SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Deerfield, Pennington County
RAP-Lake-31-000
2016

Lake Information

Name: Deerfield

County: Pennington

Surface Area: 416 Acres

Surveys and Investigations

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

Gear	Date	Effort
std exp gill net (150 ft)	August 17, 2016	2 net-nights
std exp gill net (150 ft)	August 18, 2016	1 net-nights
std frame net (3/8 inch)	August 17, 2016	3 net-nights
std frame net (3/8 inch)	August 18, 2016	3 net-nights

Common Fish Species Present

Brook Trout

Rainbow Trout

Splake Trout

Rock Bass

Yellow Perch

White Sucker

Golden Shiner

Creek Chub

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).

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

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)
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

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(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).

		Abundance		Stock Density Indices				Condition	
Gear	Species	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
std exp gill net (150 ft)	Brook Trout	0.0	0.0						
	Golden Shiner	0.0	0.0						
	Rainbow Trout	0.0	0.0						
	Rock Bass	8.7	13.6	8		0		93	5
	Splake Trout	0.0	0.0						
	White Sucker	12.7	21.1	97		79	10	103	1
	Yellow Perch	58.3	34.5	50	5	4	2	96	5
std frame net (3/8 inch)	Brook Trout	0.0	0.0						
	Creek Chub	0.0	0.0						
	Golden Shiner	0.0	0.0						
	Rock Bass	119.7	25.8	2	1	0			
	White Sucker	7.2	3.2	86	8	81	9		
	Yellow Perch	2.7	1.6	50	21	0			

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.

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
frame net (std 3/4 in)	Brook Trout				0.0				0.0			0.0
	Creek Chub							0.0	0.0			0.0
	Golden Shiner		0.0		0.0	0.0	0.0	0.0	0.0			0.0
	Lake Chub			0.0								0.0
	Rainbow Trout			0.0	0.0	0.0	0.0		0.0			0.0
	Rock Bass		32.6	4.3	87.8	111.3	35.2	33.2	45.3			50.0
	Splake Trout				0.0							0.0
	White Sucker		0.0	10.3	6.5	7.2	16.5	3.7	4.2			6.9
	Yellow Perch		0.0	1.0	14.0	18.7	19.2	5.0	22.5			11.5
std exp gill net (150 ft)	Brook Trout				0.0			0.0	0.0	0.0	0.0	0.0
	Brown Trout (Utah)	0.0	0.0	0.0		0.0						0.0
	Chinook Salmon		0.0									0.0
	Golden Shiner				0.0		0.0	0.0	0.0		0.0	0.0
	Lake Trout									0.0		0.0
	Rainbow Trout		0.0	0.0	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	29.5	9.0	40.0	48.0	15.5	22.0	8.5	7.3	5.5	8.7	19.4
	Splake Trout				0.0		0.0	0.0	0.0	0.0	0.0	0.0
	White Sucker	15.8	11.0	24.0	23.8	7.0	7.3	6.0	8.5	5.5	12.7	12.2
	Yellow Perch	35.8	60.0	38.0	66.8	9.8	49.5	80.8	87.3	41.8	58.3	52.8
std frame net (3/8 inch)	Brook Trout										0.0	0.0
	Creek Chub										0.0	0.0
	Golden Shiner										0.0	0.0
	Rock Bass										119.7	119.7
	White Sucker										7.2	7.2
	Yellow Perch										2.7	2.7

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
frame net (std 3/4 in)	Yellow Perch	PSD		0	0	25	13	16	13	16		
		PSD-P		0	0	0	0	0	0	1		
		Wr			91	89	92	84	83	86		
std exp gill net (150 ft)	Yellow Perch	PSD	20	23	55	39	38	26	28	18	36	50
		PSD-P	0	0	1	0	0	0	0	0	0	4
		Wr	92	93	91	91	92	92	81	91	85	96
std frame net (3/8 inch)	Yellow Perch	PSD										50
		PSD-P										0

