

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Roy, Marshall County

UJA-Lake-866-001

2020

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	Sep 28, 2020	3000 seconds
spring night EF-LMB	Jun 11, 2020	3600 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

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
spring night EF-LMB*	Largemouth Bass	60	60.0	14.6	80	8	32	9		

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	
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
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			1.18
	Black Crappie						0.3	0.2	0.8	1.4			0.68
	Bluegill						0.3	0.3	1.1	0.4			0.53
	Common Carp						0.0	0.0	0.1	0.4			0.13
	Largemouth Bass						0.1	0.0	0.1	0.4			0.15
	Northern Pike						3.2	2.3	1.7	1.0			2.05
	Smallmouth Bass						2.6	4.2	1.1	1.2			2.28
	Walleye						2.4	3.4	2.2	3.6			2.90
	White Sucker						2.8	2.8	1.9	0.7			2.05
	Yellow Perch						7.4	2.8	4.2	8.3			5.68
boat shocker (night)	Walleye*	466.5	4.0	286.0	90.0	27.0	87.0	24.5					140.71
boat shocker (night, AC)	Largemouth Bass		36.7		58.8		44.0						46.50
boat shocker (night, DC)	Smallmouth Bass		110.8		19.7		3.0						44.50
fall night EF-WAE*	Walleye								38.0		37.2		37.60
frame net (std 3/4 in)	Black Bullhead	0.6	8.2	6.5	3.3	3.0							4.32
	Black Crappie	0.5	0.6	0.6	0.2	0.3							0.44
	Bluegill	7.2	12.9	8.0	8.0	56.6							18.54
	Bluegill X Gr. Sunfish Hybrid	0.5	0.0	0.1	0.2	0.0							0.16
	Channel Catfish	0.0	0.0	0.0	0.0	0.0							0.00
	Common Carp	0.0	0.1	0.1	0.0	0.0							0.04
	Green Sunfish	0.0	0.7	0.2	0.0	0.2							0.22

		CPUE										
Gear	Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
frame net (std 3/4 in)	Largemouth Bass	0.0	0.0	0.0	0.0	0.0						0.00
	Northern Pike	0.5	1.5	1.2	1.0	0.5						0.94
	Smallmouth Bass	0.8	0.3	0.2	0.9	0.3						0.50
	Sunfish Hybrid	0.0	0.0	0.0	0.0	0.0						0.00
	Walleye	0.1	0.5	0.2	0.2	0.0						0.20
	Western Painted Turtle	0.0	0.0	0.0	0.0	0.0						0.00
	White Sucker	0.0	0.0	0.1	0.0	0.2						0.06
	Yellow Perch	19.6	21.3	9.8	4.1	2.0						11.36
spring night EF-LMB*	Largemouth Bass									60.0		60.00
std exp gill net	Black Bullhead	0.0	4.3	1.2	1.5	0.3						1.46
	Black Crappie	0.0	0.2	0.0	0.3	0.2						0.14
	Bluegill	0.0	0.0	0.3	0.0	0.7						0.20
	Common Carp	0.1	0.0	0.0	0.0	0.2						0.06
	Northern Pike	2.6	10.3	7.5	6.3	6.0						6.54
	Smallmouth Bass	0.1	0.5	2.3	4.0	2.3						1.84
	Walleye	0.6	2.8	8.3	6.3	6.5						4.90
	White Sucker	2.4	6.7	4.7	8.5	5.0						5.46
	Yellow Perch	26.8	99.3	82.2	10.0	23.3						48.32

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													
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
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			
		PSD-P								0	100	20	12			
		Wr								117	101	115	117			
	Bluegill	PSD								25	25	15	60			
		PSD-P								25	0	8	20			
		Wr								108	126	110	112			
	Largemouth Bass	PSD								100		100	60			
		PSD-P								0		0	40			
		Wr								121		111	125			
	Northern Pike	PSD								89	82	65	58			
		PSD-P								5	4	5	0			
		Wr								89	89	92	94			

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std gill net	Smallmouth Bass	PSD						100	100	100	100	
		PSD-P						97	86	100	93	
		Wr						100	100	99	95	
	Walleye	PSD						76	90	69	65	
		PSD-P						34	34	38	35	
		Wr						91	87	94	90	
	Yellow Perch	PSD						2	0	4	1	
		PSD-P						1	0	0	0	
		Wr						97	102	95	96	
boat shocker (night)	Walleye	PSD	0	0	0	0	0	0	0			
		PSD-P	0	0	0	0	0	0	0			
		Wr	95		91	90	96	92	98			
boat shocker (night, AC)	Largemouth Bass	PSD		84		86		66				
		PSD-P		65		41		39				
		Wr		124		116		114				
boat shocker (night, DC)	Smallmouth Bass	PSD		25		65		0				
		PSD-P		11		20		0				
		Wr		97		104		105				
frame net (std 3/4 in)	Black Crappie	PSD	27	79	50	100	33					
		PSD-P	18	0	14	100	33					
		Wr	108	117	105	101	103					
	Bluegill	PSD	49	17	55	12	2					
		PSD-P	5	4	2	7	0					
		Wr	114	120	112	115	113					
	Largemouth Bass	PSD	0				0					
		PSD-P	0				0					
	Northern Pike	PSD	54	53	38	42	85					
		PSD-P	8	3	0	0	0					
		Wr	93	90	89	85	97					
	Smallmouth Bass	PSD	28	38	25	38	13					
		PSD-P	11	0	0	24	0					
		Wr	103	96	97	102	103					
	Walleye	PSD	100	36	40	40	100					
		PSD-P	100	0	20	0	0					
		Wr	71	84	86	82	87					
	Yellow Perch	PSD	1	5	22	10	6					

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
frame net (std 3/4 in)	Yellow Perch	PSD-P	0	0	0	0	0					
		Wr	92	95	86	91	84					
spring night EF-LMB	Largemouth Bass	PSD										80
		PSD-P										32
std exp gill net	Black Crappie	PSD		100	0	100	100					
		PSD-P		100	0	100	100					
		Wr		113		98	92					
	Bluegill	PSD			0	0	0					
		PSD-P			0	0	0					
		Wr			136		121					
	Northern Pike	PSD	66	65	51	61	81					
		PSD-P	15	5	0	5	6					
		Wr	90	90	88	85	88					
	Smallmouth Bass	PSD	100	67	86	92	71					
		PSD-P	100	67	50	58	57					
		Wr	111	101	103	101	104					
	Walleye	PSD	64	41	36	68	77					
		PSD-P	27	41	14	18	8					
		Wr	94	86	91	88	90					
	Yellow Perch	PSD	0	7	13	7	3					
		PSD-P	0	0	0	0	0					
		Wr	103	101	91	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+
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)					
2013	191	94 (5)	133 (84)	176 (100)	218 (1)	236 (1)					
2012	311	88 (32)	139 (261)	190 (5)	205 (4)	214 (5)	227 (4)	247 (1)			
2011	175	84 (37)	119 (26)	151 (66)	178 (35)	201 (11)					

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)
2012	37		252 (6)	331 (4)	374 (4)	405 (2)	420 (2)	443 (11)	450 (6)		486 (2)

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)			
2012	111		206 (56)	268 (38)	334 (7)	380 (4)			447 (5)		481 (1)

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
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)

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
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)
2014	40		232 (2)	377 (19)	408 (10)	482 (2)	592 (2)	476 (1)			652 (4)
2013	50		300 (21)	367 (15)	424 (6)	535 (3)					631 (5)
2012	23	197 (6)	294 (2)	351 (8)	530 (1)						622 (6)
2011	16	183 (4)	276 (5)	398 (1)	485 (2)	464 (1)		513 (1)			661 (2)

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
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)					
2013	1069	99 (563)	138 (44)	167 (258)	187 (165)	202 (33)	205 (9)				
2012	644	102 (45)	149 (412)	184 (106)	195 (80)						
2011	1506	99 (764)	128 (548)	156 (194)							

Fish Condition

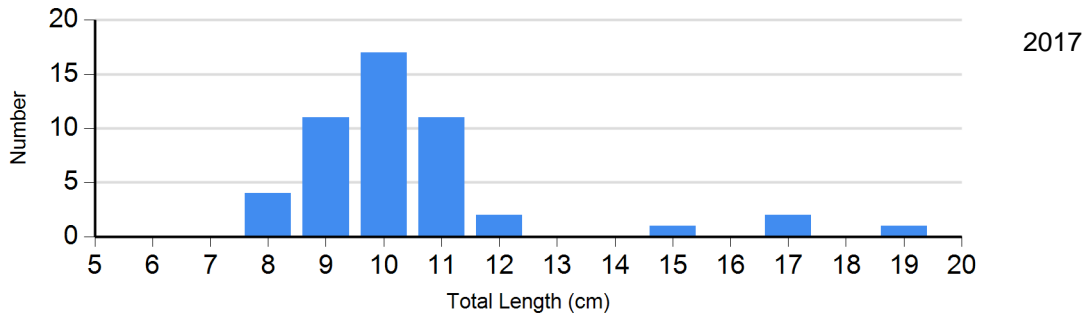
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2017	4	113 (3.2)	0		0		0	
Bluegill Frame Net	2017	498	112 (0.9)	19	114 (2.5)	0		0	
Largemouth Bass Electro Fishing	2016	15	113 (1.3)	12	119 (1.9)	17	113 (1.9)	0	
Northern Pike Gill Net	2016	4	90 (2.4)	32	88 (1.2)	2	95 (4.1)	0	
	2017	5	98 (3.4)	22	87 (1.4)	1	83	0	
	2018	7	99 (4.6)	12	89 (0.9)	1	70	0	
	2019	5	103 (0.9)	7	87 (2.1)	0		0	
Smallmouth Bass Electro Fishing	2016	3	105 (3.1)	0		0		0	
Walleye Gill Net	2016	7	92 (1.3)	12	94 (2.0)	7	90 (1.2)	3	81 (3.8)
	2017	4	84 (2.6)	23	89 (1.0)	12	86 (1.7)	2	77 (3.4)
	2018	8	93 (1.6)	8	99 (1.5)	9	92 (2.5)	1	77
	2019	15	91 (1.6)	13	90 (1.7)	14	88 (0.9)	1	91
Yellow Perch Gill Net	2016	87	97 (0.8)	1	93	1	81	0	
	2017	33	102 (1.2)	0		0		0	
	2018	48	95 (1.1)	2	96 (1.2)	0		0	
	2019	99	96 (1.0)	1	93	0		0	

