

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Pactola Reservoir, Pennington County**  
**RAP-Lake-1-000**  
**2016**

**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
std exp gill net (150 ft)	July 13, 2016	6 net-nights
std exp gill net (150 ft)	July 14, 2016	6 net-nights
std frame net (3/8 inch)	July 13, 2016	4 net-nights
std frame net (3/8 inch)	July 14, 2016	4 net-nights

## **Common Fish Species Present**

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Rainbow Trout

Lake Trout

Brown Trout

Bluegill

Rock Bass

Bluegill X Gr. Sunfish Hybrid

Northern Pike

Yellow Perch

Black Crappie

White Sucker

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## 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).

$$CPUE = \frac{\text{number of fish}}{\text{effort}}$$

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.

$$PSD = \left( \frac{\text{number of fish} \geq \text{quality length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

$$PSD - P = \left( \frac{\text{number of fish} \geq \text{preferred length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

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.

$$Wr = \left( \frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Bigmouth Buffalo	11	28	18	46	24	61	30	76	37	94
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Blue Catfish	12	30	20	51	30	76	35	89	45	114
Bluegill	3	8	6	15	8	20	10	25	12	30
Bluegill X Gr. Sunfish Hybrid	3	8	6	15	8	20	10	25	12	30
Brown Bullhead	5	13	8	20	11	28	14	36	17	43
Burbot	8	20	15	38	21	53	26	67	32	82
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Flathead Catfish	14	35	20	51	28	71	34	86	40	102
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Gizzard Shad	7	18	11	28						
Green Sunfish	3	8	6	15	8	20	10	25	12	30
Lake Herring	5	13	8	20	11	28	14	35	17	43
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Longnose Gar	16	41	27	69	36	91	45	114	55	140
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Paddlefish	16	41	26	66	33	84	41	104	51	130
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Redear Sunfish	4	10	7	18	9	23	11	28	13	33
River Carpsucker	7	18	11	28	14	36	18	46	22	56
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Saugeye	9	23	14	35	18	46	22	56	27	69
Shorthead Redhorse	6	15	10	25	13	33	16	41	20	51
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Smallmouth Buffalo	11	28	18	46	24	61	30	76	37	94
Spotted Bass	7	18	11	28	14	35	17	43	20	51
Striped Bass	12	30	20	51	30	76	35	89	45	114
Striped Bass Hybrid (wiper)	8	20	12	30	15	38	20	51	25	63
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
White Perch	5	13	8	20	10	25	12	30	15	38
White Sucker	6	15	10	25	13	33	16	41	20	51
Yellow Bass	4	10	7	18	9	23	11	28	13	33
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).

Gear	Species	Abundance		Stock Density Indices			Condition		
		CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
std exp gill net (150 ft)	Bluegill	4.0	4.0	52	11	0		93	2
	Brown Trout	0.0	0.0						
	Lake Trout	0.0	0.0						
	Northern Pike	0.5	0.5	67		50		109	10
	Rainbow Smelt	0.0	0.0						
	Rainbow Trout	0.0	0.0						
	Rock Bass	1.5	1.7	39	19	22		84	2
	White Sucker	0.2	0.2	100		100		92	
	Yellow Perch	0.2	0.2	0		0		86	15
std frame net (3/8 inch)	Black Crappie	0.3	0.2	100		0		79	3
	Bluegill	61.5	17.7	34	3	0		98	1
	Bluegill X Gr. Sunfish Hybrid	7.3	2.6	72	9	0			
	Largemouth Bass	0.1	0.2	0		0		96	
	Northern Pike	0.4	0.4	0		0		84	6
	Rock Bass	22.1	10.5	45	5	7	3	89	2
	Yellow Perch	0.4	0.4	100		0		84	17

