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.** Gill net CPUE's have remained stable in recent years (2021 – 2024). In 2024 the mean gill net CPUE was 9.4 and suggested high relative abundance. Sampled walleyes ranged in length from 6.7 to 27.6 inches, of those at least 10.0 inches 46% were ≥ 15.0 inches and 9% were ≥ 20.0 inches. Twelve year classes contributed to the gill net catch. The 2019 (age-5) cohort was the most represented single cohort accounting for 30% of walleyes in the sample. Meanwhile, year classes produced in 2021 (age 3; 15%), 2022 (age 2; 26%), and 2023 (age 1; 17%), two of which coincided with stocking events (2021 and 2023), made up an additional 58%. The oldest walleye sampled was from the 2011 (age-13) year class. Growth has been variable at Waubay Lake. Since 2016, mean length at captures at age 3 have ranged from 13.5 to 16.9 inches. In 2024, the mean length at capture of age-3 fish was 13.9 inches.

- **White bass.** The 2024 mean gill net CPUE of 1.1 was the lowest recorded from 2015 – 2024 and suggested low relative abundance. White bass from 12.6 to 16.5 inches were netted.

- **Yellow perch.** The 2024 mean gill net CPUE of 16.0 was slightly higher than the 15.4 observed in 2023 and the highest recorded from 2016 – 2024. Sampled yellow perch ranged in length from 5.1 to 12.6 inches, 69% were ≥ 8.0 inches and 14% were ≥10.0 inches. Individuals from six consecutive year classes (2018 – 2023) contributed to the catch. Yellow perch from the 2022 (age-2) cohort were the most abundant accounting for 53% of fish in the sample, while those from the 2021 (age-3) year class made up an additional 25%. Growth appears to be moderate to fast with mean length at captures at age 3 from 9.2 – 10.2 inches since 2015. In 2024, the mean length at capture of age-3 fish was 9.2 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
2024

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 13, 2024	4 net-nights
AFS std gill net	Aug 14, 2024	4 net-nights
AFS std gill net	Aug 15, 2024	4 net-nights
AFS std gill net	Aug 16, 2024	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Smallmouth Bass

Northern Pike

Common Carp

White Bass

Rock Bass

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	3	0.2	0.1	100		100		100	8
	Bluegill	1	0.1	0.1	100		0		130	
	Common Carp	21	1.3	0.4	90		90		96	4
	Lake Herring	1	0.1	0.1	100		100		150	
	Rock Bass	6	0.4	0.2	83		0		108	1
	Smallmouth Bass	16	1.0	0.6	69		44	20	95	3
	Walleye	185	9.4	1.1	46	6	9	3	84	1
	White Bass	17	1.1	0.5	100		100		95	2
	White Sucker	4	0.3	0.3	100		100		99	4
	Yellow Perch	256	16.0	2.5	69	4	14	3	111	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.

*** SDGFP standard gill nets used in 2015 (Avg. excludes 2015)**

		CPUE										
Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
AFS std gill net*	Black Bullhead	0.1	0.4	0.3	0.3	0.4	5.7	4.3	0.8	0.3	0.2	1.41
	Black Crappie	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.1	0.0	0.09
	Bluegill	0.0	0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.0	0.1	0.11
	Common Carp	0.1	0.1	0.5	0.3	1.0	0.8	2.0	0.8	1.2	1.3	0.89
	Lake Herring	0.3	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.09
	Northern Pike	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.03
	Rock Bass	0.4	0.4	0.8	0.3	0.9	0.5	0.7	0.9	1.3	0.4	0.69
	Smallmouth Bass	0.0	1.3	1.3	0.9	0.6	0.3	2.6	0.9	1.6	1.0	1.17
	Walleye	14.1	6.3	4.6	5.9	7.9	8.1	10.6	9.4	10.4	9.4	8.07
	White Bass	23.9	13.2	12.9	6.9	7.3	2.4	4.4	5.3	3.0	1.1	6.28
	White Sucker	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.11
	Yellow Perch	19.5	5.4	8.3	6.4	10.3	9.5	14.4	7.5	15.4	16.0	10.36

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. *** SDGFP standard gill nets used in 2015**

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std gill net*	Walleye	PSD	8	28	81	52	72	80	33	20	42	46
		PSD-P	0	5	3	1	3	7	11	5	9	9
		Wr	85	86	88	89	88	87	83	84	88	84
	White Bass	PSD	100	100	99	100	89	100	100	100	100	100
		PSD-P	99	100	99	98	88	100	99	100	94	100
		Wr	97	98	92	98	95	95	95	95	97	95
	Yellow Perch	PSD	83	71	62	88	12	61	74	78	41	69
		PSD-P	38	38	37	34	9	1	18	34	20	14
		Wr	117	109	109	109	111	112	108	109	114	111

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+
2024	185	197 (32)	293 (48)	352 (28)	398 (3)	409 (56)	426 (1)	558 (1)	555 (11)	574 (1)	637 (4)
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)

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	256	147 (25)	203 (135)	233 (63)	242 (8)	276 (23)	292 (2)				
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)			