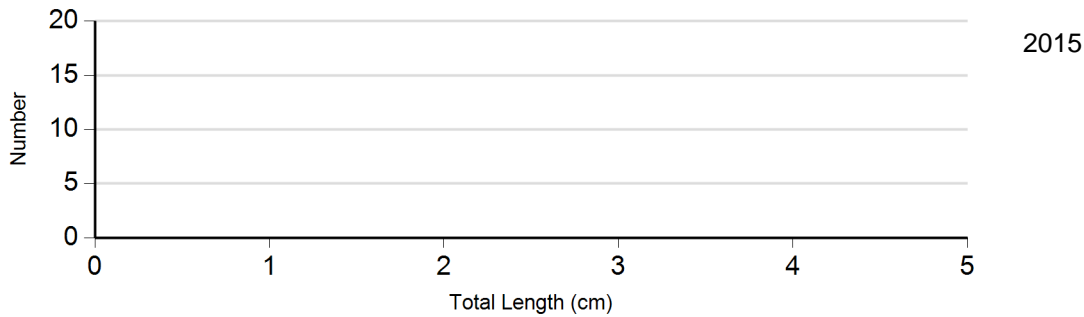
Length Frequency Distribution

Length frequency histogram of species sampled by year.

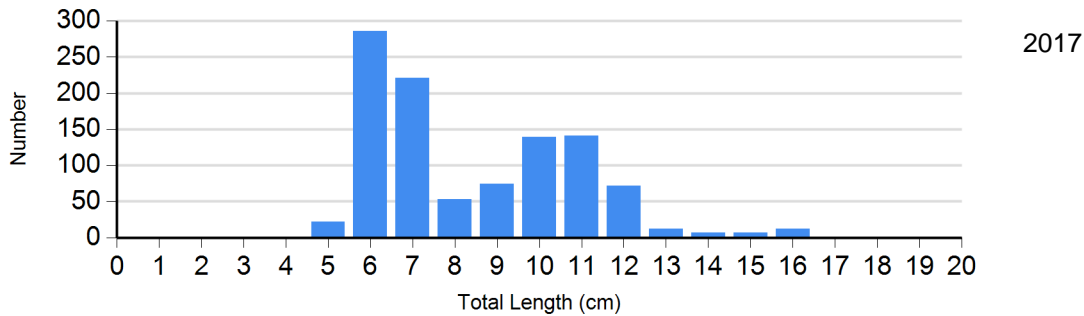
Species: Black Crappie
Gear: AFS std frame net



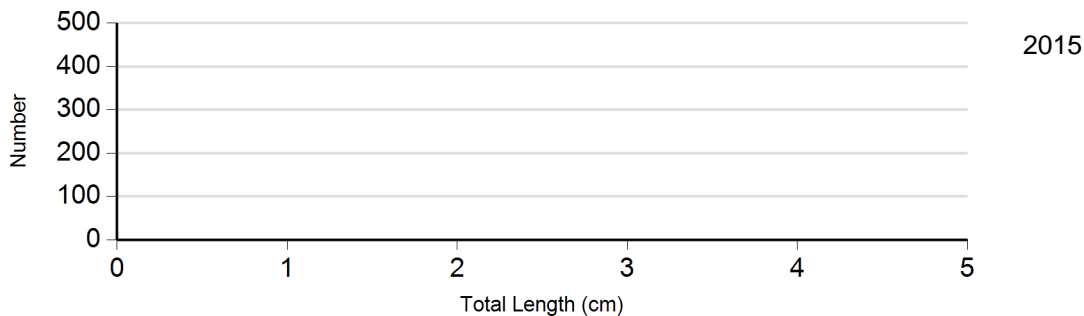
Species: Black Crappie
Gear: frame net (std 3/4 in)



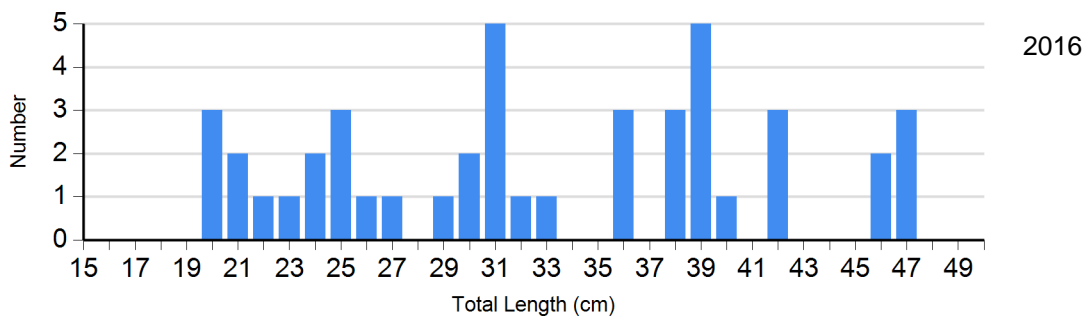
Species: Bluegill
Gear: AFS std frame net



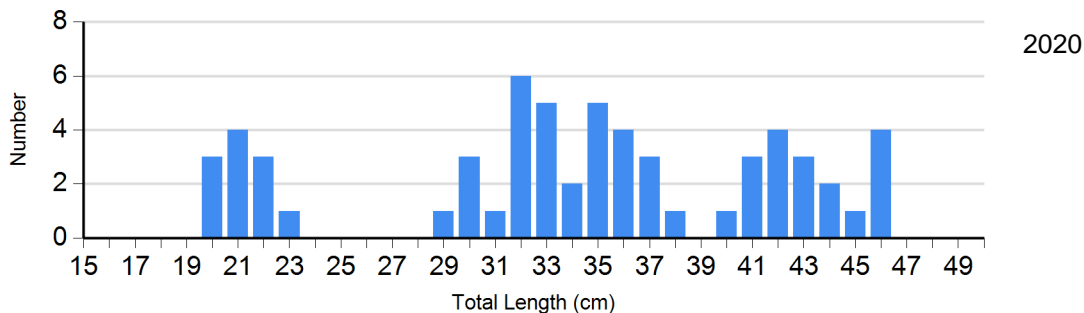
Species: Bluegill
Gear: frame net (std 3/4 in)



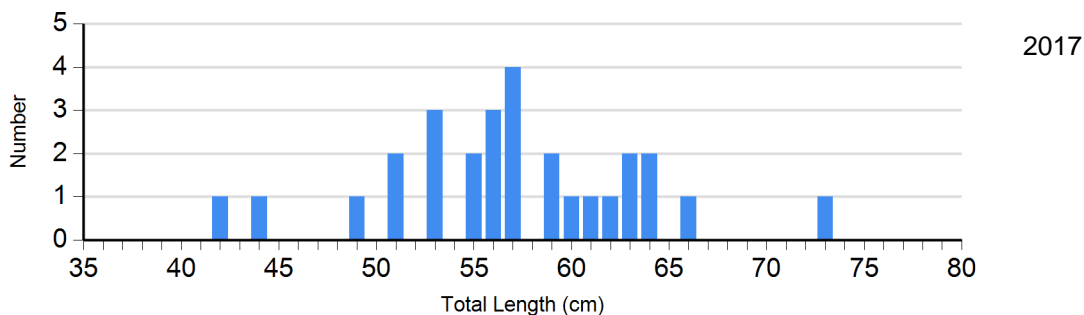
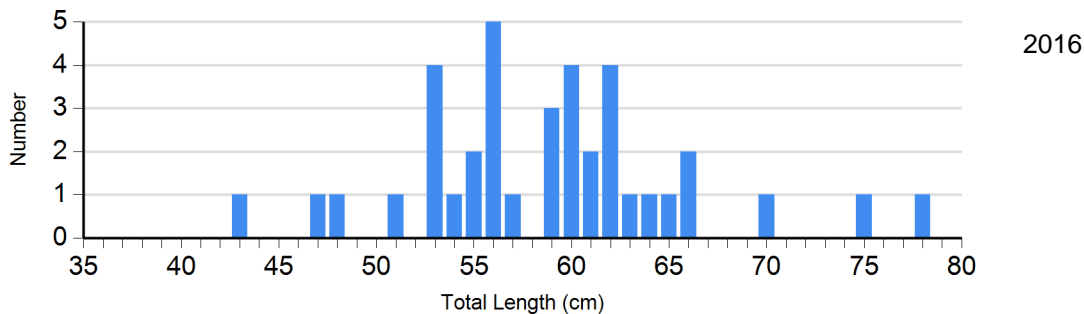
Species: Largemouth Bass
 Gear: boat shocker (night, AC)