## 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.

Gear	Species	CPUE										
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
frame net (std 3/4 in)	Black Crappie					2.6			2.1			2.4
	Bluegill					32.9	30.3	31.0	20.6			28.7
	Golden Shiner					0.0	0.0					0.0
	Green Sunfish							0.3	0.9			0.6
	Largemouth Bass					0.0	0.3	0.1	0.0			0.1
	Northern Pike							0.1	0.1			0.1
	Rainbow Smelt					0.0						0.0
	Rainbow Trout					0.0	0.0	0.0	0.0			0.0
	Rock Bass					6.6	15.5	13.4	31.6			16.8
	Rudd							3.0	2.9			3.0
	White Sucker					4.8	0.4	0.1	0.1			1.4
	Yellow Perch					1.6	5.8	0.5	0.9			2.2
std exp gill net (150 ft)	Bluegill	4.2		2.6	6.1	2.5	6.7	2.5	6.0		4.0	4.3
	Brown Trout	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
	Golden Shiner			0.0	0.0	0.0	0.0					0.0
	Lake Trout	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
	Largemouth Bass	0.1		0.2	0.0	0.0						0.1
	Northern Pike	0.3		0.4	0.7	1.1	0.9	0.3	0.5		0.5	0.6
	Rainbow Smelt	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
	Rainbow Trout			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
	Rainbow Trout (Hatchery)	0.0										0.0
	Rock Bass	1.2		0.1	0.8	0.8	0.6	0.3	1.3		1.5	0.8
	Rudd							0.1				0.1
	Sunfish/Crappie/Rock Bass				0.0							0.0
	White Sucker	2.2		0.7	0.6	0.5	0.9	0.3	0.3		0.2	0.7
	Yellow Perch	2.6		0.3	3.0	7.5	2.6	1.0	4.6		0.2	2.7
std frame net (3/8 inch)	Black Crappie										0.3	0.3
	Bluegill										61.5	61.5
	Bluegill X Gr. Sunfish Hybrid										7.3	7.3
	Largemouth Bass										0.1	0.1
	Northern Pike										0.4	0.4
	Rock Bass										22.1	22.1

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
std frame net (20' x 1')	Yellow Perch										0.4	0.4

## 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.

Gear	Species	Index	Year											
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
frame net (std 3/4 in)	Black Crappie	PSD						0				53		
		PSD-P						0				0		
		Wr						98				90		
	Northern Pike	PSD									100	100		
		PSD-P									0	100		
		Wr									99	119		
	Yellow Perch	PSD							0	11	0	57		
		PSD-P							0	4	0	0		
		Wr								78	75	98		
std exp gill net (150 ft)	Northern Pike	PSD	75		60	50	77	82	33	100			67	
		PSD-P	25		40	13	31	45	0	33			50	
		Wr	108		86	88	95	100	83	116			109	
	Yellow Perch	PSD	68		0	31	8	0	67	13			0	
		PSD-P	0		0	3	1	0	25	0			0	
		Wr	86		96	89	73	89	90	95			86	
std frame net (3/8 inch)	Black Crappie	PSD											100	
		PSD-P											0	
		Wr											79	
	Northern Pike	PSD											0	
		PSD-P											0	
		Wr											84	
	Yellow Perch	PSD											100	
		PSD-P											0	
		Wr											84	



## Length at Capture

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

Species: Black Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2011	21			151 (21)							