Fish Condition

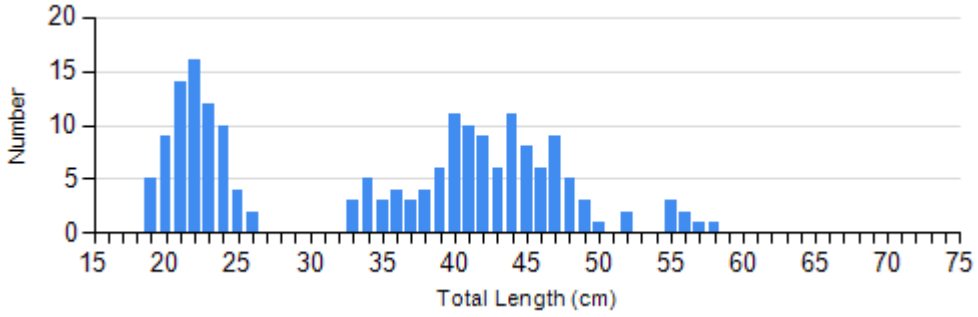
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	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)
	2024	81	85 (0.6)	56	81 (0.6)	8	84 (2.5)	6	88 (3.7)
White Bass Gill Net	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)
	2024	0		0		6	96 (2.1)	11	95 (1.7)
Yellow Perch Gill Net	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)
	2024	80	114 (1.2)	141	110 (0.9)	33	110 (1.5)	2	109 (5.5)

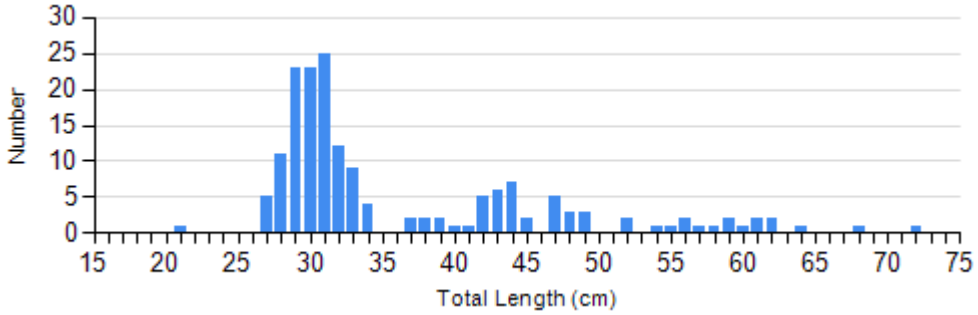
Length Frequency Distribution

Length frequency histogram of species sampled by year.

