DEPARTMENT OF NATURAL RESOURCES

LAKE SURVEY REPORT

Fisheries Management

Lake Name: Mille Lacs | **Survey Type: Large Lake Survey**

DOW Number: 48-0002-00 | **Survey ID Date: 09/01/2016**

Lake Identification

Alternate Lake Name:	N/A	DNR Sounding Map Number:	B0212
Primary Lake Class ID:	26	Alternate Lake Class ID:	N/A

Lake Location

Primary County:	Mille Lacs	Nearest Town:	Garrison
All Counties:	Aitkin, Crow Wing, Mille Lacs.		

Legal Descriptions

Lake Center:	Township - 43N	Range - 26W	Section - 5
PLS Section Lake Center:	4302605		

All Legal Descriptions:

Aitkin County:	Township - 44N	Range - 25W	(Twelve various sections)
	Township - 44N	Range - 26W	(All thirty-six sections)
	Township - 44N	Range - 27W	(All thirty-six sections)
	Township - 45N	Range - 25W	Sections - 30, 31, 32
	Township - 45N	Range - 26W	(Seventeen various sections)
	Township - 45N	Range - 27W	Sections - 25, 26, 27, 33, 34, 35, 36
Crow Wing County:	Township - 44N	Range - 28W	Sections - 12, 13, 24, 25, 36
Mille Lacs County:	Township - 42N	Range - 25W	(Twelve various sections)
	Township - 42N	Range - 26W	(Eighteen various sections)
	Township - 42N	Range - 27W	Sections - 1, 2, 3, 4, 11, 12
	Township - 43N	Range - 25W	(Twenty-Two various sections)
	Township - 43N	Range - 26W	(All thirty-six sections)
	Township - 43N	Range - 27W	(Thirty various sections)

Area Office

Area Name:	Mille Lacs	ORG Code:	F310
Region Name:	Central	Region Number:	3

Lake Access

Station ID	Ownership	Public Use	Type	Location / Comments
AC - 1	DNR	Open to Public use	Concrete	Concrete. Two ramp access. The west ramp was destroyed by ice. Ramp tends to be covered with sand.
AC - 2	DNR	Open to Public use	Concrete	Concrete.
AC - 3	DNR	Open to Public use	Concrete	Concrete.
AC - 4	DNR	Open to Public use	Concrete	Concrete.
AC - 5	DNR	Open to Public use	Concrete	Concrete.
AC - 6	DNR	Open to Public use	Concrete	Concrete.
AC - 7	DNR	Open to Public use	Concrete	Concrete.
AC - 8	DNR	Open to Public use	Concrete	Concrete.
AC - 9	DNR	Open to Public use	Concrete	Concrete.
AC - 10	DNR	Open to Public use	Concrete	Concrete.
AC - 11	DNR	Open to Public use	Concrete	Concrete.

Lake Characteristics

Lake Area (planimetered acres):	132,516.00	GIS Shoreline Length (miles):	92.03
GIS Lake Area (acres):	128,226.21	Maximum Fetch (miles):	20.00
DOW Lake Area (acres):	132,516.00	Fetch Orientation (degrees):	N/A
Littoral Area (acres):	33,129.00	USGS Quad Map Number:	N15b
Area in MN (acres):	128,226.21	USGS Quad 24K GIS Index:	2629
Maximum Depth (feet):	42.0		
Mean Depth (feet):	28.5		

Watershed Characteristics

Major Watershed

Name: Rum River
Watershed Number: 21
Watershed size (acres): 1,013,790

Minor Watershed

Name: Mille Lacs L
Watershed Number: 2
Watershed size (acres): 164,789

Surveys and Investigations

Population Assessment: 09/18/2005, 09/13/2004, 09/14/2003, 09/17/2002, 09/17/2000, 09/10/1999, 09/07/1998, 09/30/1997, 09/30/1996, 06/22/1992, 06/27/1990, 10/31/1989, 04/01/1988, 09/01/1987, 09/01/1986.

Special Assessment: 05/15/2012.

Large Lake Survey: 09/01/2016, 09/01/2015, 09/01/2014, 09/01/2013, 09/01/2012, 09/01/2011, 09/01/2010, 09/01/2009, 09/01/2008, 09/04/2007, 09/05/2006.

Fish Diseases and Parasites

Species Examined	Number of Fish Examined			Examination Results	
	Internally	Externally	In Lab	Condition Observed	Number of Fish
muskellunge	1	-	-	None observed	1
northern pike	159	-	-	None observed	127
				Tapeworm	1
				Neascus (Black Spot)	29
rock bass	-	1	-	Yellow grub	1
smallmouth bass	79	-	-	None observed	47
				Tapeworm	30
tullibee (cisco)	144	-	-	None observed	145
walleye	598	-	-	None observed	562
				Tapeworm	13
				Lymphocystis	8
				Neascus (Black Spot)	2
				Tumors	1
				Unidenitified Disease	1
				Nematodes	10
yellow perch	233	1	-	None observed	198
				Gill parasites	1
				Neascus (Black Spot)	1
				Yellow grub	1
				Liver Flukes	34

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	07/25/2016	N/A	Surface	75.9	N/A
WQ - 2	07/25/2016	N/A	Surface	77.9	N/A
WQ - 3	07/25/2016	N/A	Surface	75.9	N/A
WQ - 4	07/25/2016	N/A	Surface	79.0	N/A
WQ - 5	07/25/2016	N/A	Surface	73.0	N/A
WQ - 10	09/12/2016	34.5	Surface	68.2	N/A
	08/15/2016	35.0	Surface	74.7	N/A
	07/18/2016	34.8	Surface	72.7	N/A
	06/28/2016	34.1	Surface	70.5	N/A
	06/13/2016	34.0	Surface	63.5	N/A
	06/02/2016	33.8	Surface	60.1	N/A
	05/16/2016	35.0	Surface	50.7	N/A
	04/29/2016	N/A	Surface	44.4	N/A
WQ - 11	09/12/2016	33.0	Surface	67.8	N/A
	08/15/2016	31.0	Surface	74.8	N/A
	07/18/2016	32.0	Surface	73.0	N/A
	06/28/2016	32.3	Surface	71.2	N/A
	06/13/2016	32.5	Surface	64.6	N/A
	06/02/2016	N/A	Surface	60.1	N/A
	05/16/2016	34.0	Surface	51.3	N/A
	04/29/2016	N/A	Surface	44.8	N/A
WQ - 12	09/12/2016	31.0	Surface	68.5	N/A
	08/15/2016	N/A	Surface	74.3	N/A
	07/18/2016	32.0	Surface	71.1	N/A
	06/28/2016	31.1	Surface	69.4	N/A
	06/13/2016	32.0	Surface	65.1	N/A
	06/02/2016	N/A	Surface	59.5	N/A
	05/16/2016	32.4	Surface	50.5	N/A
	04/29/2016	N/A	Surface	46.4	N/A
WQ - 13	09/12/2016	36.0	Surface	68.5	N/A
WQ - 13	08/15/2016	36.0	Surface	74.5	9.2
			3.0	74.5	9.2
			6.0	74.5	9.2
			9.0	74.5	9.1
			12.0	74.5	9.0
			15.0	74.5	9.0
			18.0	74.3	8.8
			21.0	74.3	8.8
			24.0	74.3	8.6
			27.0	74.3	8.6
			30.0	74.3	8.6
			33.0	74.3	8.6
			36.0	74.3	8.5
WQ - 13	07/18/2016	35.6	Surface	71.4	N/A
			0.1	71.2	9.5
			3.0	71.4	9.6
			6.0	71.2	9.5

Dissolved Oxygen and Temperature Profile of Lake Water (*Continued*)

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 13	07/18/2016 (*Continued*)	35.6	9.0	71.1	9.4
			12.0	71.1	9.3
			15.0	71.1	9.2
			18.0	71.1	9.2
			21.0	71.1	9.3
			24.0	70.9	9.1
			27.0	70.9	9.0
			30.0	70.9	9.0
			33.0	70.9	8.9
			36.0	70.9	8.8
WQ - 13	06/28/2016	35.1	Surface	69.4	N/A
			0.1	69.1	9.2
			3.0	68.9	9.3
			6.0	68.7	9.3
			9.0	68.5	9.3
			12.0	68.5	9.3
			15.0	68.5	9.2
			18.0	68.5	9.1
			21.0	68.5	9.1
			24.0	68.5	9.0
			27.0	68.5	9.0
			30.0	68.5	9.0
			33.0	68.5	8.9
			36.0	68.4	8.9
WQ - 13	06/13/2016	35.5	Surface	64.2	N/A
			0.1	63.5	9.3
			3.0	63.5	9.3
			6.0	63.5	9.3
			9.0	63.5	9.3
			12.0	63.5	9.3
			15.0	63.5	9.3
			18.0	63.5	9.3
			21.0	63.5	9.3
			24.0	63.5	9.2
			27.0	63.5	9.2
			30.0	63.5	9.2
			33.0	63.3	9.1
			36.0	63.5	9.1
WQ - 13	06/02/2016	N/A	Surface	59.5	N/A
			0.1	61.9	10.2
			3.0	61.9	10.2
			6.0	60.8	10.3
			9.0	60.3	10.3
			12.0	60.1	10.3
			15.0	59.9	10.3
			18.0	59.7	10.3
			21.0	59.5	10.2
			24.0	59.4	10.2
			27.0	59.4	10.1
			30.0	59.4	10.0
			33.0	59.2	10.0
	05/16/2016	36.0	Surface	50.4	N/A

Dissolved Oxygen and Temperature Profile of Lake Water (*Continued*)

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 13	04/29/2016	N/A	Surface	45.1	N/A
			0.1	44.4	12.4
			3.0	44.4	12.5
			6.0	43.7	12.5
			9.0	43.3	12.5
			12.0	43.3	12.4
			15.0	43.2	12.5
			18.0	43.2	12.4
			21.0	43.2	12.4
			24.0	43.0	12.4
			27.0	43.0	12.4
			30.0	43.0	12.3
			33.0	43.0	12.4
			36.0	43.0	12.2
WQ - 14	09/12/2016	33.3	Surface	68.5	N/A
WQ - 14	08/15/2016	34.0	Surface	74.7	9.0
			3.0	74.7	9.0
			6.0	74.7	9.0
			9.0	74.7	9.0
			12.0	74.7	9.0
			15.0	74.7	8.9
			18.0	74.7	8.6
			21.0	74.5	8.5
			24.0	74.5	8.5
			27.0	74.5	8.3
			30.0	74.3	6.9
			33.0	74.1	6.2
WQ - 14	07/18/2016	34.0	Surface	71.4	N/A
			0.1	71.2	9.2
			3.0	71.1	9.2
			6.0	70.9	9.2
			9.0	70.7	9.2
			12.0	70.7	9.1
			15.0	70.5	9.2
			18.0	70.5	9.0
			21.0	70.5	9.0
			24.0	70.5	9.0
			27.0	70.5	8.9
			30.0	70.5	8.9
			33.0	70.5	8.6
WQ - 14	06/28/2016	32.5	Surface	70.2	N/A
			0.1	70.2	9.2
			3.0	69.3	9.2
			6.0	69.1	9.2
			9.0	68.9	9.2
			12.0	69.6	9.2
			15.0	68.7	9.2
			18.0	68.7	9.1
			21.0	68.7	9.0
			24.0	68.7	9.0
			27.0	68.7	9.0
			30.0	68.5	8.9

Dissolved Oxygen and Temperature Profile of Lake Water (*Continued*)

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 14	06/13/2016	33.0	Surface	64.0	N/A
			0.1	63.9	9.5
			3.0	63.9	9.5
			6.0	63.9	9.5
			9.0	63.9	9.5
			12.0	63.9	9.5
			15.0	63.7	9.4
			18.0	63.7	9.4
			21.0	63.5	9.3
			24.0	63.3	9.3
			27.0	63.3	9.3
			30.0	63.3	9.3
			33.0	63.3	9.2
WQ - 14	06/02/2016	N/A	Surface	59.5	N/A
			0.1	62.2	9.9
			3.0	61.9	9.9
			6.0	61.5	9.9
			9.0	61.2	9.9
			12.0	61.0	9.9
			15.0	60.6	9.9
			18.0	60.4	9.9
			21.0	60.3	9.9
			24.0	60.1	9.8
			27.0	60.1	9.7
			30.0	59.9	9.6
	05/16/2016	32.8	Surface	50.9	N/A
WQ - 14	04/29/2016	N/A	Surface	46.4	N/A
			0.1	44.8	12.2
			3.0	44.6	12.2
			6.0	44.2	12.2
			9.0	44.1	12.2
			12.0	44.1	12.1
			15.0	44.1	12.1
			18.0	44.1	12.1
			21.0	44.1	12.0
			24.0	43.9	12.1
			27.0	43.9	12.0
			30.0	43.9	12.0
			33.0	43.9	11.8
WQ - 15	09/12/2016	28.5	Surface	68.4	N/A
	08/15/2016	28.0	Surface	74.5	N/A
	07/18/2016	29.0	Surface	71.6	N/A
	06/28/2016	29.1	Surface	70.7	N/A
	06/13/2016	29.0	Surface	63.9	N/A
	06/02/2016	N/A	Surface	60.1	N/A
	05/16/2016	29.4	Surface	51.1	N/A
	04/29/2016	N/A	Surface	44.8	N/A
WQ - 16	09/12/2016	33.0	Surface	68.0	N/A
	08/15/2016	33.0	Surface	74.3	N/A
	07/18/2016	33.4	Surface	73.0	N/A
	06/28/2016	32.7	Surface	70.5	N/A
	06/13/2016	31.0	Surface	63.5	N/A

Dissolved Oxygen and Temperature Profile of Lake Water (*Continued*)

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 16	06/02/2016	N/A	Surface	59.0	N/A
	05/16/2016	33.5	Surface	50.4	N/A
WQ - 17	09/12/2016	33.8	Surface	68.0	N/A
	08/15/2016	34.0	Surface	74.5	N/A
	07/18/2016	34.0	Surface	72.5	N/A
	06/28/2016	33.3	Surface	70.3	N/A
	06/13/2016	34.0	Surface	63.7	N/A
	06/02/2016	N/A	Surface	59.0	N/A
	04/29/2016	N/A	Surface	45.3	N/A
WQ - 18	09/12/2016	28.4	Surface	67.8	N/A
WQ - 18	08/15/2016	29.0	Surface	74.7	8.9
			3.0	74.7	8.9
			6.0	74.7	8.8
			9.0	74.7	8.8
			12.0	74.7	8.8
			15.0	74.7	8.8
			18.0	74.7	8.8
			21.0	74.7	8.8
			24.0	74.5	8.4
			27.0	74.5	8.4
WQ - 18	07/18/2016	28.9	Surface	72.5	N/A
			0.1	72.3	9.8
			3.0	72.3	9.8
			6.0	72.1	9.8
			9.0	71.6	9.7
			12.0	71.4	9.5
			15.0	71.4	9.2
			18.0	71.2	9.2
			21.0	71.2	9.1
			24.0	71.2	9.0
			27.0	71.2	9.0
			29.0	71.2	8.7
WQ - 18	06/28/2016	28.1	Surface	70.5	N/A
			0.1	70.5	9.4
			3.0	70.2	9.4
			6.0	69.8	9.5
			9.0	69.4	9.4
			12.0	69.4	9.3
			15.0	69.3	9.2
			18.0	69.3	9.1
			21.0	69.3	9.0
			24.0	69.3	8.9
			27.0	69.3	8.8
WQ - 18	06/13/2016	29.0	Surface	63.9	N/A
			0.1	64.0	9.5
			3.0	63.9	9.5
			6.0	63.9	9.5
			9.0	63.9	9.5
			12.0	63.9	9.5
			15.0	63.7	9.4
			18.0	63.7	9.4

Dissolved Oxygen and Temperature Profile of Lake Water (*Continued*)

Station ID	Sampling Date	Bottom Depth (Feet)	Sample Depth (Feet)	Water Temperature (°F)	Dissolved Oxygen (ppm)
WQ - 18	06/13/2016 (*Continued*)	29.0	21.0	63.3	9.2
			24.0	63.1	9.2
			27.0	63.1	9.0
			30.0	63.1	8.2
WQ - 18	06/02/2016	N/A	Surface	59.2	N/A
			0.1	62.4	10.0
			3.0	62.2	10.0
			6.0	61.9	10.0
			9.0	61.5	10.0
			12.0	61.2	10.0
			15.0	61.0	10.0
			18.0	60.8	10.0
			21.0	60.8	9.9
			24.0	60.6	9.9
			27.0	60.6	9.8
	05/16/2016	29.5	Surface	50.9	N/A
WQ - 18	04/29/2016	N/A	Surface	45.1	N/A
			0.1	44.8	12.3
			3.0	44.8	12.3
			6.0	44.4	12.3
			9.0	44.2	12.3
			12.0	44.1	12.3
			15.0	43.7	12.3
			18.0	43.5	12.3
			21.0	43.5	12.3
			24.0	43.5	12.3
			27.0	43.5	12.3

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	07/25/2016	Surface	N/A	N\A	N/A	N/A	N/A
WQ - 10	09/12/2016	Surface	6.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	9.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	11.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	15.0	N\A	N/A	Green	N/A
	06/02/2016	6.0	16.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	13.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	16.5	N\A	N/A	Green	Algae
WQ - 11	09/12/2016	Surface	5.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	10.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	10.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	14.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	13.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	13.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	11.0	N\A	N/A	Green	Algae
WQ - 12	09/12/2016	Surface	6.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	8.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	10.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	14.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	12.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	14.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	11.0	N\A	N/A	Green	Algae
WQ - 13	09/12/2016	Surface	5.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	8.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	9.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	11.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	13.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	12.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	12.0	N\A	N/A	Green	Algae
WQ - 14	09/12/2016	Surface	6.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	10.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	10.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	11.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	13.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	13.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	13.0	N\A	N/A	Green	Algae
WQ - 15	09/12/2016	Surface	6.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	8.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	11.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	9.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	20.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	13.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	14.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	14.0	N\A	N/A	Green	Algae

Field Measurements of Water Quality (*Continued*)

Station ID	Sampling Date	Sample Depth (Feet)	Secchi Depth (Feet)	Field pH	Alkalinity (ppm)	Water Color	Color Cause
WQ - 16	09/12/2016	Surface	6.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	N/A	N\A	N/A	Brown	Algae
	07/18/2016	6.0	8.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	10.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	16.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	13.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	15.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	16.0	N\A	N/A	Green	Algae
WQ - 17	09/12/2016	Surface	5.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	8.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	10.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	15.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	9.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	14.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	12.0	N\A	N/A	Green	Algae
WQ - 18	09/12/2016	Surface	5.0	N\A	N/A	Brown Grn	Algae
	08/15/2016	Surface	7.0	N\A	N/A	Brown	Algae
	07/18/2016	6.0	9.0	N\A	N/A	Green	N/A
	06/28/2016	Surface	9.0	N\A	N/A	Brown Grn	Algae
	06/13/2016	6.0	14.0	N\A	N/A	Green	N/A
	06/02/2016	Surface	14.0	N\A	N/A	Green	Algae
	05/16/2016	6.0	13.0	N\A	N/A	Green	Algae
	04/29/2016	Surface	18.0	N\A	N/A	Green	Algae
WQ - 2	07/25/2016	Surface	N/A	N\A	N/A	N/A	N/A
WQ - 3	07/25/2016	Surface	N/A	N\A	N/A	N/A	N/A
WQ - 4	07/25/2016	Surface	N/A	N\A	N/A	N/A	N/A
WQ - 5	07/25/2016	Surface	N/A	N\A	N/A	N/A	N/A

