

Fisheries Management
Lake Name: Boot
Survey Type: Standard Survey
DOW Number: 03-0030-00
Survey ID Date: 08/16/2021
Lake Identification

 Alternate Lake Name: N/A
 Primary Lake Class ID: 23

 DNR Sounding Map Number: C0737
 Alternate Lake Class ID: N/A

Lake Location

Primary County: Becker

Nearest Town: Two Inlets

Legal Descriptions

 Lake Center: Township - 142N Range - 36W Section - 32
 PLS Section Lake Center: 14203632

All Legal Descriptions:

 Becker County: Township - 141N Range - 36W Sections - 5, 6
 Township - 142N Range - 36W Sections - 29, 32

Area Office

 Area Name: Park Rapids
 Region Name: Northwest

 ORG Code: F117
 Region Number: 1

Lake Access

(Information based on Population Assessment dated 08/16/2011)

Station ID	Ownership	Public Use	Type	Location / Comments
AC - 1	DNR	Open to Public use	Concrete	DNR access located on the north shore.

Lake Characteristics

Lake Area (planimetered acres): 348.00	GIS Shoreline Length (miles): 6.78
GIS Lake Area (acres): 385.10	Maximum Fetch (miles): 1.80
DOW Lake Area (acres): 401.00	Fetch Orientation (degrees): 45
Littoral Area (acres): 81.00	USGS Quad Map Number: J08d
Area in MN (acres): 385.10	USGS Quad 24K GIS Index: 1916
Maximum Depth (feet): 109.0	
Mean Depth (feet): N/A	

Watershed Characteristics
Major Watershed

 Name: Crow Wing River
 Watershed Number: 12
 Watershed size (acres): 1,268,954

Minor Watershed

 Name: Basswood Cr
 Watershed Number: 54
 Watershed size (acres): 20,109

LAKE SURVEY REPORT
STANDARD SURVEY DATED 08/16/2021 FOR DOW NUMBER 03-0030-00

Surveys and Investigations

Initial Survey: 09/06/1951.
Re-Survey: 08/05/1991, 07/29/1974.
Population Assessment: 08/16/2011, 08/14/2006, 08/08/2001, 08/05/1996, 08/04/1986, 08/12/1981.
Special Assessment: 09/04/2008, 05/31/2006, 08/16/2004, 05/27/2004, 06/05/2002.
Standard Survey: 08/16/2021, 08/15/2016.
Targeted Survey: 06/28/2021, 08/12/2020, 09/27/2018, 07/12/2016.

Current Water Level

Station ID	Date	Level	Reading (feet)	Reading Type
BM - 1	08/16/2021	Low	-4.10	Above or below Benchmark
BM - 2	08/17/2021	Low	-1.41	Above or below Benchmark

Notes: Based on 314 MN DNR Division of Waters water level readings from 1938 to 2021, the water surface has varied from 1546.75 (9/23/2012) to 1548.13 (6/26/2005) and water surface elevation average was 1547.45 ft. Ordinary high water elevation is 1547.7 ft. For certain years from 1997 to 2021 during which more than one reading per year was recorded, the average annual water surface elevation fluctuation was 0.43 ft. The greatest recorded change within one year during this period was 0.76 ft in 2005.

Benchmark and Gauge Descriptions / Locations

Station ID	Location Description
BM - 1	Spike in 12 inch dbh tamarrac 30 ft. from shore west of ramp. (tree is dead; found stump).
BM - 2	Top of steel culvert at outlet on east side of lake.

Water Level History - Readings

Station ID	Date	Level	Reading (feet)	Reading Type
BM - 1	08/16/2021	Low	-4.10	Above or below Benchmark
	08/15/2016	Normal	-3.40	Above or below Benchmark
	08/11/2011	Normal	-3.34	Above or below Benchmark
	08/14/2006	Low	-3.95	Above or below Benchmark
BM - 2	08/17/2021	Low	-1.41	Above or below Benchmark
	08/17/2016	Normal	-1.15	Above or below Benchmark
	08/11/2011	Normal	-0.95	Above or below Benchmark
	08/16/2006	Low	-1.20	Above or below Benchmark
BM - 3	08/11/2011	Normal	-2.43	Above or below Benchmark
	08/14/2006	Low	-3.05	Above or below Benchmark

Water Level History - Station Summary

Station ID	Minimum Level		Maximum Level		Range (feet)	Average Level (feet)	Reading Type (and number of readings)
	Feet	Date	Feet	Date			
BM - 1	-4.10	08/16/2021	-3.34	08/11/2011	0.76	-3.70	Above or below Benchmark (4)
BM - 2	-1.41	08/17/2021	-0.95	08/11/2011	0.46	-1.18	Above or below Benchmark (4)
BM - 3	-3.05	08/14/2006	-2.43	08/11/2011	0.62	-2.74	Above or below Benchmark (2)

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Surrounding Watershed Characteristics

Use / Coverage	% Use	Relief	Location / Comments
Forested	61	Flat	N/A
Bog	17	Flat	N/A
Marsh	13	Flat	N/A
Pasture	4	Flat	N/A
Grassland	2	Flat	N/A
Residential	2	Flat	N/A
Agricultural	1	Flat	N/A

Shoreline Characteristics

Use / Coverage	% Use	Relief	Location / Comments
Forested	86	Flat	N/A
Grassland	5	Flat	N/A
Residential	3	Flat	N/A
Marsh	3	Flat	N/A
Bog	2	Flat	N/A
Pasture	1	Flat	N/A
Agricultural	0	Flat	N/A

Riparian Landscape Observations

Soil Types (Pprimary and Ssecondary): N/A
 Soil Comments: N/A
 Number of Homes/Cabins: 69
 Comments About Shoreline Development: 87 Docks

Resorts and Campgrounds

Station ID	Resort/Campground Name	Number of Cabins	Number of Campsites	Comments
RE - 1	Halfmoon trail	19	N/A	N/A
RE - 2	Evergreen Bay Resort	13	N/A	N/A
Totals:		32	N/A	

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Dissolved Oxygen and Temperature Profile of Lake Water

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 1	08/16/2021	70.2	Surface	73.2	9.4
			3.0	73.2	9.5
			6.0	73.2	9.5
			9.0	73.2	9.5
			12.0	73.2	9.4
			15.0	73.0	9.4
			18.0	73.0	9.4
			21.0	73.0	9.4
			24.0	70.2	8.5
			25.0	64.6	8.6
			26.0	63.1	8.6
			27.0	62.4	7.9
			28.0	58.6	4.2
			29.0	56.7	3.3
			30.0	55.2	3.3
			31.0	54.1	2.9
			32.0	53.2	4.5
			33.0	52.2	3.7
			34.0	51.4	1.8
			35.0	51.1	1.9
40.0	49.3	1.0			
45.0	48.4	0.3			
50.0	47.8	0.2			
55.0	47.3	0.5			
60.0	46.9	0.3			
65.0	46.8	0.1			

Field Measurements of Water Quality

Station ID	Sampling Date	Sample Depth (Feet)	Secchi Depth (Feet)	Field pH	Alkalinity (ppm)	Water Color	Color Cause
WQ - 1	08/16/2021	Surface	12.8	N/A	N/A	Green Blue	N/A

Laboratory Analysis of Water Chemistry

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 1	08/16/2021	07/13/2021	Surface	Sulphate ion	0.6 ppm
				Total phosphorus	0.006 ppm
				Total alkalinity	160 ppm
				Total dissolved solids	148 ppm
				Conductivity	315 :S/cm
				pH	8.43 pH

LAKE SURVEY REPORT
STANDARD SURVEY DATED 08/16/2021 FOR DOW NUMBER 03-0030-00

Net Catch Summary by Numbers for GN

Standard gill net sets

Number of Sets: 9
 First Set Date: 08/16/2021
 Last Lift Date: 08/19/2021
 Target Species: N/A

Abbr	Species	Total Fish	Number Per Set	Quartiles for Lake Class 23 ¹		
				25%	50%	75%
BLC	Black Crappie	13	1.44	0.33	0.78	1.67
BLG	Bluegill	27	3.00	N/A	N/A	N/A
GSF	Green Sunfish	1	0.11	0.25	0.33	0.92
HSF	Hybrid Sunfish	7	0.78	N/A	N/A	N/A
LMB	Largemouth Bass	14	1.56	0.50	0.79	1.67
NOP	Northern Pike	82	9.11	2.19	5.00	8.70
PMK	Pumpkinseed	18	2.00	N/A	N/A	N/A
RKB	Rock Bass	18	2.00	0.67	2.00	4.45
WAE	Walleye	47	5.22	1.00	2.37	5.00
WTS	White Sucker	5	0.56	0.48	1.00	2.00
YEB	Yellow Bullhead	35	3.89	1.00	2.58	6.00
YEP	Yellow Perch	2	0.22	1.48	4.55	13.81
Total Fish/Set:			29.89	¹ Quartiles for Number Per Set		

Net Catch Summary by Weight for GN

Standard gill net sets

Abbr	Species	Total Weight (Pounds)	Pounds Per Set	Mean Weight ²	Quartiles for Lake Class 23 ¹		
					25%	50%	75%
BLC	Black Crappie	0.88	0.10	0.07	0.20	0.30	0.50
BLG	Bluegill	2.53	0.28	0.09	N/A	N/A	N/A
GSF	Green Sunfish	0.07	0.01	0.07	N/A	N/A	N/A
HSF	Hybrid Sunfish	1.66	0.18	0.24	N/A	N/A	N/A
LMB	Largemouth Bass	12.47	1.39	0.89	0.55	0.78	1.15
NOP	Northern Pike	111.21	12.36	1.36	1.55	2.21	3.21
PMK	Pumpkinseed	1.47	0.16	0.08	N/A	N/A	N/A
RKB	Rock Bass	2.76	0.31	0.15	0.23	0.30	0.44
WAE	Walleye	85.69	9.52	1.82	1.23	1.81	2.95
WTS	White Sucker	12.33	1.37	2.47	1.60	2.01	2.60
YEB	Yellow Bullhead	18.54	2.06	0.53	0.44	0.59	0.74
YEP	Yellow Perch	0.39	0.04	0.19	0.10	0.13	0.20
Total Pounds Fish/Set:			27.78	¹ Quartiles for Mean Weight			

² Mean Weights are based on measured fish counts only.

LAKE SURVEY REPORT
STANDARD SURVEY DATED 08/16/2021 FOR DOW NUMBER 03-0030-00

Net Catch Summary by Numbers for TN

Standard 3/4-in mesh, double frame trap net sets

Number of Sets: 9
 First Set Date: 08/16/2021
 Last Lift Date: 08/19/2021
 Target Species: N/A

Abbr	Species	Total Fish	Number Per Set	Quartiles for Lake Class 23 ¹		
				25%	50%	75%
BLG	Bluegill	74	8.22	7.74	19.83	43.38
BRB	Brown Bullhead	1	0.11	0.25	0.50	1.00
HSF	Hybrid Sunfish	31	3.44	N/A	N/A	N/A
LMB	Largemouth Bass	6	0.67	0.39	0.83	1.53
NOP	Northern Pike	6	0.67	N/A	N/A	N/A
PMK	Pumpkinseed	9	1.00	1.41	2.71	5.94
RKB	Rock Bass	8	0.89	0.80	1.67	3.69
WAE	Walleye	2	0.22	0.20	0.40	0.71
YEB	Yellow Bullhead	1	0.11	1.00	2.39	5.26
Total Fish/Set:			15.33	¹ Quartiles for Number Per Set		

Net Catch Summary by Weight for TN

Standard 3/4-in mesh, double frame trap net sets

Abbr	Species	Total Weight (Pounds)	Pounds Per Set	Mean Weight ²	Quartiles for Lake Class 23 ¹		
					25%	50%	75%
BLG	Bluegill	9.11	1.01	0.12	0.11	0.15	0.21
BRB	Brown Bullhead	0.57	0.06	0.57	0.65	0.85	1.00
HSF	Hybrid Sunfish	7.97	0.89	0.26	N/A	N/A	N/A
LMB	Largemouth Bass	1.34	0.15	0.22	0.22	0.40	0.71
NOP	Northern Pike	6.60	0.73	1.10	N/A	N/A	N/A
PMK	Pumpkinseed	1.78	0.20	0.20	0.12	0.18	0.23
RKB	Rock Bass	1.71	0.19	0.21	0.19	0.27	0.40
WAE	Walleye	5.20	0.58	2.60	0.72	1.45	2.80
YEB	Yellow Bullhead	0.46	0.05	0.46	0.52	0.66	0.86
Total Pounds Fish/Set:			3.86	¹ Quartiles for Mean Weight			

² Mean Weights are based on measured fish counts only.

