Pactola Reservoir

Pactola Reservoir is a 825 acre reservoir located 18 miles west of Rapid City. Pactola is a popular recreational and fishing lake. The primary fish species are Rainbow Trout, Lake Trout, Brown Trout, Northen Pike, Bluegill, Black Crappie, Largemouth Bass, Kokanee Salmon and Yellow Perch. There are several secondary species such as Rock Bass, White Sucker, Golden Shiner and Green Sunfish.

Rainbow Trout. Rainbow Trout are stocked into Pactola on a yearly basis. In 2023 19,674 large rainbow trout averaging 2lbs and 145,126 fry were stocked. Fisherman have success fishing the bays located near the boat ramps shortly after stocking.

Lake Trout. Pactola is home to a healthy population of Lake Trout. In the 2023 surveys the gill nets averaged 1.6 fish per net with lengths ranging from 22-31 inches.

Brown Trout. 5000 adult brown trout were stocked into Pactola in 2023. The 2023 surveys had 0.7 fish per gill net. Fish ranged from 11-18 inches.

Northen Pike. Pactola has a steady population of Northern Pike. In 2023 the gill net surveys had 1.6 fish per net and 0.4 fish per trap net. Fish ranged from 20-43 inches.

Bluegill. Pactola has an abundance of bluegill. The 2023 surveys had 102.0 fish per trap net and 2.8 fish per gill net. The bluegill ranged from 4-8 inches. With the average around 5 inches.

Black Crappie. Pactola's black crappie population can be found in the bays. No crappie were surveyed in 2023. Fishermen have success when actively fishing for the crappie.

Largemouth Bass. Pactola's bass population has avoided the surveys for several years. Fisherman report catching largemouth bass when targeting them.

Kokanee Salmon. Pactola has been stocked with Kokanee since 2022. In 2023 there were 50,522 juveniles stocked. The salmon haven't shown up in any of the surveys yet. And no fishermen have reported catching them yet. We are hoping to start seeing the Kokanee show up in the system later in 2024.

Yellow Perch. Yellow Perch can be found scattered within the bays of Pactola. In 2023 the surveys had 1.5 fish per gill net and 2.4 fish per trap net. The perch averaged 6-7 inches.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Pactola Reservoir, Pennington County
RAP-Lake-1-000
2023

Lake Information

Name: Pactola Reservoir

County: Pennington

Surface Area: 825 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 18, 2023	16 net-nights
frame net (std 3/4 in)	Jul 18, 2023	8 net-nights
suspended gill net	Jul 18, 2023	8 net-nights

Common Fish Species Present

Rainbow Trout

Lake Trout

Brown Trout

Bluegill

Rock Bass

Yellow Perch

Northern Pike

White Sucker

Green Sunfish

Golden Shiner

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	Bluegill	44	2.8	1.6	64	11	2		92	1
	Brown Trout	4	0.3	0.1	100		100		77	10
	Golden Shiner	1	0.0	0.0						
	Lake Trout	10	0.6	0.5	100		80		97	5
	Northern Pike	20	1.3	0.5	65	17	25	16	90	2
	Rock Bass	13	0.8	0.7	69		54	23	83	5
	White Sucker	19	1.2	0.5	100		95		96	3
	Yellow Perch	24	1.5	0.9	8		0		82	2
frame net (std 3/4 in)	Bluegill	831	102.9	50.1	22	2	2	1	92	1
	Green Sunfish	5	0.6	0.3	80		20		107	5
	Northern Pike	6	0.4	0.3	33		0		86	12
	Rock Bass	127	15.8	10.3	38	6	14	4	91	1
	White Sucker	1	0.1	0.2	100		100		102	
	Yellow Perch	19	2.4	1.9	32	17	11		86	3
suspended gill net*	Bluegill	1	0.1	0.2	100		0		79	
	Brown Trout	3	0.4	0.4	100		100		81	10
	Lake Trout	8	1.0	0.5	100		88		92	4
	Northern Pike	2	0.3	0.2	100		0		82	5
	Rock Bass	1	0.1	0.2	100		0		93	
	White Sucker	1	0.1	0.2	100		100		98	
	Yellow Perch	4	0.5	0.7	0		0		85	5

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	Bluegill					0.1		4.0		0.0	2.8	1.73
	Brown Trout					1.0		0.2		0.3	0.3	0.45
	Golden Shiner					0.0		0.0		0.0	0.0	0.00
	Lake Trout					2.7		0.9		1.3	0.6	1.38
	Largemouth Bass					0.0		0.1		0.0	0.0	0.03
	Northern Pike					0.3		0.9		0.3	1.3	0.70
	Rainbow Smelt					0.0		0.0		0.0	0.0	0.00
	Rainbow Trout					0.3		0.2		0.3	0.0	0.20
	Rock Bass					0.0		1.3		0.0	0.8	0.53
	White Sucker					0.8		0.9		0.3	1.2	0.80
	Yellow Perch					0.2		0.8		0.0	1.5	0.63
frame net (std 3/4 in)	Black Crappie	2.1		0.3		0.0					0.0	0.60
	Bluegill	20.6		61.5		24.6					102.9	52.40
	Bluegill X Gr. Sunfish Hybrid	0.0		7.3		2.5					0.0	2.45
	Golden Shiner	0.0		0.0		0.0					0.0	0.00
	Green Sunfish	0.9		0.0		0.0					0.6	0.38
	Largemouth Bass	0.0		0.1		0.1					0.0	0.05
	Northern Pike	0.1		0.4		0.4					0.4	0.33
	Rainbow Trout	0.1		0.0		0.4					0.0	0.13
	Rock Bass	31.6		22.1		22.5					15.8	23.00
	Rudd	2.9		0.0		0.3					0.0	0.80
	White Sucker	0.1		0.0		0.0					0.1	0.05
	Yellow Perch	0.9		0.4		0.3					2.4	1.00
std exp gill net	Bluegill	6.0		4.0								5.00
	Brown Trout	0.2		1.1								0.65
	Golden Shiner	0.0		0.0								0.00
	Lake Trout	3.1		3.0								3.05
	Northern Pike	0.5		0.5								0.50
	Rainbow Smelt	0.0		0.0								0.00
	Rainbow Trout	1.5		0.2								0.85
	Rock Bass	1.3		1.5								1.40
	Rudd	0.0		0.0								0.00
	White Sucker	0.3		0.2								0.25

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
std exp gill net	Yellow Perch	4.6		0.2								2.40
suspended gill net*	Bluegill										0.1	0.10
	Brown Trout										0.4	0.40
	Lake Trout										1.0	1.00
	Northern Pike										0.3	0.30
	Rock Bass										0.1	0.10
	White Sucker										0.1	0.10
	Yellow Perch										0.5	0.50

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	Bluegill	PSD					100		72			64
		PSD-P					0		2			2
		Wr					92		86			92
	Brown Trout	PSD					91		100		0	100
		PSD-P					22		75		0	100
		Wr					79		75		88	77
	Lake Trout	PSD					88		81		100	100
		PSD-P					17		43		80	80
		Wr					83		92		96	97
	Northern Pike	PSD					71		77		100	65
		PSD-P					29		14		0	25
		Wr					92		92		95	90
	Rainbow Trout	PSD					71		100		100	
		PSD-P					0		0		0	
		Wr					81		80		88	
	Rock Bass	PSD							77			69
		PSD-P							57			54
		Wr							87			83
	White Sucker	PSD					100		100		100	100
		PSD-P					100		100		100	95
		Wr					100		92		102	96
	Yellow Perch	PSD					20		50			8
		PSD-P					0		5			0
		Wr					87		85			82
frame net (std 3/4 in)	Bluegill	PSD	58		34		90					22
		PSD-P	10		0		11					2
		Wr	90		98		97					92
	Green Sunfish	PSD	43									80
		PSD-P	0									20
		Wr	96									107
	Northern Pike	PSD	100		0		67					33
		PSD-P	100		0		0					0
		Wr	119		84		105					86

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
frame net (std 3/4 in)	Rainbow Trout	PSD	0				33					
		PSD-P	0				0					
		Wr					70					
	Rock Bass	PSD	51		45		48					38
		PSD-P	13		7		15					14
		Wr	97		89		105					91
	White Sucker	PSD	100									100
		PSD-P	100									100
		Wr	87									102
	Yellow Perch	PSD	57		100		100					32
		PSD-P	0		0		0					11
		Wr	98		84		81					86
std exp gill net	Bluegill	PSD	78		52							
		PSD-P	0		0							
		Wr	95		93							
	Brown Trout	PSD	0		23							
		PSD-P	0		0							
		Wr	81		76							
	Lake Trout	PSD	32		17							
		PSD-P	8		6							
		Wr	87		89							
	Northern Pike	PSD	100		67							
		PSD-P	33		50							
		Wr	116		109							
	Rainbow Trout	PSD	0		0							
		PSD-P	0		0							
		Wr	79		71							
	Rock Bass	PSD	33		39							
		PSD-P	0		22							
		Wr	97		84							
	White Sucker	PSD	100		100							
		PSD-P	100		100							
		Wr	95		92							
	Yellow Perch	PSD	13		0							
		PSD-P	0		0							
		Wr	95		86							

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
suspended gill net	Bluegill	PSD										100
		PSD-P										0
		Wr										79
	Brown Trout	PSD										100
		PSD-P										100
		Wr										81
	Lake Trout	PSD										100
		PSD-P										88
		Wr										92
	Northern Pike	PSD										100
		PSD-P										0
		Wr										82
	Rock Bass	PSD										100
		PSD-P										0
		Wr										93
	White Sucker	PSD										100
		PSD-P										100
		Wr										98
	Yellow Perch	PSD										0
		PSD-P										0
		Wr										85

Length at Capture

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

Species: Lake Trout

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	53				384 (1)	398 (1)	513 (8)	544 (14)	551 (12)	573 (8)	617 (10)

Fish Condition

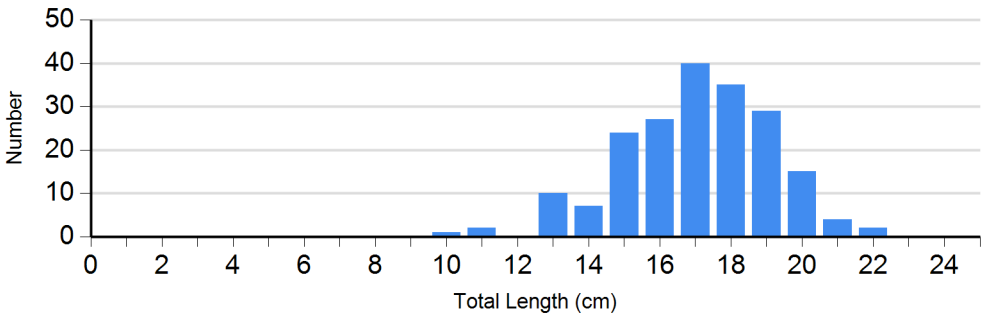
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2023	641	94 (0.7)	169	87 (1.0)	13	91	0	
Brown Trout Gill Net	2020	0		1	73	3	76 (2.3)	0	
	2022	1	88	0		0		0	
	2023	0		0		2	76 (9.5)	1	91
	2023	0		0		2	67 (3.6)	2	86 (13.9)
Lake Trout Gill Net	2020	4	89 (1.4)	8	86 (2.3)	7	97 (4.2)	2	108 (0.4)
	2022	0		1	118	2	93 (8.9)	2	87 (15.4)
	2023	0		2	84 (8.5)	8	101 (3.3)	0	
	2023	0		1	84	7	93 (3.3)	0	
Northern Pike Gill Net	2020	5	96 (11.1)	14	90 (3.1)	2	94 (0.7)	1	100
	2022	0		1	95	0		0	
	2023	0		2	82 (3.8)	0		0	
	2023	7	84 (3.0)	8	94 (2.2)	4	91 (3.2)	1	
Rainbow Trout Gill Net	2020	0		4	80 (3.0)	0		0	
	2022	0		1	88	0		0	
White Sucker Gill Net	2020	0		0		3	95 (3.7)	19	92 (2.2)
	2022	0		0		0		1	102
	2023	0		0		0		1	98
	2023	0		1	104	0		18	95 (2.4)
Yellow Perch Gill Net	2020	10	87 (2.2)	9	84 (3.5)	1	80	0	
	2023	4	85 (3.9)	0		0		0	
	2023	22	82 (1.5)	2	83 (1.6)	0		0	