Laboratory Analysis of Water Chemistry

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 1	07/25/2016	07/25/2016	Surface	Sulphate ion	4.9 ppm
				Total phosphorus	0.022 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	132 ppm
				Chlorophyll-a trichromatic method calculation	4.1 ppb
				Conductivity	174 :S/cm
				pH	8.14 pH
				Chlorophyll-a corrected for pheophytin	2.48 ppb
WQ - 2	07/25/2016	07/25/2016	Surface	Sulphate ion	5.2 ppm
				Total phosphorus	0.024 ppm
				Total alkalinity	69 ppm
				Total dissolved solids	108 ppm
				Chlorophyll-a trichromatic method calculation	5.5 ppb
				Conductivity	164 :S/cm
				pH	8.16 pH
				Chlorophyll-a corrected for pheophytin	4.61 ppb
WQ - 3	07/25/2016	07/25/2016	Surface	Sulphate ion	4.5 ppm
				Total phosphorus	0.046 ppm
				Total alkalinity	69 ppm
				Total dissolved solids	120 ppm
				Chlorophyll-a trichromatic method calculation	6.6 ppb
				Conductivity	162 :S/cm
				pH	7.75 pH
				Chlorophyll-a corrected for pheophytin	4.87 ppb
WQ - 4	07/25/2016	07/25/2016	Surface	Sulphate ion	4.0 ppm
				Total phosphorus	0.107 ppm
				Total alkalinity	68 ppm
				Total dissolved solids	136 ppm
				Chlorophyll-a trichromatic method calculation	8.0 ppb
				Conductivity	175 :S/cm
				pH	7.76 pH
				Chlorophyll-a corrected for pheophytin	4.50 ppb
WQ - 5	07/25/2016	07/25/2016	Surface	Sulphate ion	11.7 ppm
				Total phosphorus	0.087 ppm
				Total alkalinity	82 ppm
				Total dissolved solids	202 ppm
				Chlorophyll-a trichromatic method calculation	4.4 ppb
				Conductivity	232 :S/cm
				pH	6.84 pH
				Chlorophyll-a corrected for pheophytin	3.23 ppb
WQ - 10	09/12/2016	09/12/2016	Surface	Sulphate ion	5.7 ppm
				Total phosphorus	0.034 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	144 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 10 (*Continued*)	09/12/2016	09/12/2016	Surface	Chlorophyll-a trichromatic method calculation	14.0 ppb
				Conductivity	164 :S/cm
				pH	8.27 pH
				Chlorophyll-a corrected for pheophytin	11.10 ppb
WQ - 10	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.029 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	112 ppm
				Chlorophyll-a trichromatic method calculation	10.8 ppb
				Conductivity	161 :S/cm
				pH	8.50 pH
				Chlorophyll-a corrected for pheophytin	9.19 ppb
WQ - 10	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.026 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	108 ppm
				Chlorophyll-a trichromatic method calculation	9.6 ppb
				Conductivity	161 :S/cm
				pH	8.34 pH
				Chlorophyll-a corrected for pheophytin	7.87 ppb
WQ - 10	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.014 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	94 ppm
				Chlorophyll-a trichromatic method calculation	2.8 ppb
				Conductivity	169 :S/cm
				pH	8.09 pH
				Chlorophyll-a corrected for pheophytin	2.25 ppb
WQ - 10	05/16/2016	05/16/2016	6.0	Sulphate ion	5.9 ppm
				Total phosphorus	0.020 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	106 ppm
				Chlorophyll-a trichromatic method calculation	2.9 ppb
				Conductivity	166 :S/cm
				pH	7.95 pH
				Chlorophyll-a corrected for pheophytin	2.09 ppb
WQ - 11	09/12/2016	09/12/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.040 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	124 ppm
				Chlorophyll-a trichromatic method calculation	19.7 ppb
				Conductivity	164 :S/cm
				pH	8.23 pH
				Chlorophyll-a corrected for pheophytin	17.10 ppb
WQ - 11	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.032 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	92 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 11 (*Continued*)	08/15/2016	08/15/2016	Surface	Chlorophyll-a trichromatic method calculation	17.0 ppb
				Conductivity	162 :S/cm
				pH	8.52 pH
				Chlorophyll-a corrected for pheophytin	15.00 ppb
WQ - 11	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.026 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	100 ppm
				Chlorophyll-a trichromatic method calculation	14.6 ppb
				Conductivity	70 :S/cm
				pH	8.52 pH
				Chlorophyll-a corrected for pheophytin	13.30 ppb
WQ - 11	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.016 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	100 ppm
				Chlorophyll-a trichromatic method calculation	3.4 ppb
				Conductivity	168 :S/cm
				pH	8.11 pH
				Chlorophyll-a corrected for pheophytin	2.97 ppb
WQ - 11	05/16/2016	05/16/2016	6.0	Sulphate ion	5.8 ppm
				Total phosphorus	0.024 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	100 ppm
				Chlorophyll-a trichromatic method calculation	3.6 ppb
				Conductivity	166 :S/cm
				pH	8.01 pH
				Chlorophyll-a corrected for pheophytin	3.27 ppb
WQ - 12	09/12/2016	09/12/2016	Surface	Sulphate ion	5.2 ppm
				Total phosphorus	0.032 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	128 ppm
				Chlorophyll-a trichromatic method calculation	18.0 ppb
				Conductivity	164 :S/cm
				pH	8.43 pH
				Chlorophyll-a corrected for pheophytin	16.40 ppb
WQ - 12	08/15/2016	08/15/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.035 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	96 ppm
				Chlorophyll-a trichromatic method calculation	17.0 ppb
				Conductivity	162 :S/cm
				pH	8.43 pH
				Chlorophyll-a corrected for pheophytin	14.00 ppb
WQ - 12	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.026 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	116 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 12 (*Continued*)	07/18/2016	07/18/2016	6.0	Chlorophyll-a trichromatic method calculation	9.7 ppb
				Conductivity	163 :S/cm
				pH	8.11 pH
				Chlorophyll-a corrected for pheophytin	7.75 ppb
WQ - 12	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.016 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	92 ppm
				Chlorophyll-a trichromatic method calculation	3.6 ppb
				Conductivity	169 :S/cm
				pH	8.07 pH
				Chlorophyll-a corrected for pheophytin	2.96 ppb
WQ - 12	05/16/2016	05/16/2016	6.0	Sulphate ion	5.9 ppm
				Total phosphorus	0.032 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	4.8 ppb
				Conductivity	168 :S/cm
				pH	7.95 pH
				Chlorophyll-a corrected for pheophytin	4.15 ppb
WQ - 13	09/12/2016	09/12/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.031 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	136 ppm
				Chlorophyll-a trichromatic method calculation	18.7 ppb
				Conductivity	164 :S/cm
				pH	8.19 pH
				Chlorophyll-a corrected for pheophytin	16.20 ppb
WQ - 13	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.026 ppm
				Total alkalinity	69 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	14.2 ppb
				Conductivity	163 :S/cm
				pH	8.51 pH
				Chlorophyll-a corrected for pheophytin	12.50 ppb
WQ - 13	07/18/2016	07/18/2016	6.0	Sulphate ion	5.6 ppm
				Total phosphorus	0.023 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	112 ppm
				Chlorophyll-a trichromatic method calculation	12.6 ppb
				Conductivity	163 :S/cm
				pH	8.50 pH
				Chlorophyll-a corrected for pheophytin	11.10 ppb
WQ - 13	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.016 ppm
				Total alkalinity	82 ppm
				Total dissolved solids	84 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 13 (*Continued*)	06/13/2016	06/13/2016	6.0	Chlorophyll-a trichromatic method calculation	3.5 ppb
				Conductivity	169 :S/cm
				pH	8.16 pH
				Chlorophyll-a corrected for pheophytin	3.18 ppb
WQ - 13	05/16/2016	05/16/2016	6.0	Sulphate ion	5.9 ppm
				Total phosphorus	0.025 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	92 ppm
				Chlorophyll-a trichromatic method calculation	4.5 ppb
				Conductivity	166 :S/cm
				pH	8.01 pH
				Chlorophyll-a corrected for pheophytin	3.58 ppb
WQ - 14	09/12/2016	09/12/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.033 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	140 ppm
				Chlorophyll-a trichromatic method calculation	15.0 ppb
				Conductivity	163 :S/cm
				pH	8.30 pH
				Chlorophyll-a corrected for pheophytin	12.80 ppb
WQ - 14	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.029 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	108 ppm
				Chlorophyll-a trichromatic method calculation	13.4 ppb
				Conductivity	162 :S/cm
				pH	8.42 pH
				Chlorophyll-a corrected for pheophytin	11.60 ppb
WQ - 14	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.024 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	116 ppm
				Chlorophyll-a trichromatic method calculation	8.7 ppb
				Conductivity	162 :S/cm
				pH	8.30 pH
				Chlorophyll-a corrected for pheophytin	7.47 ppb
WQ - 14	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.016 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	96 ppm
				Chlorophyll-a trichromatic method calculation	2.8 ppb
				Conductivity	168 :S/cm
				pH	8.08 pH
				Chlorophyll-a corrected for pheophytin	2.11 ppb
WQ - 14	05/16/2016	05/16/2016	6.0	Sulphate ion	5.8 ppm
				Total phosphorus	0.024 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	100 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 14 (*Continued*)	05/16/2016	05/16/2016	6.0	Chlorophyll-a trichromatic method calculation	4.2 ppb
				Conductivity	166 :S/cm
				pH	8.06 pH
				Chlorophyll-a corrected for pheophytin	3.31 ppb
WQ - 15	09/12/2016	09/12/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.031 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	148 ppm
				Chlorophyll-a trichromatic method calculation	15.5 ppb
				Conductivity	164 :S/cm
				pH	8.26 pH
				Chlorophyll-a corrected for pheophytin	13.30 ppb
WQ - 15	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.029 ppm
				Total alkalinity	69 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	12.9 ppb
				Conductivity	162 :S/cm
				pH	8.42 pH
				Chlorophyll-a corrected for pheophytin	11.20 ppb
WQ - 15	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.024 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	8.7 ppb
				Conductivity	162 :S/cm
				pH	8.24 pH
				Chlorophyll-a corrected for pheophytin	7.54 ppb
WQ - 15	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.014 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	84 ppm
				Chlorophyll-a trichromatic method calculation	2.3 ppb
				Conductivity	168 :S/cm
				pH	8.15 pH
				Chlorophyll-a corrected for pheophytin	1.68 ppb
WQ - 15	05/16/2016	05/16/2016	6.0	Sulphate ion	5.8 ppm
				Total phosphorus	0.021 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	92 ppm
				Chlorophyll-a trichromatic method calculation	4.0 ppb
				Conductivity	166 :S/cm
				pH	7.99 pH
				Chlorophyll-a corrected for pheophytin	3.35 ppb
WQ - 16	09/12/2016	09/12/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.032 ppm
				Total alkalinity	73 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 16 (*Continued*)	09/12/2016	09/12/2016	Surface	Total dissolved solids	124 ppm
				Chlorophyll-a trichromatic method calculation	13.5 ppb
				Conductivity	164 :S/cm
				pH	8.33 pH
				Chlorophyll-a corrected for pheophytin	10.90 ppb
WQ - 16	08/15/2016	08/15/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.031 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	15.1 ppb
				Conductivity	162 :S/cm
				pH	8.51 pH
				Chlorophyll-a corrected for pheophytin	12.70 ppb
WQ - 16	07/18/2016	07/18/2016	6.0	Sulphate ion	5.3 ppm
				Total phosphorus	0.033 ppm
				Total alkalinity	68 ppm
				Total dissolved solids	124 ppm
				Chlorophyll-a trichromatic method calculation	14.8 ppb
				Conductivity	159 :S/cm
				pH	8.40 pH
				Chlorophyll-a corrected for pheophytin	12.80 ppb
WQ - 16	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.014 ppm
				Total alkalinity	72 ppm
				Total dissolved solids	92 ppm
				Chlorophyll-a trichromatic method calculation	2.6 ppb
				Conductivity	168 :S/cm
				pH	8.10 pH
				Chlorophyll-a corrected for pheophytin	2.00 ppb
WQ - 16	05/16/2016	05/16/2016	6.0	Sulphate ion	5.9 ppm
				Total phosphorus	0.021 ppm
				Total alkalinity	75 ppm
				Total dissolved solids	88 ppm
				Chlorophyll-a trichromatic method calculation	3.1 ppb
				Conductivity	168 :S/cm
				pH	8.11 pH
				Chlorophyll-a corrected for pheophytin	2.36 ppb
WQ - 17	09/12/2016	09/12/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.044 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	116 ppm
				Chlorophyll-a trichromatic method calculation	22.0 ppb
				Conductivity	163 :S/cm
				pH	8.20 pH
				Chlorophyll-a corrected for pheophytin	18.70 ppb
WQ - 17	08/15/2016	08/15/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.030 ppm
				Total alkalinity	71 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 17 (*Continued*)	08/15/2016	08/15/2016	Surface	Total dissolved solids	120 ppm
				Chlorophyll-a trichromatic method calculation	18.1 ppb
				Conductivity	163 :S/cm
				pH	8.55 pH
				Chlorophyll-a corrected for pheophytin	16.20 ppb
WQ - 17	07/18/2016	07/18/2016	6.0	Sulphate ion	5.6 ppm
				Total phosphorus	0.025 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	112 ppm
				Chlorophyll-a trichromatic method calculation	12.4 ppb
				Conductivity	164 :S/cm
				pH	8.48 pH
				Chlorophyll-a corrected for pheophytin	11.00 ppb
WQ - 17	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.015 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	104 ppm
				Chlorophyll-a trichromatic method calculation	2.5 ppb
				Conductivity	168 :S/cm
				pH	8.13 pH
				Chlorophyll-a corrected for pheophytin	1.90 ppb
WQ - 17	05/16/2016	05/16/2016	6.0	Sulphate ion	5.8 ppm
				Total phosphorus	0.020 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	88 ppm
				Chlorophyll-a trichromatic method calculation	4.3 ppb
				Conductivity	169 :S/cm
				pH	8.19 pH
				Chlorophyll-a corrected for pheophytin	3.90 ppb
WQ - 18	09/12/2016	09/12/2016	Surface	Sulphate ion	5.3 ppm
				Total phosphorus	0.050 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	156 ppm
				Chlorophyll-a trichromatic method calculation	22.8 ppb
				Conductivity	163 :S/cm
				pH	8.31 pH
				Chlorophyll-a corrected for pheophytin	19.30 ppb
WQ - 18	08/15/2016	08/15/2016	Surface	Sulphate ion	5.4 ppm
				Total phosphorus	0.033 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	130 ppm
				Chlorophyll-a trichromatic method calculation	19.7 ppb
				Conductivity	161 :S/cm
				pH	8.63 pH
				Chlorophyll-a corrected for pheophytin	15.90 ppb
WQ - 18	07/18/2016	07/18/2016	6.0	Sulphate ion	5.5 ppm
				Total phosphorus	0.026 ppm
				Total alkalinity	70 ppm

Laboratory Analysis of Water Chemistry (*Continued*)

Station ID	Sampling Date	Analysis Date	Sample Depth (ft)	Chemical Parameter	Chemical Value
WQ - 18 (*Continued*)	07/18/2016	07/18/2016	6.0	Total dissolved solids	136 ppm
				Chlorophyll-a trichromatic method calculation	14.1 ppb
				Conductivity	163 :S/cm
				pH	8.54 pH
				Chlorophyll-a corrected for pheophytin	11.50 ppb
WQ - 18	06/13/2016	06/13/2016	6.0	Sulphate ion	5.7 ppm
				Total phosphorus	0.015 ppm
				Total alkalinity	71 ppm
				Total dissolved solids	92 ppm
				Chlorophyll-a trichromatic method calculation	3.1 ppb
				Conductivity	168 :S/cm
				pH	8.17 pH
				Chlorophyll-a corrected for pheophytin	2.63 ppb
WQ - 18	05/16/2016	05/16/2016	6.0	Sulphate ion	5.8 ppm
				Total phosphorus	0.028 ppm
				Total alkalinity	70 ppm
				Total dissolved solids	100 ppm
				Chlorophyll-a trichromatic method calculation	3.4 ppb
				Conductivity	167 :S/cm
				pH	8.04 pH
				Chlorophyll-a corrected for pheophytin	2.70 ppb

Net Catch Summary by Numbers for GN

Standard gill net sets

Number of Sets: 52
First Set Date: 09/18/2016
Last Lift Date: 09/28/2016
Target Species: N/A

Abbr	Species	Total Fish	Number Per Set	Quartiles for Lake Class 26* 25%	50%	75%
BLC	Black Crappie	3	0.06	0.08	0.29	0.69
BLG	Bluegill	1	0.02	N/A	N/A	N/A
BOF	Bowfin (Dogfish)	1	0.02	0.04	0.08	0.12
MUE	Muskellunge	1	0.02	0.03	0.03	0.08
NOP	Northern Pike	53	1.02	0.92	1.63	4.31
RKB	Rock Bass	54	1.04	0.06	0.37	1.08
SMB	Smallmouth Bass	60	1.15	0.03	0.09	0.22
SPO	Spottail Shiner	1	0.02	N/A	N/A	N/A
TLC	Tullibee (Cisco)	1,084	20.85	4.91	12.83	17.65
WAE	Walleye	545	10.48	3.34	8.33	14.79
WTS	White Sucker	30	0.58	0.79	1.41	2.43
YEP	Yellow Perch	1,023	19.67	9.86	18.50	57.14
	Total Fish/Set:		54.92	* 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	Quartiles for Lake Class 26* 25%	50%	75%
BLC	Black Crappie	0.51	0.01	0.17	0.23	0.42	0.55
BLG	Bluegill	0.50	0.01	0.50	N/A	N/A	N/A
BOF	Bowfin (Dogfish)	3.52	0.07	3.52	2.99	4.00	4.32
MUE	Muskellunge	23.48	0.45	23.48	3.31	4.80	8.00
NOP	Northern Pike	303.85	5.84	5.73	2.43	3.07	4.31
RKB	Rock Bass	27.54	0.53	0.51	0.30	0.45	0.58
SMB	Smallmouth Bass	111.78	2.15	1.86	0.80	1.22	1.50
SPO	Spottail Shiner	0.04	0.00	0.04	N/A	N/A	N/A
TLC	Tullibee (Cisco)	1046.90	20.13	0.97	0.35	0.42	0.51
WAE	Walleye	897.40	17.26	1.65	0.94	1.24	1.55
WTS	White Sucker	73.85	1.42	2.46	1.57	1.79	2.14
YEP	Yellow Perch	283.68	5.46	0.28	0.19	0.22	0.25
	Total Pounds Fish/Set:		53.33		* Quartiles for Mean Weight		

Net Catch Summary by Numbers for GNP

Multifilament GN; 300 x 6; three 100 panels 1.5-2.0-2.5

Number of Set - Days: 16
First Set - Day Date: 09/18/2016
Last Set - Day Date: 09/28/2016
Target Species: N/A

Abbr	Species	Total Fish	Number Per Set - Day	Quartiles for Lake Class 26* 25%	50%	75%
BLG	Bluegill	11	0.69	N/A	N/A	N/A
BOF	Bowfin (Dogfish)	5	0.31	N/A	N/A	N/A
BRB	Brown Bullhead	3	0.19	N/A	N/A	N/A
LMB	Largemouth Bass	4	0.25	N/A	N/A	N/A
MUE	Muskellunge	1	0.06	N/A	N/A	N/A
NOP	Northern Pike	123	7.69	N/A	N/A	N/A
PMK	Pumpkinseed	5	0.31	N/A	N/A	N/A
RKB	Rock Bass	30	1.88	N/A	N/A	N/A
SMB	Smallmouth Bass	24	1.50	N/A	N/A	N/A
TLC	Tullibee (Cisco)	4	0.25	N/A	N/A	N/A
WAE	Walleye	134	8.38	N/A	N/A	N/A
WTS	White Sucker	30	1.88	N/A	N/A	N/A
YEB	Yellow Bullhead	7	0.44	N/A	N/A	N/A
YEP	Yellow Perch	23	1.44	N/A	N/A	N/A
	Total Fish/Set - Day:		25.25	* Quartiles for Number Per Set - Day		

Net Catch Summary by Weight for GNP

Multifilament GN; 300 x 6; three 100 panels 1.5-2.0-2.5

Abbr	Species	Total Weight (Pounds)	Pounds Per Set - Day	Mean Weight	Quartiles for Lake Class 26* 25%	50%	75%
BLG	Bluegill	5.50	0.34	0.50	N/A	N/A	N/A
BOF	Bowfin (Dogfish)	20.81	1.30	4.16	N/A	N/A	N/A
BRB	Brown Bullhead	3.42	0.21	1.14	N/A	N/A	N/A
LMB	Largemouth Bass	10.26	0.64	2.57	N/A	N/A	N/A
MUE	Muskellunge	3.57	0.22	3.57	N/A	N/A	N/A
NOP	Northern Pike	621.82	38.86	5.06	N/A	N/A	N/A
PMK	Pumpkinseed	1.20	0.07	0.24	N/A	N/A	N/A
RKB	Rock Bass	21.59	1.35	0.72	N/A	N/A	N/A
SMB	Smallmouth Bass	54.48	3.40	2.27	N/A	N/A	N/A
TLC	Tullibee (Cisco)	3.59	0.22	0.90	N/A	N/A	N/A
WAE	Walleye	372.59	23.29	2.78	N/A	N/A	N/A
WTS	White Sucker	101.89	6.37	3.40	N/A	N/A	N/A
YEB	Yellow Bullhead	7.20	0.45	1.03	N/A	N/A	N/A
YEP	Yellow Perch	15.52	0.97	0.67	N/A	N/A	N/A
	Total Pounds Fish/Set - Day:		77.71		* Quartiles for Mean Weight		

