Antelope Lake Survey Summary

Antelope Lake, located 2.0 miles south and 2.0 miles east of Webster, is managed as a walleye and yellow perch fishery but other fish species (e.g., northern pike, smallmouth bass) are present and may contribute to the fishery.

- **Walleye.** Walleye numbers were considerably lower in 2023 than in 2020. At 4.8/gill net, relative abundance was considered low. Sampled walleyes ranged in length from 8.3 to 26.4 inches of those that were at least 10.0 inches 75% were ≥ 15.0 inches and 16% were ≥20.0 inches. Nine year classes (2009, 2011, 2013 and 2017 – 2022) were represented. Individuals from the 2017 (age-6) and 2021 (age-2) cohorts, which coincided with fry stockings, were among the most numerous accounting for 37% of walleyes sampled, while those from the naturally produced 2022 (age-1) year class made up an additional 24%. The 2023 sample suggests good walleye growth with mean length at capture at age 3 and age 4 of 16.5 and 18.3 inches.

- **Yellow Perch**. Yellow perch were the most abundant species in the 2023 gill net catch. At 16.5 per gill net, relative abundance was considered high for Antelope Lake. Sampled yellow perch ranged in length from 4.7 to 12.2 inches, only 4% were ≥8.0 inches and 1% were ≥10.0 inches. Three year classes (2018, 2021, and 2022) contributed to the catch. Individuals from the 2022 (age-1) cohort, which had a mean length at capture of 6.1 inches, were the most abundant accounting for 96% of fish in the sample.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Antelope, Day County
UBS-Lake-317-000
2023

Lake Information

Name: Antelope

County: Day

Surface Area: 752 Acres

Maximum Depth: 20 Feet

Mean Depth: 12 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 10, 2023	4 net-nights
AFS std gill net	Jul 12, 2023	4 net-nights
AFS std gill net	Jul 13, 2023	4 net-nights

Common Fish Species Present

Northern Pike

Walleye

Yellow Perch

Rock Bass

Smallmouth Bass

Common Carp

White Sucker

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	Common Carp	5	0.4	0.3	100		100		107	5
	Northern Pike	9	0.8	0.2	56		33		79	7
	Rock Bass	9	0.7	0.3	88		63		109	3
	Smallmouth Bass	5	0.4	0.3	100		100		104	6
	Walleye	67	4.8	1.2	75	9	16	7	90	1
	White Sucker	1	0.1	0.1	100		100		106	
	Yellow Perch	199	16.5	3.7	4	2	1		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	Common Carp				0.0			0.8			0.4	0.40
	Northern Pike				0.5			0.8			0.8	0.70
	Rock Bass				0.2			0.1			0.7	0.33
	Smallmouth Bass				0.2			0.0			0.4	0.20
	Walleye				4.2			13.8			4.8	7.60
	White Sucker				0.0			0.1			0.1	0.07
	Yellow Perch				4.3			0.2			16.5	7.00
frame net (std 3/4 in)	Bluegill	3.0										3.00
	Common Carp	0.8										0.80
	Northern Pike	1.6										1.60
	Rock Bass	0.8										0.80
	Smallmouth Bass	0.3										0.30
	Walleye	1.8										1.80
	Yellow Perch	0.5										0.50
std exp gill net	Bluegill	0.3										0.30
	Common Carp	2.0										2.00
	Northern Pike	0.5										0.50
	Rock Bass	0.8										0.80
	Walleye	12.5										12.50
	Yellow Perch	12.3										12.30

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				90			15			75
		PSD-P				40			6			16
		Wr				96			92			90
	Yellow Perch	PSD				27			50			4
		PSD-P				0			50			1
		Wr				104			115			114
std exp gill net	Walleye	PSD	66									
		PSD-P	18									
		Wr	96									
	Yellow Perch	PSD	2									
		PSD-P	2									
		Wr	104									

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	66	249 (16)	369 (12)	420 (8)	465 (5)	468 (7)	484 (13)				654 (5)
2020	176	244 (15)	309 (61)	356 (90)		526 (1)		544 (3)			646 (6)
2017	50	292 (4)	408 (13)	485 (10)	519 (15)	556 (1)			605 (4)	670 (2)	650 (1)
2014	64	245 (31)	395 (1)	442 (10)		513 (18)	515 (3)				582 (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+
2023	199	154 (191)	210 (7)			317 (1)					
2017	53	142 (21)	198 (32)								
2014	52	151 (47)	167 (4)	262 (1)							

Fish Condition

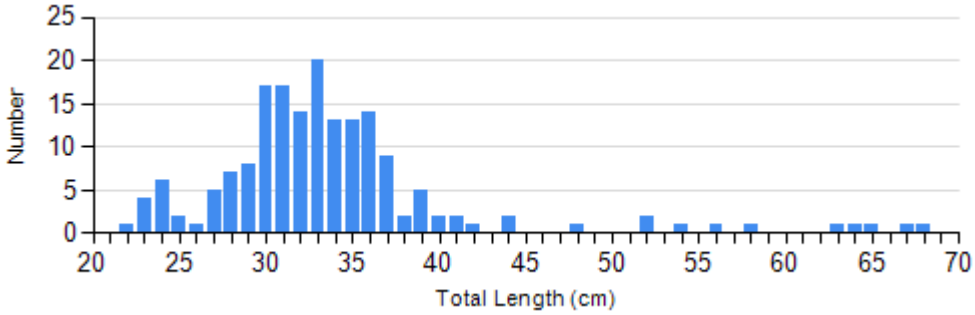
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	140	93 (0.4)	15	94 (1.5)	5	90 (3.7)	5	85 (3.6)
	2023	14	92 (1.1)	34	92 (0.9)	5	85 (2.0)	4	81 (2.9)
Yellow Perch Gill Net	2020	1	105	0		1	126	0	
	2023	190	114 (0.6)	7	123 (5.8)	0		1	101

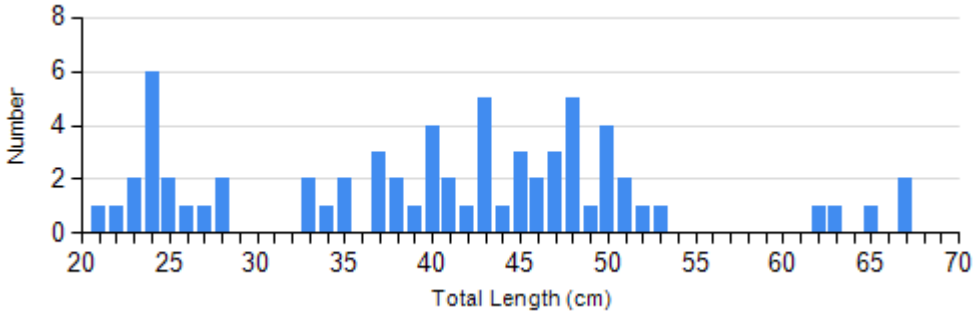
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net

