

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Roy, Marshall County

UJA-Lake-866-001

2023

Lake Information

Name:	Roy	Maximum Depth:	21 Feet
County:	Marshall	Mean Depth:	10 Feet
		OHWM Elevation:	1,796
Surface Area:	2,113 Acres	Outlet Elevation:	1,795

Surveys and Investigations

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

Gear	Date	Effort
fall night EF-WAE	Oct 24, 2023	2400 seconds

Common Fish Species Present

Yellow Perch

Walleye

Smallmouth Bass

Northern Pike

Largemouth Bass

Bluegill

Black Crappie

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.

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

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

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

Gear	Species	CPUE										Avg	
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		
AFS std frame net	Black Bullhead				1.4								1.40
	Black Crappie				0.2								0.20
	Bluegill				22.5								22.50
	Common Carp				0.2								0.20
	Green Sunfish				2.0								2.00
	Largemouth Bass				0.1								0.10
	Northern Pike				0.7								0.70
	Rock Bass				0.0								0.00
	Smallmouth Bass				0.0								0.00
	Walleye				0.1								0.10
Yellow Perch				7.8								7.80	
AFS std gill net	Black Bullhead			1.3	0.9	2.1	0.4		0.5	0.4			0.93
	Black Crappie			0.3	0.2	0.8	1.4		1.3	1.5			0.92
	Bluegill			0.3	0.3	1.1	0.4		0.8	2.9			0.97
	Common Carp			0.0	0.0	0.1	0.4		0.7	0.3			0.25
	Largemouth Bass			0.1	0.0	0.1	0.4		0.4	0.6			0.27
	Northern Pike			3.2	2.3	1.7	1.0		1.2	3.9			2.22
	Smallmouth Bass			2.6	4.2	1.1	1.2		0.5	2.8			2.07
	Walleye			2.4	3.4	2.2	3.6		3.7	1.8			2.85
	White Sucker			2.8	2.8	1.9	0.7		1.3	2.8			2.05
	Yellow Perch			7.4	2.8	4.2	8.3		6.8	7.7			6.20
boat shocker (night)	Walleye*	90.0	27.0	87.0	24.5								57.13
boat shocker (night, AC)	Largemouth Bass	58.8		44.0									51.40
boat shocker (night, DC)	Smallmouth Bass	19.7		3.0									11.35
fall night EF-WAE*	Walleye					38.0		37.2	1.5	38.1	4.5		23.86
frame net (std 3/4 in)	Black Bullhead	3.3	3.0						6.2				4.17
	Black Crappie	0.2	0.3						1.1				0.53
	Bluegill	8.0	56.6						14.2				26.27
	Bluegill X Gr. Sunfish Hybrid	0.2	0.0						0.0				0.07
	Common Carp	0.0	0.0						0.0				0.00
	Green Sunfish	0.0	0.2						0.0				0.07
	Largemouth Bass	0.0	0.0						0.1				0.03

CPUE

Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
frame net (std 3/4 in)	Northern Pike	1.0	0.5						1.6			1.03
	Smallmouth Bass	0.9	0.3						0.1			0.43
	Sunfish Hybrid	0.0	0.0						0.1			0.03
	Walleye	0.2	0.0						0.0			0.07
	Western Painted Turtle	0.0	0.0						0.0			0.00
	White Sucker	0.0	0.2						0.1			0.10
	Yellow Perch	4.1	2.0						6.7			4.27
spring day EF*	Smallmouth Bass									25.0		25.00
spring night EF-LMB*	Largemouth Bass							60.0				60.00
std exp gill net	Black Bullhead	1.5	0.3									0.90
	Black Crappie	0.3	0.2									0.25
	Bluegill	0.0	0.7									0.35
	Common Carp	0.0	0.2									0.10
	Northern Pike	6.3	6.0									6.15
	Smallmouth Bass	4.0	2.3									3.15
	Walleye	6.3	6.5									6.40
	White Sucker	8.5	5.0									6.75
Yellow Perch	10.0	23.3									16.65	

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										
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
AFS std frame net	Black Crappie	PSD				0							
		PSD-P				0							
		Wr				113							
	Bluegill	PSD				4							
		PSD-P				0							
		Wr				112							
	Largemouth Bass	PSD				100							
		PSD-P				67							
		Wr				101							
	Northern Pike	PSD				94							
		PSD-P				13							
		Wr				84							
	Smallmouth Bass	PSD				100							
		PSD-P				100							
		Wr				96							
	Walleye	PSD				100							
		PSD-P				50							
		Wr				82							
Yellow Perch	PSD				0								
	PSD-P				0								
	Wr				91								
AFS std gill net	Black Crappie	PSD			0	100	30	24		27	94		
		PSD-P			0	100	20	12		27	56		
		Wr			117	101	115	117		122	108		
	Bluegill	PSD			25	25	15	60		44	60		
		PSD-P			25	0	8	20		11	26		
		Wr			108	126	110	112		116	118		
	Largemouth Bass	PSD			100		100	60		40	86		
		PSD-P			0		0	40		40	29		
		Wr			121		111	125		125	122		
	Northern Pike	PSD			89	82	65	58		36	64		
		PSD-P			5	4	5	0		14	6		
		Wr			89	89	92	94		88	85		

Gear	Species	Index	Year									
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Smallmouth Bass	PSD			100	100	100	100		100	91	
		PSD-P			97	86	100	93		100	76	
		Wr			100	100	99	95		95	100	
	Walleye	PSD			76	90	69	65		61	52	
		PSD-P			34	34	38	35		36	14	
		Wr			91	87	94	90		88	90	
	Yellow Perch	PSD			2	0	4	1		4	5	
		PSD-P			1	0	0	0		0	0	
		Wr			97	102	95	96		99	99	
boat shocker (night)	Walleye	PSD	0	0	0	0						
		PSD-P	0	0	0	0						
		Wr	90	96	92	98						
boat shocker (night, AC)	Largemouth Bass	PSD	86		66							
		PSD-P	41		39							
		Wr	116		114							
boat shocker (night, DC)	Smallmouth Bass	PSD	65		0							
		PSD-P	20		0							
		Wr	104		105							
frame net (std 3/4 in)	Black Crappie	PSD	100	33							21	
		PSD-P	100	33							11	
		Wr	101	103							111	
	Bluegill	PSD	12	2							24	
		PSD-P	7	0							3	
		Wr	115	113							110	
	Largemouth Bass	PSD		0							100	
		PSD-P		0							100	
		Wr									123	
	Northern Pike	PSD	42	85							54	
		PSD-P	0	0							7	
		Wr	85	97							85	
	Smallmouth Bass	PSD	38	13							0	
		PSD-P	24	0							0	
		Wr	102	103							99	
	Walleye	PSD	40	100								
		PSD-P	0	0								
		Wr	82	87								

Gear	Species	Index	Year									
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
frame net (std 3/4 in)	Yellow Perch	PSD	10	6							2	
		PSD-P	0	0							0	
		Wr	91	84							90	
spring day EF	Smallmouth Bass	PSD										52
		PSD-P										36
		Wr										96
spring night EF-LMB	Largemouth Bass	PSD								80		
		PSD-P								32		
std exp gill net	Black Crappie	PSD	100	100								
		PSD-P	100	100								
		Wr	98	92								
	Bluegill	PSD	0	0								
		PSD-P	0	0								
		Wr		121								
	Northern Pike	PSD	61	81								
		PSD-P	5	6								
		Wr	85	88								
	Smallmouth Bass	PSD	92	71								
		PSD-P	58	57								
		Wr	101	104								
	Walleye	PSD	68	77								
		PSD-P	18	8								
		Wr	88	90								
	Yellow Perch	PSD	7	3								
		PSD-P	0	0								
		Wr	99	92								

Length at Capture

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

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	259	79 (5)	110 (193)	165 (17)	183 (33)	197 (11)	194 (2)				
2017	1046	72 (643)	110 (379)	153 (17)	164 (7)						
2015	1358	87 (44)	107 (1291)	159 (14)	168 (8)	232 (2)					
2014	195	86 (85)	97 (30)	129 (61)	187 (17)	198 (5)					

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	38		216 (8)	256 (5)	324 (14)	356 (11)					
2016	44		228 (9)	284 (11)	312 (4)	380 (2)	387 (5)	397 (7)	422 (1)	471 (5)	
2014	59		251 (7)	320 (10)	361 (11)	370 (7)	368 (2)		443 (7)	451 (10)	445 (3)

Species: Smallmouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	3		207 (2)	278 (1)							
2014	21		202 (6)	296 (6)	317 (6)	331 (1)	407 (1)	407 (1)			

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	24	197 (3)		358 (13)	415 (1)	492 (3)	557 (2)				565 (2)
2021	48	197 (2)	282 (18)	322 (1)	426 (9)	502 (4)		616 (1)	599 (1)	540 (1)	601 (11)
2019	45	182 (1)	293 (15)	412 (11)		487 (5)	559 (2)		549 (7)	575 (2)	538 (2)
2018	28	213 (2)	326 (8)	397 (3)	466 (3)		521 (2)	524 (4)	557 (3)	526 (1)	612 (2)
2017	42	215 (1)		395 (13)	450 (1)		511 (16)	510 (4)	547 (4)		661 (3)
2016	30		285 (6)	371 (2)	455 (1)	476 (9)	486 (4)	597 (2)	626 (1)		637 (5)
2015	42	194 (3)	282 (2)	356 (7)	427 (23)	443 (4)	575 (1)				678 (2)

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
2014	40		232 (2)	377 (19)	408 (10)	482 (2)	592 (2)	476 (1)			652 (4)

