Waubay Lake Survey Summary

Waubay Lake, located on the southeastern edge of Grenville, is managed as a walleye and yellow perch fishery but other fish species (e.g., northern pike, smallmouth bass, white bass) are present and contribute to the fishery.

- **Walleye.** Abundance has increased since a period of lower abundance between 2016-2018, with a mean gill net CPUE of 10.4 in 2023. Captured walleyes ranged in length from 7.6 to 25.9 inches; of those that were at least 10.0 inches 31% were >15.0 inches and 7% were >20.0 inches. Individuals from eight year-classes contributed to the gill net catch (2011, 2014, 2016 – 2017, 2019 – 2022). Those from the 2019 (age-4) cohort, which coincided with a fry stocking, were the most abundant accounting for 45% of walleyes in the sample. Recent recruitment is indicated by the presence of the 2022 (age-1) and 2021 (age-2) cohorts that comprised 22% and 18% of the sample, respectively. Growth has decreased among the newest cohorts which is not uncommon when strong cohorts are present. The strong 2019 year-class had a mean length at capture of 14.9 inches at age-4 compared to 16.3 inches at age-4 for the 2018 year-class.

- **White bass.** Abundance of white bass has decreased substantially since high abundance observed from 2015-2017. The mean gill net CPUE in 2023 was 3.0, white bass ranged in length from 9.6 to 16.9 inches, most (94%) were >12.0 inches indicating little recruitment.

- **Yellow perch.** Yellow perch were the most abundant species in the 2023 gill net catch. Relative abundance has increased since a period of lower abundance from 2016 – 2018, with 2023 mean gill net CPUE of 15.4. Sampled yellow perch ranged in length from 5.3 to 13.0 inches, 39% were >8.0 inches and 19% were >10.0 inches. Individuals from six year classes (2010 and 2018 – 2022) contributed to the catch. Those from the 2022 (age-1) cohort were the most abundant accounting for 46% of fish in the sample, while the 2019 (age-4) and 2021 (age-2) cohorts were well represented at 25% and 24% of the catch, respectively. Yellow perch growth appears moderate with mean length at capture of age-2 yellow perch >7.3 inches since 2014. In 2023, the mean length at capture of age-2 fish was 7.8 inches.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Waubay (Day; below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Waubay, Day County

UBS-Lake-411-000

2023

Lake Information

Name: Waubay

County: Day

Surface Area: 16,943 Acres

Maximum Depth: 31 Feet

Mean Depth: 13 Feet

OHWM Elevation: 1,787

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 15, 2023	6 net-nights
AFS std gill net	Aug 16, 2023	6 net-nights
AFS std gill net	Aug 17, 2023	4 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Walleye

Smallmouth Bass

White Bass

Rock Bass

Common Carp

White Sucker

Black Bullhead

Lake Herring

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	Black Bullhead	4	0.3	0.2	100		100		105	3
	Black Crappie	1	0.1	0.1	100		100		111	
	Common Carp	20	1.2	0.4	100		100		100	4
	Lake Herring	2	0.1	0.1	100		100		124	1
	Northern Pike	1	0.1	0.1	100		100		83	
	Rock Bass	21	1.3	0.6	65	17	15		115	2
	Smallmouth Bass	31	1.6	0.8	40	15	20	13	102	2
	Walleye	212	10.4	1.1	42	5	9	3	88	1
	White Bass	48	3.0	1.1	100		94		97	1
	White Sucker	5	0.3	0.2	100		100		108	5
	Yellow Perch	246	15.4	4.0	41	4	20	4	114	1

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std gill net	Black Bullhead			0.4	0.3	0.3	0.4	5.7	4.3	0.8	0.3	1.56
	Black Crappie			0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.1	0.10
	Bluegill			0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.0	0.11
	Common Carp			0.1	0.5	0.3	1.0	0.8	2.0	0.8	1.2	0.84
	Lake Herring			0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.09
	Northern Pike			0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.04
	Rock Bass			0.4	0.8	0.3	0.9	0.5	0.7	0.9	1.3	0.73
	Smallmouth Bass			1.3	1.3	0.9	0.6	0.3	2.6	0.9	1.6	1.19
	Walleye			6.3	4.6	5.9	7.9	8.1	10.6	9.4	10.4	7.90
	White Bass			13.2	12.9	6.9	7.3	2.4	4.4	5.3	3.0	6.93
	White Sucker			0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.09
	Yellow Perch			5.4	8.3	6.4	10.3	9.5	14.4	7.5	15.4	9.65
boat shocker (day)	Smallmouth Bass						16.0					16.00
boat shocker (night, DC)	Smallmouth Bass		8.0									8.00
fall night EF-WAE*	Walleye	15.0	1.2	1.5	7.0		10.5	9.0				7.37
frame net (std 3/4 in)	Black Bullhead	2.0										2.00
	Black Crappie	2.6										2.60
	Bluegill	0.3										0.30
	Common Carp	0.2										0.20
	Northern Pike	0.6										0.60
	Rock Bass	1.2										1.20
	Smallmouth Bass	3.5										3.50
	Walleye	2.8										2.80
	White Bass	2.5										2.50
	White Sucker	0.0										0.00
	Yellow Perch	0.0										0.00
	Black Bullhead	1.4	0.1									0.75

std exp gill net	Bluegill	0.0	0.0	0.00
	Common Carp	0.5	0.1	0.30
	Lake Herring	0.3	0.3	0.30
	Northern Pike	1.0	0.4	0.70
	Rock Bass	2.0	0.4	1.20
	Smallmouth Bass	0.3	0.0	0.15
	Walleye	19.3	14.1	16.70
	White Bass	8.1	23.9	16.00
	White Sucker	0.1	0.0	0.05
	Yellow Perch	18.5	19.5	19.00

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Walleye	PSD			28	81	52	72	80	33	20	42
		PSD-P			5	3	1	3	7	11	5	9
		Wr			86	88	89	88	87	83	84	88
	White Bass	PSD			100	99	100	89	100	100	100	100
		PSD-P			100	99	98	88	100	99	100	94
		Wr			98	92	98	95	95	95	95	97
	Yellow Perch	PSD			71	62	88	12	61	74	78	41
		PSD-P			38	37	34	9	1	18	34	20
		Wr			109	109	109	111	112	108	109	114
std exp gill net	Walleye	PSD	17	8								
		PSD-P	1	0								
		Wr	84	85								
	White Bass	PSD	100	100								
		PSD-P	100	99								
		Wr	98	97								
	Yellow Perch	PSD	87	83								
		PSD-P	41	38								
		Wr	115	117								

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+
2023	212	223 (47)	308 (39)	349 (6)	379 (96)		491 (1)	502 (10)		635 (4)	558 (8)
2022	163	225 (13)	295 (3)	343 (121)	414 (6)	397 (5)	477 (10)		576 (1)	645 (2)	575 (2)
2021	170	211 (1)	307 (112)	402 (7)	424 (8)	469 (22)		583 (6)	480 (2)	585 (2)	580 (10)
2020	187	225 (72)	354 (17)	388 (9)	427 (41)	445 (2)	458 (8)	475 (2)	482 (4)	484 (27)	467 (4)
2019	130	253 (10)	341 (13)	395 (72)		460 (6)	466 (1)	553 (1)	467 (24)		548 (3)
2018	96	264 (7)	327 (37)	430 (7)	402 (8)	444 (2)	472 (3)	434 (33)			
2017	92	223 (21)	354 (1)	394 (4)	479 (2)		410 (58)		410 (2)	445 (1)	668 (2)
2016	100		320 (6)	396 (1)	396 (1)	365 (83)	334 (1)	485 (4)			691 (3)
2015	117	215 (4)	280 (1)		332 (104)		387 (4)				417 (4)
2014	157	228 (3)		304 (120)		386 (21)	399 (3)			435 (9)	

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	246	146 (114)	199 (60)	260 (4)	259 (61)	291 (7)					330 (1)
2022	121	145 (23)	202 (7)	241 (68)	263 (22)	283 (1)					
2021	231	147 (11)	205 (141)	244 (78)							316 (1)
2020	142	146 (37)	211 (104)		280 (1)						
2019	165	146 (145)		247 (9)	282 (6)	274 (1)	306 (2)	311 (1)			327 (1)
2018	102		211 (46)	242 (29)	257 (7)	281 (3)		296 (10)	274 (4)	295 (1)	
2017	133	152 (39)	207 (31)	247 (21)	269 (7)	273 (4)	279 (18)	300 (4)	286 (7)		

2016	87	153 (22)	205 (7)	238 (18)	258 (16)	267 (21)	242 (4)		
2015	159	136 (17)	190 (14)	237 (38)	248 (56)	261 (14)	267 (19)	312 (1)	
2014	152	138 (9)	186 (12)	233 (62)	261 (33)	251 (31)	299 (3)	343 (1)	303 (1)

Fish Condition

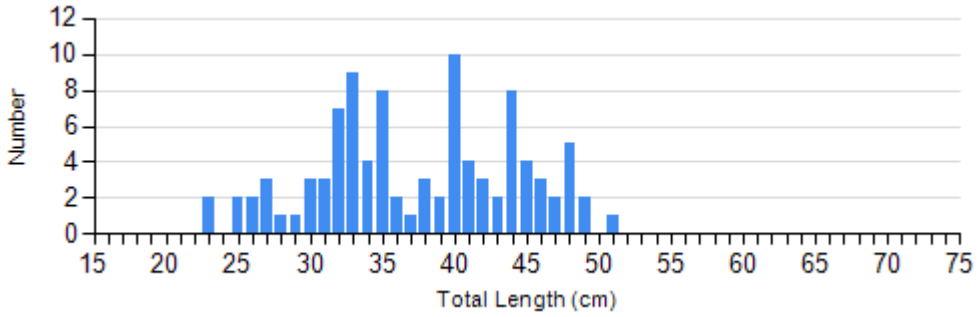
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2019	36	88 (0.7)	87	87 (0.5)	3	86 (1.5)	1	90
	2020	24	85 (1.0)	89	87 (0.5)	9	87 (2.8)	0	
	2021	114	82 (0.5)	37	83 (0.8)	15	85 (1.7)	3	86 (3.3)
	2022	121	85 (0.6)	22	82 (1.2)	6	80 (1.6)	2	73 (5.1)
	2023	97	89 (0.5)	55	87 (0.8)	11	89 (1.5)	4	82 (5.0)
White Bass Gill Net	2019	13	100 (1.3)	1	105	41	96 (0.5)	61	94 (0.6)
	2020	0		0		11	96 (2.5)	25	94 (1.0)
	2021	0		1	94	39	96 (0.6)	31	94 (0.9)
	2022	0		0		27	98 (0.8)	57	94 (0.7)
	2023	0		3	100 (1.0)	19	98 (1.5)	26	97 (1.1)
Yellow Perch Gill Net	2019	145	112 (0.7)	5	115 (3.8)	10	116 (3.1)	5	97 (3.9)
	2020	56	115 (1.7)	85	110 (1.0)	1		0	
	2021	61	113 (1.3)	128	107 (0.8)	41	105 (0.9)	1	106
	2022	26	108 (2.0)	53	111 (1.3)	41	106 (1.3)	0	
	2023	145	115 (1.0)	51	115 (1.6)	47	112 (1.2)	3	108 (5.1)

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



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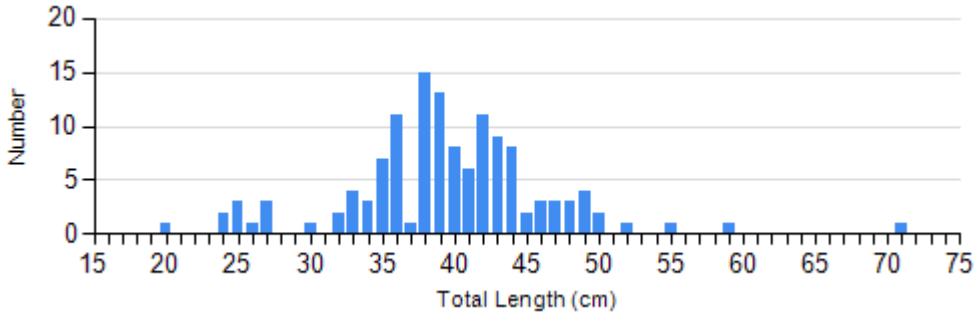

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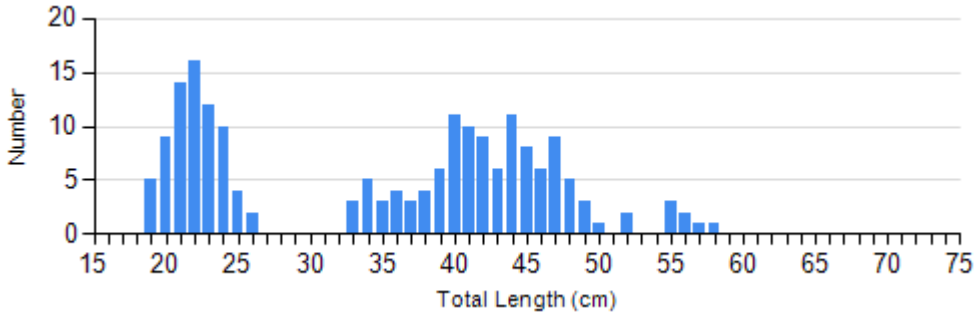

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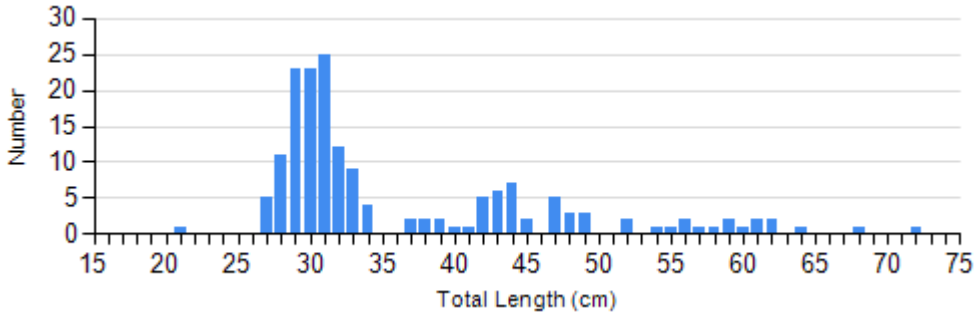

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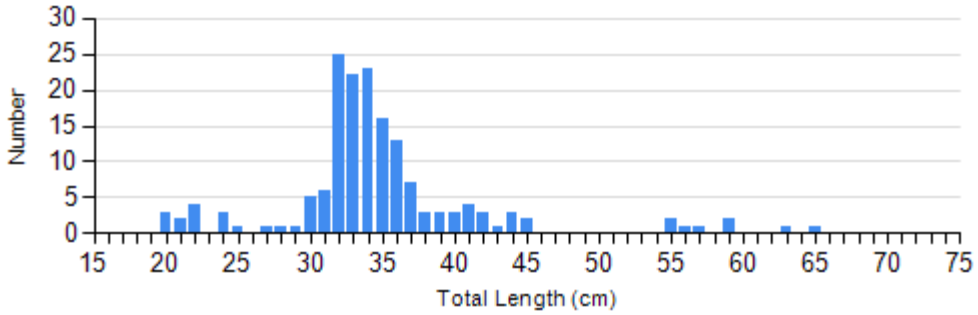

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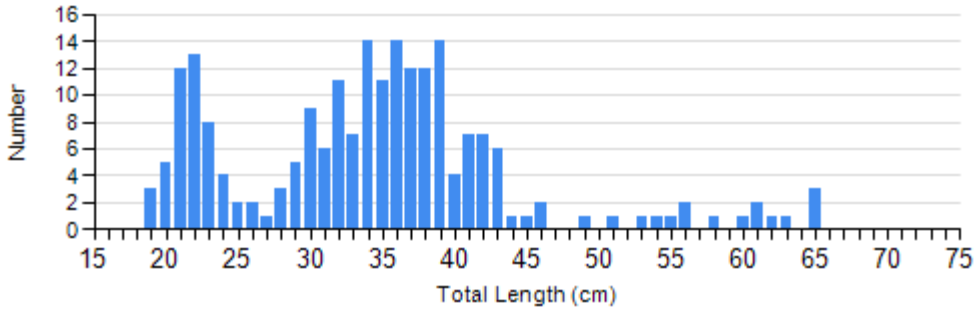

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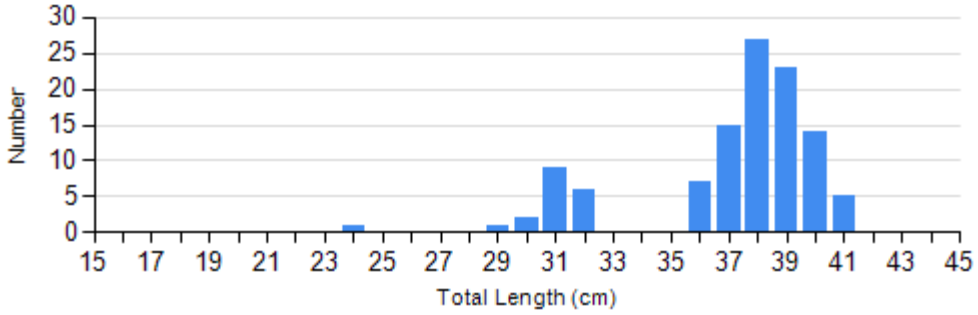
Species: White Bass
Gear: AFS std gill net



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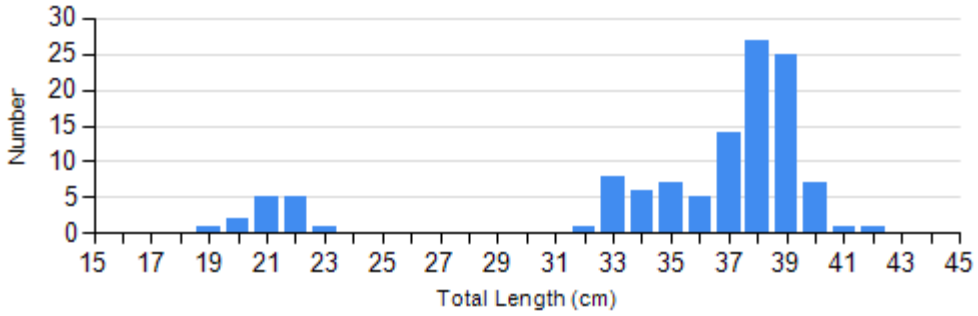

