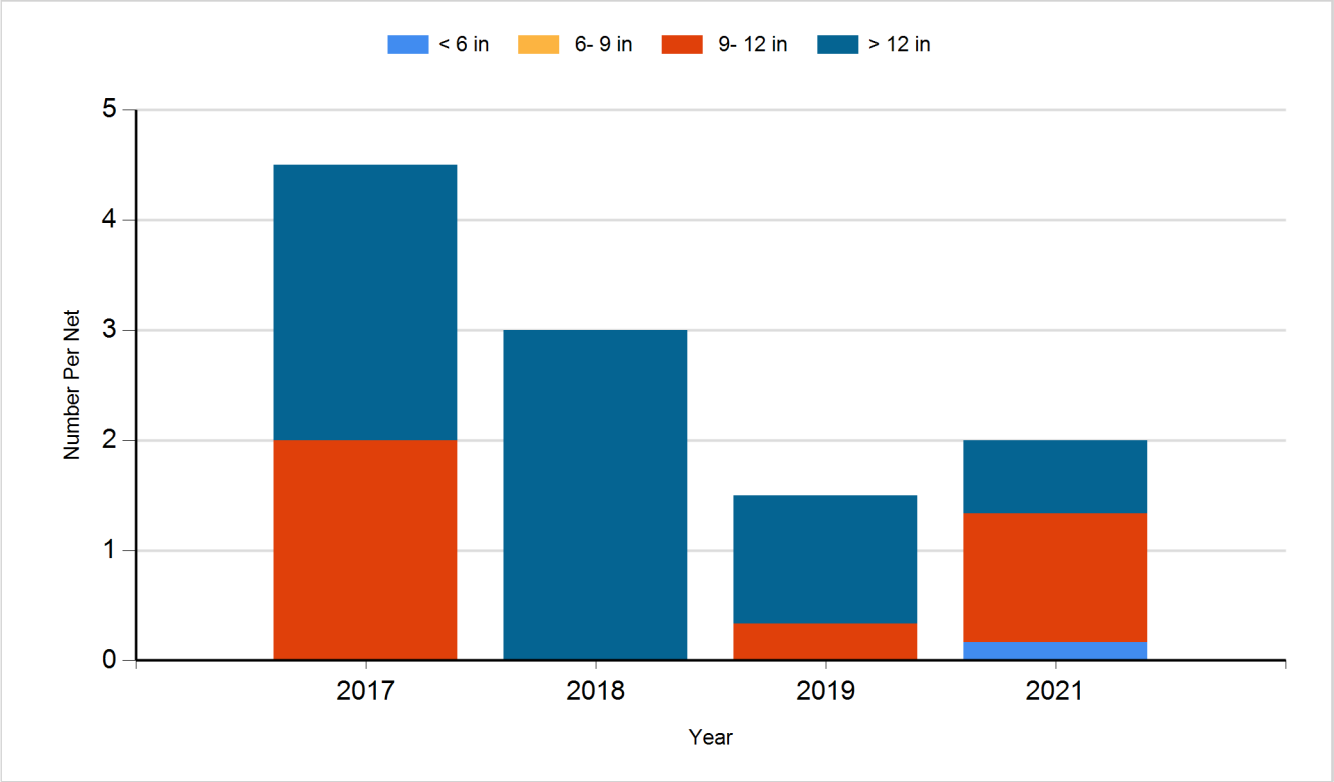


2021

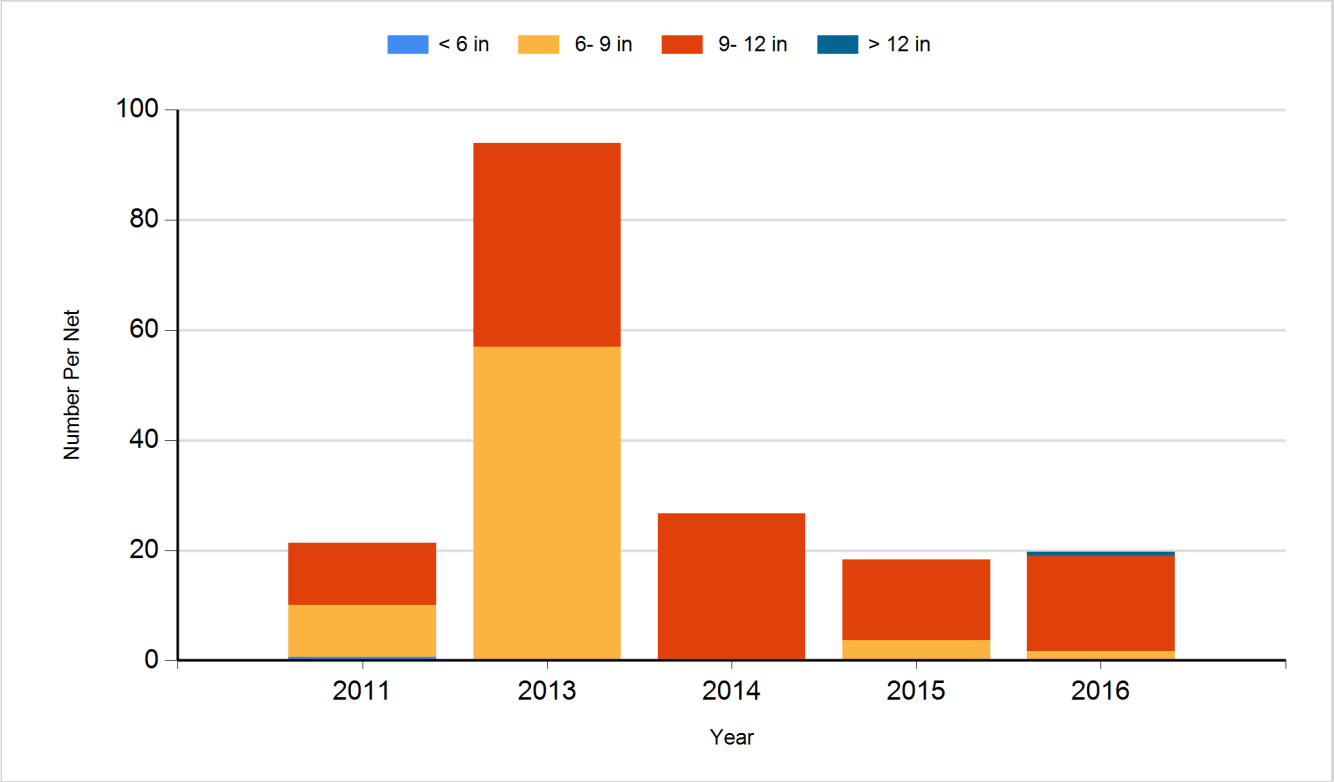
Historic Fish Sizes and Relative Abundance