LAKE SURVEY REPORT
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Length Frequency Distribution for GN

Standard gill net sets

(Field work conducted between 08/16/2021 and 08/19/2021)

	<u>BLC</u>	<u>BLG</u>	<u>GSF</u>	<u>HSF</u>	<u>LMB</u>	<u>NOP</u>	<u>PMK</u>	<u>RKB</u>	<u>WAE</u>	<u>WTS</u>	<u>YEB</u>	<u>YEP</u>
< 3.00	-	-	-	-	-	-	-	-	-	-	-	-
3.00 - 3.49	-	2	-	-	-	-	-	-	-	-	-	-
3.50 - 3.99	-	5	-	-	-	-	11	1	-	-	-	-
4.00 - 4.49	3	4	-	1	-	-	2	2	-	-	-	-
4.50 - 4.99	6	4	1	-	-	-	1	2	-	-	-	-
5.00 - 5.49	2	5	-	-	-	-	1	5	-	-	-	-
5.50 - 5.99	-	2	-	1	2	-	1	3	-	-	1	-
6.00 - 6.49	-	3	-	2	-	-	1	1	-	-	1	-
6.50 - 6.99	2	1	-	-	-	-	1	1	-	-	1	1
7.00 - 7.49	-	1	-	1	-	-	-	2	-	-	1	-
7.50 - 7.99	-	-	-	2	-	-	-	-	-	-	2	-
8.00 - 8.49	-	-	-	-	-	-	-	1	-	-	-	-
8.50 - 8.99	-	-	-	-	-	-	-	-	2	-	3	-
9.00 - 9.49	-	-	-	-	2	-	-	-	-	-	5	1
9.50 - 9.99	-	-	-	-	-	2	-	-	-	-	6	-
10.00 - 10.49	-	-	-	-	1	-	-	-	1	-	5	-
10.50 - 10.99	-	-	-	-	3	-	-	-	-	-	6	-
11.00 - 11.49	-	-	-	-	-	-	-	-	-	-	1	-
11.50 - 11.99	-	-	-	-	-	1	-	-	-	-	2	-
12.00 - 12.99	-	-	-	-	2	2	-	-	1	-	1	-
13.00 - 13.99	-	-	-	-	1	3	-	-	8	-	-	-
14.00 - 14.99	-	-	-	-	3	3	-	-	5	-	-	-
15.00 - 15.99	-	-	-	-	-	8	-	-	6	1	-	-
16.00 - 16.99	-	-	-	-	-	8	-	-	4	-	-	-
17.00 - 17.99	-	-	-	-	-	14	-	-	2	3	-	-
18.00 - 18.99	-	-	-	-	-	12	-	-	3	1	-	-
19.00 - 19.99	-	-	-	-	-	7	-	-	1	-	-	-
20.00 - 20.99	-	-	-	-	-	8	-	-	4	-	-	-
21.00 - 21.99	-	-	-	-	-	2	-	-	6	-	-	-
22.00 - 22.99	-	-	-	-	-	4	-	-	2	-	-	-
23.00 - 23.99	-	-	-	-	-	2	-	-	2	-	-	-
24.00 - 24.99	-	-	-	-	-	-	-	-	-	-	-	-
25.00 - 25.99	-	-	-	-	-	1	-	-	-	-	-	-
26.00 - 26.99	-	-	-	-	-	3	-	-	-	-	-	-
27.00 - 27.99	-	-	-	-	-	1	-	-	-	-	-	-
28.00 - 28.99	-	-	-	-	-	1	-	-	-	-	-	-
29.00 - 29.99	-	-	-	-	-	-	-	-	-	-	-	-
30.00 - 30.99	-	-	-	-	-	-	-	-	-	-	-	-
31.00 - 31.99	-	-	-	-	-	-	-	-	-	-	-	-
32.00 - 32.99	-	-	-	-	-	-	-	-	-	-	-	-
33.00 - 33.99	-	-	-	-	-	-	-	-	-	-	-	-
34.00 - 34.99	-	-	-	-	-	-	-	-	-	-	-	-
35.00 - 35.99	-	-	-	-	-	-	-	-	-	-	-	-
= > 36.00	-	-	-	-	-	-	-	-	-	-	-	-
	<u>BLC</u>	<u>BLG</u>	<u>GSF</u>	<u>HSF</u>	<u>LMB</u>	<u>NOP</u>	<u>PMK</u>	<u>RKB</u>	<u>WAE</u>	<u>WTS</u>	<u>YEB</u>	<u>YEP</u>
Total	13	27	1	7	14	82	18	18	47	5	35	2
Min. Length	4.25	3.03	4.65	4.25	5.51	9.53	3.50	3.98	8.70	15.39	5.83	6.50
Max. Length	6.77	7.32	4.65	7.99	14.92	28.62	6.73	8.35	23.74	18.70	12.20	9.06
Mean Length	4.98	4.85	4.65	6.52	11.11	18.35	4.36	5.64	16.88	17.35	9.60	7.78
# Measured	13	27	1	7	14	82	18	18	47	5	35	2
No Lengths for	0	0	0	0	0	0	0	0	0	0	0	0

Note: Unless all fish were measured in the catch, totals shown for some length-frequency distributions may differ from the total number of fish in the catch, due to rounding of fractions used in the estimation of length frequency from a subsample of measured fish

LAKE SURVEY REPORT
STANDARD SURVEY DATED 08/16/2021 FOR DOW NUMBER 03-0030-00

Length Frequency Distribution for TN

Standard 3/4-in mesh, double frame trap net sets

(Field work conducted between 08/16/2021 and 08/19/2021)

	<u>BLG</u>	<u>BRB</u>	<u>HSF</u>	<u>LMB</u>	<u>NOP</u>	<u>PMK</u>	<u>RKB</u>	<u>WAE</u>	<u>YEB</u>
< 3.00	-	-	-	-	-	-	-	-	-
3.00 - 3.49	5	-	-	-	-	-	-	-	-
3.50 - 3.99	10	-	2	-	-	3	-	-	-
4.00 - 4.49	10	-	2	-	-	-	-	-	-
4.50 - 4.99	8	-	1	-	-	1	1	-	-
5.00 - 5.49	9	-	1	1	-	-	1	-	-
5.50 - 5.99	7	-	2	1	-	-	1	-	-
6.00 - 6.49	12	-	3	-	-	2	3	-	-
6.50 - 6.99	7	-	2	-	-	-	-	-	-
7.00 - 7.49	5	-	7	1	-	1	-	-	-
7.50 - 7.99	1	-	10	1	-	2	-	-	-
8.00 - 8.49	-	-	1	-	-	-	2	-	-
8.50 - 8.99	-	-	-	1	-	-	-	1	-
9.00 - 9.49	-	-	-	-	-	-	-	-	-
9.50 - 9.99	-	-	-	1	-	-	-	-	1
10.00 - 10.49	-	-	-	-	-	-	-	-	-
10.50 - 10.99	-	-	-	-	-	-	-	-	-
11.00 - 11.49	-	1	-	-	-	-	-	-	-
11.50 - 11.99	-	-	-	-	-	-	-	-	-
12.00 - 12.99	-	-	-	-	-	-	-	-	-
13.00 - 13.99	-	-	-	-	1	-	-	-	-
14.00 - 14.99	-	-	-	-	-	-	-	-	-
15.00 - 15.99	-	-	-	-	-	-	-	-	-
16.00 - 16.99	-	-	-	-	2	-	-	-	-
17.00 - 17.99	-	-	-	-	-	-	-	-	-
18.00 - 18.99	-	-	-	-	-	-	-	-	-
19.00 - 19.99	-	-	-	-	3	-	-	-	-
20.00 - 20.99	-	-	-	-	-	-	-	-	-
21.00 - 21.99	-	-	-	-	-	-	-	-	-
22.00 - 22.99	-	-	-	-	-	-	-	-	-
23.00 - 23.99	-	-	-	-	-	-	-	-	-
24.00 - 24.99	-	-	-	-	-	-	-	-	-
25.00 - 25.99	-	-	-	-	-	-	-	1	-
26.00 - 26.99	-	-	-	-	-	-	-	-	-
27.00 - 27.99	-	-	-	-	-	-	-	-	-
28.00 - 28.99	-	-	-	-	-	-	-	-	-
29.00 - 29.99	-	-	-	-	-	-	-	-	-
30.00 - 30.99	-	-	-	-	-	-	-	-	-
31.00 - 31.99	-	-	-	-	-	-	-	-	-
32.00 - 32.99	-	-	-	-	-	-	-	-	-
33.00 - 33.99	-	-	-	-	-	-	-	-	-
34.00 - 34.99	-	-	-	-	-	-	-	-	-
35.00 - 35.99	-	-	-	-	-	-	-	-	-
= > 36.00	-	-	-	-	-	-	-	-	-

	<u>BLG</u>	<u>BRB</u>	<u>HSF</u>	<u>LMB</u>	<u>NOP</u>	<u>PMK</u>	<u>RKB</u>	<u>WAE</u>	<u>YEB</u>
Total	74	1	31	6	6	9	8	2	1
Min. Length	3.23	11.10	3.62	5.47	13.78	3.74	4.88	8.74	9.88
Max. Length	7.56	11.10	8.23	9.84	19.92	7.68	8.35	25.28	9.88
Mean Length	5.25	11.10	6.66	7.40	17.54	5.73	6.38	17.01	9.88
# Measured	74	1	31	6	6	9	8	2	1
No Lengths for	0	0	0	0	0	0	0	0	0

Note: Unless all fish were measured in the catch, totals shown for some length-frequency distributions may differ from the total number of fish in the catch, due to rounding of fractions used in the estimation of length frequency from a subsample of measured fish

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Length At Capture with Last Incremental Length

(Body-Scale constant, all lengths, and all length increments in inches)

Species: Black Crappie
Body-Scale Constant: 0.79
Total Sample Size: 13

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2020	1	11	4.66	5.16	4.25	0.091	2.43	0.097
2019	2	2	6.77	6.77	6.77	0.000	2.91	0.177

Species: Bluegill
Body-Scale Constant: 0.79
Total Sample Size: 51

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2019	2	2	3.54	3.66	3.43	0.118	0.96	0.070
2018	3	6	3.48	3.74	3.23	0.078	0.63	0.031
2017	4	10	4.39	5.00	3.78	0.147	0.73	0.073
2016	5	10	5.08	5.83	4.02	0.195	0.87	0.092
2015	6	10	5.98	6.69	5.47	0.122	0.83	0.092
2014	7	10	6.72	7.40	6.30	0.122	0.44	0.073
2013	8	2	7.28	7.44	7.13	0.157	0.30	0.129
2012	9	1	7.56	7.56	7.56	N/A	0.28	N/A

Species: Largemouth Bass
Body-Scale Constant: 0.79
Total Sample Size: 20

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2020	1	4	5.70	5.98	5.47	0.124	2.69	0.250
2019	2	7	8.86	10.39	7.09	0.449	2.47	0.273
2018	3	4	11.18	12.20	10.71	0.345	1.95	0.179
2017	4	1	13.54	13.54	13.54	N/A	0.52	N/A
2016	5	1	12.76	12.76	12.76	N/A	0.24	N/A
2015	6	2	14.59	14.76	14.41	0.177	0.40	0.020
2014	7	0	-	-	-	-	-	-
2013	8	1	14.92	14.92	14.92	N/A	0.23	N/A

LAKE SURVEY REPORT
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Length At Capture with Last Incremental Length (Continued)

Species: Northern Pike
Body-Scale Constant: 2.09
Total Sample Size: 77

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2020	1	18	13.83	16.10	9.53	0.475	3.63	0.262
2019	2	17	17.17	19.25	15.12	0.262	2.09	0.217
2018	3	19	18.85	22.36	17.13	0.312	1.27	0.124
2017	4	12	20.47	23.11	17.95	0.448	0.83	0.091
2016	5	7	23.04	26.57	19.69	0.910	1.31	0.274
2015	6	2	26.22	26.26	26.18	0.039	1.34	0.788
2014	7	0	-	-	-	-	-	-
2013	8	1	27.44	27.44	27.44	N/A	0.57	N/A
2012	9	0	-	-	-	-	-	-
2011	10	1	28.62	28.62	28.62	N/A	0.45	N/A

Species: Walleye
Body-Scale Constant: 1.10
Total Sample Size: 43

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2020	1	2	9.39	10.08	8.70	0.689	2.47	0.620
2019	2	11	13.28	15.24	8.94	0.480	3.41	0.240
2018	3	15	15.50	17.13	13.58	0.287	2.74	0.147
2017	4	4	18.65	20.12	17.87	0.512	1.11	0.206
2016	5	1	18.74	18.74	18.74	N/A	0.88	N/A
2015	6	3	21.22	22.95	20.00	0.890	0.50	0.161
2014	7	3	21.19	22.44	19.80	0.765	0.33	0.047
2013	8	3	22.15	23.66	21.22	0.761	0.32	0.052
2012	9	1	20.31	20.31	20.31	N/A	0.49	N/A

Species: Yellow Perch
Body-Scale Constant: 1.18
Total Sample Size: 2

Length at Capture in 2021 for Each Age Class, with Incremental Lengths for 2021

Year Class	Age	Sample Size	Length At Capture			Standard Error	Length Increments	
			Average Length	Maximum Length	Minimum Length		Increment	Standard Error
2016	5	1	9.06	9.06	9.06	N/A	0.33	N/A
2015	6	1	6.50	6.50	6.50	N/A	0.27	N/A

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Back-Calculated Lengths for Each Age Class and Average Annual Increments of Back-Calculated Lengths

Species: Black Crappie

Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2
2020	1	11	2.23	-
			2.23	-
2019	2	2	1.68	3.87
			1.68	2.19
Mean Length			2.14	3.87
Mean Increment			2.14	2.19
Total N			13	2

Species: Bluegill

Gear Type: Combined Gear Types (TN)

Class	Age	N	1	2	3	4	5	6	7	8	9
2019	2	2	1.61	2.59	-	-	-	-	-	-	-
			1.61	0.98	-	-	-	-	-	-	-
2018	3	6	1.48	2.15	2.85	-	-	-	-	-	-
			1.48	0.68	0.70	-	-	-	-	-	-
2017	4	10	1.47	2.08	2.83	3.66	-	-	-	-	-
			1.47	0.61	0.75	0.82	-	-	-	-	-
2016	5	10	1.43	1.97	2.62	3.33	4.21	-	-	-	-
			1.43	0.54	0.65	0.71	0.87	-	-	-	-
2015	6	10	1.46	1.93	2.65	3.51	4.37	5.15	-	-	-
			1.46	0.47	0.72	0.87	0.86	0.78	-	-	-
2014	7	10	1.55	2.10	2.92	3.80	4.68	5.57	6.27	-	-
			1.55	0.55	0.82	0.89	0.88	0.89	0.70	-	-
2013	8	2	1.43	2.04	2.69	3.76	4.62	5.81	6.57	6.99	-
			1.43	0.61	0.65	1.08	0.86	1.19	0.76	0.42	-
2012	9	1	1.47	1.91	2.36	3.00	3.83	4.85	5.46	6.67	7.28
			1.47	0.44	0.45	0.64	0.83	1.02	0.61	1.21	0.61
Mean Length			1.48	2.05	2.76	3.57	4.41	5.38	6.26	6.88	7.28
Mean Increment			1.48	0.58	0.72	0.83	0.87	0.87	0.70	0.68	0.61
Total N			51	51	49	43	33	23	13	3	1

LAKE SURVEY REPORT
STANDARD SURVEY DATED 08/16/2021 FOR DOW NUMBER 03-0030-00

Back-Calculated Lengths for Each Age Class and Average Annual Increments of Back-Calculated Lengths (Continued)

Species: Largemouth Bass

Gear Type: Combined Gear Types (GN and TN)

Class	Age	N	1	2	3	4	5	6	7	8
2020	1	4	3.01	-	-	-	-	-	-	-
			3.01	-	-	-	-	-	-	-
2019	2	7	2.70	6.39	-	-	-	-	-	-
			2.70	3.69	-	-	-	-	-	-
2018	3	4	2.78	5.60	9.23	-	-	-	-	-
			2.78	2.83	3.63	-	-	-	-	-
2017	4	1	3.50	7.56	11.36	13.02	-	-	-	-
			3.50	4.06	3.80	1.66	-	-	-	-
2016	5	1	3.26	5.72	8.56	11.01	12.52	-	-	-
			3.26	2.46	2.84	2.45	1.51	-	-	-
2015	6	2	2.58	5.32	8.37	11.09	13.40	14.19	-	-
			2.58	2.74	3.05	2.72	2.31	0.80	-	-
2013	8	1	2.57	5.11	7.51	9.71	12.67	13.75	14.28	14.69
			2.57	2.54	2.40	2.20	2.96	1.08	0.53	0.41
Mean Length			2.83	6.01	9.01	11.18	13.00	14.04	14.28	14.69
Mean Increment			2.83	3.23	3.30	2.35	2.27	0.89	0.53	0.41
Total N			20	16	9	5	4	3	1	1