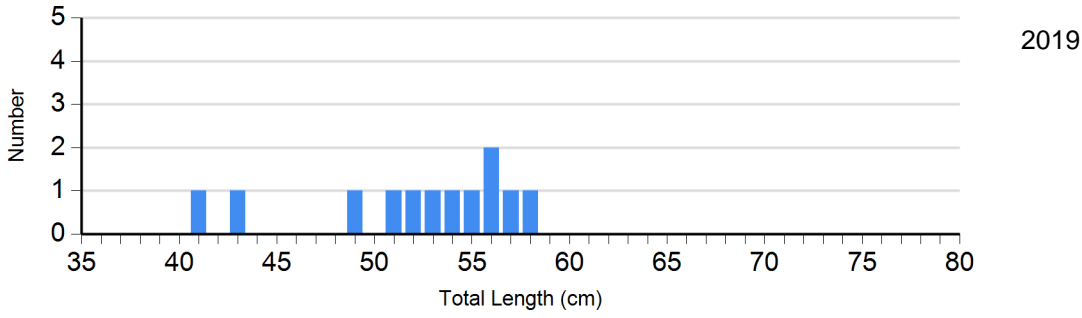
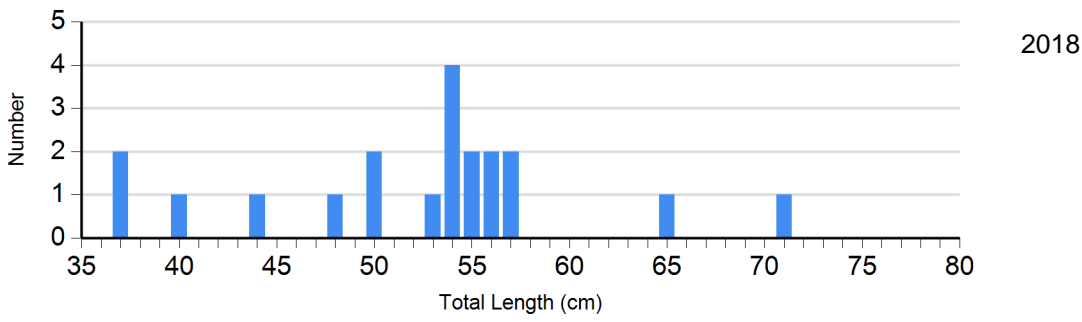


Species: Largemouth Bass
 Gear: spring night EF-LMB

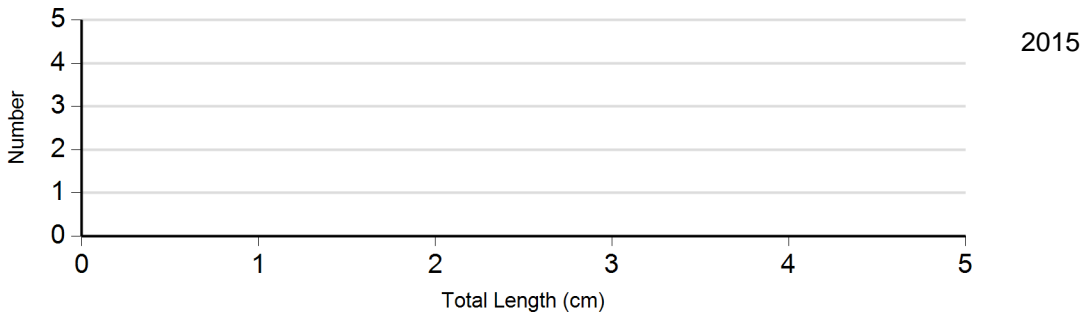


Species: Northern Pike
 Gear: AFS std gill net

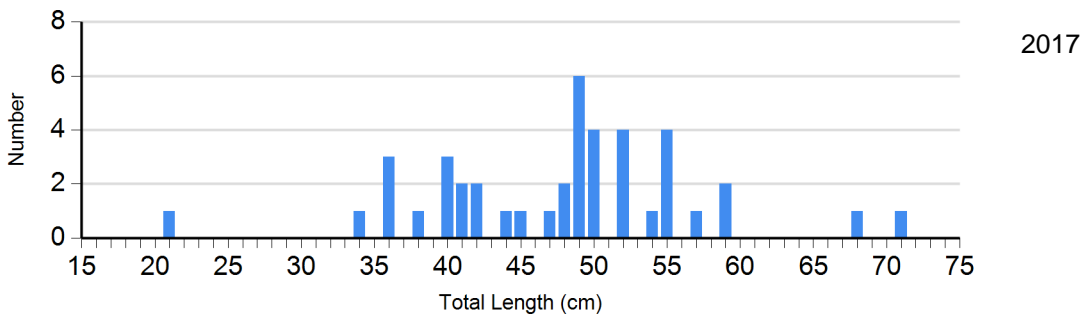
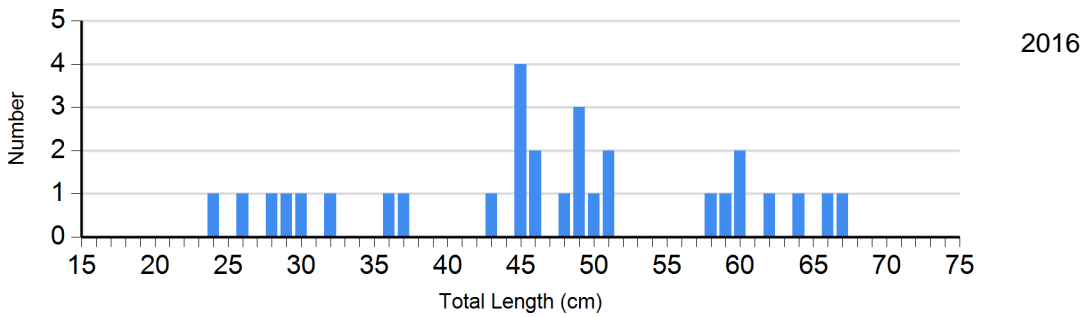


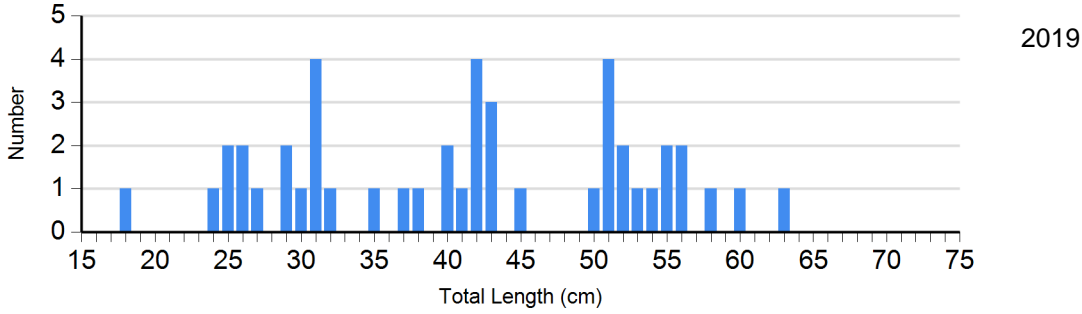
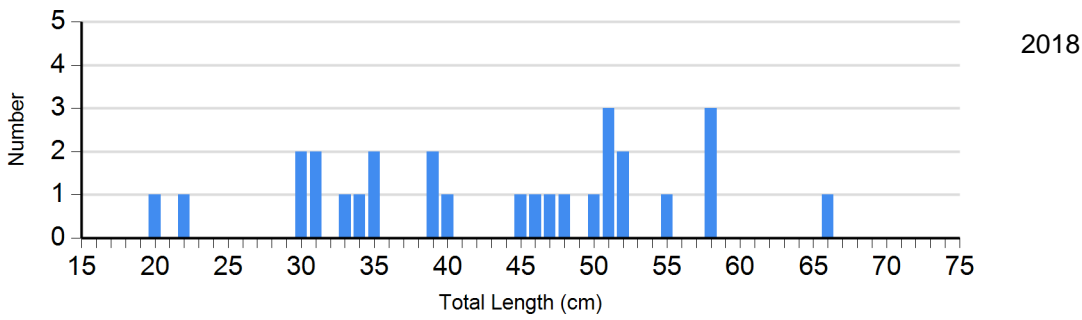


Species: Northern Pike
 Gear: std exp gill net

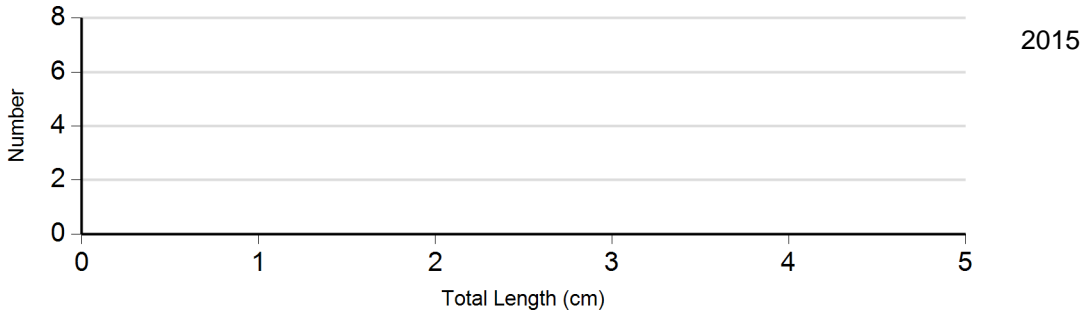


Species: Walleye
 Gear: AFS std gill net

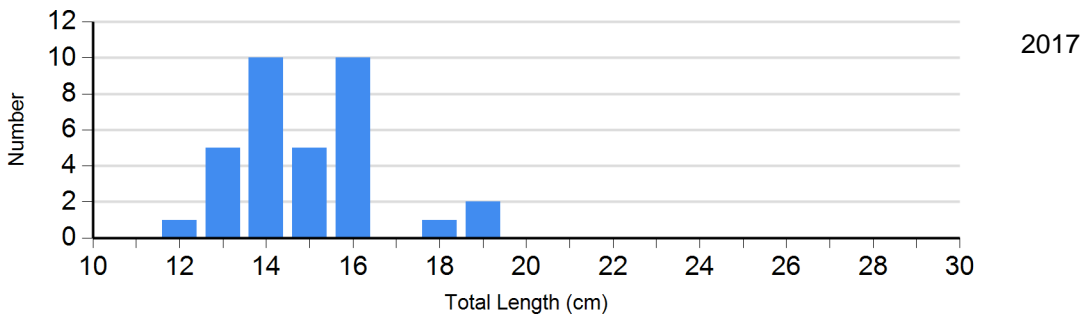
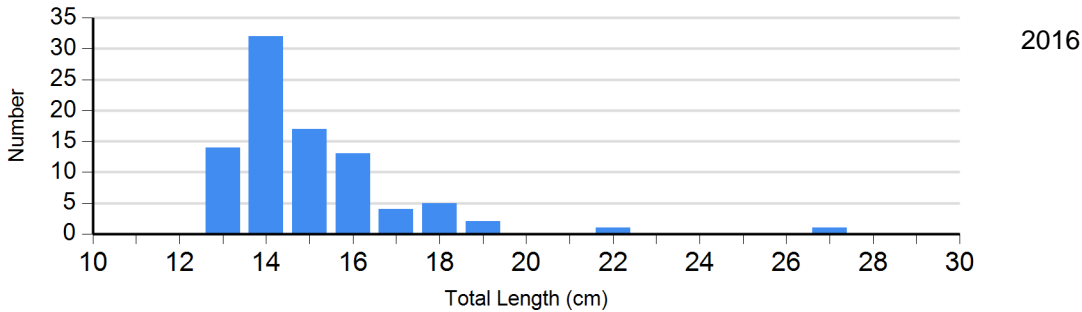