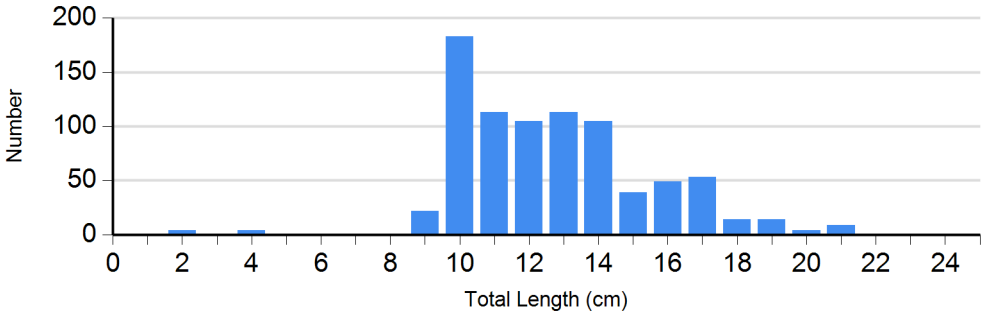
Length Frequency Distribution

Length frequency histogram of species sampled by year.

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

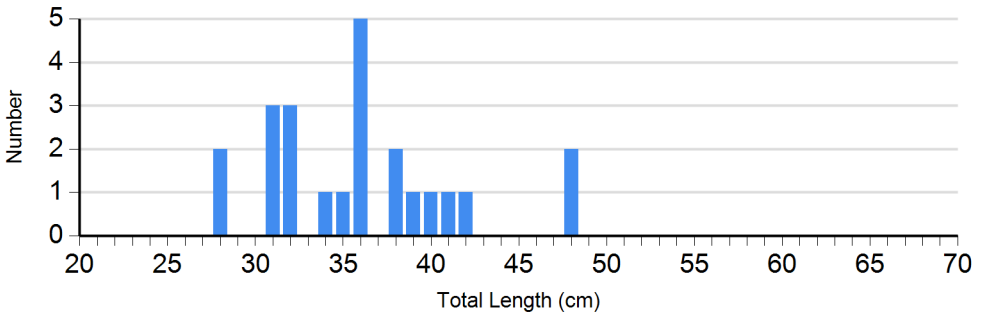


2018



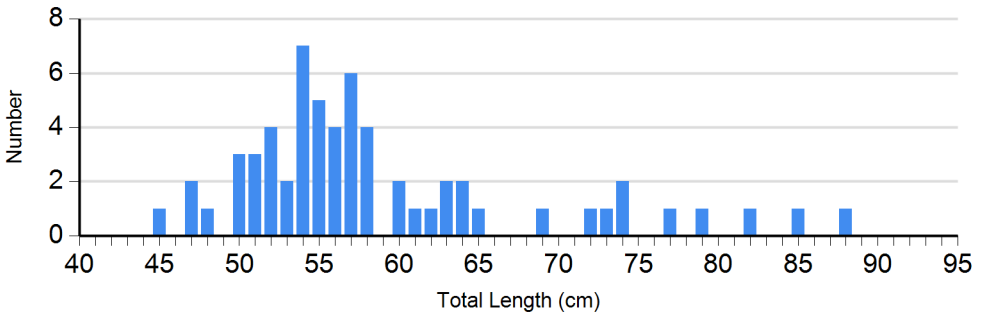
2023

Species: Brown Trout
Gear: AFS std gill net

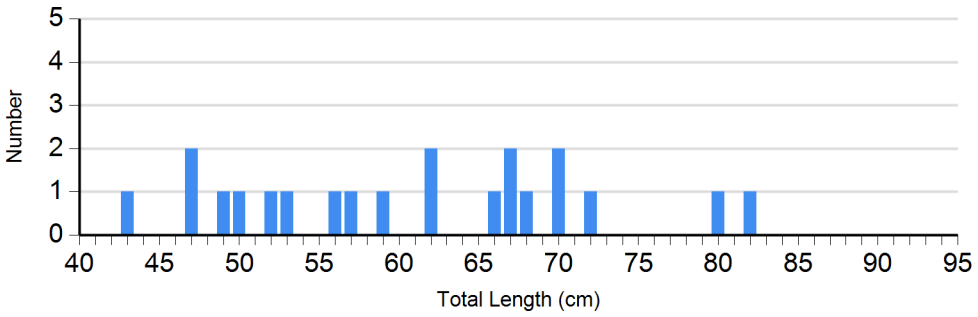


2018

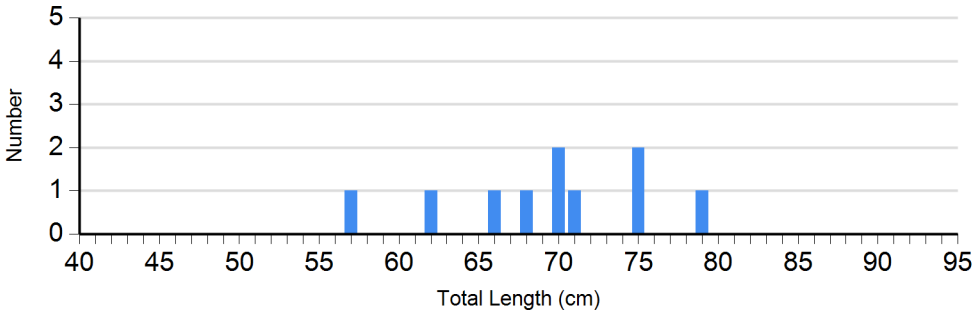
Species: Lake Trout
Gear: AFS std gill net



2018

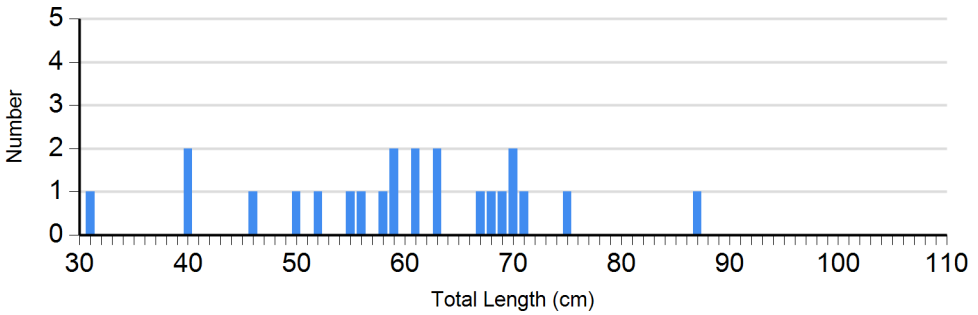


2020

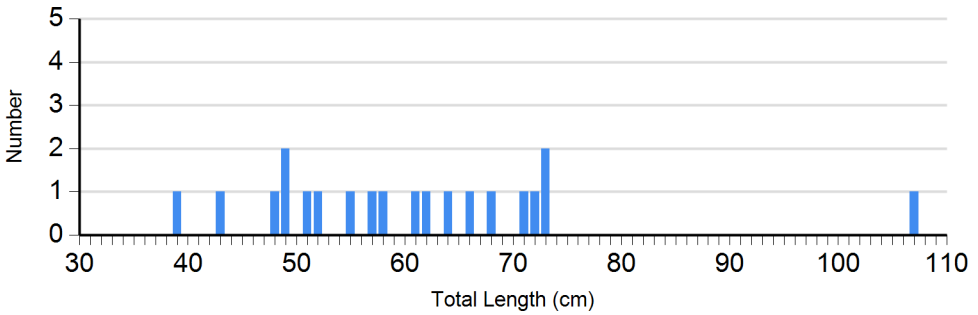


2023

Species: Northern Pike
Gear: AFS std gill net

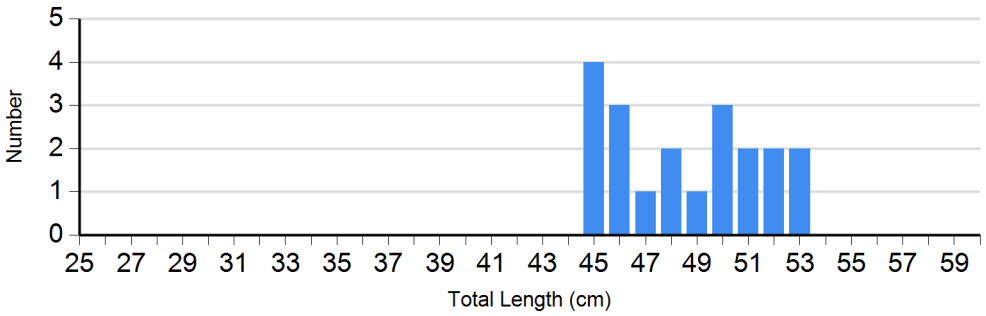


2020

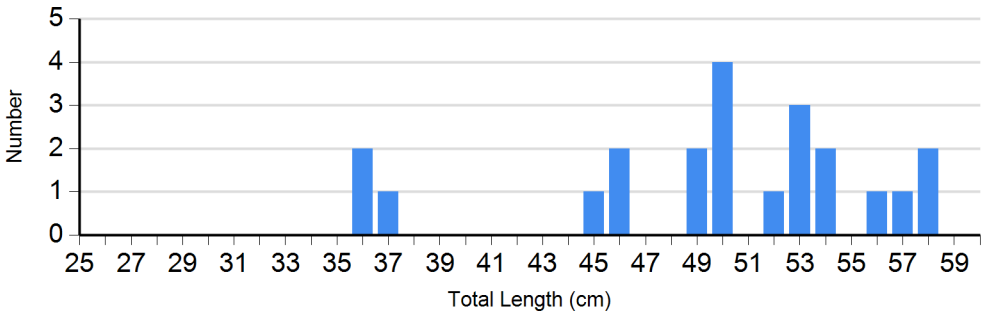


2023

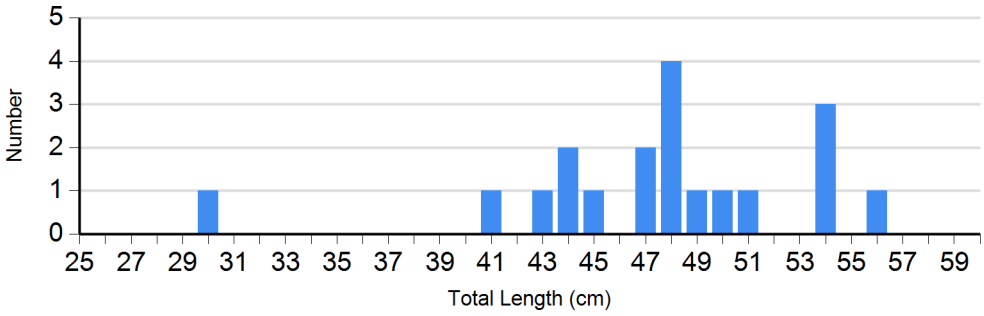
Species: White Sucker
Gear: AFS std gill net