## **Fish Condition**

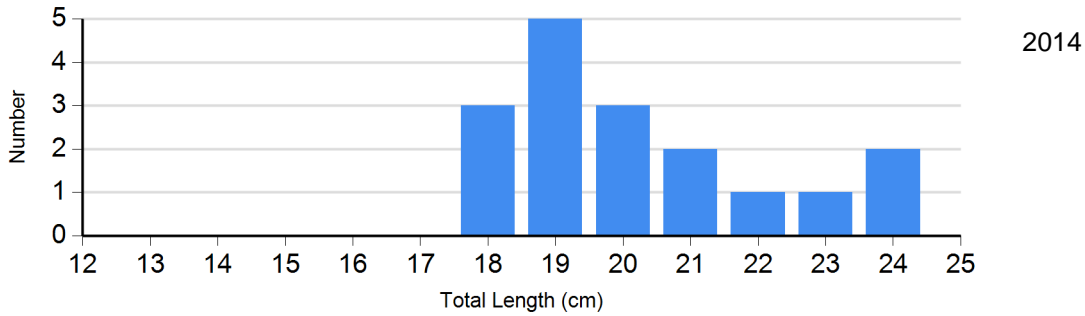
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2014	8	92 (2.1)	9	89 (3.1)	0		0	
	2016	0		2	79 (2.0)	0		0	
Northern Pike Gill Net	2012	2	90 (3.6)	4	99 (4.1)	2	115 (0.6)	3	96 (6.6)
	2013	2	80 (2.9)	1	90	0		0	
	2014	0		4	108 (6.7)	0		2	132 (1.9)
	2016	2	90 (4.4)	1	119	2	126 (9.1)	1	102
Yellow Perch Gill Net	2012	31	89 (1.9)	0		0		0	
	2013	4	86 (4.3)	5	91 (1.5)	3	94 (2.9)	0	
	2014	48	97 (3.6)	7	87 (2.2)	0		0	
	2016	2	86 (12.0)	0		0		0	

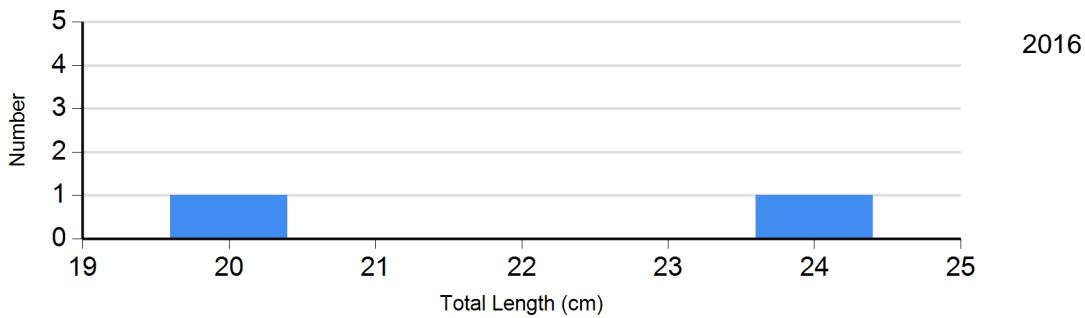
# Length Frequency Distribution

Length frequency histogram of species sampled by year.

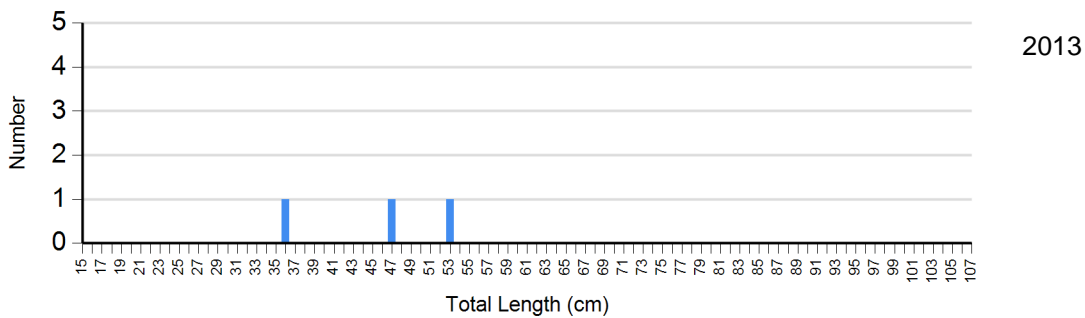
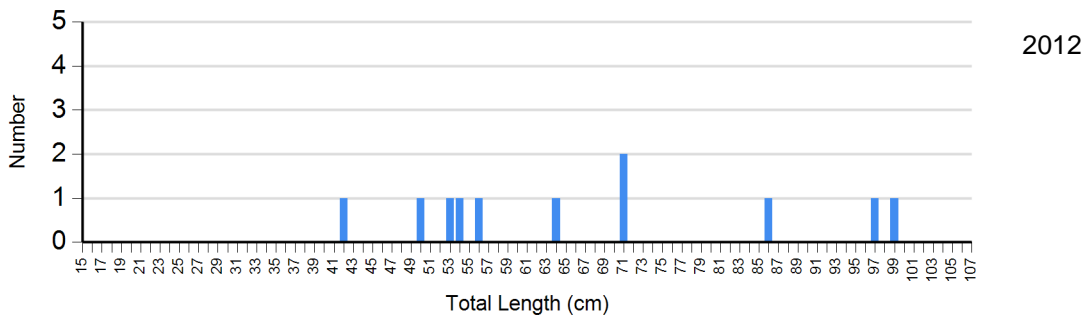
Species: Black Crappie  
Gear: frame net (std 3/4 in)