Species: Northern Pike

Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2	3	4	5	6	7	8	9	10
2020	1	18	10.20	-	-	-	-	-	-	-	-	-
			10.20	-	-	-	-	-	-	-	-	
2019	2	17	10.23	15.08	-	-	-	-	-	-	-	-
			10.23	4.85	-	-	-	-	-	-	-	
2018	3	19	9.43	14.29	17.58	-	-	-	-	-	-	-
			9.43	4.86	3.29	-	-	-	-	-	-	
2017	4	12	8.81	13.99	17.62	19.64	-	-	-	-	-	-
			8.81	5.17	3.63	2.02	-	-	-	-	-	
2016	5	7	8.76	14.28	17.93	20.22	21.73	-	-	-	-	-
			8.76	5.52	3.65	2.29	1.51	-	-	-	-	
2015	6	2	9.65	14.31	16.91	19.60	22.24	24.89	-	-	-	-
			9.65	4.66	2.60	2.70	2.64	2.65	-	-	-	
2013	8	1	9.81	16.89	21.68	22.28	23.12	25.15	26.09	26.87	-	-
			9.81	7.08	4.79	0.60	0.84	2.03	0.94	0.78	-	-
2011	10	1	8.15	13.56	16.09	18.14	20.35	21.99	23.09	24.90	27.19	28.17
			8.15	5.41	2.53	2.05	2.21	1.64	1.10	1.81	2.29	0.98
Mean Length			9.62	14.49	17.68	19.86	21.83	24.23	24.59	25.89	27.19	28.17
Mean Increment			9.62	5.04	3.43	2.10	1.72	2.24	1.02	1.30	2.29	0.98
Total N			77	59	42	23	11	4	2	2	1	1

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Back-Calculated Lengths for Each Age Class and Average Annual Increments of Back-Calculated Lengths (Continued)

Species: Walleye

Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2	3	4	5	6	7	8	9
2020	1	2	6.93	-	-	-	-	-	-	-	-
			6.93	-	-	-	-	-	-	-	-
2019	2	11	5.73	9.87	-	-	-	-	-	-	-
			5.73	4.15	-	-	-	-	-	-	-
2018	3	15	6.05	9.39	12.76	-	-	-	-	-	-
			6.05	3.33	3.37	-	-	-	-	-	-
2017	4	4	6.91	11.14	14.72	17.54	-	-	-	-	-
			6.91	4.24	3.58	2.82	-	-	-	-	-
2016	5	1	5.87	10.35	12.44	15.71	17.86	-	-	-	-
			5.87	4.48	2.09	3.27	2.15	-	-	-	-
2015	6	3	7.78	12.34	15.21	18.07	19.65	20.72	-	-	-
			7.78	4.56	2.87	2.86	1.58	1.07	-	-	-
2014	7	3	5.80	10.74	14.78	16.85	18.62	19.96	20.86	-	-
			5.80	4.94	4.04	2.07	1.77	1.34	0.90	-	-
2013	8	3	6.65	10.56	13.78	16.84	19.11	20.38	21.17	21.83	-
			6.65	3.91	3.22	3.06	2.27	1.28	0.78	0.67	-
2012	9	1	5.16	8.17	12.26	14.04	16.37	17.30	18.34	19.11	19.82
			5.16	3.01	4.09	1.78	2.33	0.93	1.04	0.77	0.71
Mean Length			6.21	10.08	13.54	17.01	18.76	20.05	20.63	21.15	19.82
Mean Increment			6.21	3.91	3.38	2.69	1.94	1.20	0.87	0.69	0.71
Total N			43	41	30	15	11	10	7	4	1

Species: Yellow Perch

Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2	3	4	5	6
2016	5	1	2.72	3.93	6.17	7.77	8.73	-
			2.72	1.21	2.24	1.60	0.96	-
2015	6	1	2.41	3.16	4.10	5.08	5.83	6.23
			2.41	0.75	0.94	0.98	0.75	0.40
Mean Length			2.57	3.55	5.14	6.43	7.28	6.23
Mean Increment			2.57	0.98	1.59	1.29	0.86	0.40
Total N			2	2	2	2	2	1

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Age Class Frequency Distribution

Species & SS Type (1)	Number of Fish (2)			Number of Fish in Year Class ('yy) and Age Class															
	Aged	Keyed	Unaged	'21 0	'20 1	'19 2	'18 3	'17 4	'16 5	'15 6	'14 7	'13 8	'12 9	'11 10	'10 11	'09 12	'08 13	'07 14	<'07 15+
<u>Black Crappie</u>																			
GN	13	0	0	0	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>Bluegill</u>																			
TN	51	23	0	0	0	3	8	17	15	13	15	2	1	0	0	0	0	0	0
<u>Largemouth Bass</u>																			
GN	14	0	0	0	2	3	4	1	1	2	0	1	0	0	0	0	0	0	0
TN	6	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals:	20	0	0	0	4	7	4	1	1	2	0	1	0	0	0	0	0	0	0
<u>Northern Pike</u>																			
GN	77	5	0	0	18	19	22	12	7	2	0	1	0	1	0	0	0	0	0
<u>Walleye</u>																			
GN	47	0	0	0	2	11	15	4	1	3	3	3	1	3	0	0	0	0	1
<u>Yellow Perch</u>																			
GN	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0

(1) Key to Sampling Station (SS) Type abbreviations:

GN = Standard gill net sets

TN = Standard 3/4-in mesh, double frame trap net sets

(2) Notes:

Number of Fish Aged: Fish that were aged from bony parts.

Number of Fish Keyed: Fish assigned an age with an age-length key or by expansion of mesh or station age distributions.

Number of Fish Unaged: Fish that were not aged and were not assigned an age.

Survey Crew Notes

null

Area Signed by user 'wamassur' on 04/01/2022

Discussion

Boot Lake is located six miles northwest of Two Inlets in northeastern Becker County. Boot Lake has a surface area of 378 acres, maximum depth of 109 feet, and is 21% littoral. A DNR owned public access is located on the north end of the lake. Boot Lake is managed primarily for Walleye and Yellow Perch with secondary management for Northern Pike, Black Crappie, Bluegill, and Largemouth Bass. Boot lake was initially surveyed in 1951 and has since been surveyed thirteen times for population assessments. Currently no aquatic invasive species (AIS) have been identified in Boot Lake.

Boot Lake is in lake class 23, one of seven class 23 lakes in the Park Rapids management area. Class 23 lakes are characterized as being deep, clear water basins with hard water and very low littoral area.

The Walleye catch rate of 5.2/gill net was slightly above the current management goal of 5.0/net and the interquartile range for class 23 (1.00 - 5.00). Walleye abundance in past surveys has been similar, generally fluctuating from within to above the interquartile range for class 23. The Proportional Stock Density (PSD) value of 67, Relative Stock Density - Preferred (RSD-P) value of 29, and Relative Stock Density - Memorable (RSD-M) value of 0 were below the management goal of an RSD-P value of 40 and a RSD-M value of 4. Walleye growth was above other class 23 lakes with a mean back-calculated length of 17.0 inches at age four. Boot Lake is currently stocked with Walleye fingerlings during even numbered years at a rate of 2.0 lbs/littoral acre (165 lbs).

Yellow Perch abundance (0.2/gill net) was down from recent surveys and below the interquartile range of class 23 (1.48 - 13.81) and the current management goal of 1.0/gill net. Historical gill net catch rates have generally fluctuated at the low end of the interquartile range. Yellow Perch PSD and RSD-P values in past surveys have been very low, with few Yellow Perch of an acceptable size for angling.

The Northern Pike catch rate of 9.1/gill net was above the interquartile range for class 23 (2.19 - 8.70). Eight of the past thirteen surveys have had Northern Pike gill net catch rates within the interquartile range and three surveys above the interquartile range. Northern Pike had a PSD value of 20 and RSD-P value of 1 which were similar to past surveys. Northern Pike growth is slow compared to other class 23 lakes, with a mean back-calculated length of 19.8 inches age four.

The Black Crappie catch rate of 1.4/gill net was within the interquartile range for class 23 (0.33 - 1.67). Black Crappie were not sampled in the trap nets. Black Crappie have been sampled in very low numbers in past surveys with catch rates below the interquartile range for both gear types.

Bluegill abundance (8.2/trap net) was within the interquartile range for class 23 (7.74 - 43.38). Bluegill abundance in recent surveys has fluctuated from below to within the interquartile range. The Bluegill PSD value of 38 was similar to past surveys. Bluegill growth is slightly below other class 23 lakes, with a mean back-calculated length of 3.5 inches at age four.

The Largemouth Bass catch rate of 1.5/gill net and 0.6/trap net was within the interquartile range for class 23 (0.50 - 1.67 and 0.39 - 1.53 respectively). Largemouth Bass catch rates in recent surveys have generally fluctuated within the interquartile range for both gear types. Largemouth Bass growth was similar to other class 23 lakes with a mean back-calculated length of 11.1 inches at age four.

Other species sampled included Rock Bass, White Sucker, Yellow Bullhead and low numbers of Pumpkinseed, Green Sunfish, Hybrid Sunfish, and Brown Bullhead.

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Status Of The Fishery

Boot Lake is located in northeastern Becker County, six miles northwest of Two Inlets. Boot Lake is a narrow, deep-water lake with a surface area of 378 acres and a maximum depth of 109 feet. There is a state-owned public access located on the north shore of the lake. Boot Lake is best known for its Walleye population, but also provides angling opportunities for Northern Pike.

The Minnesota Department of Natural Resources (DNR) has classified Minnesota's lakes into 43 different types based on physical, chemical, and other characteristics. Boot Lake is in lake class 23. Class 23 lakes are generally deep, very clear, have hard water and are irregularly shaped. Other class 23 lakes in the Park Rapids management area include Benedict, Big Bass, Blue, East Crooked, Eleventh Crow Wing, and Spearhead.

Walleye abundance in Boot has remained stable the past several surveys with catch rates at the high end for this lake class. Walleye sampled had an average length of 16.8 inches, weighed 1.8 pounds, and measured up to 25.2 inches. Yellow Perch, an important forage for Walleye were small in size and sampled in low numbers.

Northern Pike were sampled in high numbers for this lake class. Northern Pike abundance in past surveys has fluctuated from moderate to high numbers. Anglers will find the Northern Pike population dominated by small, "hammer handle" pike averaging 18.3 inches in length and 1.3 pounds. The Northern Pike population in Boot is limited by high reproduction and recruitment of young pike and slow growth rates. Past surveys have sampled very few larger Northern Pike.

Boot Lake is not really known as a Bass - Panfish lake because of its limited shallow water habitat and productivity. However, Boot Lake supports moderate numbers of Bluegill, Pumpkinseed, Largemouth Bass, and low numbers of Black Crappie. Bluegill sampled were small in size, with an average length of 5.2 inches and very few over 7.0 inches. Bluegill growth rates are slow in Boot Lake. Past and present surveys have shown the Black Crappie population to fluctuate from low to moderate numbers. Largemouth Bass have been sampled in low to moderate numbers in past surveys.

Currently no Aquatic Invasive Species (AIS) have been identified in Boot Lake. To avoid spreading AIS, lake users are required to remove all aquatic plants or animals from their watercraft and drain all water from their boat before leaving the access.

Survey Attachments

Note: The following attachment is excluded from this report:

(1) Boot.pdf

Approval Dates And Notices

Date Approved By Park Rapids Area Fisheries Supervisor: 04/01/2022

Date Approved By Northwest Region Fisheries Manager: TJS 4/28/22



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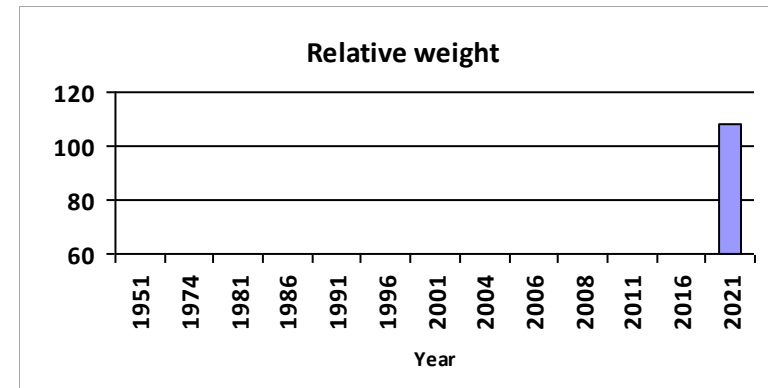
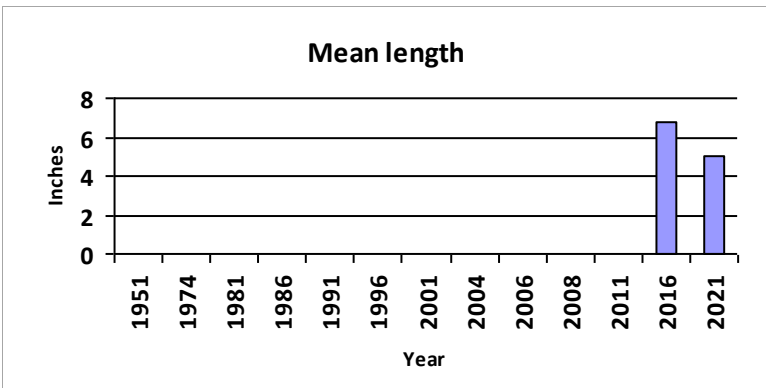
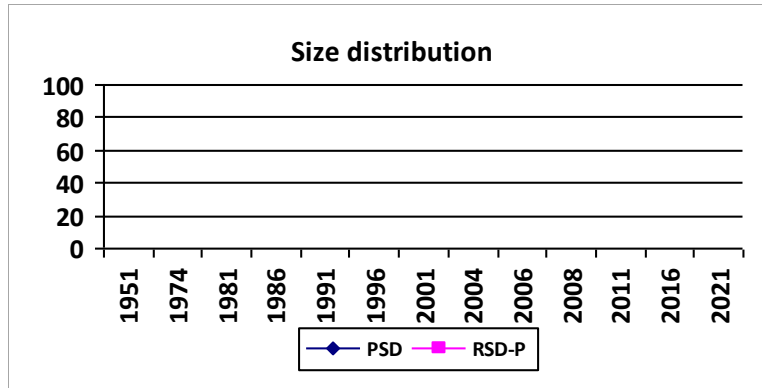
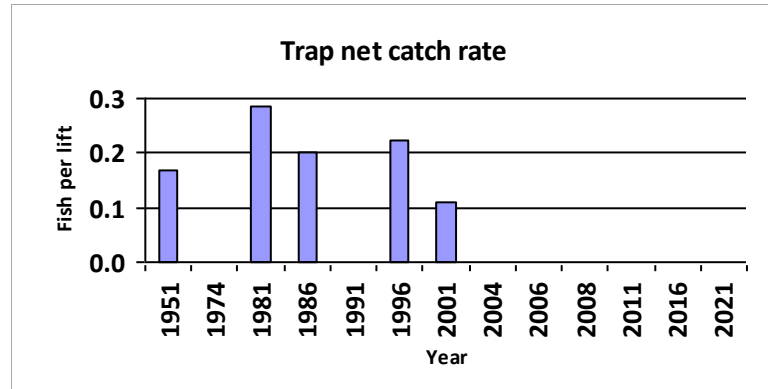
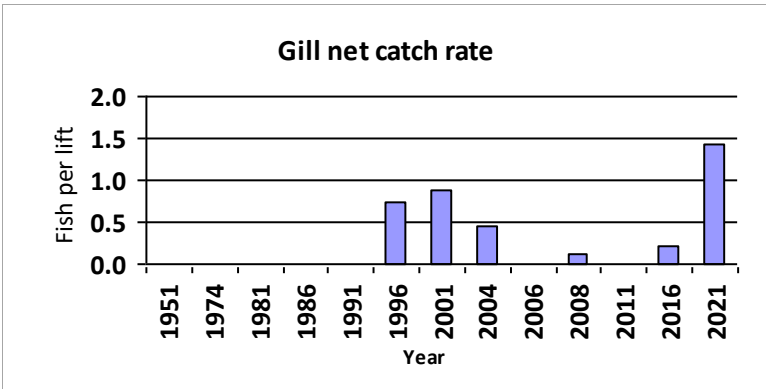
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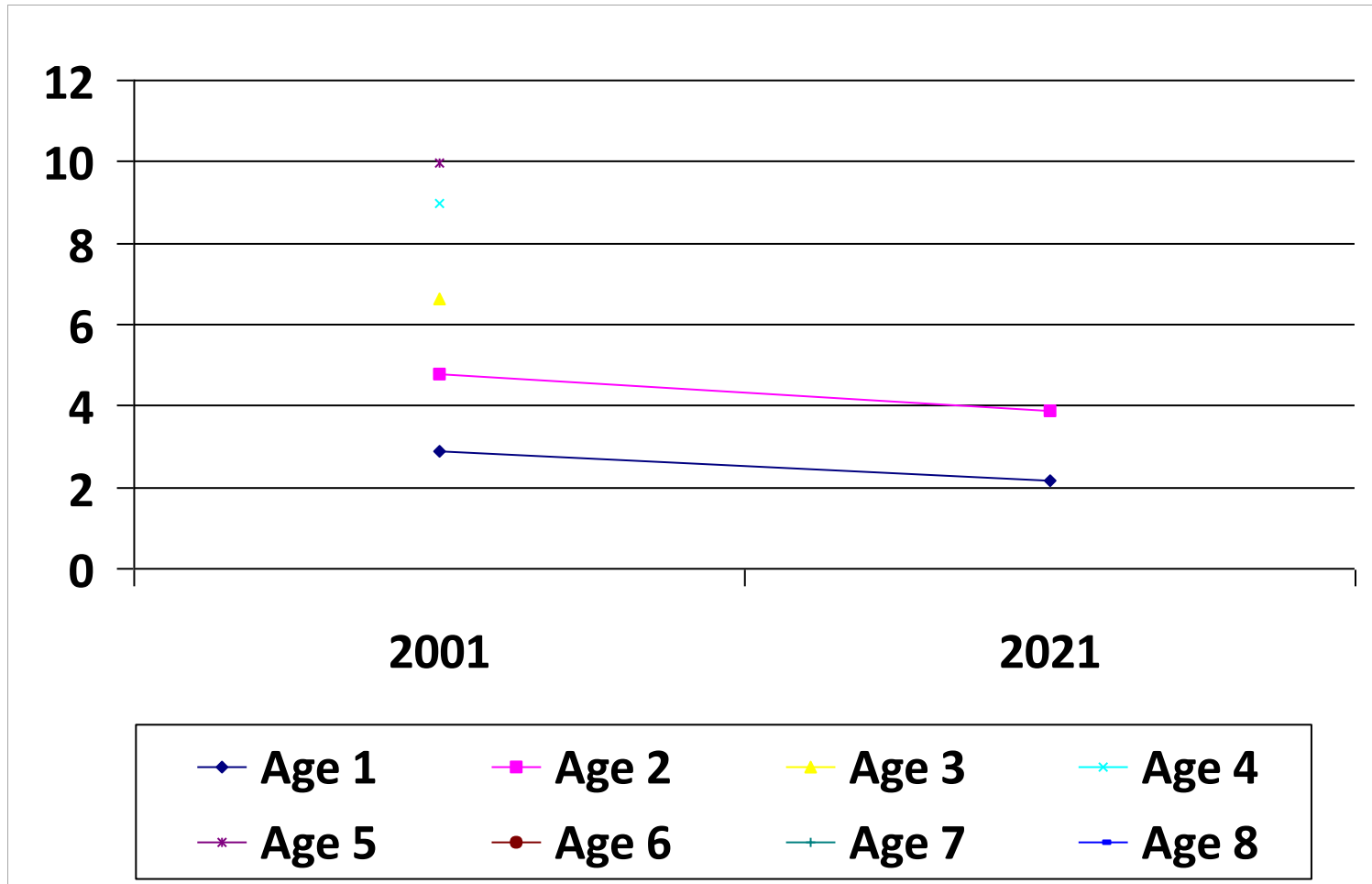
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BOOT

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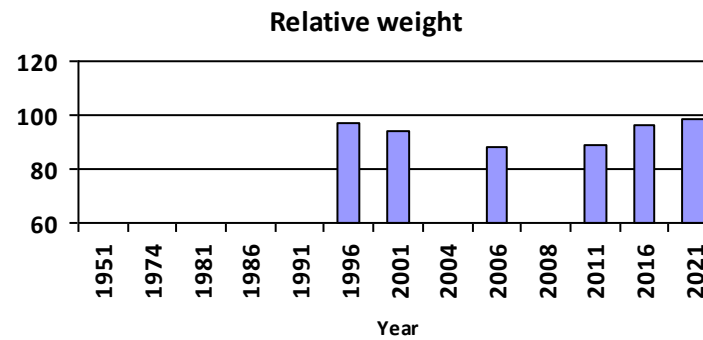
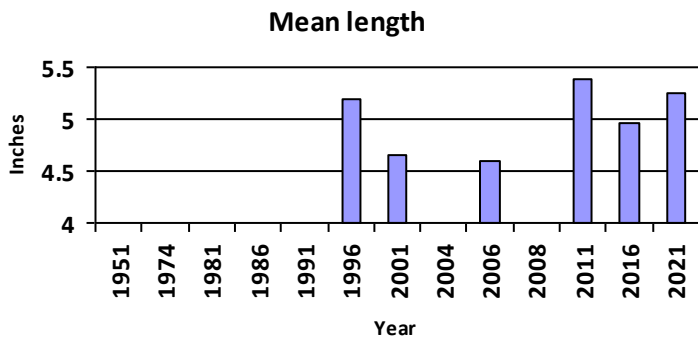
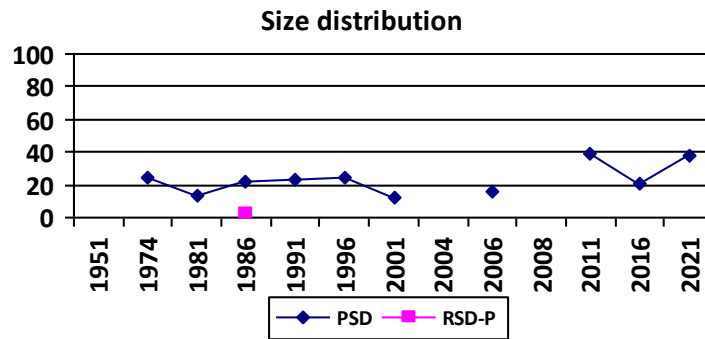
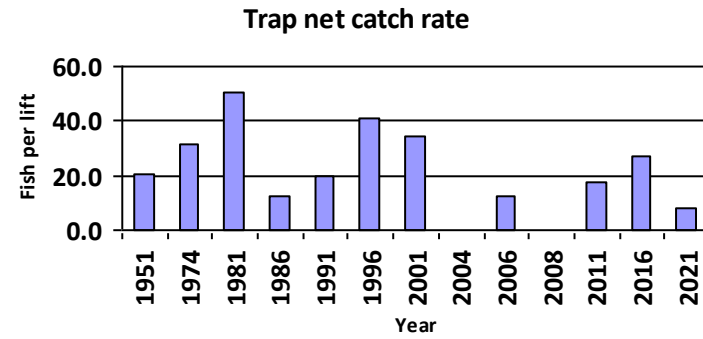
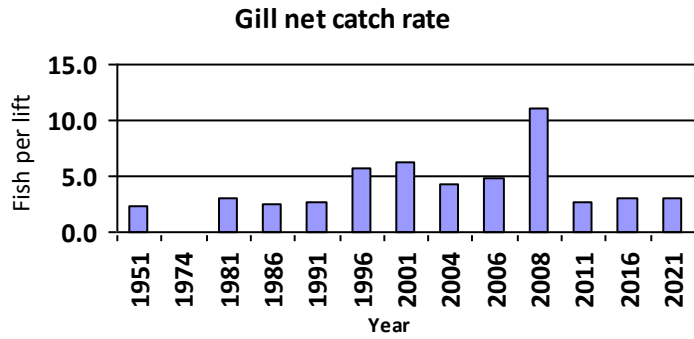


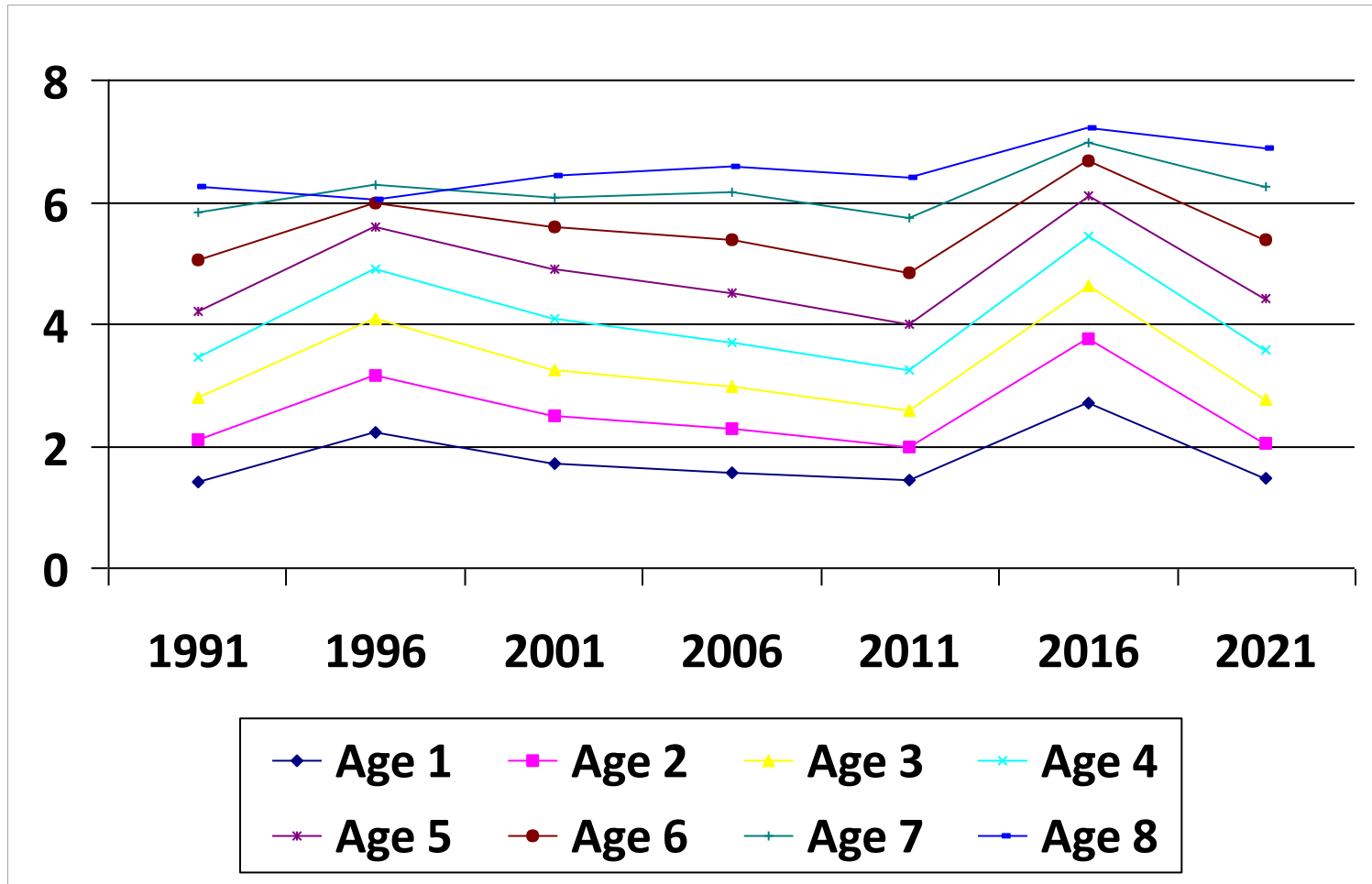


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BOOT

BLUEGILL



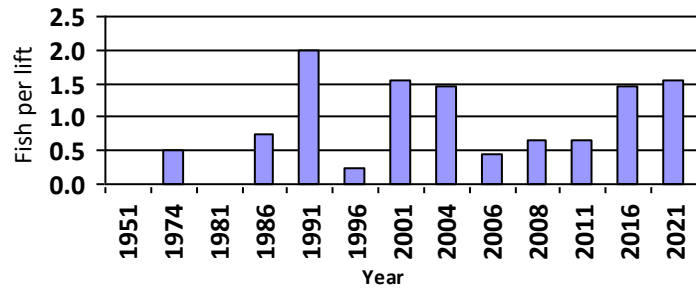


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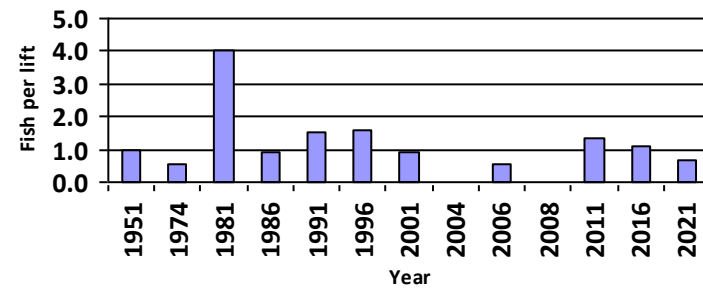
BOOT