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
2022	93		136 (10)	152 (58)	182 (15)	194 (10)					
2021	81		144 (9)	153 (40)	170 (30)	204 (1)					
2019	101		145 (77)	167 (19)	183 (1)	193 (4)					
2018	50		141 (9)	160 (32)	175 (8)	205 (1)					
2017	34		138 (10)	157 (23)	186 (1)						
2016	89		140 (27)	153 (37)	165 (22)	195 (1)	249 (2)				
2015	728	99 (187)	112 (423)	153 (113)	194 (2)	219 (3)					
2014	275	97 (55)	116 (172)	129 (23)	182 (22)	214 (4)					

Fish Condition

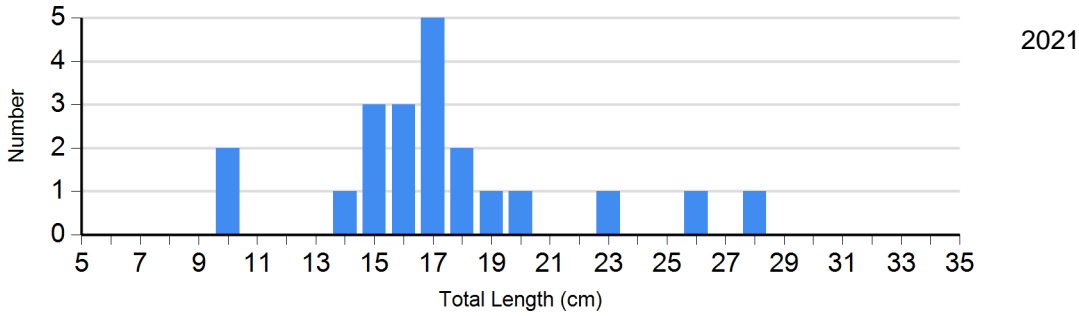
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2021	15	113 (3.0)	2	113 (2.2)	2	102 (3.0)	0	
Bluegill Frame Net	2021	195	109 (0.9)	54	112 (1.2)	7	110 (2.0)	0	
Northern Pike Gill Net	2019	5	103 (0.9)	7	87 (2.1)	0		0	
	2021	9	87 (1.4)	3	92 (3.3)	2	88 (0.3)	0	
	2022	17	88 (1.4)	27	83 (1.2)	2	87 (5.0)	1	92
Smallmouth Bass Electro Fishing	2022	12	92 (5.9)	4	104 (2.1)	2	94	7	87 (2.5)
Walleye Gill Net	2019	15	91 (1.6)	13	90 (1.7)	14	88 (0.9)	1	91
	2021	17	90 (1.1)	11	85 (1.7)	13	88 (2.2)	3	89 (6.6)
	2022	10	87 (1.4)	8	93 (1.6)	3	91 (2.6)	0	
Yellow Perch Gill Net	2019	99	96 (1.0)	1	93	0		0	
	2021	78	99 (1.0)	3	95 (2.7)	0		0	
	2022	87	99 (0.8)	5	90 (2.0)	0		0	

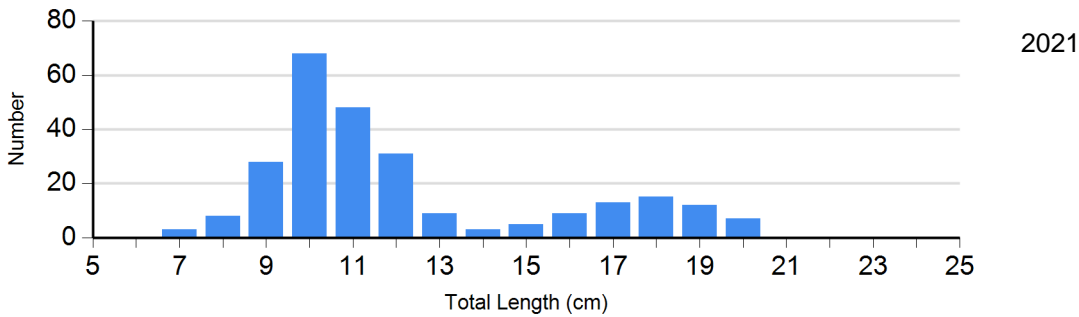
Length Frequency Distribution

Length frequency histogram of species sampled by year.

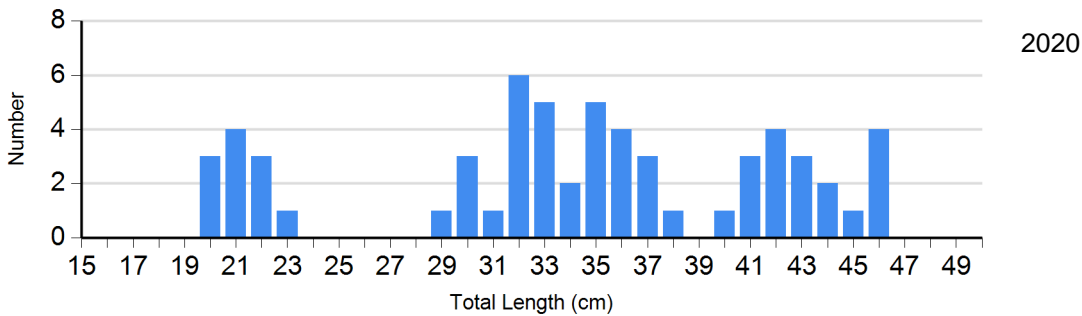
Species: Black Crappie
Gear: frame net (std 3/4 in)



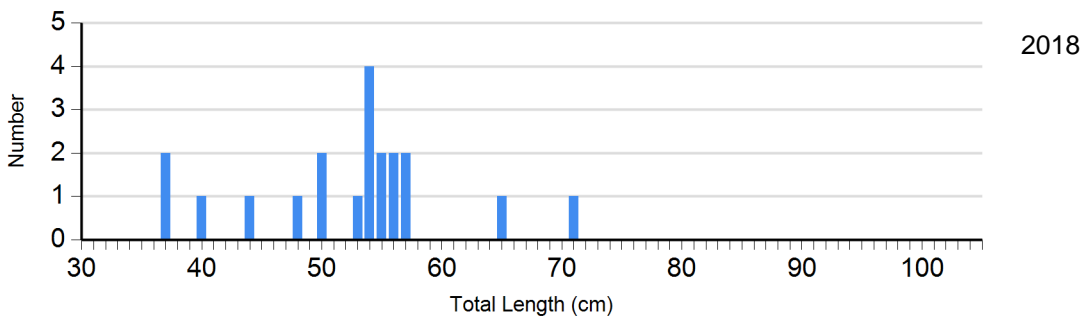
Species: Bluegill
Gear: frame net (std 3/4 in)

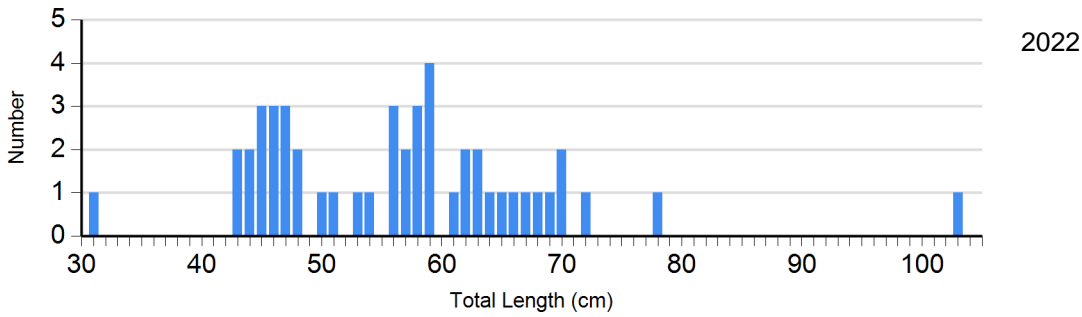
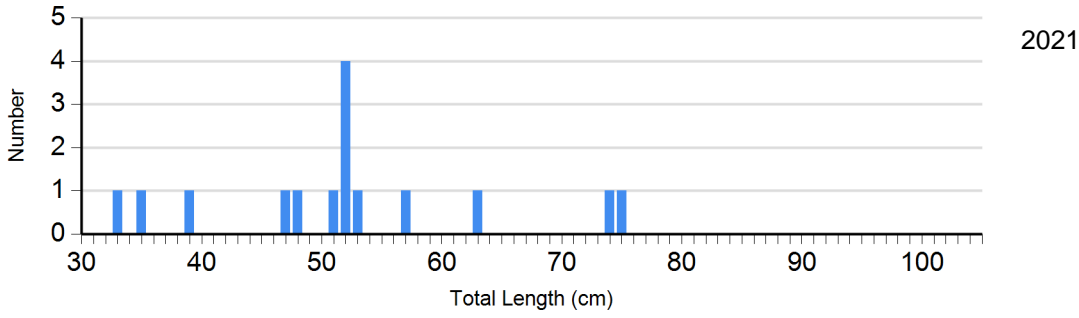
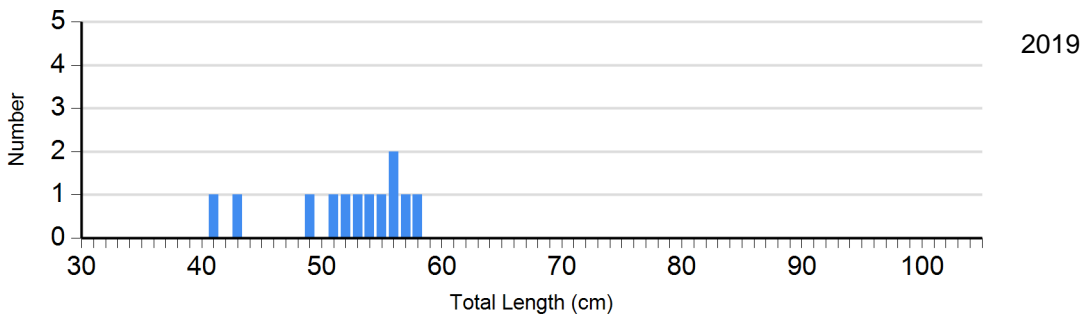