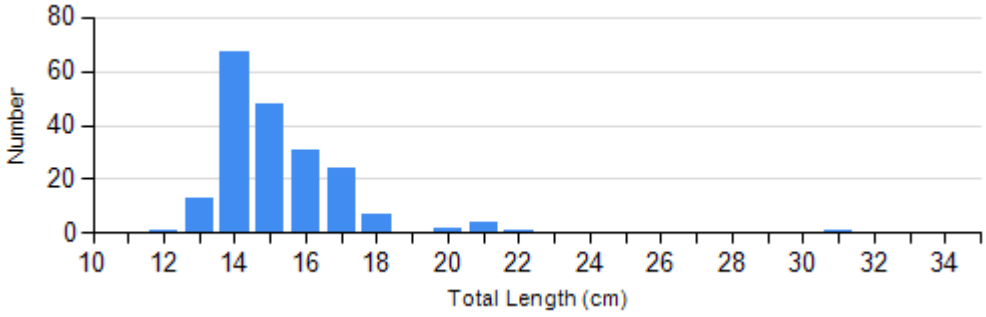


2020



2023

Species: Yellow Perch
Gear: AFS std gill net

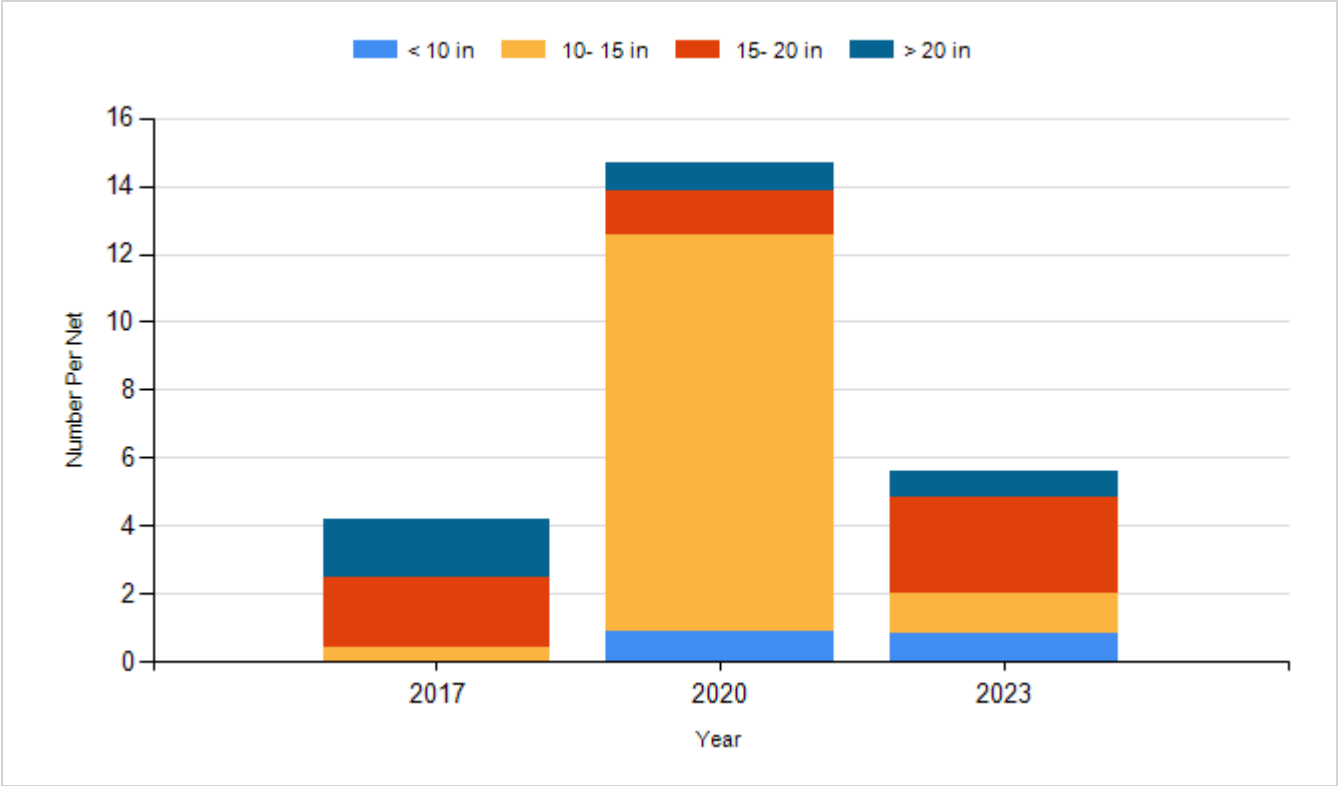


2023

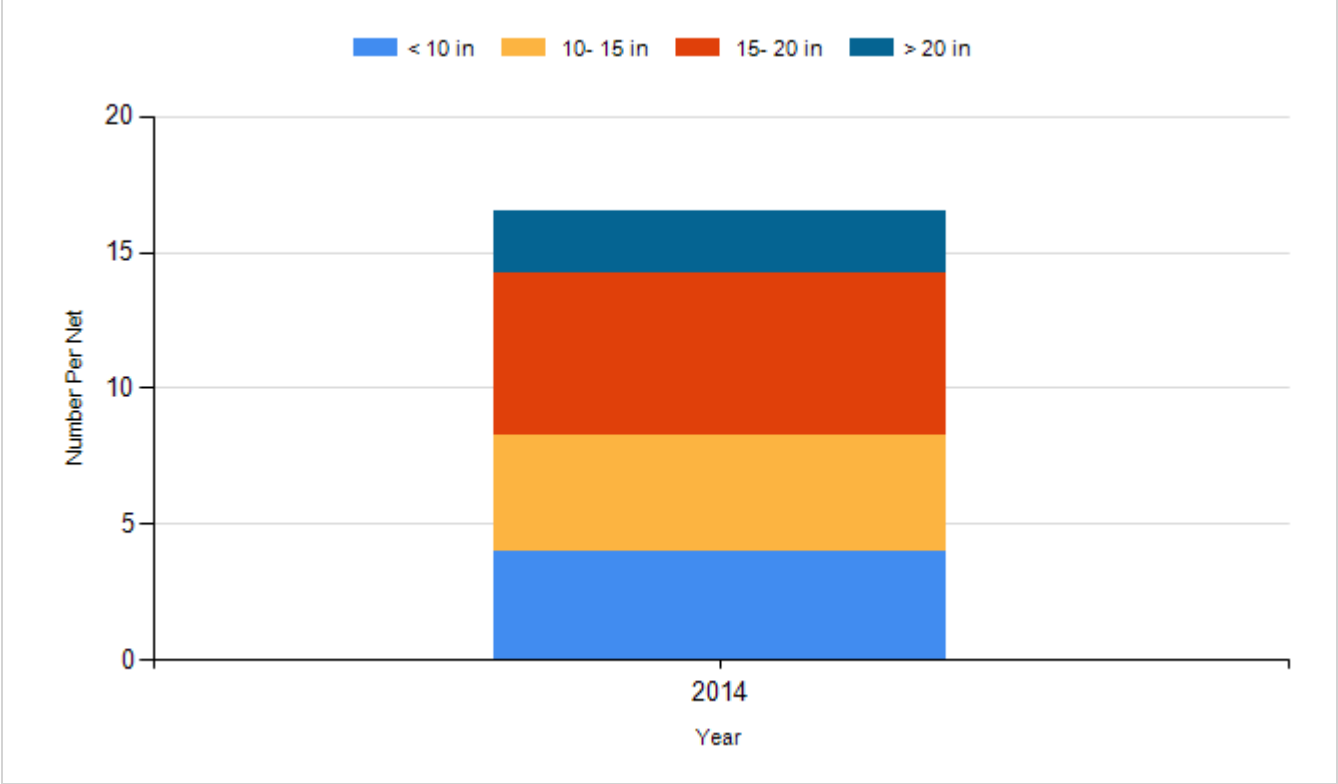
Historic Fish Sizes and Relative Abundance