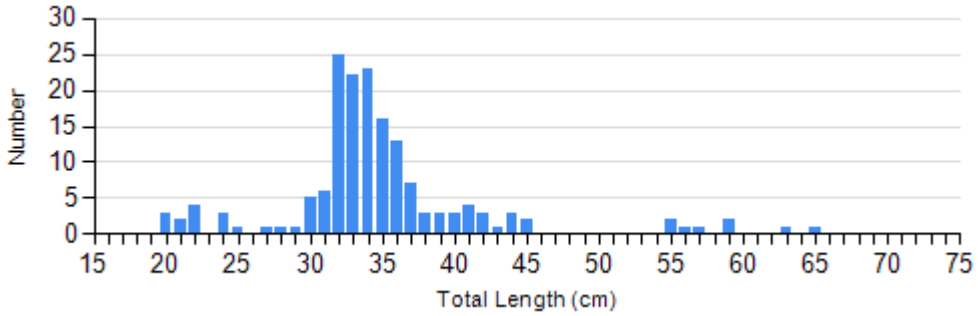
Species: Walleye
Gear: AFS std gill net



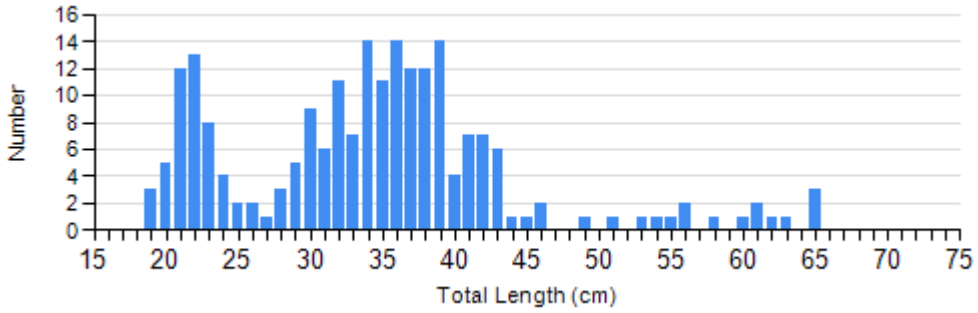
2020



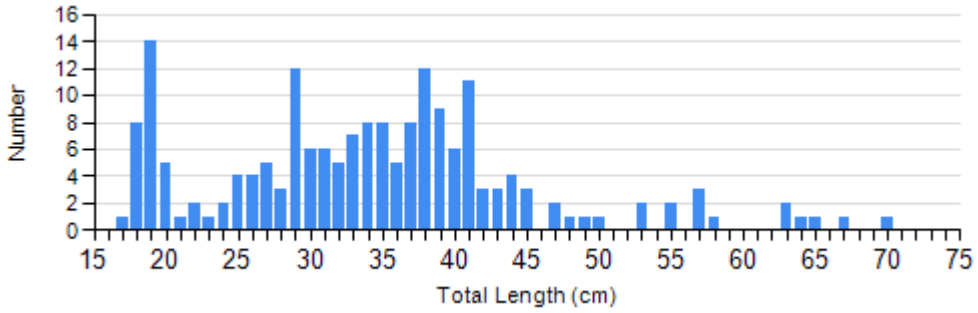
2021



2022

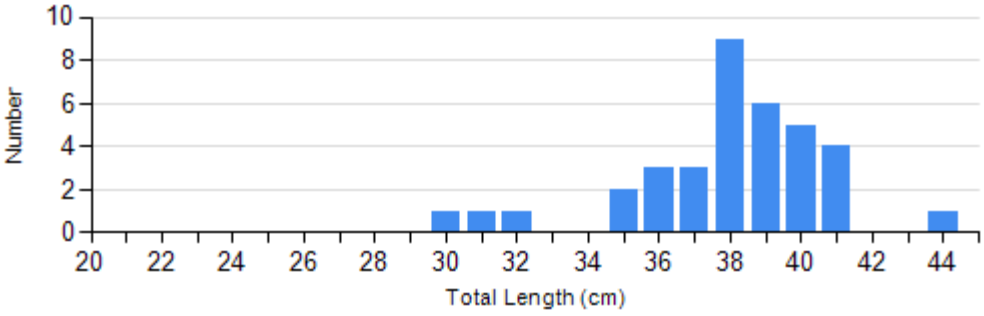


2023

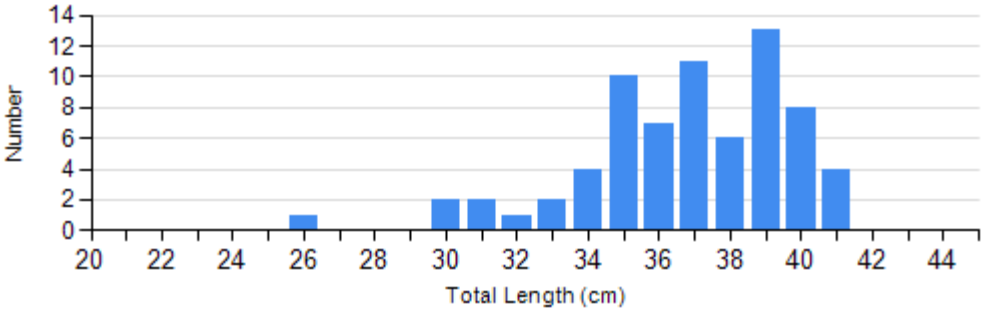


2024

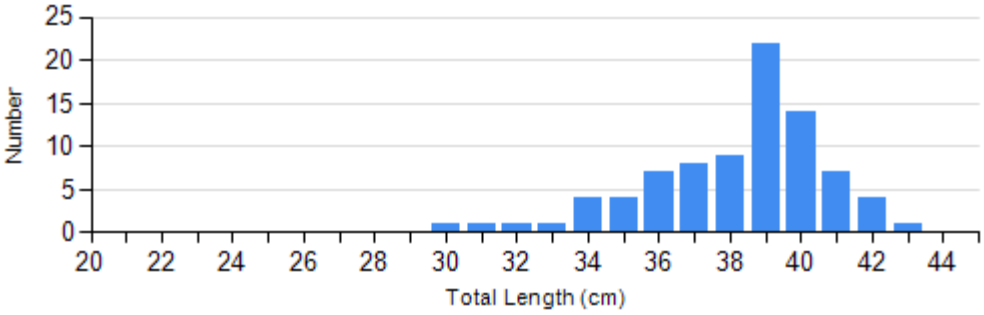
Species: White Bass
Gear: AFS std gill net