Species: Largemouth Bass
Gear: spring night EF-LMB

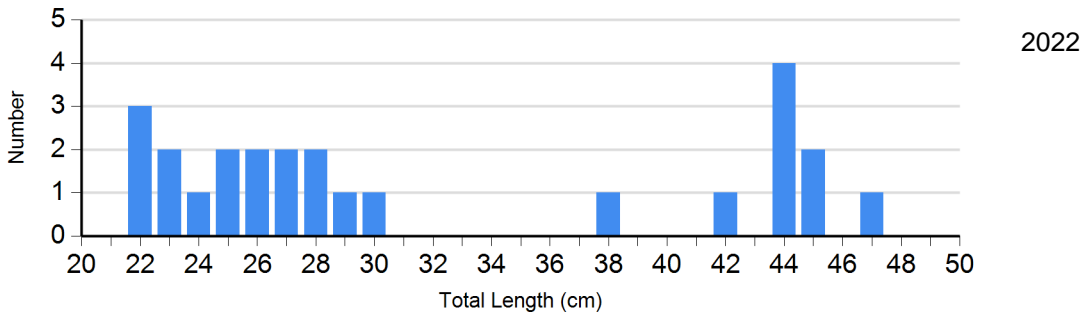


Species: Northern Pike
Gear: AFS std gill net

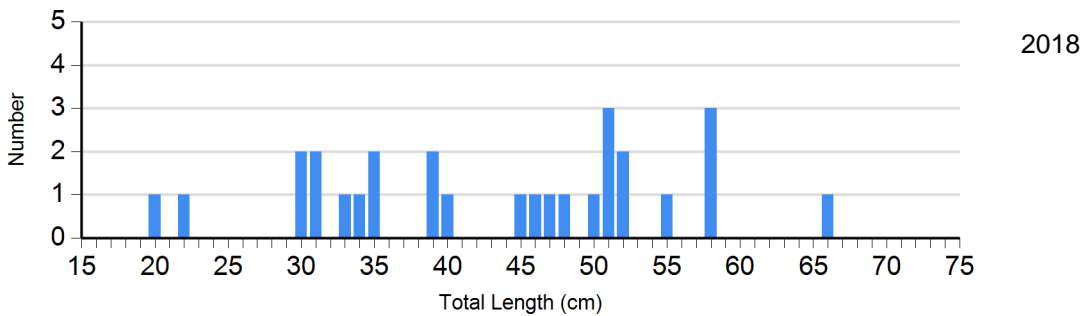


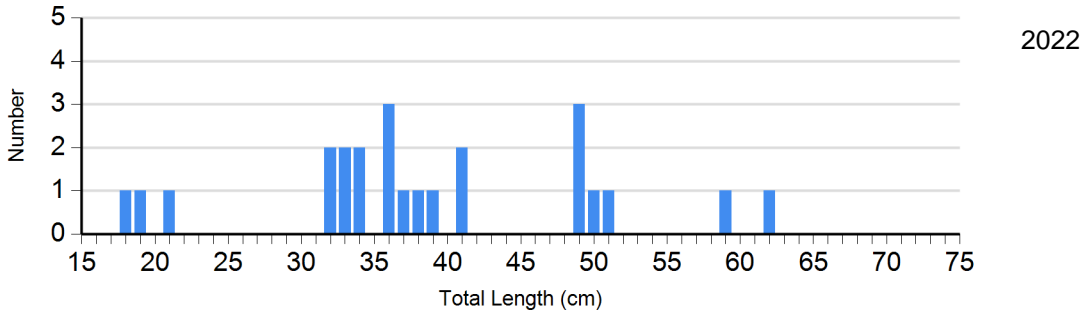
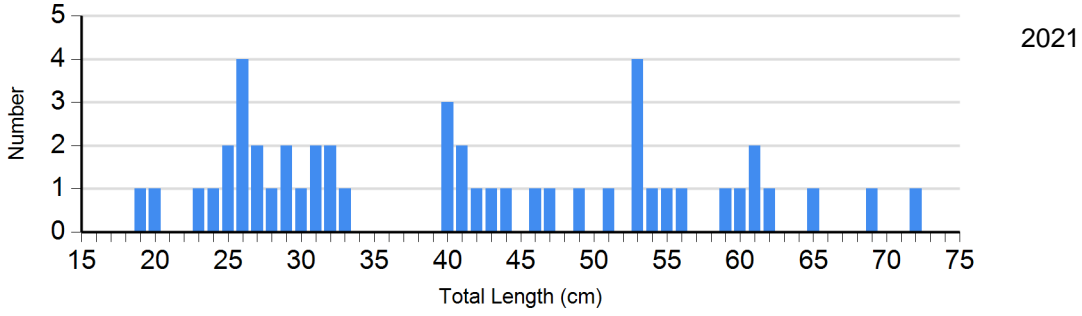
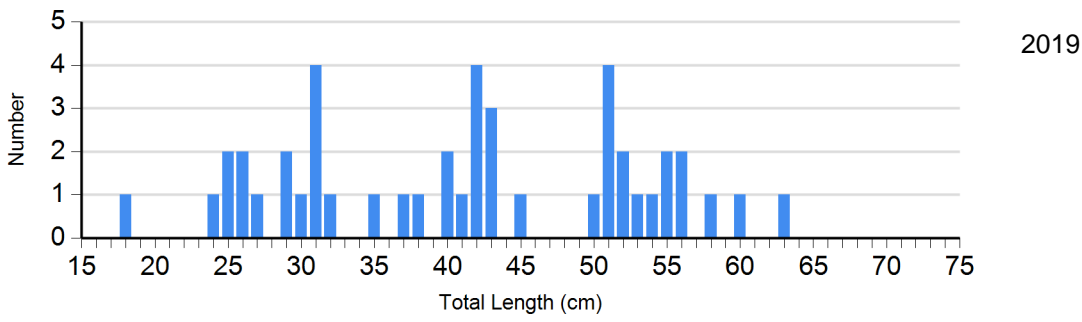


Species: Smallmouth Bass
 Gear: spring day EF

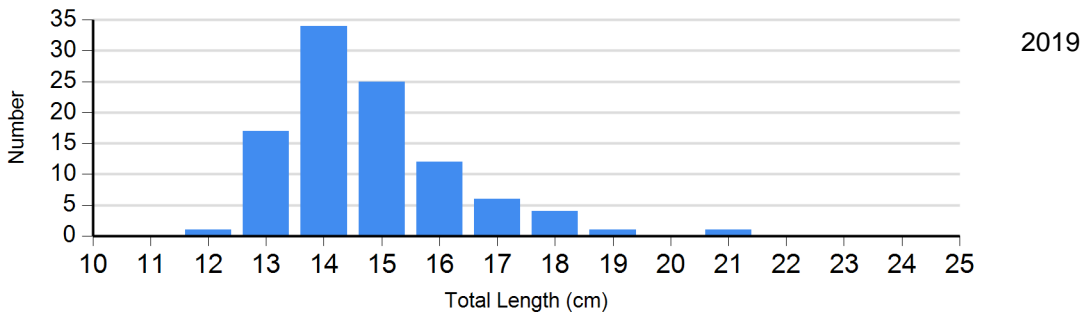
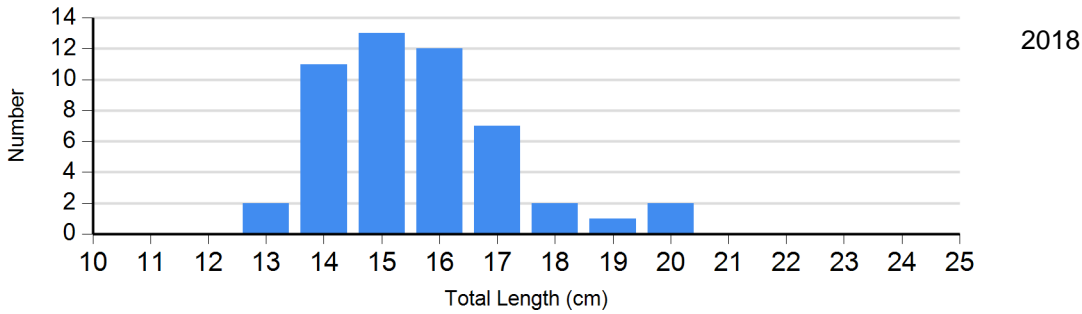


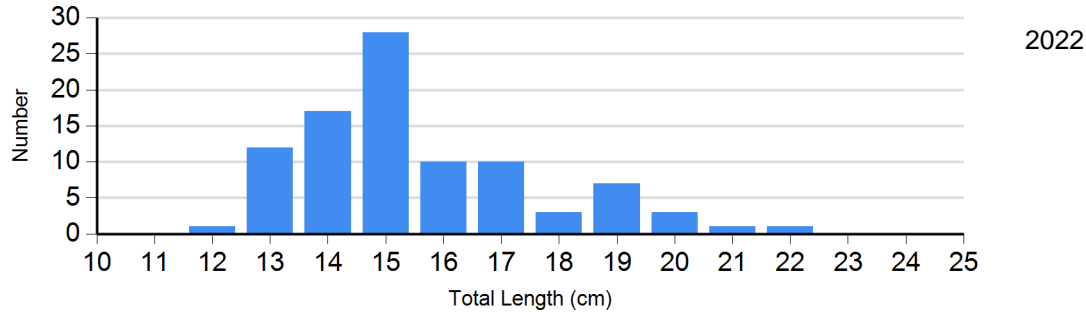
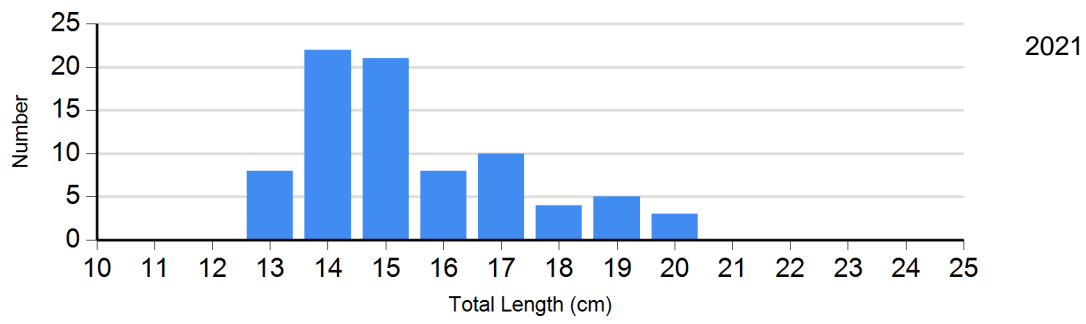
Species: Walleye
 Gear: AFS std gill net