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

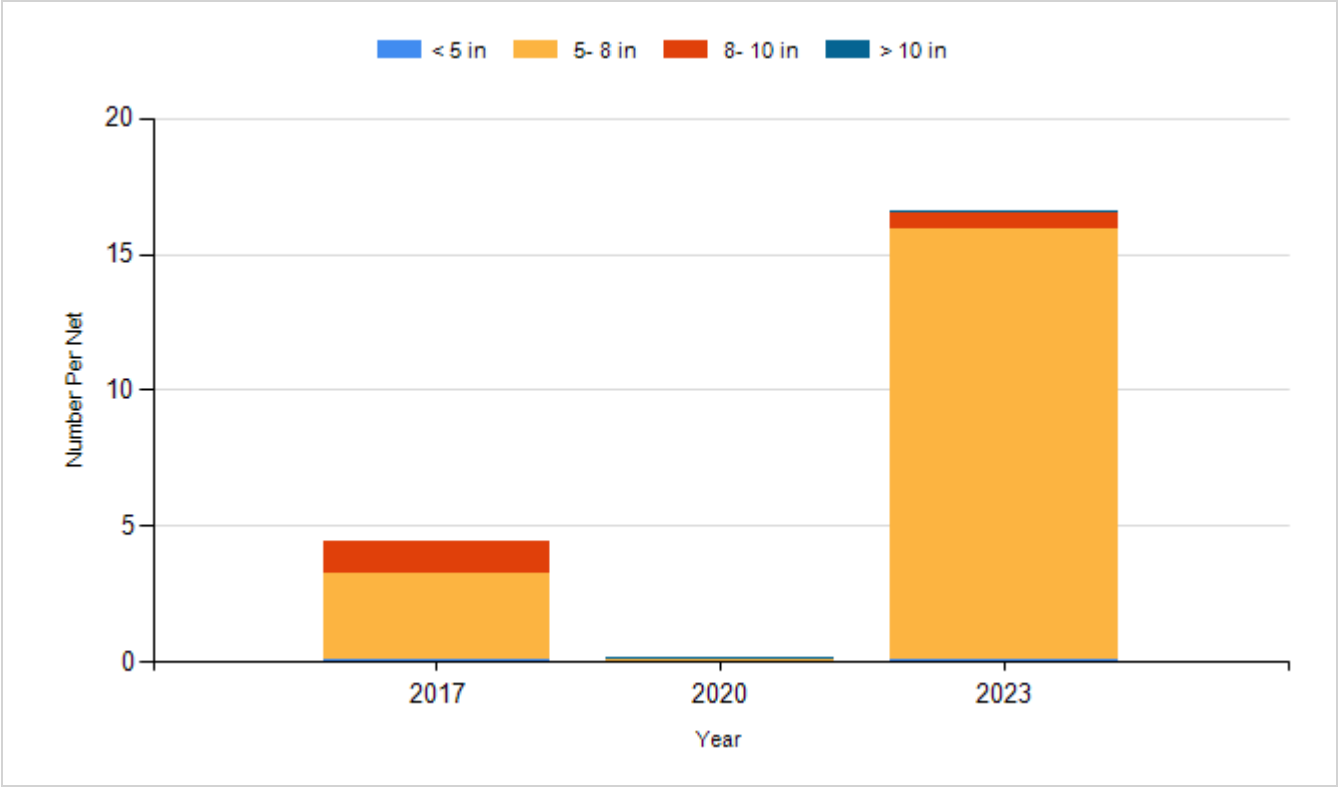
Species: Walleye
Gear: AFS std gill net



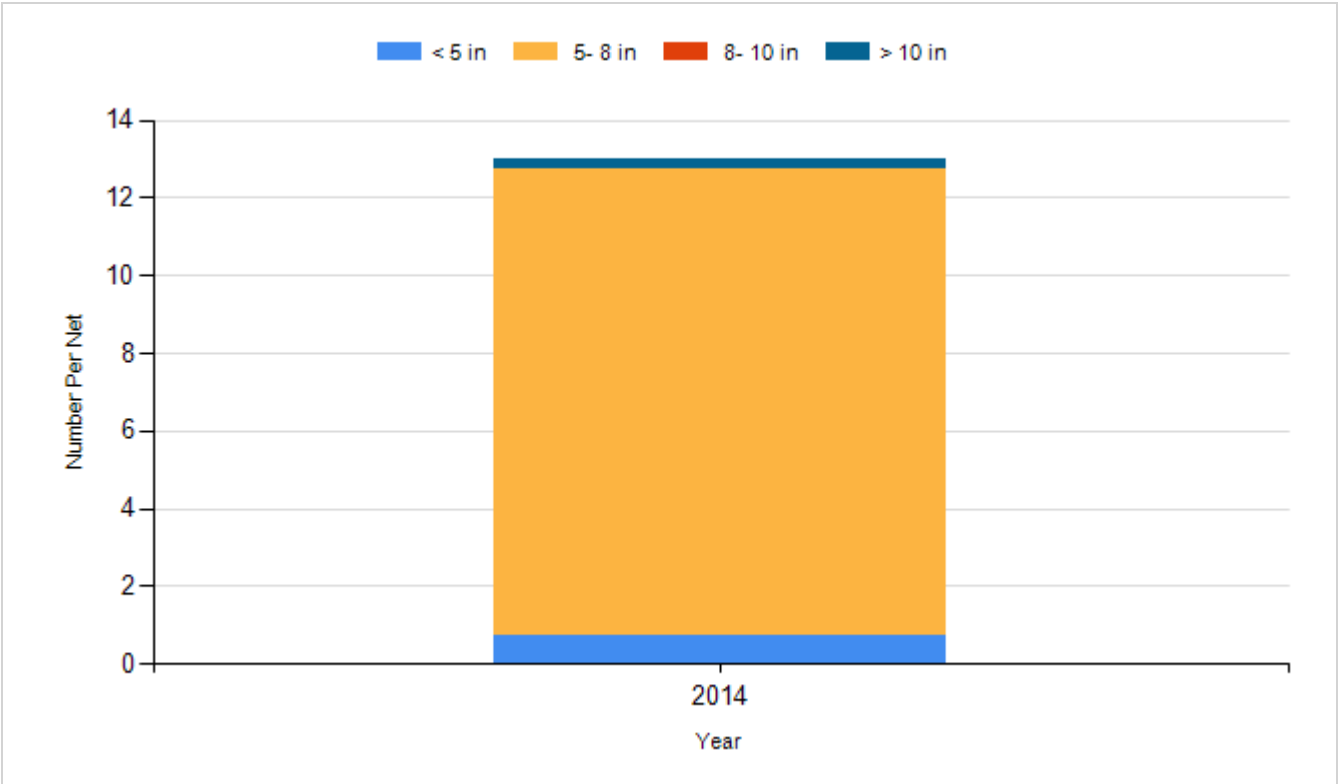
Species: Walleye
Gear: std exp gill net



Species: 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	600,000
2015	Walleye	Fry	365,000
2017	Walleye	Fry	400,000
2019	Walleye	Fry	365,000
2021	Walleye	Fry	400,000
2023	Walleye	Fry	400,000

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Antelope, Day County
UBS-Lake-317-000
2023

Lake Information

Name: Antelope

County: Day

Surface Area: 752 Acres

Maximum Depth: 20 Feet

Mean Depth: 12 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 10, 2023	4 net-nights
AFS std gill net	Jul 12, 2023	4 net-nights
AFS std gill net	Jul 13, 2023	4 net-nights