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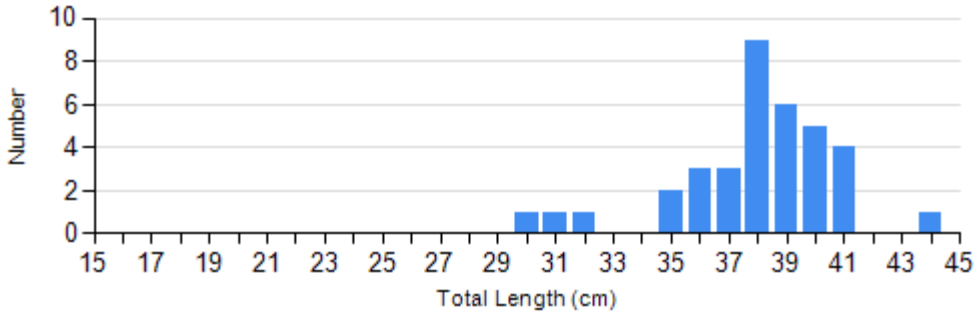

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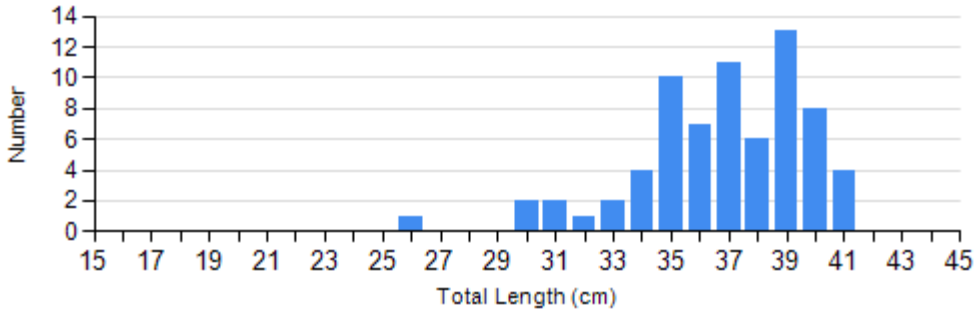

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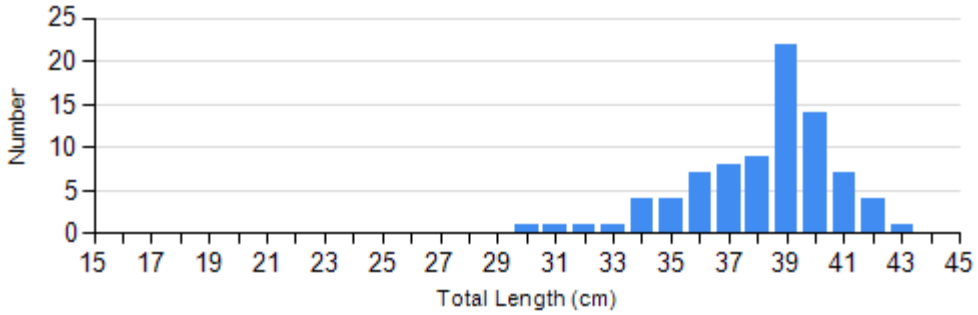

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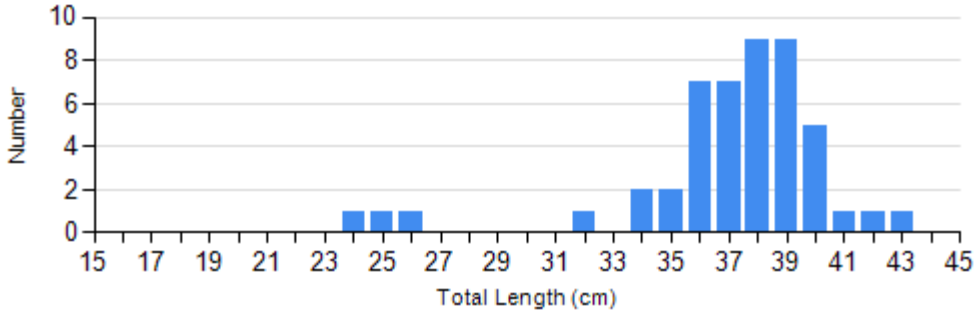
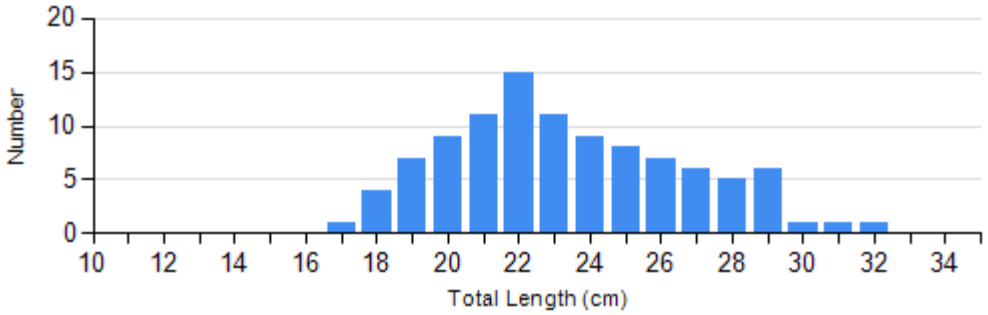


2023

Species: Yellow Perch
Gear: AFS std gill net



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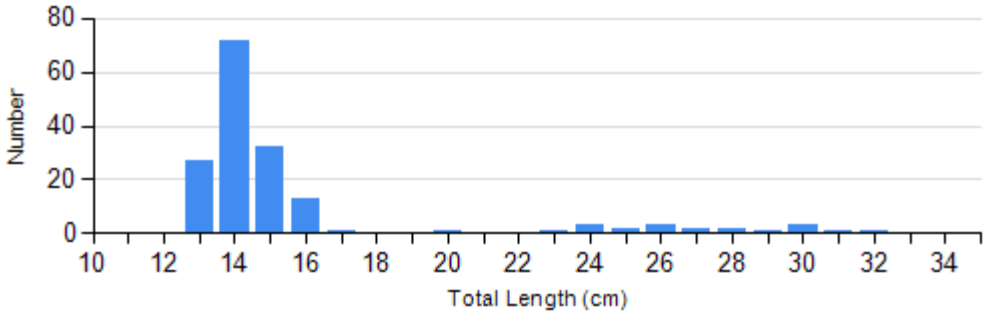

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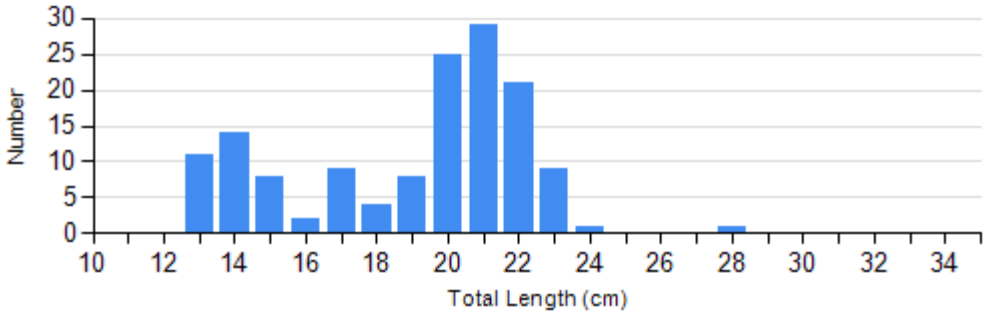

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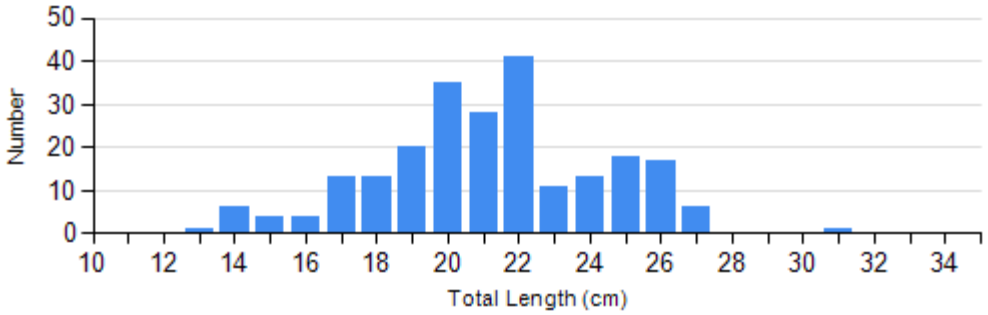

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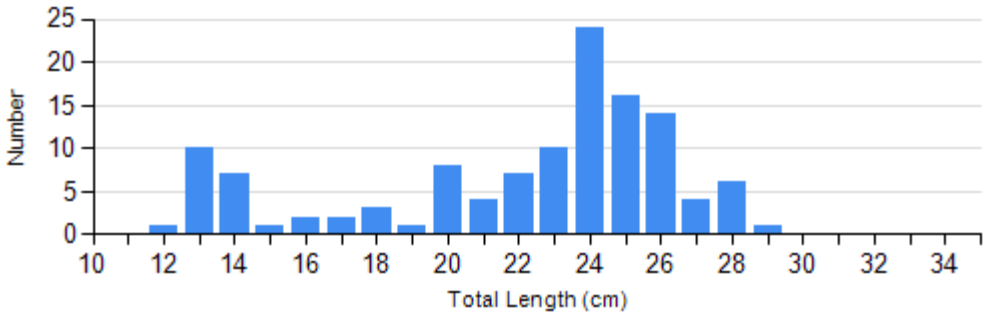
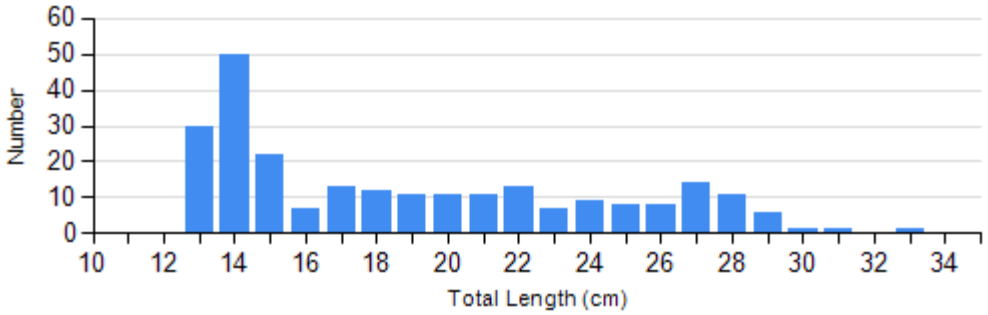


2022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50
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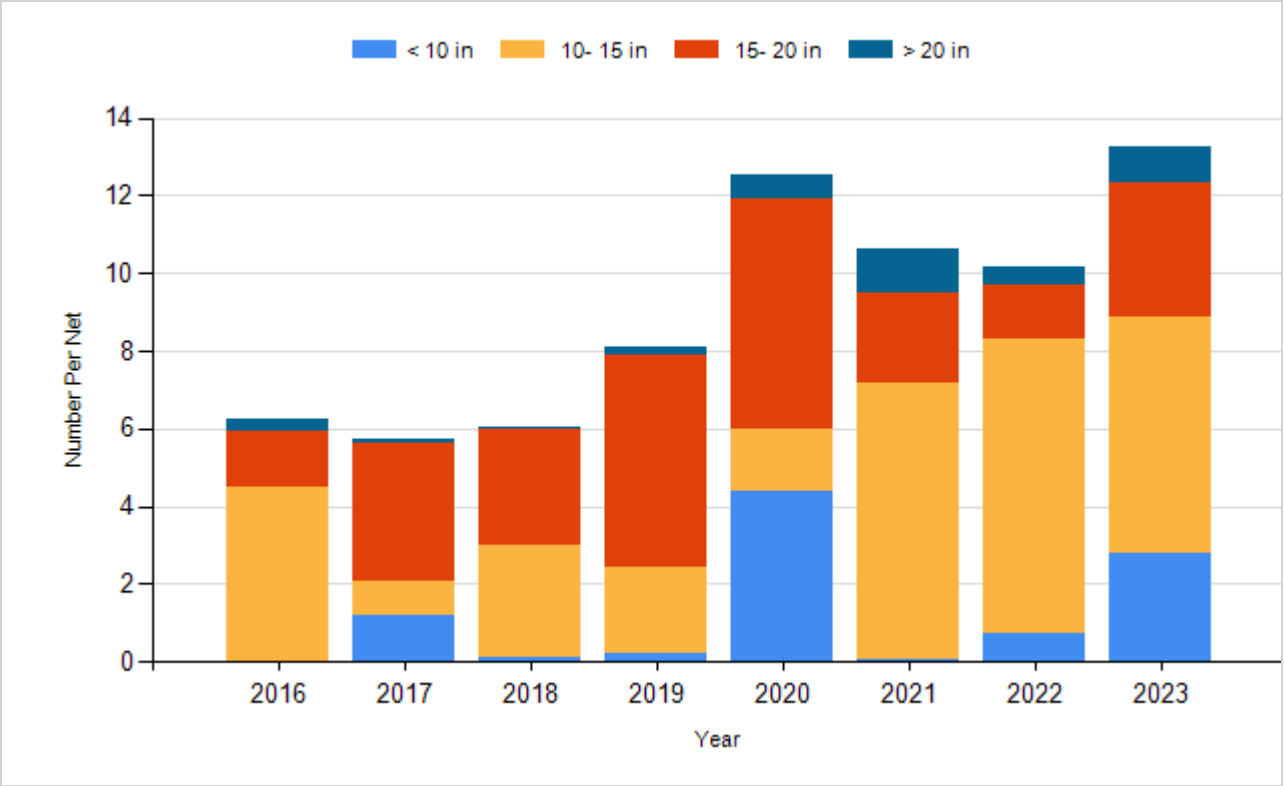
30
20
10
0
Number
10
12
14
16
18
20
22
24
26
28
30
32
34
Total Length (cm)

2023

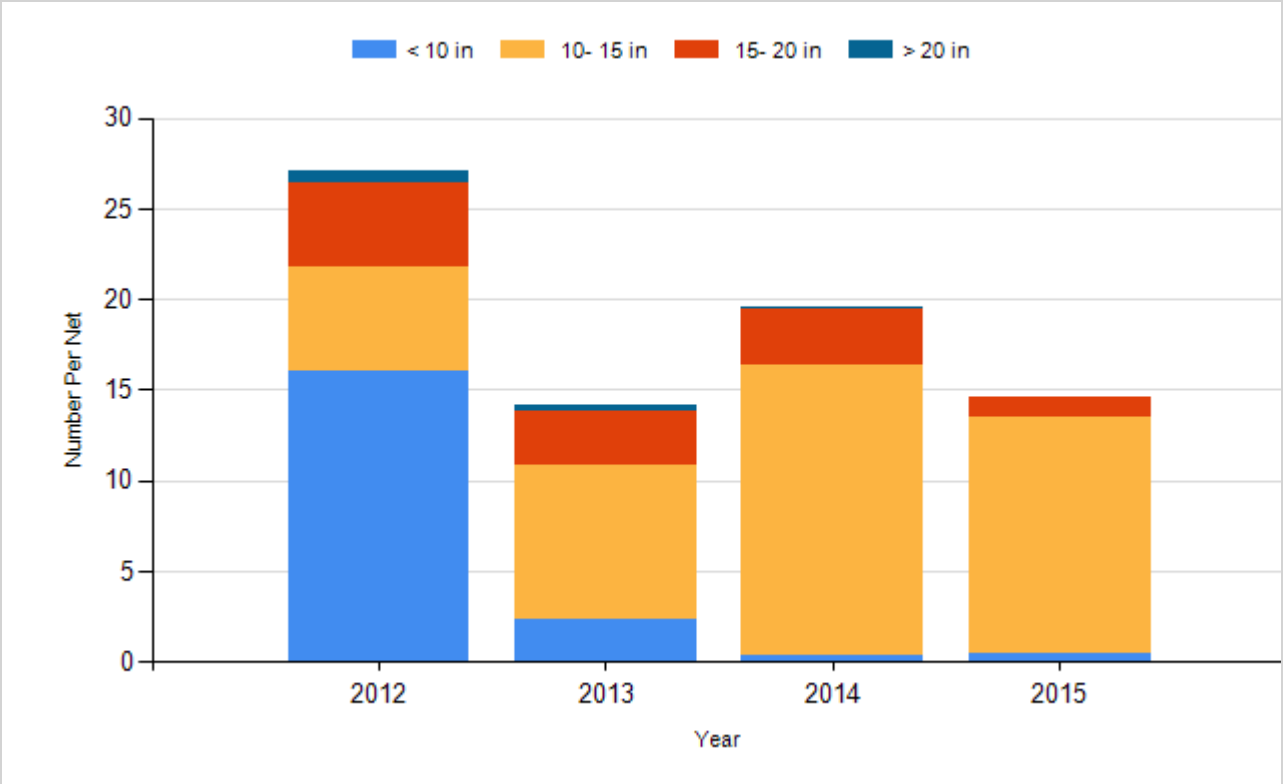
Historic Fish Sizes and Relative Abundance