LARGEMOUTH BASS

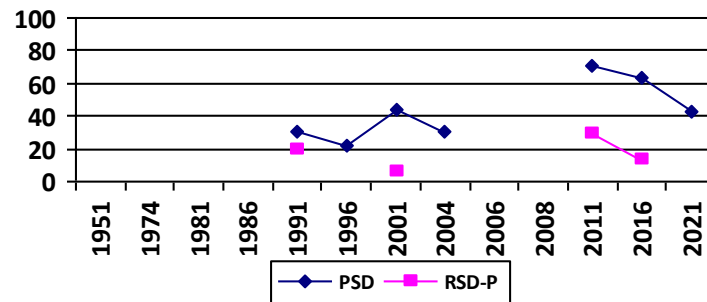
Gill net catch rate



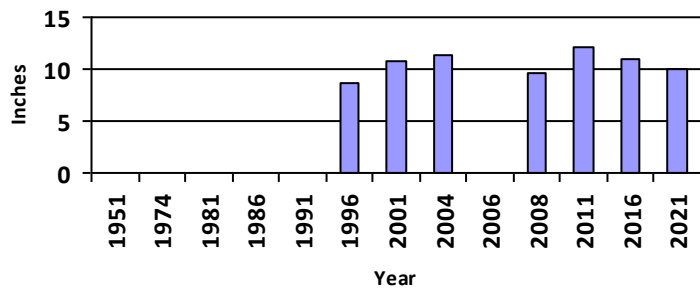
Trap net catch rate



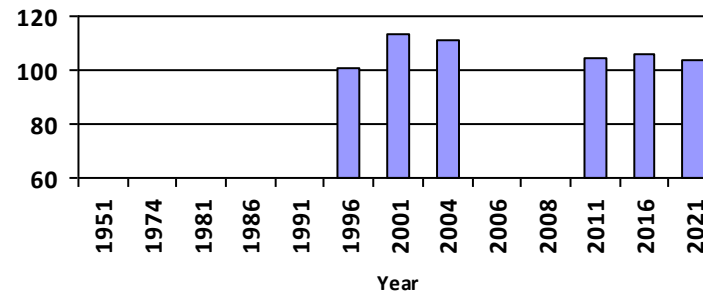
Size distribution

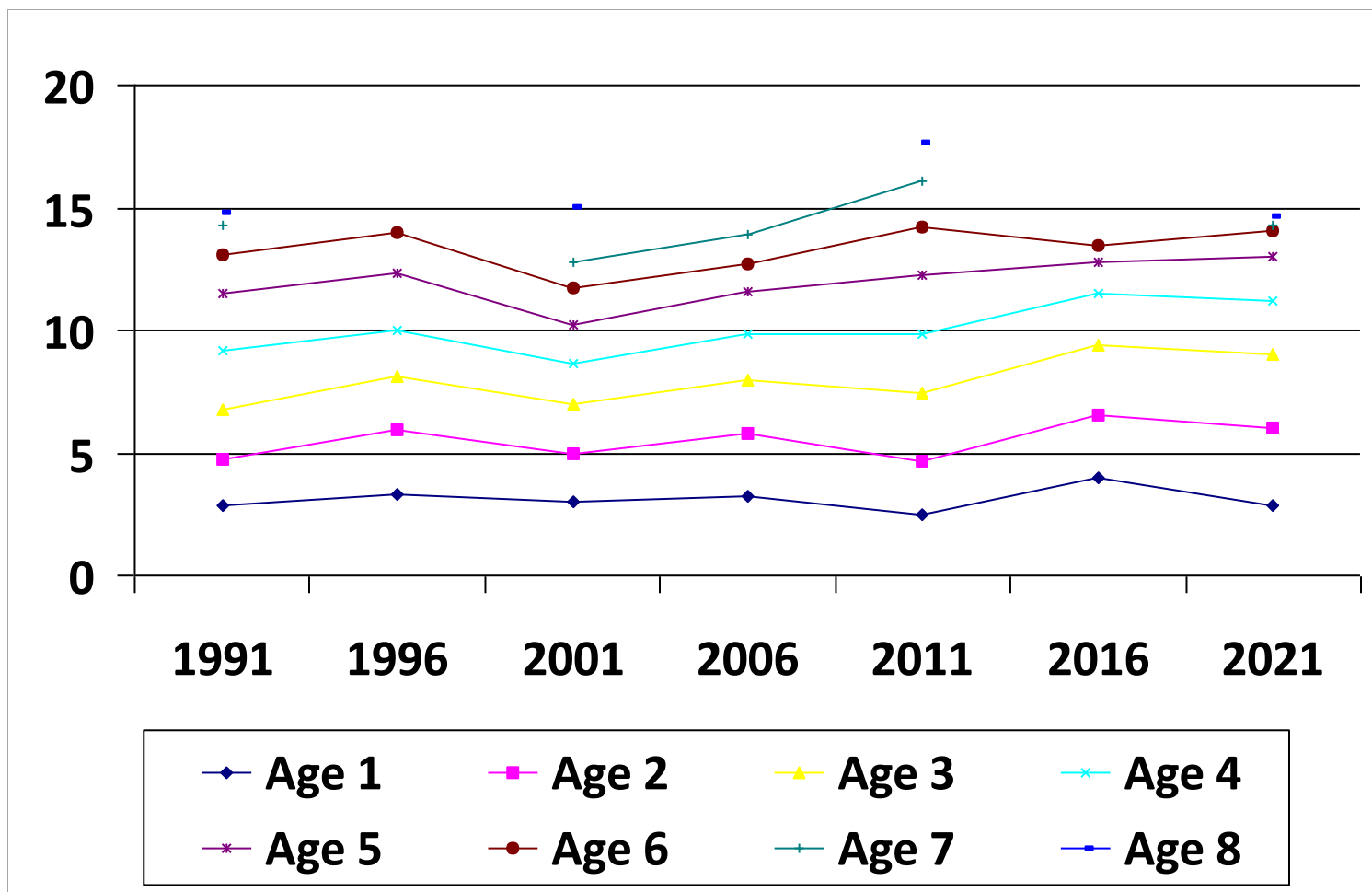


Mean length



Relative weight

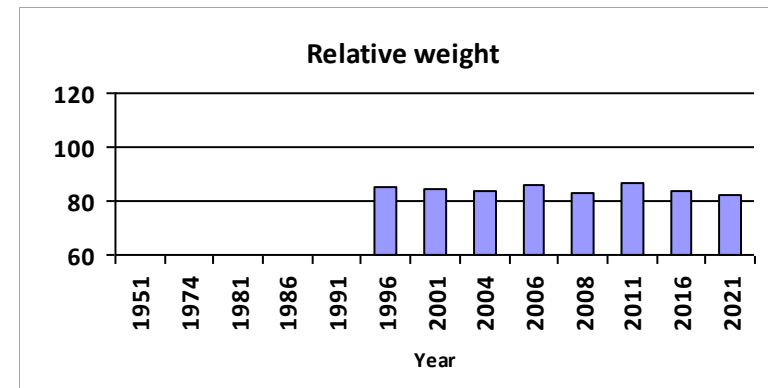
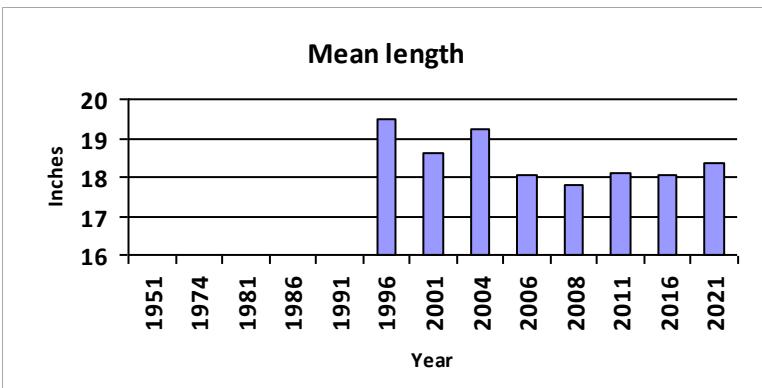
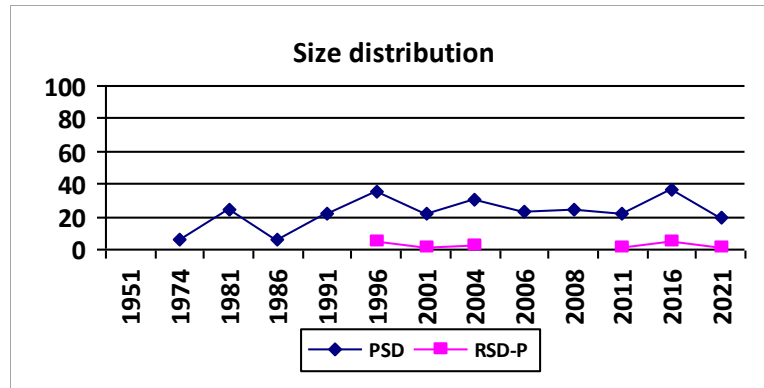
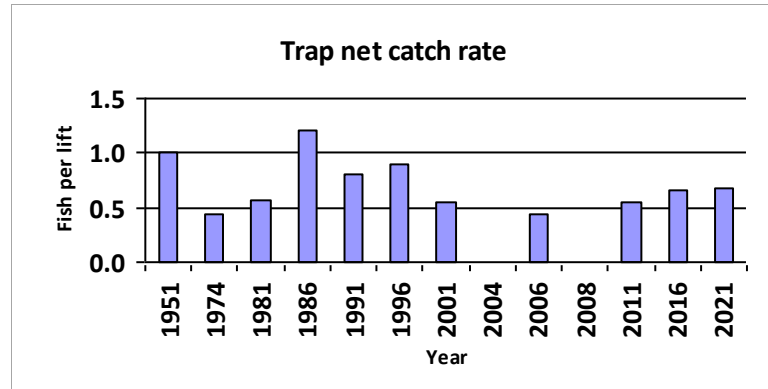
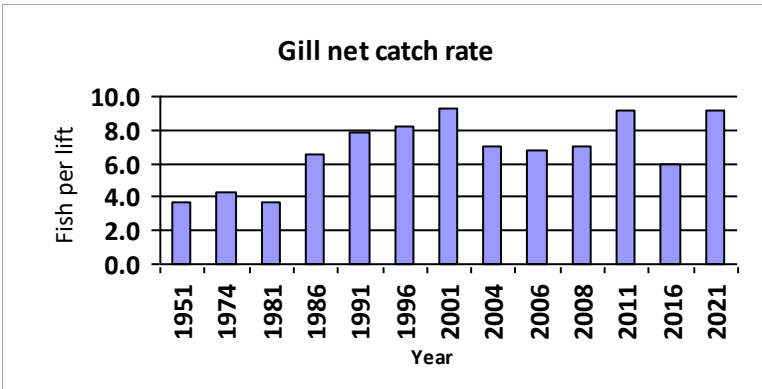