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

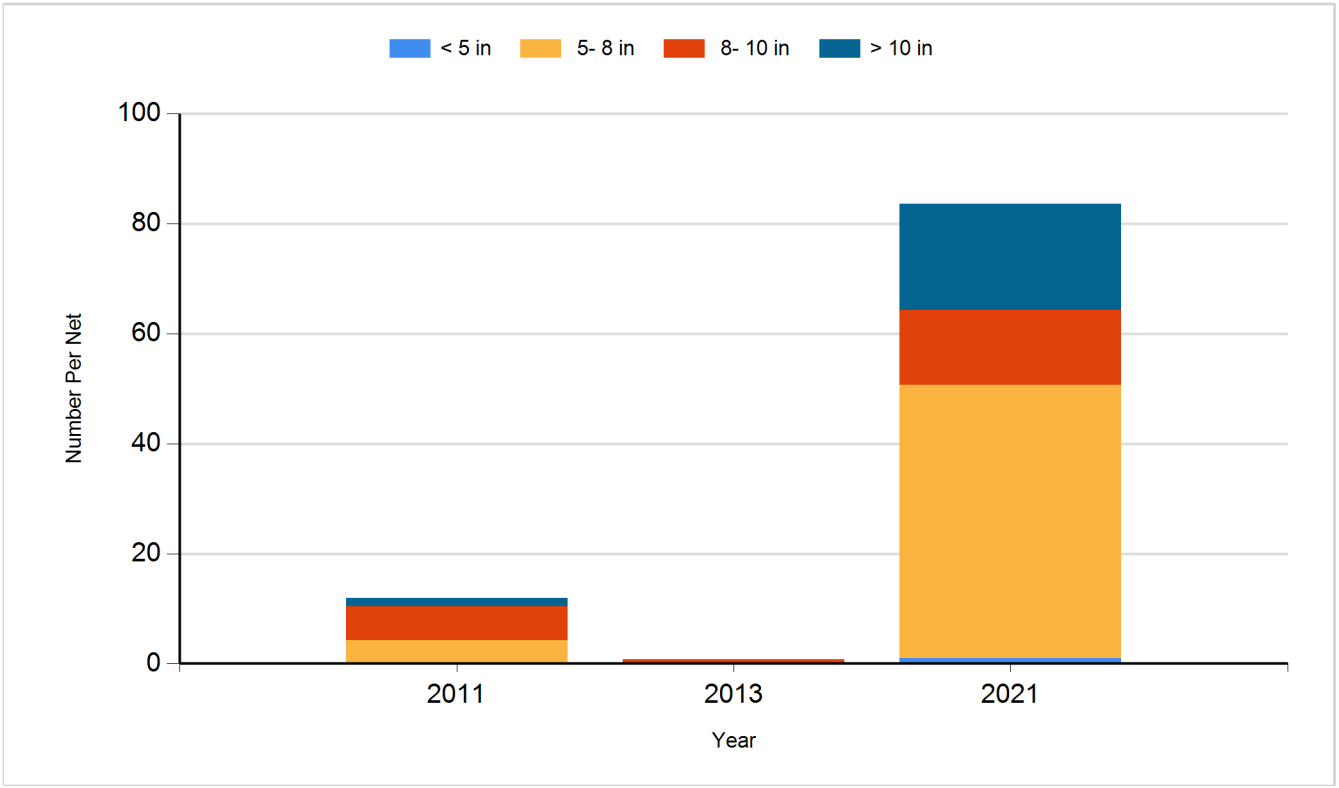
Species: Black Bullhead
Gear: AFS std gill net



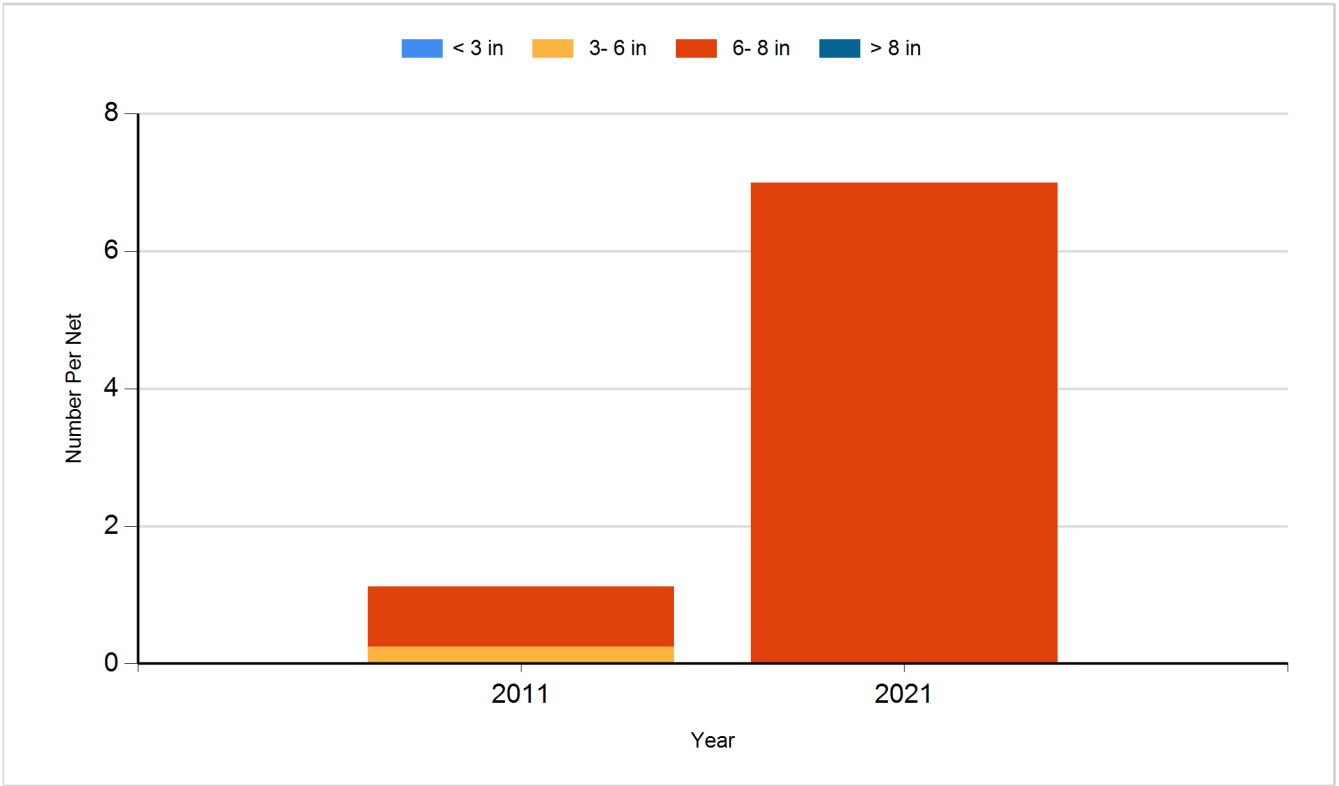