Common Fish Species Present

Northern Pike

Walleye

Yellow Perch

Rock Bass

Smallmouth Bass

Common Carp

White Sucker

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	Common Carp	5	0.4	0.3	100		100		107	5
	Northern Pike	9	0.8	0.2	56		33		79	7
	Rock Bass	9	0.7	0.3	88		63		109	3
	Smallmouth Bass	5	0.4	0.3	100		100		104	6
	Walleye	67	4.8	1.2	75	9	16	7	90	1
	White Sucker	1	0.1	0.1	100		100		106	
	Yellow Perch	199	16.5	3.7	4	2	1		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	Common Carp				0.0			0.8			0.4	0.40
	Northern Pike				0.5			0.8			0.8	0.70
	Rock Bass				0.2			0.1			0.7	0.33
	Smallmouth Bass				0.2			0.0			0.4	0.20
	Walleye				4.2			13.8			4.8	7.60
	White Sucker				0.0			0.1			0.1	0.07
	Yellow Perch				4.3			0.2			16.5	7.00
frame net (std 3/4 in)	Bluegill	3.0										3.00
	Common Carp	0.8										0.80
	Northern Pike	1.6										1.60
	Rock Bass	0.8										0.80
	Smallmouth Bass	0.3										0.30
	Walleye	1.8										1.80
	Yellow Perch	0.5										0.50
std exp gill net	Bluegill	0.3										0.30
	Common Carp	2.0										2.00
	Northern Pike	0.5										0.50
	Rock Bass	0.8										0.80
	Walleye	12.5										12.50
	Yellow Perch	12.3										12.30

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	Common Carp	PSD							80			100
		PSD-P							40			100
		Wr							110			107
	Northern Pike	PSD				100			11			56
		PSD-P				50			0			33
		Wr				89			94			79
	Rock Bass	PSD				100			0			88
		PSD-P				50			0			63
		Wr				119			127			109
	Smallmouth Bass	PSD				100						100
		PSD-P				100						100
		Wr				113						104
	Walleye	PSD				90			15			75
		PSD-P				40			6			16
		Wr				96			92			90
	White Sucker	PSD							100			100
		PSD-P							100			100
		Wr							95			106
	Yellow Perch	PSD				27			50			4
		PSD-P				0			50			1
		Wr				104			115			114
frame net (std 3/4 in)	Common Carp	PSD	11									
		PSD-P	11									
		Wr	111									
	Northern Pike	PSD	84									
		PSD-P	0									
		Wr	92									
	Rock Bass	PSD	50									
		PSD-P	20									
		Wr	121									
	Smallmouth Bass	PSD	100									
		PSD-P	100									
		Wr	128									

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
frame net (std 3/4 in)	Walleye	PSD	100									
		PSD-P	91									
		Wr	87									
	Yellow Perch	PSD	0									
		PSD-P	0									
		Wr	102									
std exp gill net	Common Carp	PSD	0									
		PSD-P	0									
		Wr	107									
	Northern Pike	PSD	100									
		PSD-P	50									
		Wr	85									
	Rock Bass	PSD	0									
		PSD-P	0									
		Wr	113									
	Walleye	PSD	66									
		PSD-P	18									
		Wr	96									
	Yellow Perch	PSD	2									
		PSD-P	2									
		Wr	104									

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	66	249 (16)	369 (12)	420 (8)	465 (5)	468 (7)	484 (13)				654 (5)
2020	176	244 (15)	309 (61)	356 (90)		526 (1)		544 (3)			646 (6)
2017	50	292 (4)	408 (13)	485 (10)	519 (15)	556 (1)			605 (4)	670 (2)	650 (1)
2014	64	245 (31)	395 (1)	442 (10)		513 (18)	515 (3)				582 (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+
2023	199	154 (191)	210 (7)			317 (1)					
2017	53	142 (21)	198 (32)								
2014	52	151 (47)	167 (4)	262 (1)							

Fish Condition

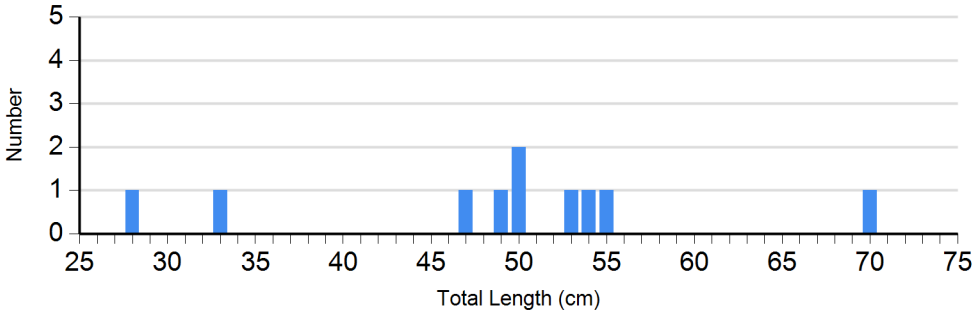
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Common Carp Gill Net	2020	2	124 (0.6)	4	107 (3.5)	3	105 (4.4)	1	113
	2023	0		0		5	107 (3.6)	0	
Northern Pike Gill Net	2020	8	95 (1.7)	1	90	0		0	
	2023	4	92 (2.0)	2	83 (0.0)	3	59 (4.7)	0	
Walleye Gill Net	2020	140	93 (0.4)	15	94 (1.5)	5	90 (3.7)	5	85 (3.6)
	2023	14	92 (1.1)	34	92 (0.9)	5	85 (2.0)	4	81 (2.9)
White Sucker Gill Net	2020	0		0		1	95	0	
	2023	0		0		0		1	106
Yellow Perch Gill Net	2020	1	105	0		1	126	0	
	2023	190	114 (0.6)	7	123 (5.8)	0		1	101

Length Frequency Distribution

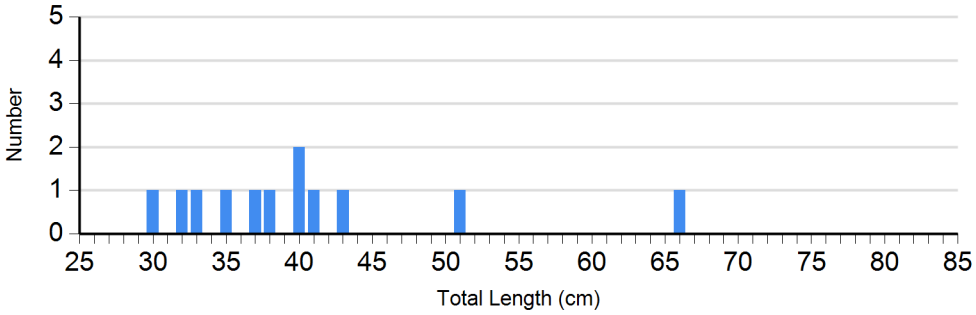
Length frequency histogram of species sampled by year.