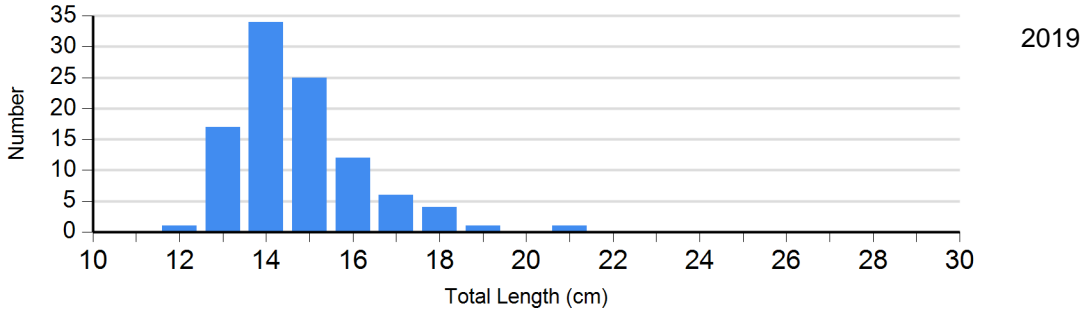
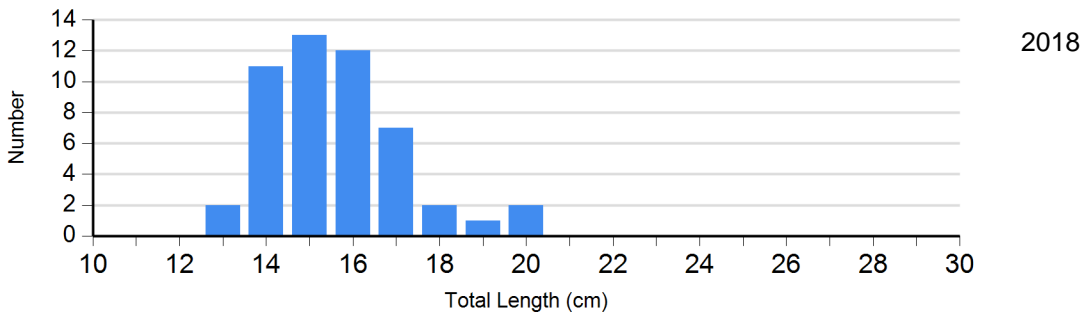


Species: Walleye
Gear: std exp gill net

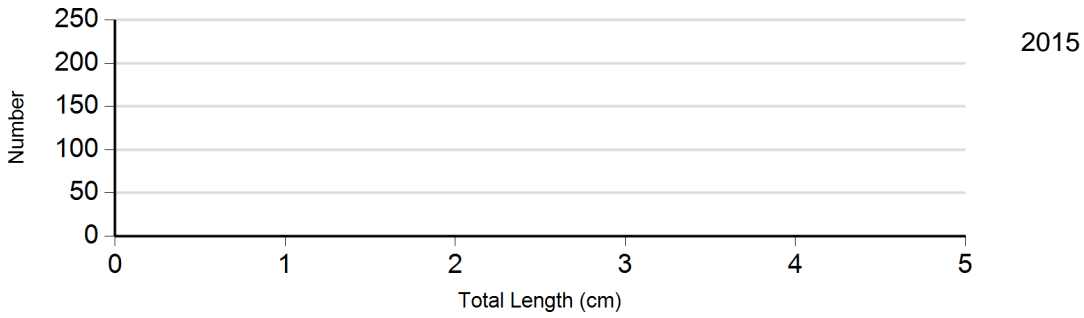


Species: Yellow Perch
Gear: AFS std gill net





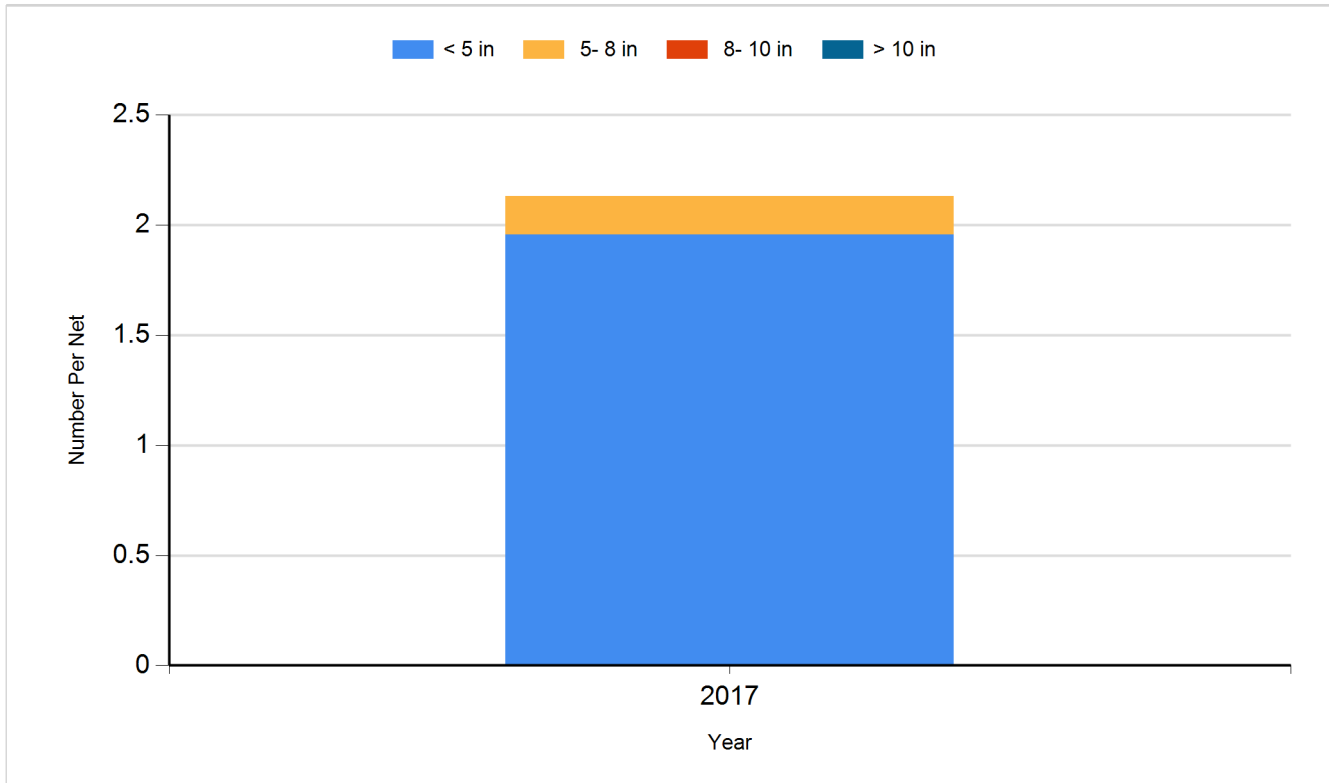
Species: Yellow Perch
 Gear: std exp gill net