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

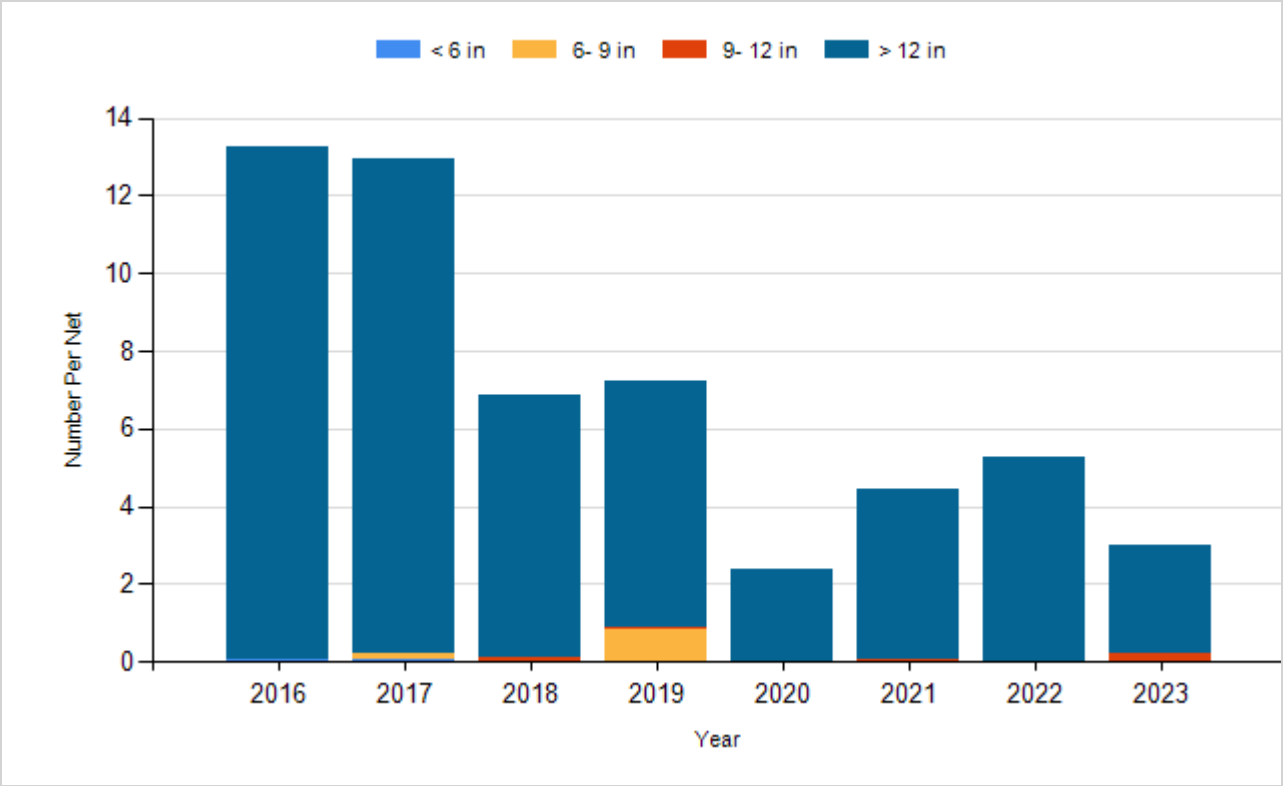
Species: Walleye
Gear: AFS std gill net



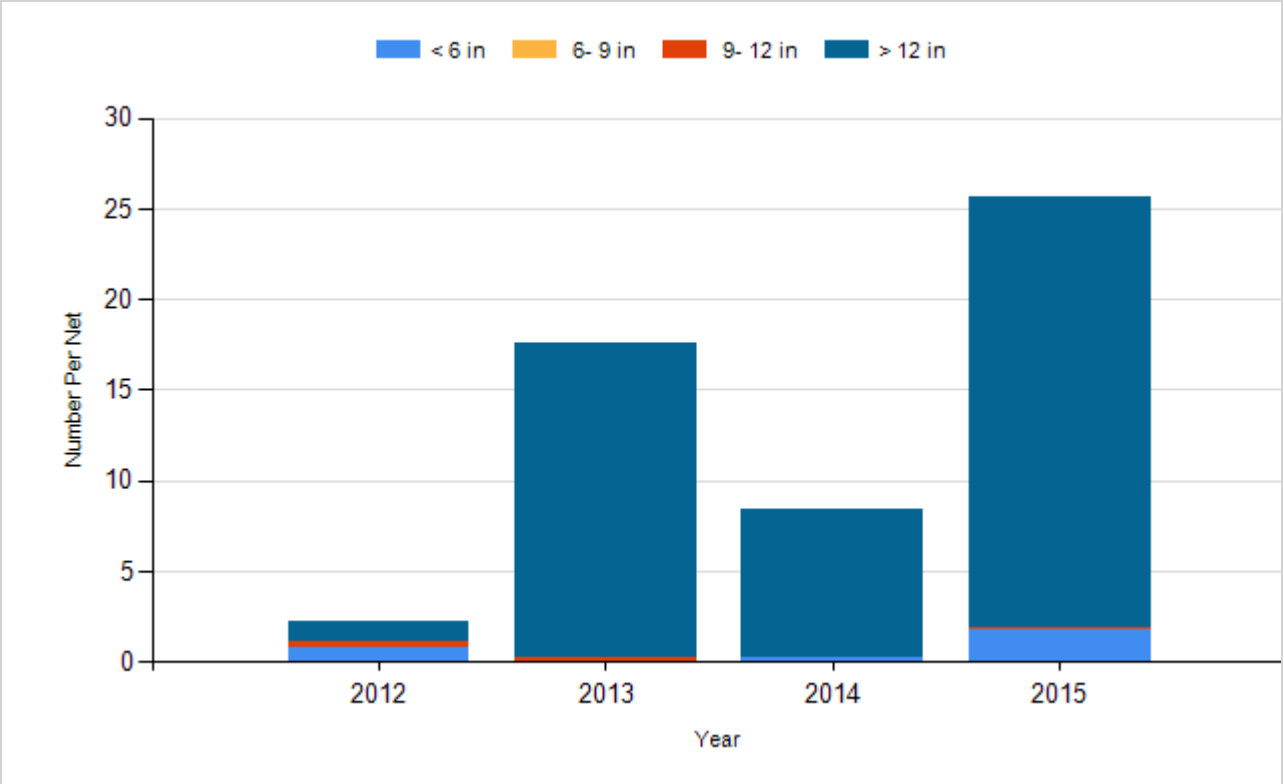
Species: Walleye
Gear: std exp gill net



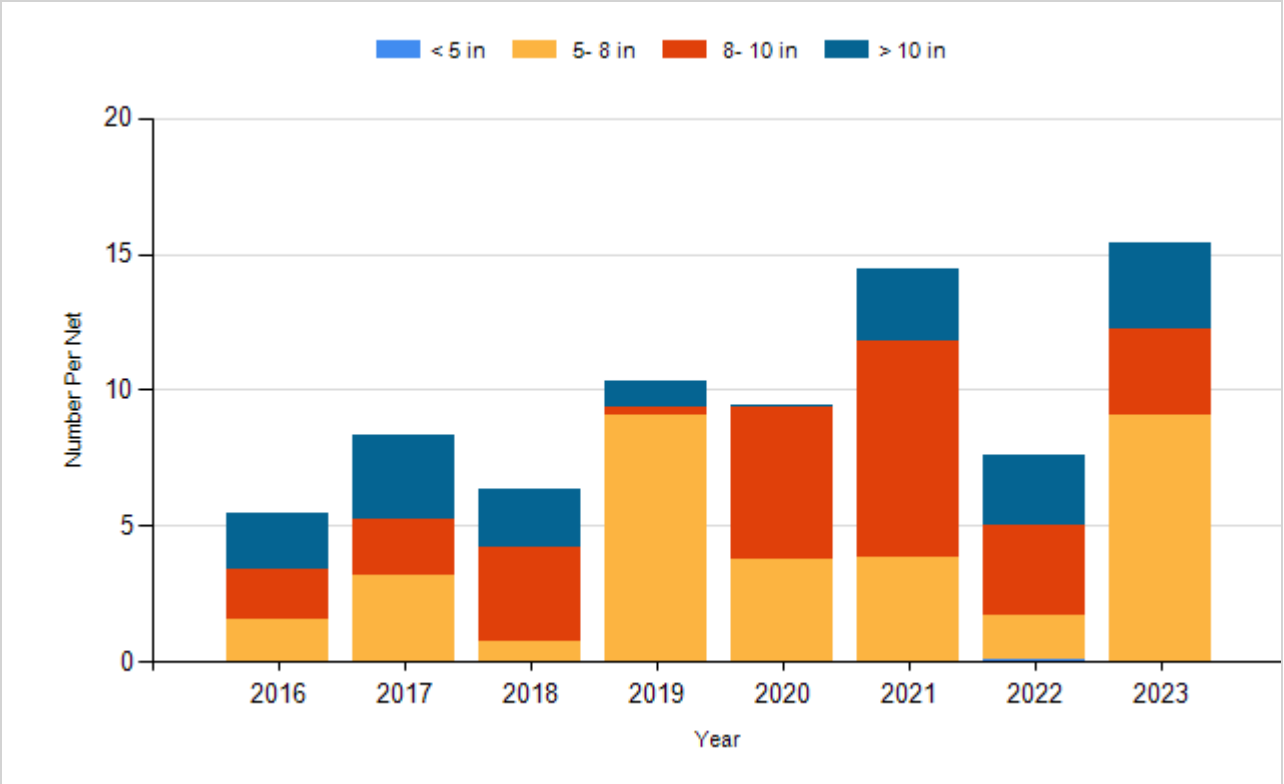
Species: White Bass
Gear: AFS std gill net



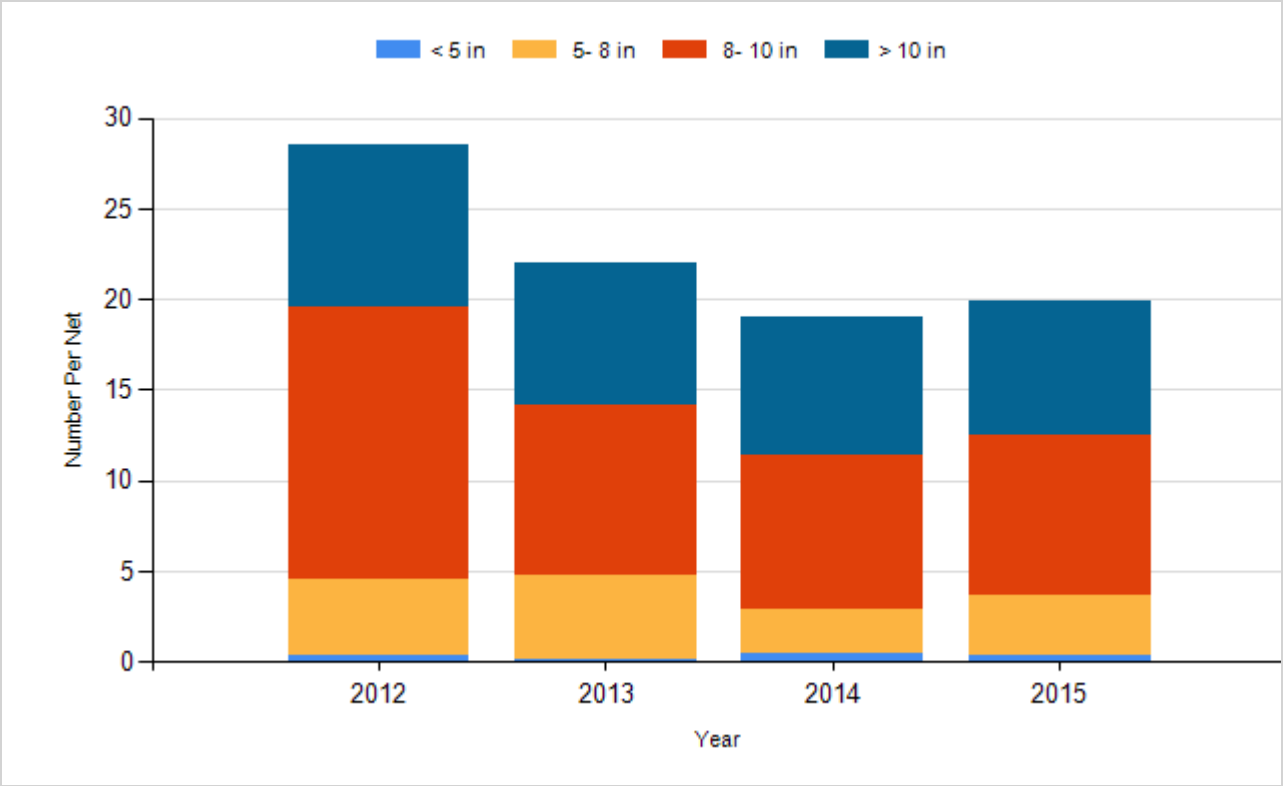
Species: White Bass
Gear: std exp gill net



Species: 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
2012	Walleye	Fry	8,000,000
2014	Walleye	Fry	8,500,000
2016	Walleye	Fry	8,500,000
2017	Walleye	Fry	8,000,000
2019	Walleye	Fry	4,000,000
2021	Walleye		5,000,000
2021	Walleye	Fry	7,500,000
2021	Walleye	Juvenile	214,580
2023	Walleye	Fry	8,000,000

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Waubay, Day County
UBS-Lake-411-000
2023

Lake Information

Name: Waubay

County: Day

Surface Area: 16,943 Acres

Maximum Depth: 31 Feet

Mean Depth: 13 Feet

OHWM Elevation: 1,787

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 15, 2023	6 net-nights
AFS std gill net	Aug 16, 2023	6 net-nights
AFS std gill net	Aug 17, 2023	4 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Walleye

Smallmouth Bass

White Bass

Rock Bass

Common Carp

White Sucker

Black Bullhead

Lake Herring

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	Black Bullhead	4	0.3	0.2	100		100		105	3
	Black Crappie	1	0.1	0.1	100		100		111	
	Common Carp	20	1.2	0.4	100		100		100	4
	Lake Herring	2	0.1	0.1	100		100		124	1
	Northern Pike	1	0.1	0.1	100		100		83	
	Rock Bass	21	1.3	0.6	65	17	15		115	2
	Smallmouth Bass	31	1.6	0.8	40	15	20	13	102	2
	Walleye	212	10.4	1.1	42	5	9	3	88	1
	White Bass	48	3.0	1.1	100		94		97	1
	White Sucker	5	0.3	0.2	100		100		108	5
	Yellow Perch	246	15.4	4.0	41	4	20	4	114	1

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std gill net	Black Bullhead			0.4	0.3	0.3	0.4	5.7	4.3	0.8	0.3	1.56
	Black Crappie			0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.1	0.10
	Bluegill			0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.0	0.11
	Common Carp			0.1	0.5	0.3	1.0	0.8	2.0	0.8	1.2	0.84
	Lake Herring			0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.09
	Northern Pike			0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.04
	Rock Bass			0.4	0.8	0.3	0.9	0.5	0.7	0.9	1.3	0.73
	Smallmouth Bass			1.3	1.3	0.9	0.6	0.3	2.6	0.9	1.6	1.19
	Walleye			6.3	4.6	5.9	7.9	8.1	10.6	9.4	10.4	7.90
	White Bass			13.2	12.9	6.9	7.3	2.4	4.4	5.3	3.0	6.93
	White Sucker			0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.09
	Yellow Perch			5.4	8.3	6.4	10.3	9.5	14.4	7.5	15.4	9.65
boat shocker (day)	Smallmouth Bass						16.0					16.00
boat shocker (night)	Walleye*	15.0	1.2	1.5	7.0							6.18
boat shocker (night, DC)	Smallmouth Bass		8.0									8.00
fall night EF-WAE*	Walleye						10.5	9.0				9.75
frame net (std 3/4 in)	Black Bullhead	2.0										2.00
	Black Crappie	2.6										2.60
	Bluegill	0.3										0.30
	Common Carp	0.2										0.20
	Northern Pike	0.6										0.60
	Rock Bass	1.2										1.20
	Smallmouth Bass	3.5										3.50
	Walleye	2.8										2.80
	White Bass	2.5										2.50
	White Sucker	0.0										0.00
	Yellow Perch	0.0										0.00
std exp gill net	Black Bullhead	1.4	0.1									0.75
	Bluegill	0.0	0.0									0.00
	Common Carp	0.5	0.1									0.30
	Lake Herring	0.3	0.3									0.30
	Northern Pike	1.0	0.4									0.70

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
std exp gill net	Rock Bass	2.0	0.4									1.20
	Smallmouth Bass	0.3	0.0									0.15
	Walleye	19.3	14.1									16.70
	White Bass	8.1	23.9									16.00
	White Sucker	0.1	0.0									0.05
	Yellow Perch	18.5	19.5									19.00

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Black Bullhead	PSD			100	100	100	83	29	99	100	100
		PSD-P			100	100	25	50	5	9	77	100
		Wr			94	90	104	95	106	102	115	105
	Common Carp	PSD			100	63	100	81	25	94	100	100
		PSD-P			100	63	100	75	25	22	100	100
		Wr			103	100	102	98	109	99	98	100
	Lake Herring	PSD			100	100	100		100			100
		PSD-P			100	100	100		50			100
		Wr			121	134	127		122			124
	Northern Pike	PSD			100	100						100
		PSD-P			100	0						100
		Wr			91	83						83
	Rock Bass	PSD			100	100	50	71	29	73	87	65
		PSD-P			0	31	0	7	0	18	7	15
		Wr			109	109	112	111	114	107	106	115
	Smallmouth Bass	PSD			50	86	40	50	75	64	60	40
		PSD-P			20	48	40	30	75	45	40	20
		Wr			100	91	101	99	95	99	98	102
	Walleye	PSD			28	81	52	72	80	33	20	42
		PSD-P			5	3	1	3	7	11	5	9
		Wr			86	88	89	88	87	83	84	88
	White Bass	PSD			100	99	100	89	100	100	100	100
		PSD-P			100	99	98	88	100	99	100	94
		Wr			98	92	98	95	95	95	95	97
	White Sucker	PSD				100				100	100	100
		PSD-P				100				100	100	100
		Wr				97				102	104	108
	Yellow Perch	PSD			71	62	88	12	61	74	78	41
		PSD-P			38	37	34	9	1	18	34	20
		Wr			109	109	109	111	112	108	109	114
boat shocker (day)	Smallmouth Bass	PSD						63				
		PSD-P						25				