Species: Yellow Perch
Gear: AFS std gill net

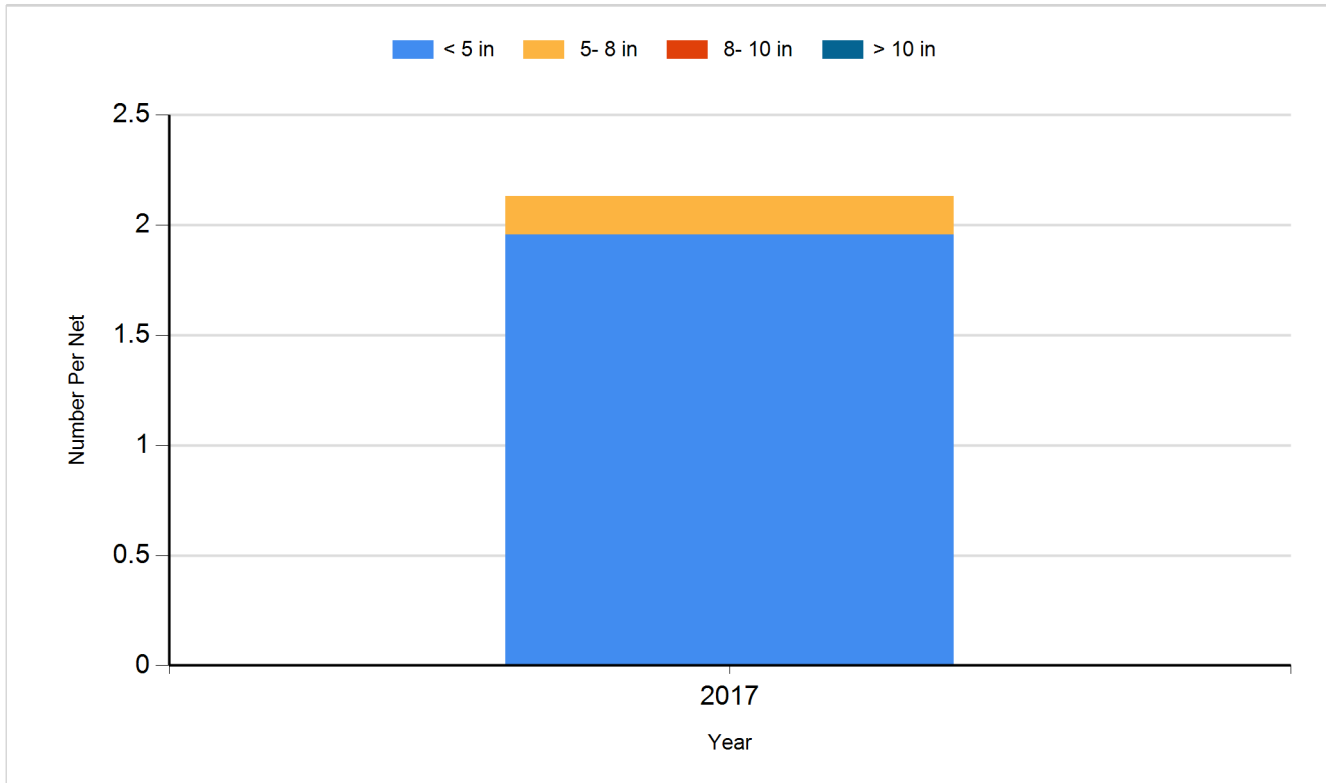




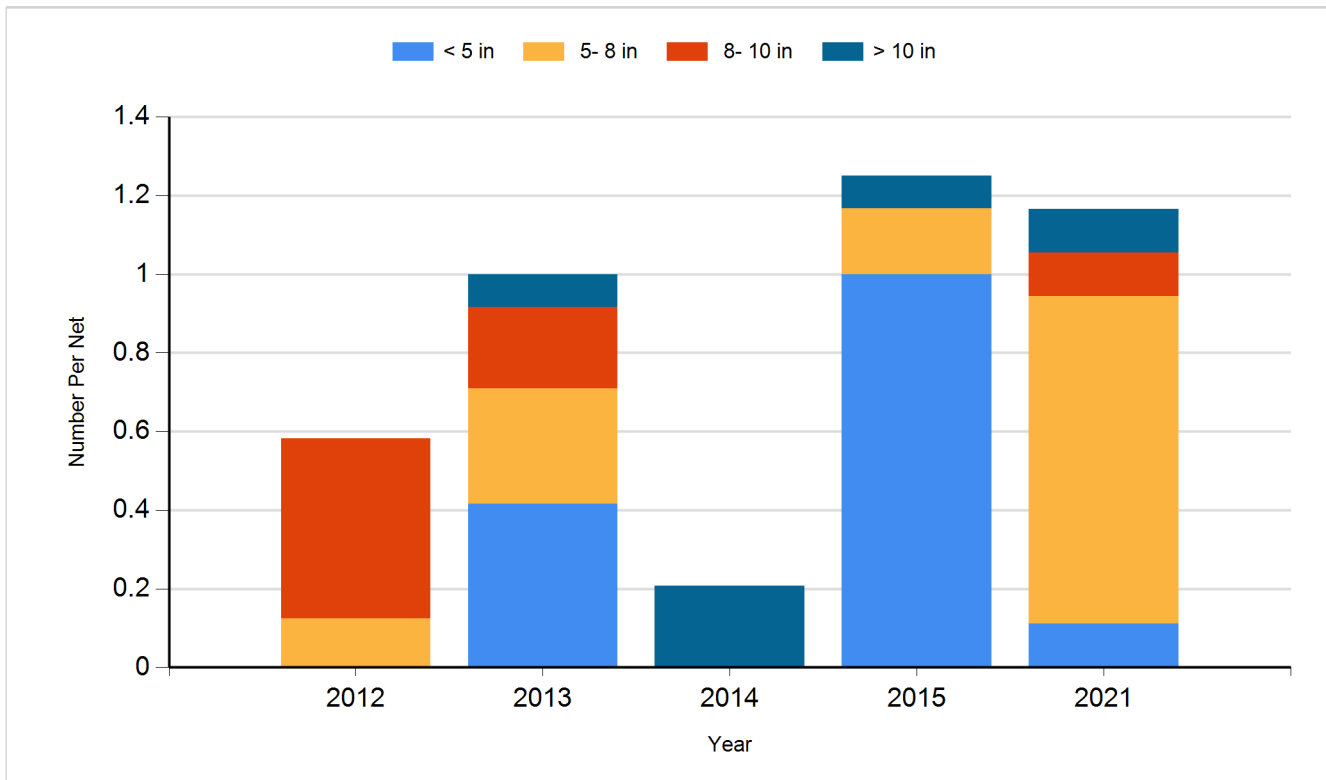
Historic Fish Sizes and Relative Abundance

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

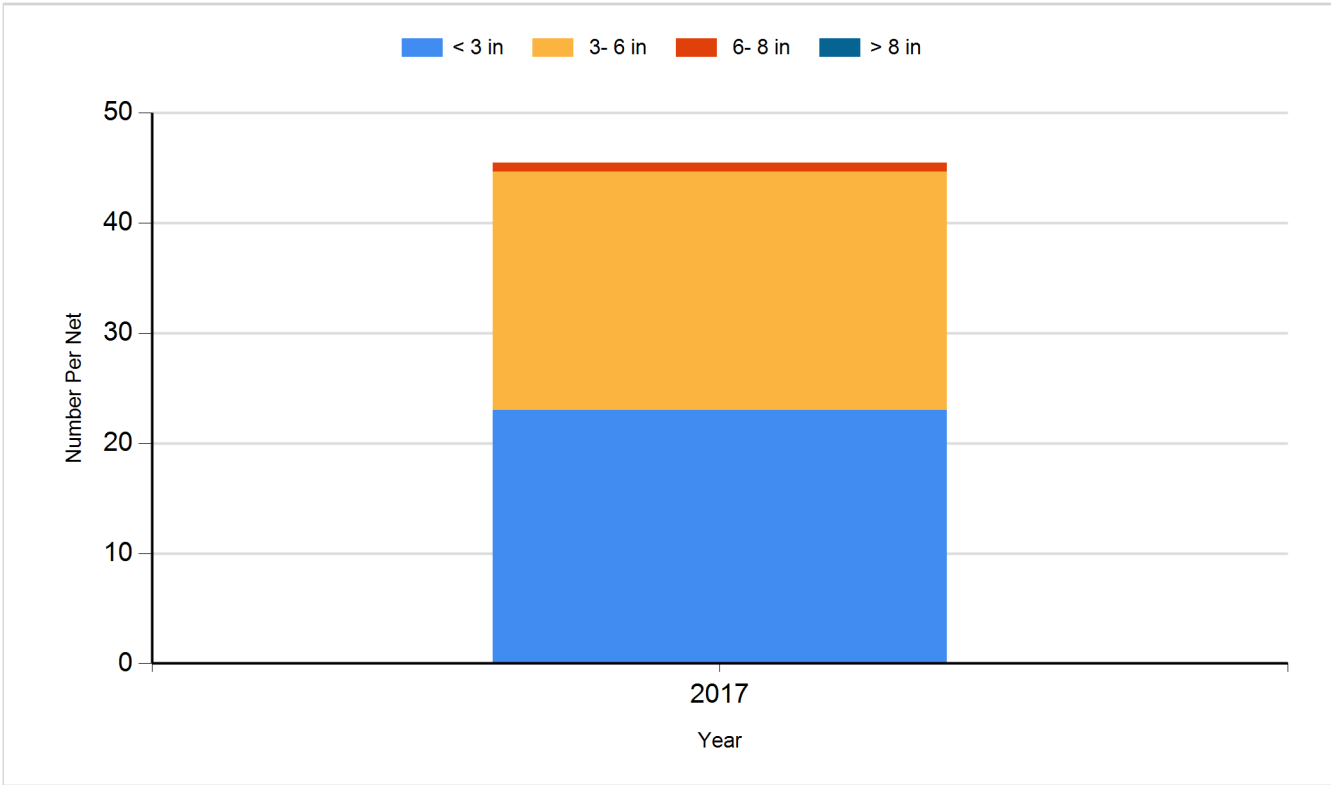
Species: Black Crappie
Gear: AFS std frame net



