2023 Roscoe Lake Survey Summary

Water: Roscoe Lake

County: Edmunds

Legal Description: T123-R70-S29&32

GPS: 45.432929, -99.317546

Surface Area: 837 Acres

Class: Warm Water Permanent

Maximum Depth: 25 feet

Mean Depth: 9 feet

Roscoe Lake is an 837-acre natural lake 1 mile east and ½ mile south of the City of Roscoe in northcentral Edmunds County. A gravel road from US HWY 12 provides access to the northwest corner of the lake. There are no boat launch or other public use facilities at Roscoe Lake. Most of the angling pressure at Roscoe occurs during the ice-fishing season.

Primary game fish managed at Roscoe include Walleye and Yellow Perch. Yellow Perch were introduced naturally when the lake filled to current levels. The first recorded Walleye stocking occurred in 2016. No other species have been documented at Roscoe Lake.

Roscoe was surveyed on August 1-2, 2023, utilizing ¾ inch standard frame nets sets and AFS standard gill net sets. Yellow Perch and Walleye were the only game fish species observed during the 2023 survey.

- **Yellow Perch:** 46.8 fish per frame net were sampled with all individuals at or below 6 inches. Age and growth information indicated all perch netted were from the 2021 year class. The perch observed were relating to shoreline habitat and only found in frame net sets. Relative condition (weight at length) was above the state average.

- **Walleye:** Catch rates were relatively high with an average of 8.8 individuals sampled per AFS gill net set. Several year classes of Walleye were recorded, and numerous fish were observed between 20 and 25 inches. Condition was at or above the state average. Walleye fry have been stocked at Roscoe in 2016, 2018, 2021 and 2023. In addition, the current survey recorded fish from the 2019 and 2022 year classes indicating natural reproduction occurs on years with favorable conditions. It is anticipated that the 2023 fry stocking will develop another strong year class due to higher spring water levels than observed in previous years.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Roscoe, Edmunds County
NFS-Lake-730-001
2023

Lake Information

Name: Roscoe

County: Edmunds

Surface Area: 837 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 01, 2023	3 net-nights
AFS std gill net	Aug 02, 2023	1 net-nights
frame net (std 3/4 in)	Aug 01, 2023	5 net-nights
frame net (std 3/4 in)	Aug 02, 2023	5 net-nights

Common Fish Species Present

Yellow Perch

Walleye

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	Walleye	35	8.8	2.9	86		49	13	95	5
frame net (std 3/4 in)	Walleye	11	1.1	0.6	91		91		86	3
	Yellow Perch	468	46.8	22.7	1		0		101	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	Walleye					12.3		8.0			8.8	9.70
	Yellow Perch					1.3		11.5			0.0	4.27
frame net (std 3/4 in)	Walleye					4.5		1.1			1.1	2.23
	Yellow Perch					0.6		0.0			46.8	15.80

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					78		100			86
		PSD-P					0		50			49
		Wr					95		102			95
	Yellow Perch	PSD					100		91			
		PSD-P					100		0			
		Wr					91		100			
frame net (std 3/4 in)	Walleye	PSD					87		100			91
		PSD-P					0		64			91
		Wr					92		99			86
	Yellow Perch	PSD					100					1
		PSD-P					100					0
		Wr					86					101

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2022	1	1	274									
2022	1	5	212 (5.3)									
2021	2	12	241 (7.4)	352 (9.2)								
2019	4	1	201	340	390	489						
2019	4	6	234 (13.5)	330 (9.5)	406 (11.2)	487 (6.1)						
2018	5	3	255 (17.2)	335 (16.6)	423 (7)	494 (5.8)	549 (3.8)					
2018	5	7	234 (8.9)	338 (11.6)	414 (10.9)	480 (8.4)	543 (8.1)					
2017	6	1	242	359	441	504	557	591				
2017	6	1	280	345	409	517	566	597				
2016	7	4	237 (7.7)	330 (5.4)	402 (1.5)	467 (9.9)	525 (14.9)	572 (8.1)	604 (8.5)			
2016	7	4	243 (12.2)	349 (17.7)	413 (25.3)	455 (17)	511 (6.4)	563 (7.3)	596 (2.5)			
Weighted Mean		45	237	342	411	480	536	573	600			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2022	1	1										
2022	1	5										
2021	2	12										
2019	4	1										
2019	4	6										
2018	5	3										
2018	5	7										
2017	6	1										