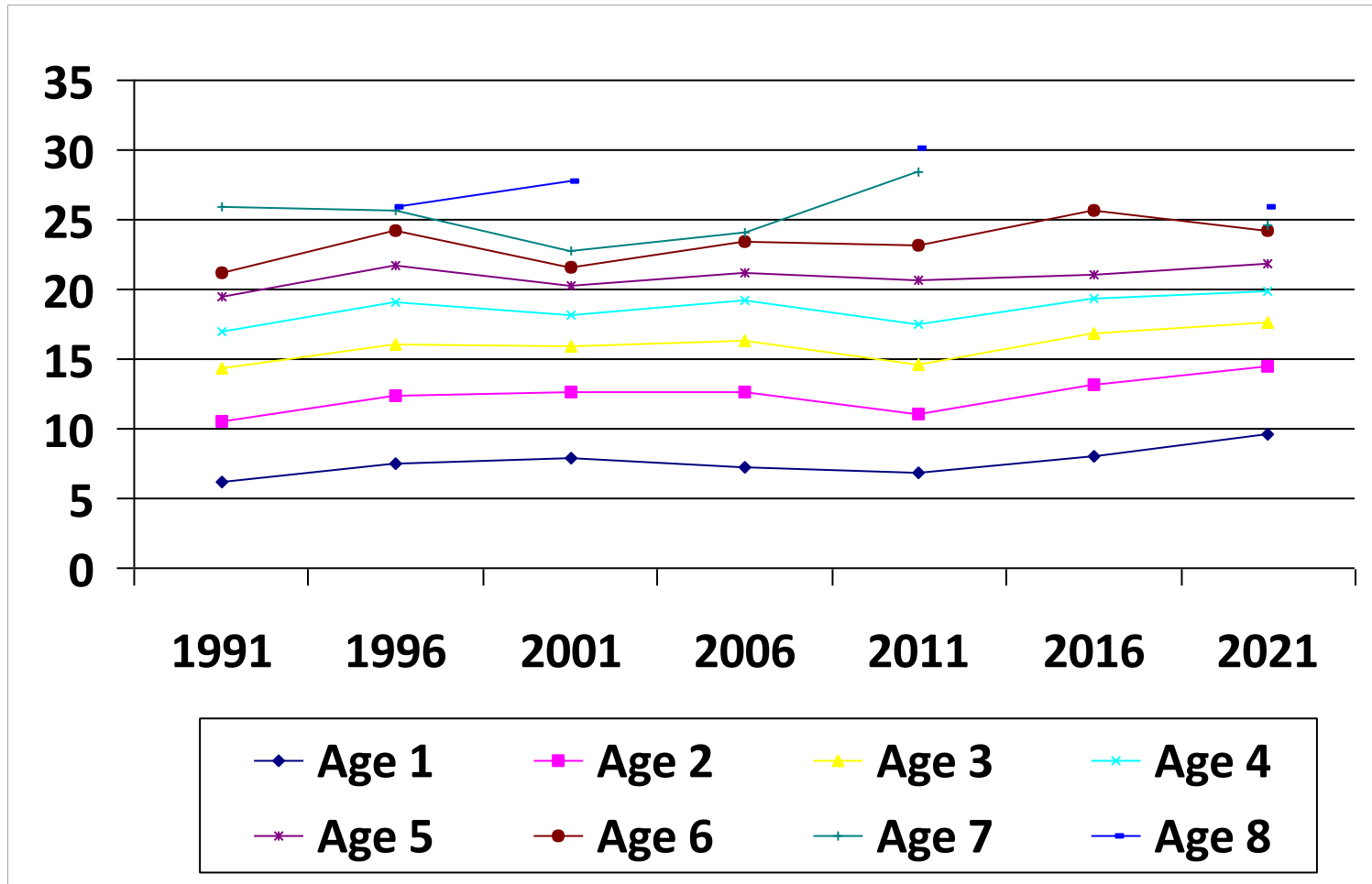


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BOOT

NORTHERN PIKE

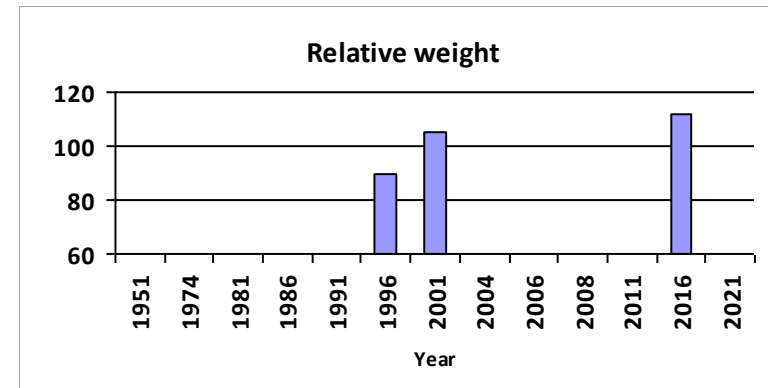
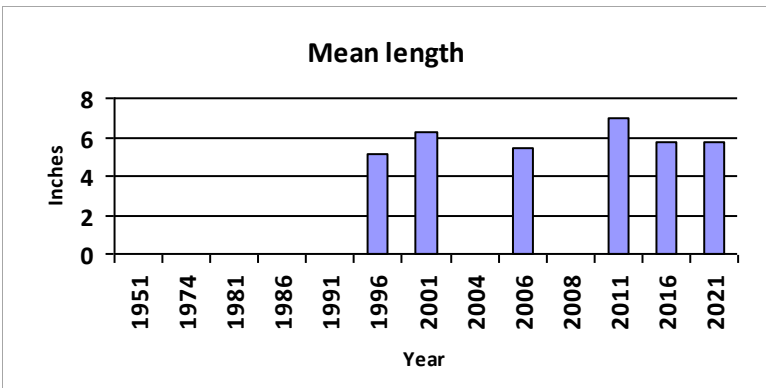
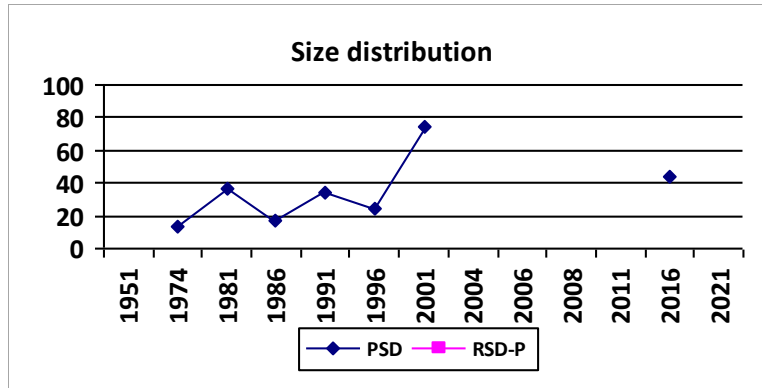
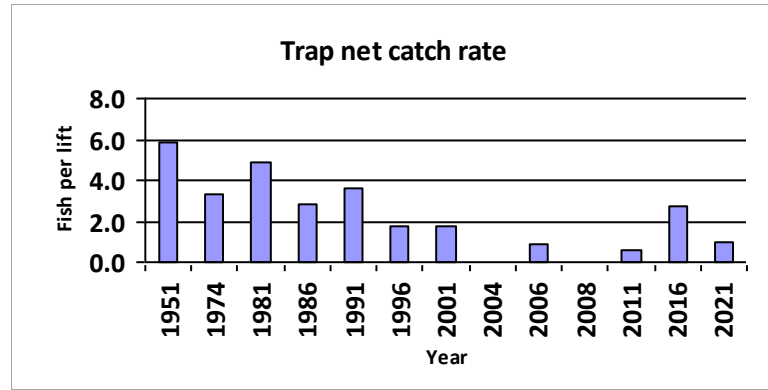
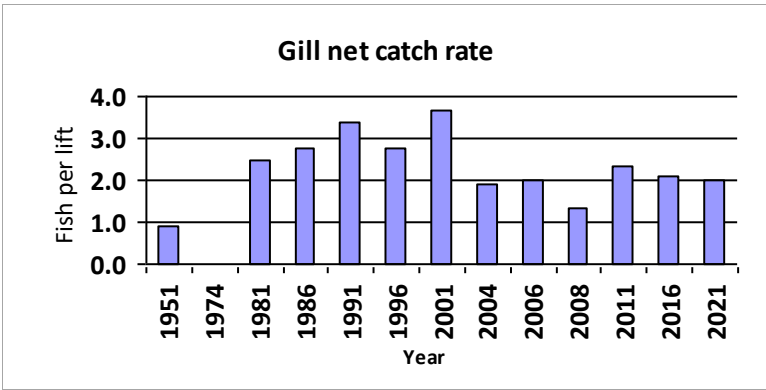




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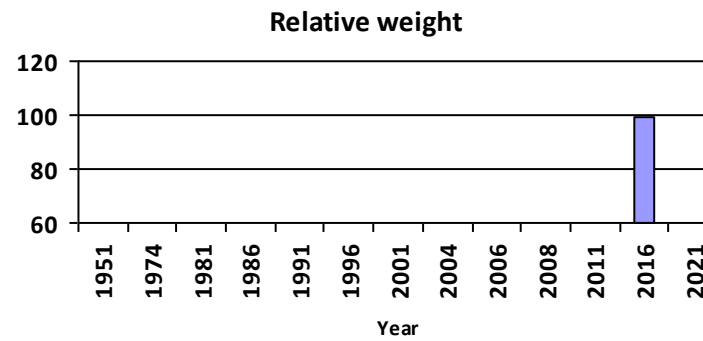
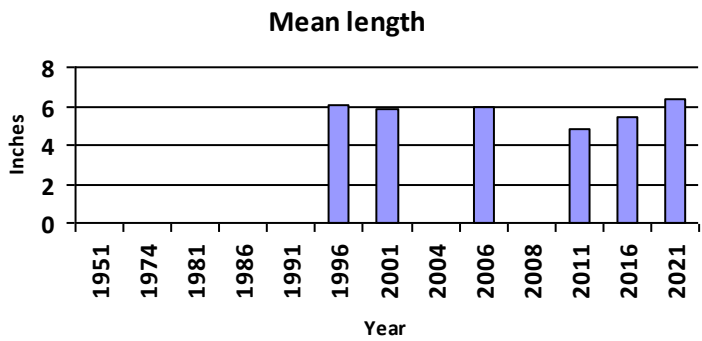
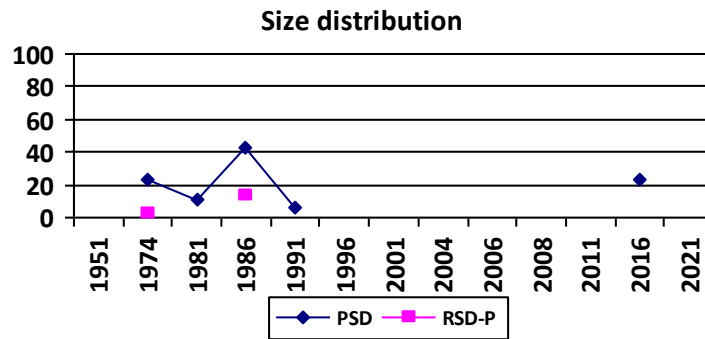
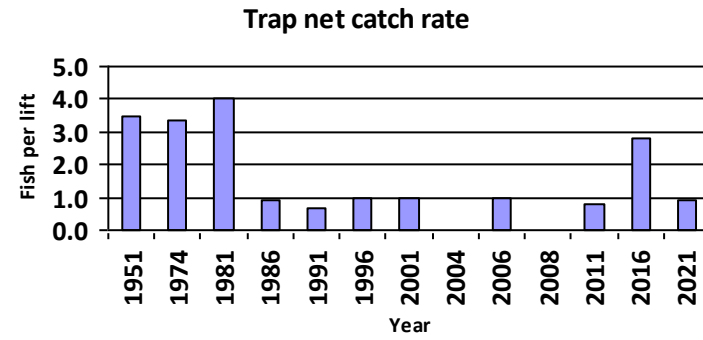
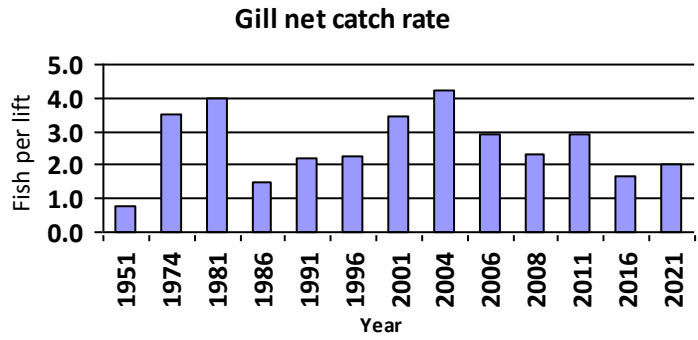
PUMPKINSEED SUNFISH



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BOOT

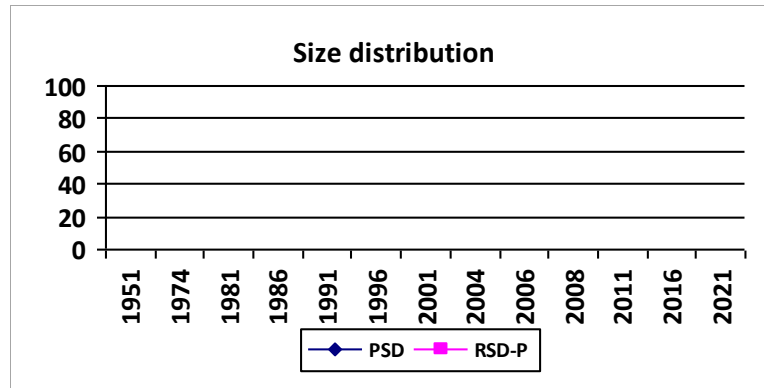
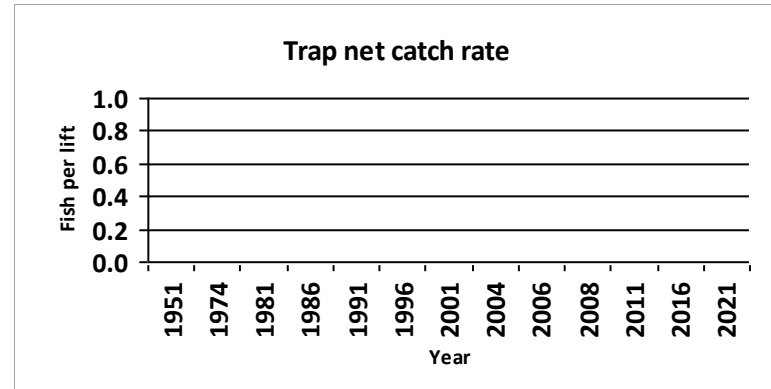
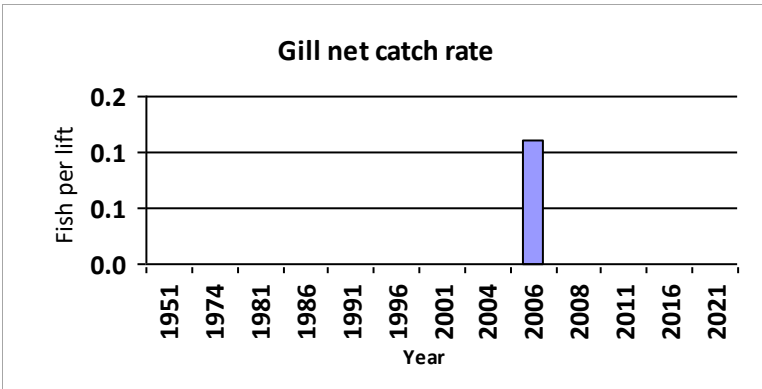
ROCK BASS



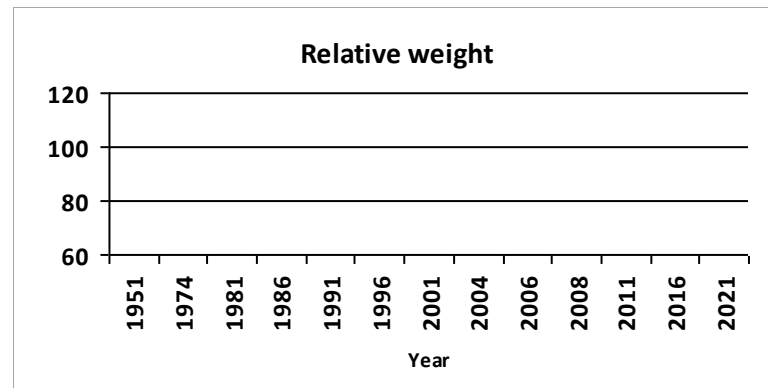
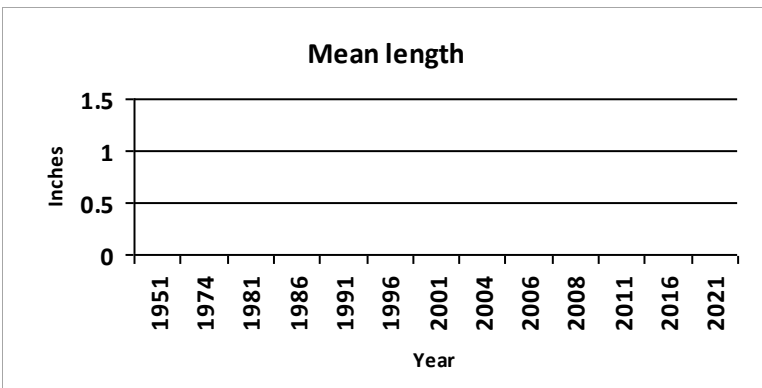
03-0030-00