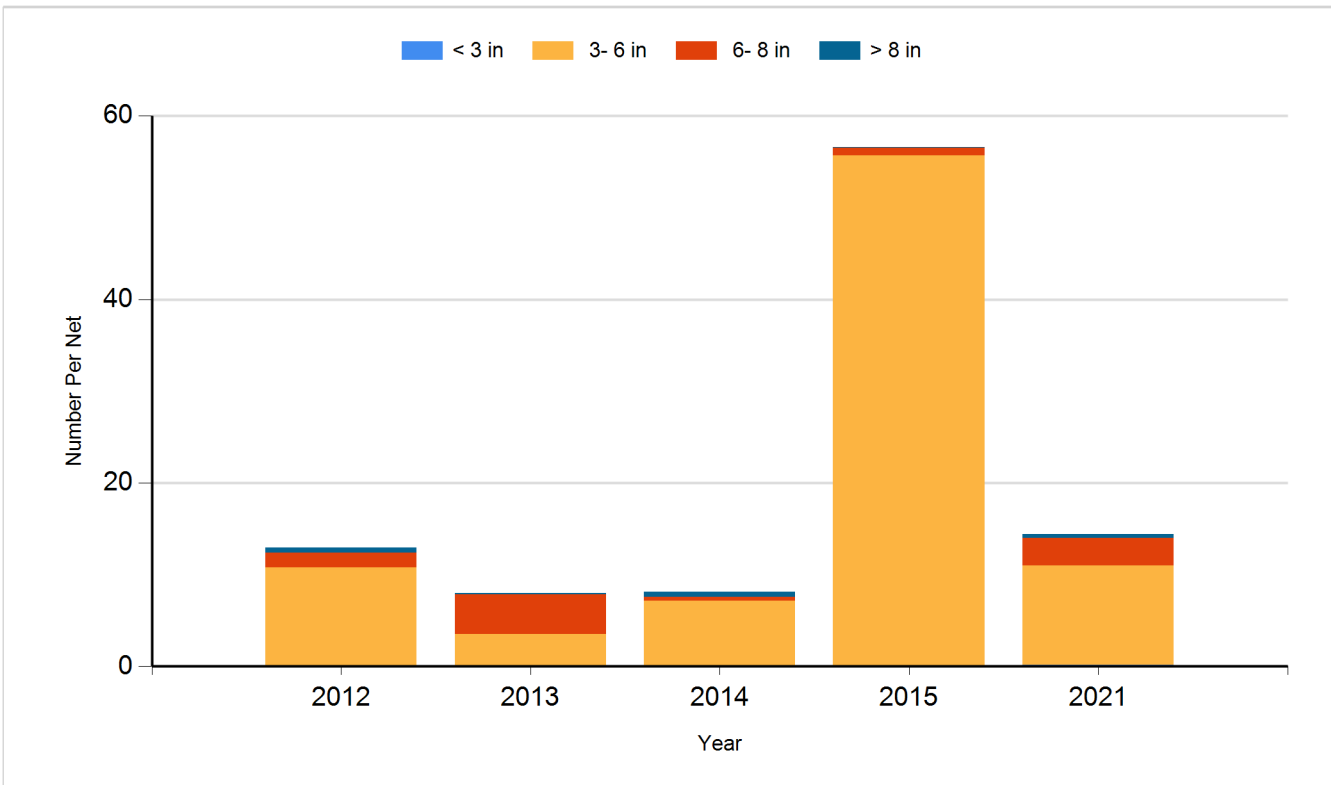
Species: Black Crappie
Gear: frame net (std 3/4 in)



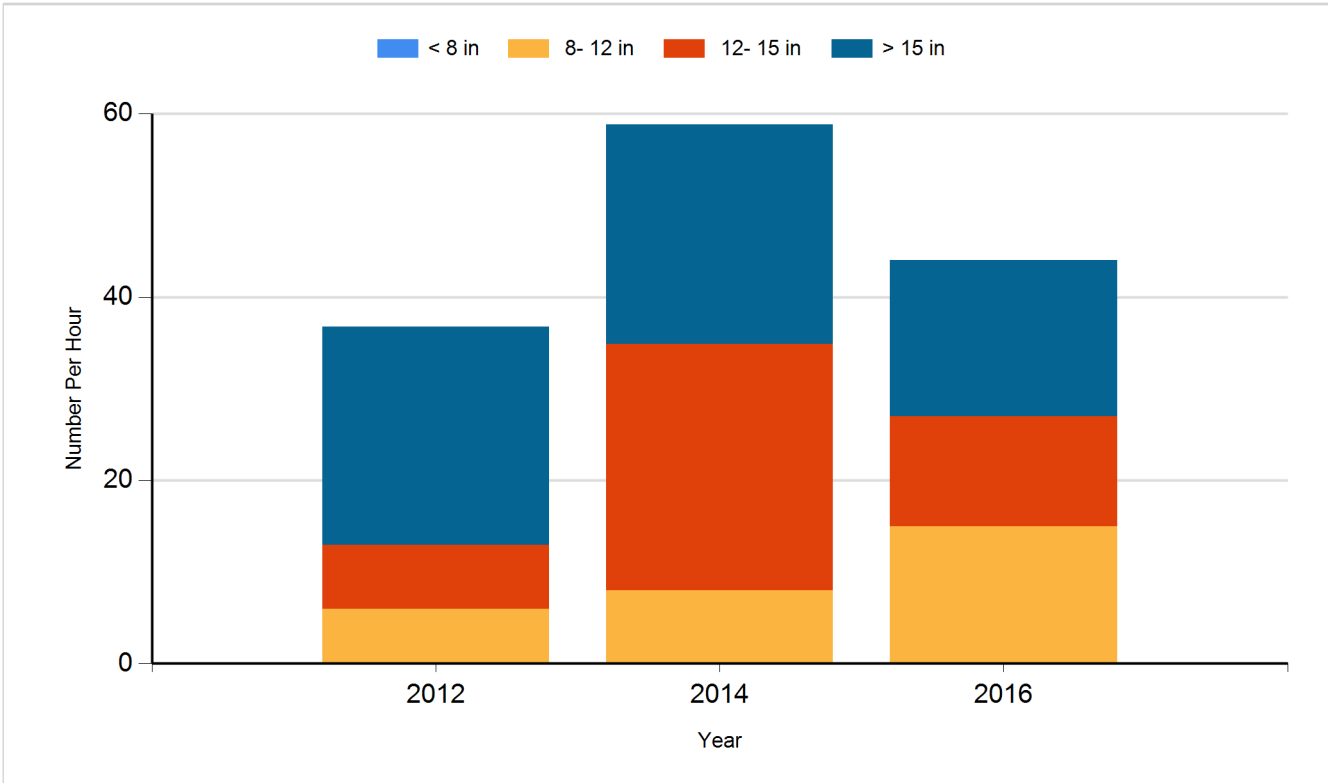
Species: Bluegill
Gear: AFS std frame net