2018

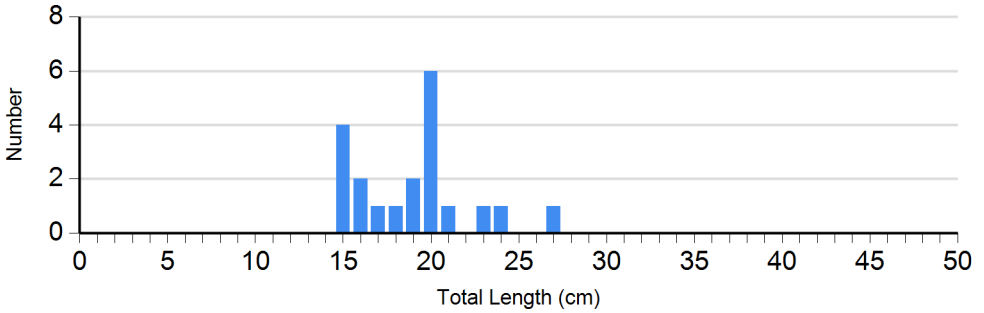


2020

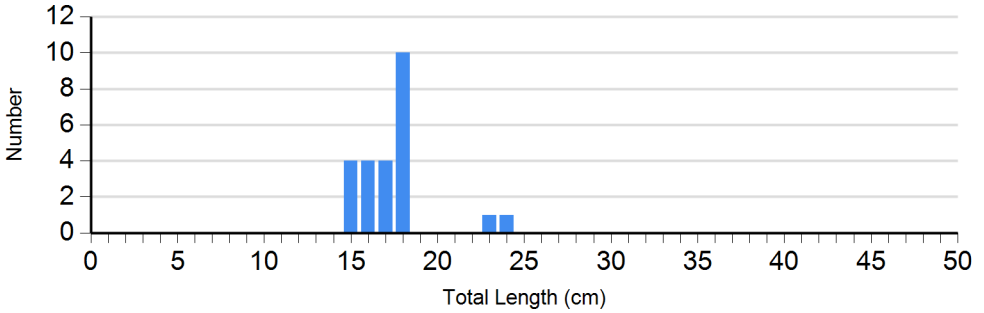


2023

Species: Yellow Perch
Gear: AFS std gill net



2020

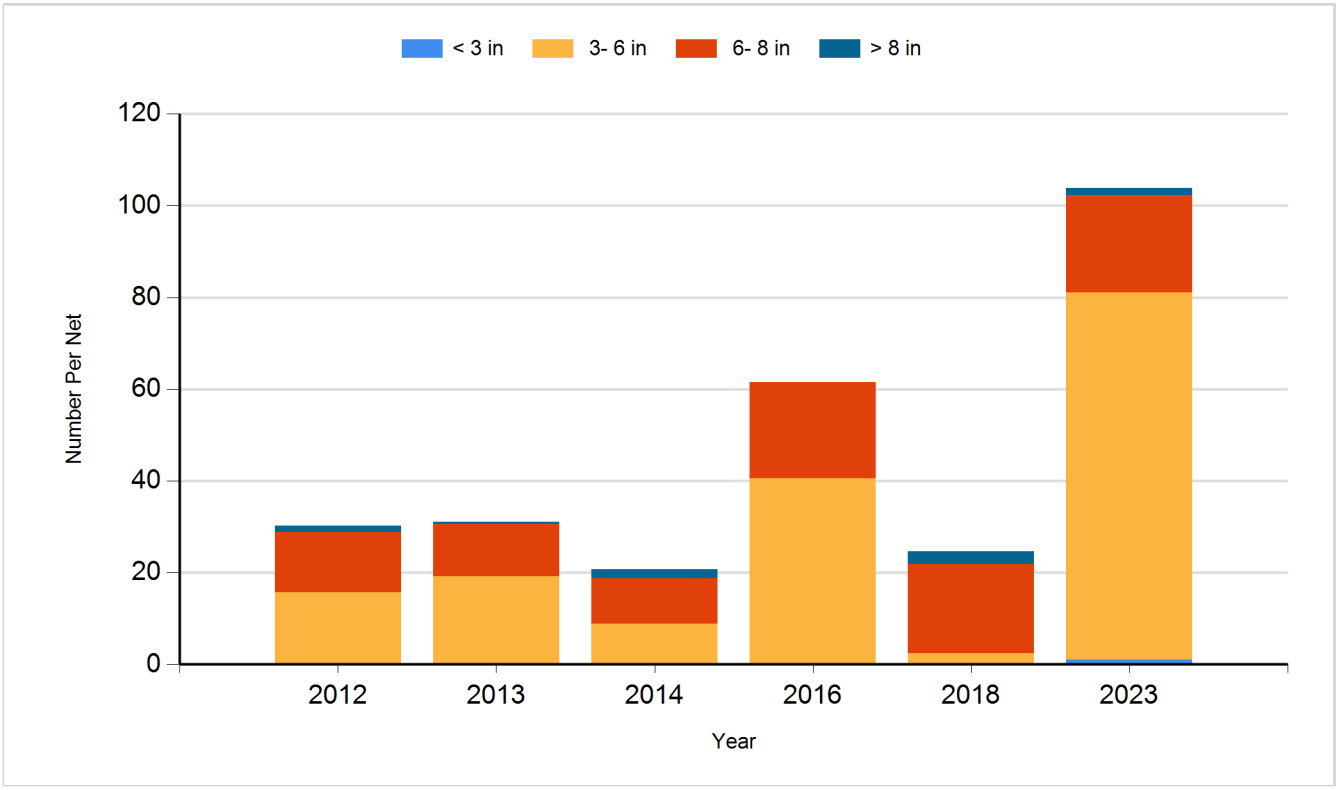


2023

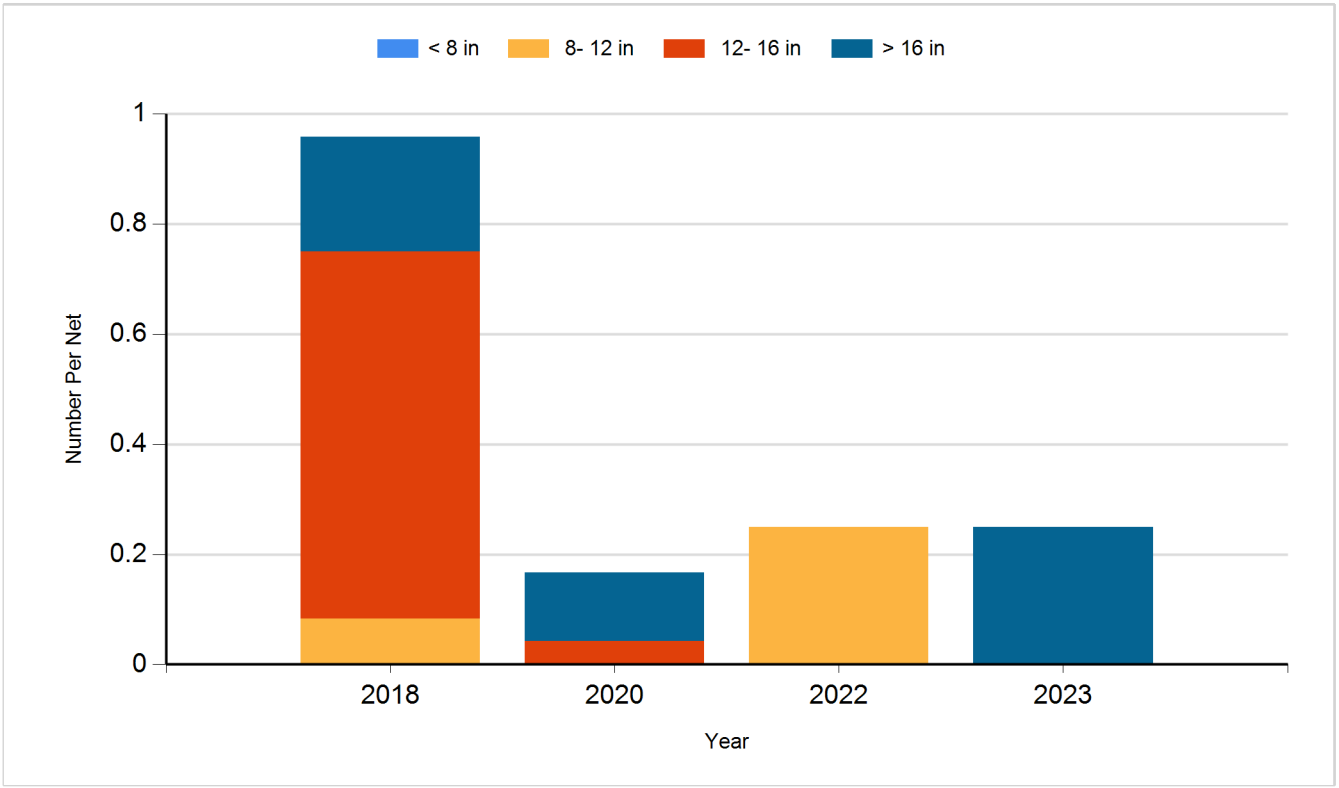
Historic Fish Sizes and Relative Abundance

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

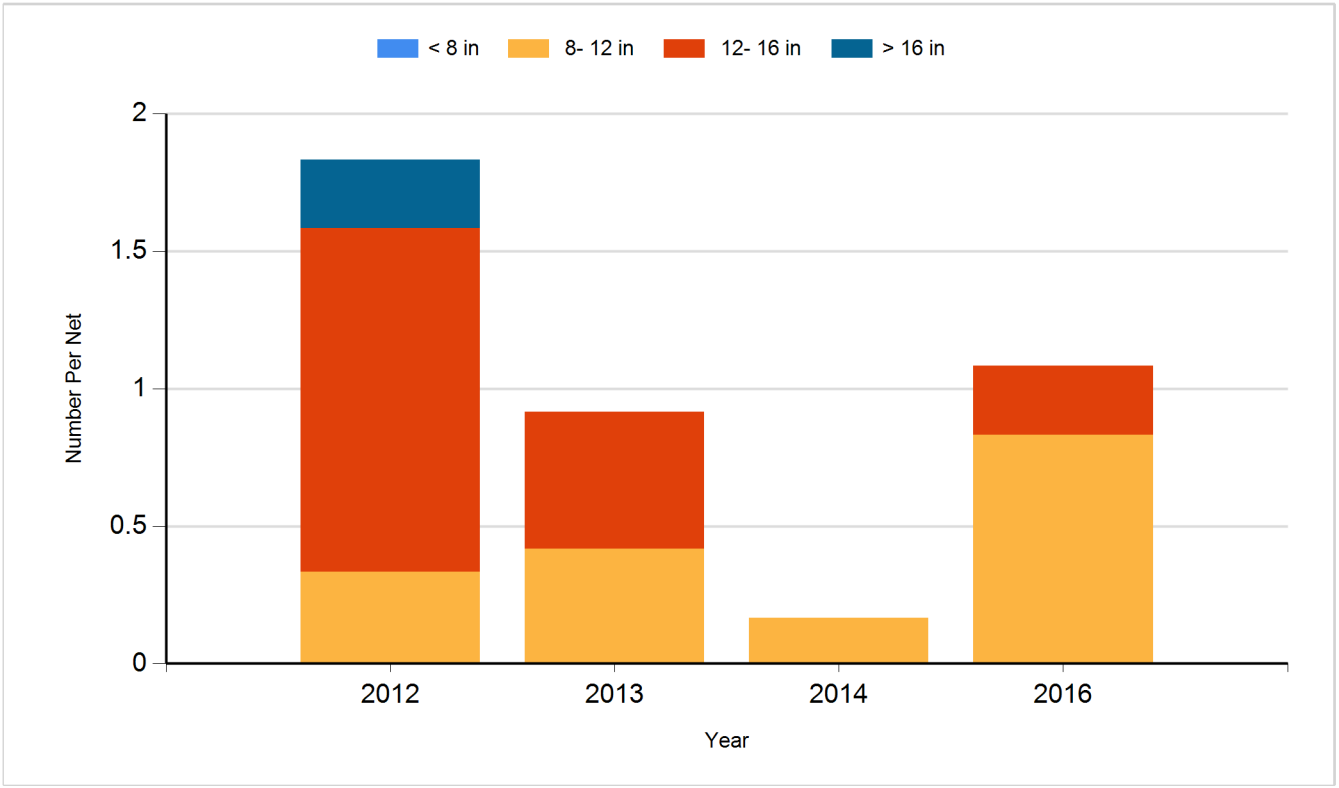
Species: Bluegill
Gear: frame net (std 3/4 in)