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
boat shocker (day)	Smallmouth Bass	Wr						96				
boat shocker (night)	Walleye	PSD	0	0	0	0						
		PSD-P	0	0	0	0						
		Wr	96	83	93	96						
boat shocker (night, DC)	Smallmouth Bass	PSD		88								
		PSD-P		38								
		Wr		85								
frame net (std 3/4 in)	Black Bullhead	PSD	100									
		PSD-P	94									
		Wr	90									
	Common Carp	PSD	100									
		PSD-P	100									
		Wr	99									
	Northern Pike	PSD	89									
		PSD-P	50									
		Wr	80									
	Rock Bass	PSD	76									
		PSD-P	5									
		Wr	105									
	Smallmouth Bass	PSD	56									
		PSD-P	25									
		Wr	93									
	Walleye	PSD	11									
		PSD-P	1									
		Wr	80									
	White Bass	PSD	100									
		PSD-P	100									
		Wr	90									
	White Sucker	PSD	100									
		PSD-P	100									
		Wr	94									
std exp gill net	Black Bullhead	PSD	100	100								
		PSD-P	82	0								
		Wr	108	127								
	Common Carp	PSD	100	100								

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
std exp gill net	Common Carp	PSD-P	100	100								
		Wr	92	119								
	Lake Herring	PSD	100	100								
		PSD-P	100	50								
		Wr	115	122								
	Northern Pike	PSD	100	100								
		PSD-P	63	100								
		Wr	86	77								
	Rock Bass	PSD	94	100								
		PSD-P	0	0								
		Wr	107	111								
	Smallmouth Bass	PSD	50									
		PSD-P	0									
		Wr	92									
	Walleye	PSD	17	8								
		PSD-P	1	0								
		Wr	84	85								
	White Bass	PSD	100	100								
		PSD-P	100	99								
		Wr	98	97								
	White Sucker	PSD	100									
		PSD-P	100									
		Wr	98									
	Yellow Perch	PSD	87	83								
		PSD-P	41	38								
		Wr	115	117								

Length at Capture

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

Species: Smallmouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	12		206 (2)	270 (4)	288 (4)	318 (2)					
2015	8			260 (1)	294 (1)	331 (5)		414 (1)			

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	212	223 (47)	308 (39)	349 (6)	379 (96)		491 (1)	502 (10)		635 (4)	558 (8)
2022	163	225 (13)	295 (3)	343 (121)	414 (6)	397 (5)	477 (10)		576 (1)	645 (2)	575 (2)
2021	170	211 (1)	307 (112)	402 (7)	424 (8)	469 (22)		583 (6)	480 (2)	585 (2)	580 (10)
2020	187	225 (72)	354 (17)	388 (9)	427 (41)	445 (2)	458 (8)	475 (2)	482 (4)	484 (27)	467 (4)
2019	130	253 (10)	341 (13)	395 (72)		460 (6)	466 (1)	553 (1)	467 (24)		548 (3)
2018	96	264 (7)	327 (37)	430 (7)	402 (8)	444 (2)	472 (3)	434 (33)			
2017	92	223 (21)	354 (1)	394 (4)	479 (2)		410 (58)		410 (2)	445 (1)	668 (2)
2016	100		320 (6)	396 (1)	396 (1)	365 (83)	334 (1)	485 (4)			691 (3)
2015	117	215 (4)	280 (1)		332 (104)		387 (4)				417 (4)
2014	157	228 (3)		304 (120)		386 (21)	399 (3)			435 (9)	

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	246	146 (114)	199 (60)	260 (4)	259 (61)	291 (7)					330 (1)
2022	121	145 (23)	202 (7)	241 (68)	263 (22)	283 (1)					
2021	231	147 (11)	205 (141)	244 (78)							316 (1)
2020	142	146 (37)	211 (104)		280 (1)						
2019	165	146 (145)		247 (9)	282 (6)	274 (1)	306 (2)	311 (1)			327 (1)
2018	102		211 (46)	242 (29)	257 (7)	281 (3)		296 (10)	274 (4)	295 (1)	
2017	133	152 (39)	207 (31)	247 (21)	269 (7)	273 (4)	279 (18)	300 (4)	286 (7)		

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	87	153 (22)	205 (7)	238 (18)	258 (16)	267 (21)	242 (4)				
2015	159	136 (17)	190 (14)	237 (38)	248 (56)	261 (14)	267 (19)	312 (1)			
2014	152	138 (9)	186 (12)	233 (62)	261 (33)	251 (31)	299 (3)	343 (1)	303 (1)		

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).

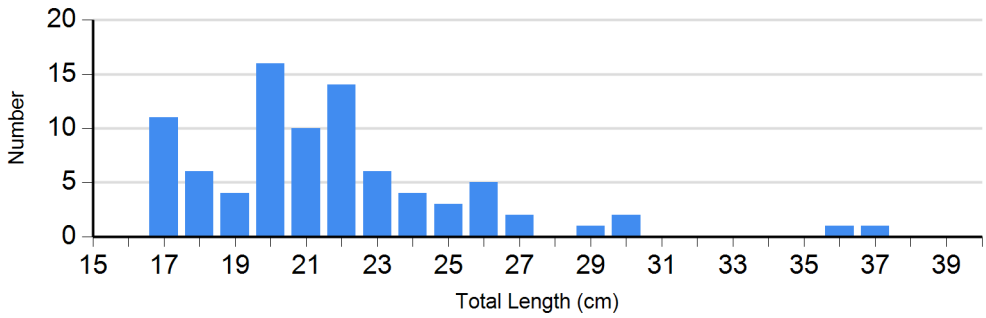
		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2019	1	95	2	104 (18.2)	1	93	2	89 (3.0)
	2020	61	106 (1.3)	21	107 (2.5)	4	100 (6.8)	0	
	2021	1	107	62	102 (1.1)	6	101 (2.1)	0	
	2022	0		3	122 (1.6)	10	113 (3.3)	0	
	2023	0		0		3	106 (2.8)	1	102
Common Carp Gill Net	2019	3	111 (2.6)	1	100	4	93 (5.0)	8	96 (3.0)
	2020	9	111 (1.1)	0		0		3	104 (7.3)
	2021	2	110 (1.5)	23	101 (1.4)	5	93 (1.7)	2	90 (1.3)
	2022	0		0		5	98 (2.7)	7	97 (2.0)
	2023	0		0		10	98 (1.8)	9	103 (6.3)
Northern Pike Gill Net	2023	0		0		1	83	0	
Smallmouth Bass Electro Fishing	2019	6	98 (3.2)	6	95 (3.9)	4	95 (0.9)	0	
Walleye Gill Net	2019	36	88 (0.7)	87	87 (0.5)	3	86 (1.5)	1	90
	2020	24	85 (1.0)	89	87 (0.5)	9	87 (2.8)	0	
	2021	114	82 (0.5)	37	83 (0.8)	15	85 (1.7)	3	86 (3.3)
	2022	121	85 (0.6)	22	82 (1.2)	6	80 (1.6)	2	73 (5.1)
	2023	97	89 (0.5)	55	87 (0.8)	11	89 (1.5)	4	82 (5.0)
White Bass Gill Net	2019	13	100 (1.3)	1	105	41	96 (0.5)	61	94 (0.6)
	2020	0		0		11	96 (2.5)	25	94 (1.0)
	2021	0		1	94	39	96 (0.6)	31	94 (0.9)
	2022	0		0		27	98 (0.8)	57	94 (0.7)
	2023	0		3	100 (1.0)	19	98 (1.5)	26	97 (1.1)

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
White Sucker Gill Net	2021	0		0		1	102	0	
	2022	0		0		1	109	2	101 (4.4)
	2023	0		0		0		5	108 (3.7)
Yellow Perch Gill Net	2019	145	112 (0.7)	5	115 (3.8)	10	116 (3.1)	5	97 (3.9)
	2020	56	115 (1.7)	85	110 (1.0)	1		0	
	2021	61	113 (1.3)	128	107 (0.8)	41	105 (0.9)	1	106
	2022	26	108 (2.0)	53	111 (1.3)	41	106 (1.3)	0	
	2023	145	115 (1.0)	51	115 (1.6)	47	112 (1.2)	3	108 (5.1)

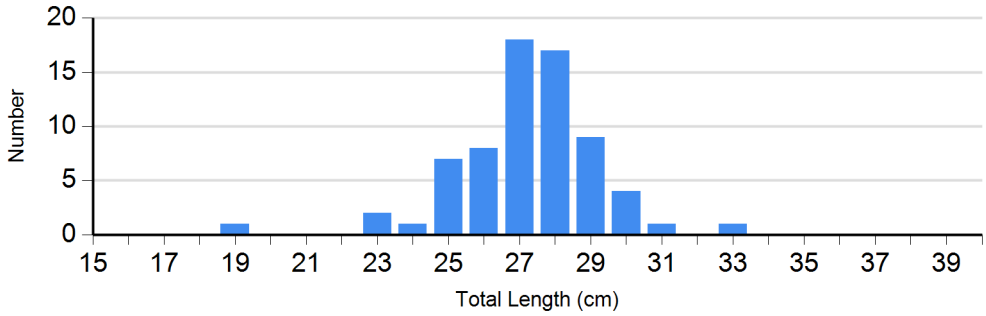
Length Frequency Distribution

Length frequency histogram of species sampled by year.

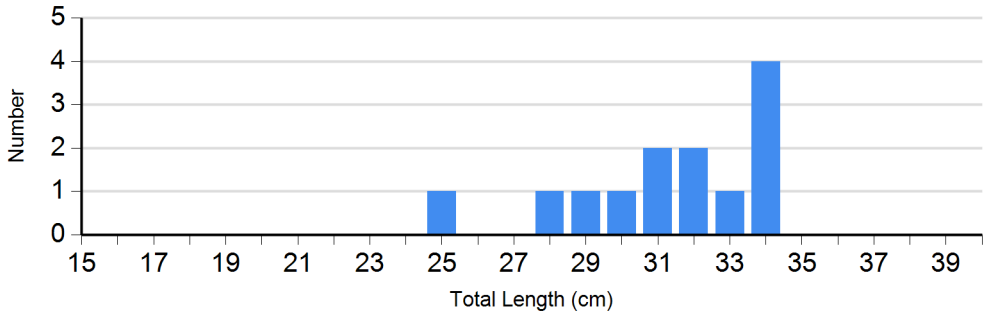
Species: Black Bullhead
Gear: AFS std gill net



2020

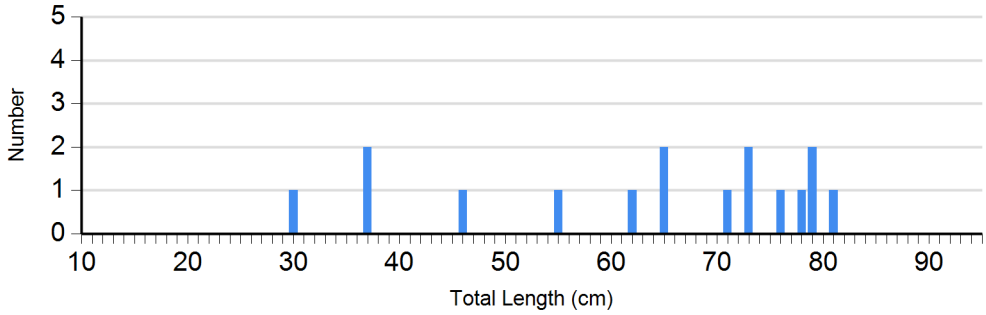


2021

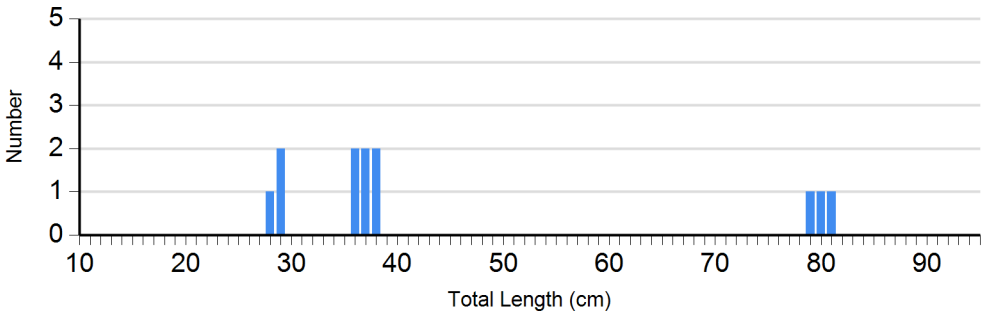


2022

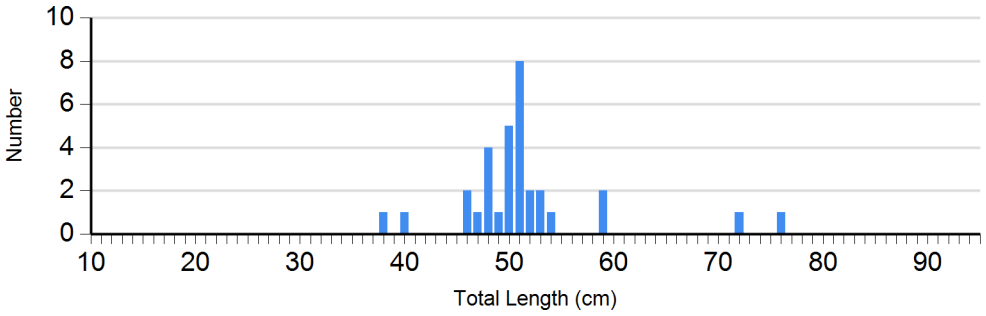
Species: Common Carp
Gear: AFS std gill net



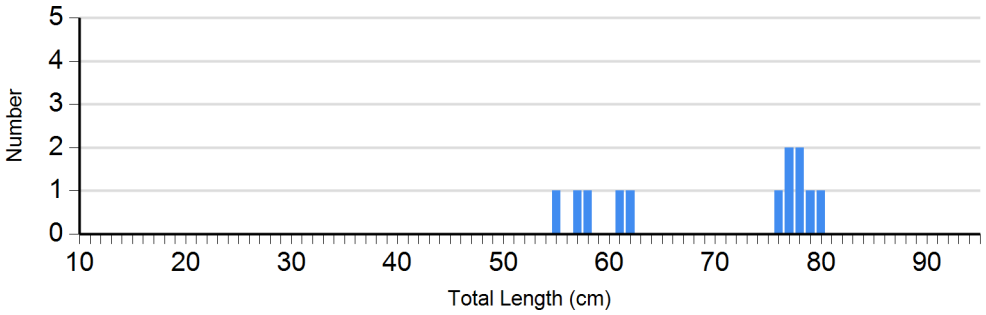
2019



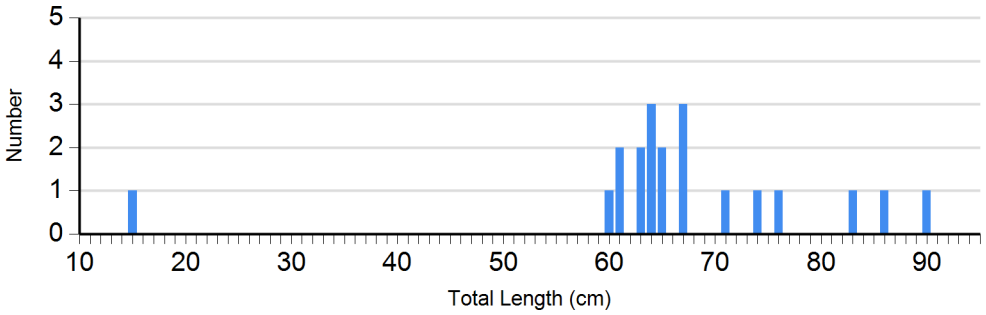
2020



2021

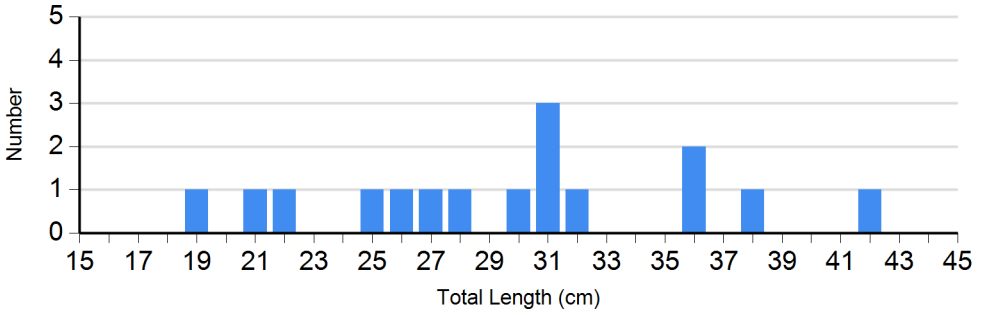


2022



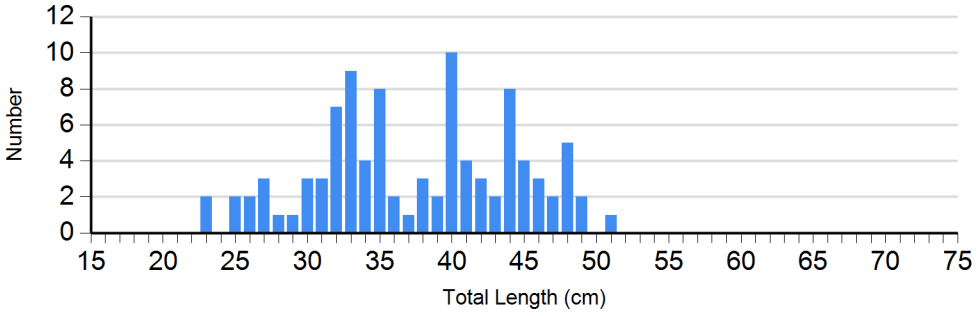
2023

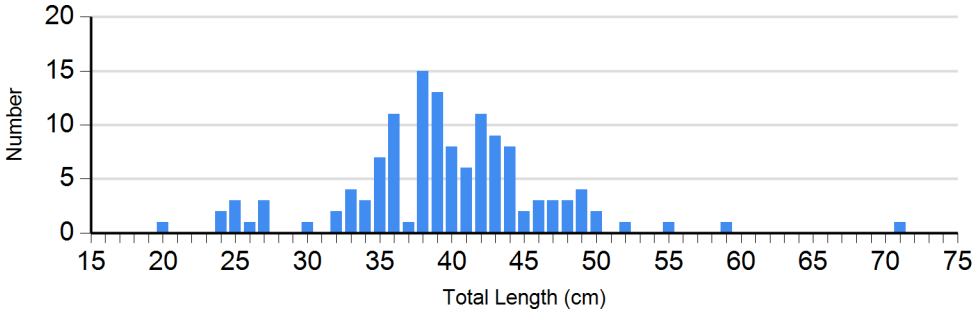
Species: Smallmouth Bass
Gear: boat shocker (day)