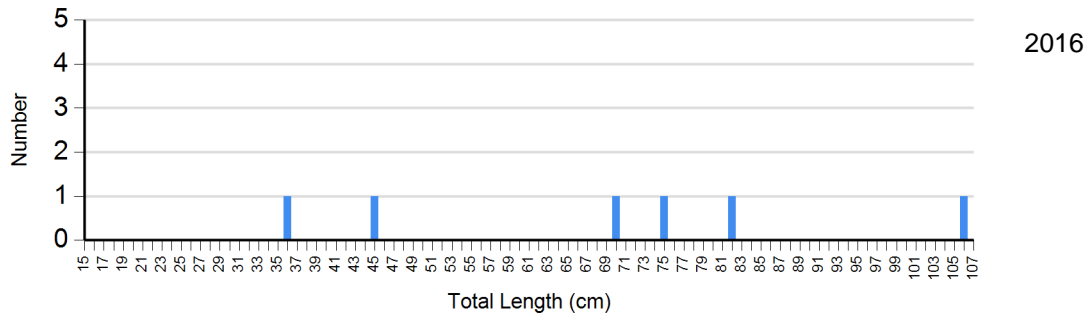
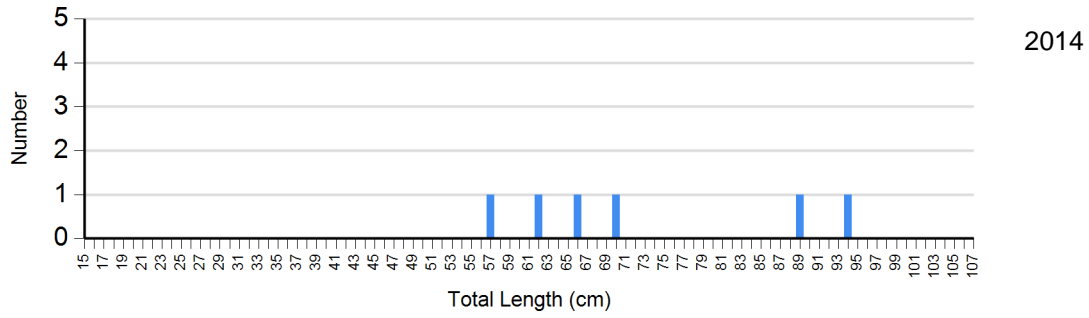


Species: Black Crappie  
Gear: std frame net (3/8 inch)