Species: Common Carp
Gear: AFS std gill net



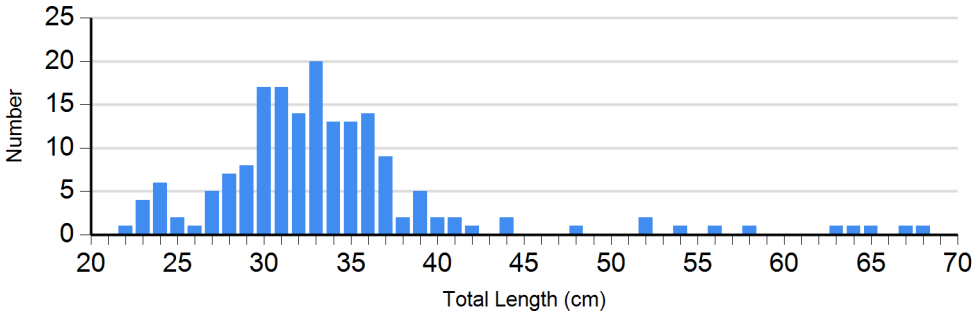
2020

Species: Northern Pike
Gear: AFS std gill net

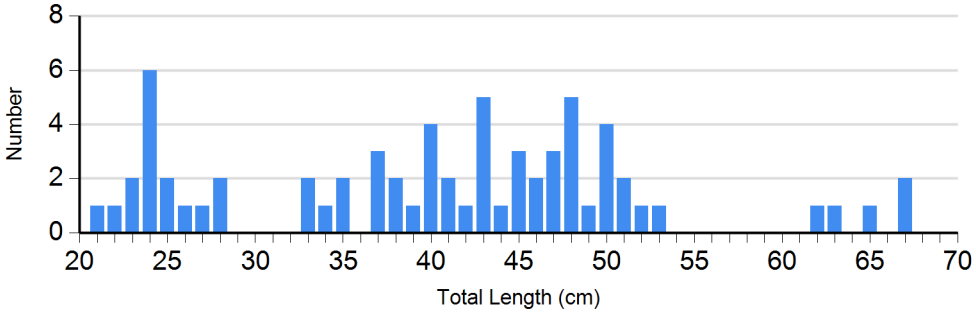


2020

Species: Walleye
Gear: AFS std gill net

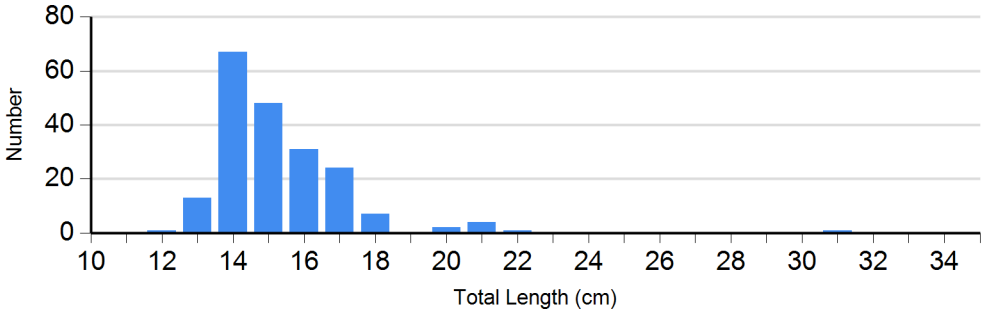


2020



2023

Species: Yellow Perch
Gear: AFS std gill net

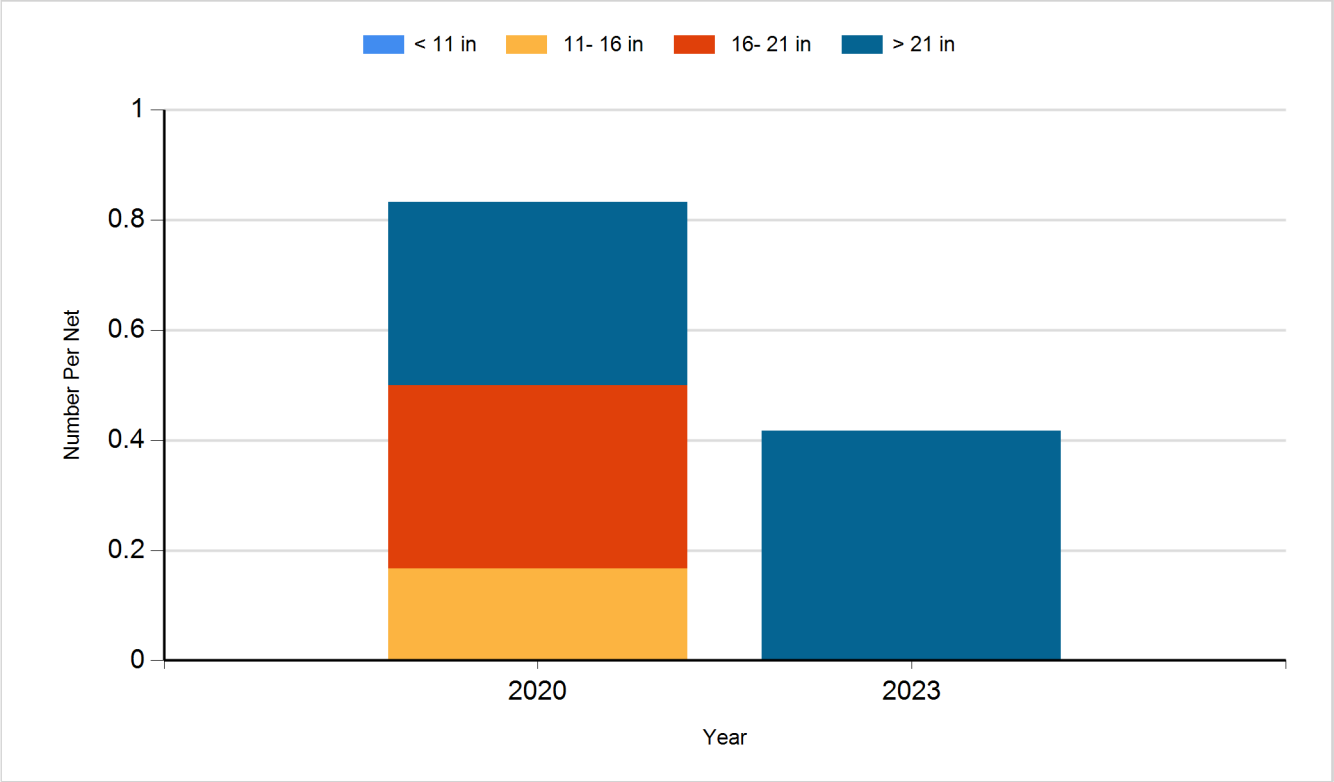


2023

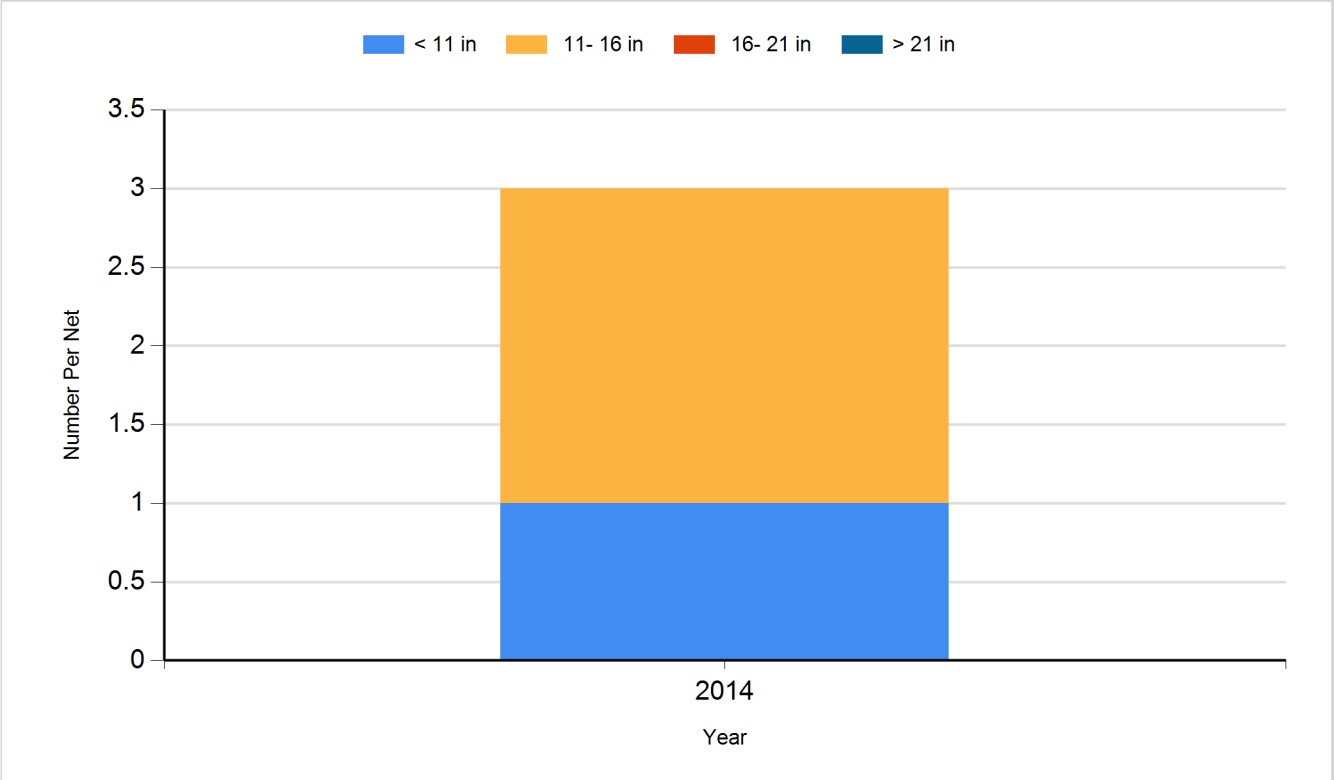
Historic Fish Sizes and Relative Abundance