Species: Black Bullhead
Gear: std exp gill net



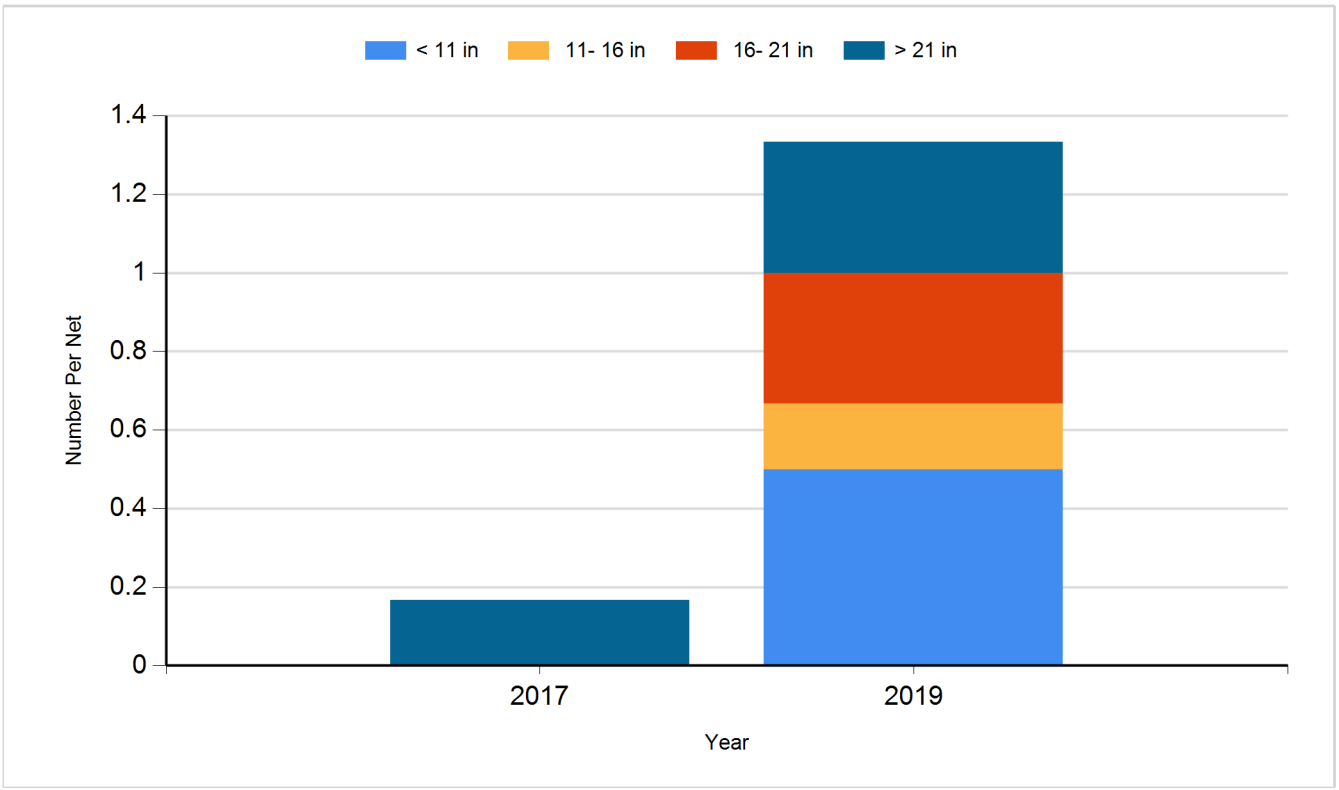
Species: Black Crappie
Gear: frame net (std 3/4 in)