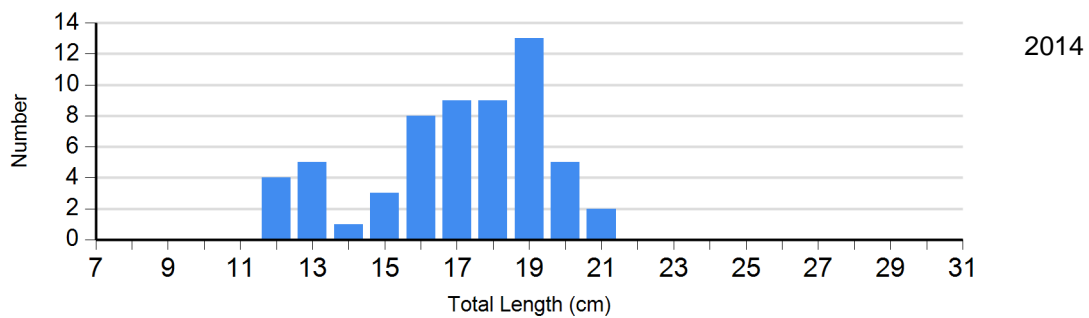
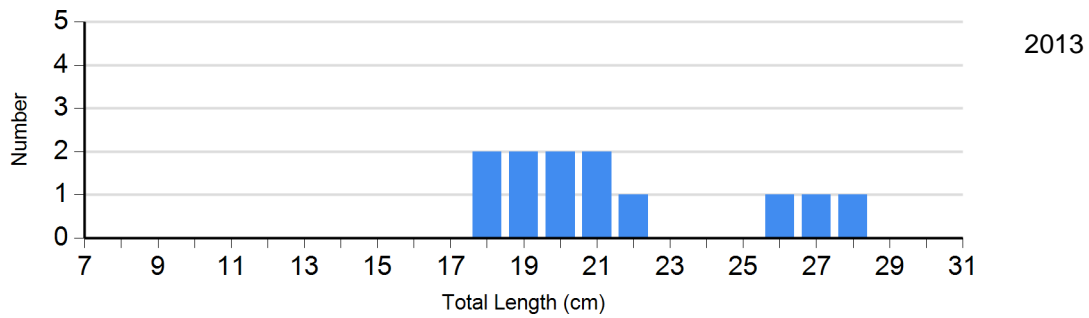
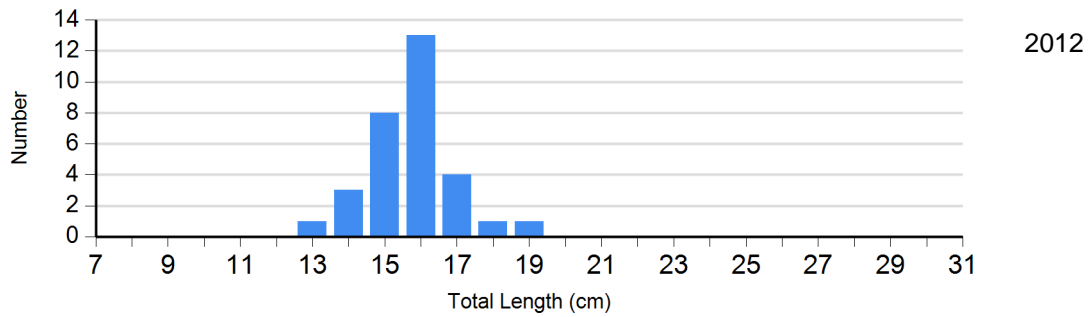


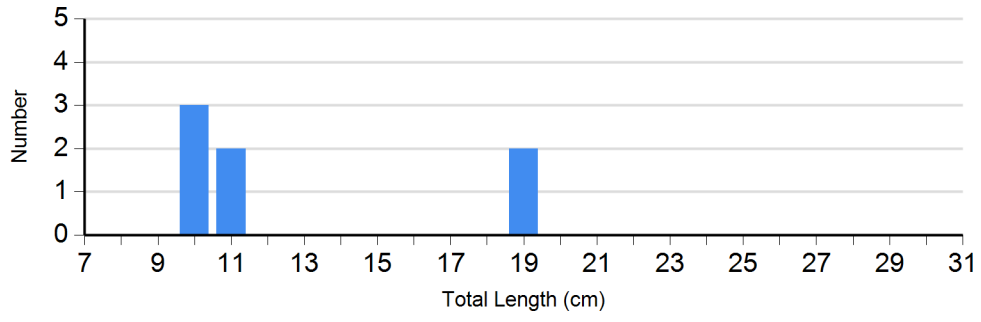
Species: Northern Pike  
Gear: std exp gill net (150 ft)





Species: Yellow Perch  
 Gear: std exp gill net (150 ft)