Electrofishing Catch Summary for EF

Standard electrofishing

Total run-time for all stations: 1666668:43:54
Total on-time for all stations: 03:46:38
First Sampling Date: 08/31/2016
Last Sampling Date: 09/07/2016
Daylight Sampling: No
Target Species: All ages walleye

		Summary By Numbers			Summary By Weight (pounds)			
		Total	Number per Hour		Total	Lbs per Hour		Mean
Abbr	Species	Number	Run-Time	On-Time	Weight	Run-Time	On-Time	Weight
WAE	Walleye	836	0.00	221.33	92.96	0.00	24.61	0.11

Natural Reproduction Catch Summary for SEF

Special sampling, electrofishing

Total run-time for all stations: 1666666:51:54
Total on-time for all stations: 00:24:00
First Sampling Date: 08/31/2016
Last Sampling Date: 09/07/2016
Daylight Sampling: No
Target Species: All ages walleye

Abbr	Species	Age	Total Number	Number Measured	Mean Length (inches)	Length Range (inches) Min	Length Range (inches) Max	Catch Rates (number per hour) Run-Time	Catch Rates (number per hour) On-Time
JND	Johnny Darter	All	2	2	1.89	1.81	1.97	0.00	5.00
BLC	Black Crappie	All	2	2	4.59	2.95	6.22	0.00	5.00
BLG	Bluegill	All	6	6	3.14	3.07	3.35	0.00	15.00
BNM	Bluntnose Minnow	All	11	11	2.67	2.28	3.31	0.00	27.50
BKS	Brook Silverside	All	3	3	3.24	2.52	3.74	0.00	7.50
BUB	Burbot	All	3	3	3.49	3.23	3.78	0.00	7.50
GOS	Golden Shiner	All	1	1	3.62	3.62	3.62	0.00	2.50
HSF	Hybrid Sunfish	All	2	2	3.09	2.91	3.27	0.00	5.00
LMB	Largemouth Bass	YOY	4	4	2.48	2.01	2.95	0.00	10.00
LMB	Largemouth Bass	≥ 1	2	2	4.00	3.66	4.33	0.00	5.00
LGP	Logperch	All	1	1	3.23	3.23	3.23	0.00	2.50
RKB	Rock Bass	All	1	1	7.64	7.64	7.64	0.00	2.50
SMS	Slimy Sculpin	All	1	1	2.05	2.05	2.05	0.00	2.50
SMB	Smallmouth Bass	YOY	16	16	2.36	2.09	2.91	0.00	40.00
SPO	Spottail Shiner	All	94	94	3.59	2.17	4.57	0.00	235.00
WAE	Walleye	YOY	45	45	4.67	3.31	7.01	0.00	112.50
WAE	Walleye	≥ 1	1	1	8.58	8.58	8.58	0.00	2.50
WTS	White Sucker	All	1	1	4.17	4.17	4.17	0.00	2.50
YEP	Yellow Perch	YOY	343	343	2.78	1.77	3.90	0.00	857.50
YEP	Yellow Perch	≥ 1	27	27	4.15	2.80	7.40	0.00	67.50

Length Frequency Distribution for GN (for fish < 36.00 inches)

Standard gill net sets

(Field work conducted between 09/18/2016 and 09/28/2016)

	BLC	BLG	BOF	MUE	NOP	YNOP	RKB	SMB	SPO	TLC	WAE	YWAE	WTS	YEP
< 3.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00 - 3.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.50 - 3.99	-	-	-	-	-	-	4	-	-	-	-	-	-	-
4.00 - 4.49	-	-	-	-	-	-	3	-	1	-	-	1	-	-
4.50 - 4.99	-	-	-	-	-	-	1	-	-	-	-	1	-	1
5.00 - 5.49	-	-	-	-	-	-	2	-	-	-	-	-	-	36
5.50 - 5.99	-	-	-	-	-	-	2	-	-	-	-	-	-	208
6.00 - 6.49	1	-	-	-	-	-	-	-	-	-	-	-	-	124
6.50 - 6.99	1	-	-	-	-	-	4	1	-	-	-	8	-	55
7.00 - 7.49	1	-	-	-	-	-	9	2	-	-	-	28	-	48
7.50 - 7.99	-	-	-	-	-	-	4	-	-	-	-	10	-	99
8.00 - 8.49	-	1	-	-	-	-	3	-	-	1	-	3	-	103
8.50 - 8.99	-	-	-	-	-	-	1	1	-	2	1	-	-	117
9.00 - 9.49	-	-	-	-	-	-	2	-	-	3	1	-	-	87
9.50 - 9.99	-	-	-	-	-	2	5	-	-	13	5	-	-	35
10.00 - 10.49	-	-	-	-	-	3	7	-	-	13	8	-	-	33
10.50 - 10.99	-	-	-	-	-	-	5	-	-	11	10	-	-	36
11.00 - 11.49	-	-	-	-	-	-	1	1	-	101	10	-	-	19
11.50 - 11.99	-	-	-	-	-	-	1	-	-	230	10	-	-	11
12.00 - 12.99	-	-	-	-	-	-	-	2	-	314	12	-	-	9
13.00 - 13.99	-	-	-	-	-	-	-	14	-	176	51	-	-	2
14.00 - 14.99	-	-	-	-	-	-	-	15	-	60	88	-	-	-
15.00 - 15.99	-	-	-	-	-	-	-	12	-	79	89	-	2	-
16.00 - 16.99	-	-	-	-	1	-	-	5	-	66	45	-	18	-
17.00 - 17.99	-	-	-	-	-	-	-	2	-	14	22	-	4	-
18.00 - 18.99	-	-	-	-	-	-	-	2	-	1	12	-	1	-
19.00 - 19.99	-	-	-	-	2	-	-	3	-	-	15	-	3	-
20.00 - 20.99	-	-	-	-	2	-	-	-	-	-	25	-	1	-
21.00 - 21.99	-	-	1	-	-	-	-	-	-	-	13	-	1	-
22.00 - 22.99	-	-	-	-	4	-	-	-	-	-	18	-	-	-
23.00 - 23.99	-	-	-	-	2	-	-	-	-	-	18	-	-	-
24.00 - 24.99	-	-	-	-	1	-	-	-	-	-	18	-	-	-
25.00 - 25.99	-	-	-	-	2	-	-	-	-	-	15	-	-	-
26.00 - 26.99	-	-	-	-	8	-	-	-	-	-	5	-	-	-
27.00 - 27.99	-	-	-	-	2	-	-	-	-	-	3	-	-	-
28.00 - 28.99	-	-	-	-	5	-	-	-	-	-	-	-	-	-
29.00 - 29.99	-	-	-	-	3	-	-	-	-	-	-	-	-	-
30.00 - 30.99	-	-	-	-	4	-	-	-	-	-	-	-	-	-
31.00 - 31.99	-	-	-	-	3	-	-	-	-	-	-	-	-	-
32.00 - 32.99	-	-	-	-	1	-	-	-	-	-	-	-	-	-
33.00 - 33.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34.00 - 34.99	-	-	-	-	1	-	-	-	-	-	-	-	-	-
35.00 - 35.99	-	-	-	-	2	-	-	-	-	-	-	-	-	-
= > 36.00	-	-	-	1	5	-	-	-	-	-	-	-	-	-

	BLC	BLG	BOF	MUE	NOP	YNOP	RKB	SMB	SPO	TLC	WAE	YWAE	WTS	YEP
Total	3	1	1	1	48	5	54	60	1	1084	494	51	30	1023
Min. Length	6.30	8.27	21.26	45.20	16.10	9.84	3.82	6.97	4.17	8.39	8.86	4.13	15.04	4.92
Max. Length	7.28	8.27	21.26	45.20	42.13	10.24	11.57	19.76	4.17	18.19	27.72	8.31	21.06	13.39
Mean Length	6.80	8.27	21.26	45.20	28.32	10.05	7.92	14.52	4.17	12.89	16.75	7.25	17.23	7.70
# Measured	3	1	1	1	48	5	54	60	1	1084	494	51	30	1023
No Lengths for	0	0	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.

Length Frequency Distribution for GN (for fish > 36.00 inches)

Standard gill net sets

(Field work conducted between 09/18/2016 and 09/28/2016)

	BLC	BLG	BOF	MUE	NOP	YNOP	RKB	SMB	SPO	TLC	WAE	YWAE	WTS	YEP
< 36.00	3	1	1	-	43	5	54	60	1	1084	494	51	30	1023
36.00 - 36.99	-	-	-	-	1	-	-	-	-	-	-	-	-	-
37.00 - 37.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38.00 - 38.99	-	-	-	-	1	-	-	-	-	-	-	-	-	-
39.00 - 39.99	-	-	-	-	2	-	-	-	-	-	-	-	-	-
40.00 - 40.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41.00 - 41.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42.00 - 42.99	-	-	-	-	1	-	-	-	-	-	-	-	-	-
43.00 - 43.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44.00 - 44.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45.00 - 45.99	-	-	-	1	-	-	-	-	-	-	-	-	-	-
46.00 - 46.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47.00 - 47.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48.00 - 48.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49.00 - 49.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50.00 - 50.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51.00 - 51.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52.00 - 52.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53.00 - 53.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54.00 - 54.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55.00 - 55.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56.00 - 56.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57.00 - 57.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58.00 - 58.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59.00 - 59.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60.00 - 60.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61.00 - 61.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62.00 - 62.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63.00 - 63.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64.00 - 64.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65.00 - 65.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66.00 - 66.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67.00 - 67.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68.00 - 68.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69.00 - 69.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70.00 - 70.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71.00 - 71.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72.00 - 72.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73.00 - 73.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74.00 - 74.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75.00 - 75.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76.00 - 76.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77.00 - 77.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
= > 78.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	BLC	BLG	BOF	MUE	NOP	YNOP	RKB	SMB	SPO	TLC	WAE	YWAE	WTS	YEP
Total	3	1	1	1	48	5	54	60	1	1084	494	51	30	1023
Min. Length	6.30	8.27	21.26	45.20	16.10	9.84	3.82	6.97	4.17	8.39	8.86	4.13	15.04	4.92
Max. Length	7.28	8.27	21.26	45.20	42.13	10.24	11.57	19.76	4.17	18.19	27.72	8.31	21.06	13.39
Mean Length	6.80	8.27	21.26	45.20	28.32	10.05	7.92	14.52	4.17	12.89	16.75	7.25	17.23	7.70
# Measured	3	1	1	1	48	5	54	60	1	1084	494	51	30	1023
No Lengths for	0	0	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.

Length Frequency Distribution for GNP (for fish < 16.00 inches)

Multifilament GN; 300 x 6; three 100 panels 1.5-2.0-2.5

(Field work conducted between 09/18/2016 and 09/28/2016)

	BLG	BOF	BRB	LMB	MUE	NOP	PMK	RKB	SMB	TLC	WAE	WTS	YEB	YEP
< 0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.50 - 0.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.00 - 1.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.50 - 1.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.00 - 2.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.50 - 2.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00 - 3.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.50 - 3.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.00 - 4.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.50 - 4.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.00 - 5.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.50 - 5.99	-	-	-	-	-	-	2	-	-	-	-	-	-	-
6.00 - 6.49	-	-	-	-	-	-	1	-	-	-	-	-	-	-
6.50 - 6.99	-	-	-	-	-	-	2	1	-	-	-	-	-	-
7.00 - 7.49	2	-	-	-	-	-	-	4	-	-	-	-	-	-
7.50 - 7.99	1	-	-	-	-	-	-	1	-	-	-	-	-	-
8.00 - 8.49	4	-	-	-	-	-	-	3	-	-	-	-	-	-
8.50 - 8.99	3	-	-	-	-	-	-	4	-	-	-	-	-	-
9.00 - 9.49	1	-	-	-	-	-	-	3	-	-	-	-	-	1
9.50 - 9.99	-	-	-	-	-	-	-	8	-	-	-	-	-	4
10.00 - 10.49	-	-	-	-	-	-	-	1	-	-	-	-	-	1
10.50 - 10.99	-	-	-	1	-	-	-	2	1	-	-	-	3	7
11.00 - 11.49	-	-	-	-	-	-	-	-	-	-	-	-	-	3
11.50 - 11.99	-	-	-	-	-	-	-	2	-	-	-	-	-	4
12.00 - 12.49	-	-	1	-	-	-	-	1	1	1	-	-	1	3
12.50 - 12.99	-	-	2	-	-	-	-	-	-	2	-	-	2	-
13.00 - 13.49	-	-	-	-	-	-	-	-	-	1	3	-	1	-
13.50 - 13.99	-	-	-	-	-	-	-	-	3	-	6	-	-	-
14.00 - 14.49	-	-	-	-	-	-	-	-	1	-	8	-	-	-
14.50 - 14.99	-	-	-	-	-	-	-	-	2	-	9	-	-	-
15.00 - 15.49	-	-	-	-	-	-	-	-	-	-	8	-	-	-
15.50 - 15.99	-	-	-	-	-	-	-	-	4	-	3	-	-	-
= > 16.00	-	5	-	3	1	123	-	-	12	-	97	30	-	-

	BLG	BOF	BRB	LMB	MUE	NOP	PMK	RKB	SMB	TLC	WAE	WTS	YEB	YEP
Total	11	5	3	4	1	123	5	30	24	4	134	30	7	23
Min. Length	7.17	19.57	12.32	10.51	25.67	19.02	5.91	6.65	10.94	12.40	13.07	16.10	10.63	9.49
Max. Length	9.25	25.47	12.91	17.72	25.67	38.86	6.97	12.28	19.96	13.46	26.89	21.77	13.11	12.40
Mean Length	8.24	22.65	12.66	15.46	25.67	26.62	6.35	9.22	15.88	12.81	19.45	19.16	11.89	10.94
# Measured	11	5	3	4	1	123	5	30	24	4	134	30	7	23
No Lengths for	0	0	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.

Length Frequency Distribution for GNP (for fish ≥ 16.00 inches)

Multifilament GN; 300 x 6; three 100 panels 1.5-2.0-2.5

(Field work conducted between 09/18/2016 and 09/28/2016)

	BLG	BOF	BRB	LMB	MUE	NOP	PMK	RKB	SMB	TLC	WAE	WTS	YEB	YEP
< 16.00	11	-	3	1	-	-	5	30	12	4	37	-	7	23
16.00 - 16.49	-	-	-	-	-	-	-	-	2	-	9	2	-	-
16.50 - 16.99	-	-	-	2	-	-	-	-	1	-	6	4	-	-
17.00 - 17.49	-	-	-	-	-	-	-	-	5	-	5	2	-	-
17.50 - 17.99	-	-	-	1	-	-	-	-	1	-	6	-	-	-
18.00 - 18.49	-	-	-	-	-	-	-	-	1	-	6	4	-	-
18.50 - 18.99	-	-	-	-	-	-	-	-	1	-	2	1	-	-
19.00 - 19.49	-	-	-	-	-	1	-	-	-	-	2	1	-	-
19.50 - 19.99	-	1	-	-	-	-	-	-	1	-	3	3	-	-
20.00 - 20.49	-	-	-	-	-	2	-	-	-	-	1	6	-	-
20.50 - 20.99	-	1	-	-	-	1	-	-	-	-	3	2	-	-
21.00 - 21.49	-	-	-	-	-	5	-	-	-	-	1	2	-	-
21.50 - 21.99	-	-	-	-	-	6	-	-	-	-	3	3	-	-
22.00 - 22.49	-	-	-	-	-	3	-	-	-	-	4	-	-	-
22.50 - 22.99	-	-	-	-	-	8	-	-	-	-	4	-	-	-
23.00 - 23.49	-	1	-	-	-	6	-	-	-	-	6	-	-	-
23.50 - 23.99	-	-	-	-	-	5	-	-	-	-	4	-	-	-
24.00 - 24.49	-	-	-	-	-	6	-	-	-	-	10	-	-	-
24.50 - 24.99	-	1	-	-	-	9	-	-	-	-	12	-	-	-
25.00 - 25.49	-	1	-	-	-	7	-	-	-	-	2	-	-	-
25.50 - 25.99	-	-	-	-	1	5	-	-	-	-	2	-	-	-
26.00 - 26.49	-	-	-	-	-	4	-	-	-	-	4	-	-	-
26.50 - 26.99	-	-	-	-	-	6	-	-	-	-	2	-	-	-
27.00 - 27.49	-	-	-	-	-	4	-	-	-	-	-	-	-	-
27.50 - 27.99	-	-	-	-	-	6	-	-	-	-	-	-	-	-
28.00 - 28.49	-	-	-	-	-	4	-	-	-	-	-	-	-	-
28.50 - 28.99	-	-	-	-	-	3	-	-	-	-	-	-	-	-
29.00 - 29.49	-	-	-	-	-	4	-	-	-	-	-	-	-	-
29.50 - 29.99	-	-	-	-	-	7	-	-	-	-	-	-	-	-
30.00 - 30.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30.50 - 30.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.00 - 31.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31.50 - 31.99	-	-	-	-	-	3	-	-	-	-	-	-	-	-
32.00 - 32.49	-	-	-	-	-	4	-	-	-	-	-	-	-	-
32.50 - 32.99	-	-	-	-	-	2	-	-	-	-	-	-	-	-
33.00 - 33.49	-	-	-	-	-	2	-	-	-	-	-	-	-	-
33.50 - 33.99	-	-	-	-	-	2	-	-	-	-	-	-	-	-
34.00 - 34.49	-	-	-	-	-	2	-	-	-	-	-	-	-	-
34.50 - 34.99	-	-	-	-	-	1	-	-	-	-	-	-	-	-
35.00 - 35.49	-	-	-	-	-	2	-	-	-	-	-	-	-	-
35.50 - 35.99	-	-	-	-	-	1	-	-	-	-	-	-	-	-
= > 36.00	-	-	-	-	-	2	-	-	-	-	-	-	-	-

	BLG	BOF	BRB	LMB	MUE	NOP	PMK	RKB	SMB	TLC	WAE	WTS	YEB	YEP
Total	11	5	3	4	1	123	5	30	24	4	134	30	7	23
Min. Length	7.17	19.57	12.32	10.51	25.67	19.02	5.91	6.65	10.94	12.40	13.07	16.10	10.63	9.49
Max. Length	9.25	25.47	12.91	17.72	25.67	38.86	6.97	12.28	19.96	13.46	26.89	21.77	13.11	12.40
Mean Length	8.24	22.65	12.66	15.46	25.67	26.62	6.35	9.22	15.88	12.81	19.45	19.16	11.89	10.94
# Measured	11	5	3	4	1	123	5	30	24	4	134	30	7	23
No Lengths for	0	0	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.

Length Frequency Distribution for EF

Standard electrofishing

(Field work conducted between 08/31/2016 and 09/07/2016)

	WAE	YWAE
< 3.00	-	-
3.00 - 3.49	-	15
3.50 - 3.99	-	81
4.00 - 4.49	-	86
4.50 - 4.99	-	104
5.00 - 5.49	-	159
5.50 - 5.99	-	140
6.00 - 6.49	-	86
6.50 - 6.99	-	90
7.00 - 7.49	-	25
7.50 - 7.99	-	1
8.00 - 8.49	-	-
8.50 - 8.99	5	-
9.00 - 9.49	4	-
9.50 - 9.99	-	-
10.00 - 10.49	9	-
10.50 - 10.99	-	-
11.00 - 11.49	1	-
11.50 - 11.99	5	-
12.00 - 12.99	4	-
13.00 - 13.99	6	-
14.00 - 14.99	4	-
15.00 - 15.99	7	-
16.00 - 16.99	-	-
17.00 - 17.99	2	-
18.00 - 18.99	1	-
19.00 - 19.99	-	-
20.00 - 20.99	-	-
21.00 - 21.99	-	-
22.00 - 22.99	-	-
23.00 - 23.99	1	-
24.00 - 24.99	-	-
25.00 - 25.99	-	-
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	-	-

	WAE	YWAE
Total	49	787
Min. Length	8.62	3.23
Max. Length	23.94	7.99
Mean Length	12.61	5.22
# Measured	49	521
No Lengths for	0	266

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.