Fish Condition

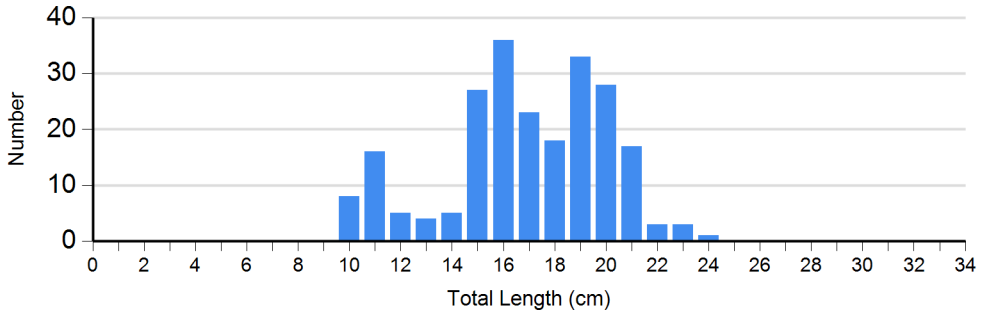
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Yellow Perch Gill Net	2012	146	96 (1.1)	52	84 (0.9)	0		0	
	2013	232	84 (0.4)	91	76 (0.8)	0		0	
	2014	285	95 (0.7)	64	74 (0.8)	0		0	
	2015	107	91 (1.8)	60	73 (1.1)	0		0	
	2016	87	98 (0.9)	81	93 (7.8)	5	93 (4.2)	2	93 (5.9)

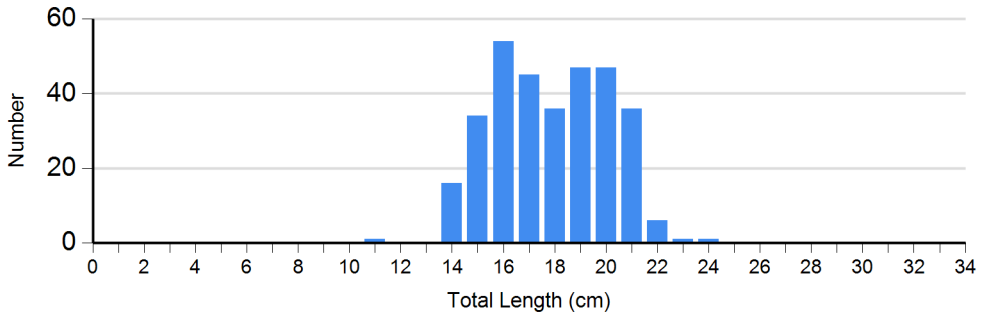
Length Frequency Distribution

Length frequency histogram of species sampled by year.

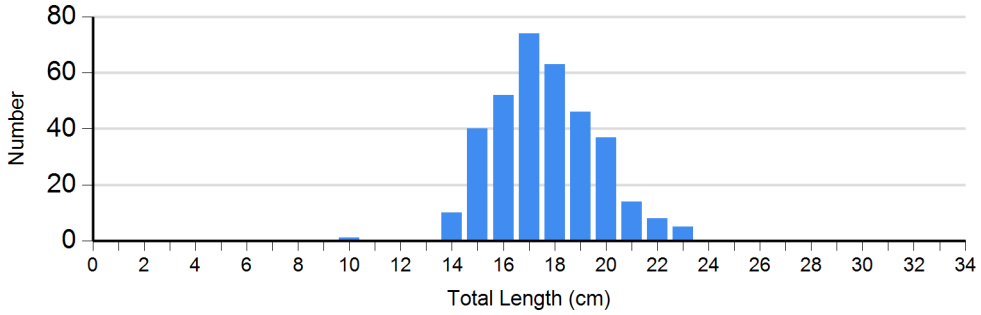
Species: Yellow Perch
Gear: std exp gill net (150 ft)