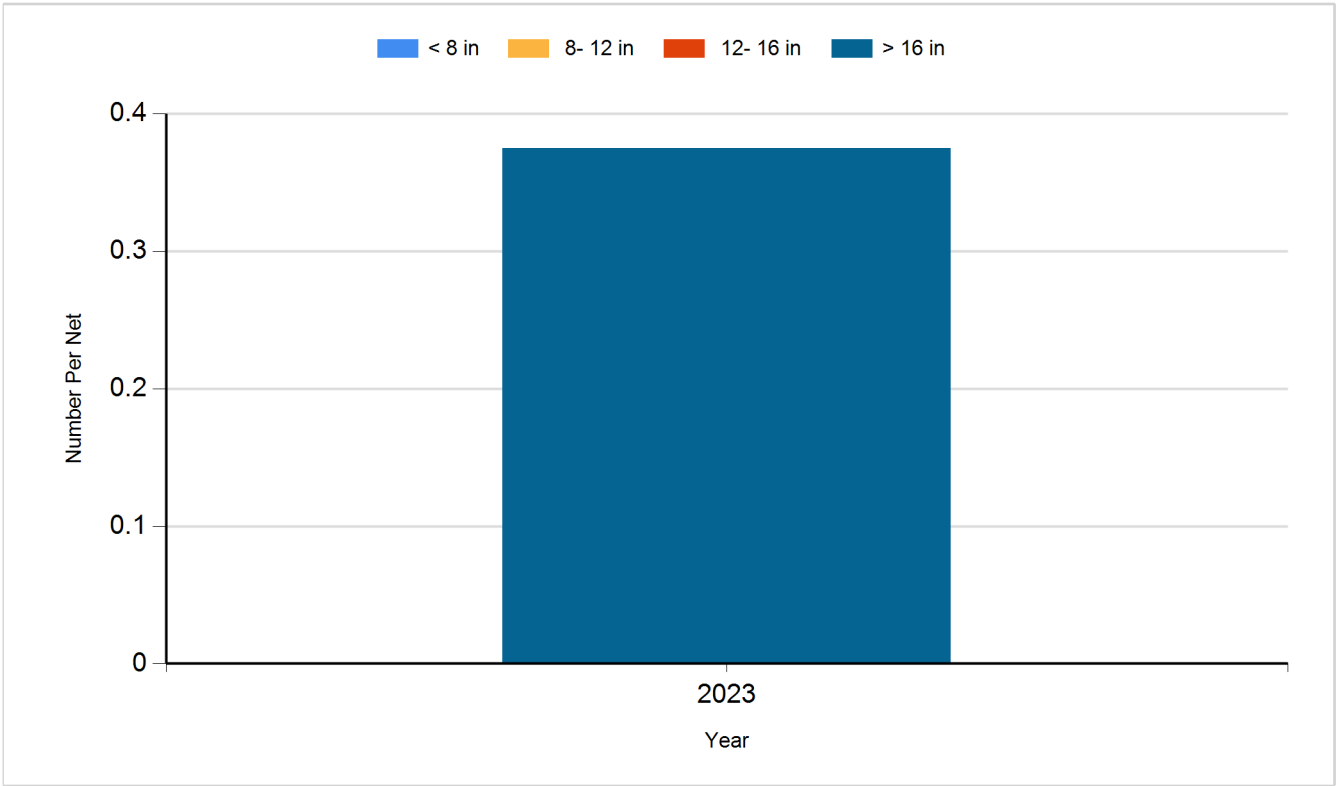
Species: Brown Trout
Gear: AFS std gill net



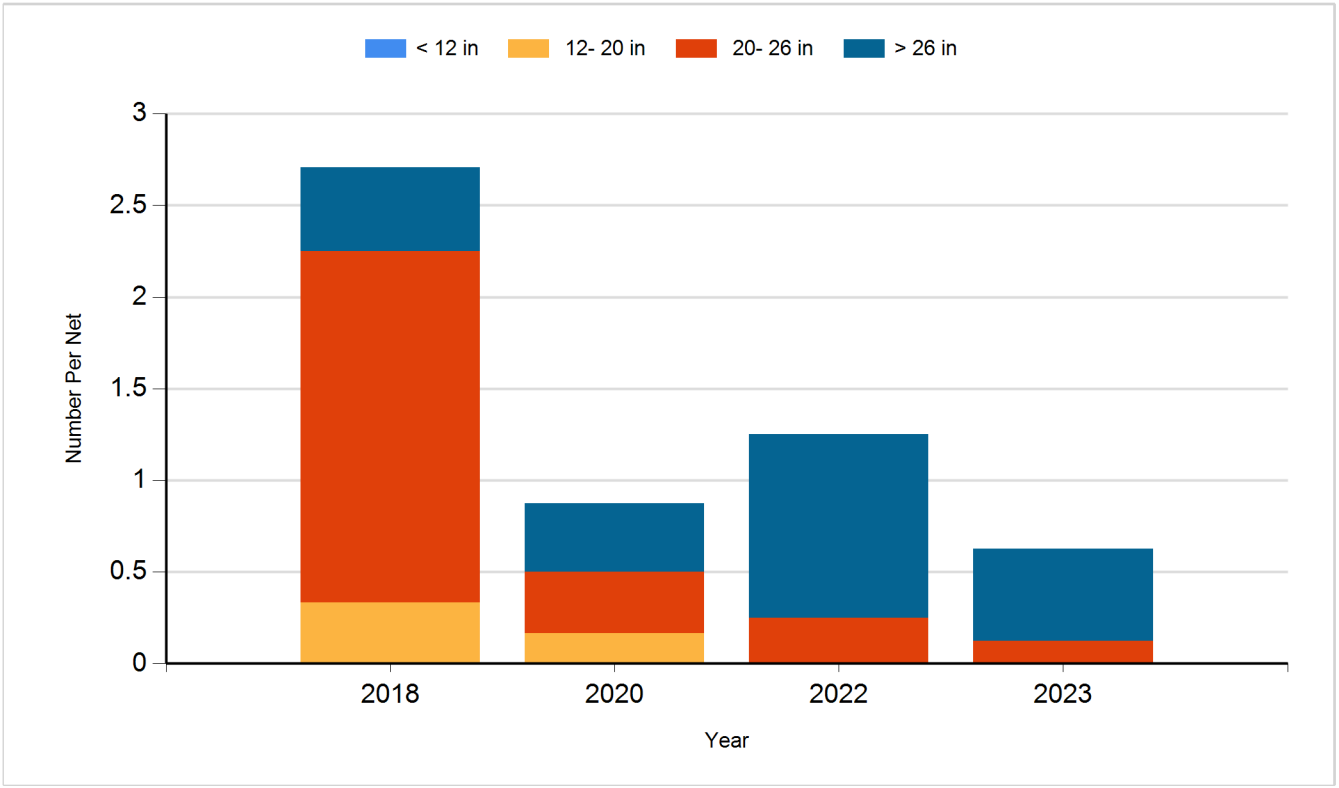
Species: Brown Trout
Gear: std exp gill net



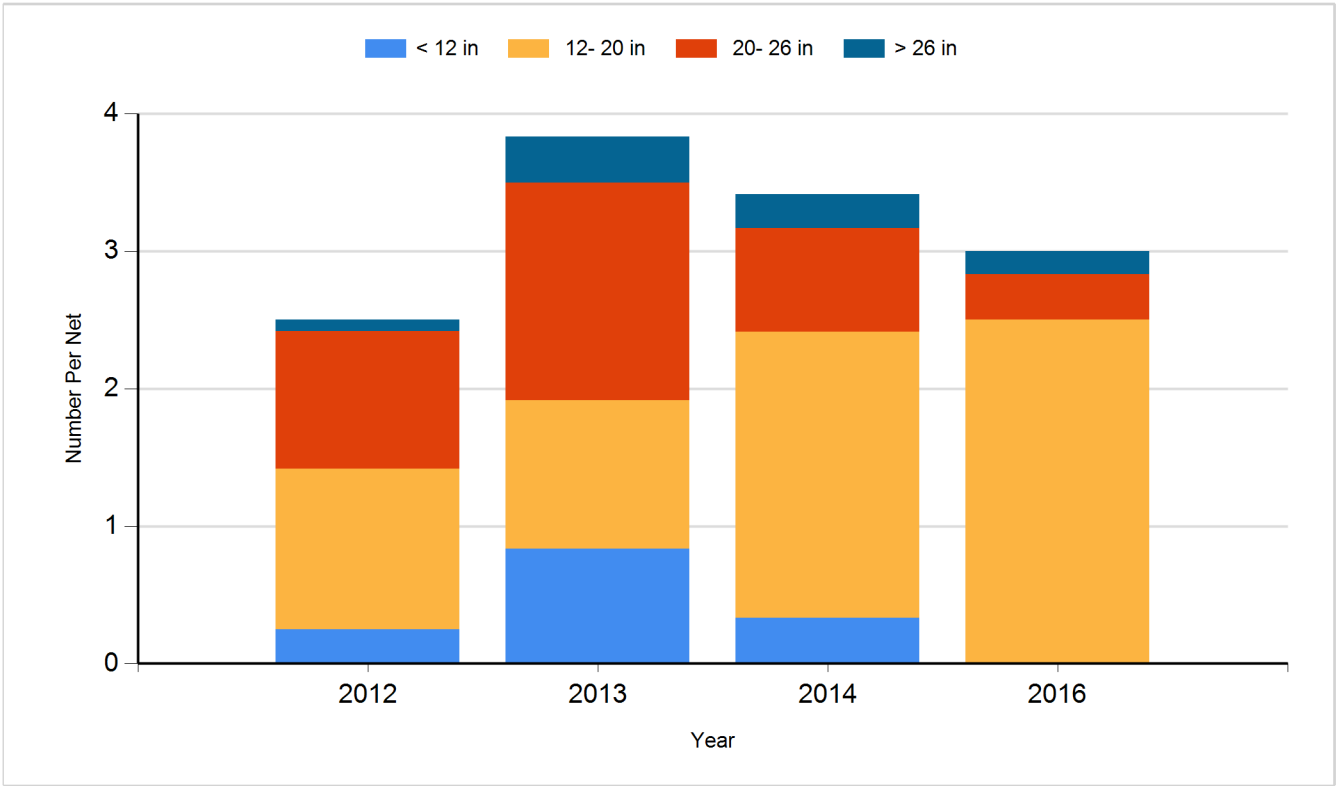
Species: Brown Trout
Gear: suspended gill net