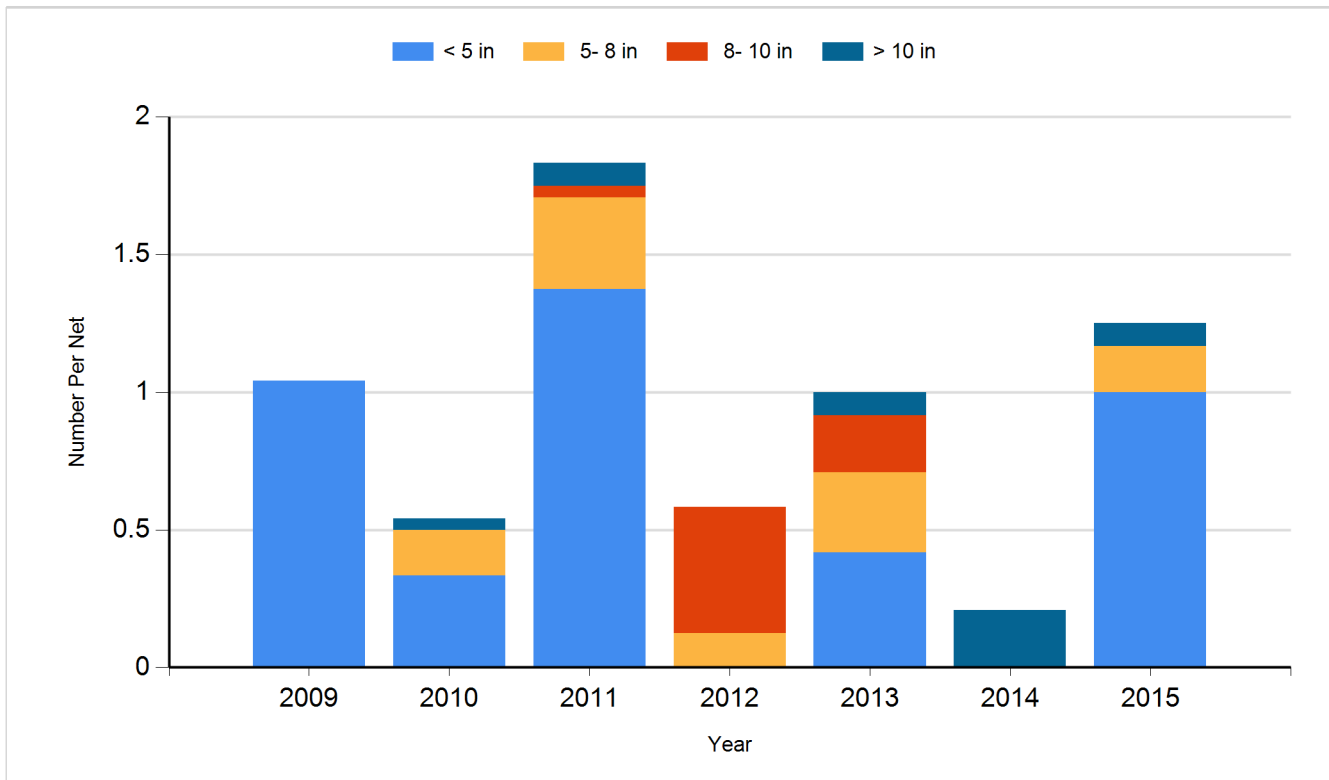
Historic Fish Sizes and Relative Abundance

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

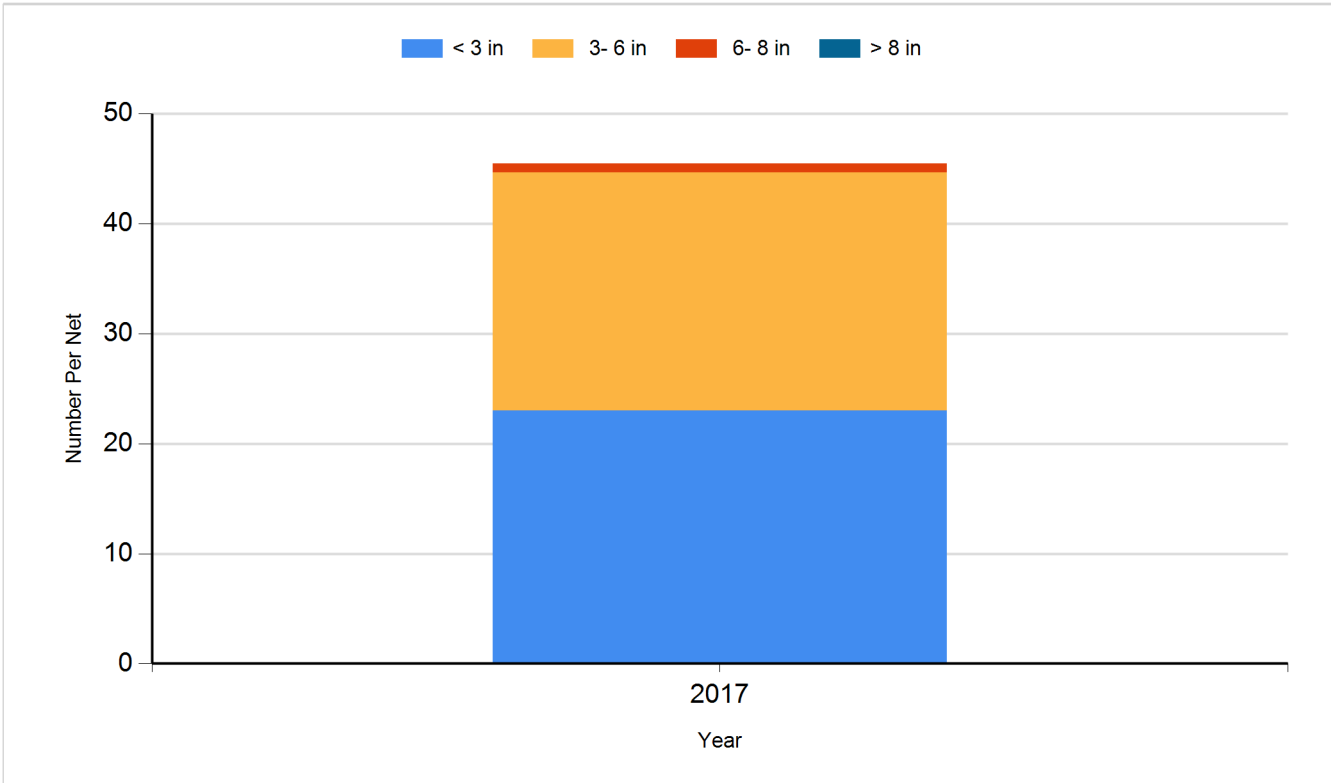
Species: Black Crappie
Gear: AFS std frame net



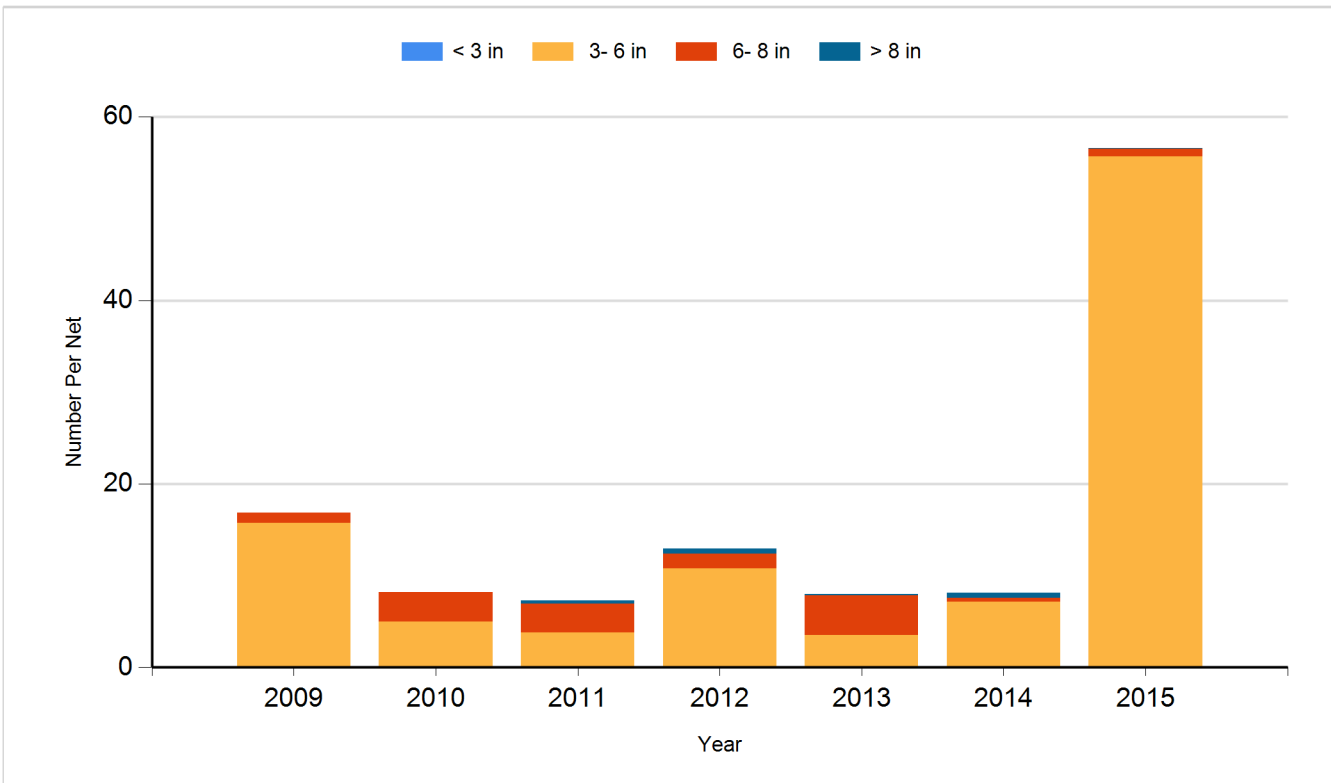
Species: Black Crappie
Gear: frame net (std 3/4 in)