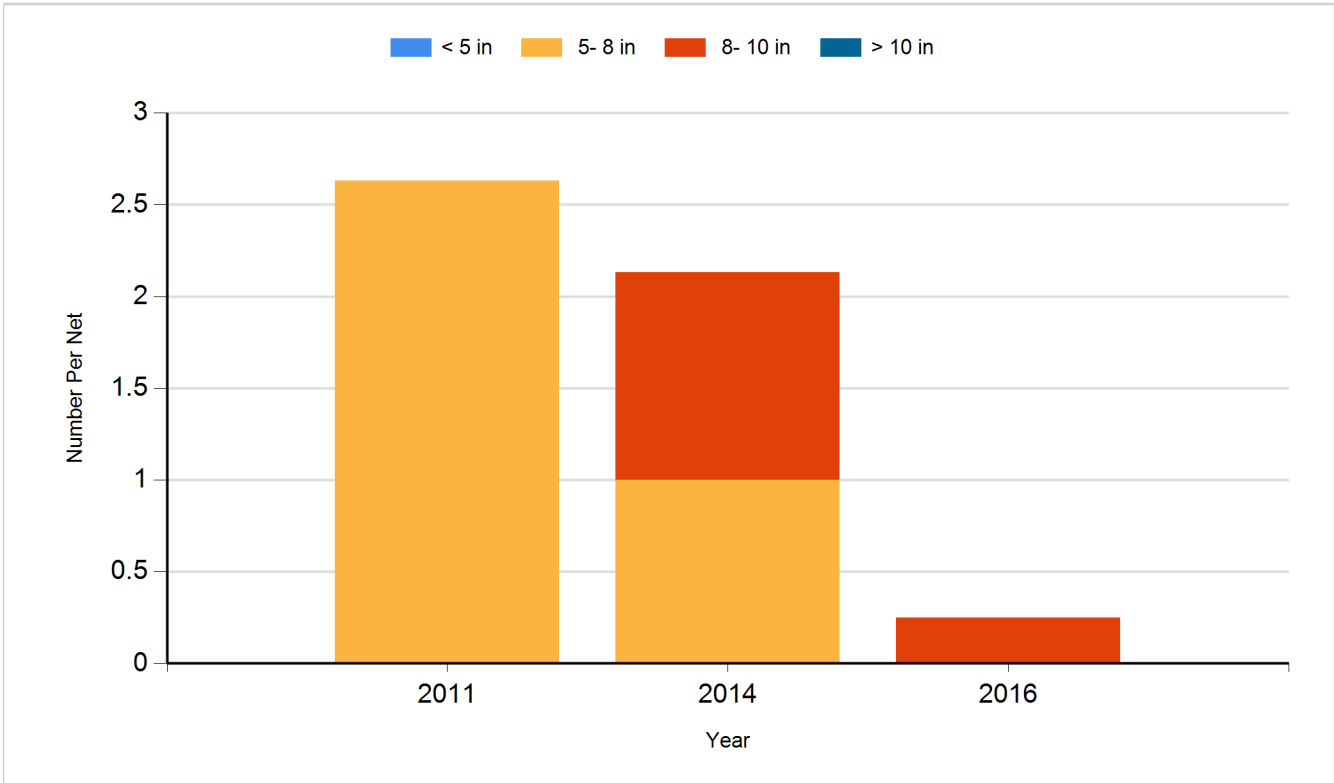


2016