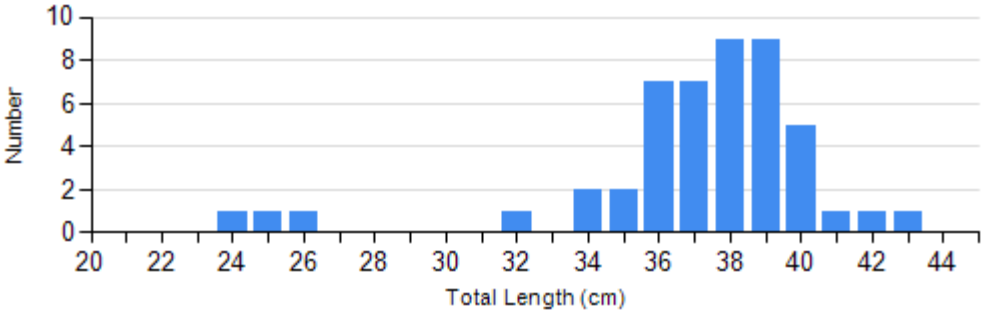
2020



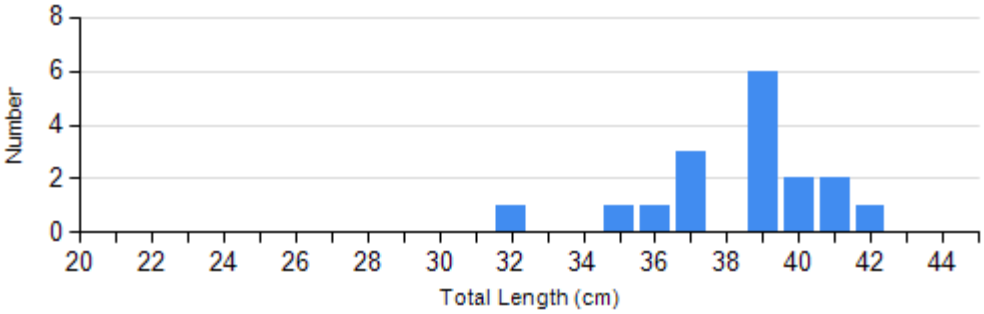
2021



2022

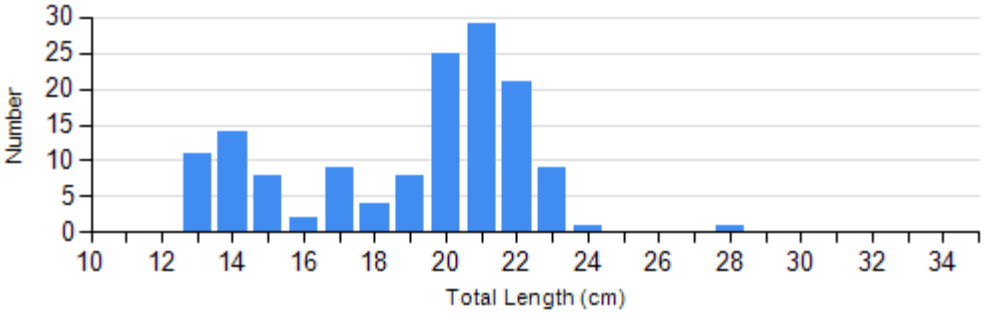


2023

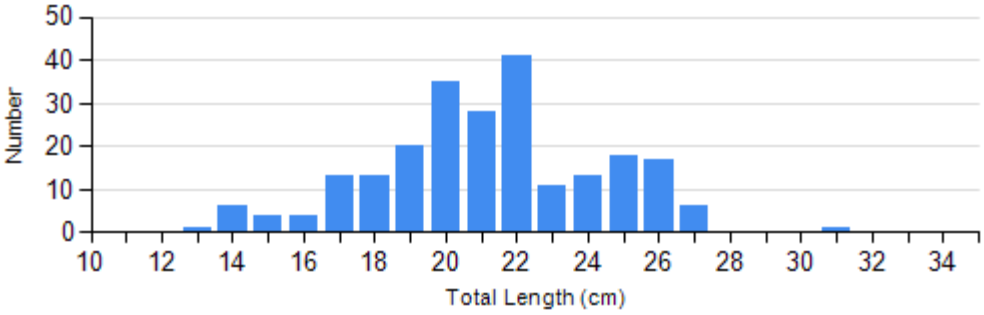


2024

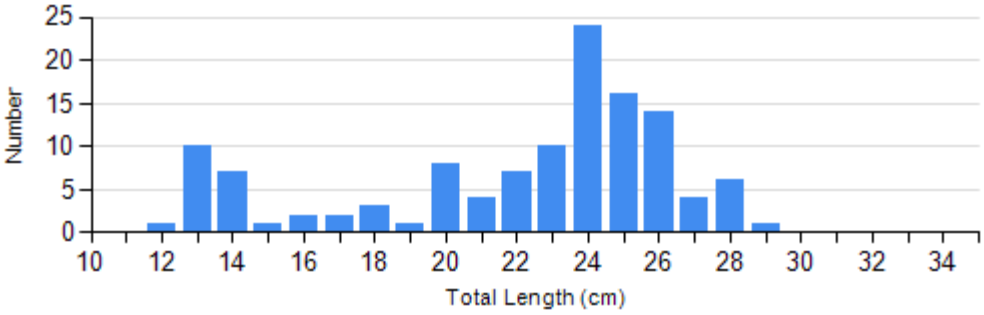
Species: Yellow Perch
Gear: AFS std gill net