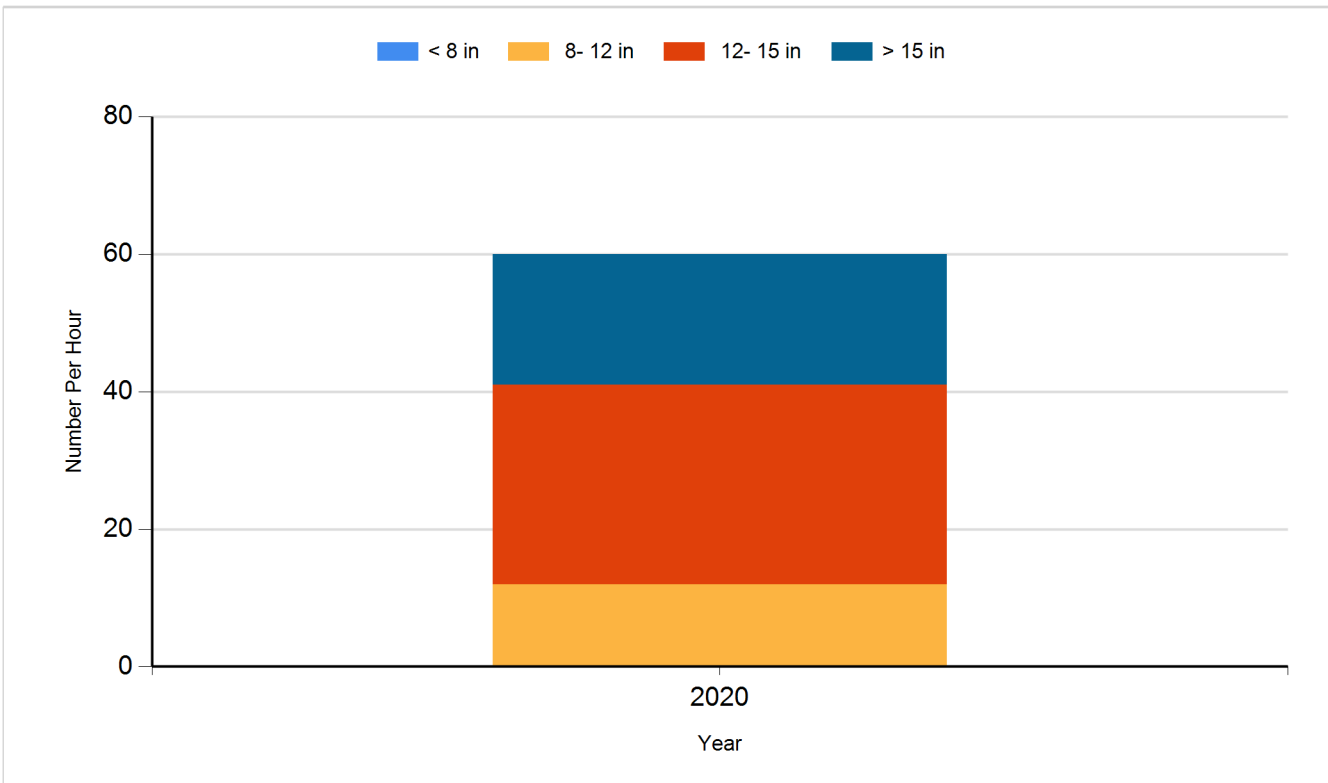
Species: Bluegill
Gear: frame net (std 3/4 in)



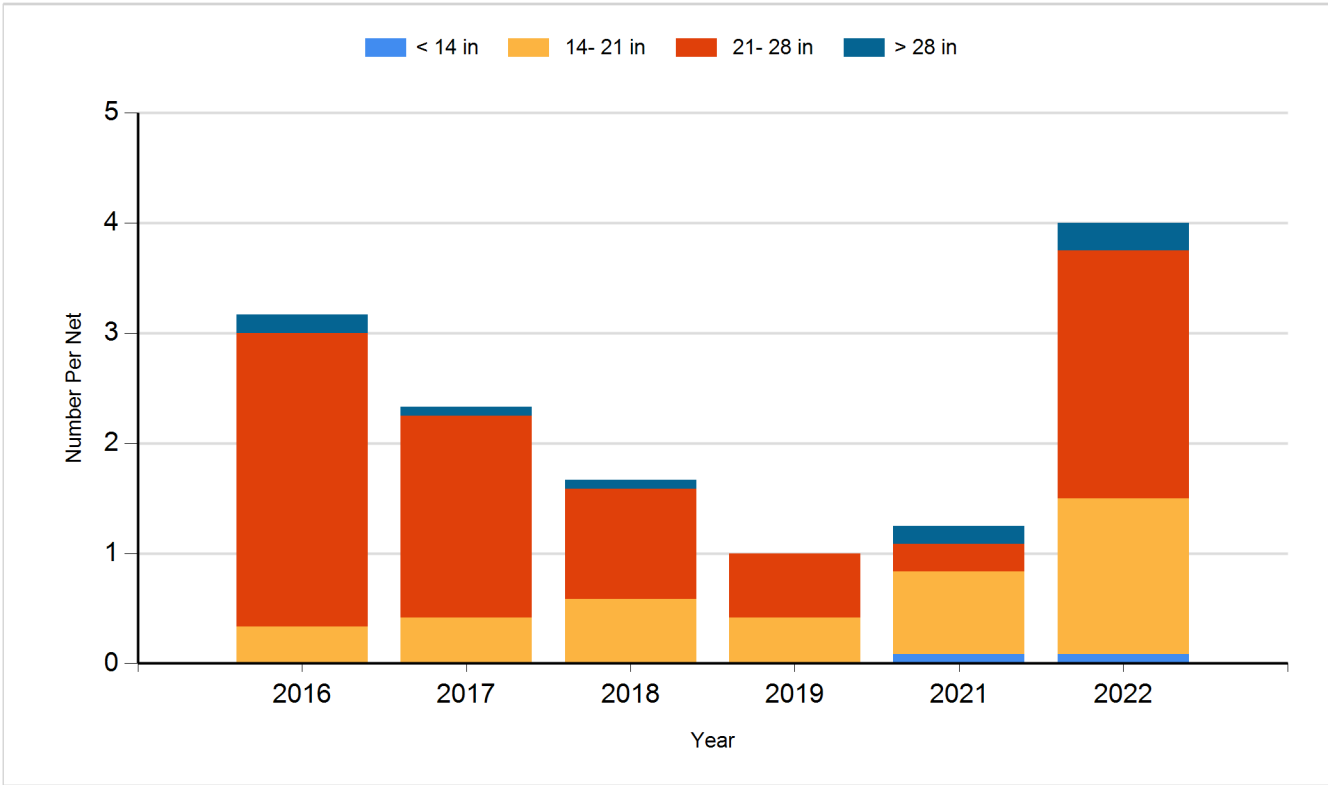
Species: Largemouth Bass
Gear: boat shocker (night, AC)



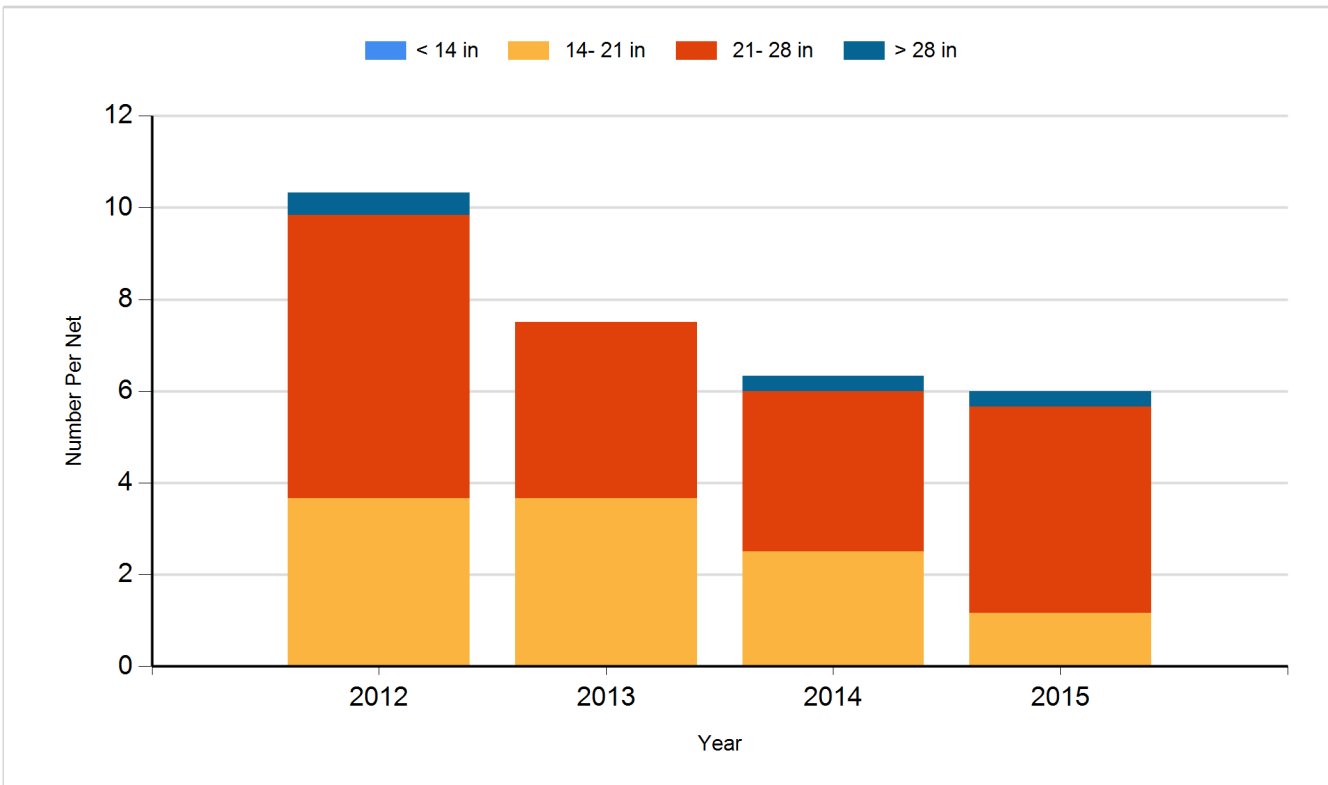
Species: Largemouth Bass
Gear: spring night EF-LMB