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

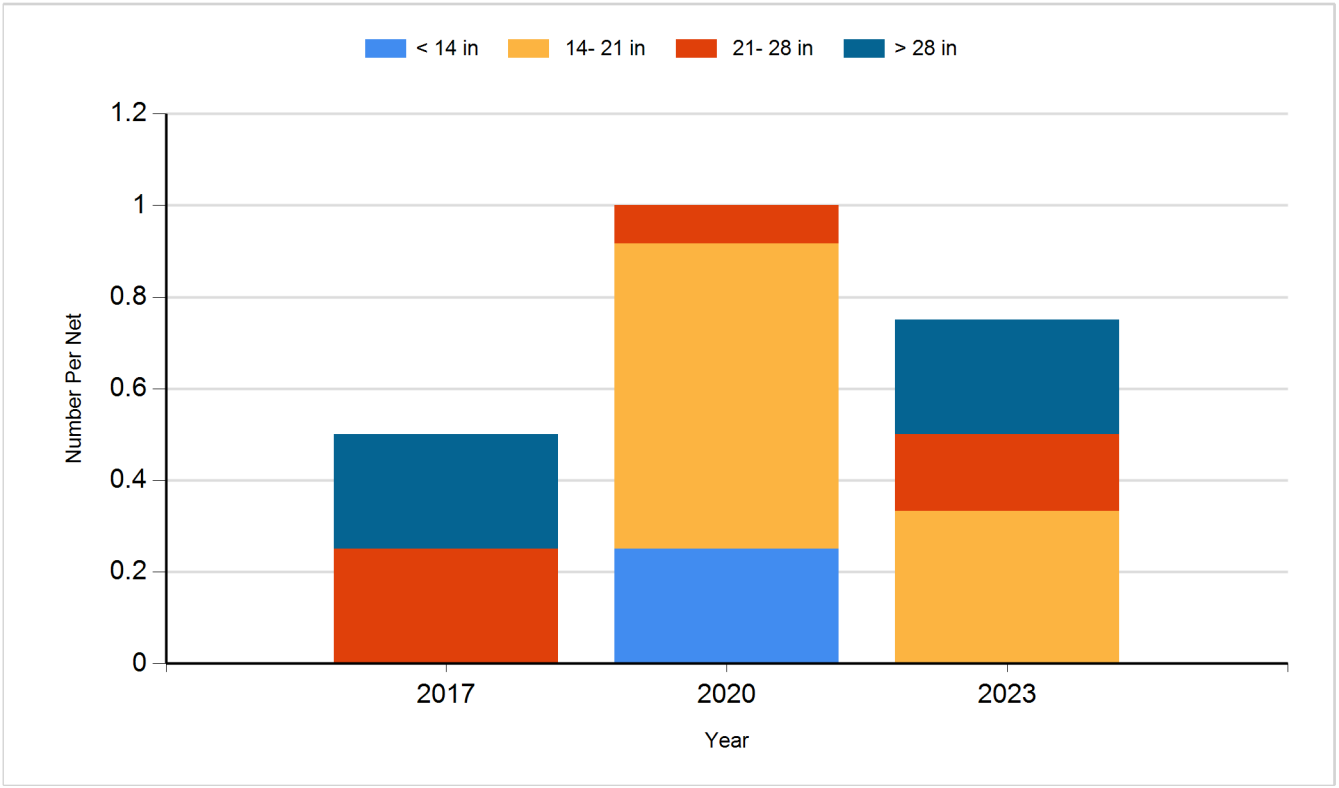
Species: Common Carp
Gear: AFS std gill net



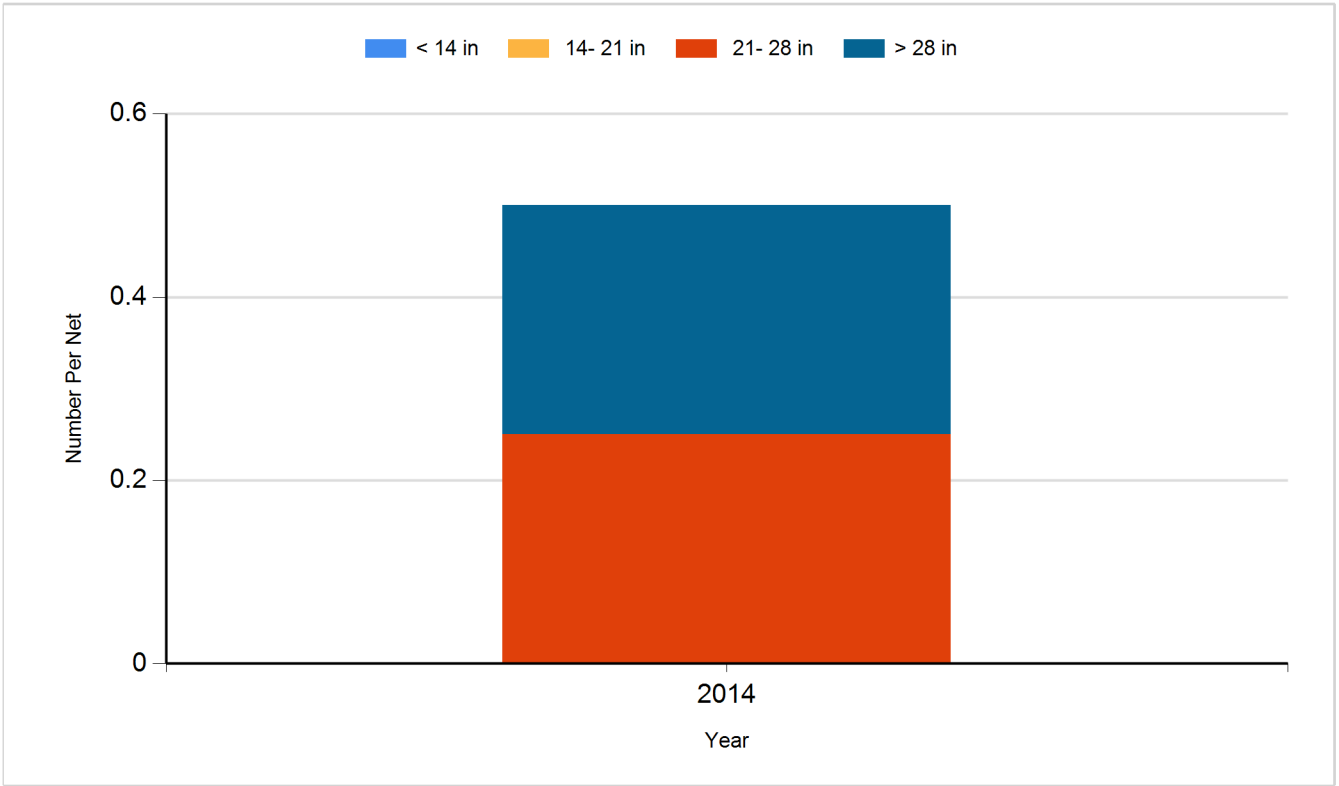
Species: Common Carp
Gear: std exp gill net