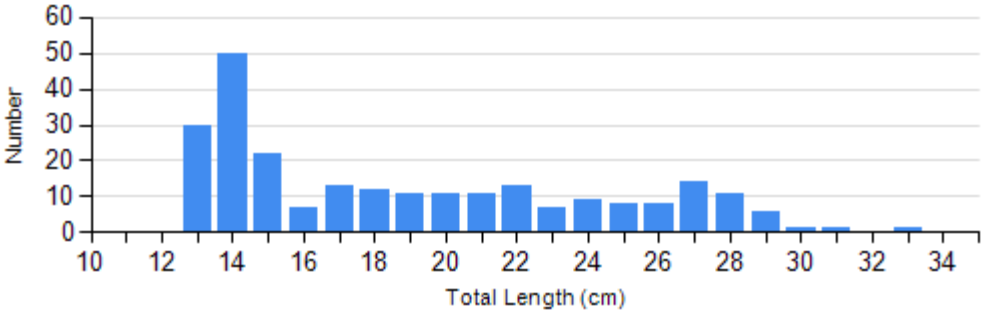
2020



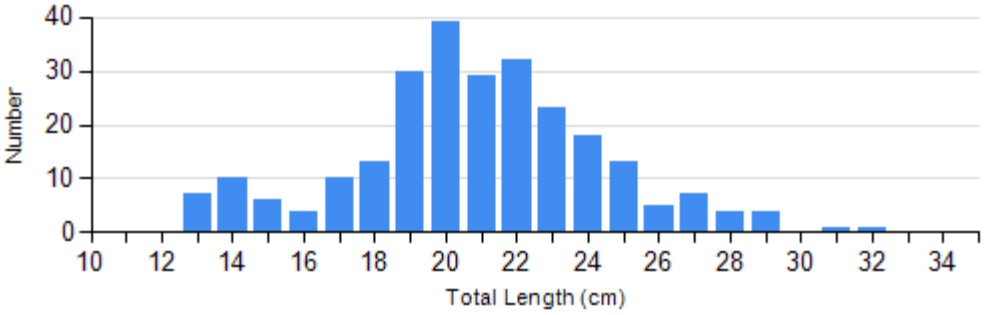
2021



2022



2023