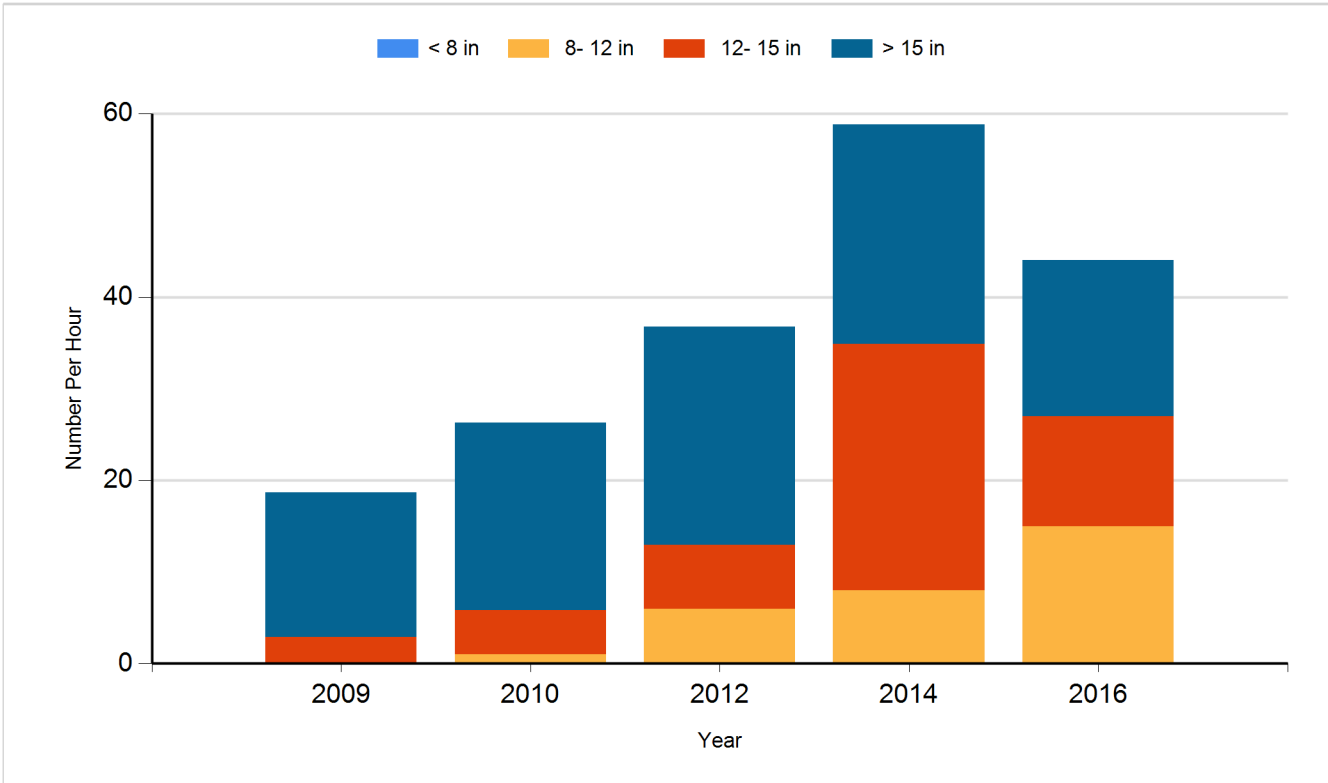
Species: Bluegill
Gear: AFS std frame net



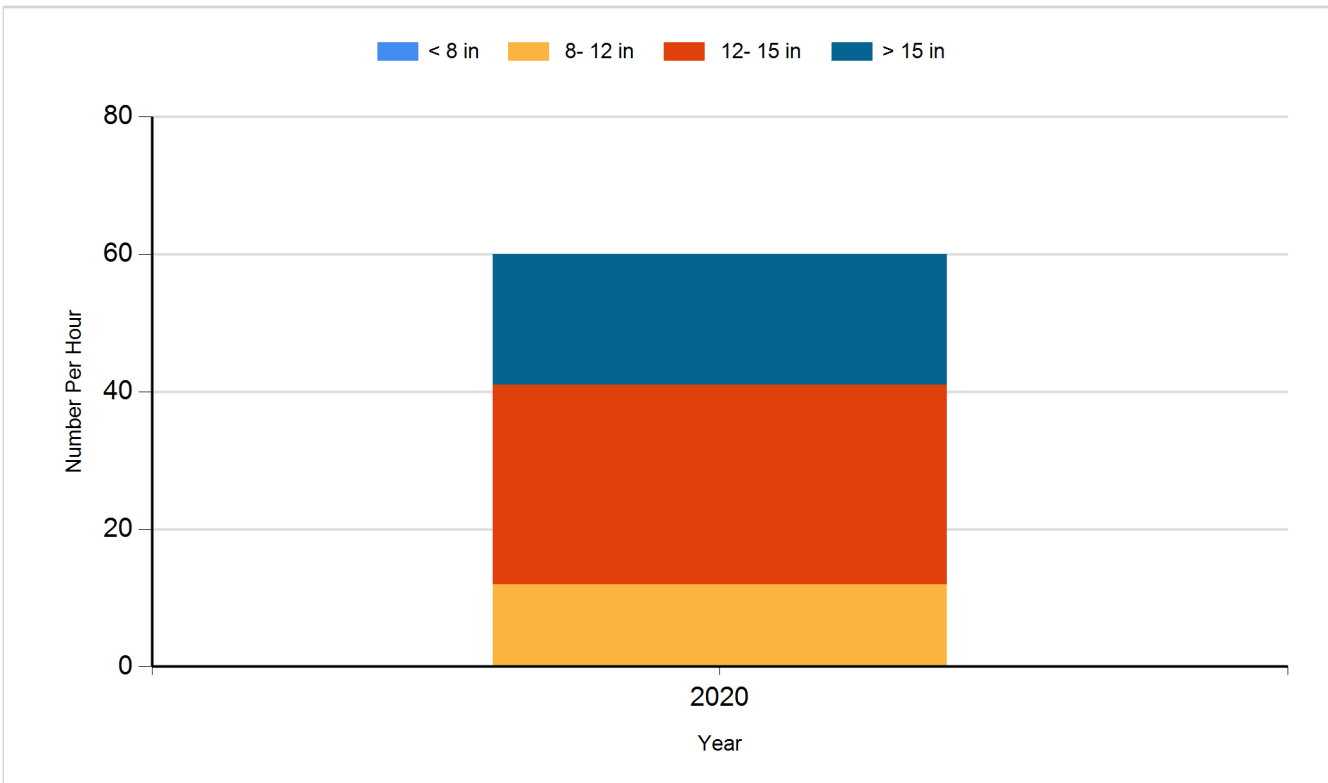
Species: Bluegill
Gear: frame net (std 3/4 in)



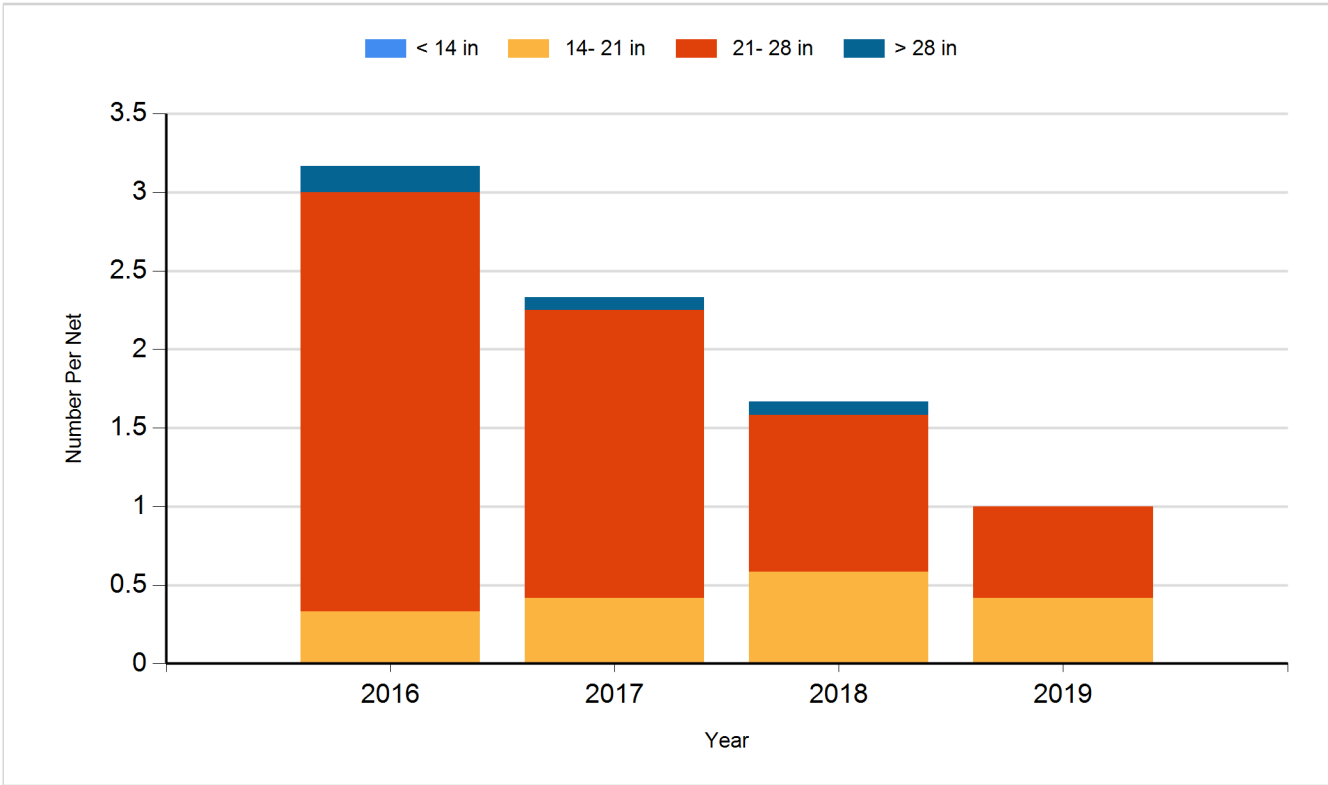
Species: Largemouth Bass
Gear: boat shocker (night, AC)