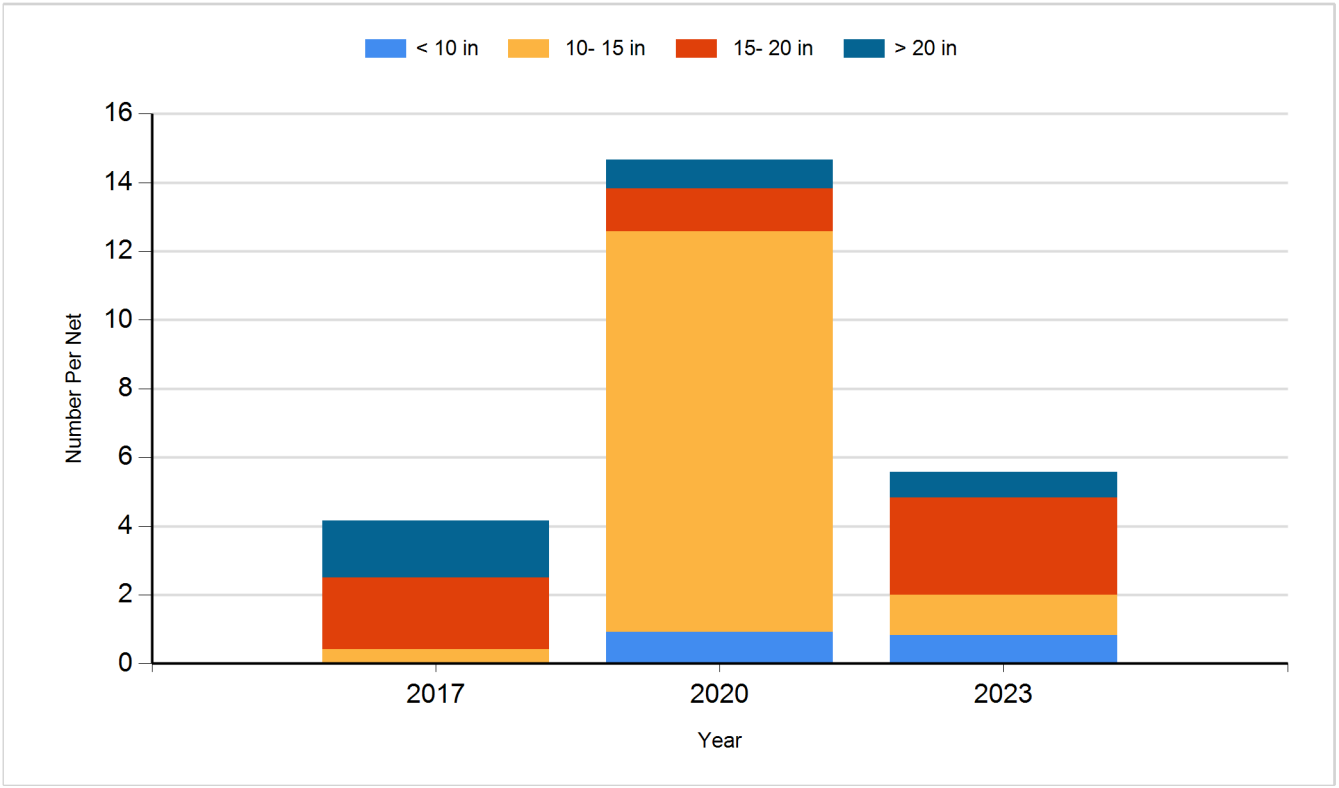
Species: Northern Pike
Gear: AFS std gill net



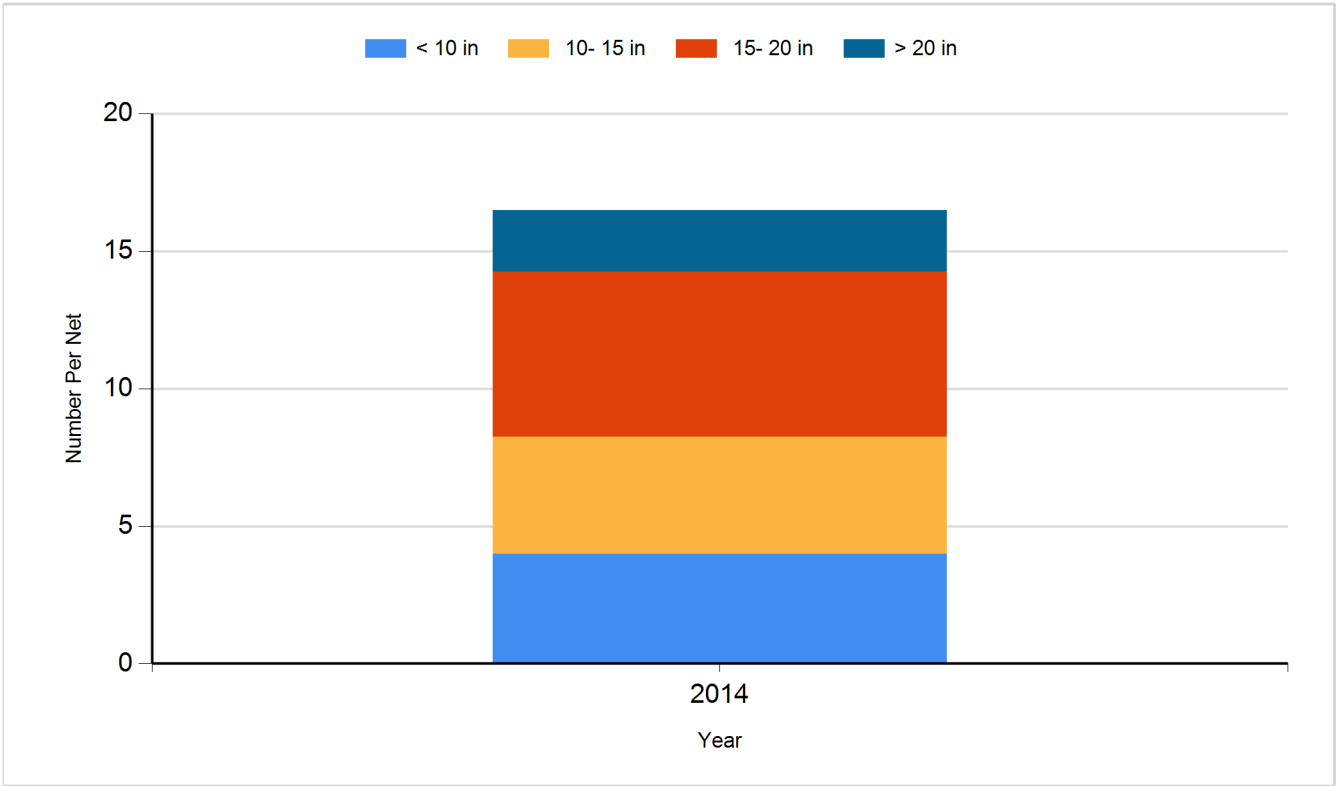
Species: Northern Pike
Gear: std exp gill net