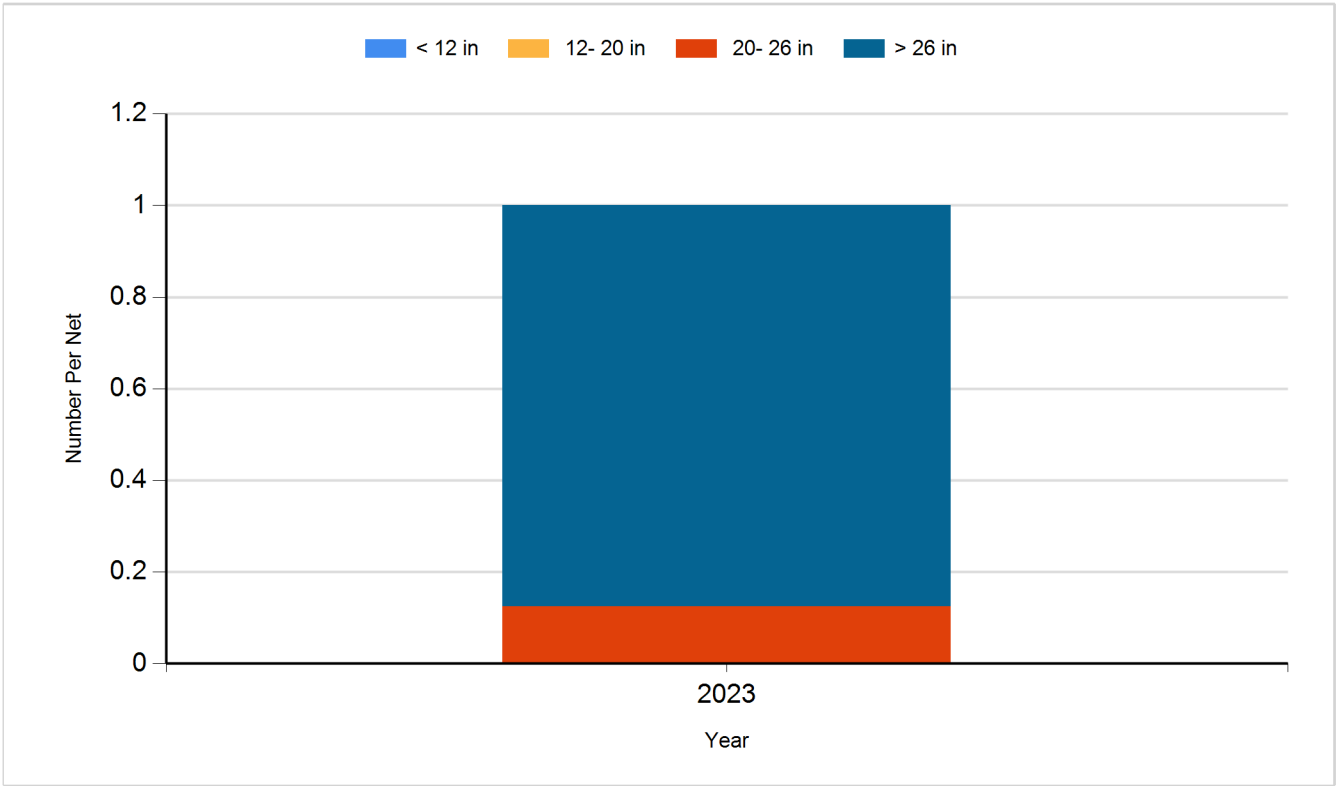
Species: Lake Trout
Gear: AFS std gill net



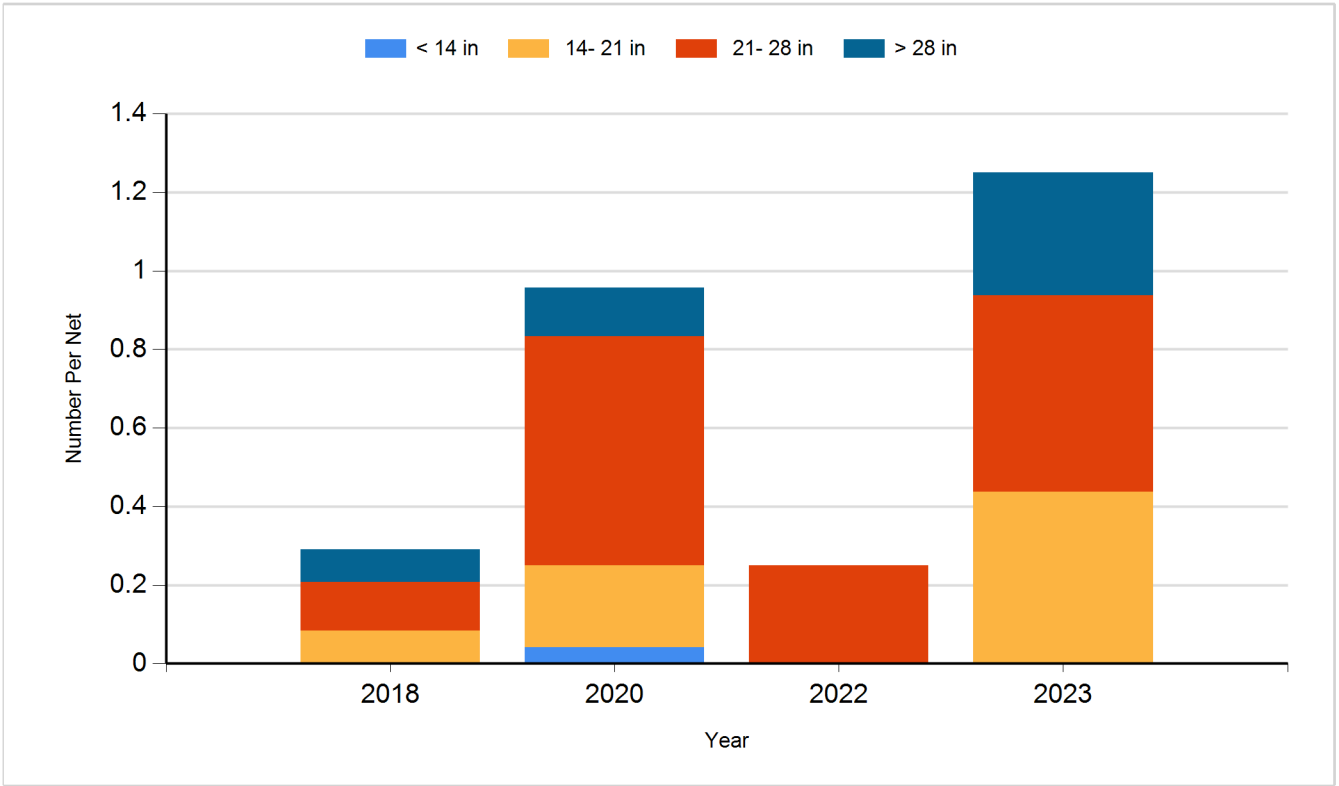
Species: Lake Trout
Gear: std exp gill net



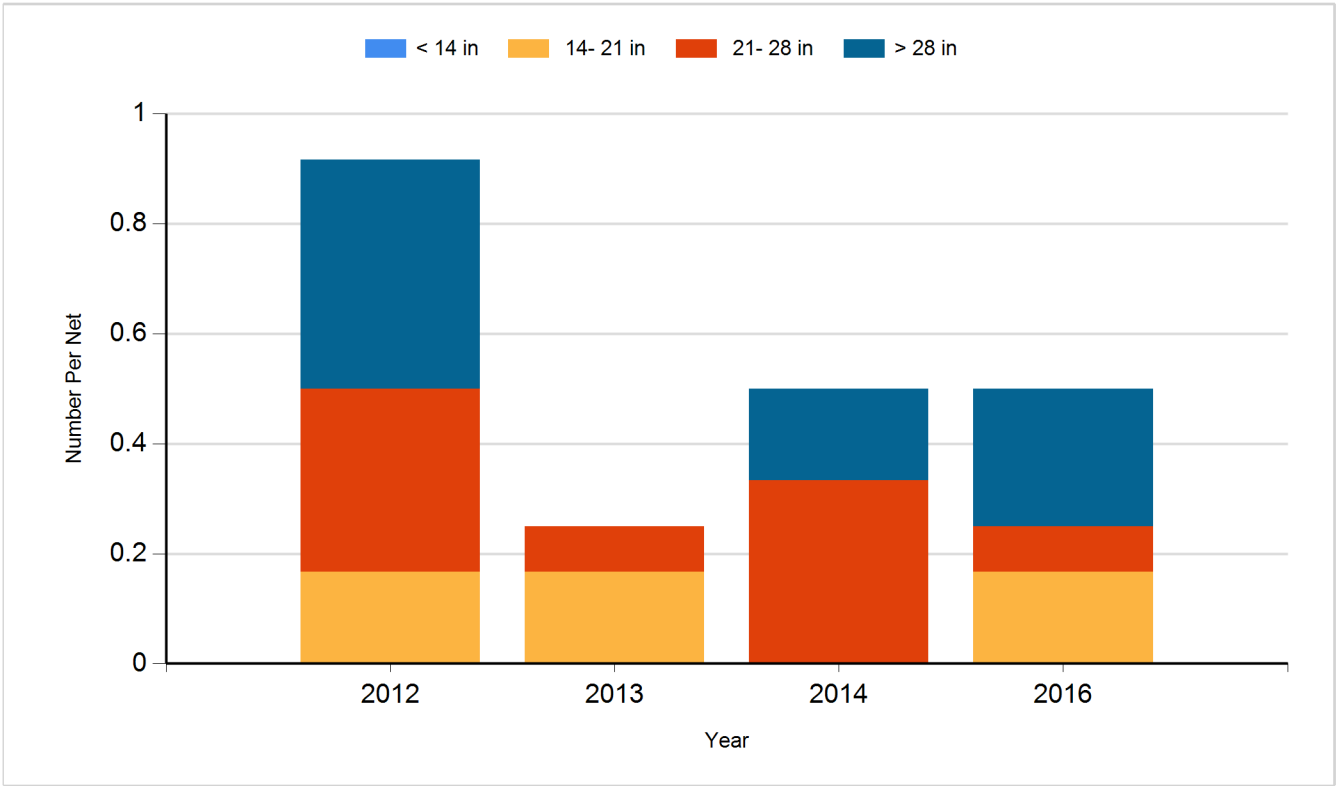
Species: Lake Trout
Gear: suspended gill net