BOOT

TULLIBEE



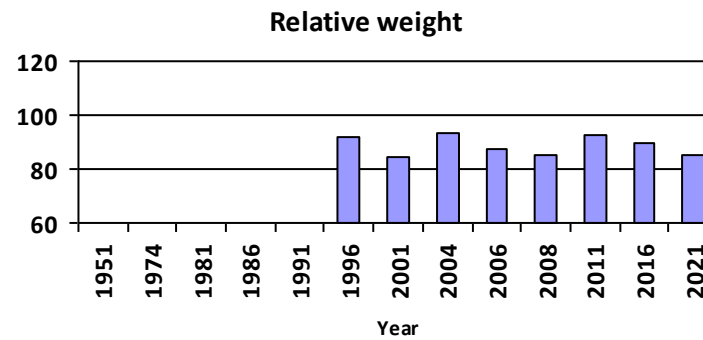
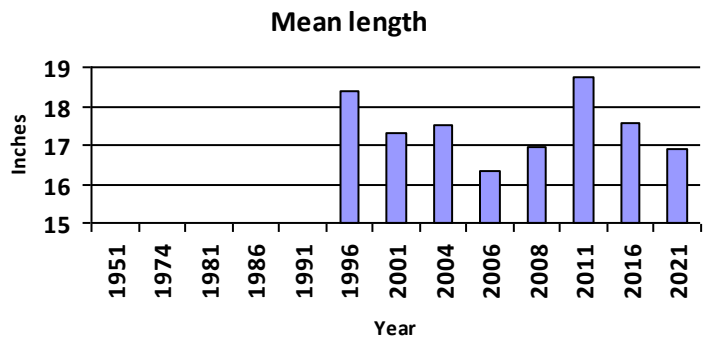
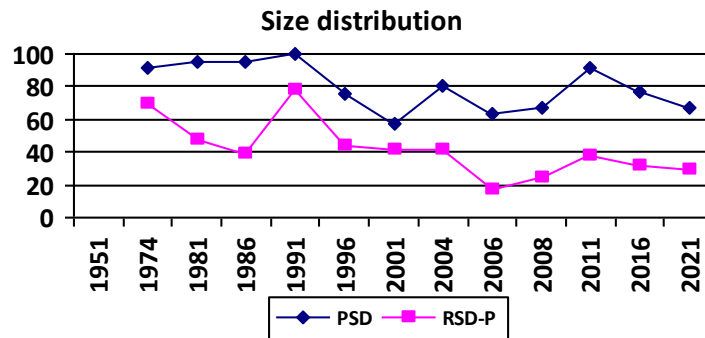
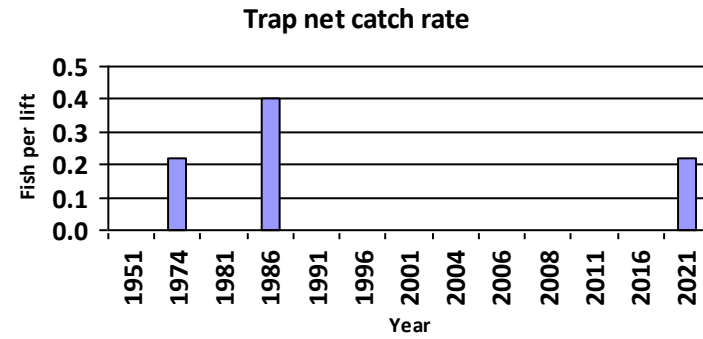
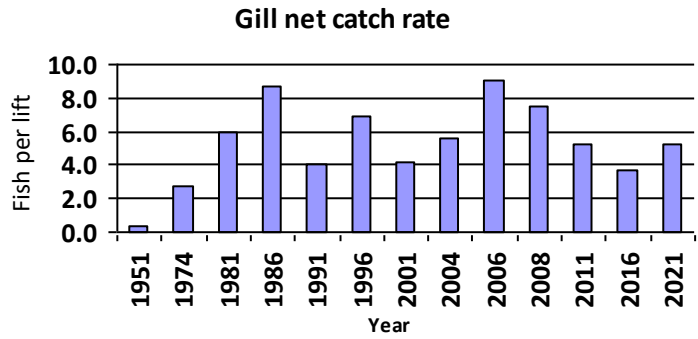
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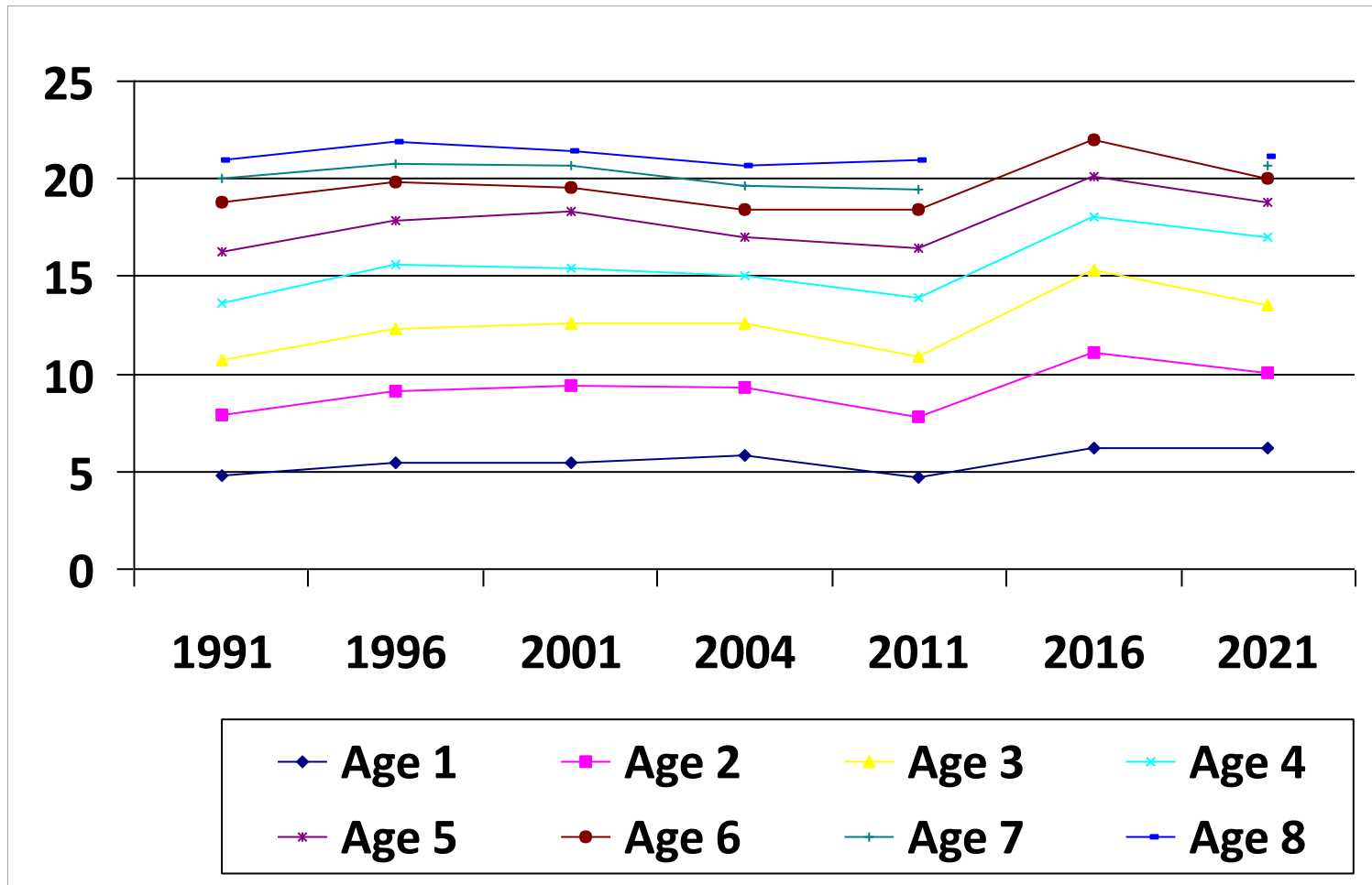


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BOOT

WALLEYE

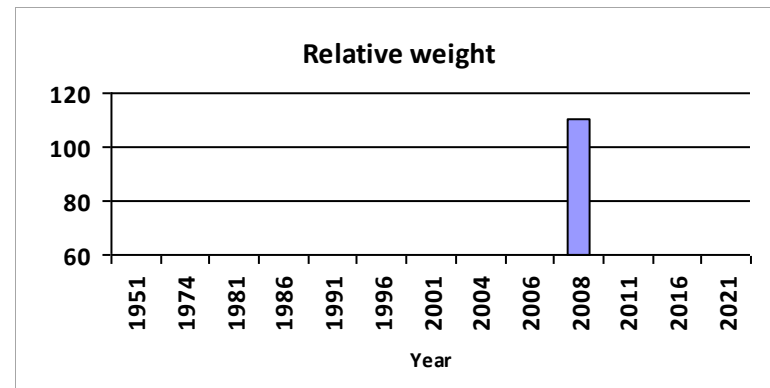
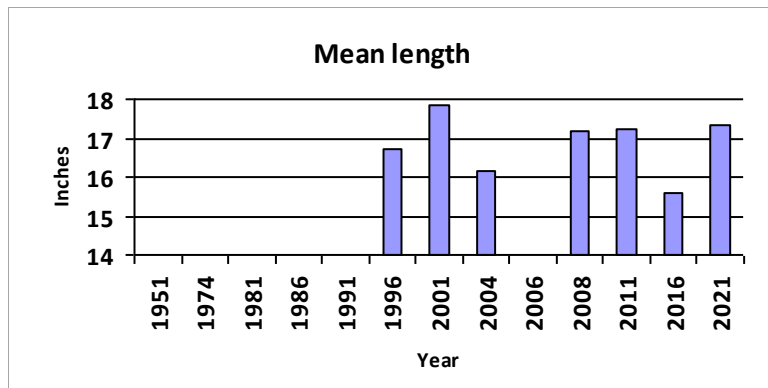
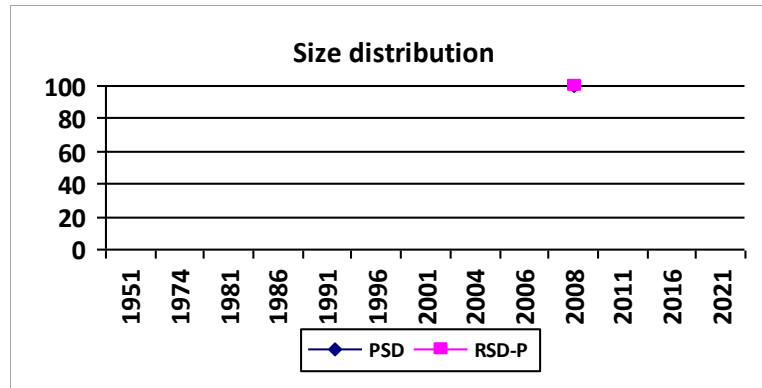
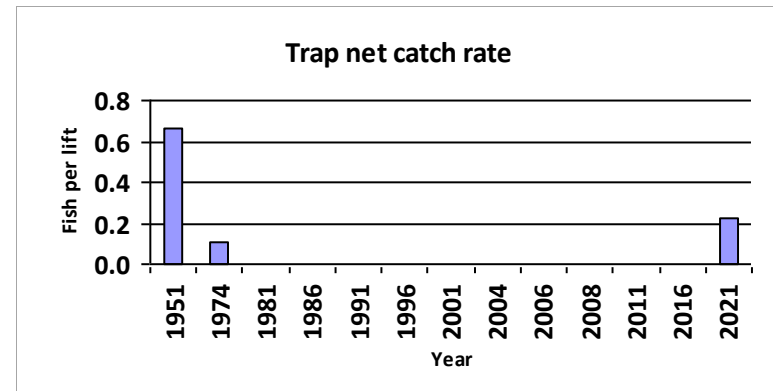
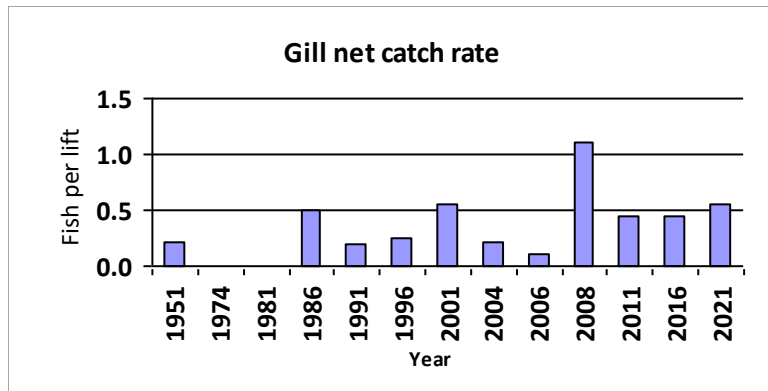




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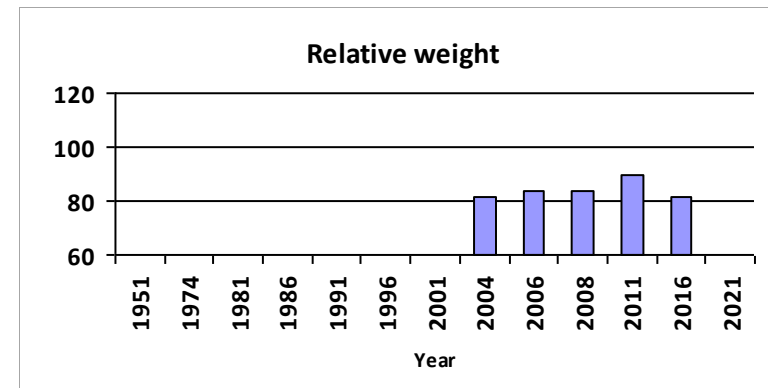
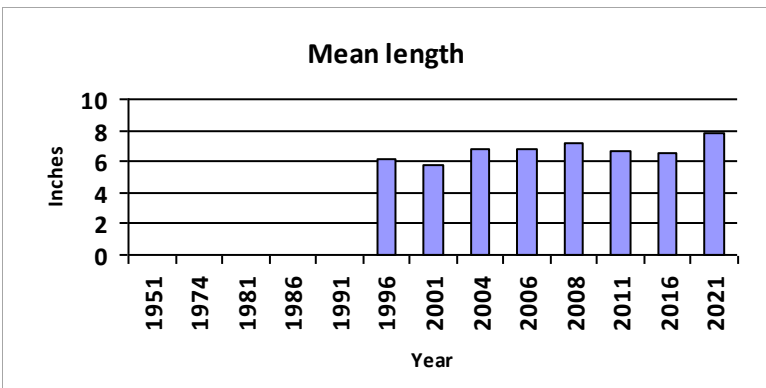
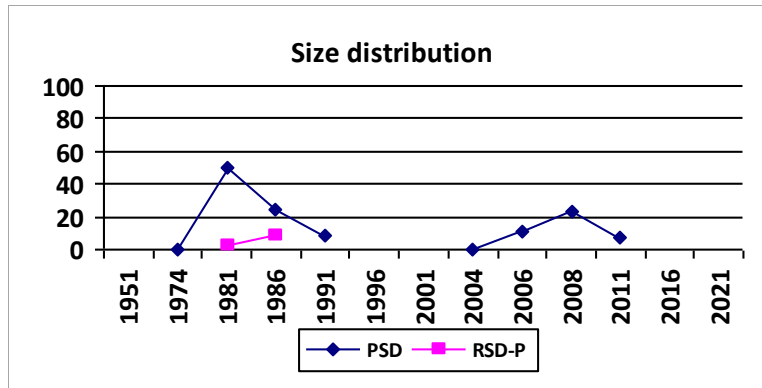
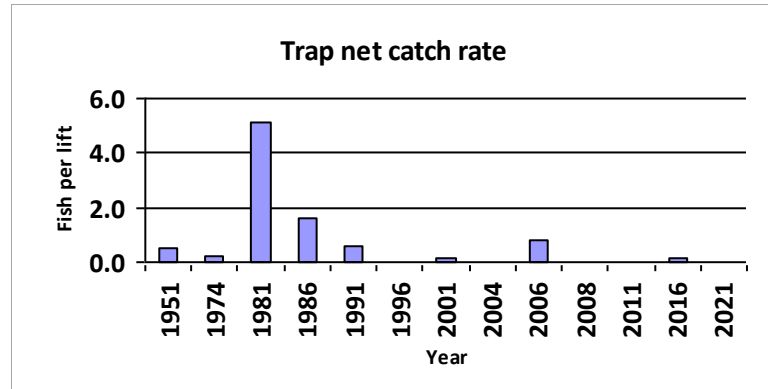
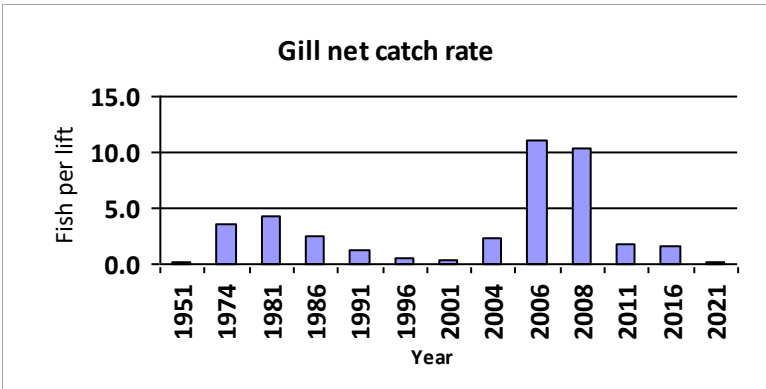
WHITE SUCKER