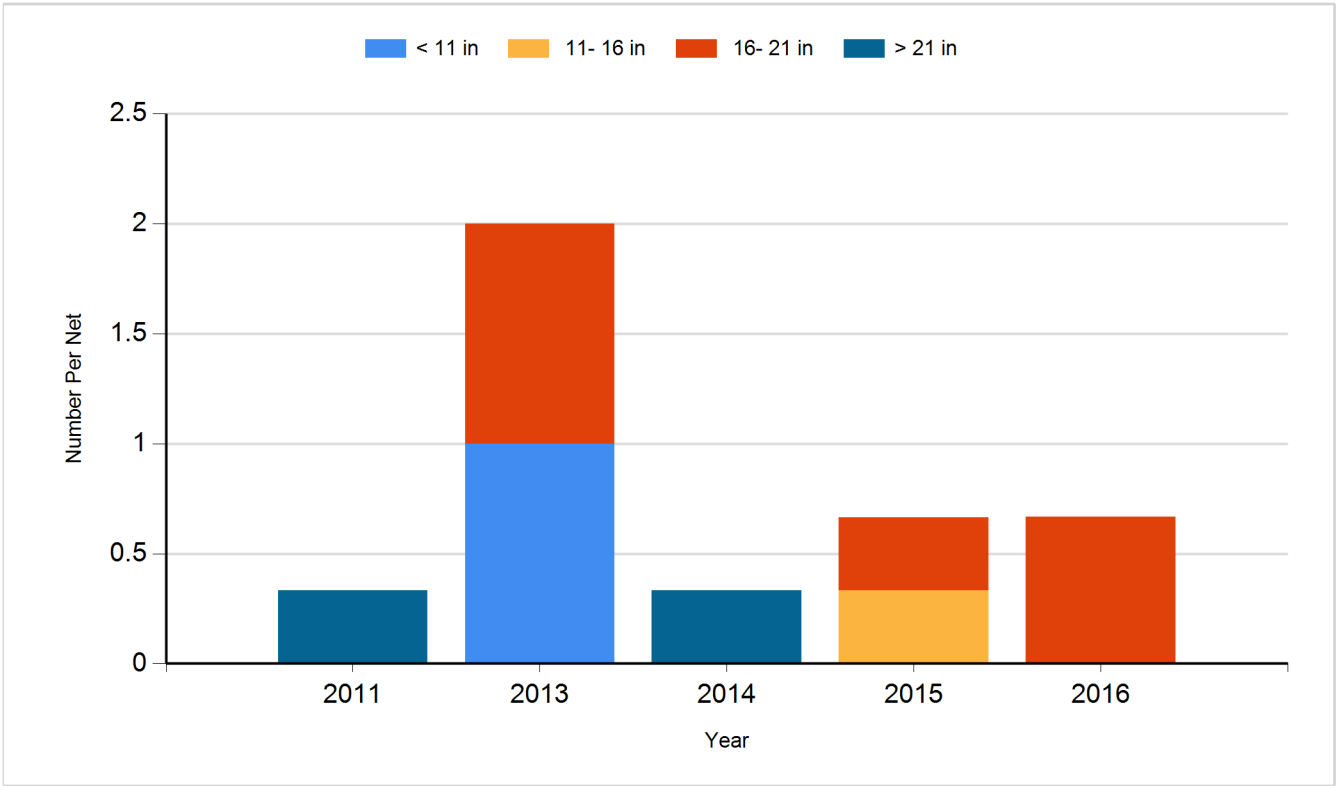
Species: Bluegill
Gear: frame net (std 3/4 in)



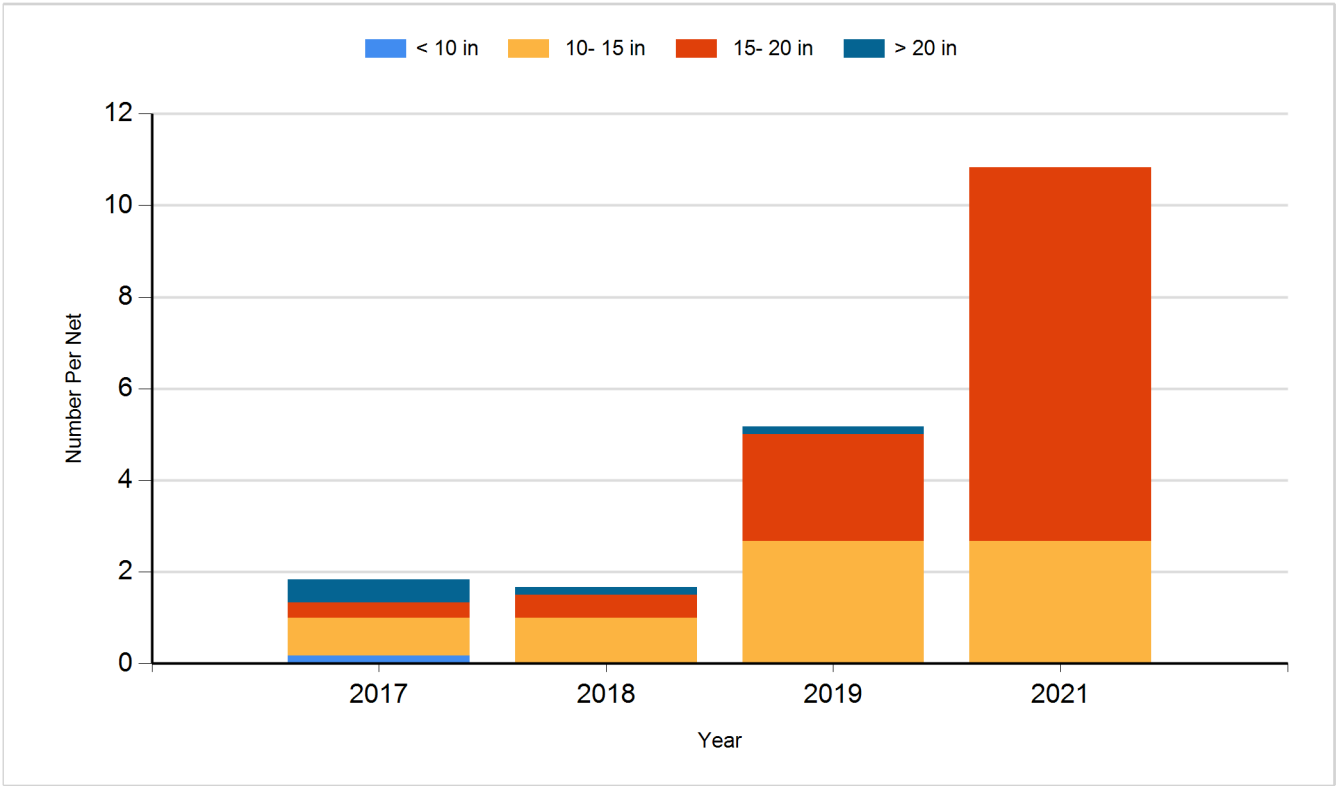