Length Frequency Distribution for SEF

Special sampling, electrofishing

(Field work conducted between 08/31/2016 and 09/07/2016)

	BKS	BLC	BLG	BNM	BUB	GOS	HSF	JND	LGP	LMB	YLMB	RKB	YSMB	SMS	SPO
< 3.00	1	1	-	9	-	-	1	2	-	-	4	-	16	1	19
3.00 - 3.49	1	-	6	2	2	-	1	-	1	-	-	-	-	-	3
3.50 - 3.99	1	-	-	-	1	1	-	-	-	1	-	-	-	-	64
4.00 - 4.49	-	-	-	-	-	-	-	-	-	1	-	-	-	-	7
4.50 - 4.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
5.00 - 5.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.50 - 5.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.00 - 6.49	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
6.50 - 6.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.00 - 7.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.50 - 7.99	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
8.00 - 8.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.50 - 8.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.00 - 9.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.50 - 9.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.00 - 10.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.50 - 10.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.00 - 11.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.50 - 11.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.00 - 12.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.00 - 13.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.00 - 14.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15.00 - 15.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.00 - 16.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.00 - 17.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.00 - 18.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.00 - 19.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.00 - 20.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.00 - 21.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.00 - 22.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23.00 - 23.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.00 - 24.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25.00 - 25.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	BKS	BLC	BLG	BNM	BUB	GOS	HSF	JND	LGP	LMB	YLMB	RKB	YSMB	SMS	SPO
Total	3	2	6	11	3	1	2	2	1	2	4	1	16	1	94
Min. Length	2.52	2.95	3.07	2.28	3.23	3.62	2.91	1.81	3.23	3.66	2.01	7.64	2.09	2.05	2.17
Max. Length	3.74	6.22	3.35	3.31	3.78	3.62	3.27	1.97	3.23	4.33	2.95	7.64	2.91	2.05	4.57
Mean Length	3.24	4.59	3.14	2.67	3.49	3.62	3.09	1.89	3.23	4.00	2.48	7.64	2.36	2.05	3.59
# Measured	3	2	6	11	3	1	2	2	1	2	4	1	16	1	94
No Lengths for	0	0	0	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.

Length Frequency Distribution for SEF (*Continued*)

Special sampling, electrofishing

(Field work conducted between 08/31/2016 and 09/07/2016)

	WAE	YWAE	WTS	YEP	YYEP
< 3.00	-	-	-	6	246
3.00 - 3.49	-	2	-	5	89
3.50 - 3.99	-	13	-	6	8
4.00 - 4.49	-	7	1	2	-
4.50 - 4.99	-	8	-	1	-
5.00 - 5.49	-	6	-	2	-
5.50 - 5.99	-	4	-	2	-
6.00 - 6.49	-	1	-	1	-
6.50 - 6.99	-	3	-	-	-
7.00 - 7.49	-	1	-	2	-
7.50 - 7.99	-	-	-	-	-
8.00 - 8.49	-	-	-	-	-
8.50 - 8.99	1	-	-	-	-
9.00 - 9.49	-	-	-	-	-
9.50 - 9.99	-	-	-	-	-
10.00 - 10.49	-	-	-	-	-
10.50 - 10.99	-	-	-	-	-
11.00 - 11.49	-	-	-	-	-
11.50 - 11.99	-	-	-	-	-
12.00 - 12.99	-	-	-	-	-
13.00 - 13.99	-	-	-	-	-
14.00 - 14.99	-	-	-	-	-
15.00 - 15.99	-	-	-	-	-
16.00 - 16.99	-	-	-	-	-
17.00 - 17.99	-	-	-	-	-
18.00 - 18.99	-	-	-	-	-
19.00 - 19.99	-	-	-	-	-
20.00 - 20.99	-	-	-	-	-
21.00 - 21.99	-	-	-	-	-
22.00 - 22.99	-	-	-	-	-
23.00 - 23.99	-	-	-	-	-
24.00 - 24.99	-	-	-	-	-
25.00 - 25.99	-	-	-	-	-
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	-	-	-	-	-

	WAE	YWAE	WTS	YEP	YYEP
Total	1	45	1	27	343
Min. Length	8.58	3.31	4.17	2.80	1.77
Max. Length	8.58	7.01	4.17	7.40	3.90
Mean Length	8.58	4.67	4.17	4.15	2.78
# Measured	1	45	1	27	343
No Lengths for	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.

Length At Capture with Last Incremental Length

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

Species: Northern Pike
Body-Scale Constant: 2.09
Total Sample Size: 176

Length at Capture in 2016 for Each Age Class, with Incremental Lengths for 2016

			Length At Capture				Length Increments	
Year Class	Age	Sample Size	Average Length	Maximum Length	Minimum Length	Standard Error	Increment	Standard Error
2016	0	5	10.05	10.24	9.84	0.078	10.05	0.078
2015	1	6	19.90	22.32	16.10	0.855	7.25	0.580
2014	2	25	22.26	24.72	19.02	0.276	4.97	0.383
2013	3	69	26.29	33.54	20.94	0.365	2.89	0.159
2012	4	43	28.89	35.63	22.72	0.502	2.41	0.191
2011	5	13	28.74	34.53	24.57	0.903	1.77	0.226
2010	6	6	31.82	36.42	24.96	2.055	1.84	0.328
2009	7	4	35.86	39.65	29.57	2.285	1.49	0.403
2008	8	4	38.45	42.13	34.06	1.661	1.21	0.254
2007	9	1	39.21	39.21	39.21	N/A	1.37	N/A

Species: Smallmouth Bass
Body-Scale Constant: 1.42
Total Sample Size: 83

Length at Capture in 2016 for Each Age Class, with Incremental Lengths for 2016

			Length At Capture				Length Increments	
Year Class	Age	Sample Size	Average Length	Maximum Length	Minimum Length	Standard Error	Increment	Standard Error
2015	1	3	7.22	7.40	6.97	0.129	3.75	0.101
2014	2	2	9.84	10.94	8.74	1.102	2.89	0.826
2013	3	15	13.40	14.72	11.30	0.208	2.87	0.158
2012	4	36	14.67	16.73	13.15	0.139	2.33	0.103
2011	5	9	16.18	17.20	15.20	0.185	1.64	0.177
2010	6	9	16.96	17.52	15.94	0.196	1.50	0.165
2009	7	1	18.03	18.03	18.03	N/A	0.78	N/A
2008	8	1	18.66	18.66	18.66	N/A	0.92	N/A
2007	9	2	18.31	18.58	18.03	0.276	0.82	0.045
2006	10	2	18.39	19.37	17.40	0.984	0.93	0.248
2005	11	2	19.59	19.96	19.21	0.374	0.62	0.195
2004	12	0	-	-	-	-	-	-
2003	13	0	-	-	-	-	-	-
2002	14	1	19.76	19.76	19.76	N/A	0.69	N/A

Length At Capture with Last Incremental Length (*Continued*)

Species: Tullibee (Cisco)
Body-Scale Constant: 1.42
Total Sample Size: 145

Length at Capture in 2016 for Each Age Class, with Incremental Lengths for 2016

Year Class	Age	Sample Size	Length At Capture: Average Length	Length At Capture: Maximum Length	Length At Capture: Minimum Length	Length At Capture: Standard Error	Length Increments: Increment	Length Increments: Standard Error
2015	1	19	9.87	10.31	9.13	0.080	4.68	0.124
2014	2	51	11.61	12.99	10.24	0.083	3.08	0.083
2013	3	27	13.33	14.72	11.14	0.186	1.95	0.091
2012	4	5	14.51	15.71	13.74	0.337	1.18	0.121
2011	5	1	15.12	15.12	15.12	N/A	0.69	N/A
2010	6	2	16.02	16.77	15.28	0.748	0.58	0.009
2009	7	12	16.35	17.24	15.59	0.163	0.62	0.060
2008	8	24	16.30	18.19	14.45	0.197	0.55	0.037
2007	9	3	16.56	17.32	15.43	0.576	0.58	0.094
2006	10	1	15.43	15.43	15.43	N/A	0.41	N/A

Species: Yellow Perch
Body-Scale Constant: 1.18
Total Sample Size: 241

Length at Capture in 2016 for Each Age Class, with Incremental Lengths for 2016

Year Class	Age	Sample Size	Length At Capture: Average Length	Length At Capture: Maximum Length	Length At Capture: Minimum Length	Length At Capture: Standard Error	Length Increments: Increment	Length Increments: Standard Error
2015	1	56	5.91	7.32	4.92	0.075	2.94	0.066
2014	2	28	6.85	8.43	5.94	0.126	1.97	0.097
2013	3	100	8.62	10.91	6.81	0.089	1.89	0.058
2012	4	36	10.43	12.20	8.54	0.120	1.36	0.052
2011	5	7	11.54	12.44	10.94	0.198	1.11	0.106
2010	6	1	11.89	11.89	11.89	N/A	0.89	N/A
2009	7	1	10.55	10.55	10.55	N/A	0.34	N/A
2008	8	3	12.28	13.19	11.34	0.535	0.51	0.095
2007	9	6	11.91	13.39	11.02	0.366	0.51	0.043
2006	10	2	12.44	12.60	12.28	0.157	0.48	0.071
2005	11	1	10.94	10.94	10.94	N/A	0.33	N/A

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

Species: Northern Pike
Gear Type: Combined Gear Types (GN and GNP)

Class	Age	N	1	2	3	4	5	6	7	8	9
2015	1	6	12.65	-	-	-	-	-	-	-	-
			12.65	-	-	-	-	-	-	-	-
2014	2	25	9.77	17.30	-	-	-	-	-	-	-
			9.77	7.53	-	-	-	-	-	-	-
2013	3	69	10.45	18.11	23.40	-	-	-	-	-	-
			10.45	7.66	5.29	-	-	-	-	-	-
2012	4	43	11.34	18.09	22.94	26.48	-	-	-	-	-
			11.34	6.75	4.85	3.54	-	-	-	-	-
2011	5	13	10.70	17.22	21.51	24.47	26.97	-	-	-	-
			10.70	6.51	4.29	2.96	2.51	-	-	-	-
2010	6	6	11.86	17.03	21.90	26.31	28.34	29.33	-	-	-
			11.86	5.18	4.87	4.41	2.03	1.97	-	-	-
2009	7	4	12.10	17.62	22.38	27.62	31.44	33.03	34.36	-	-
			12.10	5.52	4.76	5.24	3.82	1.59	1.34	-	-
2008	8	4	10.44	19.33	23.62	28.82	32.39	34.40	36.11	37.24	-
			10.44	8.88	4.30	5.20	3.57	2.01	1.72	1.13	-
2007	9	1	15.99	20.98	22.77	24.60	27.86	30.81	33.51	36.51	37.84
			15.99	4.99	1.79	1.83	3.26	2.95	2.70	3.00	1.33
Mean Length			10.79	17.91	22.99	26.27	28.71	31.94	35.04	37.10	37.84
Mean Increment			10.79	7.18	4.98	3.67	2.77	1.94	1.66	1.50	1.33
Total N			171	165	140	71	28	14	9	5	1

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

Species: Smallmouth Bass
Gear Type: Combined Gear Types (GN and GNP)

Class	Age	N	1	2	3	4	5	6	7	8	9	10	11	12
2015	1	3	3.47	-	-	-	-	-	-	-	-	-	-	-
			3.47	-	-	-	-	-	-	-	-	-	-	-
2014	2	2	3.54	6.95	-	-	-	-	-	-	-	-	-	-
			3.54	3.41	-	-	-	-	-	-	-	-	-	-
2013	3	15	4.07	7.48	10.53	-	-	-	-	-	-	-	-	-
			4.07	3.41	3.05	-	-	-	-	-	-	-	-	-
2012	4	36	3.90	6.79	9.68	12.34	-	-	-	-	-	-	-	-
			3.90	2.89	2.89	2.66	-	-	-	-	-	-	-	-
2011	5	9	4.02	7.08	10.10	12.43	14.54	-	-	-	-	-	-	-
			4.02	3.05	3.02	2.33	2.11	-	-	-	-	-	-	-
2010	6	9	3.78	6.35	9.06	11.85	13.90	15.46	-	-	-	-	-	-
			3.78	2.57	2.71	2.79	2.05	1.56	-	-	-	-	-	-
2009	7	1	5.04	8.61	11.80	13.28	14.62	15.75	17.25	-	-	-	-	-
			5.04	3.57	3.19	1.48	1.34	1.13	1.50	-	-	-	-	-
2008	8	1	4.52	6.82	9.35	11.13	13.83	15.32	16.66	17.74	-	-	-	-
			4.52	2.30	2.53	1.78	2.70	1.49	1.34	1.08	-	-	-	-
2007	9	2	3.56	6.08	8.60	10.81	13.04	14.40	15.68	16.76	17.49	-	-	-
			3.56	2.52	2.52	2.22	2.23	1.36	1.28	1.08	0.74	-	-	-
2006	10	2	3.28	5.73	8.10	10.38	12.06	13.36	14.69	15.77	16.62	17.46	-	-
			3.28	2.45	2.37	2.28	1.68	1.30	1.33	1.08	0.85	0.85	-	-
2005	11	2	4.12	6.46	8.83	11.14	13.53	15.03	16.11	16.85	17.63	18.26	18.97	-
			4.12	2.34	2.38	2.31	2.39	1.51	1.08	0.75	0.78	0.63	0.72	-
2002	14	1	4.08	6.50	8.69	10.74	12.60	13.56	14.76	15.56	16.41	17.13	17.61	18.19
			4.08	2.42	2.19	2.05	1.86	0.96	1.20	0.80	0.85	0.72	0.48	0.58
Mean Length			3.91	6.87	9.74	12.11	13.86	14.96	15.73	16.51	17.12	17.71	18.52	18.19
Mean Increment			3.91	2.95	2.87	2.55	2.07	1.44	1.27	0.96	0.80	0.73	0.64	0.58
Total N			83	80	78	63	27	18	9	8	7	5	3	1

(*Continued from above table*)

Class	Age	N	13	14
2002	14	1	18.75	19.07
			0.56	0.32
Mean Length			18.75	19.07
Mean Increment			0.56	0.32
Total N			1	1

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

Species: Tullibee (Cisco)
Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2	3	4	5	6	7	8	9	10
2015	1	19	5.19	-	-	-	-	-	-	-	-	-
			5.19	-	-	-	-	-	-	-	-	-
2014	2	51	4.03	8.53	-	-	-	-	-	-	-	-
			4.03	4.50	-	-	-	-	-	-	-	-
2013	3	27	3.85	7.93	11.39	-	-	-	-	-	-	-
			3.85	4.08	3.46	-	-	-	-	-	-	-
2012	4	5	3.96	8.39	11.60	13.33	-	-	-	-	-	-
			3.96	4.43	3.21	1.72	-	-	-	-	-	-
2011	5	1	3.84	7.69	11.43	13.08	14.42	-	-	-	-	-
			3.84	3.85	3.74	1.65	1.34	-	-	-	-	-
2010	6	2	4.50	9.48	11.90	13.51	14.50	15.13	14.68	-	-	-
			4.50	4.99	2.42	1.61	0.99	0.64	0.62	-	-	-
2009	7	12	4.45	8.25	11.27	12.99	14.21	15.04	15.73	-	-	-
			4.45	3.80	3.02	1.72	1.22	0.82	0.69	-	-	-
2008	8	24	4.16	7.77	10.62	12.39	13.51	14.38	15.19	15.76	-	-
			4.16	3.61	2.85	1.78	1.11	0.87	0.82	0.57	-	-
2007	9	3	4.38	8.53	11.01	12.21	13.21	13.97	14.72	15.42	15.98	-
			4.38	4.15	2.49	1.20	1.00	0.76	0.75	0.70	0.56	-
2006	10	1	4.06	6.76	8.34	11.08	12.18	13.10	13.62	14.10	14.54	15.02
			4.06	2.70	1.58	2.74	1.10	0.92	0.52	0.48	0.44	0.48
Mean Length			4.21	8.22	11.10	12.66	13.72	14.54	15.26	15.66	15.62	15.02
Mean Increment			4.21	4.15	3.09	1.73	1.14	0.84	0.76	0.58	0.53	0.48
Total N			145	126	75	48	43	42	41	28	4	1

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

Species: Yellow Perch
Gear Type: Combined Gear Types (GN)

Class	Age	N	1	2	3	4	5	6	7	8	9	10	11
2015	1	56	2.97	-	-	-	-	-	-	-	-	-	-
			2.97	-	-	-	-	-	-	-	-	-	-
2014	2	28	2.78	4.88	-	-	-	-	-	-	-	-	-
			2.78	2.10	-	-	-	-	-	-	-	-	-
2013	3	100	2.86	4.81	6.73	-	-	-	-	-	-	-	-
			2.86	1.95	1.92	-	-	-	-	-	-	-	-
2012	4	36	3.22	5.44	7.53	9.07	-	-	-	-	-	-	-
			3.22	2.22	2.09	1.54	-	-	-	-	-	-	-
2011	5	7	3.36	5.52	7.70	9.31	10.42	-	-	-	-	-	-
			3.36	2.16	2.18	1.61	1.11	-	-	-	-	-	-
2010	6	1	3.25	5.29	8.19	9.39	10.33	11.00	-	-	-	-	-
			3.25	2.04	2.90	1.20	0.94	0.67	-	-	-	-	-
2009	7	1	3.77	5.74	8.33	8.98	9.52	9.92	10.21	-	-	-	-
			3.77	1.97	2.59	0.65	0.54	0.40	0.29	-	-	-	-
2008	8	3	3.36	5.20	6.81	8.47	9.71	10.52	11.19	11.77	-	-	-
			3.36	1.84	1.61	1.66	1.24	0.81	0.67	0.58	-	-	-
2007	9	6	3.40	5.32	7.04	8.24	9.02	9.72	10.31	10.89	11.41	-	-
			3.40	1.92	1.72	1.21	0.77	0.70	0.59	0.58	0.52	-	-
2006	10	2	3.18	4.85	7.01	8.35	9.32	10.13	10.73	11.22	11.64	11.97	-
			3.18	1.68	2.16	1.34	0.97	0.81	0.60	0.49	0.43	0.33	-
2005	11	1	2.83	4.87	7.39	8.29	8.62	9.11	9.38	9.68	10.00	10.24	10.61
			2.83	2.04	2.52	0.90	0.33	0.49	0.27	0.30	0.32	0.24	0.37
Mean Length			2.97	5.00	7.00	8.95	9.68	10.01	10.50	11.06	11.30	11.39	10.61
Mean Increment			2.97	2.03	1.97	1.48	0.95	0.70	0.56	0.54	0.48	0.30	0.37
Total N			241	185	157	57	21	14	13	12	9	3	1

Age Class Frequency Distribution

Species & SS Type (1)	Number of Fish (2)			Number of Fish in Year Class ('yy) and Age Class														
				'16	'15	'14	'13	'12	'11	'10	'09	'08	'07	'06	'05	'04	'03	'02	<'02
	Aged	Keyed	Unaged	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
Largemouth Bass																			
SEF	4	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern Pike																			
GN	53	0	0	5	5	3	15	16	1	4	2	1	1	0	0	0	0	0	0
GNP	123	0	0	0	1	22	54	27	12	2	2	3	0	0	0	0	0	0	0
Totals:	176	0	0	5	6	25	69	43	13	6	4	4	1	0	0	0	0	0	0
Smallmouth Bass																			
GN	60	0	0	0	3	1	11	31	6	3	0	0	2	1	1	0	0	1	0
GNP	24	0	0	0	0	1	4	6	3	6	1	1	0	1	1	0	0	0	0
SEF	16	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals:	100	0	0	16	3	2	15	37	9	9	1	1	2	2	2	0	0	1	0
Tullibee (Cisco)																			
GN	146	935	3	0	28	576	282	31	4	9	44	93	10	4	0	0	0	0	0
Walleye																			
EF	570	266	0	787	19	8	20	0	0	1	0	0	0	1	0	0	0	0	0
GN	545	0	0	51	46	43	251	26	26	17	3	15	13	12	13	2	7	12	8
GNP	5	27	102	0	0	8	14	0	0	0	0	0	0	10	0	0	0	0	0
SEF	45	0	1	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals:	1165	293	103	883	65	59	285	26	26	18	3	15	13	23	13	2	7	12	8
Yellow Perch																			
GN	241	783	0	0	334	131	444	76	14	2	2	5	11	3	2	0	0	0	0
SEF	343	17	10	360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals:	584	800	10	360	334	131	444	76	14	2	2	5	11	3	2	0	0	0	0

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

SEF = Special sampling, electrofishing
GN = Standard gill net sets
GNP = Multifilament GN; 300 x 6; three 100 panels 1.5-2.0-2.5
EF = Standard electrofishing

(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.