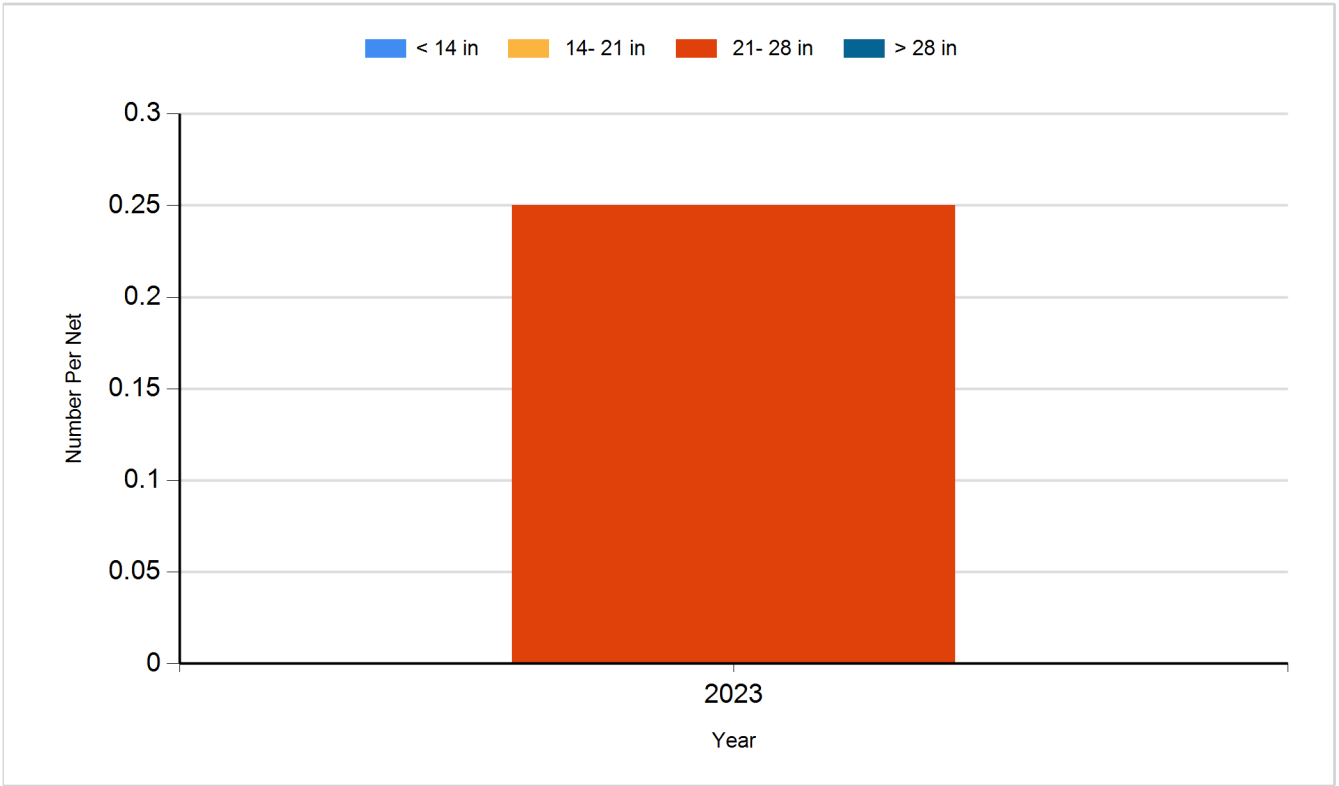
Species: Northern Pike
Gear: AFS std gill net



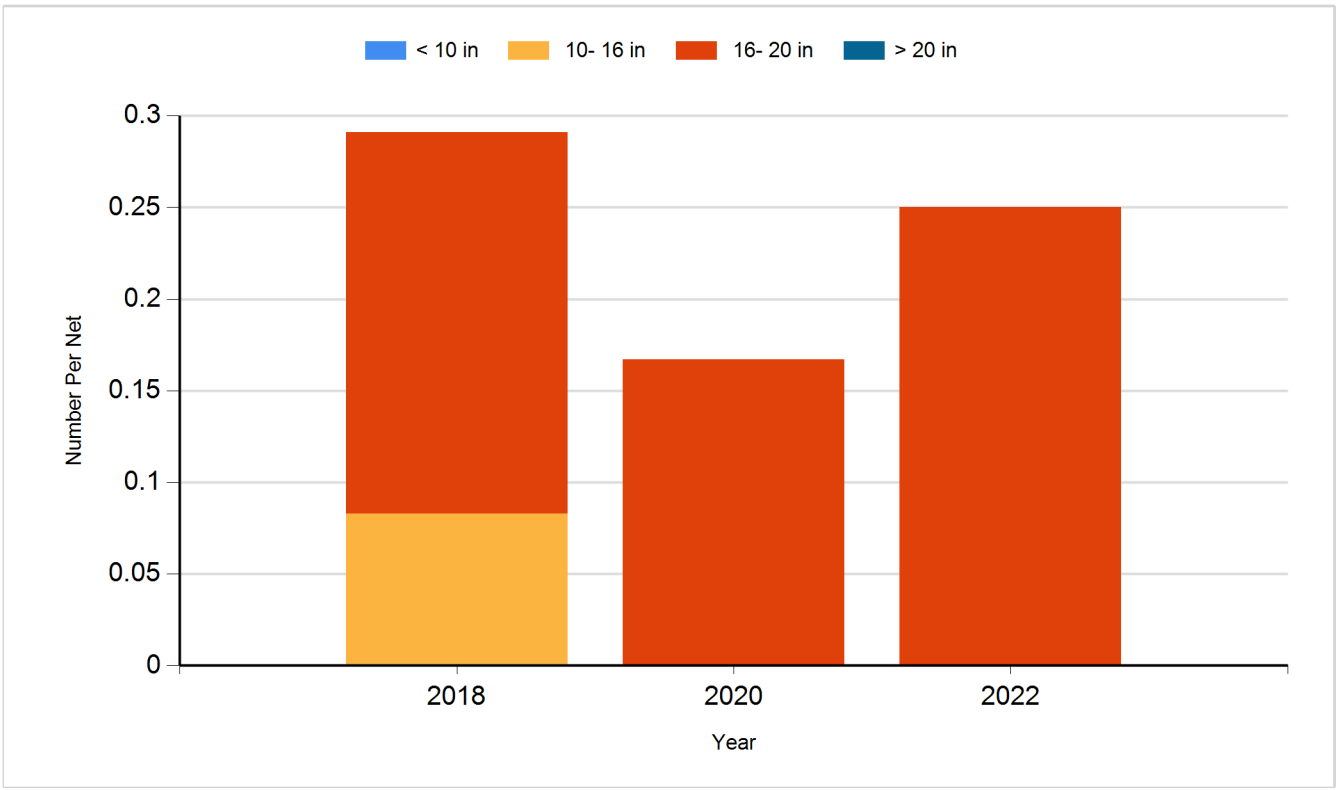
Species: Northern Pike
Gear: std exp gill net



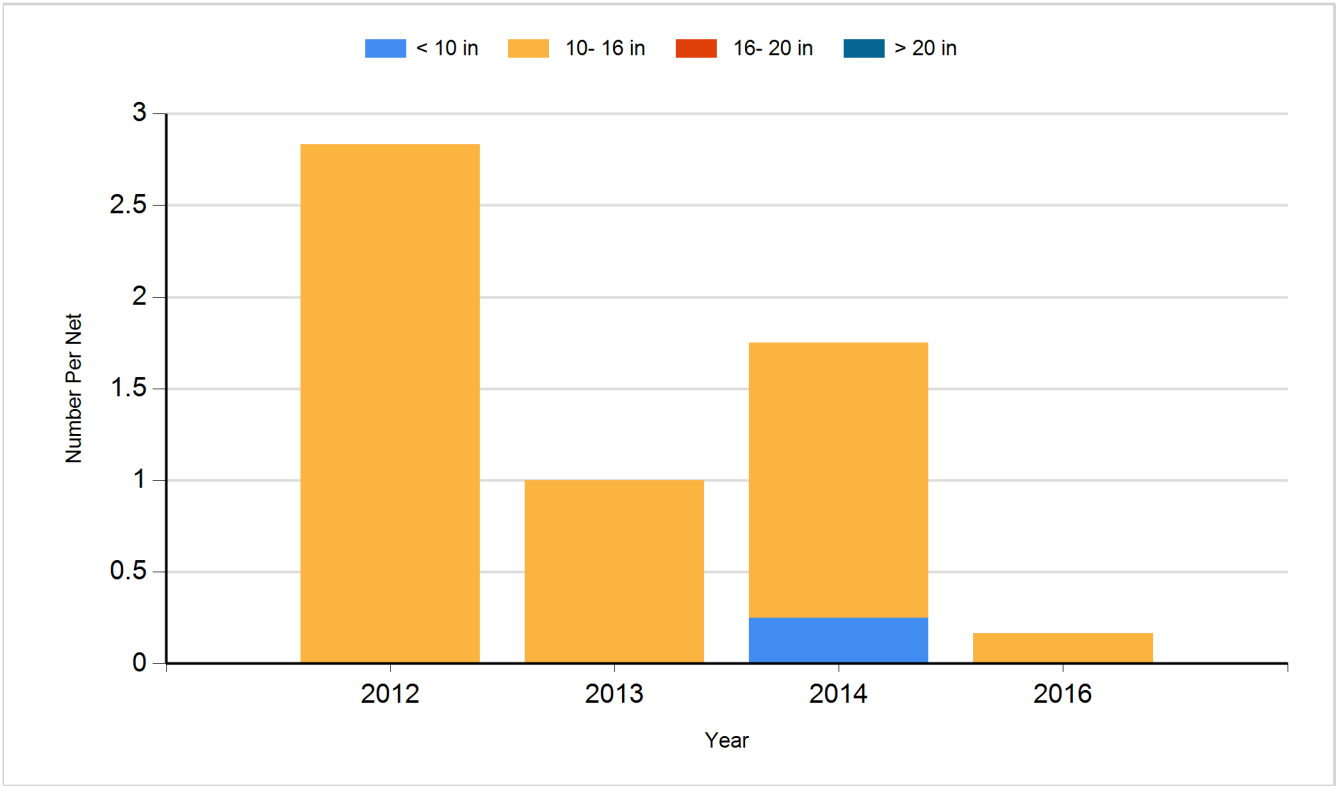
Species: Northern Pike
Gear: suspended gill net



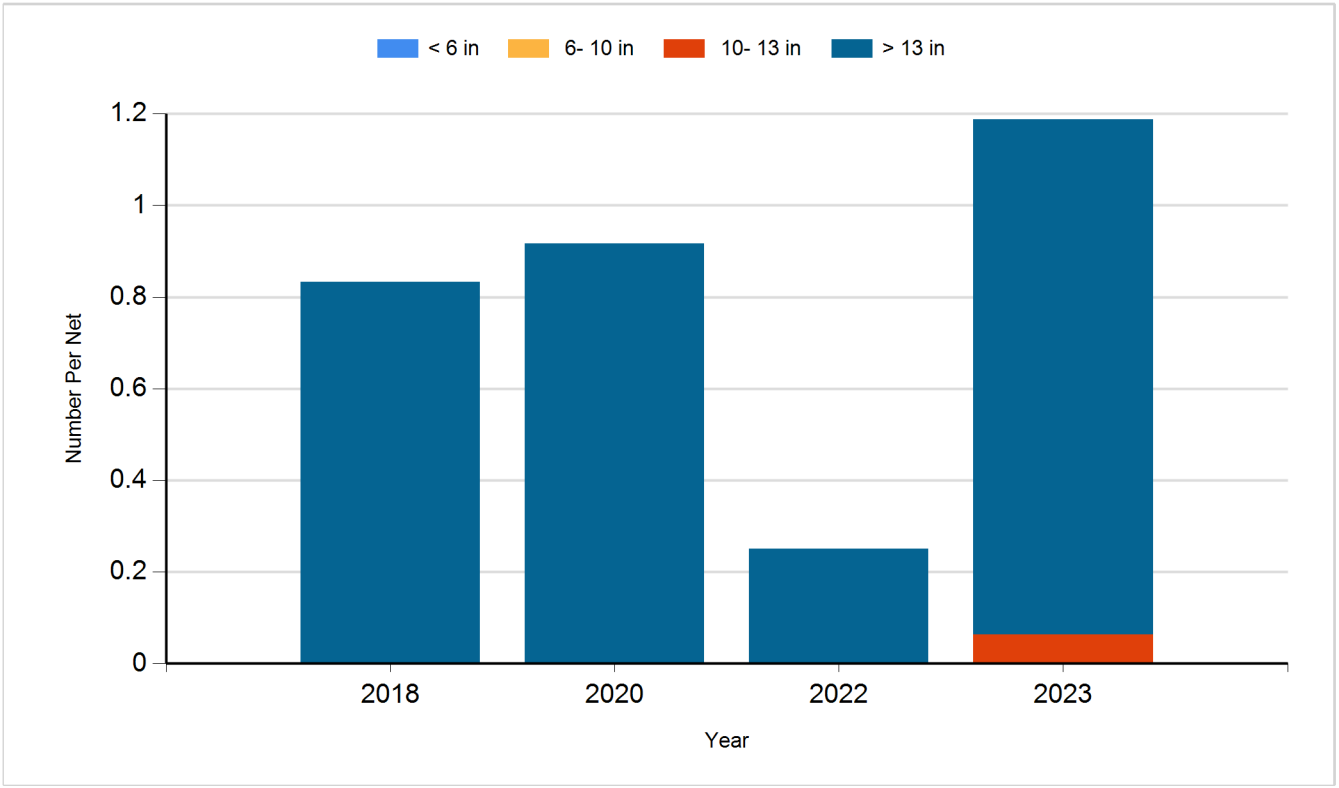
Species: Rainbow Trout
Gear: AFS std gill net