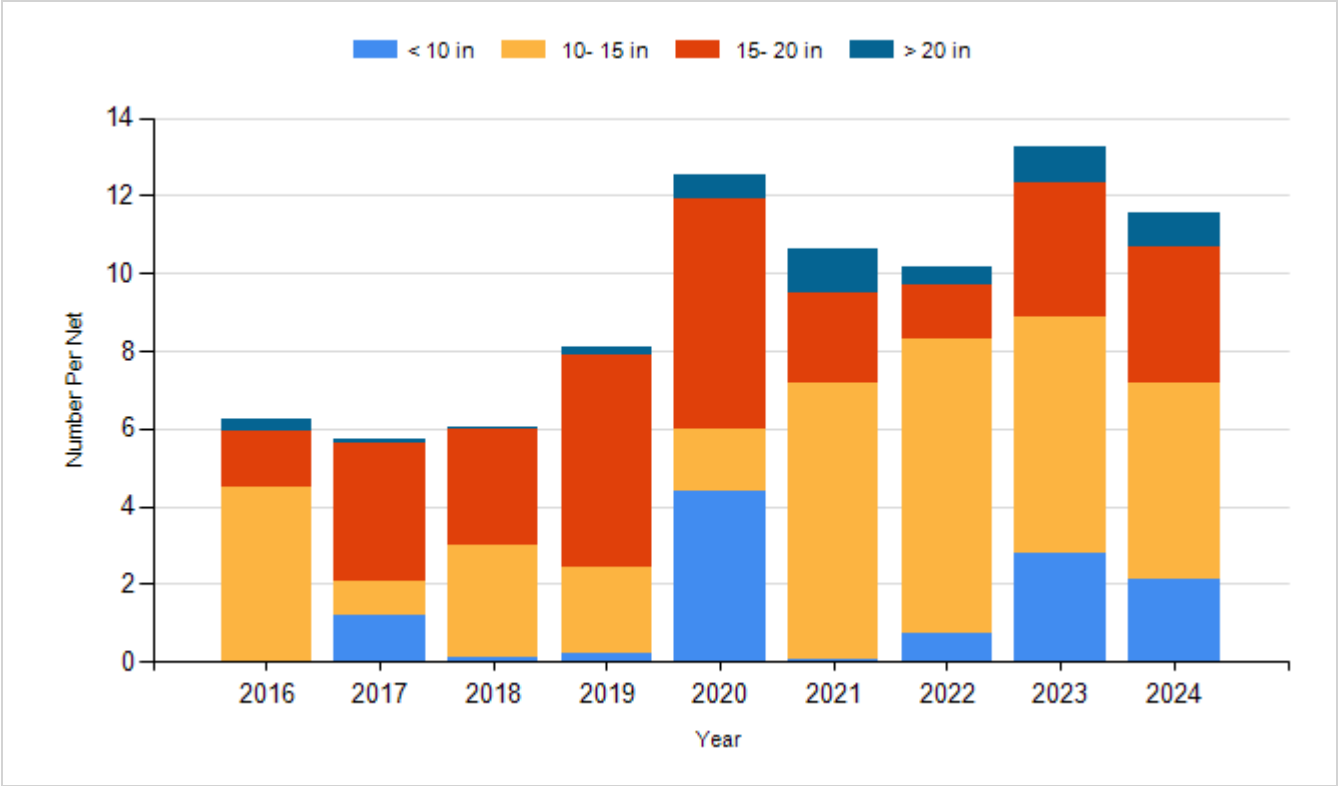


2024

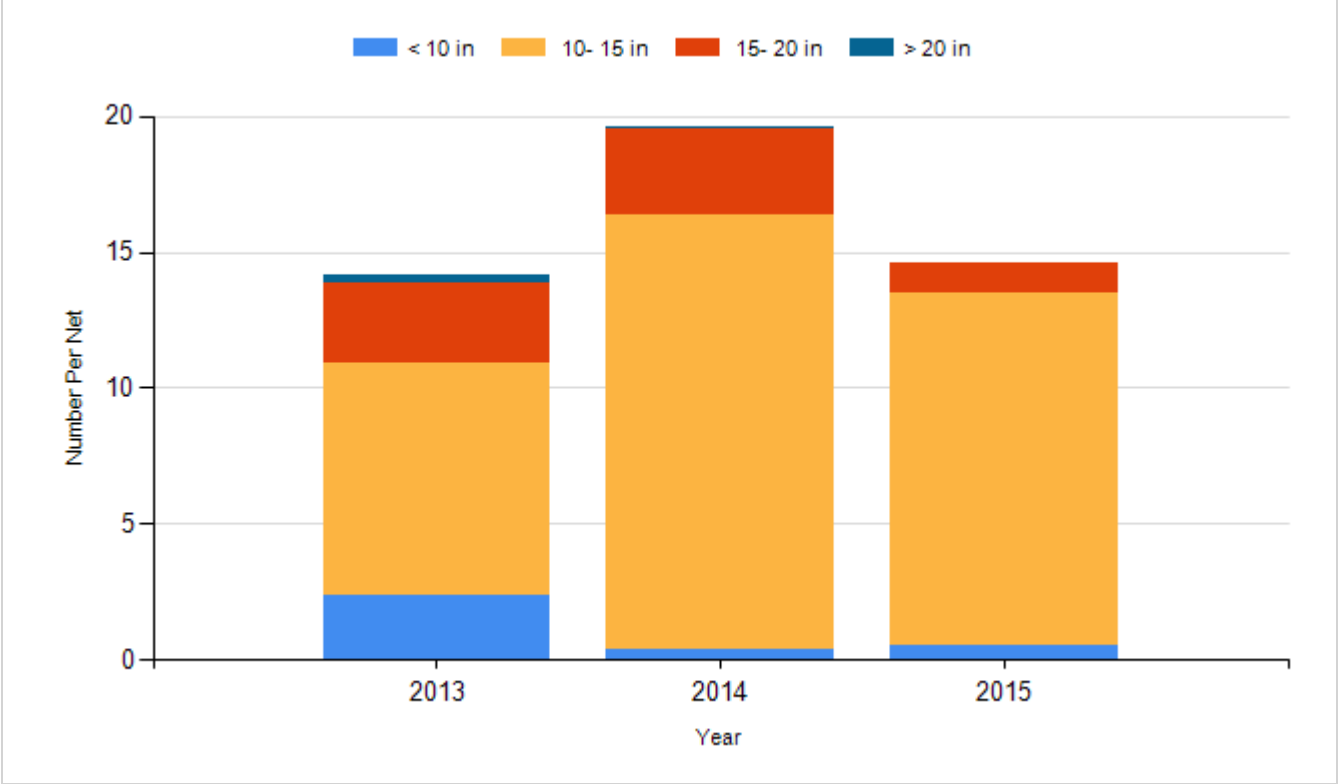
Historic Fish Sizes and Relative Abundance