Other Species

Gear Type (1)	Other Species (Gender) (2)	Total Num	Number Measured	Length (inches) Min - Mean - Max	Number Weighed	Weight (pounds) Min - Mean - Max
GN	Northern Crayfish	477	0	N/A	0	N/A

(1) Key to sampling gear abbreviations:

GN = Standard gill net sets

(2) Gender: If identified and reported.

Survey Crew Notes

null

Discussion

The Mille Lacs Lake game fish community is primarily composed of Walleye, Yellow Perch, Northern Pike, Muskellunge, and Smallmouth Bass. Other game fish include Tullibee, Largemouth Bass, Bluegill, Pumpkinseed and Black Crappie. Common minnow species include Spottail Shiner and Mimic Shiner. Invasive animal species include Common Carp, Zebra Mussel, Chinese Mystery-snail, Banded Mystery-snail, and Spiny Water Flea. Curly-leaf Pondweed and Eurasian Watermilfoil are well established in the lake.

Fall Assessment
Gill Nets
Walleye catch per effort (CPE) in the inshore gillnets was 9.8 fish/net and 14.3lb/net, with an average weight of 1.5 lb. In offshore nets, Walleye CPE was 11.6 fish/net and 21.9 lb/net, and Walleye averaged 1.9 lb. Walleye CPE was the fourth lowest observed in the inshore nets and the third lowest observed in the offshore nets. The bulk of the catch consisted of fish from the 2013 year class, which comprised approximately 49% of the Walleye observed in the inshore nets and 43% of the Walleye in the offshore nets. The 2013 year class of Walleye is the only year class in the last seven years to be above median level. Mature male CPE increased in both the inshore and offshore nets, mainly due to the maturation of most of the males in the 2013 year class, but was still below average. Males comprised about 67% of the mature fish and tended to reach maturity once they grew past fourteen inches. Mature female CPE was the second lowest observed in both sets of nets. Female Walleye tended to be mature once they attained lengths greater than twenty inches.

Condition was below average for all size ranges of Walleye in the fall of 2016, indicating that sufficient forage was unavailable for the current population. In general, Walleye did not exhibit an emaciated external appearance, but normal internal visceral fat was conspicuously absent upon examination in the fall. Relative condition was highest for Walleye under 14 inches, but was about 3% below average. Condition of median sized fish (14 - 20 inches) changed little from the previous year at 5% below average. Condition of Walleye greater than 20 inches was the poorest and dropped from 4% above average the previous year to the second lowest observed at 9.5% below average in 2016. Strong angler catch rates throughout the summer of 2016 and continuing into the winter of 2017 further suggests fish that were hungry and unsated.

Northern Pike CPE in the inshore gill nets was 1.6 fish/net and remains the same as the previous year, just above median. The majority of the catch continues to be fish from the relatively strong 2012 and 2013 year classes, creating a modal length around 26 inches. Sexually dimorphic growth is readily apparent in the 2012 and 2013 year classes as the range of length for these fish extends from around 20 inches in the slower growing males to over 35 inches in the faster growing females. Almost 45% of the fish sampled from these two year classes have grown past the 28 inch mark, which has helped propel "large" Northern Pike to above average levels for the first time since 2011. Northern Pike below 28 inches in length have been declining the last several years and are now slightly above average level. Five age 0 Northern Pike were observed in the fall sampling, which may be indicative of another stronger year class, as young-of-year Northern Pike tend to be less susceptible to the fall sampling gear.

The 16 specialized Northern Pike nets sampled 123 Northern Pike, or 7.7 Pike/net and has decreased for the second consecutive year and is now below median level. Mean weight of Northern Pike in the Pike nets was 5.1 lb. Pike nets sampled eight year classes of Pike, with 70% of the fish coming from the 2012 and 2013 year classes.

Yellow Perch CPE in the inshore gillnets decreased from the previous year by over 50% to 20.4 fish/net and 4.8 lb/net, both well below the median for Mille Lacs Lake. Gill net CPE of Perch larger than 9 inches increased slightly to 3.8 fish/net, which is also well below the median, but the second consecutive increase observed since large Yellow Perch began to decline in 2011. CPE in the offshore gill nets similarly decreased from the previous year to 18.6 fish/net and 6.5 lb/net, both well below the median value.

Discussion (***Continued***)

Tullibee CPE was 9.6 fish/net and 8.7 lb/net in the inshore nets, which place both numbers and weight above the 75th quartile. Numbers decreased by over 50% in the offshore nets but were still the second highest observed at 38.9 fish/net and 38.4 lb/net. Biomass remained relatively unchanged in the offshore nets reflecting the reduced number of age 1 fish sampled. The vast majority (> 80%) of fish were from the 2013 and 2014 year classes.

Smallmouth Bass CPE in the inshore nets was the fourth highest observed at 1.44/net and 2.7 lb/net and continues to indicate an increasing population. Smallmouth Bass CPE in the offshore nets increased to the highest observed at 0.7 fish/net and 1.27 lb/net, but they remain at an overall low density with all fourteen fish coming from three rocky locations located in the southeast quadrant of the lake.

No Burbot were sampled in either the inshore or offshore nets, which is a continuation of a declining trend that was ongoing when sampling first began in the early 1980s. Catches of Rock Bass were above the 75th percentile in both the inshore and offshore nets. White sucker were above the 75th percentile in the inshore nets, but below the 25th percentile in the offshore nets.

Trawling

Trawling was discontinued in 2016 as the trawl has appeared to become ineffective at indexing various fish populations. Trawl hauls over the last several years were becoming fouled with various aquatic invasive species, particularly Chinese Mystery Snails, Zebra Mussels, and Eurasion water milfoil.

Electrofishing

Electrofishing catch rates for YOY Walleye were highly variable among stations, ranging from 21.6/hour at St. Albans Bay to 451.5/hour a week later at the same location. Overall CPE for YOY Walleye was 208.5/hr., which is approaching double the median, indicating that spring reproduction and survival through fall were good. Catch rates for age 1 Walleye ranged from 2.9/hour at Wealthwood to 9.4/hour at Father Hennepin State Park, with an average CPE of 5.0/hour, which is less than half the median, suggesting a relatively weak 2015 year class. Overall CPE for Walleye age 2 and older was 7.9/hour, of which two-thirds (67%) were from the 2013 year class. Average age 0 Walleye length from electrofishing was 5.2 inches; however, the range in size was much wider than typical with age 0 lengths spanning 3.2 inches to 8 inches. Age 1 Walleye average length was 9.7 inches.

Two minute duration, shallow-water forage, electrofishing runs at the beginning and end of each station caught mostly age 0 Yellow Perch, which were over 80% above median levels. Spottail Shiners and Bluntnose Minnows were both observed at above median levels. Age 1+ Yellow Perch numbers were low, being observed at about half the median.

Walleye Fry Stocking

Walleye stocking on Mille Lacs has occurred in the past, even though all indications suggested that natural reproduction has been adequate. Relatively low numbers of Walleye fingerlings had been stocked with some regularity between 1945 and 1973 with the fish originating from spawning runs that occurred outside the Mille Lacs drainage.

Genetics work that has occurred over the last several years indicates that current Mille Lacs spawning stock is a unique strain that's endemic to the Mille Lacs watershed. Reduced numbers of spawning stock due to reduced recruitment prompted consideration of reinstating stocking efforts beginning the spring of 2016. While current evidence suggests that Mille Lacs is not currently reproduction limited, it was determined that we could use fry stocking to learn two key pieces of information. First we wished to explore how to most efficiently go about collecting adults for propogation should the actual need arise in the future. Because Mille Lacs continues to retain its unique genetic strain of Walleye, it was determined that the most appropriate strain of Walleye to use for artificial propogation purposes were fish that came directly from Mille Lacs. Most Walleye egg take operations in Minnesota occur on rivers where it's possible to to concentrate adult fish as they travel to spawning locations. Conversely, the vast majority of Walleye spawning on Mille Lacs occurs on windswept rock and cobble substrates in nearshore areas throughout the lake and the methods for collecting large numbers of adults would necessarily be different than what is typical for other established Walleye egg take operations throughout Minnesota.

The second piece of information we wished to obtain was an actual estimate of the number of fry that are naturally reproduced. By marking hatchery fry with a chemical signature prior to being restocked in Mille Lacs, we would be able to calculate a mark-recapture estimate of natural fry production by using the Lincoln-Peterson estimator. Hatchery fry

Discussion (***Continued***)

would be marked with the antibiotic oxytetracycline (OTC) and placed into the lake to behave as the marked portion of the population. OTC is absorbed into the bony structures of the fry and can later be detected in fall fingerlings using fluorescence microscopy. Fall Walleye fingerlings captured during normal fall sampling events were used as the recapture population.

Collection of adult brood stock began with non-lethal trap nets in the southeast portion of Mille Lacs on 14 April, 2016, which was immediately after ice-out. Eggs were fertilized using a dry method. We planned to use milt from two males for each female, but our catch of male Walleye was less that the females. We adjusted our male to female fertilization ratio to 1:1 and found it necessary to recycle males in order to obtain enough milt. On 15 April, we conducted a night electrofishing run at Hunter's point and obtained an additional 62 male Walleye and 12 female Walleye to help supplement the male brood stock, which allowed us to use a 2:1 male to female ratio for fertilizing the remainder of the eggs. Over a five day period, 244 quarts of fertilized eggs were collected and sent to the St. Paul hatchery to incubate under a temperature regime that mimicked the lake temperatures around the Walleye spawning areas. We wished for the hatching dates for the natuarally reproduced fry and the hatchery fry to correspond as closely as possible so that both groups of fry would be subject to similar environmental conditions when the hatchery fry were stocked into the lake. Hatching occurred approximately three weeks later and ten million fry were marked with OTC and stocked at various known spawning locations throughout the lake from 5 May through 9 May. Hatchery fry were stocked in five feet of water or less to ensure that hatchery fry and natural fry would be subject to similar mortality vectors. An additional 250,000 fry were OTC marked and planted into hatchery efficacy ponds in the Little Falls area in order to collect fingerling Walleye in the fall to evaluate the strength of the OTC mark. Hatch rates on hatchery reared fry were high at around 85%, indicating that our fertilizing and hatchery methods were viable for propogating Mille Lacs strain Walleye.

Throughout the month of September the MNDNR and GLIFWC collected 1,207 YOY Walleye from Mille Lacs during normal fall sampling events. An additional 115 age 0 Walleye were collected from the Little Falls Area efficacy ponds. All YOY Walleye were frozen and subsequently shipped to University of Wisconsin - Stevens Point (UWSP) to have otolilths extracted and examined for OTC marks. UWSP was able to extract useable ototliths from 114 of the 115 efficacy fish. All efficacy fish otoliths showed a clear, bright mark indicating that OTC marking on the stocked fry was successful.

Useable otoliths were sucessfully retrieved from 1,165 of the 1,207 sampled age 0 Walleye from Mille Lacs. Of the 1,165 useable otoliths, 1,118 showed no OTC mark and 47 showed a bright, clear mark, suggesting a marked fraction in the overall population of 4%. With a marked population of 10,000,000 hatchery fry, the estimate from the Peterson estimator would suggest that Walleye wild fry production for Mille Lacs in 2016 was approximately 233,000,000 fry, which would translate to over 7,000 natural fry per littoral acre. When 2016 natural fry reproduction is viewed in conjuction with 2016 fall elecrofishing catch rates, there is no current evidence to suggest that Mille Lacs is reproduction limited. Fry stocking is currently planned to continue for several successive years, which should provide additional data on the variability of natural fry production.

Forage Nets

Specialized six-panel forage gill nets provide data on smaller fishes in Mille Lacs. The historical forage fish metrics were calculated from data collected using a bottom trawl; however, the trawl became ineffective at exhibiting forage fish trends in the mid-1990's and again over the last several years, possibly as a consequence of aqutic invasive species which tended to foul the trawl and clear-water phases associated with the Mille Lacs where it appears fish mostly abandoned areas of the lake suitable for trawling. The time series associated with the six-panel forage nets is comparatively punctuated as we first began to use this particular gear in 2010.

Age 0 Yellow Perch, a major staple in the diets of piscivores in Mille Lacs Lake, were observed at moderate numbers and biomass, similar to the previous year. Age 1 Yellow Perch remain at a relatively low density; however, biomass is moderate, suggesting that age 1 fish are relatively large. Likewise, age 2 Yellow Perch were observed at low numbers and biomass in 2016. Age 0 Tullibee were observed at moderate numbers and biomass, while age 1 Tullibee went from the highest observed in 2015 to the second lowest on record in 2016. Age 0 Walleye were caught in moderate numbers, while age 1 Walleye were observed at low levels. Age 0 and age1 Spottail Shiners have been exhibiting an increasing trend in both numbers and biomass since 2011, but likely still represent relatively low numbers when the trawling gear was used. Overall abundance of forage is likely relatively low as evidenced by high targeted angler catch rates on

Discussion (*Continued*)

Walleye during the 2016 fishing season as well as the low condition factor observed in the 2016 annual fall sampling.

Invasive Species/Zooplankton
Zebra Mussel transect counts are now occurring on a biennial basis and 2016 was an off year with no counts performed. Veligers were still sampled in the zooplankton tows with peak density occurring at the beginning of July and overall densities observed at low to moderate levels across the summer.

The abundance of Spiny Water Flea was low throughout most of the open water season. Peak abundance occurred in mid-June and was the fourth highest observed.

Zooplankton density and biomass remain near the lowest observed. Small cladocerans continue to be observed at trace levels. We did observe a seasonal bloom in larger cladocerans from mid-May through mid-June, but overall numbers and biomass remain low. Smaller cladocerans have been depleted in other lakes that contain Bythotrephes, which would help explain the decreases observed in Mille Lacs. It still remains unclear what role Zebra Mussels may be playing in the declines observed with zooplankton. Copepods are also exhibiting severe declines, but still make up the vast majority of the current zooplankton catch.

Water Quality
Water quality metrics for total phosphorous, chlorophyll-a, total dissolved solids, and pH were all generally within normally observed ranges. The major water quality change that we have been able to observe over the last several years is a decrease in total alkalinity. Alkalinity has progressively decreased each year beginning in 2011. This trend ended with the 2015 measurements of alkalinity, where alkalinity levels were the second lowest observed. The 2016 alkalinity measurements reverted back to the previous trend, therefore were the lowest observed. The reduction in alkalinity over the last several years is likely attributable to the changes in Zebra Mussel numbers observed during the same time period. Calcium removal from solution for use as shell material of Zebra Mussels is likely influential in the observed changes associated with alkalinity. A corresponding decrease is being observed in conductivity as calcium ions are being removed from the water. The pH levels had been decreasing from 2011 through 2013, which may also be related to a reduction in buffering capacity as calcium was removed from solution. However, in 2014, 2015, and 2016, pH measurements inexplicably returned to more moderate to high basic levels, the opposite of what would be expected with a decrease in buffering capacity. The more recent pH levels may reflect an issue with laboratory measurements where there is a change in water quality during the time lag between collection of the sample and the actual meausurement. In situ measurements may produce different results.

Overview
Current indexing data suggest that Walleye and forage fish populations are presently low in Mille Lacs. Mature male Walleye have shown indications of population decline throughout much of the entire time period since the Large Lake sampling program began in 1983. Declines in mature female Walleye were not prominent until around 2007. Some of the changes to Walleye numbers and in the Walleye length frequency distribution over the years appear to be due to various regulations that have been implemented over the last several decades; however, it also appears that major changes are occurring to various fish populations throughout the lake, including Walleye, due to a changing ecosystem. Burbot, a cold water species, have shown severe declines in population which are likely related to a warming climate. Tullibee are also considered a cold water species and while they don't show a decline in population that is as severe as Burbot, their population numbers are showing high variability across years. Further, Tullibee are now rarely found in appreciable numbers in the nearshore fall gill nets. Conversely, Smallmouth Bass have been increasing over time which appears to be a regional phenomenon and is consistent with a warming climate. Further, we are observing increasing variability in summer water clarity measurements, with overall clearer water over the last couple decades when compared to data collected prior to the 1980's. Clearer water suggests reduced overall productivity in the system, but it may also convey some competitive advantages to sight oriented predators such as Smallmouth Bass and Northern Pike, while creating a disadvantage for Walleye which tend to find more turbid, low-light conditions advantageous.

We have heard two main competing hypotheses on the reason for the Walleye population decline in Mille Lacs. The first hypothesis broadly suggests that top-down effects related to an "unbalanced" population of Walleye that contains too many large fish has destabilized the forage base, which has in turn has led to intra-specific predation on the smaller conspecifics and a resulting decrease in Walleye recruitment. The competing hypothesis roughly suggests that overall

Discussion (*Continued*)

reduced productivity at the lower trophic levels is responsible for bottom-up effects that are creating bottlenecks in energy transfer to the higher trophic levels of the food web.

At this point, it seems that the weight-of-evidence would suggest the latter hypothesis is most probable. The compelling piece of data for the likelihood of either hypothesis being correct resides mainly in the zooplankton data. If a top-down effect were at play in Mille Lacs we would predict that tertiary consumers would reduce forage fish, which would in turn cause an increase in zooplankton, with the zooplankton then grazing down edible algae.

Instead, what the data indicate is that water clarity has increased since the 1980's, suggesting decreased productivity of autotrophs. Zooplankton has decreased to the lowest level observed in this relatively punctuated time series and continues to remain low, forage fish also remain low, as do Walleye at the tertiary level. The overall reductions of organisms observed at all trophic levels is consistent with a bottom-up trophic cascade that may begin at the lowest trophic level or just above with the zooplankton.

Zooplankton have likely been reduced due to two factors. First is that the overall base productivity of Mille Lacs has likely decreased due to less nutrients entering the lake as sewer and septic systems are more advanced compared to decades past. Further, less nutrients are likely entering the lake due to reductions in phosphourus in lawn fertilizers and detergents, as well as advances in reducing overland flow from significant precipitation events. Second, native edible zooplankton have likely been severely reduced due to relatively recently introduced aquatic invasive species, particularly Bythotrephes. Bythotrephes are capable of impacting forage fish by consuming the same zooplankton species that are consumed by fry and smaller forage species. Further, fry and Yellow Perch under three inches in length are incapable of utilizing Bythotrephes as a food item due to the prominent spiked tail-like appendage that makes up the majority of their overall length.

Status Of The Fishery

The Mille Lacs Lake game fish community is primarily composed of Walleye, Yellow Perch, Northern Pike, Muskellunge, Tullibee, and Smallmouth Bass. Other game fish include Largemouth Bass, Bluegill, Pumpkinseed and Black Crappie. Common minnow species include Spottail Shiner and Mimic Shiner. Invasive animal species include Common Carp, Zebra Mussel, Chinese Mystery-snail, Banded Mystery-snail, and Spiny Water Flea. Curlyleaf Pondweed and Eurasian Watermilfoil are well established in the lake.

Creel Survey
Fishing effort for the 2015-2016 winter season was 1,167,500 angler-hours (ang-hrs), about 33% below average. An additional 9,250 angler-hours were observed once Walleye season closed in late February. Ice fishing pressure decreased from the previous year due to late ice-up, which occurred in late December, and poor travel conditions which restricted travel on the lake.

Open water 2016 fishing effort was approximately 520,000 ang-hrs, which was approximately 62% below average and the second lowest observed. Open water night effort was the lowest observed, mainly due to an extended night closure that was in place through the open water season. Open water day pressure was below median level throughout all periods of the summer, with the exception of October; most likely due to restrictive Walleye regulations and an early September Walleye closure due to exceeding the 2016 allocation of 28,600 pounds. October pressure increased, in part, due to a highly successful nationally televised BASS tournament in late September that attracted the attention of additional bass anglers.