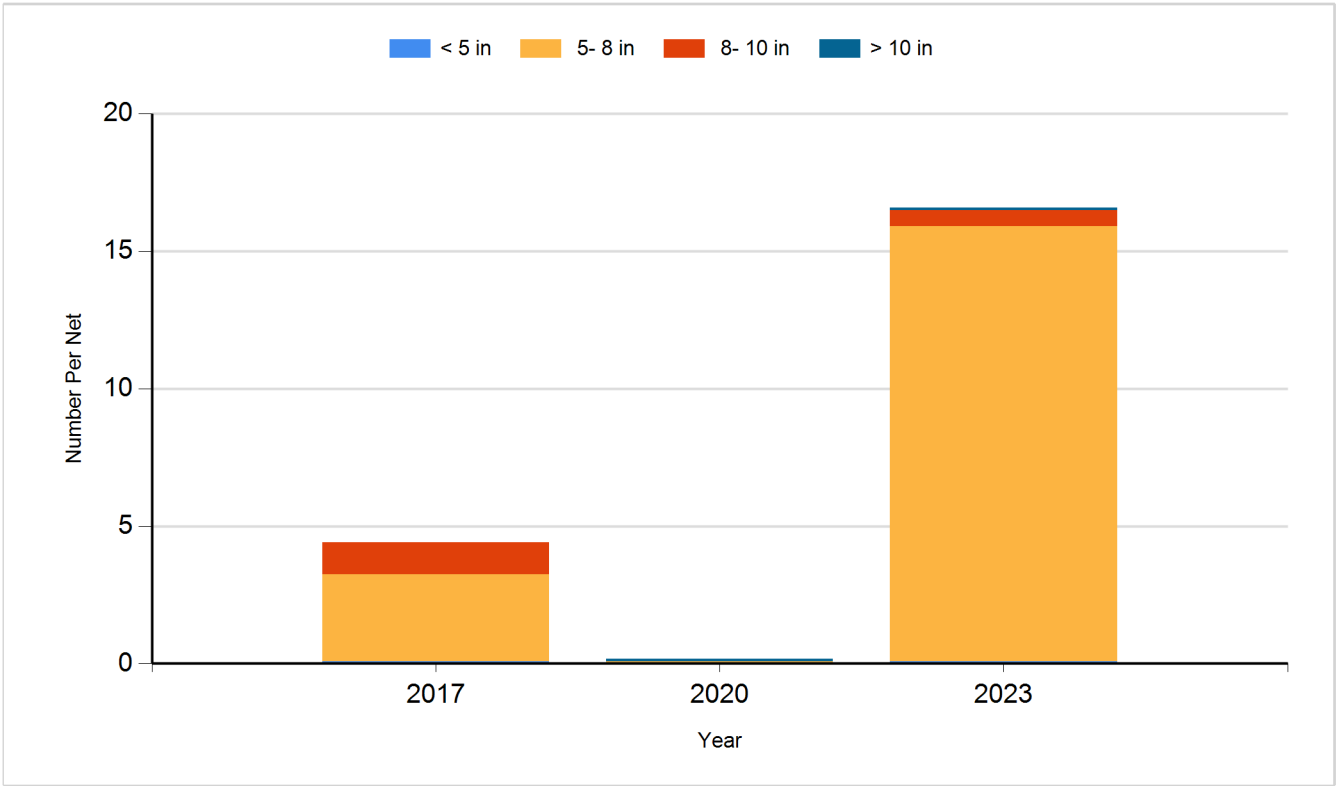
Species: Walleye
Gear: AFS std gill net



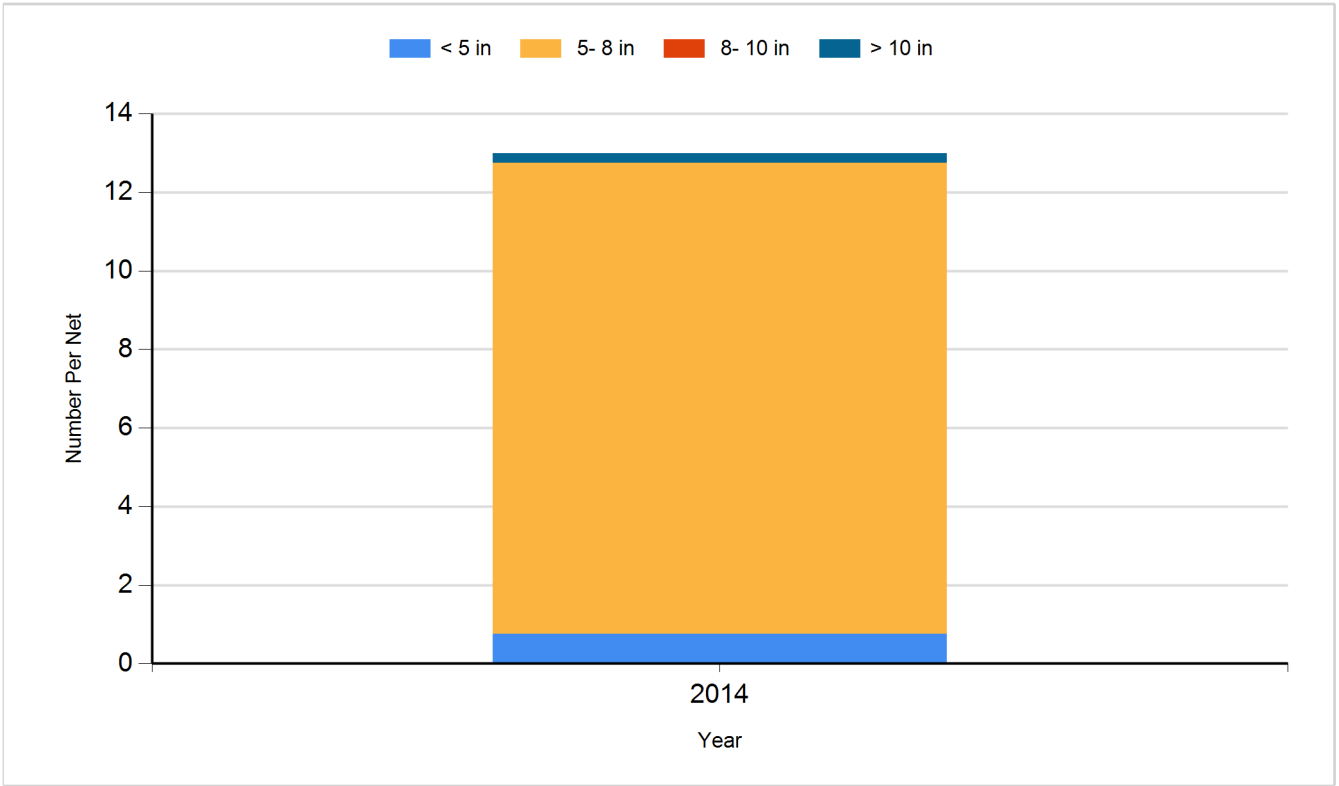
Species: Walleye
Gear: std exp gill net



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	600,000
2015	Walleye	Fry	365,000
2017	Walleye	Fry	400,000
2019	Walleye	Fry	365,000
2021	Walleye	Fry	400,000
2023	Walleye	Fry	400,000