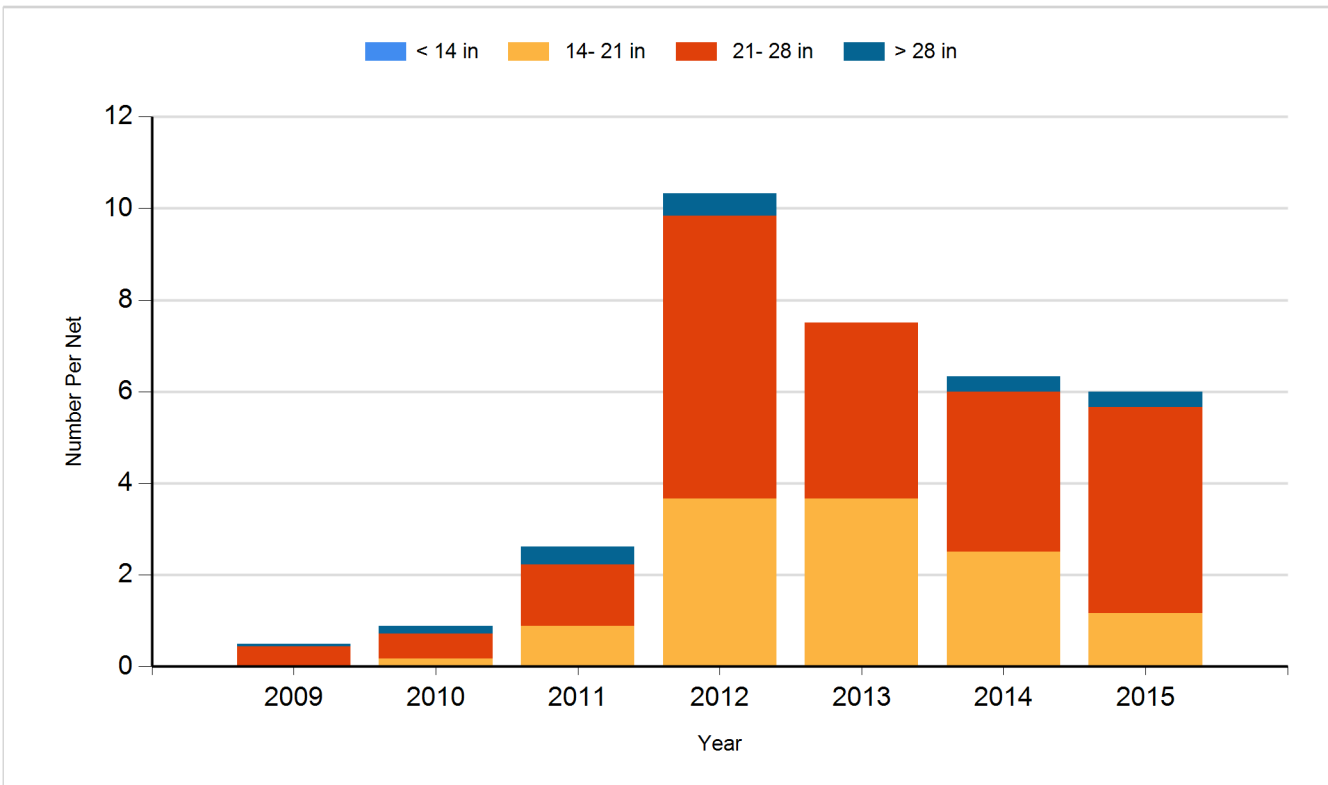
Species: Largemouth Bass
Gear: spring night EF-LMB



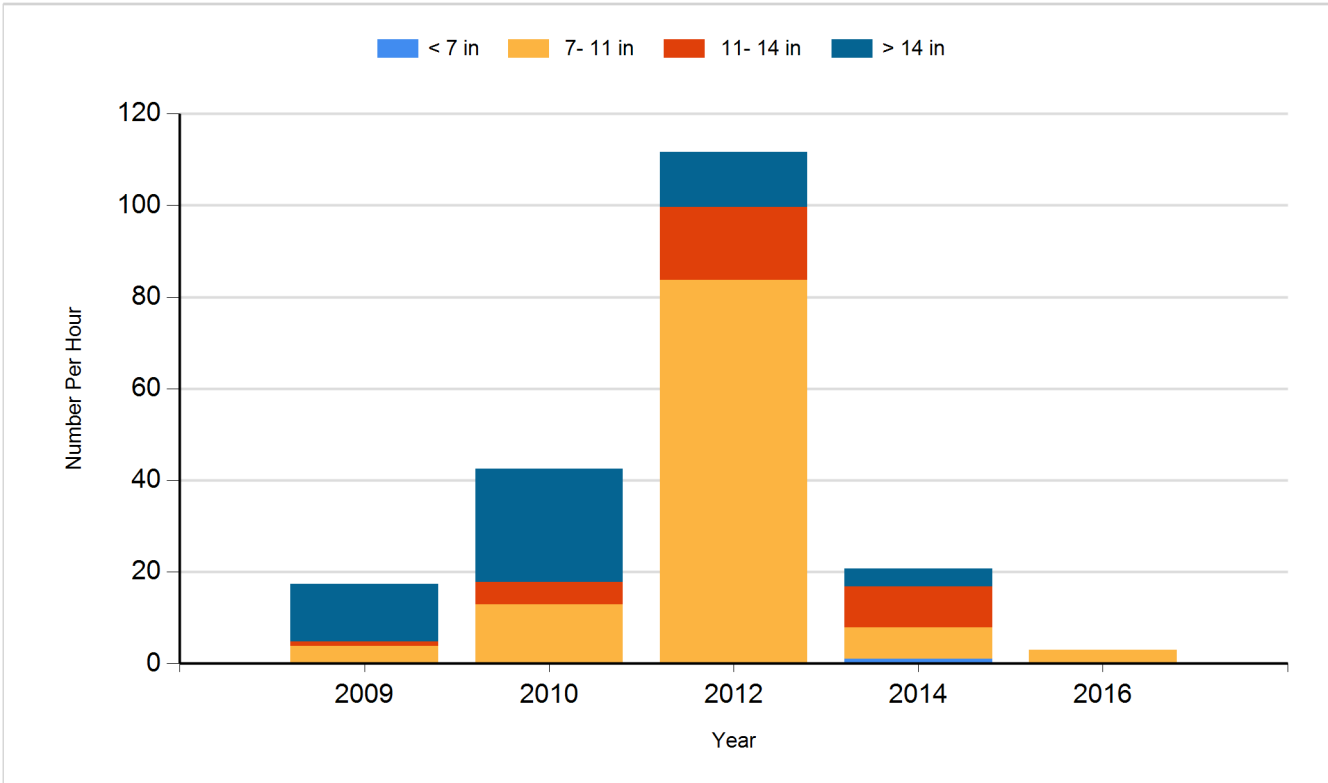
Species: Northern Pike
Gear: AFS std gill net



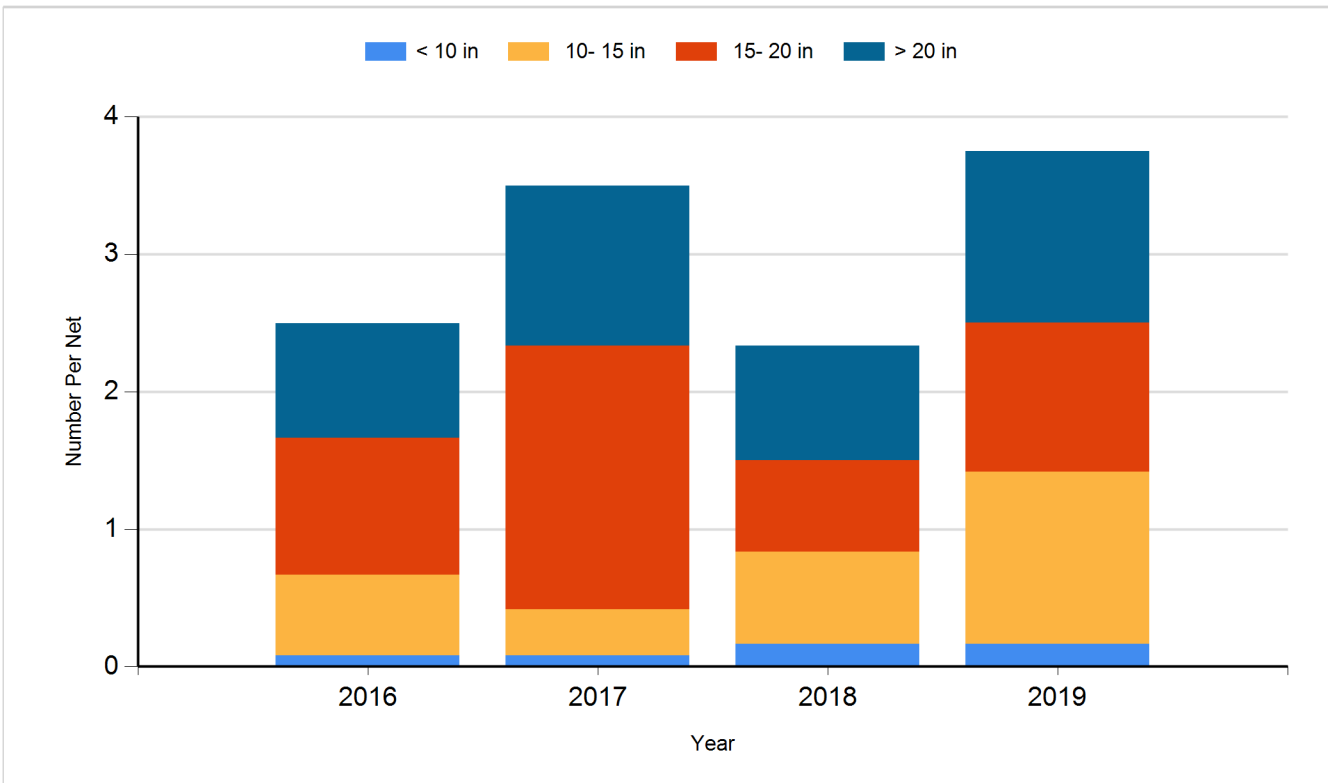
Species: Northern Pike
Gear: std exp gill net