Species: Common Carp
Gear: AFS std gill net



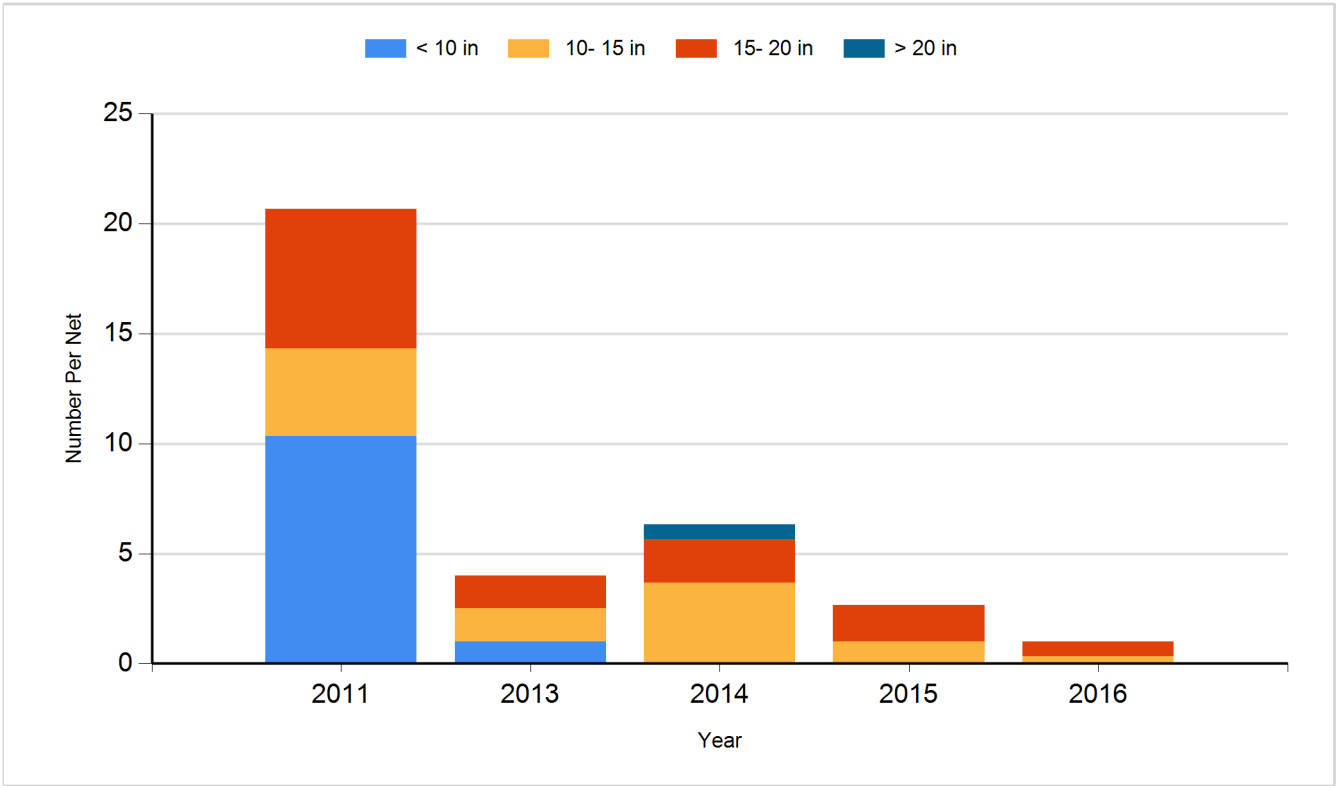
Species: Common Carp
Gear: std exp gill net



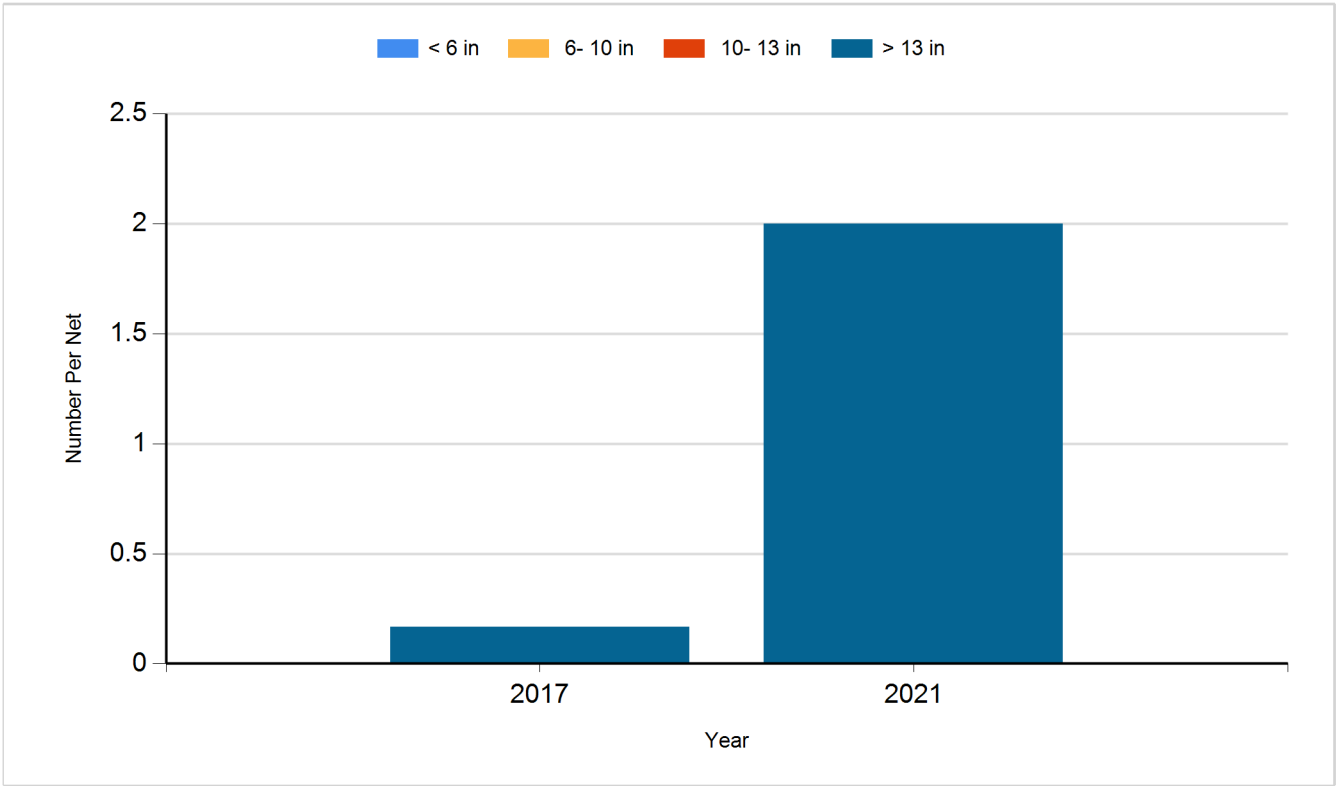