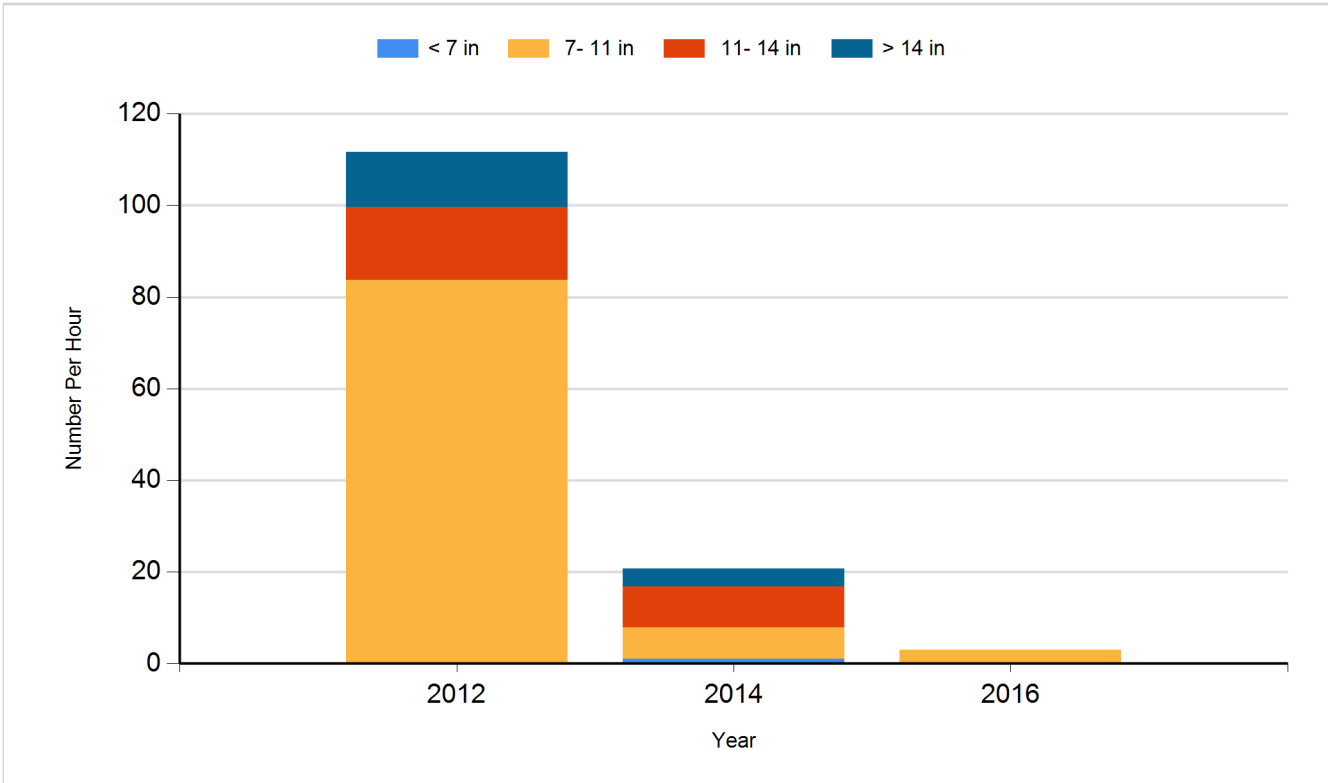
Species: Northern Pike
Gear: AFS std gill net



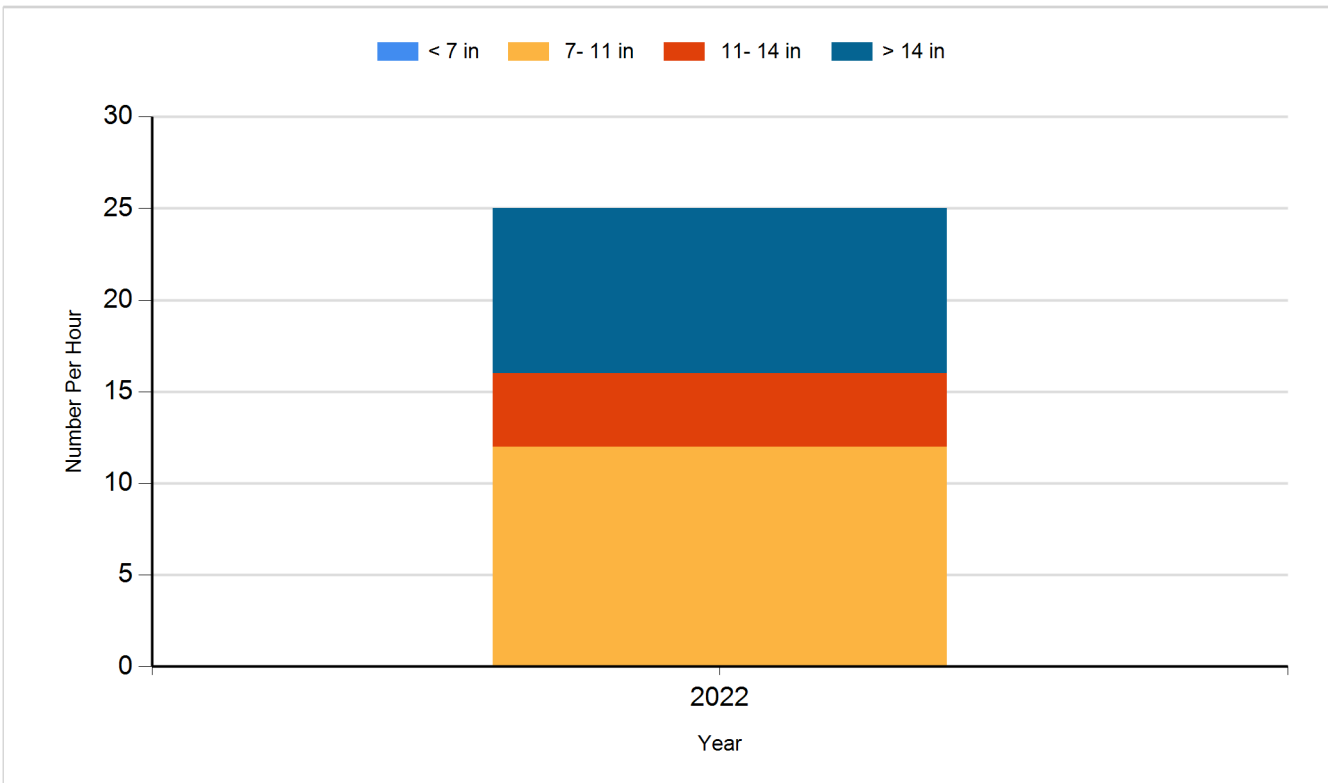
Species: Northern Pike
Gear: std exp gill net



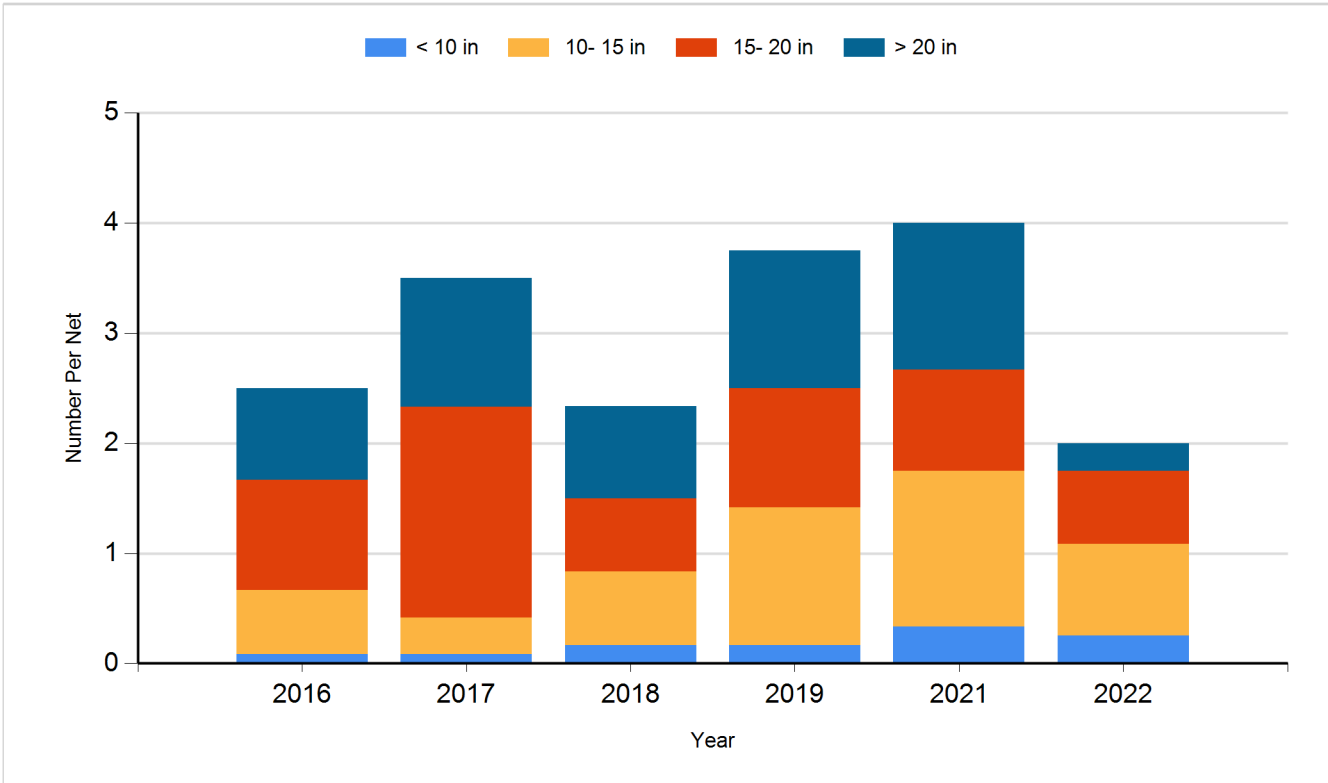
Species: Smallmouth Bass
Gear: boat shocker (night, DC)