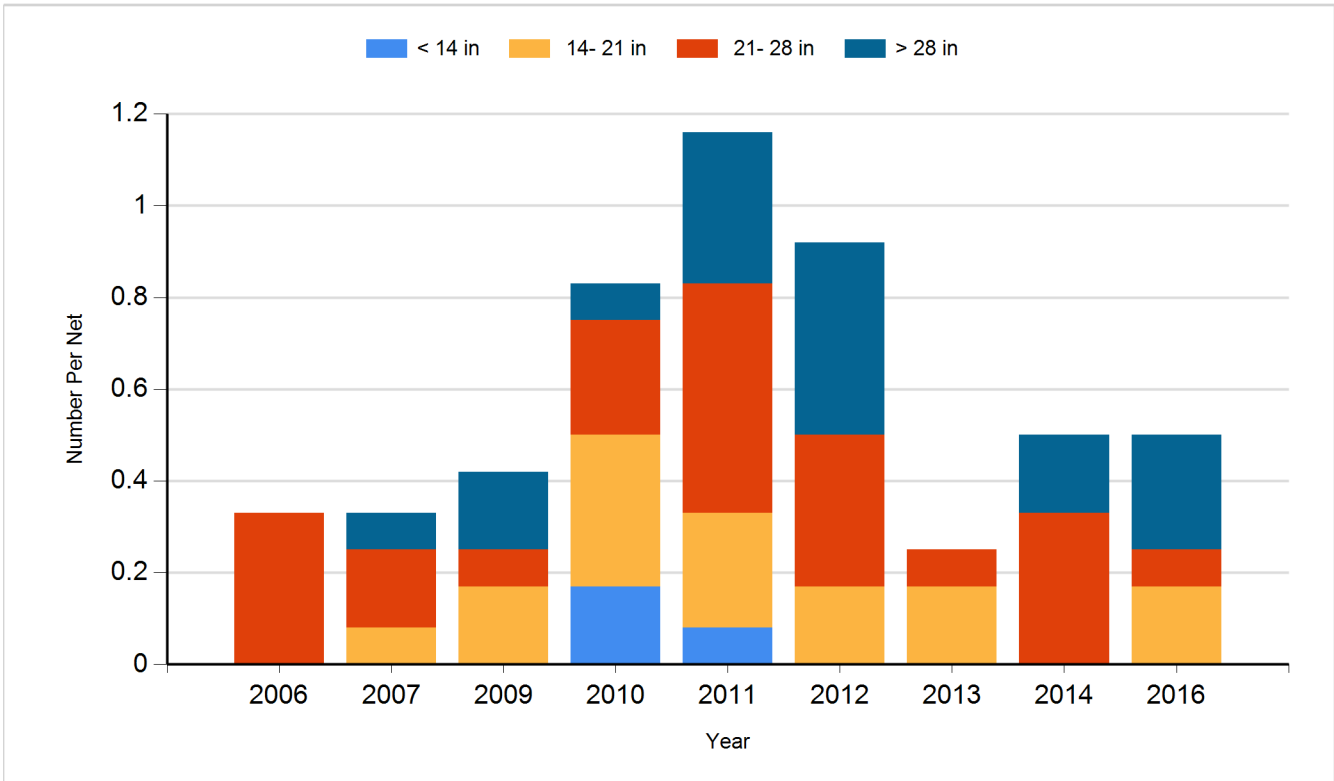
## Historic Fish Sizes and Relative Abundance