Walleye harvest, for the entire season, was the lowest observed at around 1,600 lbs with harvest only allowed during winter under an 18"-20" harvest slot. Total kill, which includes hooking mortality, was 36,350 lbs. Anglers realized an exceptional Walleye catch rate and released an additional 513,250 lb of Walleye.

Anglers harvested 18,950 lb of Northern Pike, which was half that observed the previous year. The decrease in pike kill occurred in the winter fishery and was likely influenced by ice conditions and a change in regulations that made it more difficult to harvest larger fish. An additional 59,500 lb of Northern Pike were released, which created a hooking mortality estimate of about 3,000 lb and a total kill of 22,000 lbs.

Yellow Perch harvest was extremely low at 5,100 lb, and Tullibee harvest was similarly low at under 2,000 lb. Anglers caught 128,250 Smallmouth Bass in 2016, which was the highest ever observed for Mille Lacs Lake and an increase of almost 50% over the previous high catch in 2015. Approximately 2,300 Smallmouth were harvested.

Fall Assessment
Walleye catch per effort (CPE) in the inshore gillnets was 9.8 fish/net and 14.3 lb/net. In offshore nets, Walleye CPE was 11.6 fish/net and 21.9 lb/net. The bulk of the Walleye catch came from the 2013 year class with only age 3 Walleye being observed at above median levels in the gill nets. The relatively small increase in the number of Walleye caught in the fall of 2016 when compared to last year's sampling event, likely represents an increase of selectivity of the fishing gear as the individual fish of the 2013 year class continue to grow larger and become more vulnerable to the gill nets. The CPE of Walleye longer than 20 inches decreased by 26% in the inshore nets, but increased by 20% in the offshore nets. The CPE of mature males increased in 2016 due to the maturation of most of the males of the strong 2013 year class; however, mature male CPE remains at a relatively low level. Mature female CPE has shown little change over the last three years and remains at the lowest observed. The biomass of mature females declined in both the nearshore and offshore nets, which is likely a strong indication of the poor condition (fatness) of Walleye in the fall of 2016. Walleye condition on fish greater than 20 inches went from one of the best observed in 2015 to the second lowest observed in 2016. This prominent change in the robustness of larger Walleye was likely due to a strong decline in eatable size age 1 Tullibee, which grew larger than the gape limitation of the larger Walleye through 2016 and were not replaced with an appreciable contemporary year class of available forage. Surprisingly, the smallest size class of Walleye (<14 inches) showed an increase in condition, but they too remain below average condition. Medium sized Walleye (14-20 inches) showed little change in condition and remain near the lowest condition observed for this size class of fish. Low condition for all size classes of Walleye are a strong indicator of reduced forage availability in Mille Lacs and will likely result in continued high angler catch rates until forage levels become replenished.

Northern Pike CPE in the inshore nets at 1.6 fish/net remained unchanged from last year and is above the median. Almost 60% of the fish were from the 2012 and 2013 year classes, which made up the majority of fish less than 28

Status Of The Fishery (*Continued*)

inches. Fish greater than 28 inches showed a strong increase in 2016, which appears to be due to the larger females of the 2012 and 2013 year classes growing into this quality size range. Five age 0 Northern Pike were caught in the inshore nets, which may be a harbinger of another above-average year class. The Northern Pike catch in the 16 specialized Northern Pike gill nets decreased for the second year in a row to a CPE of 7.7 fish/net and 38.9 lb/net, which are both just below median.

Yellow Perch CPE decreased by about half and are now below median levels in the inshore nets at 20.4/net and 4.8 lb/net. Gill net CPE of perch larger than 9 inches increased for the second consecutive year to 3.5 fish/net, but is still well below the median of 11.3 fish/net. Yellow Perch CPE in the offshore nets also decreased by about half to 18.6/net and 6.4 lb/net, which are both below median. Most of the Yellow Perch observed in both the inshore and offshore nets were from the 2013 year class, however a fairly large percentage of the fish observed in the nearshore nets were from the 2015 year class.

Tullibee CPE changed little for numbers of fish in the inshore nets at 9.6 fish/net; however biomass increased 2.5 times to 8.7 lb/net in the inshore nets, both metrics are over the 75% quartile for Mille Lacs Lake. CPE decreased by almost 55% in the offshore nets to 38.9 fish/net while biomass remained about the same at 38.4 lb/net, which is the highest observed. Tullibee catch tended toward younger fish in 2015 but was mostly 2+ aged fish in 2016. The majority of Tullibee were from the 2014 year class with fish ranging from 10.5 inches to 13 inches, making them less vulnerable to all but the larger piscine predators (Northern Pike and Muskellunge). The difference in magnitude between the inshore and offshore catches over the last several years may reflect a diminished lake-wide population that is no longer over-flowing into the less desirable habitat of the near shore region, or it may represent a behavioral shift into offshore regions due to other environmental factors.

Burbot continued to exhibit a declining trend in number, and are now only occasionally observed in the assessment nets. Rock Bass showed little change at 1.3/net, which is at the 75% quartile for this species. Smallmouth Bass decreased from the highest observed at 2.3/net in 2015 to 1.4/net in the inshore nets in 2016, which is still above the 75% quartile. Smallmouth Bass continued to incrementally increase in the offshore nets and are at the highest observed at 0.70/net. Trends over the last decade continue to suggest an increasing Smallmouth Bass population in the lake.

The major prey species of piscivorous predators in Mille Lacs is generally small Yellow Perch. Annual fall sampling using small-mesh forage gill nets indicated that moderate numbers and biomass of young-of-the-year (YOY) Yellow Perch were available in 2016 when compared across the seven year history of this sampling gear. Age 1 and age 2 Yellow Perch were below median level. Age 0 Tullibee were observed at moderate numbers and biomass, while age 1 Tullibee went from the highest observed to near the lowest observed. Spottail Shiners were above median level and have generally been increasing over the last three years.

Age 0 and age 1 Walleye were observed at moderate numbers and biomass. Overall, the forage nets would suggest reduced forage availability for all sizes of Walleye. However, the increased condition observed in Walleye less than 20 inches that were captured in the fall gill nets suggests that smaller and mid-size Walleye are utilizing the available small forage, but are still not finding adequate amounts of food. Larger Walleye appear to be having an even more difficult time finding adequate food resources.

Age 0 Walleye CPE in the six electrofishing transects was highly variable in 2016, with the lowest catch rate and highest catch rate coming from the same location over two separate weeks. Overall CPE for YOY Walleye was 208.5/hour, which is close to twice the median and suggests that spring reproduction and survival were adequate up through fall. Catch rates for age 1 Walleye was less than half the median at 5.0 Walleye/hr, which suggests a relatively weak 2015 year class. Average length for age 0 Walleye was 5.2 inches, which spanned an extremely wide range of 3.2 inches to 8 inches. The average length of age 1 Walleye was relatively high at 9.7 inches. Forage electrofishing runs of two minutes duration showed comparatively high numbers of age 0 Yellow Perch and low numbers of age 1 Yellow Perch. Catches of other species were relatively unremarkable in the six year history of forage sampling, although we did observe above median catches of Spottail Shiners and Bluntnose Minnows.

Walleye Fry Stocking
Walleye fry stocking was initiated in the spring of 2016. Relatively small numbers of Walleye fingerlings had been

Status Of The Fishery (*Continued*)

stocked previously in Mille Lacs from the years of 1945 through 1973. The current fry stocking is being done to ensure that we have adequate techniques in place to rear appropriate numbers of fry from Mille Lacs' unique genetic strain of fish in case an actual need for augmentation arises in the future. Further, we are marking stocked fry with an oxytetracycline (OTC) chemical signature that is absorbed into the bony structures, which allows us to later identify stocked fry in order to calculate a simple Peterson mark-recapture estimate of the number of natural fry that are currently being produced in the lake.

Collection of adult brood stock occurred over a five day period, in mid-April, in the southeast quadrant of Mille Lacs from lake spawning fish. Approximately 244 quarts of fertilized eggs were collected and incubated in the St. Paul hatchery under a temperature regime that mimicked water temperatures in Mille Lacs. This would allow natural fry and stocked fry to hatch out at the same time, which would leave both groups of fish susceptible to similar environmental conditions once the marked fry were stocked back into the lake.

Hatchery fry began to hatch after about three weeks and ten million fry were subsequently immersed in an OTC bath and stocked into Mille Lacs in various locations in early to mid-May. An additional 250,000 marked fry were stocked in efficacy ponds so that we could evaluate the quality of the OTC marks.

Throughout the month of September 1,207 YOY Walleye were collected from Mille Lacs and 115 age 0 Walleye were collected from the efficacy ponds. All useable otoliths from the efficacy ponds showed a bright clear OTC mark, indicating that the marking procedure was successful and that the marks were highly recognizable. Useable otoliths were retrieved from 1,165 of the sampled age 0 Walleye from Mille Lacs and we were able to discern OTC marks on 47 of the fish, indicating a marked fraction of 4% in the lake. The simple Peterson estimator would suggest that 233,000,000 natural fry were produced in 2016. This would equate to over 7,000 natural fry per littoral acre, which is relatively high when compared to other Walleye lakes. Further, this amount of fry production and survival resulted in fall electrofishing catch rates that were relatively high, which would indicate that with the first year of data there is no current evidence to suggest Mille Lacs Walleye are reproduction limited. Fry stocking is slated to continue for several more years, which will provide additional data on the variability of natural fry production.

Invasive Species
Zebra Mussels were not sampled in 2016. Zebra Mussels appear to have peaked in 2012, so we are now switching to a biennial sampling cycle. We do still collect Zebra Mussel veliger counts in our normal zooplankton tows and peak veliger densities in 2016 occurred in early July, when we observed the third highest count since sampling began in 2008.

Spiny Water Flea (Bythotrephes) was observed during each sampling period from May through September. Peak density occurred in mid-June at 9.8 Bythotrephes per sample, which is the fourth highest observed since Spiny Water Flea was first observed in the fall of 2009. Cursory spot checks of fish stomachs show that age 1+ Tullibee and age 1+ Yellow Perch are consuming Spiny Water Flea.

It appears that Spiny Water Flea have taken a toll on zooplankton numbers and biomass. Native zooplankton are a vital dietary staple for many larval and juvenile fish in Mille Lacs. We have been observing severe declines in various species that belong to three broad functional groups. Currently, all three groups show a severe level of depletion, but small cladocerans and large cladocerans show the greatest decrease over time, where throughout the summer they are now often barely detectable in the samples. An unusual observation for 2016 was that the large cladoceran, Daphnia galeata mendotae, actually showed up in June at the highest density observed since June of 2013, before depleting again to barely detectable levels in the latter part of summer.

Overview
When all available data are considered together, it appears that aquatic organisms in Mille Lacs are being impacted due to changing abiotic conditions and a bottom-up trophic cascade. The evidence of increasing annual water temperature is suggested in the opposing trends exhibited by Burbot and Smallmouth Bass. Burbot, an obligate cold-water species, have been declining since the mid 1980's, whereas Smallmouth Bass, which tend to find warmer water to be more suitable, have been increasing since the late 1980's.

Biotic changes also appear to be influencing species assemblages and density within the lake. The idea of a trophic

Status Of The Fishery (*Continued*)

cascade is more simply stated as changes that occur to species at one trophic level has an impact (positive or negative) to species in the next trophic level, which then in turn impacts species in the next trophic level until it has reverberated throughout all trophic levels. Trophic cascades can be top-down or bottom-up. Top-down cascades tend to begin with a change in the apex predator and work their way down to autotrophs, while bottom-up cascades will typically begin with the autotrophs and work upwards to the apex predators.

What the data indicate are that autotrophs have declined, likely due to decreases in nutrient levels and consumption by Zebra Mussels. Zooplankton have also become depleted, likely due to the declines in the autotroph trophic level, along with predation by Spiny Water Flea, and competition with Zebra Mussels. The third trophic level consisting of the forage fish also appears to have decreased as an overall group, which in turn has caused an overall decrease in the apex predators, which still mainly consists of Walleye. These metrics are much more consistent with changes that would be predicted to occur due to declines in the lower portions of the food web.

Table 1. Gill net catch rates from inshore nets, Mille Lacs Lake, 2006 - 2016.

	1998-present													
	MEDIAN	25th QUARTILE	75th QUARTILE	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
TOTAL LIFTS				32	32	32	32	32	32	32	32	32	32	32
Mean No./Lift														
Bowfin	0.00	0.00	0.03	0.031	0	0.03	0	0.03	0.06	0	0	0	0	0
Tullibee	4.4	0.7	8.7	9.6	10.9	7.8	0.8	0.2	1.6	11.4	34.8	0.6	0.3	0.3
Northern Pike	1.6	1.3	1.8	1.6	1.6	2.7	2.8	1.2	1.9	2.2	2.0	1.8	1.3	1.1
Muskellunge	0.03	0.00	0.03	0.031	0.03	0	0	0	0	0.03	0	0.03	0.03	0.03
Carp	0.00	0.00	0.00	0	0.06	0	0	0	0	0	0	0	0	0.03
White Sucker	0.6	0.4	0.8	0.9	0.6	1.1	1.2	0.6	0.7	0.5	0.6	0.2	0.3	0.2
Bullhead spp.	0.03	0.00	0.06	0	0	0.03	0	0	0	0	0.06	0.03	0	0.06
Burbot	0.03	0.03	0.06	0	0.03	0.06	0	0	0.06	0	0.06	0.03	0.03	0.03
Rock Bass	0.8	0.5	1.3	1.3	1.4	0.8	1.3	0.9	0.8	0.5	3.1	0.8	0.5	0.5
Bluegill	0.03	0.00	0.08	0.031	0	0	0.1	0.16	0.06	0	0.1	0.1	0	0
Pumpkinseed	0.00	0.00	0.03	0	0	0	0.09	0.09	0.06	0	0	0.03	0	0
Black Crappie	0.2	0.1	0.3	0.063	0	0.09	0	0.1	0.5	0.2	0.5	0.4	0.3	1.8
Largemouth Bass	0.00	0.00	0.00	0	0	0	0	0.06	0	0	0	0	0.03	0
Smallmouth Bass	0.4	0.3	1.0	1.4	2.3	0.8	1.5	1.0	1.0	0.3	1.9	0.5	0.2	0.2
Yellow Perch	44.0	32.2	67.6	20.4	43.9	28.1	18.6	19.0	44.0	60.8	93.4	51.5	36.4	67.0
Walleye	10.8	9.2	13.8	9.8	8.7	7.1	8.7	4.8	9.7	10.8	13.1	9.8	7.2	20.4
Mean Pounds/Lift														
Bowfin	0.00	0.00	0.10	0.11	0	0.2	0	0.1	0.3	0	0	0	0	0
Tullibee	1.2	0.5	2.8	8.712	3.5	1.9	0.6	0.2	0.6	4.9	10.0	0.1	0.1	0.1
Northern Pike	9.1	7.3	9.5	9.328	8.3	11.1	8.8	5.1	10.0	13.2	9.2	10.5	7.9	6.8
Muskellunge	0.1	0.0	0.7	0.734	0.5	0	0	0	0	0.5	0	0.3	0.1	0.7
Carp	0.00	0.00	0.00	0	0.005	0	0	0	0	0	0	0	0	0.1
White Sucker	1.1	0.8	1.5	2.16	1.3	2.0	3.0	1.2	1.7	1.0	0.9	0.6	0.7	0.3
Bullhead spp.	0.02	0.00	0.08	0	0	0.04	0	0	0	0	0.08	0.02	0	0
Burbot	0.03	0.00	0.07	0	0.005	0.01	0	0	0.04	0	0.01	0.07	0.04	0
Rock Bass	0.5	0.3	0.6	0.571	0.5	0.5	0.6	0.5	0.5	0.3	1.6	0.5	0.2	0.3
Bluegill	0.00	0.00	0.02	0.016	0	0	0.02	0.03	0.03	0	0.03	0.05	0	0
Pumpkinseed	0.00	0.00	0.00	0	0	0	0.01	0.01	0.02	0	0	0.01	0	0
Black Crappie	0.1	0.0	0.1	0.012	0	0.02	0	0.04	0.2	0.07	0.4	0.14	0.2	0.4
Largemouth Bass	0.00	0.00	0.00	0	0	0	0	0.005	0	0	0	0	0	0
Smallmouth Bass	0.8	0.5	1.9	2.701	4.2	1.2	2.4	1.7	2.1	0.5	3.1	0.8	0.3	0.2
Yellow Perch	11.1	7.3	16.6	4.802	8.4	4.3	3.3	5.7	11.0	15.0	16.6	13.2	9.7	19.5
Walleye	22.9	14.9	29.3	14.34	15.6	11.5	11.3	10.7	16.1	22.9	23.4	18.7	12.8	31.7
Mean Weight														
Tullibee	0.4	0.3	0.5	0.91	0.32	0.25	0.79	1.17	0.40	0.43	0.29	0.17	0.42	0.30
Northern Pike	5.7	4.9	6.0	5.74	5.07	4.19	3.18	4.43	5.34	6.01	4.60	5.83	5.86	6.23
Yellow Perch	0.3	0.2	0.3	0.24	0.19	0.15	0.18	0.30	0.25	0.25	0.18	0.26	0.27	0.29
Walleye	1.9	1.7	2.1	1.47	1.78	1.62	1.30	2.20	1.66	2.12	1.79	1.91	1.78	1.56

Table 2. Gill net catch rates from offshore nets, Mille Lacs Lake, 2005-2016.

	1998-present													
	MEDIAN	25th QUARTILE	75th QUARTILE	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
TOTAL LIFTS				20	20	20	20	20	20	20	20	20	20	20
Mean No./Lift														
Tullibee	15.6	7.9	27.7	38.9	83.75	28.2	7.7	20.1	15.6	27.1	53.6	10.6	2.5	3.7
Northern Pike	0.05	0.05	0.10	0.05	0.1	0.2	0.3	0.10	0.05	0.15	0.05	0.1	0	0.05
White Sucker	0.3	0.1	0.4	0.1	0.05	0.3	0.2	0.15	0.05	0.05	0.6	0.2	0.4	0.40
Burbot	0.05	0.00	0.10	0	0.05	0.05	0	0	0	0	0.1	0.1	0.05	0.05
Rock Bass	0.4	0.3	0.6	0.65	0.4	0.4	0.7	0.30	0.60	0.25	0.35	0.25	0.1	0.25
Black Crappie	0.00	0.00	0.00	0.05	0	0	0	0	0	0.05	0	0	0	0.10
Bluegill	0.00	0.00	0.00	0	0	0	0.05	0.05	0	0	0	0	0	0
Smallmouth Bass	0.00	0.00	0.33	0.7	0.45	0.40	0.35	0.30	0.20	0	0.40	0	0	0
Yellow Perch	34.0	20.7	51.3	18.55	35.25	25.9	24.3	17.9	34.0	41.5	58.3	29.2	16.5	22.9
Walleye	18.3	14.4	22.8	11.6	10.1	13.6	19.2	9.9	14.5	18.3	22.1	23.5	17.6	43.3
Mean Pounds/Lift														
Tullibee	10.1	6.6	18.2	38.41	38.17	19.3	10.1	21.8	12.9	17.2	19.0	8.2	2.4	3.1
Northern Pike	0.3	0.2	0.7	0.267	0.65	1.95	1.61	0.60	0.16	0.7	0.2	0.7	0	0.3
White Sucker	0.5	0.3	0.7	0.237	0.062	0.31	0.41	0.29	0.11	0.1	0.5	0.5	1.0	0.8
Burbot	0.01	0.00	0.15	0	0.009	0.01	0	0	0	0	0.2	0.2	0.1	0.1
Rock Bass	0.2	0.1	0.3	0.45	0.21	0.35	0.41	0.21	0.41	0.1	0.2	0.1	0.1	0.2
Black Crappie	0.00	0.00	0.00	0.006	0	0	0	0	0	0.02	0	0	0	0.01
Smallmouth Bass	0.00	0.00	0.35	1.268	0.7	0.6	0.2	0.40	0.31	0	0.7	0	0	0
Yellow Perch	8.7	6.5	11.8	6.419	9.5	6.5	6.02	6.3	10.4	11.9	12	7.7	6.9	8.1
Walleye	34.6	27.5	36.3	21.93	19.9	18.3	27.5	25.4	28.4	41.4	35.6	36.4	28.1	48.1
Mean Weight														
Tullibee	0.7	0.5	0.9	0.99	0.46	0.69	1.31	1.08	0.83	0.64	0.35	0.77	0.96	0.85
White Sucker	2.0	1.8	2.3	2.4	1.2	1.2	2.7	1.9	2.2	2.51	0.82	2.41	2.82	1.99
Yellow Perch	0.3	0.2	0.4	0.35	0.27	0.25	0.25	0.35	0.31	0.29	0.21	0.26	0.42	0.35
Walleye	1.8	1.6	1.9	1.9	2.0	1.3	1.4	2.6	2.0	2.27	1.61	1.55	1.60	1.11

Table 3. Age-length distribution of walleye, inshore nets, Mille Lacs Lake, 2016.