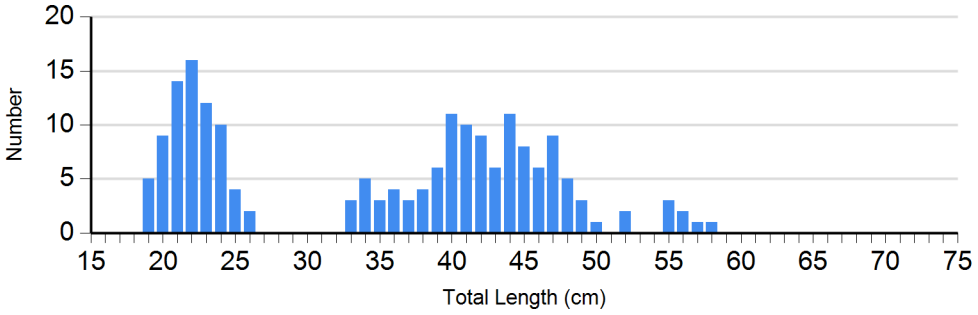


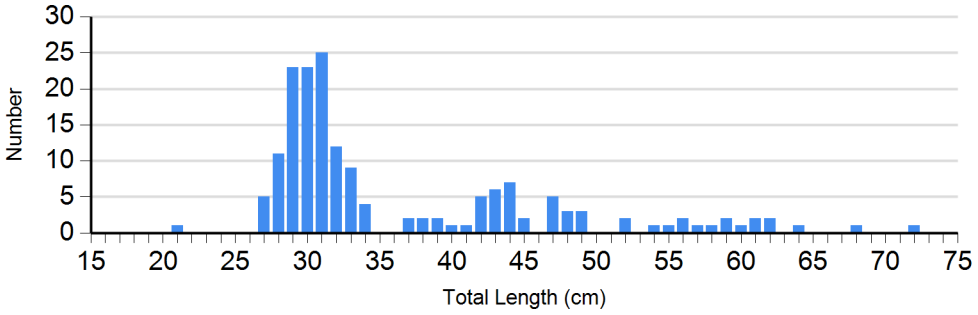
2019

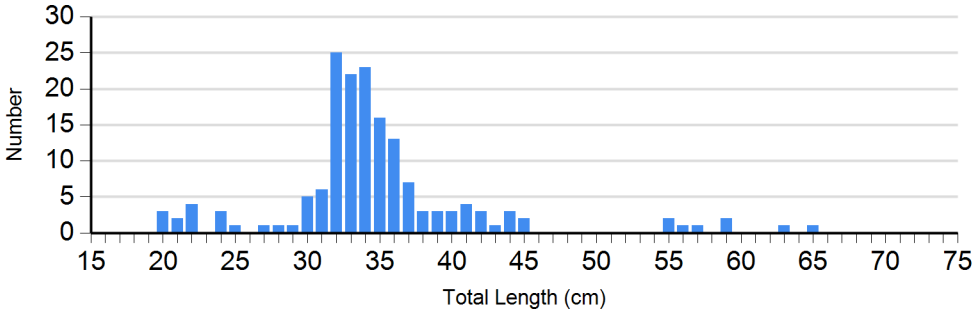
Species: Walleye
Gear: AFS std gill net

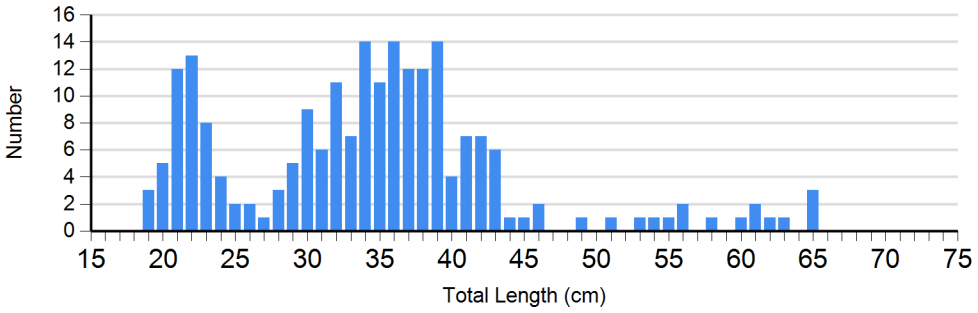






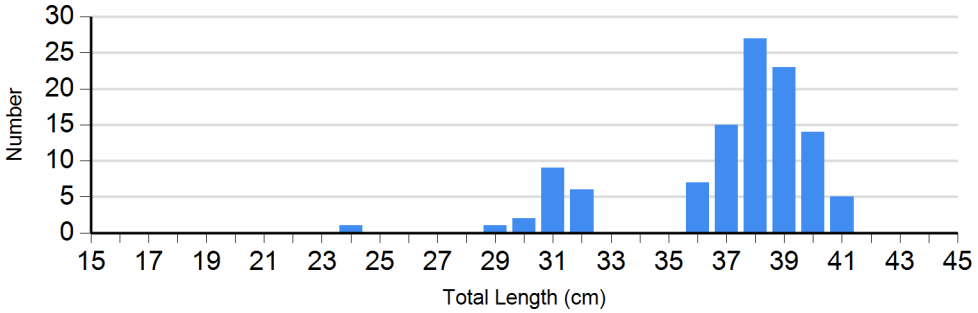




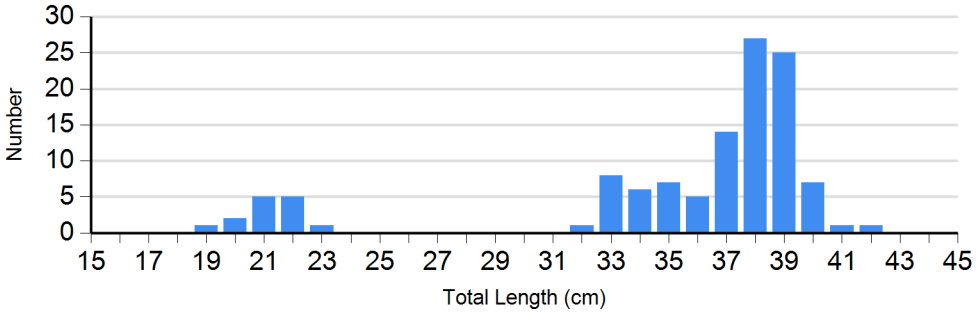


2023

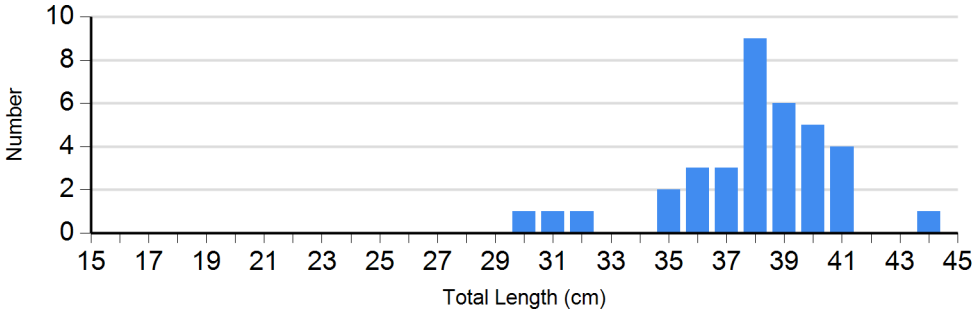
Species: White Bass
Gear: AFS std gill net



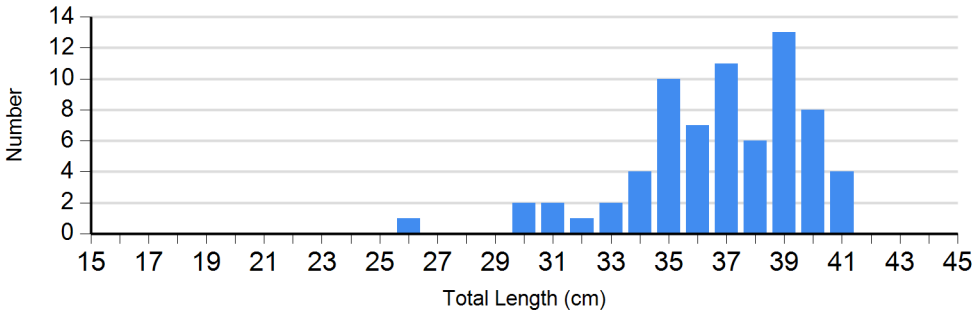
2018



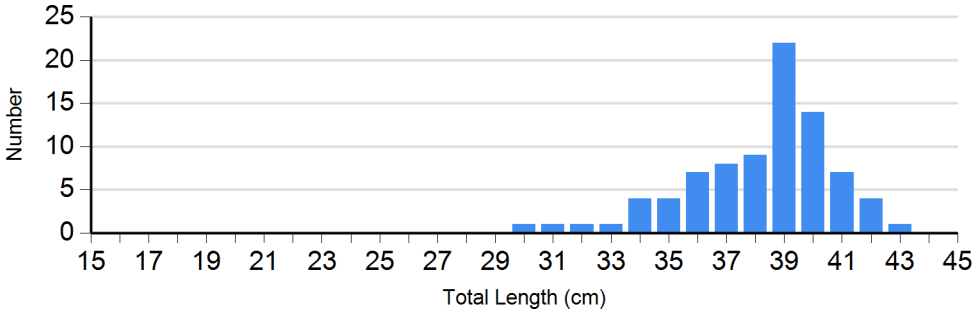
2019



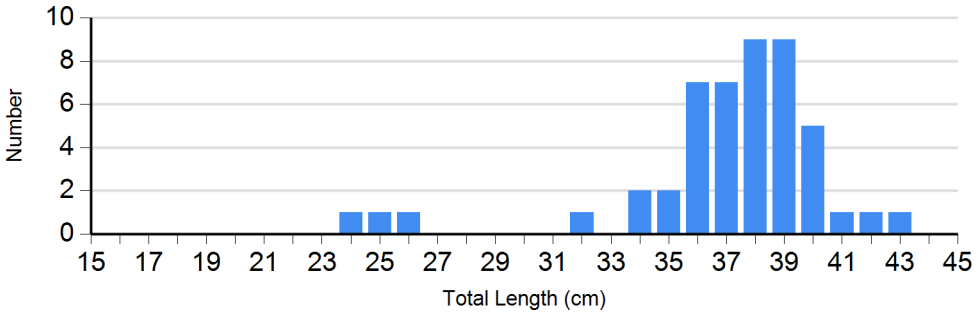
2020



2021

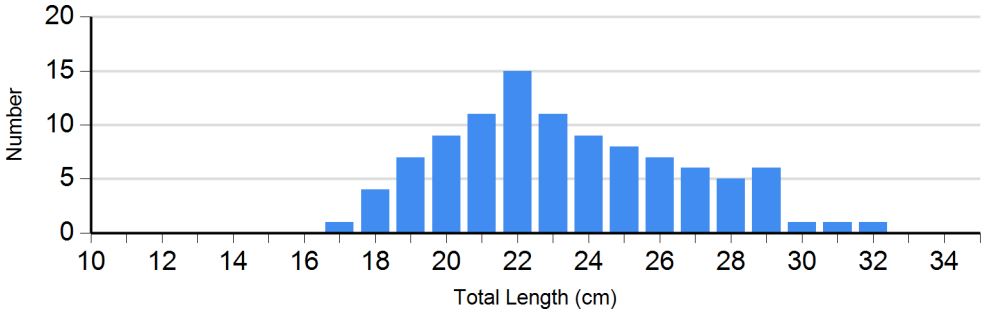


2022

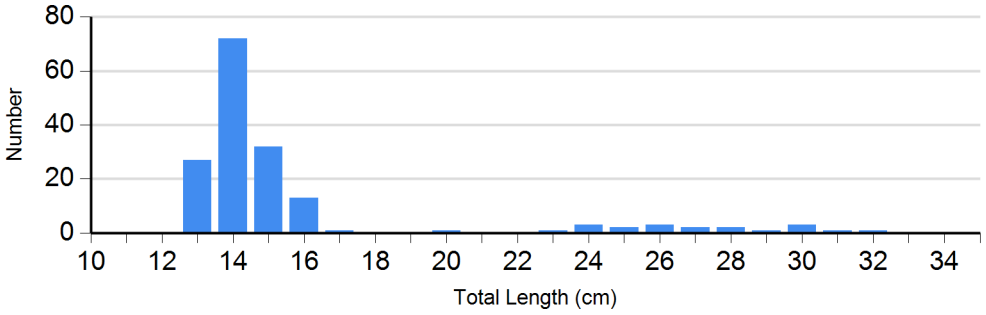


2023

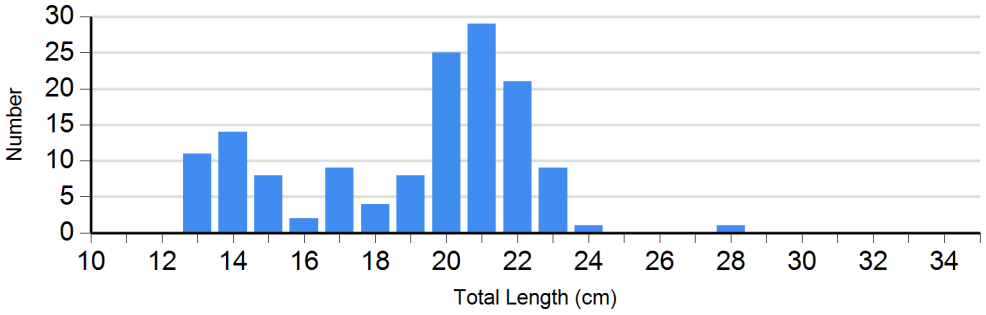
Species: Yellow Perch
Gear: AFS std gill net