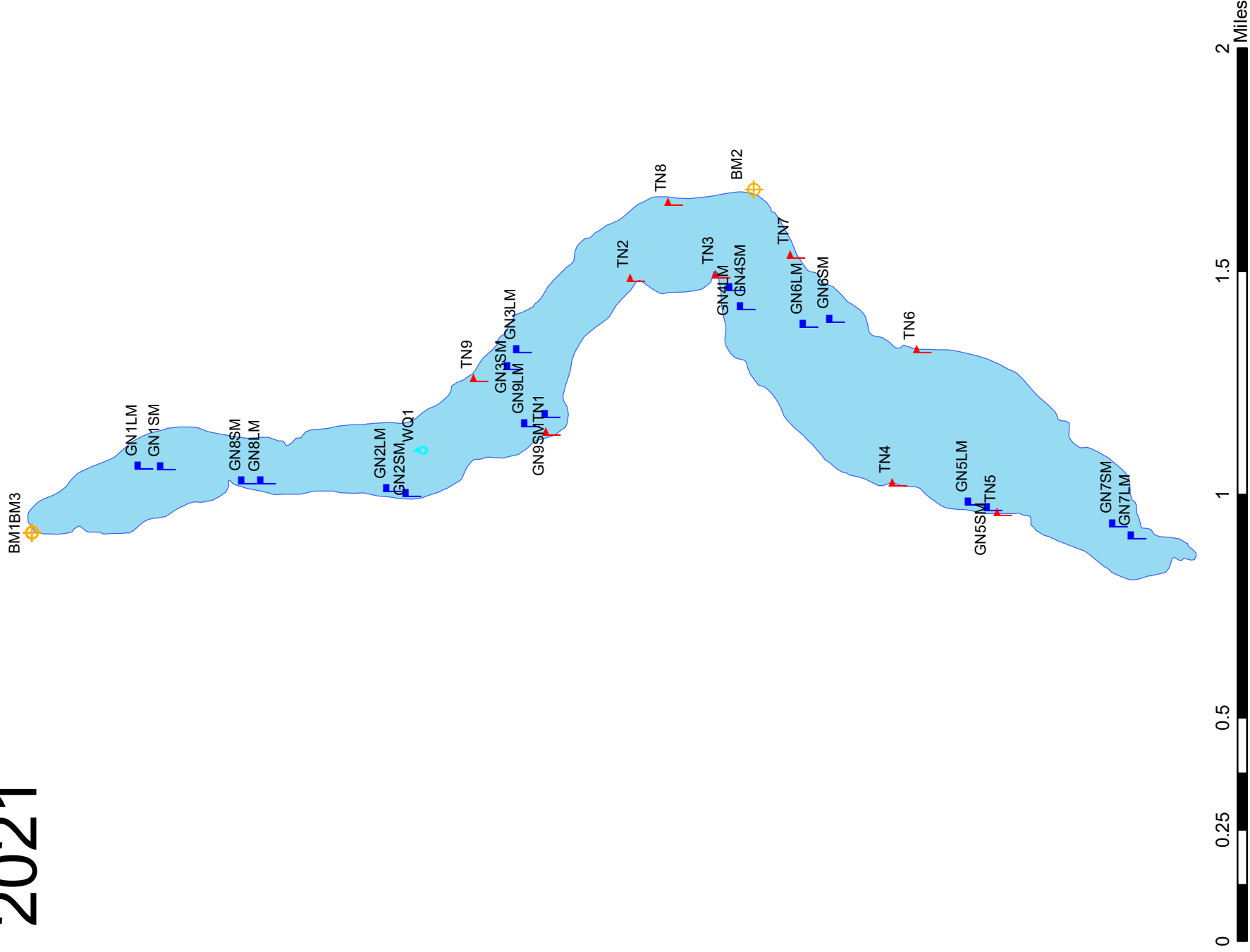
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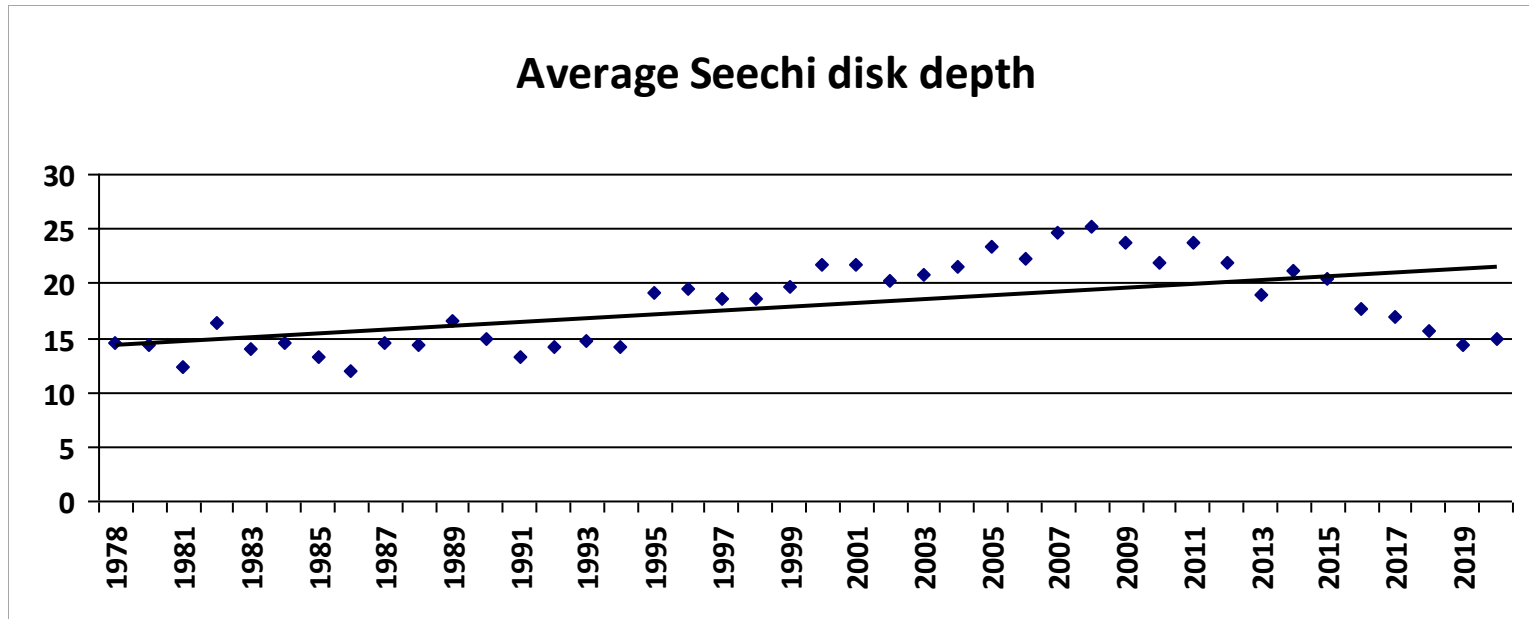
BOOT

YELLOW PERCH



Boot (03-0030-00) Lake Survey 2021





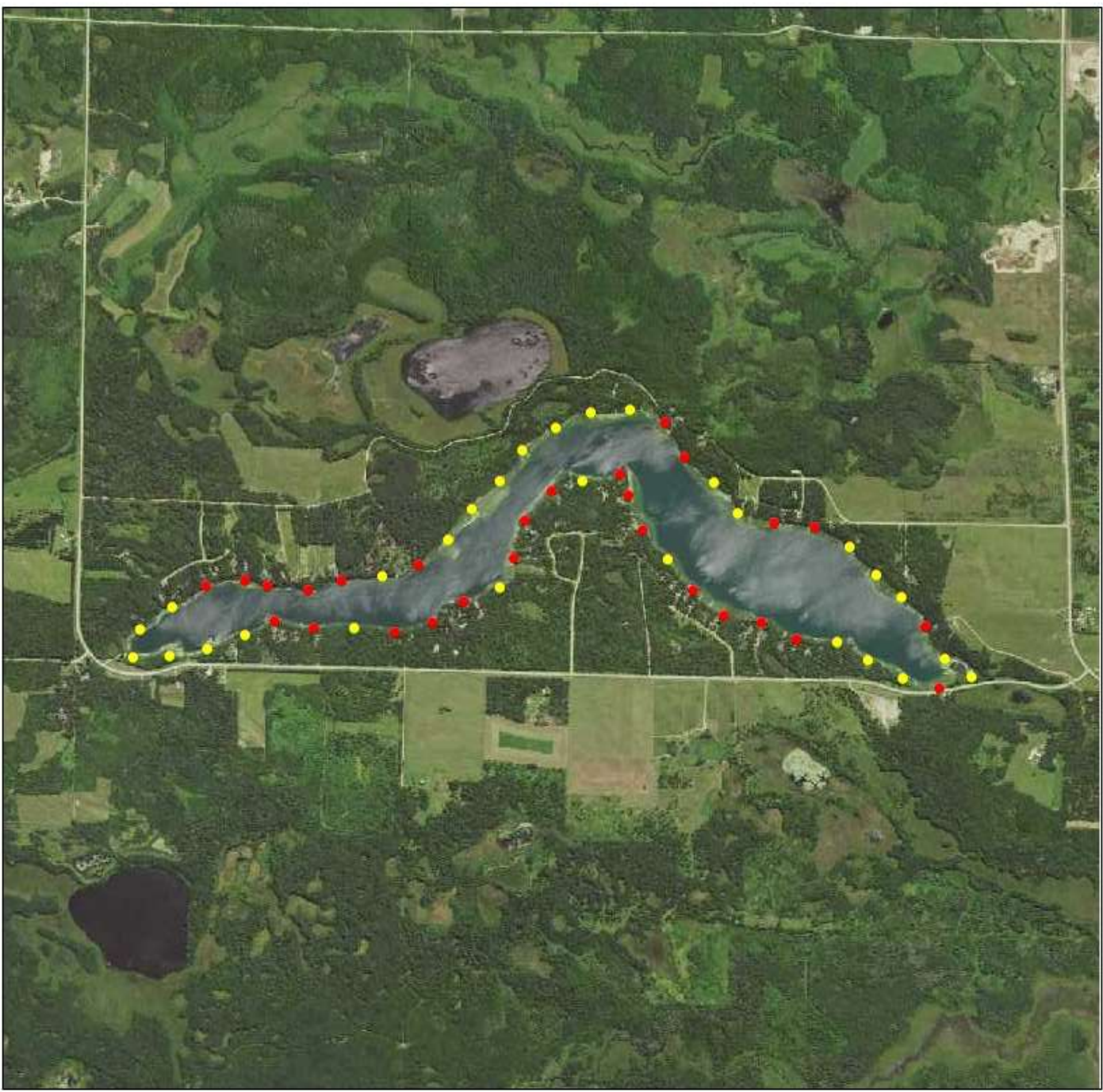
Secchi disk readings were recorded by volunteers in the Citizen Lakes Monitoring Program from 1978 to 2020 on Boot Lake. A total of 387 readings were recorded with an average of 9.2 readings per year, and the number of readings ranged from 5 to 23 per year. The overall average was 18.4 feet, and the yearly average ranged from 11.9 in 1986 to 25.2 in 2008.

Minnesota Department of Natural Resources
Score the Shore Survey Summary Report
Boot Lake (DOW# 03003000) - Survey Date: 7/1/2021

Minnesota DNR Fisheries Area staff conducted an assessment of lakeshore habitat on Boot Lake on Jul 01 2021, following the Score the Shore survey protocols. The assessment consisted of 55 survey sites evenly spaced 200 meters around the lake. Assessments were made in three habitat zones: Shoreline Zone (the shore-water interface to the top of the natural bank), Shoreland Zone (land-ward from shoreline to development structure or 100 feet), and Aquatic Zone (lake-ward 50 feet of shoreline). The average lakewide habitat score was 79.9 (+/- 2.7) out of 100 possible. Approximately 49 percent of the sites were developed with a mean score of 68.1 (+/- 4.4), while undeveloped sites had a mean score of 91.3 (+/- 1.2).

Category	Survey Sites	Shoreland Score (33.3)	Shoreline Score (33.3)	Aquatic Score (33.3)	Mean Score Std Error	Mean Score (100)
Lakewide Undeveloped Total	55	26.8	26.2	27.0	2.7	79.9
Undeveloped Nonwetland	27	33.2	29.4	28.9	1.2	91.5
Undeveloped Wetland	1	33.3	26.7	26.7	0.0	86.7
Developed Total	27	20.1	23.0	25.1	4.4	68.1
Resort or Commercial Campground	3	7.8	12.2	22.2	7.3	42.2
Roadway	1	0.0	6.7	20.0	0.0	26.7
Single-Family Residential	23	22.5	25.1	25.7	4.2	73.3

Boot Lake Score the Shore Results



0 185 370 740 1,110 1,480 Meters

Development

- Developed (Red dot)
- Undeveloped (Yellow dot)
- No Sample (Grey dot)