Species: Walleye
Gear: AFS std gill net



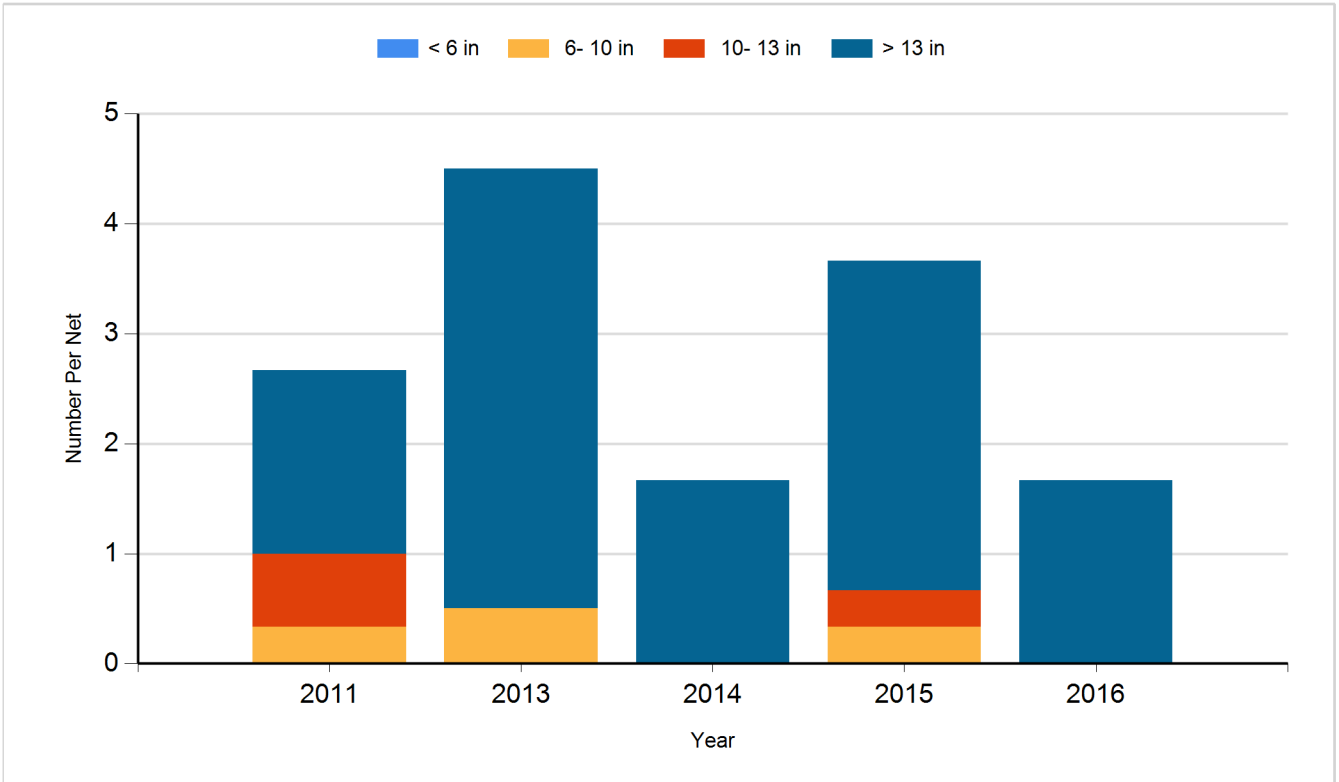
Species: Walleye
Gear: std exp gill net