2017	6	1
2016	7	4
2016	7	4
Weighted Mean		45

Species: Yellow Perch

			Mean back-calculated length (SE) at age									
Year Class	Age	N	1	2	3	4	5	6	7	8	9	10
2021	2	27	93 (2.5)	133 (3.1)								
Weighted Mean		27	93	133								

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2021	2	27										
Weighted Mean		27										

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	35	320 (5)	445 (12)		525 (6)	577 (7)	612 (1)	619 (4)			
2020	32				508 (31)		477 (1)				
2018	37		396 (36)		386 (1)						

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	46			150 (1)	200 (6)	227 (31)	232 (7)	244 (1)			

Fish Condition

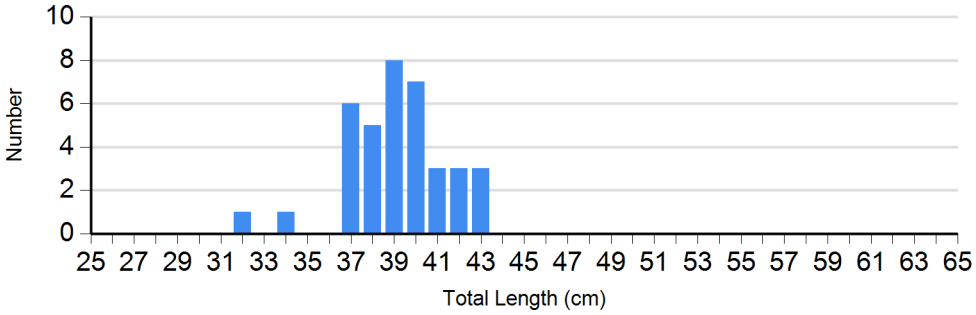
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	0		16	102 (1.7)	16	101 (1.6)	0	
	2023	5	90 (3.0)	13	101 (4.3)	16	94 (7.7)	1	73
Yellow Perch Gill Net	2020	4	103 (4.2)	42	99 (1.1)	0		0	

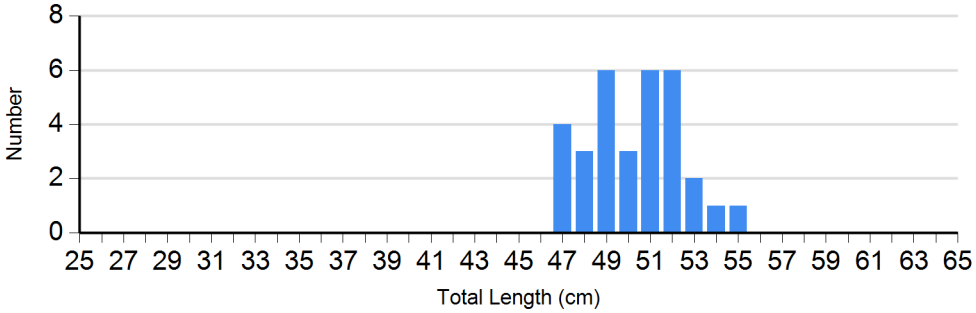
Length Frequency Distribution

Length frequency histogram of species sampled by year.