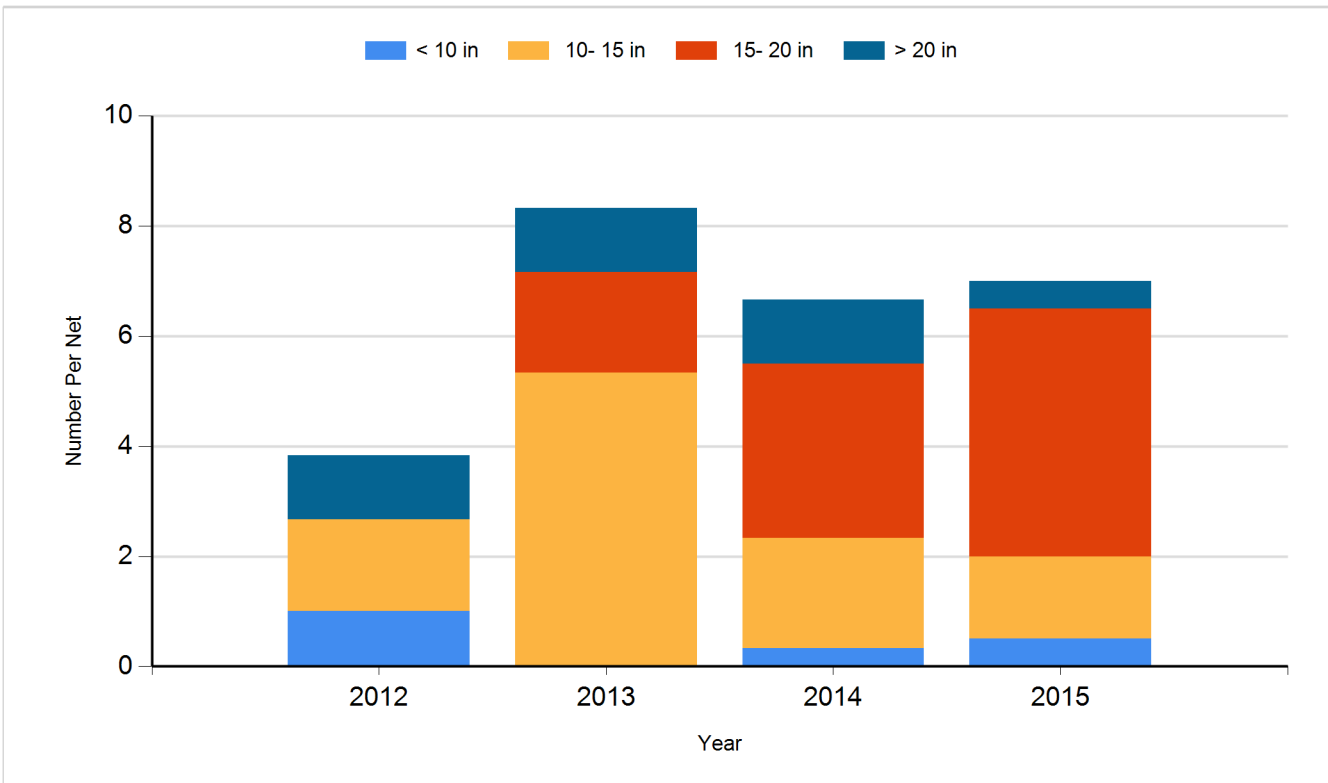
Species: Smallmouth Bass
Gear: spring day EF



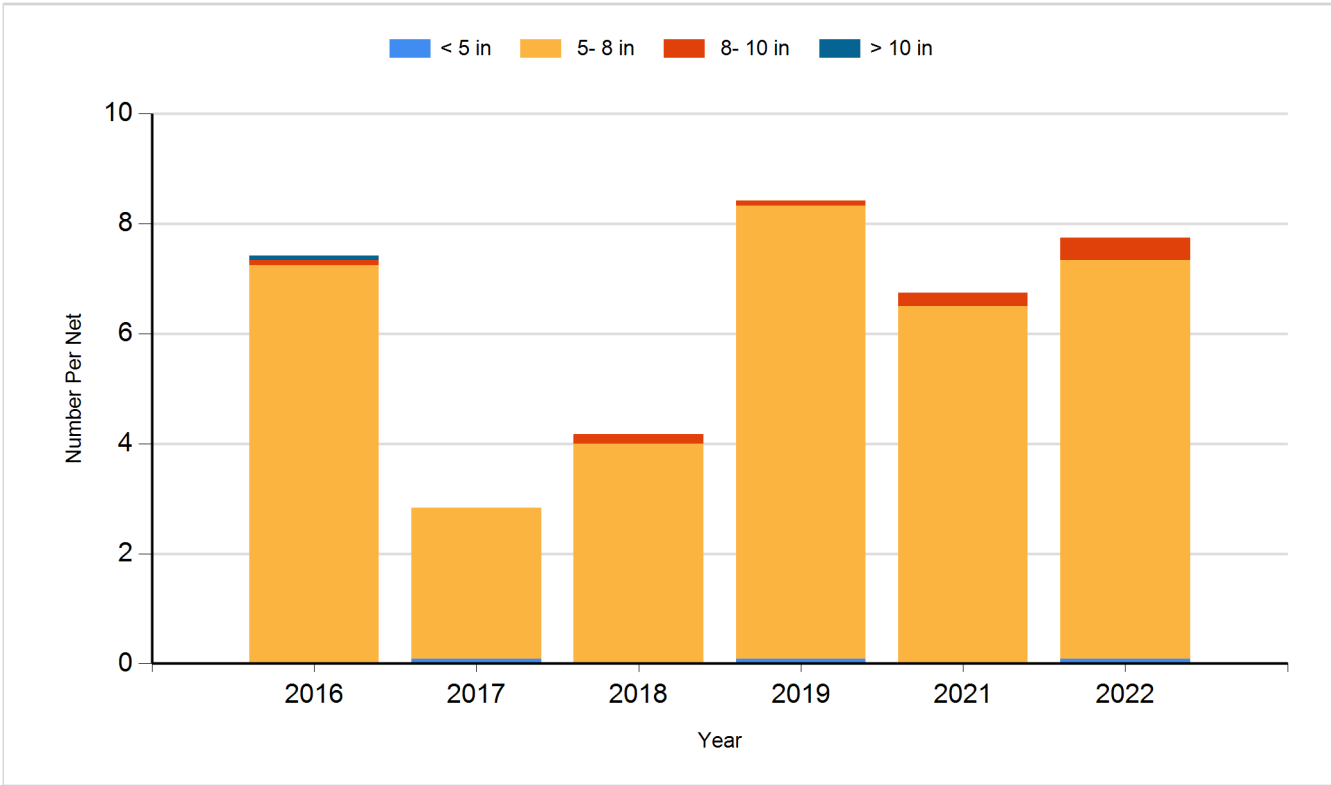
Species: Walleye
Gear: AFS std gill net



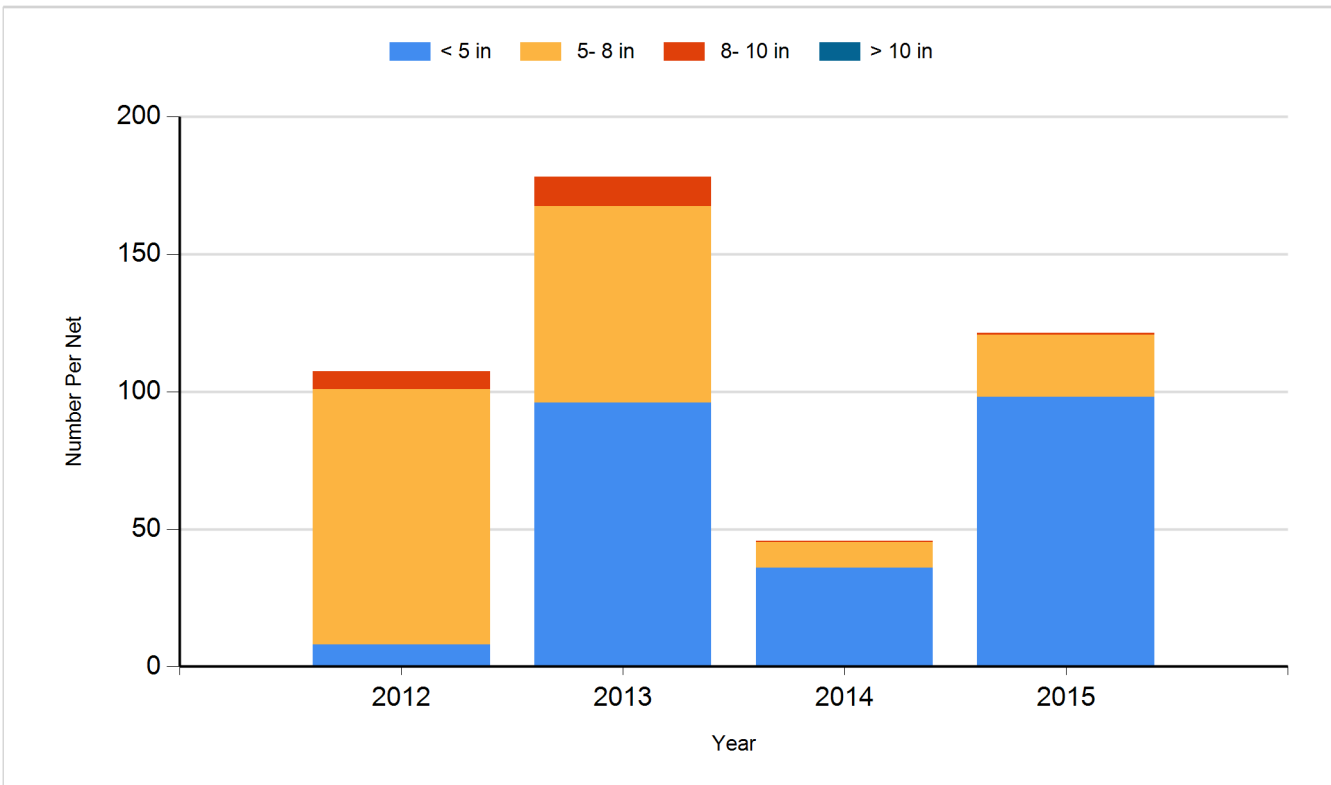
Species: Walleye
Gear: std exp gill net



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
2013	Walleye	Fry	850,000
2016	Walleye	Fry	1,000,000
2018	Walleye	Fry	1,030,000
2019	Walleye	Fry	1,030,000
2023	Walleye	Fry	1,030,000