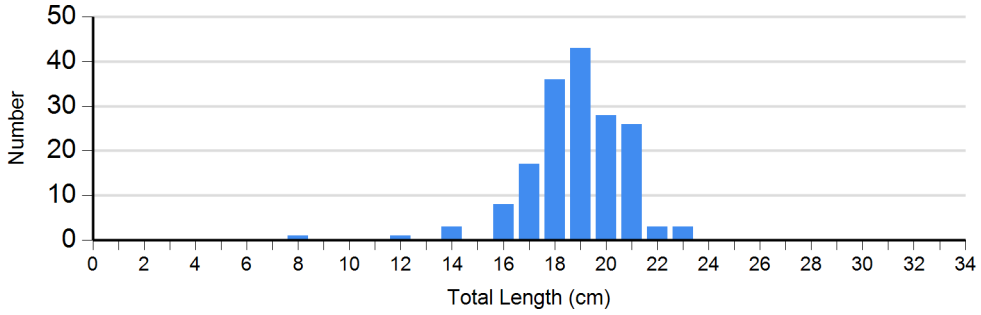
2012



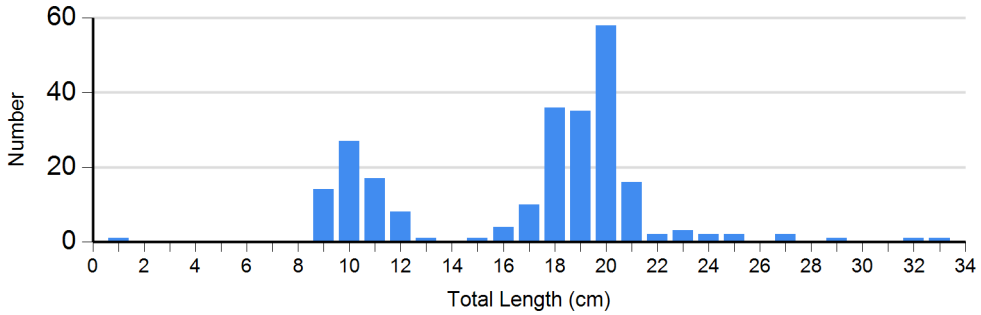
2013



2014



2015

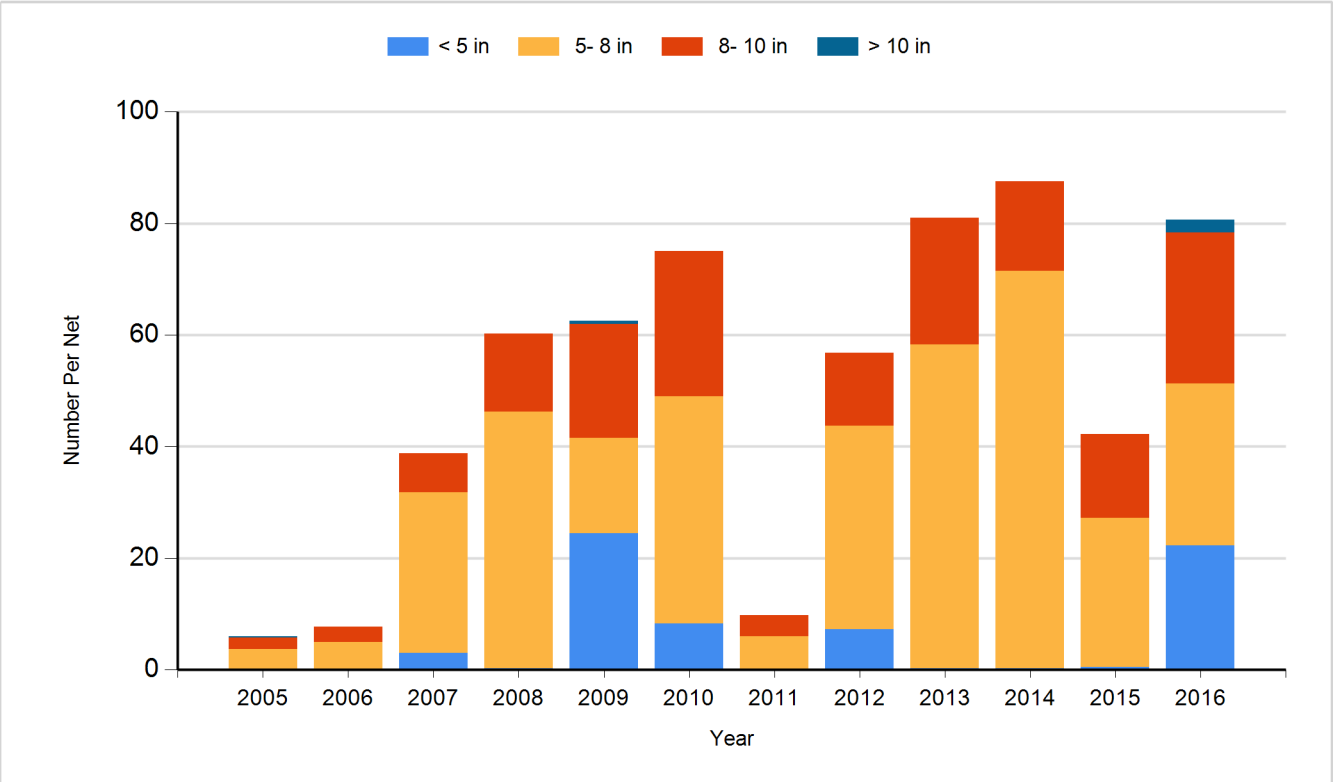


2016

Historic Fish Sizes and Relative Abundance

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

Species: Yellow Perch
Gear: Gill Net



Fish Stocking

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

Year	Species	Size	Number
2005	Rainbow Trout (Erwin)	Catchable	4,000
2005	Rainbow Trout (McConaugRainbow Trout	Catchable	4,000
2005	Rainbow Trout (Shasta)	Catchable	4,000
2006	Rainbow Trout (Erwin)	Catchable	1,000
2006	Rainbow Trout (McConaugRainbow Trout	Catchable	3,495
2006	Rainbow Trout (Shasta)	Catchable	505
2006	Splake Trout	Catchable	7,124
2007	Rainbow Trout (Erwin)	Catchable	4,200
2007	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	767
2007	Rainbow Trout (Shasta)	Catchable	1,400
2007	Rainbow Trout (Shasta)	Catchable 11"	3,433
2008	Rainbow Trout (McConaugRainbow Trout	Catchable	1,400
2008	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	1,940
2008	Rainbow Trout (Shasta)	Catchable 11"	2,140