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

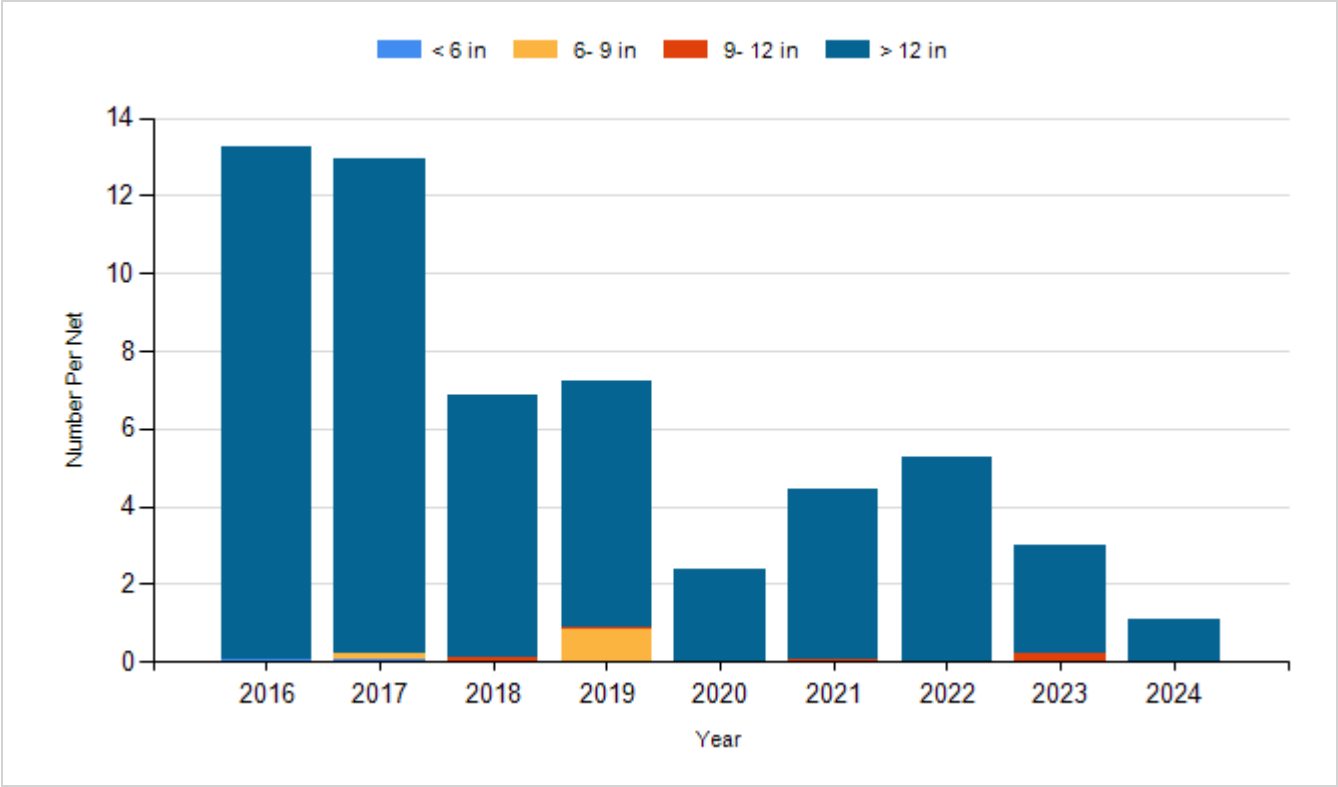
Species: Walleye
Gear: AFS std gill net



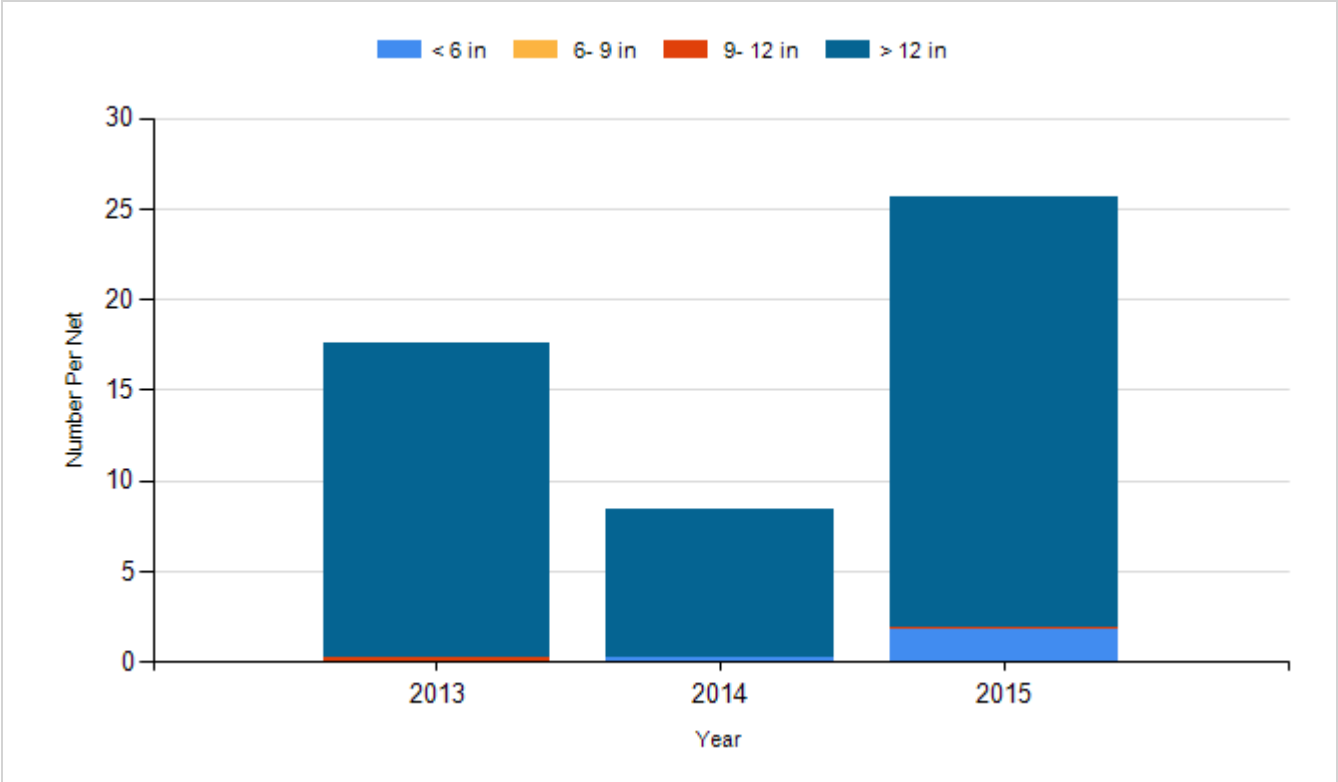
Species: Walleye
Gear: std exp gill net



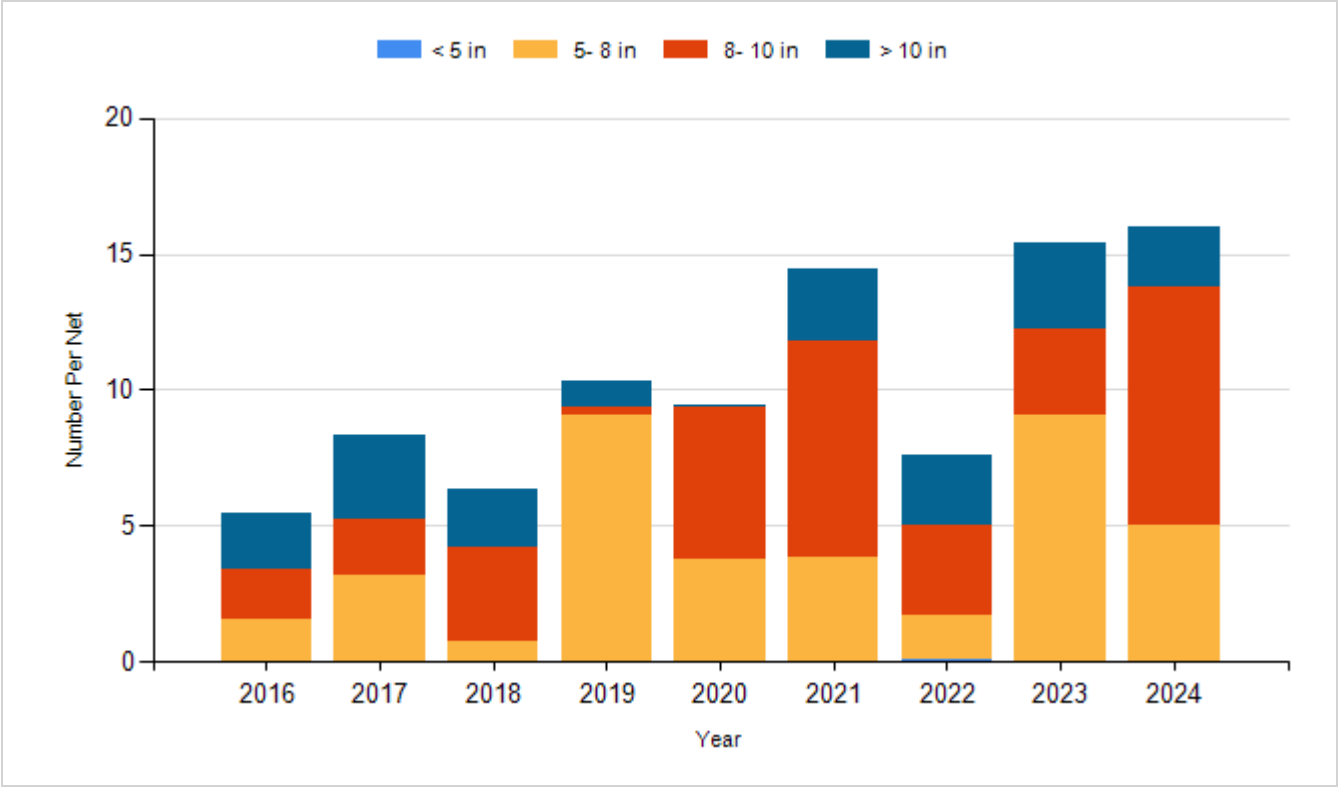