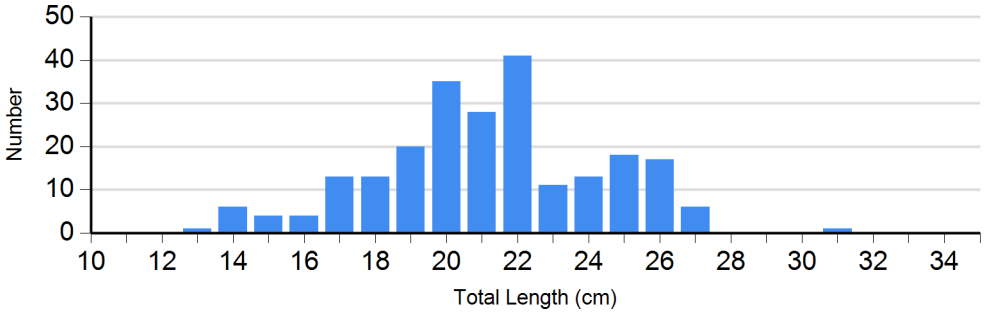
2018



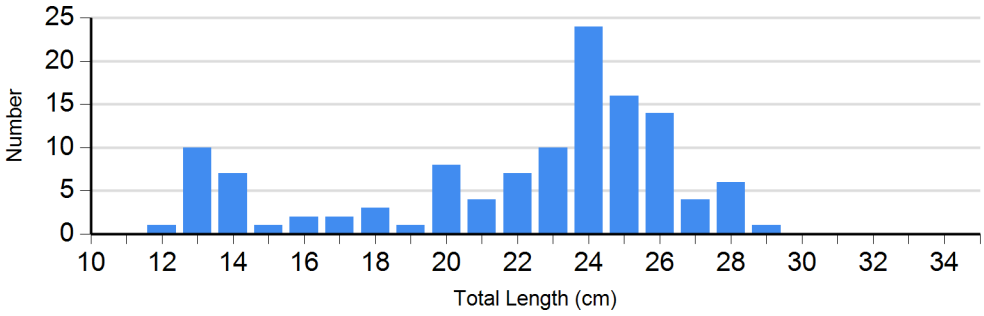
2019



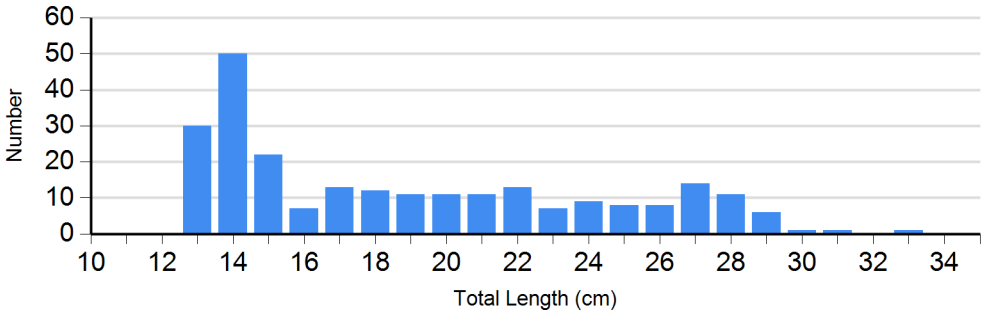
2020



2021



2022

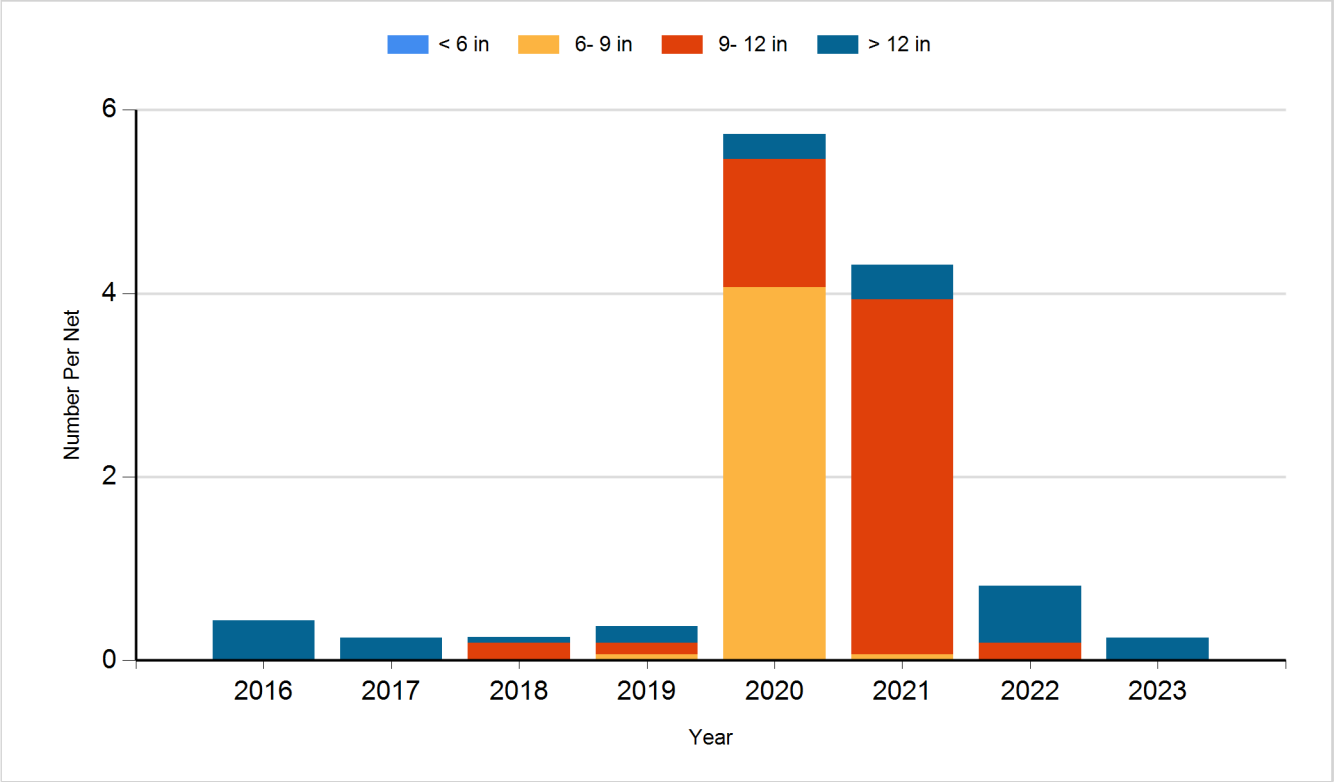


2023

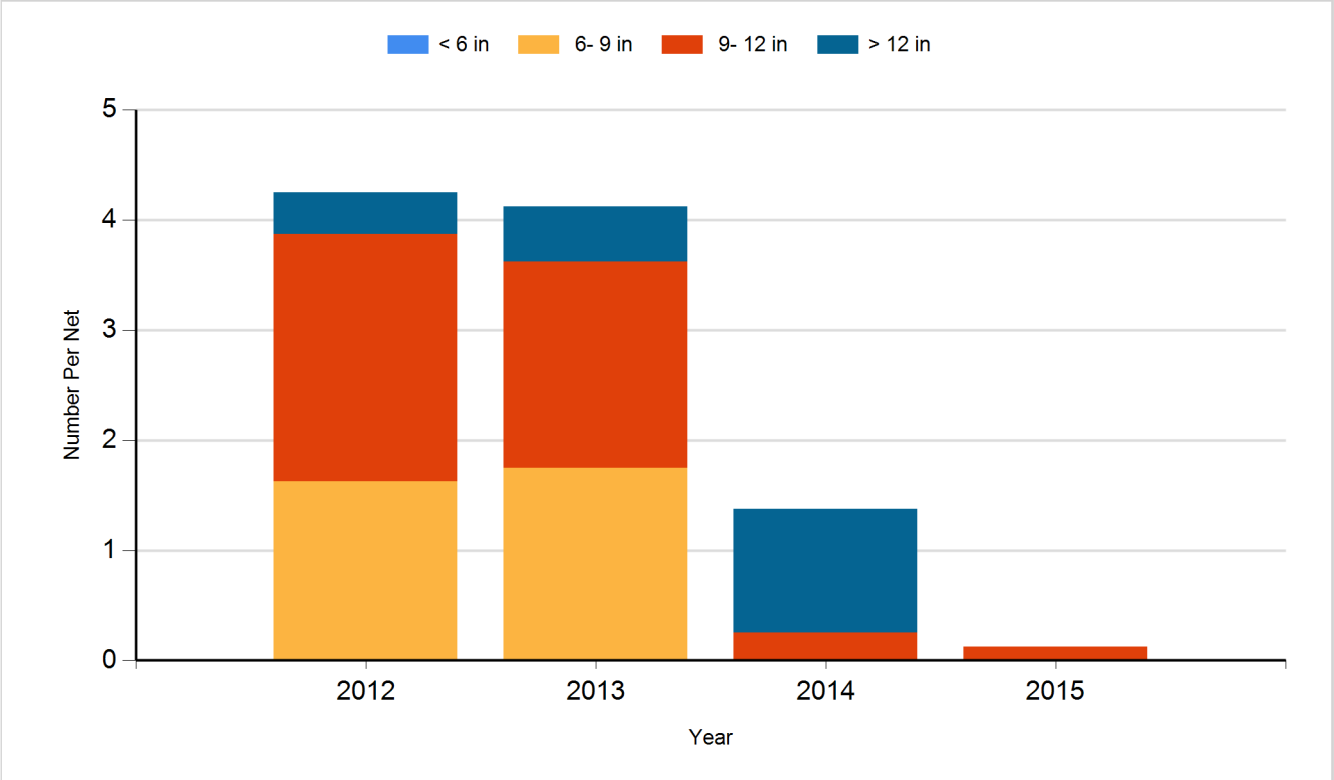
Historic Fish Sizes and Relative Abundance

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

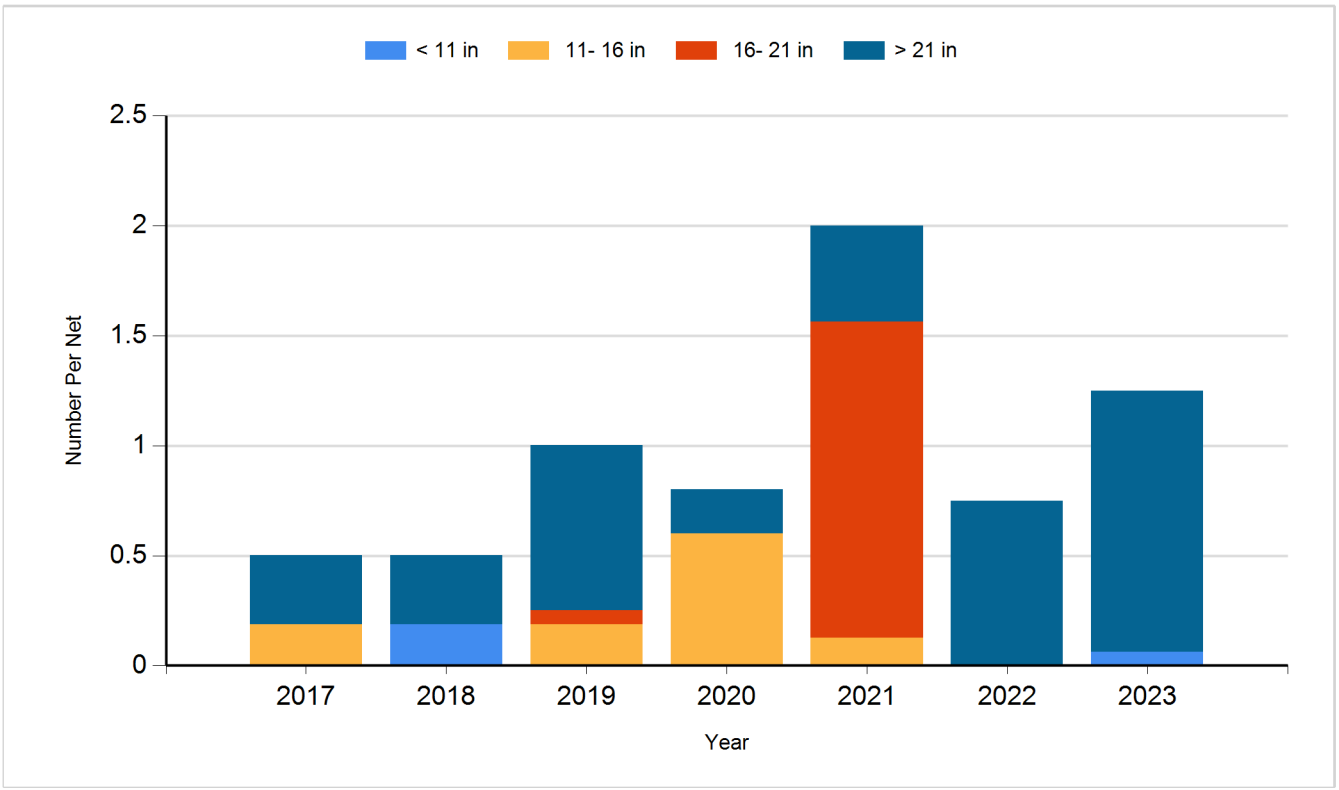
Species: Black Bullhead
Gear: AFS std gill net



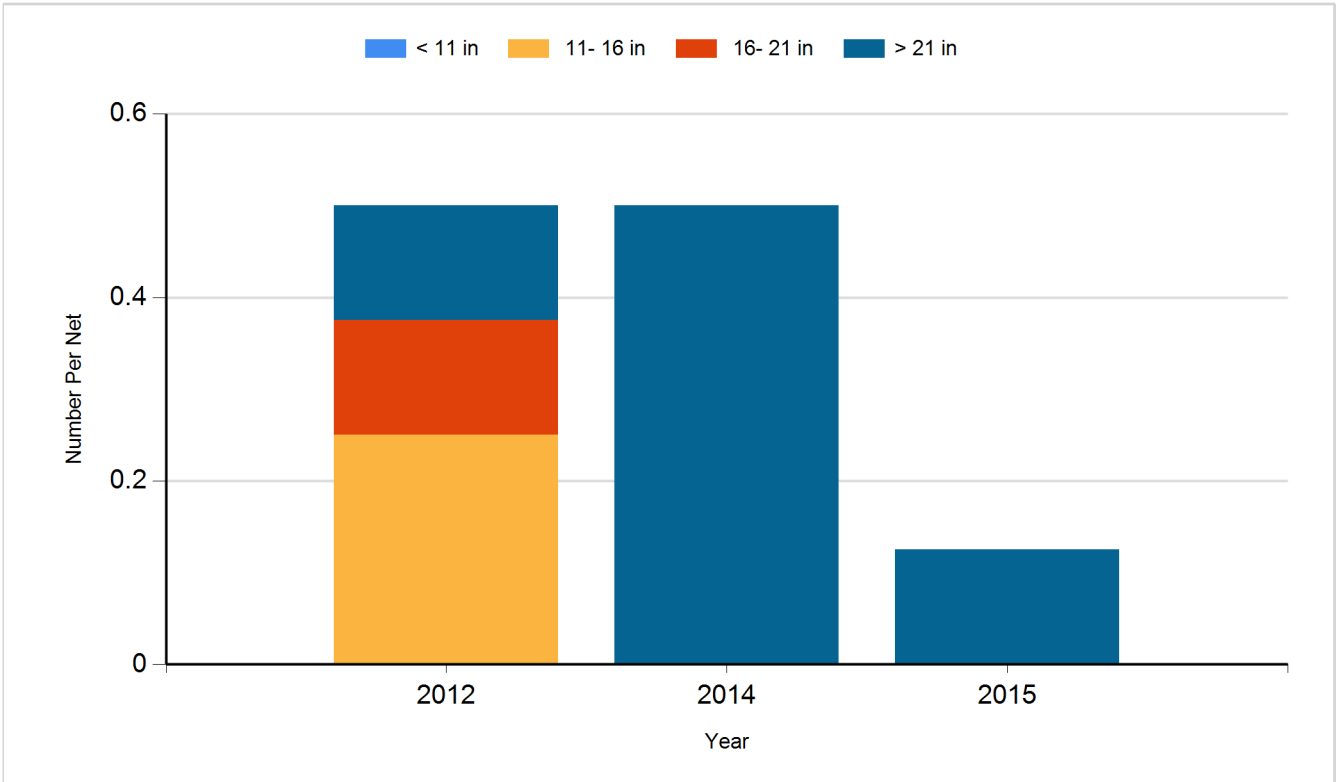
Species: Black Bullhead
Gear: std exp gill net



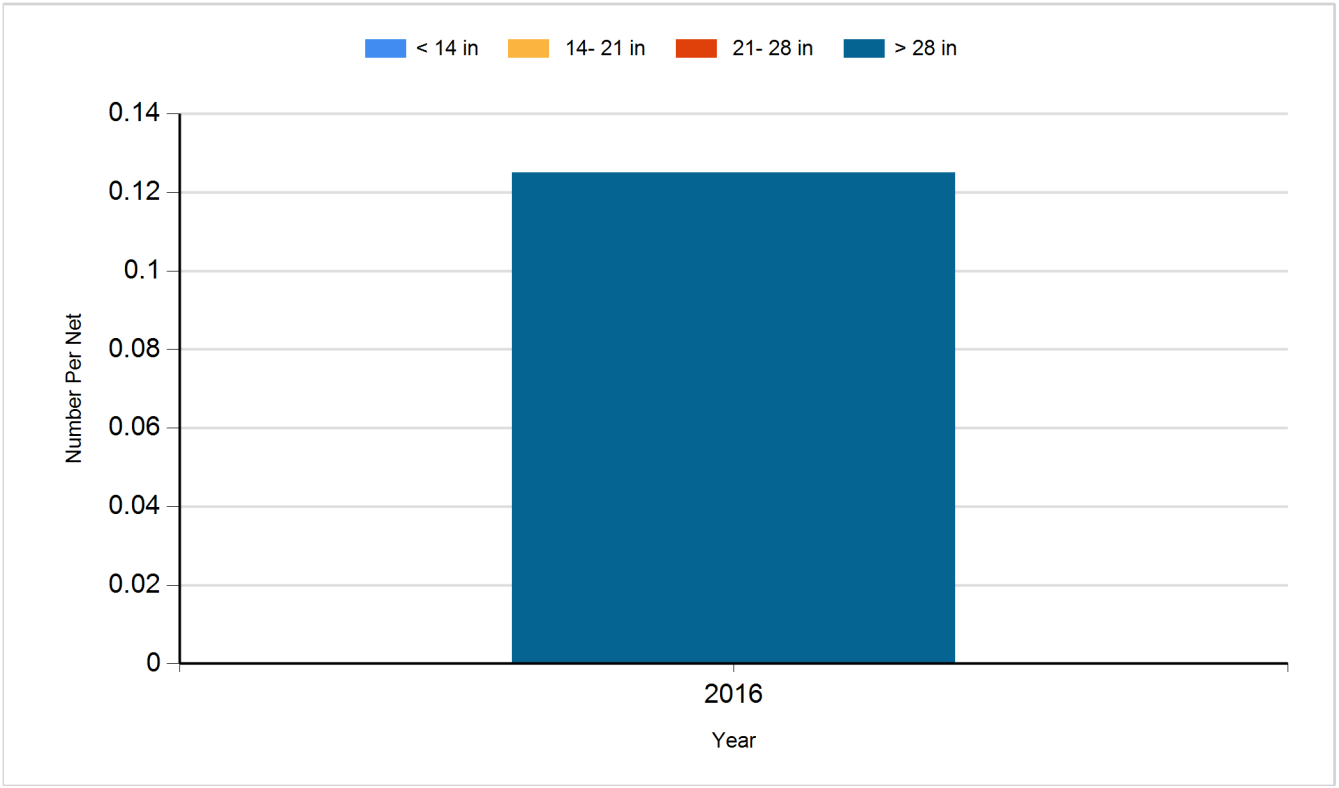
Species: Common Carp
Gear: AFS std gill net



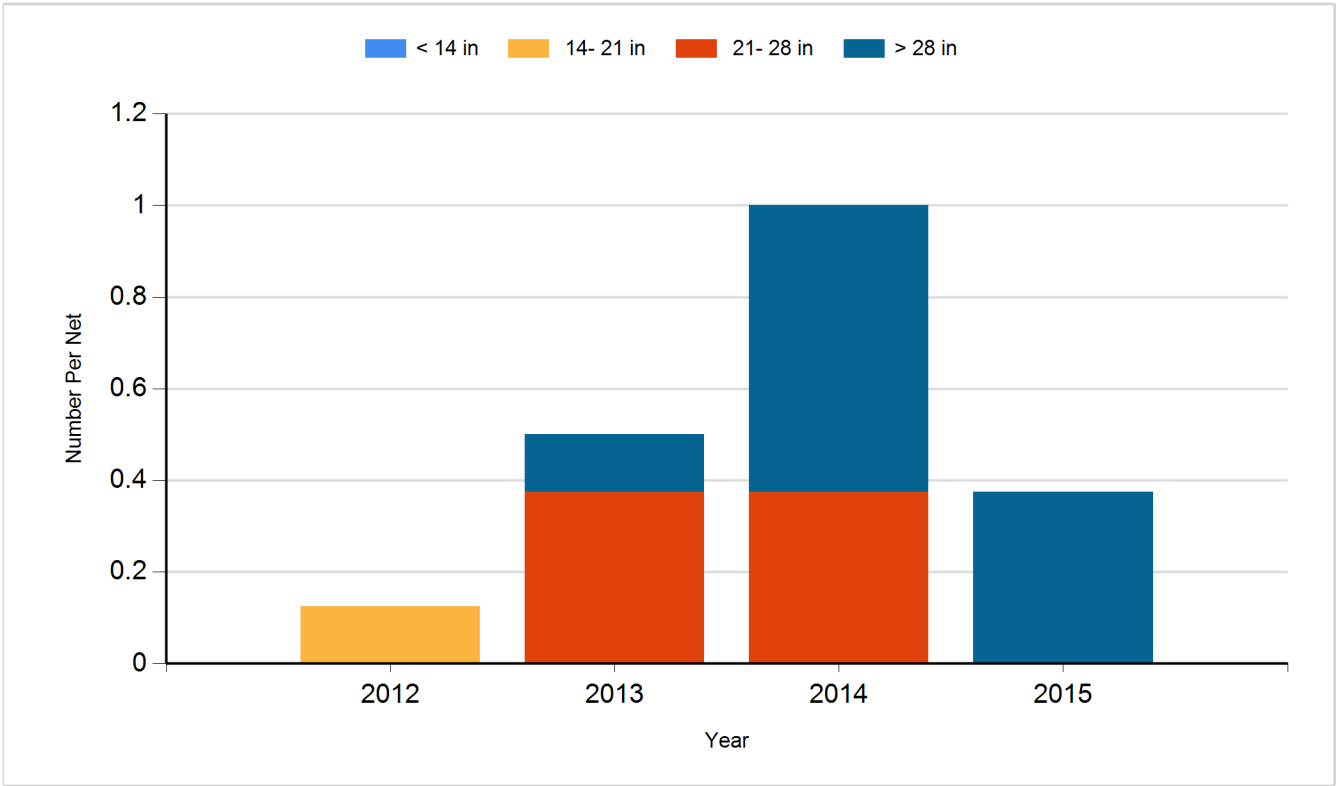
Species: Common Carp
Gear: std exp gill net