2008	Rainbow Trout (Utah)	Catchable	2,000
2008	Rainbow Trout (Utah)	Catchable 11"	2,000
2009	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	11,883
2010	Rainbow Trout (Erwin x Arlee)	Catchable	2,000
2010	Rainbow Trout (Erwin x Arlee)	Catchable 11"	1,997
2010	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	3,868
2010	Rainbow Trout (Shasta)	Catchable 11"	3,999
2011	Rainbow Trout (Erwin x Arlee)	Catchable 11"	4,000
2011	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	4,000
2011	Rainbow Trout (Shasta)	Catchable 11"	4,000
2012	Rainbow Trout (Erwin x Arlee)	Catchable 11"	4,500
2012	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	4,000
2012	Rainbow Trout (Shasta)	Catchable 11"	4,000
2012	Splake Trout (Story)	Fingerling	5,853
2013	Rainbow Trout (Erwin x Arlee)	Catchable 11"	4,000
2013	Rainbow Trout (McConaugRainbow Trout	Catchable 11"	4,000

2013	Rainbow Trout (Shasta)	Catchable 11"	4,000
2014	Rainbow Trout (Shasta)	Catchable 11"	12,000
2015	Lake Trout	Adult	823
2015	Rainbow Trout (Shasta)	Catchable 11"	12,000
2016	Lake Trout	Adult	400
2016	Rainbow Trout (Shasta)	Catchable 11"	9,516