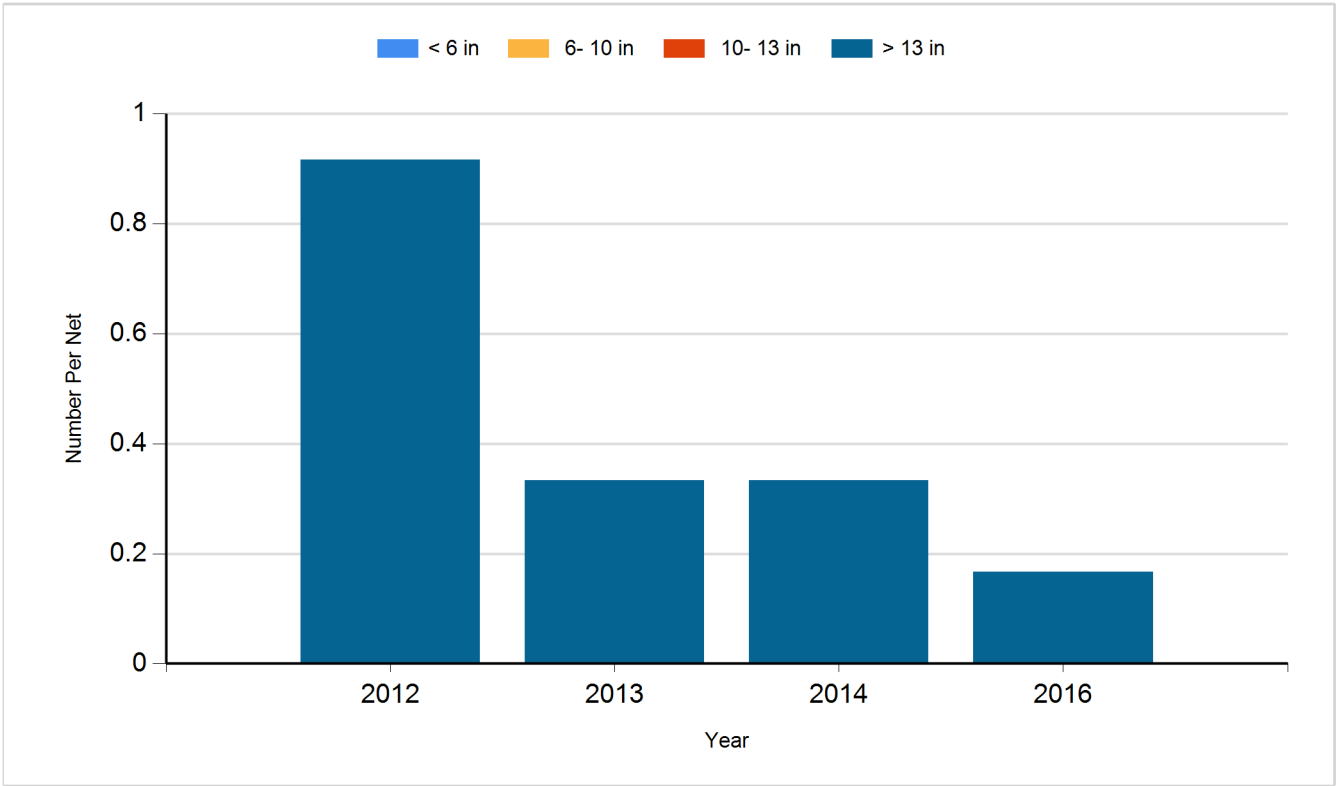
Species: Rainbow Trout
Gear: std exp gill net



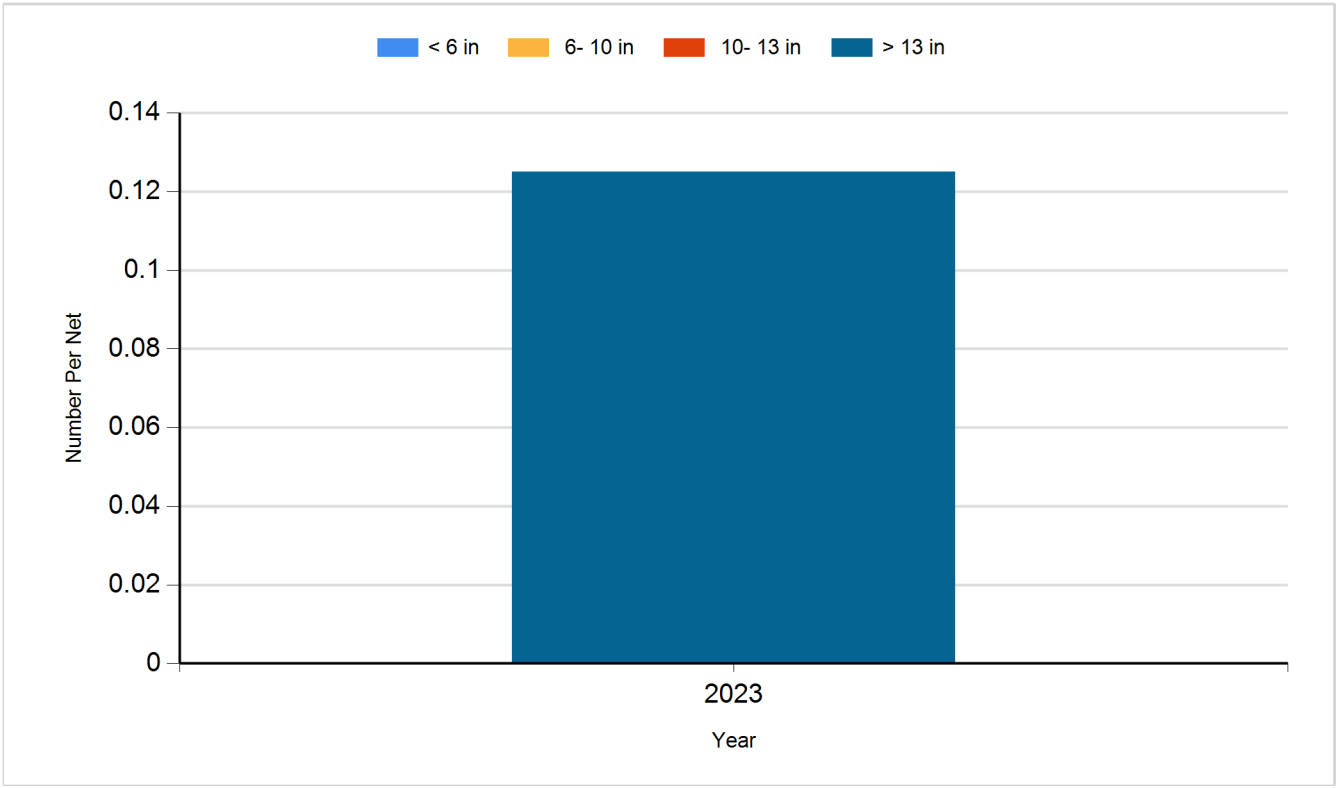
Species: White Sucker
Gear: AFS std gill net



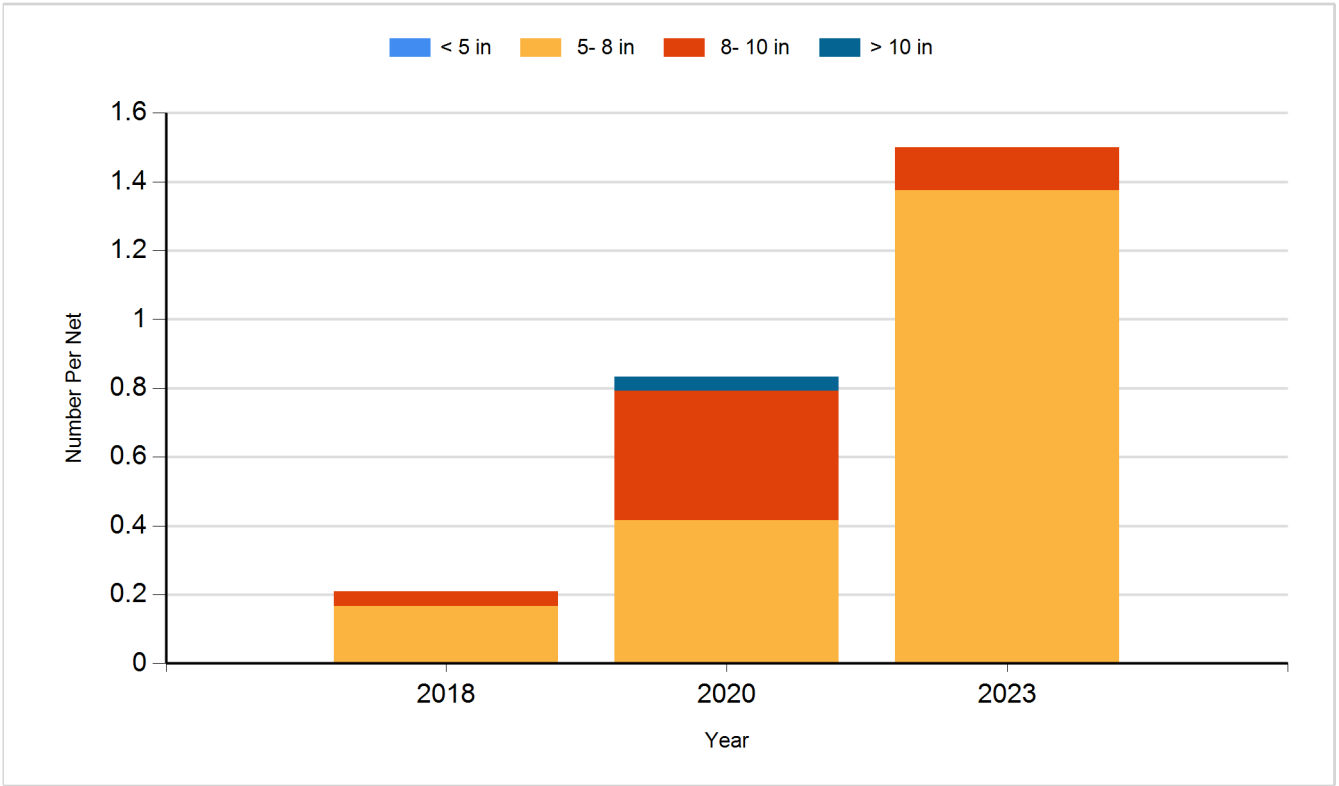
Species: White Sucker
Gear: std exp gill net