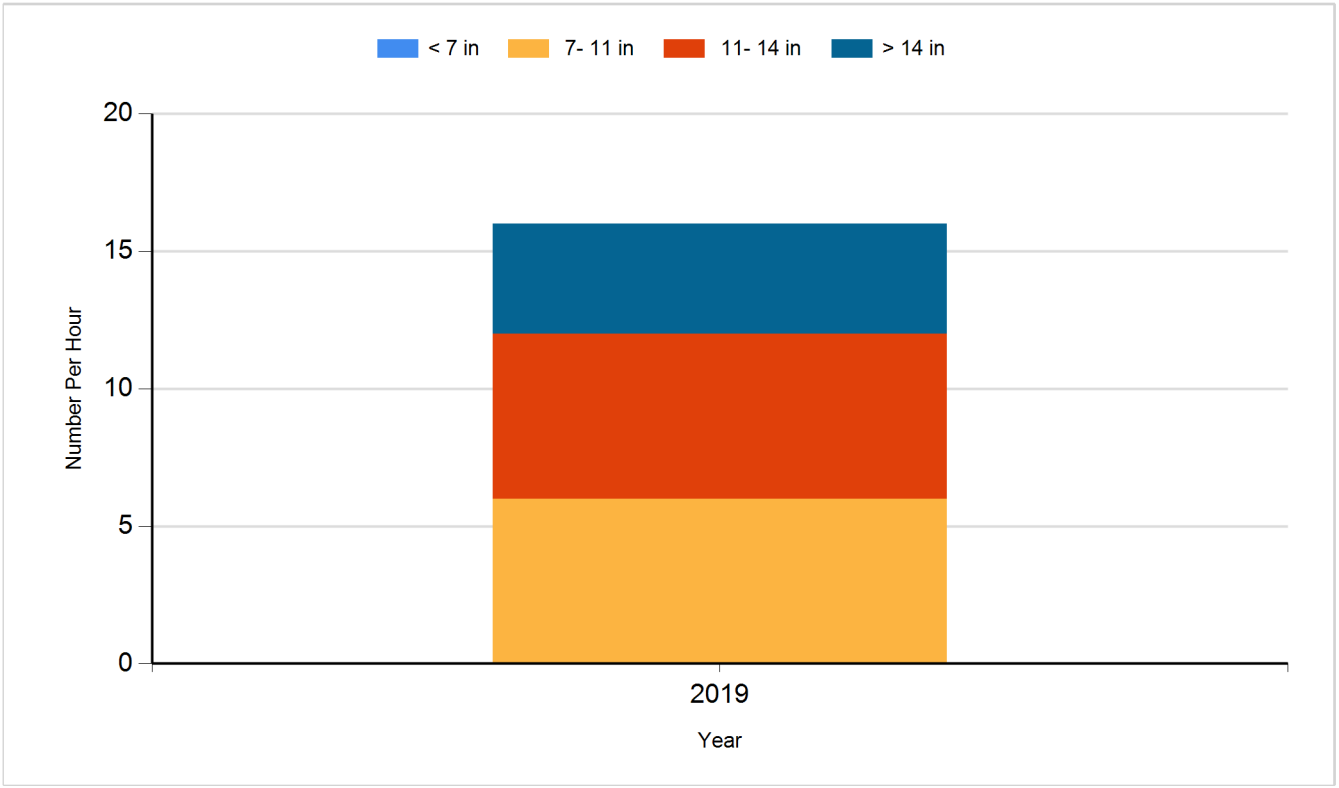
Species: Northern Pike
Gear: AFS std gill net



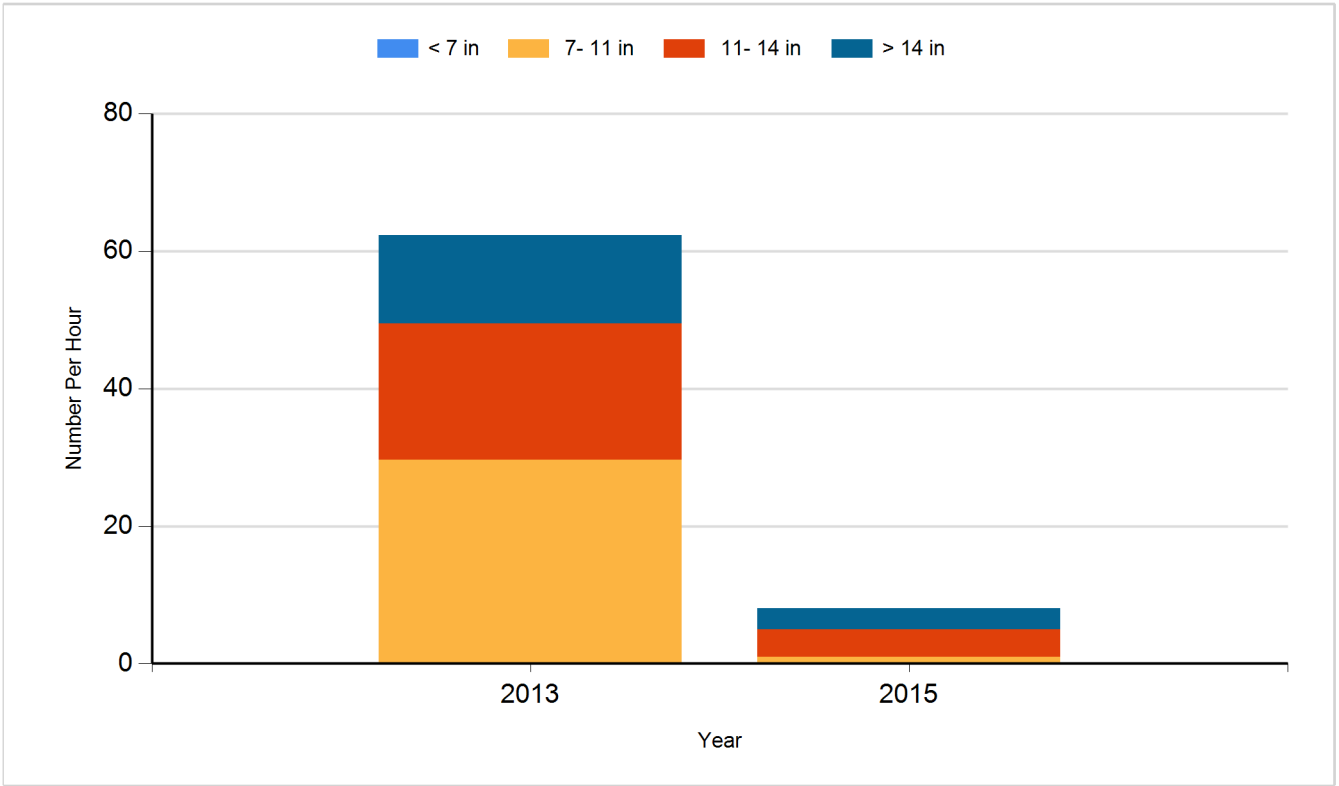
Species: Northern Pike
Gear: std exp gill net



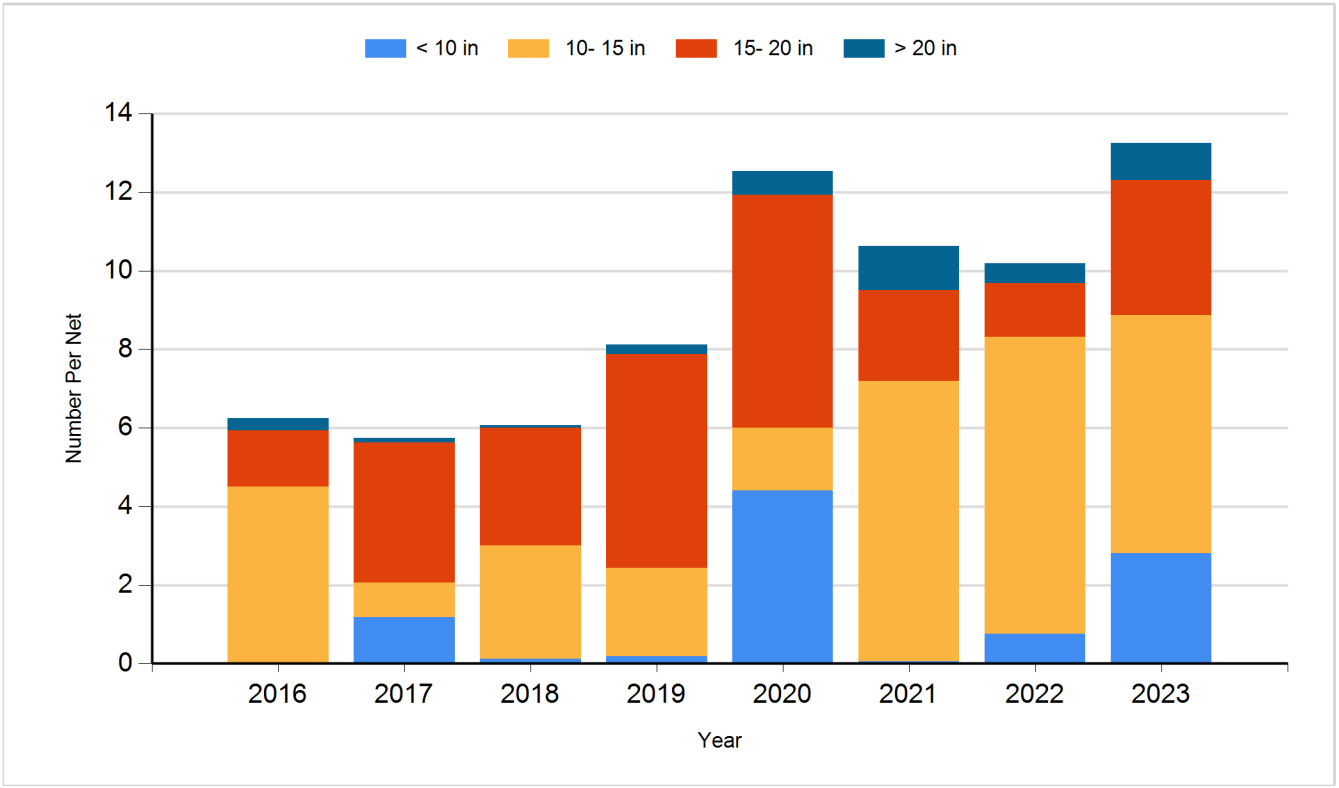
Species: Smallmouth Bass
Gear: boat shocker (day)



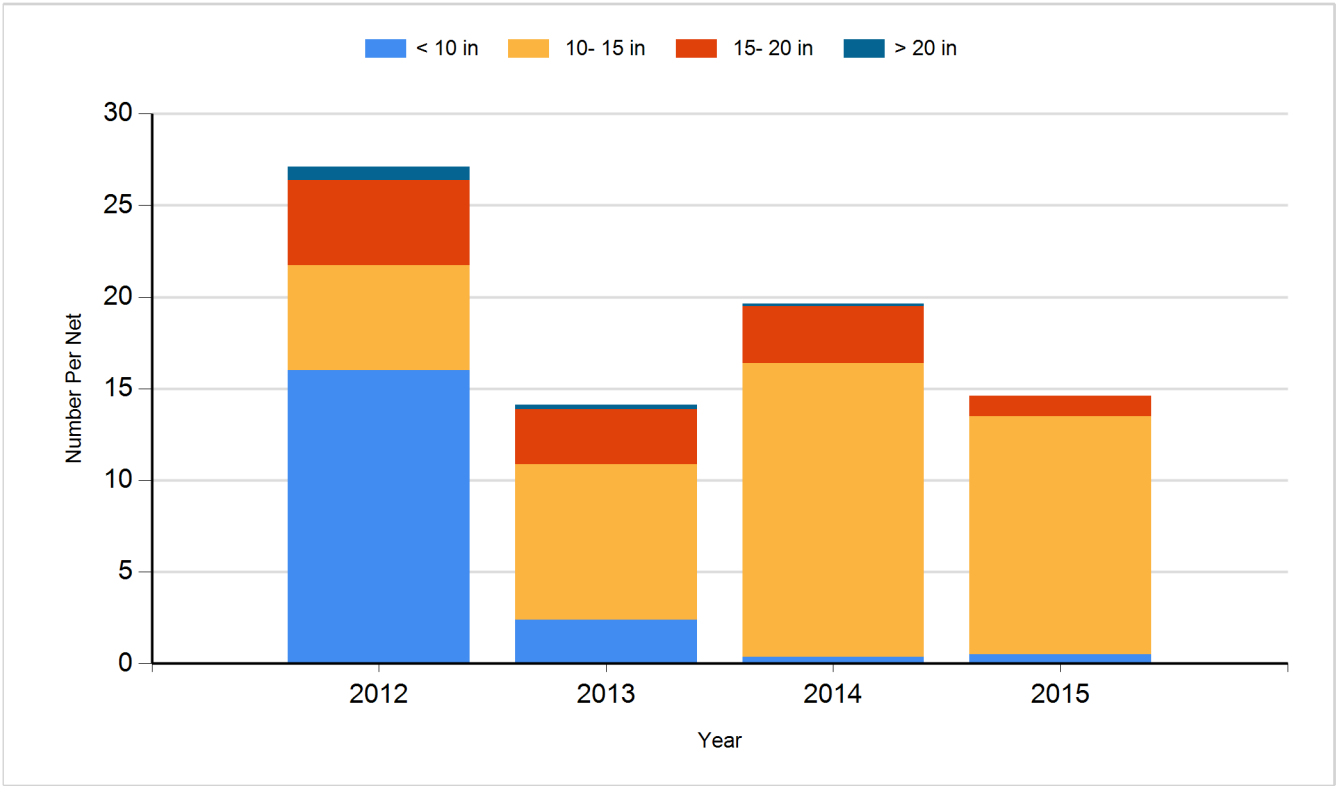
Species: Smallmouth Bass
Gear: boat shocker (night, DC)