Length	Age																		
(inches)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
4.5	1																		
5																			
5.5																			
6																			
6.5	7																		
7	14																		
7.5	8																		
8	2																		
8.5																			
9																			
9.5		4																	
10		6																	
10.5		8																	
11		7																	
11.5		5		1															
12		2	5	1															
13			13	13															
14			2	57															
15				46	2														
16				23	3														
17				10	6														
18				1	3	2	3												
19					1	4	2		2	1									
20					5	2	1		3	1					1				
21						1	1				1								
22						1	2			1		2			1				1
23								1	1		2	4				1			
24									1	2	2	1		1	1				
25											1	2			2				
26										2									
27																			
28																			
Total	32	32	20	152	20	10	9	1	7	7	6	9	0	1	5	1	0	0	1

Table 4. Age-length frequency of walleye, offshore gill nets, Mille Lacs Lake, 2016.

Length	Age																						
(inches)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<5.4	1																						
5.5																							
6																							
6.5	1																						
7	14																						
7.5	2																						
8	1																						
8.5		1																					
9		1																					
9.5		1																					
10		2																					
10.5		2																					
11		3																					
11.5		4																					
12			4																				
13			18	7																			
14			1	28																			
15				41																			
16				18	1																		
17				5	1																		
18					1	2																	
19					2	2			1														
20					1	4	2		2	2	1												
21						5	2			1	1				1								
22						3	3	1	1		1			1									
23							1	1	2	1	1	1	1										1
24									1	2				2	3				1			1	
25									1		2	3	1	1				1				1	
26														1	2								
27														1	1		1						
>28																							
Total	19	14	23	99	6	16	8	2	8	6	6	4	2	6	7	0	1	1	1	0	0	2	1

Table 5. Catch by age of walleye in the inshore gill nets, Mille Lacs Lake, 1972-2016.

Year	Number of Nets	Total Walleye	AGE 0	1	2	3	4	5	6	7	8	9+
1972	20	110	0.0	0.4	0.7	1.5	1.4	1.2	0.4*			
1975	20	372	0.0	1.3	1.6	3.5	2.5	4.2	5.7*			
1976	8	80	0.0	0.3	2.4	1.9	1.6	0.8	3.1*			
1977	20	240	0.0	0.9	0.9	2.8	2.6	2.7	2.2*			
1979	20	149	0.0	0.1	1.5	2.0	2.1	1.0	0.9*			
1980	20	342	0.0	0.5	1.1	4.9	4.4	2.7	3.6*			
1981	20	306	0.0	0.2	5.0	2.7	3.9	2.0	1.7*			
1982	20	468	0.0	0.2	1.1	9.2	2.2	5.0	5.8*			
1983	32	774	0.0	1.4	0.8	1.2	13.4	3.7	2.3	0.7	0.3	0.5
1984	32	663	1.0	0.5	5.0	1.3	1.9	6.8	1.3	1.4	0.6	0.9
1985	32	367	0.0	1.3	0.4	2.2	0.3	0.6	4.8	0.9	0.4	0.7
1986	31	443	0.0	0.1	2.3	0.5	2.8	0.1	0.4	6.5	0.4	1.2
1987	32	509	0.1	0.4	0.2	6.8	0.2	1.8	0.2	0.3	4.1	1.8
1988	32	508	2.1	1.9	0.5	0.3	6.6	0.5	0.7	0.3	0.3	2.8
1989	32	667	0.0	5.5	2.5	0.3	0.1	7.1	0.2	1.4	0.3	3.5
1990	32	384	0.3	0.6	5.1	1.5	0.1	0.2	2.2	0.2	0.6	1.3
1991	31	771	2.8	1.3	2.0	13.4	1.7	0.2	0.2	1.5	0.0	1.8
1992	32	520	0.0	2.8	1.2	1.2	7.5	1.1	0.1	0.0	1.1	1.2
1993	32	357	0.0	0.5	2.1	0.6	0.6	5.0	0.5	0.2	0.0	1.7
1994	31	388	0.0	2.2	2.5	3.6	0.6	0.7	2.1	0.2	0.0	0.7
1995	32	577	0.1	0.8	2.8	3.5	4.4	0.8	0.7	3.7	0.5	0.8
1996	32	420	0.2	1.3	1.6	2.3	2.6	2.2	0.3	0.2	1.8	0.6
1997	32	394	0.4	3.2	1.6	1.2	1.6	1.8	1.4	0.1	0.1	1.0
1998	32	462	1.0	0.6	2.4	2.8	1.9	1.5	1.3	1.3	0.2	1.5
1999	32	330	0.5	1.1	1.2	1.3	1.6	1.2	0.9	0.6	0.7	1.2
2000	32	482	1.1	2.2	2.1	1.1	1.3	1.2	0.8	1.3	1.0	2.5
2001	32	412	1.1	1.8	2.0	1.5	0.4	1.2	1.2	0.9	0.6	2.2
2002	32	349	1.1	0.4	0.5	1.9	0.8	0.4	0.7	1.3	0.6	3.3
2003	32	512	1.8	4.7	0.5	0.4	1.4	0.8	0.5	0.6	1.1	4.0
2004	32	464	0.0	2.3	5.0	0.6	0.4	0.9	0.4	0.4	0.3	4.2
2005	32	414	0.4	1.0	3.3	3.8	0.1	0.2	0.7	0.3	0.3	2.7
2006	32	652	7.0	3.0	0.5	1.8	2.7	0.2	0.1	0.8	0.4	4.0
2007	32	230	1.4	0.8	1.5	0.2	0.5	1.0	0.1	0.0	0.2	1.5
2008	32	312	1.4	1.8	1.8	1.4	0.2	0.4	0.4	0.1	0.1	2.3
2009	32	418	0.0	2.6	3.2	2.3	1.7	0.2	0.7	1.0	0.1	1.5
2010	32	346	1.3	0.4	2.5	1.6	0.9	1.0	0.1	0.6	0.7	1.6
2011	32	310	1.8	1.1	0.6	2.3	0.7	0.9	0.7	0.1	0.2	1.5
2012	32	155	0.7	0.4	0.3	0.1	0.8	0.5	0.3	0.3	0.1	1.3
2013	32	277	4.9	0.3	0.2	0.5	0.2	0.8	0.3	0.3	0.5	0.8
2014	32	227	0.1	3.4	0.6	0.6	0.4	0.2	0.4	0.3	0.2	1.0
2015	32	279	0.2	0.6	4.5	0.6	0.5	0.4	0.2	0.3	0.3	1.1
2016	32	313	1.0	1.0	0.6	4.8	0.6	0.3	0.3	0.0	0.2	0.9
Median CPE, 1998-2015		347.5	1.1	1.1	1.6	1.4	0.7	0.8	0.5	0.5	0.3	1.6
Median CPE, 1983-2015		413.0	0.4	1.3	1.8	1.3	0.8	0.8	0.5	0.4	0.3	1.5

* Age 6 include all fish age 6 and over for the years 1972-1982

Table 6. Length-maturity distribution for walleye, inshore and offshore gill nets, Mille Lacs Lake, 2016.

Unidentified	Male Immature	Male Mature	Total Length (inches)	Female Immature	Female Mature
	1		< 5.9	1	
			6 -6.4		
	5		6.5 -6.9	3	
1	14		7 -7.4	12	
	5		7.5 -7.9	5	
	3		8 -8.4		
	1		8.5 -8.9		
			9 -9.4	1	
	2		9.5 -9.9	3	
	3		10 -10.4	5	
			10.5 -10.9	10	
	3		11 -11.4	6	1
	3		11.5 -11.9	7	
	5	1	12 -12.9	6	
	6	20	13 -13.9	25	
	3	51	14 -14.9	34	
		51	15 -15.9	37	1
		18	16 -16.9	25	2
		6	17 -17.9	14	2
		9	18 -18.9	1	2
		10	19 -19.9	3	2
		13	20 -20.9	4	8
		3	21 -21.9	1	9
1		3	22 -22.9	3	10
		2	23 -23.9		16
			24 -24.9	1	17
			25 -25.9	1	14
			26 -26.9		5
			27 -27.9		3
			28 -28.9		
			29 -29.9		
			30 -30.9		
			31 -31.9		
2	54	187	Total	208	92

Table 7. Age-length distribution of northern pike, inshore gill nets, Mille Lacs Lake, 2016.

	Total	Age										
Length (in)	Aged	0	1	2	3	4	5	6	7	8	9	10
8 -8.9												
9 -9.9	2	2										
10 -10.9	3	3										
11 -11.9												
12 -12.9												
13 -13.9												
14 -14.9												
15 -15.9												
16 -16.9	1		1									
17 -17.9												
18 -18.9												
19 -19.9	2		2									
20 -20.9	2		1		1							
21 -21.9												
22 -22.9	4		1	1	1	1						
23 -23.9	2			2								
24 -24.9	1				1							
25 -25.9	2				1	1						
26 -26.9	8				3	4		1				
27 -27.9	2				2							
28 -28.9	4				1	2	1					
29 -29.9	3				3							
30 -30.9	4				1	3						
31 -31.9	3				1	1		1				
32 -32.9	1					1						
33 -33.9												
34 -34.9	1					1						
35 -35.9	2					1		1				
36 -36.9	1							1				
37 -37.9												
38 -38.9	1								1			
39 -39.9	2								1		1	
40 -40.9	1									1		
Total	52	5	5	3	15	15	1	4	2	1	1	0

Table 8. Catch by age of northern pike in the inshore gill nets, Mille Lacs Lake, 1985-2016.

Year	Number of nets	Age 0	1	2	3	4	5	6	7	8	9	10+	Not aged	Total
1985	32	0	0	0	1	5	9	5	3	0	0	0	33	56
1986	31	0	0	6	12	16	15	4	1	0	1	0		55
1987	32	0	0	1	5	7	8	7	4	2	0	1	3	38
1988	32	0	0	3	6	9	5	3	1	1	0	0	10	38
1989	32	0	0	8	5	9	6	2	0	0	0	0		30
1990	32	0	0	4	7	5	4	0	1	0	0	0	4	25
1991	31	0	0	1	3	5	10	10	3	0	0	0		32
1992	32	0	0	7	2	14	4	2	1	1	2	1	3	37
1993	32	0	0	7	4	4	5	1	5	0	2	0		28
1994	31	0	1	13	4	11	9	1	0	0	2	0		41
1995	32	0	0	5	9	5	2	0	0	0	0	0		21
1996	32	0	1	3	15	6	4	2	3	1	1	0		36
1997	32	0	0	9	17	9	5	3	1	0	0	0		44
1998	32	3	1	6	7	9	6	5	1	0	1	0		39
1999	32	0	3	6	11	13	7	5	2	0	0	0		47
2000	32	0	6	6	5	5	10	2	1	1	0	0		36
2001	32	1	4	21	8	11	5	1	4	2	0	1		58
2002	32	2	4	8	11	6	5	4	1	0	0	0		41
2003	32	4	2	5	7	12	9	4	4	1	1	0		49
2004	32	0	2	8	11	9	4	9	2	3	2	0		50
2005	32	0	1	4	16	8	10	4	3	1	1	1		49
2006	32	0	0	2	5	13	7	5	1	1	0	1		35
2007	32	1	0	9	6	13	7	1	1	4	1	0		43
2008	32	2	9	3	14	6	9	7	2	2	2	2		58
2009	32	0	15	16	5	7	8	3	5	2	2	0		63
2010	32	0	0	34	11	5	3	4	4	8	1	0		70
2011	32	0	5	11	18	7	5	4	2	4	3	1		60
2012	32	10	3	3	4	5	3	5	1	2	0	1		37
2013	32	12	28	10	8	15	7	1	3	3	0	1		88
2014	32	0	17	27	7	22	6	2	2	2	0	0		85
2015	32	1	0	16	16	7	4	2	4	0	0	2		52
2016	32	5	5	3	15	15	1	4	2	1	1	0		52
median 1985-2015		0	1	6	7	8	6	3	2	1	0	0		43

Table 9. Catch rates from the pike gill nets, Mille Lacs Lake, 2007-2016.

	2007-present												
	MEDIAN	25th QUARTILE	75th QUARTILE	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
TOTAL LIFTS				16	16	16	16	16	16	16	16	16	16
Mean No./Lift													
Tullibee	0.00	0.00	0.06	0.25	0.125	0	0	0	0.06	0	0	0.1	0
Bowfin	0.31	0.13	0.38	0.313	0.063	0.13	0.81	0.38	0.31	0.06	0.2	0.4	0.6
Northern Pike	9.10	8.06	9.70	7.688	8.3	9.7	8.1	6.1	7.8	10.3	9.9	9.7	9.1
Muskellunge	0.00	0.00	0.00	0.063	0	0	0	0	0	0	0.06	0.1	0
Carp	0.00	0.00	0.00	0	0	0	0	0	0.06	0	0.06	0.0	0
White Sucker	1.31	0.75	1.40	1.875	2.1	1.3	1.4	1.6	0.75	1.4	0.4	0.4	1.1
Black Bullhead	0.00	0.00	0.00	0	0	0	0	0	0	0.06	0	0.0	0.0
Brown Bullhead	0.06	0.06	0.25	0.188	0.063	0	0.25	0.06	0.06	0	0.2	1.2	2.1
Yellow Bullhead	0.44	0.31	0.69	0.438	0.125	0.31	0.75	1.4	0.69	0.44	0.4	0.6	0.1
Rock Bass	1.13	1.00	1.19	1.875	0.9	1.1	1.8	1.2	1.2	1.0	0.8	1.1	1.0
Bluegill	0.38	0.19	0.88	0.688	0.063	0.38	0.88	0.19	0.25	0.9	0.9	0.4	0.1
Pumpkinseed	0.69	0.38	1.20	0.313	0.375	0.69	1.25	0.69	0.56	1.2	1.3	0.3	0.1
Hybrid Sunfish	0.06	0.00	0.19	0	0	0.19	0.19	0	0.06	0	0.06	0.1	0.3
Black Crappie	0.60	0.25	0.63	0	0	0.25	0.25	0.63	0.50	1.3	0.6	0.6	0.6
Largemouth Bass	0.31	0.25	0.40	0.25	0	0.31	0.25	0.69	0.31	0.25	0.4	0.2	0.4
Smallmouth Bass	1.20	0.69	1.69	1.5	2.4	1.1	2.6	1.7	0.69	0.4	1.3	0.4	1.2
Yellow Perch	2.19	0.94	3.70	1.438	0.9	0.06	0.5	1.4	2.2	3.7	2.4	6.3	10.2
Walleye	11.80	10.19	12.69	8.375	8.6	5.9	10.2	12.7	14.1	11.8	10.9	13.3	12.4
Mean Pounds/Lift													
Tullibee	0.00	0.00	0.04	0.225	0.155	0	0	0	0.04	0	0	0.04	0
Bowfin	1.56	0.44	1.79	1.301	0.345	0.44	4.33	1.8	1.6	0.1	1.0	1.8	3.2
Northern Pike	40.60	33.75	48.00	38.86	37.29	40.6	32.4	31.9	33.8	51.1	48.0	47.7	52.5
Muskellunge	0.00	0.00	0.00	0.223	0	0	0	0	0	0	0.3	2.3	0
Carp	0.00	0.00	0.00	0	0	0	0	0	0.16	0	0.9	0	0
White Sucker	4.20	2.06	4.90	6.368	7.2	4.2	4.5	4.9	2.1	4.9	1.4	1.4	4.2
Black Bullhead	0.00	0.00	0.00	0	0	0	0	0	0	0.04	0	0	0
Brown Bullhead	0.12	0.05	0.30	0.214	0.091	0	0.28	0.12	0.05	0	0.3	1.4	1.7
Yellow Bullhead	0.57	0.40	0.67	0.45	0.575	0.04	0.75	0.53	0.67	0.6	0.4	0.7	0.14
Rock Bass	0.78	0.69	0.80	1.349	0.598	0.88	1.43	0.78	0.69	0.8	0.5	0.7	0.8
Bluegill	0.14	0.07	0.24	0.344	0.031	0.12	0.24	0.07	0.14	0.3	0.3	0.2	0.07
Pumpkinseed	0.16	0.11	0.30	0.075	0.107	0.17	0.32	0.16	0.15	0.35	0.3	0.1	0.03
Hybrid Sunfish	0.02	0.00	0.06	0	0	0.06	0.09	0	0.01	0	0.03	0.02	0.15
Black Crappie	0.39	0.25	0.40	0	0	0.16	0.25	0.36	0.39	1.1	0.4	0.5	0.4
Largemouth Bass	0.61	0.50	0.90	0.641	0	0.9	0.59	1.47	0.61	0.5	1.1	0.4	0.8
Smallmouth Bass	3.10	2.01	4.92	3.405	5.3	2.8	7.3	4.9	2.0	0.7	4.3	1.6	3.1
Yellow Perch	1.33	0.57	2.30	0.97	0.575	0.04	0.33	0.85	1.3	2.3	1.4	4.1	6.4
Walleye	43.48	39.95	48.60	23.29	24.82	24.0	40.0	43.5	52.0	45.4	40.3	57.1	48.6
Mean Weight													
Tullibee	0.69	0.69	0.96		1.2	--	--	--	0.7	---	---	0.7	---
Bowfin	4.99	4.69	5.35		5.5	3.5	5.3	4.7	5.0	2.3	5.5	4.8	5.3
Northern Pike	4.80	4.32	5.00		4.5	4.2	4.0	5.2	4.3	5.0	4.8	4.9	5.8
Muskellunge	11.80	8.50	15.10		--	--	--	--	---	---	5.2	18.4	---
Carp	8.15	5.33	10.98		--	--	--	--	2.5	---	13.8	---	---
White Sucker	3.30	3.20	3.40		3.4	3.2	3.3	3.0	2.8	3.4	3.6	3.3	3.8
Black Bullhead	0.60	0.60	0.60		--	--	--	--	---	0.6	---	---	---
Brown Bullhead	1.20	0.98	1.43		1.5	--	1.1	2.0	0.8	---	1.4	1.2	0.8
Yellow Bullhead	1.00	0.60	1.15		4.6	0.1	1.0	0.4	1.0	0.6	1.1	1.2	1.4
Rock Bass	0.70	0.64	0.80		0.6	0.8	0.8	0.7	0.6	0.8	0.7	0.6	0.8
Bluegill	0.40	0.38	0.50		0.5	0.3	0.3	0.4	0.6	0.4	0.4	0.5	0.7
Pumpkinseed	0.28	0.26	0.30		0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3
Hybrid Sunfish	0.41	0.29	0.49		--	0.3	0.5	--	0.2	---	0.5	0.3	0.5
Black Crappie	0.74	0.66	0.80		--	0.6	1.0	0.6	0.8	0.8	0.7	0.8	0.7
Largemouth Bass	2.25	1.99	2.40		--	2.9	2.4	2.1	2.0	1.9	2.5	2.4	2.0
Smallmouth Bass	2.86	2.50	2.92		2.2	2.5	2.9	2.9	2.9	1.8	3.3	3.7	2.6
Yellow Perch	0.61	0.60	0.63		0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Walleye	3.80	3.68	3.92		2.9	4.1	3.9	3.4	3.7	3.8	3.7	4.3	3.9

Table 10. Age-length distribution of northern pike, pike gill nets, Mille Lacs Lake, 2016.