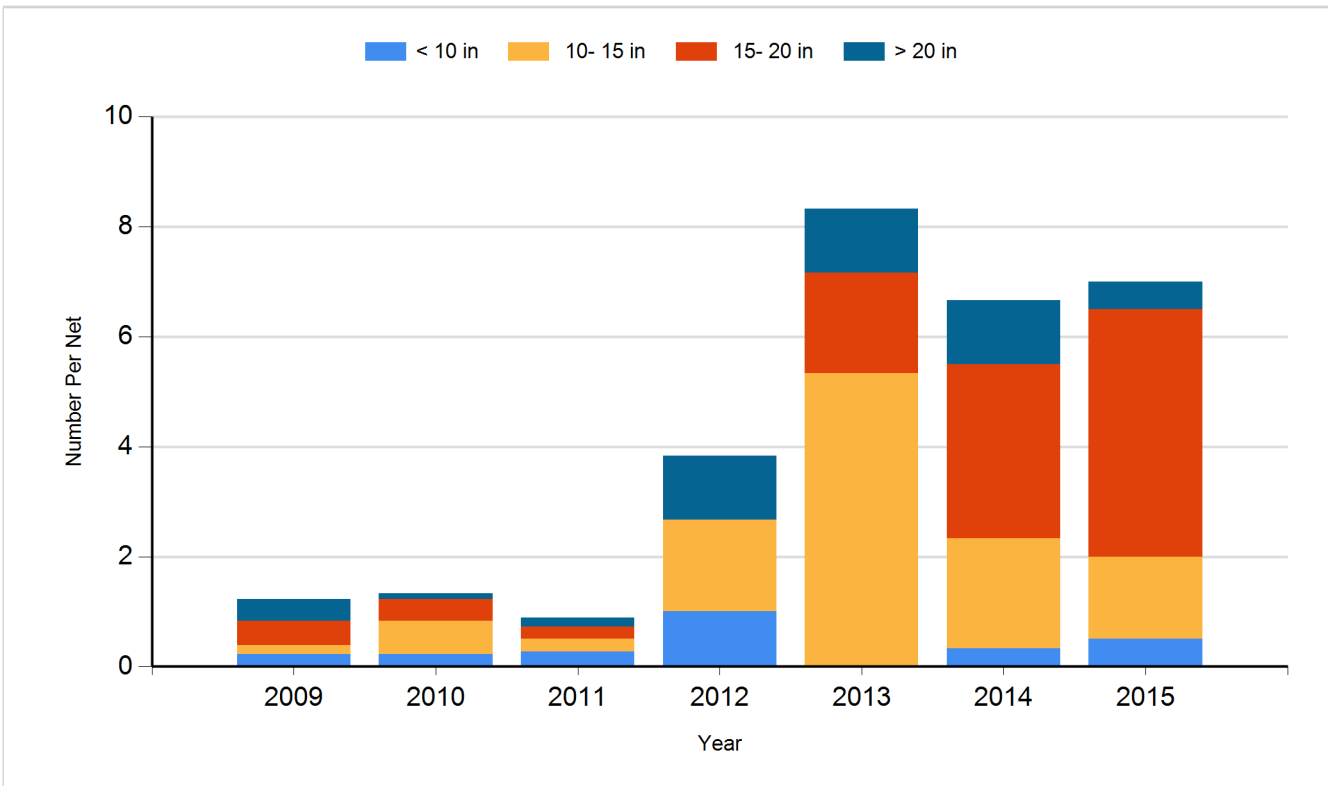
Species: Smallmouth Bass
Gear: boat shocker (night, DC)



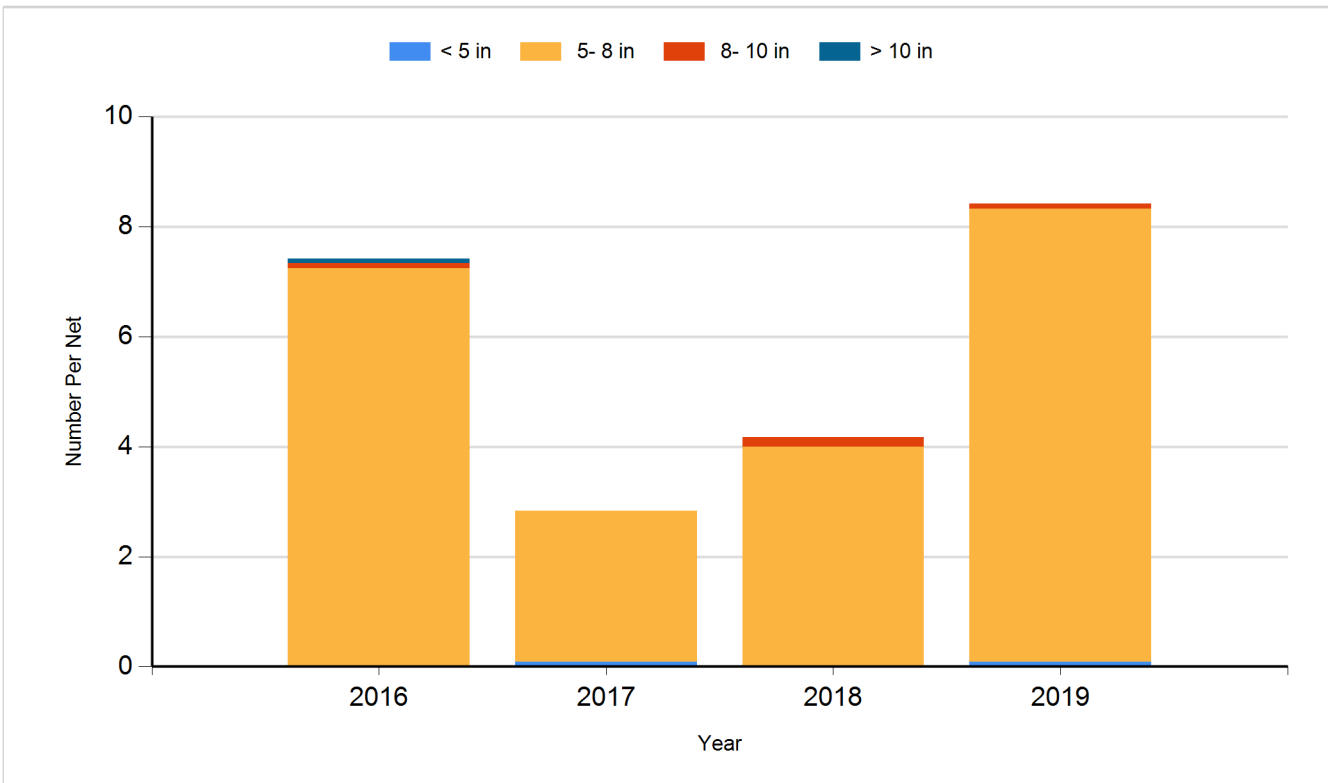
Species: Walleye
Gear: AFS std gill net



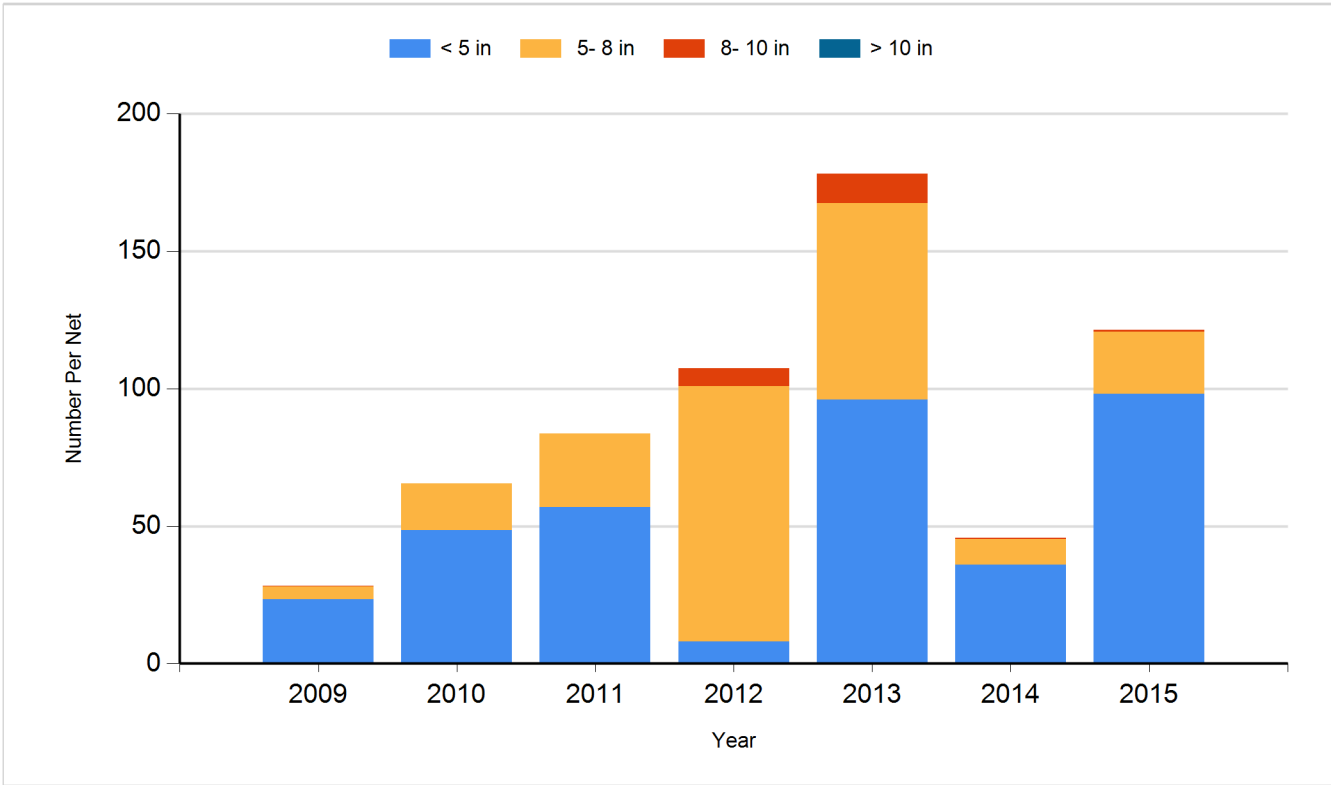
Species: Walleye
Gear: std exp gill net



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