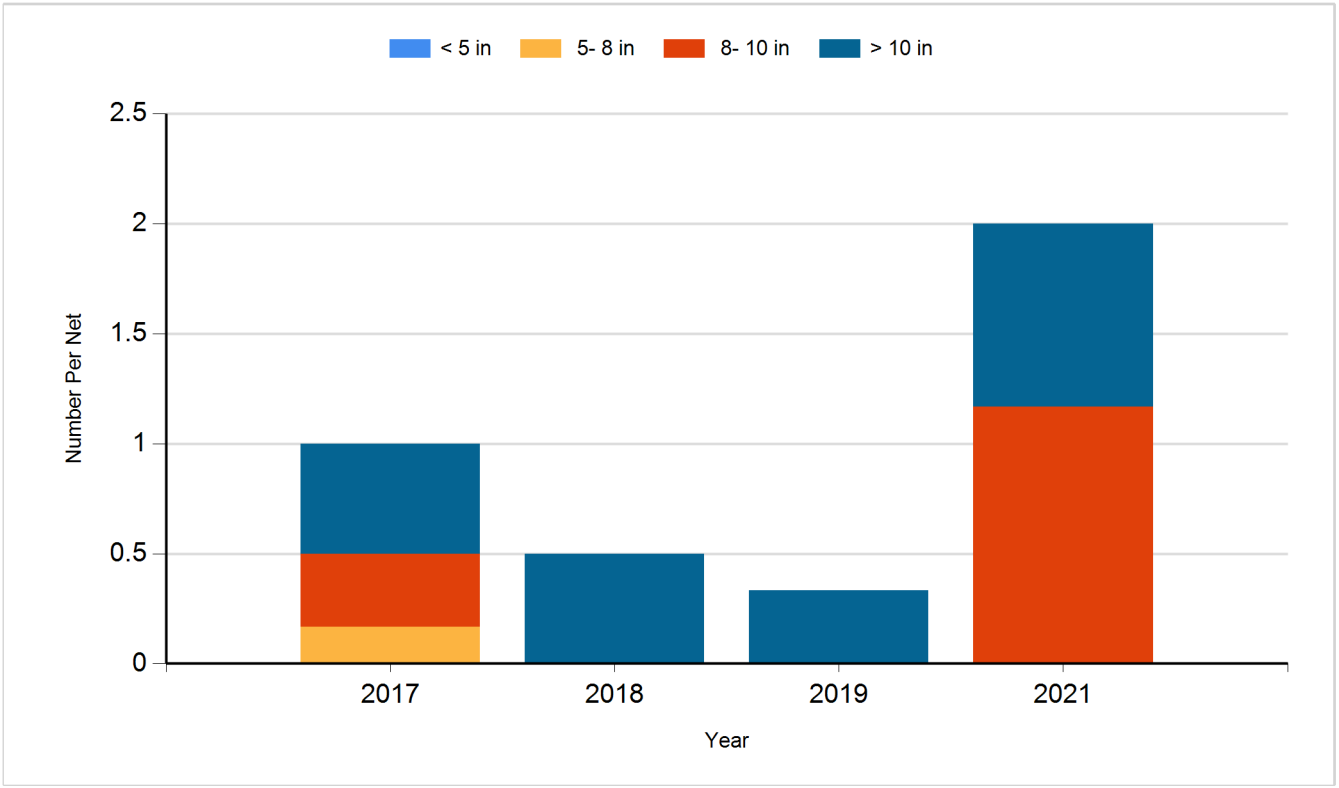
Species: White Sucker
Gear: AFS std gill net



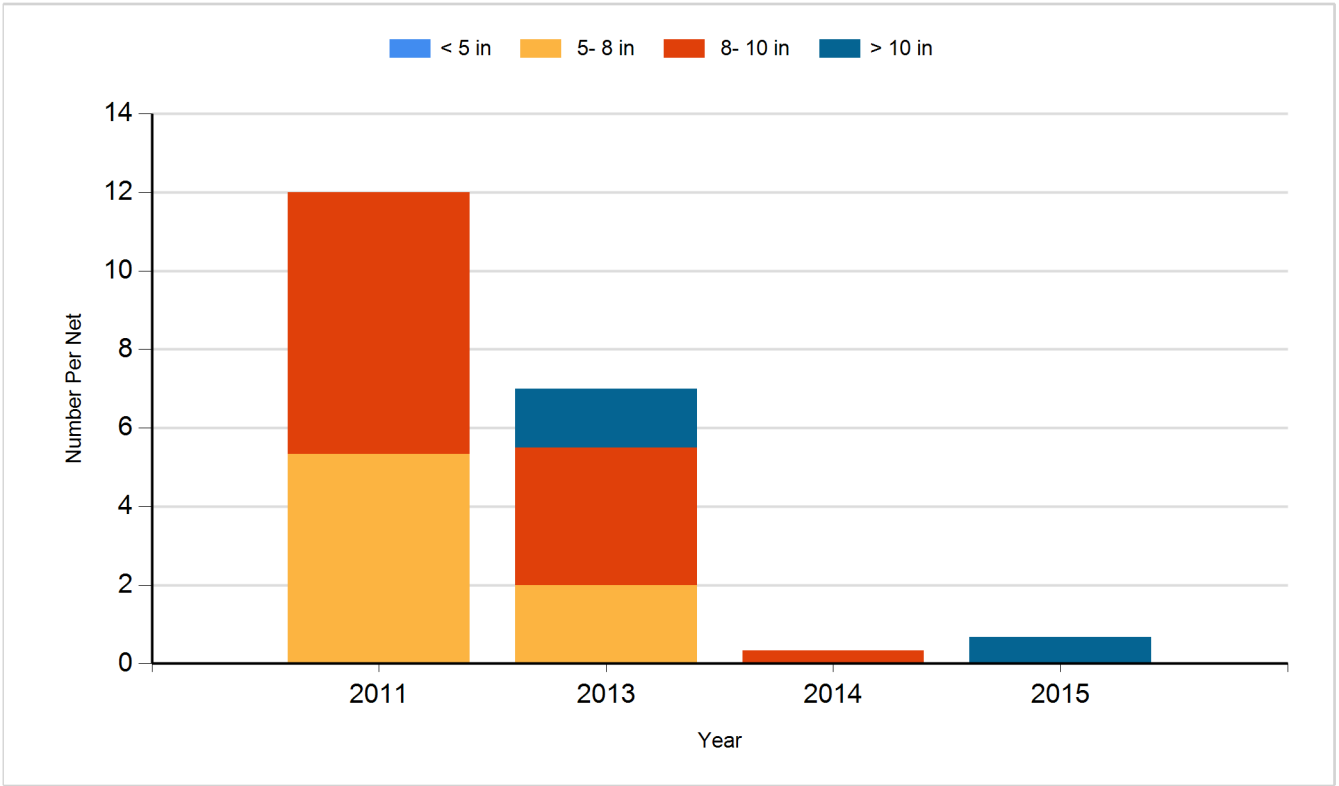
Species: White Sucker
Gear: std exp gill net



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
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
2021	Walleye	Fry	1,900,000