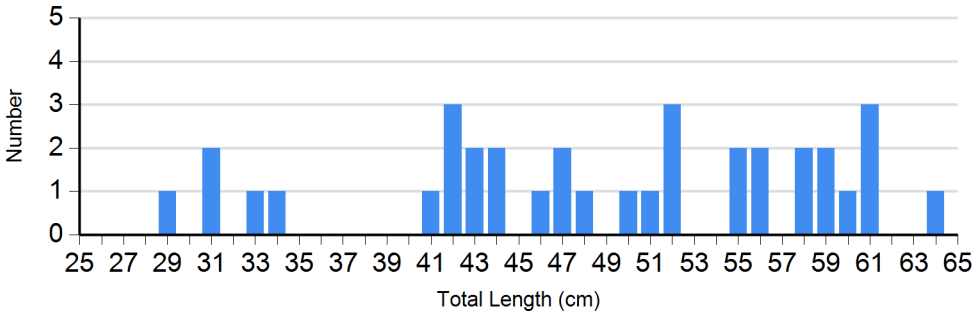
Species: Walleye
Gear: AFS std gill net



2018

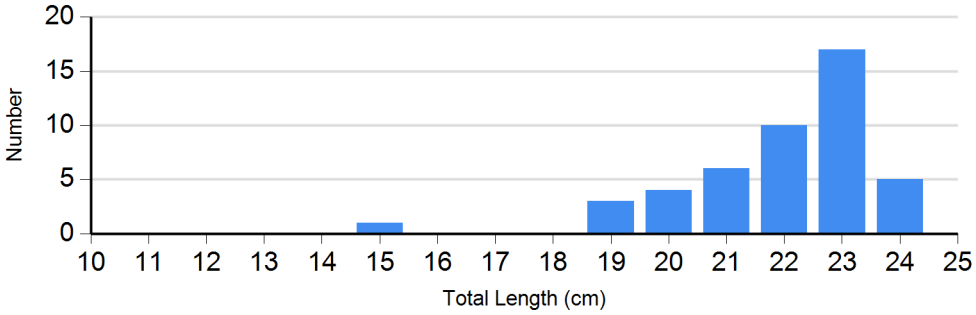


2020



2023

Species: Yellow Perch
Gear: AFS std gill net

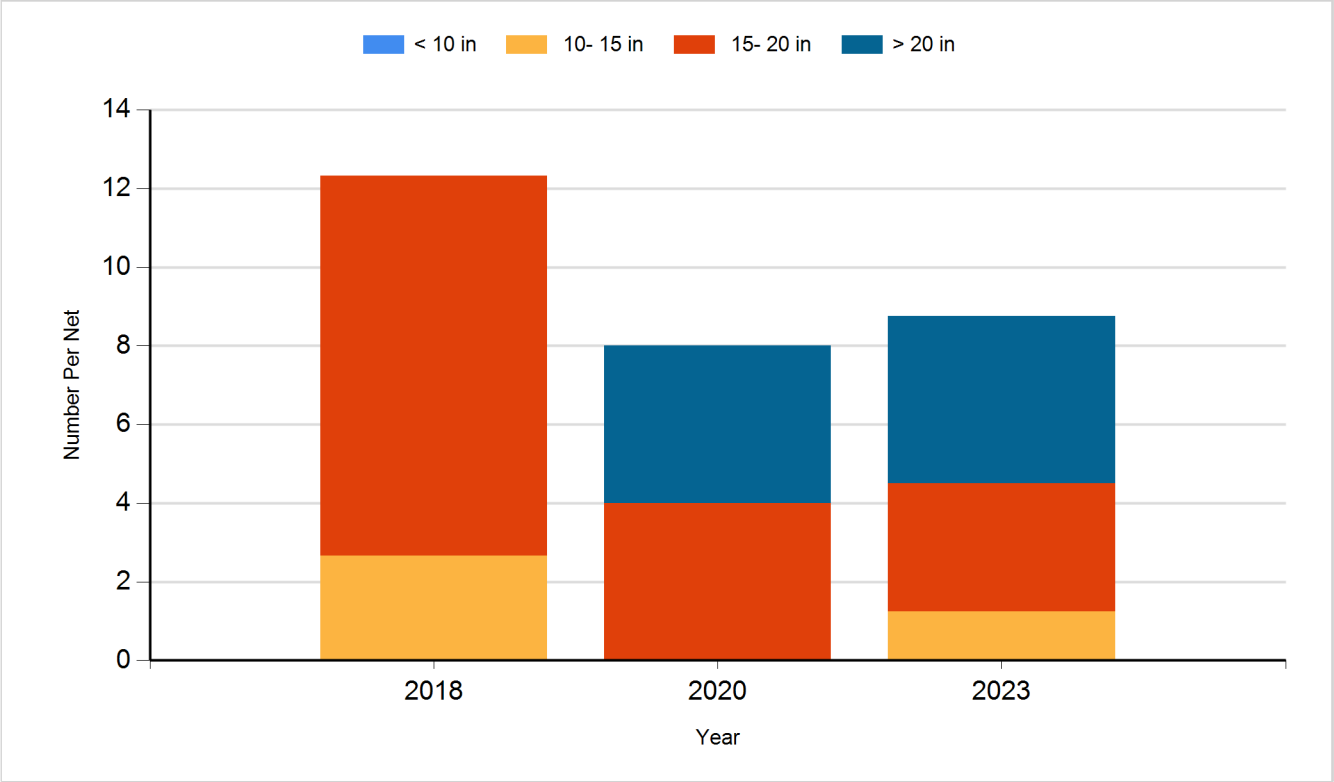


2020

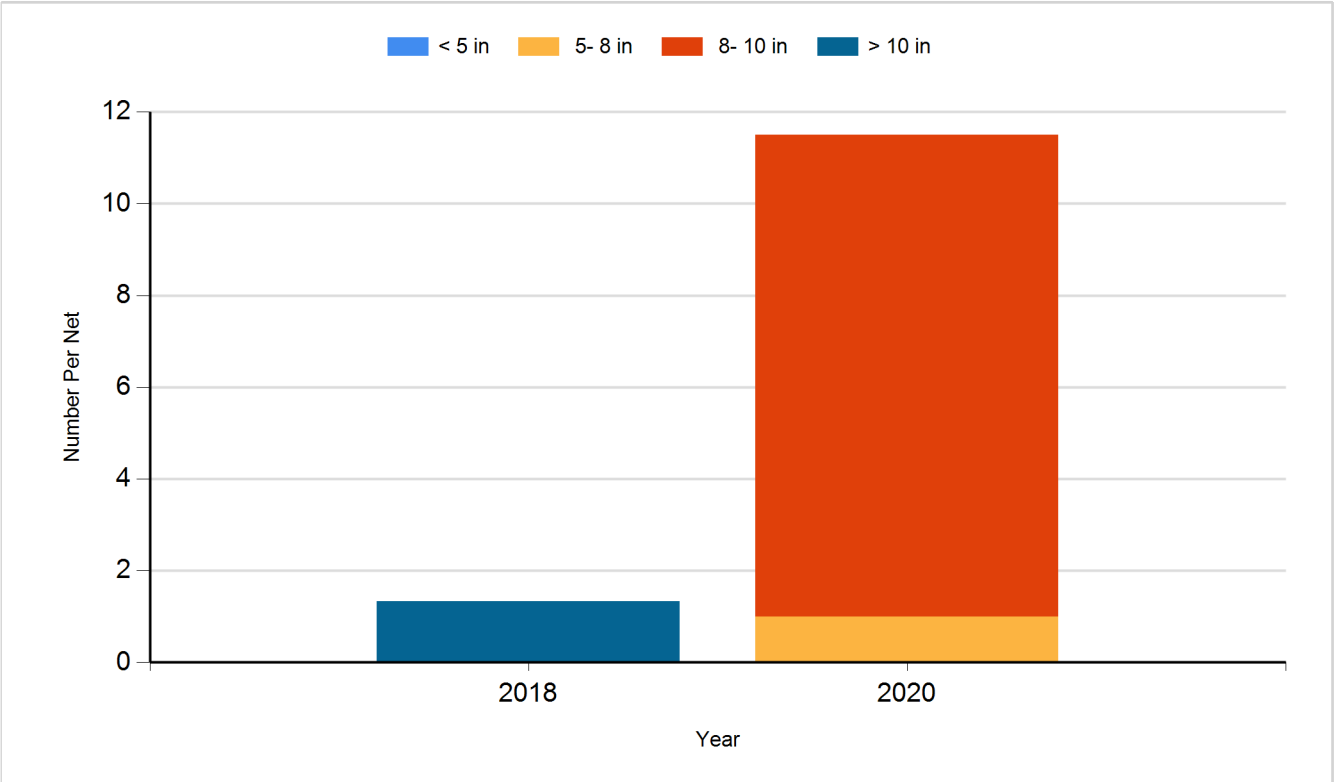
Historic Fish Sizes and Relative Abundance

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

Species: Walleye
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2016	Walleye	Fry	400,000
2018	Saugeye	Small Fingerling	30,160
2021	Walleye	Fry	400,000
2023	Walleye	Fry	400,000