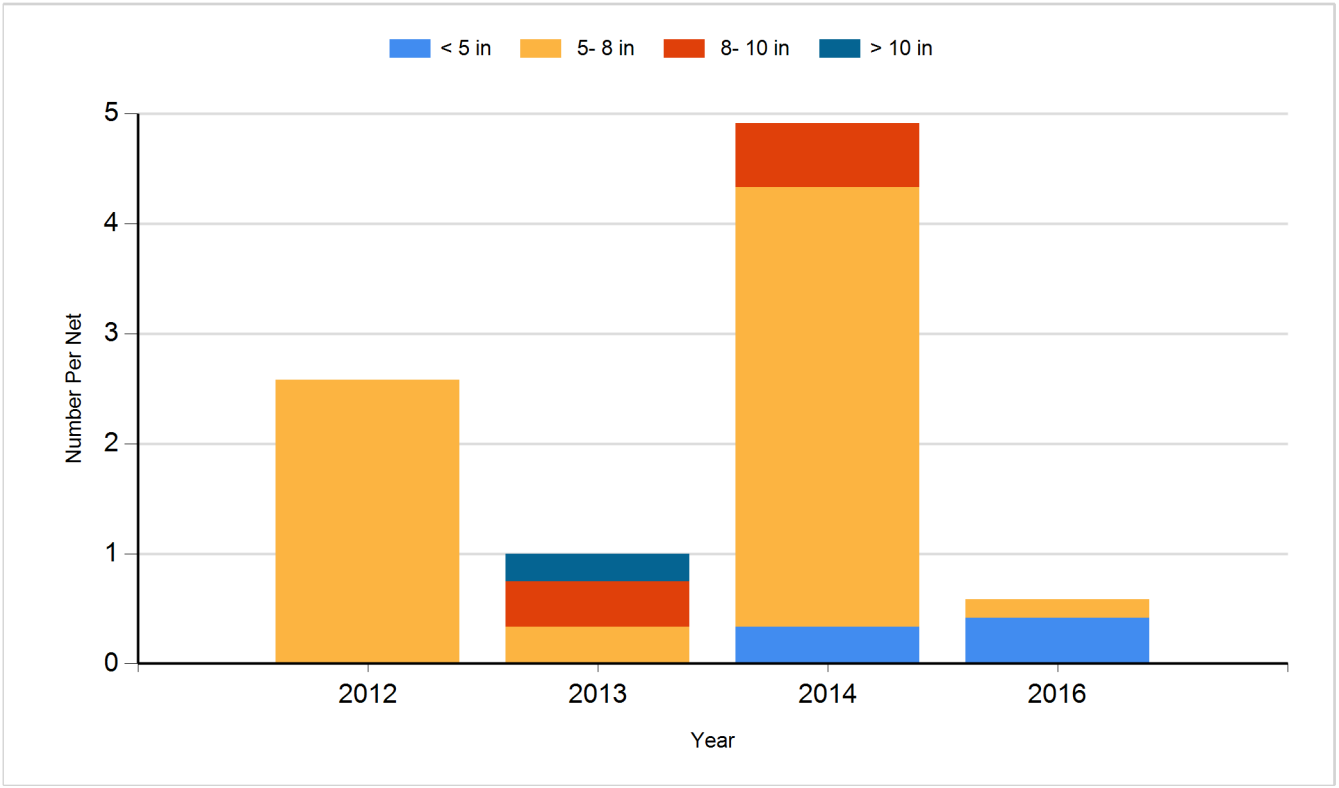
Species: White Sucker
Gear: suspended gill net



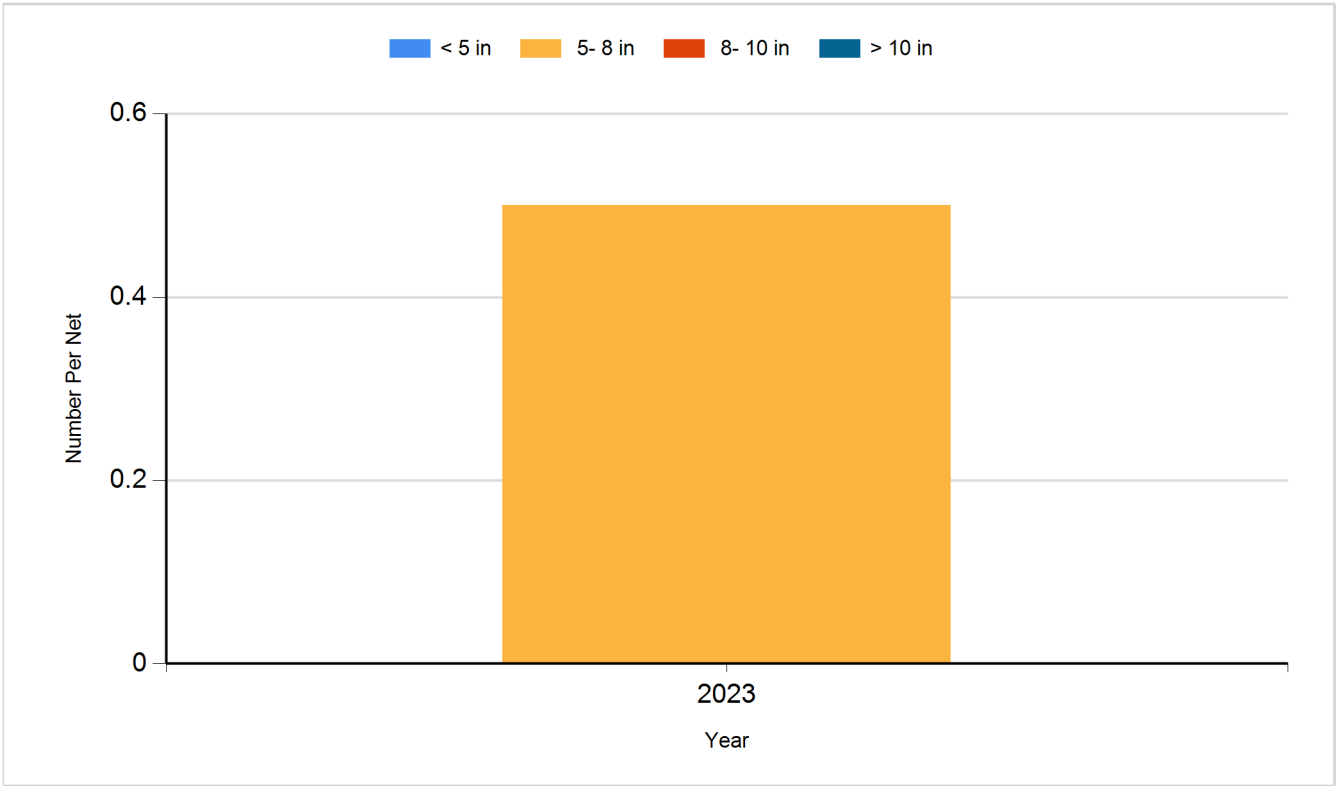
Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net



Species: Yellow Perch
Gear: suspended gill net



Fish Stocking

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

Year	Species	Size	Number
2012	Rainbow Trout (Erwin x Arlee)	Catchable 11"	9,450
2012	Rainbow Trout (Shasta)	Catchable 11"	19,484
2013	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	12,324
2013	Rainbow Trout (Shasta)	Catchable 11"	17,400
2013	Rainbow Trout (Shasta)	Catchable 15"	129
2014	Rainbow Trout (Erwin x Arlee)	Catchable 11"	880
2014	Rainbow Trout (Erwin x Arlee)	Catchable 15"	354
2014	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	699
2014	Rainbow Trout (Shasta)	Catchable	1,369
2014	Rainbow Trout (Shasta)	Catchable 11"	26,950
2015	Brown Trout	Fingerling	4,000
2015	Lake Trout	Adult	97
2015	Rainbow Trout (Erwin x Arlee)	Catchable 11"	1,356
2015	Rainbow Trout (Erwin x Arlee)	Catchable 15"	206
2015	Rainbow Trout (Erwin x Arlee)	Fingerling	15,236
2015	Rainbow Trout (Shasta)	Catchable 11"	28,727
2016	Brown Trout (Plymouth Rock)	Catchable 11"	8,000
2016	Rainbow Trout (Ennis)	Catchable 11"	9,482
2016	Rainbow Trout (Ennis)	Catchable 15"	3,079
2016	Rainbow Trout (Shasta)	Catchable 11"	9,816
2017	Brown Trout (Plymouth Rock)	Catchable	10,346
2017	Rainbow Trout (Erwin x Arlee)	Catchable 15"	12,337
2017	Rainbow Trout (Shasta)	Catchable 15"	11,415
2018	Brown Trout (Plymouth Rock)	Catchable	3,009
2018	Rainbow Trout (Erwin x Arlee)	Catchable	4,924
2018	Rainbow Trout (Erwin x Arlee)	Catchable 15"	2,622
2018	Rainbow Trout (Erwin x Arlee)	Fingerling	28,579
2018	Rainbow Trout (Shasta)	Catchable	5,131
2018	Rainbow Trout (Shasta)	Catchable 11"	2,800
2018	Rainbow Trout (Shasta)	Catchable 15"	9,694
2018	Rainbow Trout (Shasta)	Juvenile	2,800
2019	Brown Trout	Catchable	4,033
2019	Brown Trout	Fingerling	16,960
2019	Brown Trout	Juvenile	8,760
2019	Rainbow Trout (Erwin x Arlee)	Catchable 15"	2,043

2019	Rainbow Trout (Erwin x Arlee)	Juvenile	59,910
2019	Rainbow Trout (Shasta)	Catchable 11"	1,600
2019	Rainbow Trout (Shasta)	Catchable 15"	15,952
2019	Rainbow Trout (Shasta)	Fingerling	62,165
2020	Rainbow Trout (Arlee)	Catchable 15"	10,585
2020	Rainbow Trout (Gerrard)	Adult	6,322
2020	Rainbow Trout (Shasta)	Adult	13,108
2020	Rainbow Trout (Shasta)	Catchable 11"	1,414
2021	Rainbow Trout (Arlee)	Adult	27,762
2021	Rainbow Trout (Gerrard)	Adult	2,657
2021	Rainbow Trout (Shasta)	Adult	7,215
2021	Rainbow Trout (Shasta)	Juvenile	20,985
2022	Kokanee Salmon	Juvenile	25,903
2022	Rainbow Trout (Arlee)	Adult	19,946
2022	Rainbow Trout (Gerrard)	Adult	2,207
2022	Rainbow Trout (Gerrard)	Juvenile	4,166
2022	Rainbow Trout (Shasta)	Adult	2,706
2022	Rainbow Trout (Trout Lodge)	Juvenile	15,912
2023	Brown Trout	Adult	5,000
2023	Kokanee Salmon	Juvenile	50,522
2023	Rainbow Trout		145,126
2023	Rainbow Trout	Adult	19,674