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

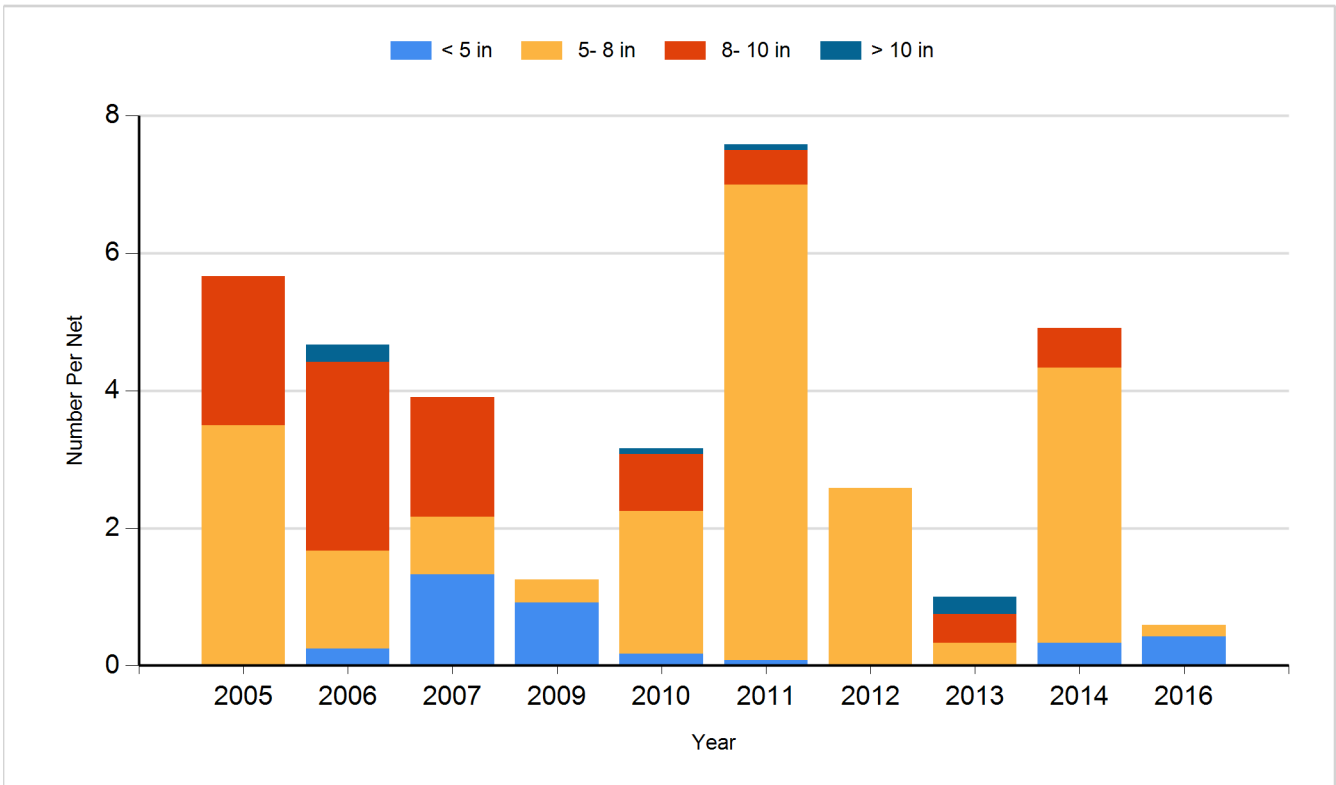
Species: Black Crappie  
Gear: Frame Net



Species: Northern Pike  
Gear: Gill Net



Species: Yellow Perch  
Gear: Gill Net



## **Fish Stocking**

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

Year	Species	Size	Number
2005	Lake Trout	Catchable	7,451
2005	Rainbow Trout (Shasta)	Catchable	14,997
2006	Rainbow Trout (Erwin)	Catchable	22,366
2006	Rainbow Trout (Shasta)	Catchable	4,000
2007	Brown Trout (Soda Lake)	Catchable	4,700
2007	Rainbow Trout (Erwin)	Catchable	3,000
2007	Rainbow Trout (Shasta)	Catchable 11"	2,800
2008	Rainbow Trout (McConaugRainbow Trout)	Catchable 11"	2,125
2008	Rainbow Trout (Shasta)	Catchable 11"	4,963
2008	Rainbow Trout (Utah)	Catchable	7,975
2009	Rainbow Trout (Erwin)	Catchable	3,300
2009	Rainbow Trout (McConaugRainbow Trout)	Catchable	2,400
2009	Rainbow Trout (McConaugRainbow Trout)	Fingerling	7,420
2009	Rainbow Trout (Shasta)	Catchable 11"	22,699
2009	Rainbow Trout (Shasta)	Fingerling	4,603
2009	Rainbow Trout (Shasta)	Small Fingerling	12,420
2010	Rainbow Trout (Erwin x Arlee)	Catchable	9,619
2010	Rainbow Trout (Shasta)	Catchable	14,700
2010	Rainbow Trout (Shasta)	Catchable 11"	4,725
2011	Rainbow Trout (Erwin x Arlee)	Catchable	4,180
2011	Rainbow Trout (Erwin x Arlee)	Catchable 11"	4,725
2011	Rainbow Trout (Shasta)	Catchable	15,112
2011	Rainbow Trout (Shasta)	Catchable 11"	4,725
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

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