Species: White Bass
Gear: AFS std gill net



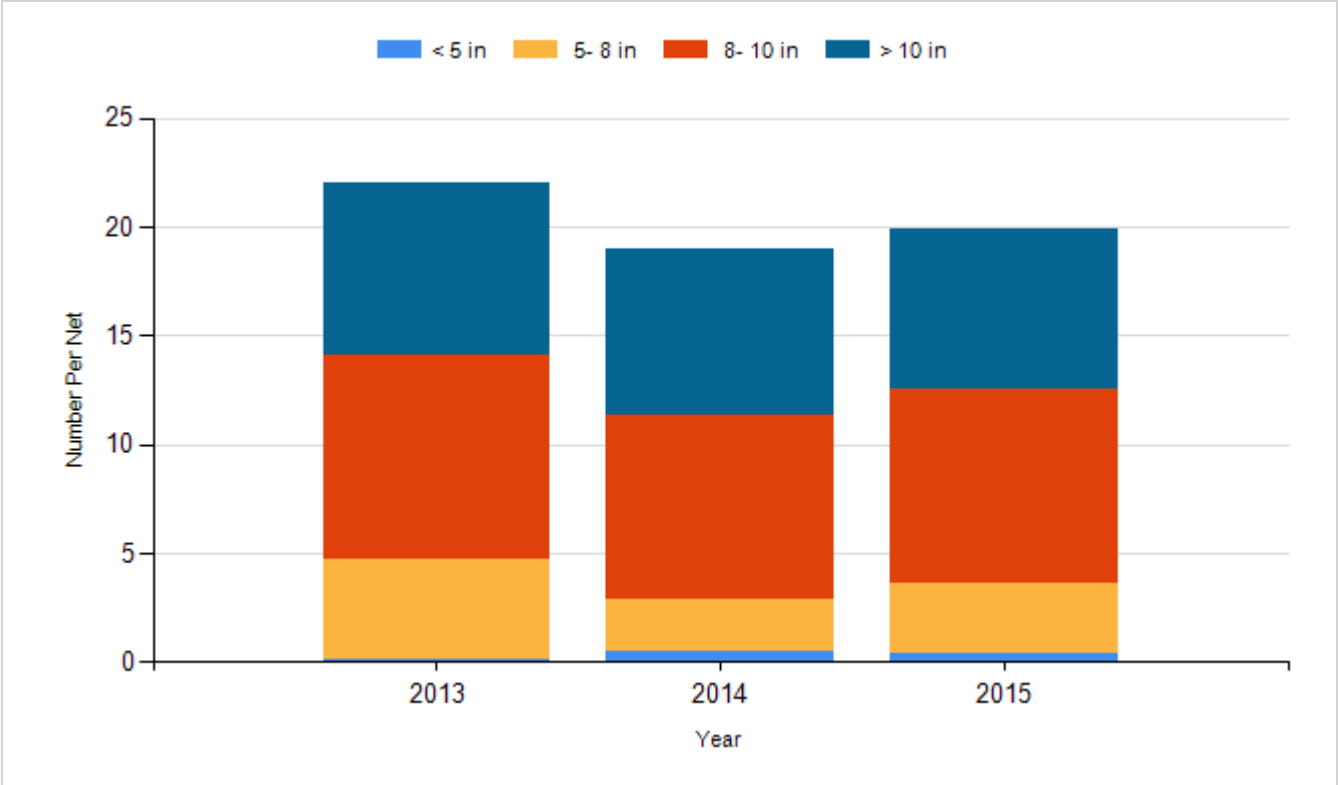
Species: White Bass
Gear: std exp gill net



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
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