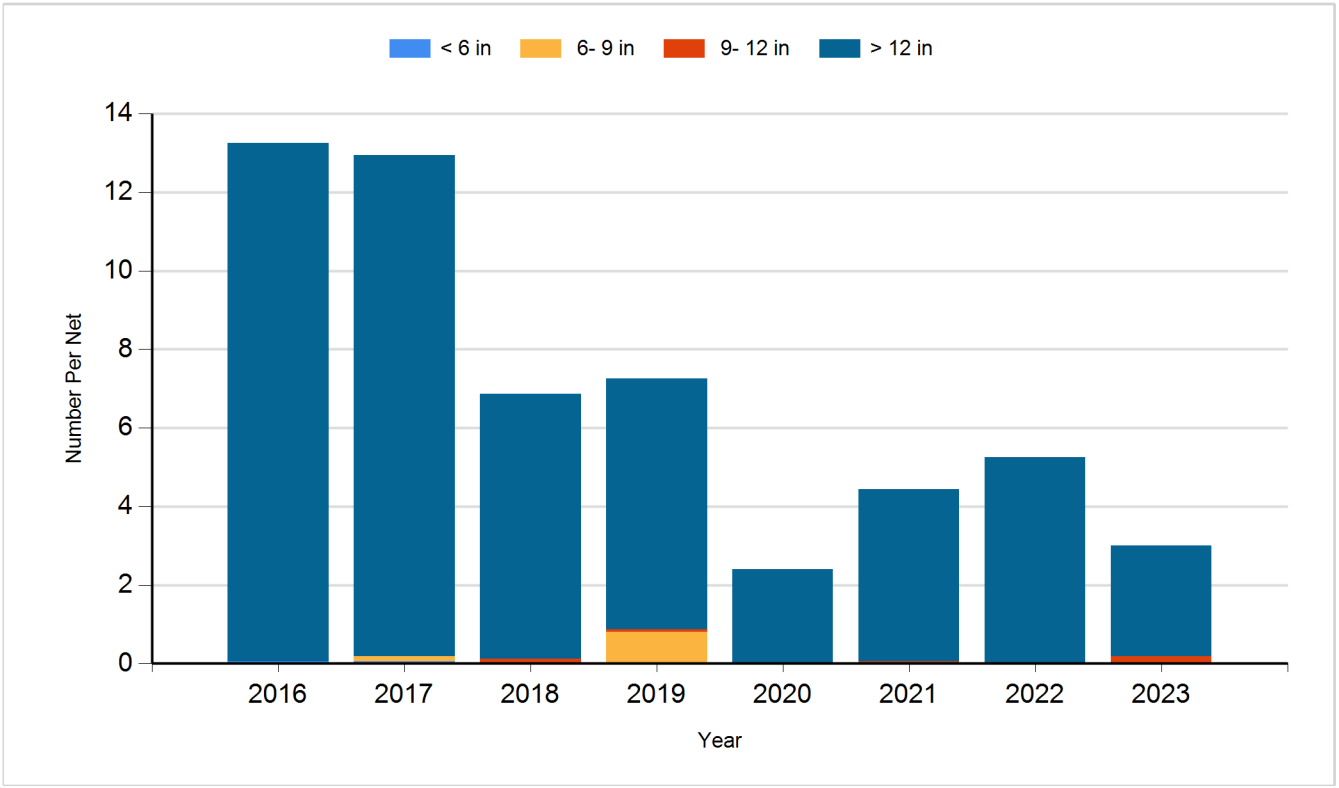
Species: Walleye
Gear: AFS std gill net



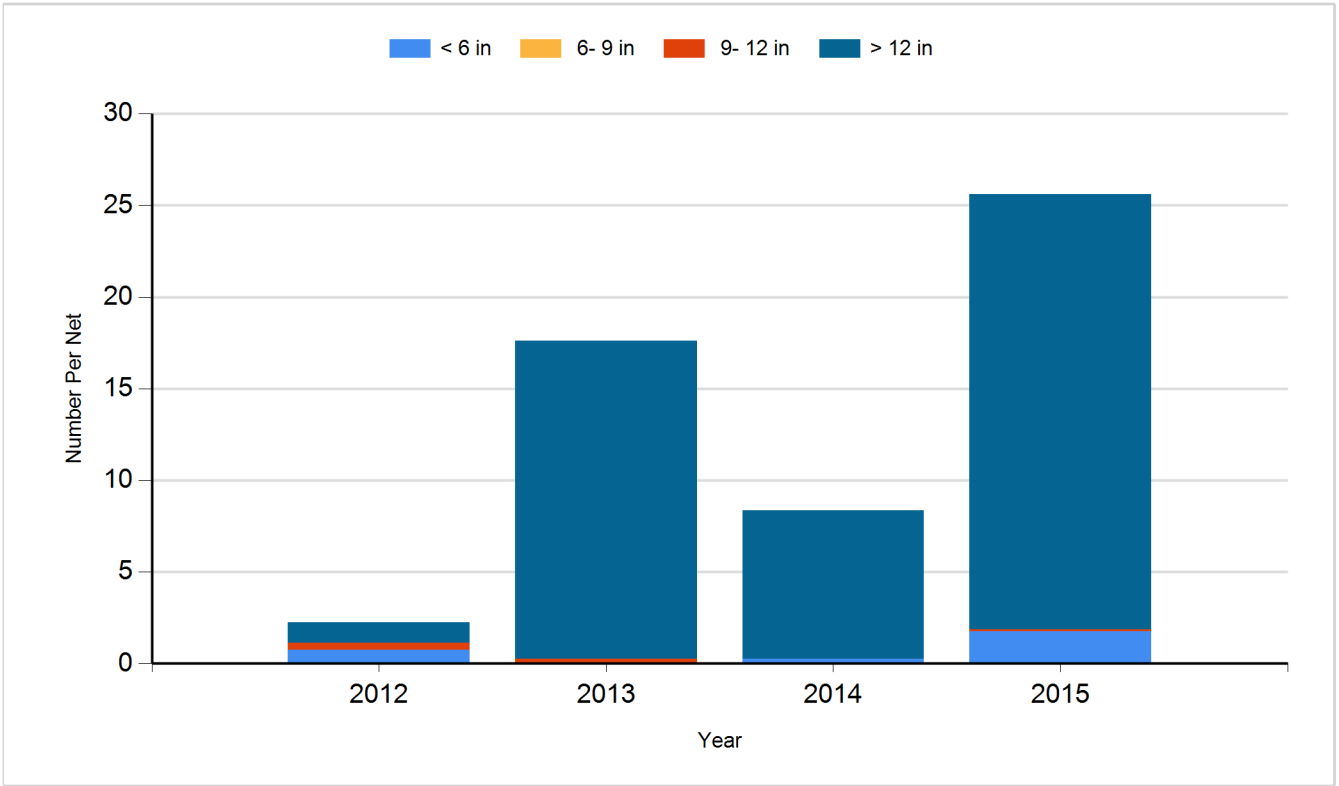
Species: Walleye
Gear: std exp gill net



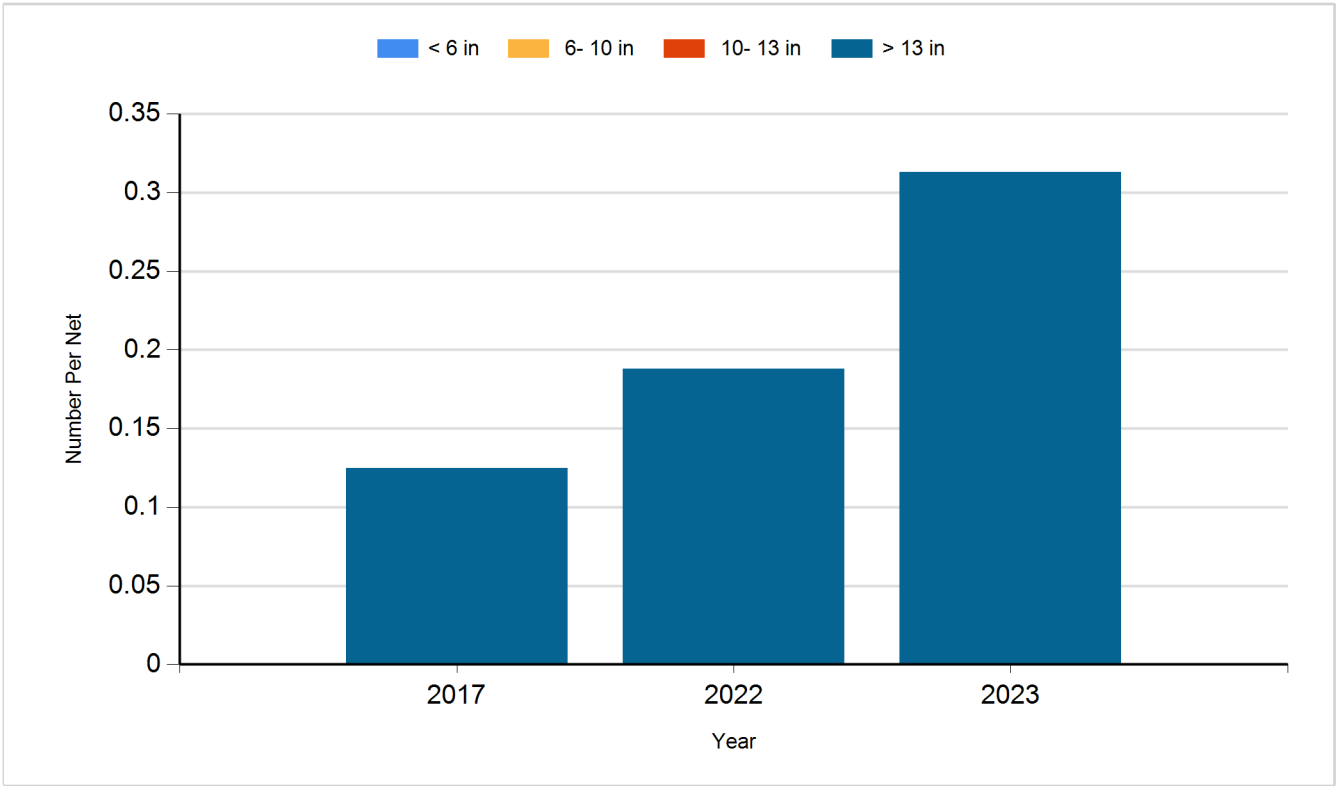
Species: White Bass
Gear: AFS std gill net



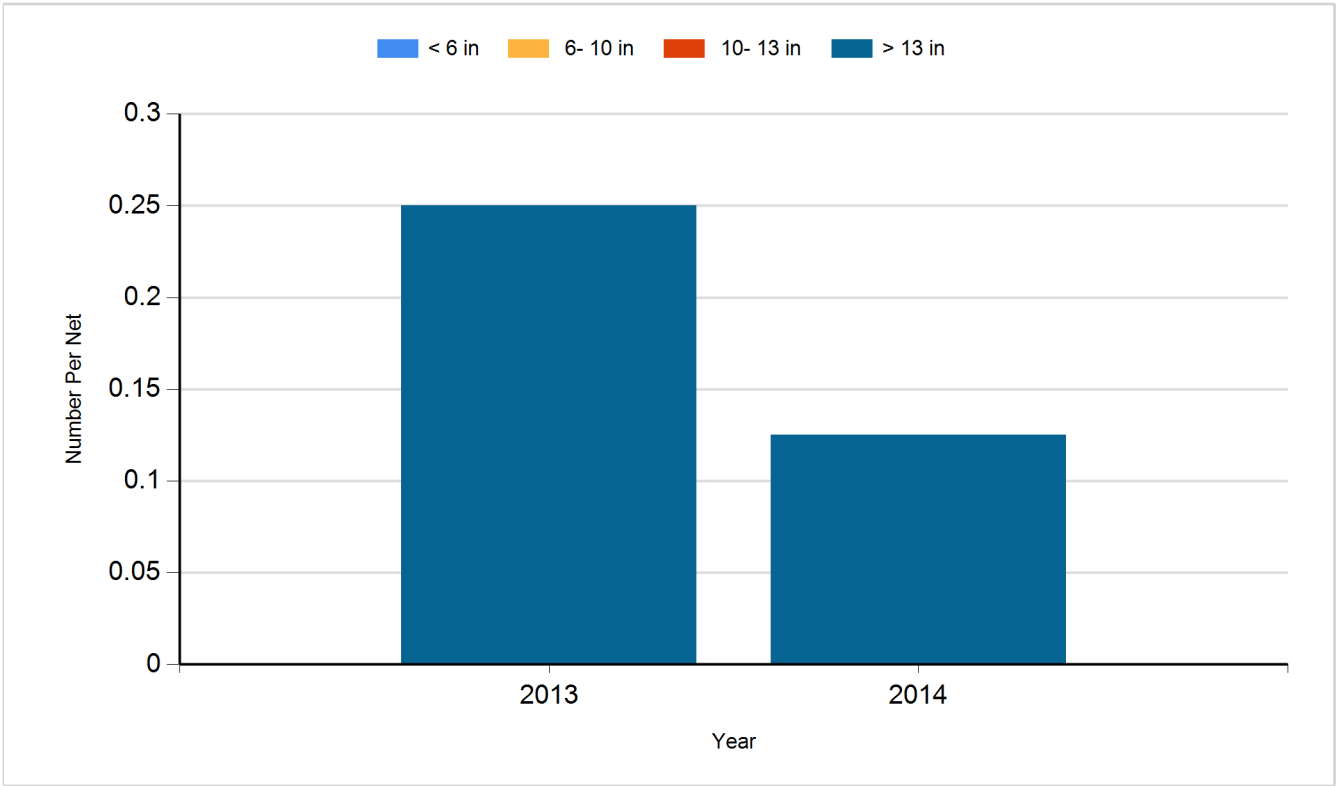
Species: White Bass
Gear: std exp gill net



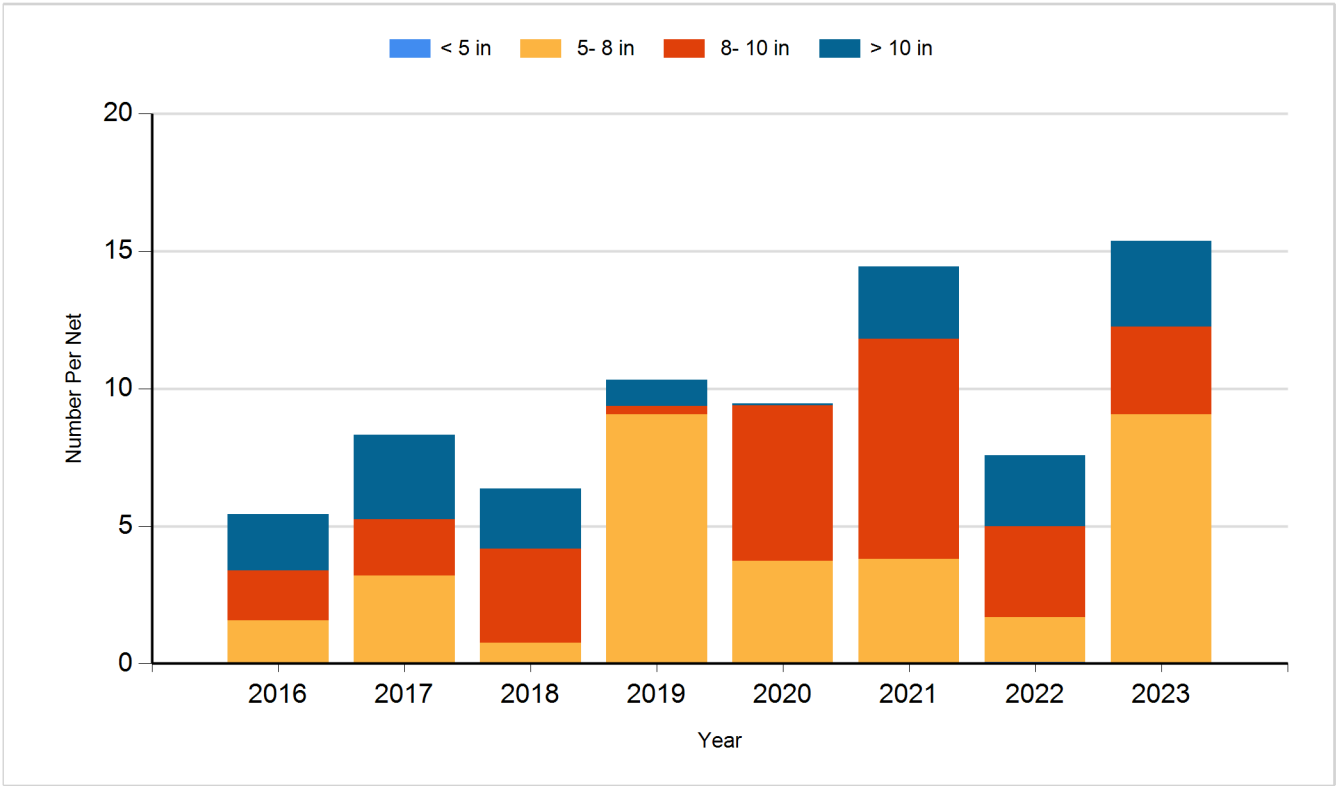
Species: White Sucker
Gear: AFS std gill net



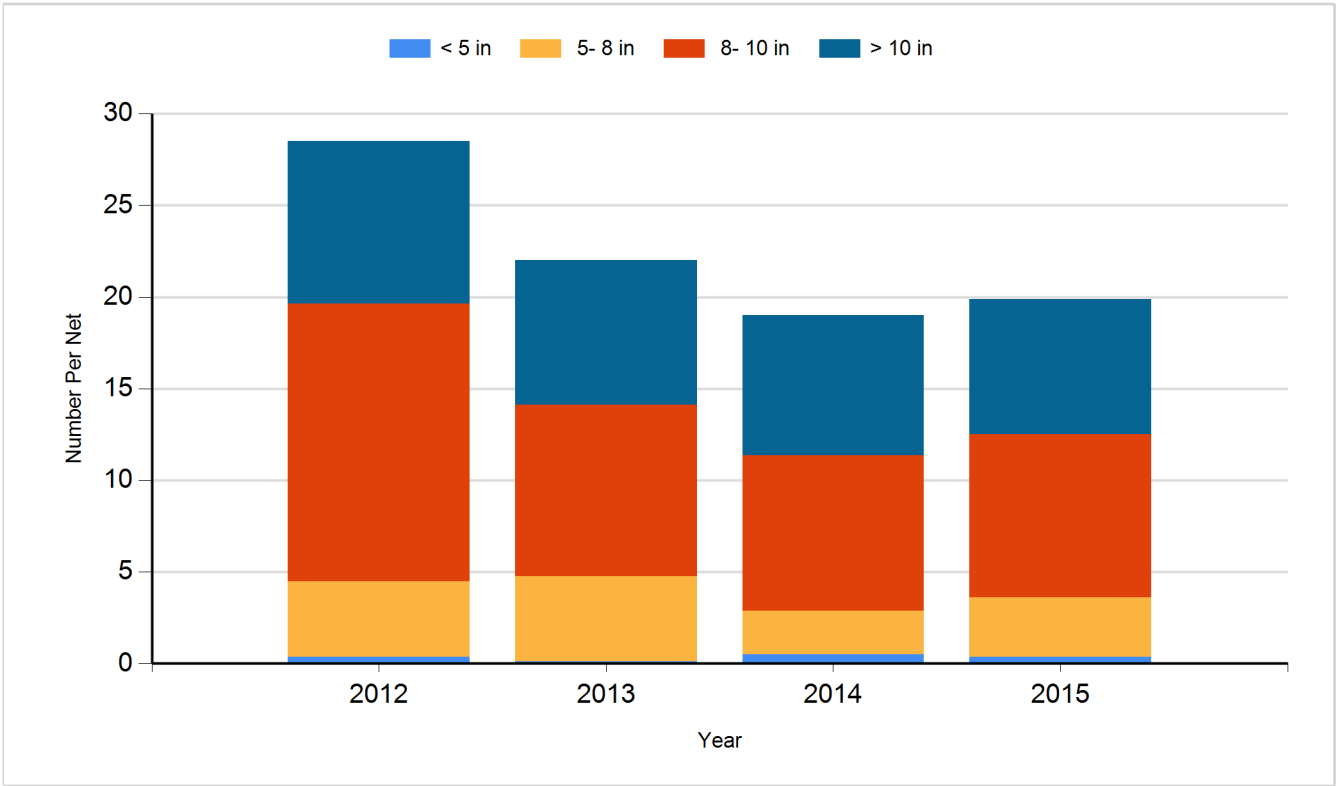
Species: White Sucker
Gear: std exp gill net



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
2012	Walleye	Fry	8,000,000
2014	Walleye	Fry	8,500,000
2016	Walleye	Fry	8,500,000
2017	Walleye	Fry	8,000,000
2019	Walleye	Fry	4,000,000
2021	Walleye		5,000,000
2021	Walleye	Fry	7,500,000
2021	Walleye	Juvenile	214,580
2023	Walleye	Fry	8,000,000