	Total	Age									
Length (in)	Aged	0	1	2	3	4	5	6	7	8	9
12 -12.9											
13 -13.9											
14 -14.9											
15 -15.9											
16 -16.9											
17 -17.9											
18 -18.9											
19 -19.9	1			1							
20 -20.9	3			3							
21 -21.9	11		1	7	3						
22 -22.9	11			5	5	1					
23 -23.9	11			4	7						
24 -24.9	15			2	8	2	2	1			
25 -25.9	12				9	2	1				
26 -26.9	10				5	4	1				
27 -27.9	10				5	3	2				
28 -28.9	7				4	2	1				
29 -29.9	11				3	5	2		1		
30 -30.9											
31 -31.9	3				1	1	1				
32 -32.9	6				1	5					
33 -33.9	4				3	1					
34 -34.9	3						2			1	
35 -35.9	3					1		1	1		
36 -36.9											
37 -37.9											
38 -38.9	2									2	
39 -39.9											
40 -40.9											
41 -41.9											
Total	123	0	1	22	54	27	12	2	2	3	0

Table 11. Yellow perch age-length in the inshore gill nets, Mille Lacs Lake, 2016.

Length Group (inches)	Total	Age										
		0	1	2	3	4	5	6	7	8	9	10+
2.5 -2.9	0											
3.0 -3.4	0											
3.5 -3.9	0											
4.0 -4.4	0											
4.5 -4.9	0											
5.0 -5.4	30		30									
5.5 -5.9	164		142	22								
6.0 -6.4	95		73	22								
6.5 -6.9	29		9	17	3							
7.0 -7.4	30		4	9	18							
7.5 -7.9	55			9	46							
8.0 -8.4	61			7	54							
8.5 -8.9	68				65	3						
9.0 -9.4	53				53							
9.5 -9.9	17				9	8						
10.0 -10.4	16				8	8						
10.5 -10.9	18				1	14	1		1			1
11.0 -11.4	11					2.4	4			1	4	
11.5 -11.9	3					1	1	1			1	
12.0 -12.9	1					0.2	0.2			0.2	0.2	0.3
13.0 -13.9	1									0.5	0.5	
	652	0	257	86	257	37	6	1	1	2	5	1

Table 12. Yellow perch age-length in the offshore gill nets, Mille Lacs Lake, 2016.

Length Group (inches)	Total	Age										
		0	1	2	3	4	5	6	7	8	9	10+
2.5 -2.9	0											
3.0 -3.4	0											
3.5 -3.9	0											
4.0 -4.4	0											
4.5 -4.9	1		1									
5.0 -5.4	6		6									
5.5 -5.9	44		38	6								
6.0 -6.4	35		27	8								
6.5 -6.9	20		6	12	2							
7.0 -7.4	18		2	5	11							
7.5 -7.9	44			7	37							
8.0 -8.4	42			5	37							
8.5 -8.9	49				47	2						
9.0 -9.4	34				34							
9.5 -9.9	18				9	9						
10.0 -10.4	17				9	9						
10.5 -10.9	18				1	14	1		1			1
11.0 -11.4	8					2	3			1	3	
11.5 -11.9	8					3	3	1			1	
12.0 -12.9	8					1	1			1	1	3
13.0 -13.9	1									0.5	0.5	
	371	0	80	43	187	39	8	1	1	3	6	4

Table 13. Electrofishing catch and CPE of walleye, Mille Lacs Lake, 2016.

Number per Mile

Location	Date	Effort	Catch			CPE		
		(miles)	Age 0	Age 1	Age 2+	Age 0	Age 1	Age 2+
Hennepin	08/31/16	1.2	55	6	6	45.8	5.0	5.0
	09/06/16	1.2	38	4	7	31.7	3.3	5.8
St.Alban's Bay	09/01/16	1.1	8	2	8	7.3	1.8	7.3
	09/06/16	1.1	307	2	6	279.1	1.8	5.5
Wealthwood	08/31/16	1.0	163	3	3	163.0	3.0	3.0
	09/07/16	1.0	216	2	0	216.0	2.0	0.0
All Stations Combined		6.6	787	19	30	119.2	2.9	4.5

Number per Hour

Location	Date	Effort	Catch			CPE		
		(hours)	Age 0	Age 1	Age 2+	Age 0	Age 1	Age 2+
Hennepin	08/31/16	0.6	55	6	6	85.9	9.4	9.4
	09/06/16	0.8	38	4	7	48.7	5.1	9.0
St.Alban's Bay	09/01/16	0.4	8	2	8	21.6	5.4	21.6
	09/06/16	0.7	307	2	6	451.5	2.9	8.8
Wealthwood	08/31/16	0.7	163	3	3	234.5	4.3	4.3
	09/07/16	0.6	216	2	0	354.1	3.3	0.0
All Stations Combined		3.8	787	19	30	208.5	5.0	7.9

Table 14. Catch rates (number per net) from September forage gill nets, Mille Lacs Lake, 2010-2016.

	Number per net						
Taxon	2010	2011	2012	2013	2014	2015	2016
Spottail shiner age 0	5.12	1.48	4.52	4.28	7.56	14.56	13.36
Spottail shiner age 1+	38.76	3.36	3.84	2.44	13.32	8.48	15.80
Tullibee age 0	47.52	6.12	1.28	42.00	29.88	17.56	26.60
Tullibee age 1	1.56	0.16	0.04	0.24	20.36	15.28	0.12
Tullibee age 2+	0.80	0.40	0.16	0.08	0.04	0.32	1.64
Walleye age 0	2.00	3.44	2.28	2.52	0.04	0.36	2.04
Walleye age 1	0.12	0.24	0.00	0.00	0.88	0.12	0.12
Walleye age 2	0.04	0.04	0.04	0.00	11.00	0.52	0.08
Walleye age 3+	0.00	0.04	0.04	0.00	0.04	0.00	0.08
Yellow perch age 0	77.68	30.40	21.24	93.28	1.32	28.68	31.56
Yellow perch age 1	61.20	21.40	4.80	29.20	18.12	2.40	7.92
Yellow perch age 2	13.68	5.36	0.64	0.32	2.64	6.76	1.28
Yellow perch age 3+	8.92	2.44	1.08	0.28	0.52	0.96	0.48

Table 15. Biomass (grams per net) from September forage gill nets, Mille Lacs Lake, 2010-2016.

	Biomass (gms/net)						
Taxon	2010	2011	2012	2013	2014	2015	2016
Spottail shiner age 0	15.3	3	16.8	9.7	15.4	37.4	41.3
Spottail shiner age 1+	382.7	40.5	46.4	21.9	131.4	72.8	164.3
Tullibee age 0	627.4	18.4	10	155.6	303.4	109.2	97.7
Tullibee age 1	260.4	36.4	3	19.5	633.4	868.7	15.0
Tullibee age 2+	203.1	84.9	86.2	28.2	87.0	114.2	634.4
Walleye age 0	66.2	100.1	45.6	86.3	13.1	10.6	48.7
Walleye age 1	21.5	20.7	4.2	0	134.4	11.5	17.2
Walleye age 2	23.7	0	7.1	0	7.3	99.2	18.0
Walleye age 3+	0	56.4	49.8	0	0	0	52
Yellow perch age 0	273.5	72.2	153.4	339.0	4.7	138.4	177.6
Yellow perch age 1	276.2	443	200.9	764.4	345.0	43.3	402.8
Yellow perch age 2	303.5	273.6	50.8	32.8	167.3	421.8	99.6
Yellow perch age 3+	428.4	384.2	146.2	29.9	24.8	98.6	69.2

Table 16. Veliger densities (number/l) from nine sampling locations on Mille Lacs Lake, 2008-2016.

	2008	2009	2010	2011	2012	2013	2014	2015	2016
LateMay		0	0.001	0.002	0.017	0	0.014	0.019	0.023
MidJune	0	0.005	0.302	0.014	7.532	0.002	0.026	0.367	0.018
June/July		0.107	7.471	0.744	9.792	14.344	6.037	30.484	15.135
MidJuly	0.042	0.114	14.682		5.845	24.058	4.046	9.235	1.320
MidAug	0.504	0.245	2.48	1.785	0.921	3.886	0.998	0.571	0.833
MidSept	0.353	0.021	0.052	0.394	0.105	0.32	0.012	0.008	0.032

Table 17. Mean number of *Bythotrephes* from nine sampling locations on Mille Lacs Lake, 2009-2016.

	2009	2010	2011	2012	2013	2014	2015	2016
LateMay	0	0	0	0	0.111	0.111	0.778	0.556
MidJune	0	0.222	3.333	5.222	0.778	0.889	15.111	9.778
June/July	0	5.111	11.556	1.667	7.889	1.556	1.778	1.556
MidJuly		2.444		0.333	7.222	1.222	2.111	0.444
MidAug		2.000	2.889	4	1.111	1.333	0.778	0.556
MidSept	0.333	10.333	2.000	6.111	11.889	2.556	5.111	1.222

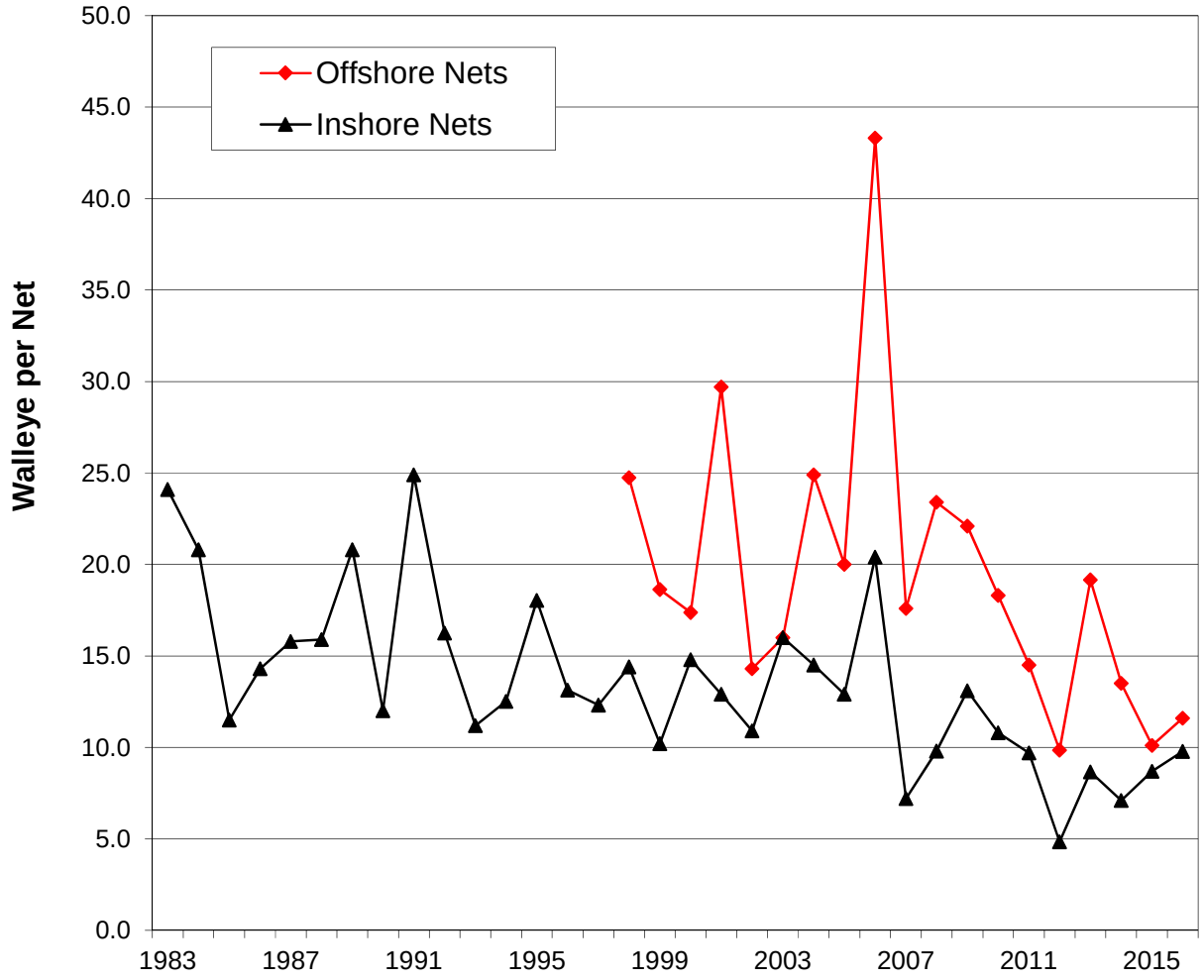

Figure 1. Walleye gill net CPE (no/net), Mille Lacs Lake, 1983-2016. Walleye continue to remain at a relatively low level of abundance in the fall gill nets. Age 3 (2013 YC) walleye were the only year class observed at above median level in the gill nets (Table 7), further suggesting that large fish are low and female spawning stock and harvestable sized fish (under current regulations) will likely remain low for at least the next year.

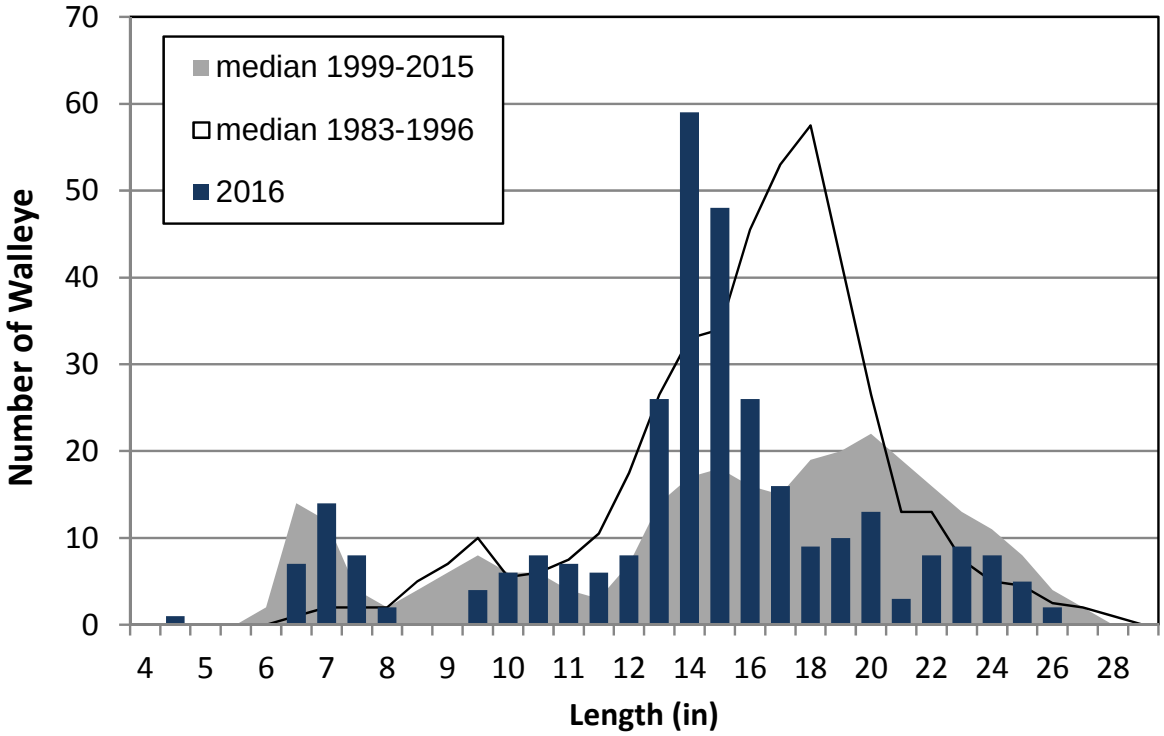

Figure 2. Inshore walleye gill net catch by length, Mille Lacs Lake, 2016.

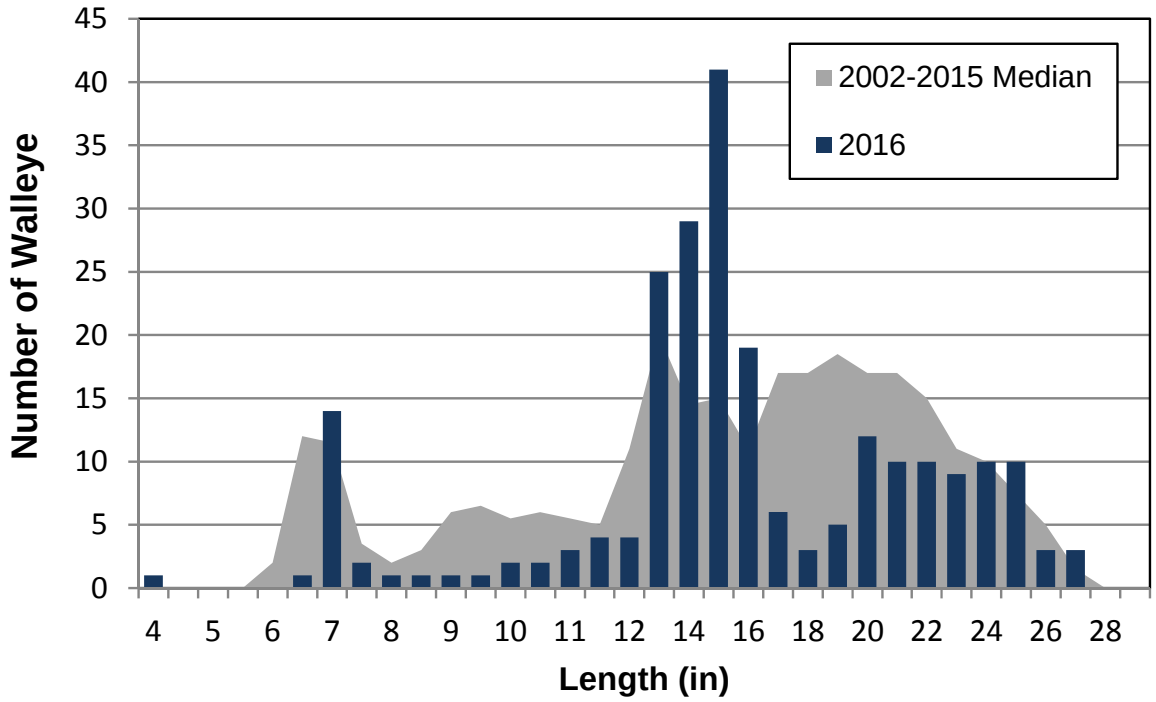

Figure 3. Offshore walleye gill net catch by length, Mille Lacs Lake, 2016.

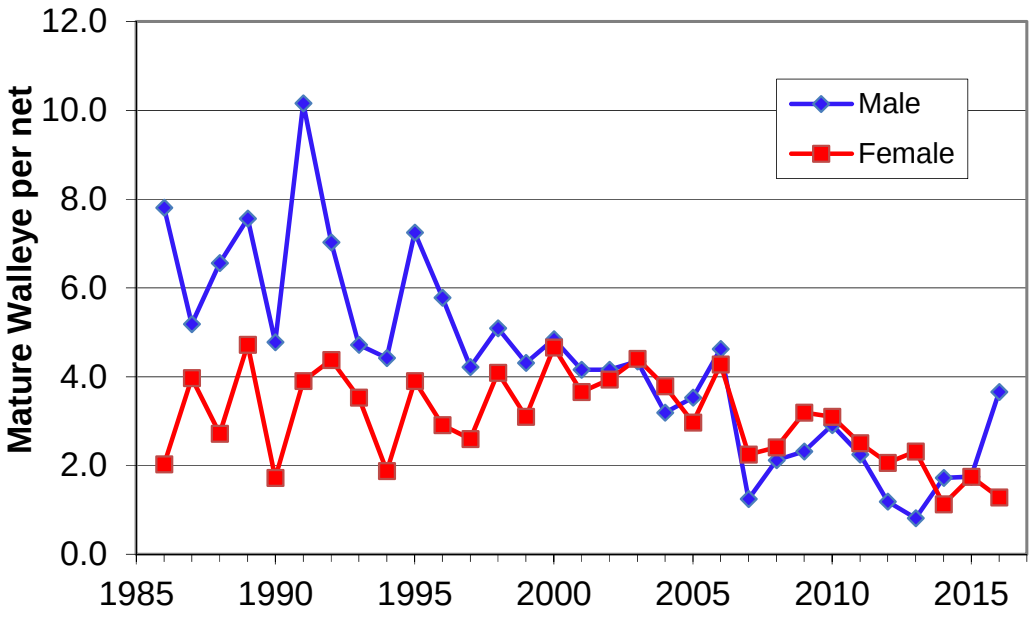

Figure 4. Mature walleye (no/net) from inshore gill nets, Mille Lacs Lake, 1986 - 2016.

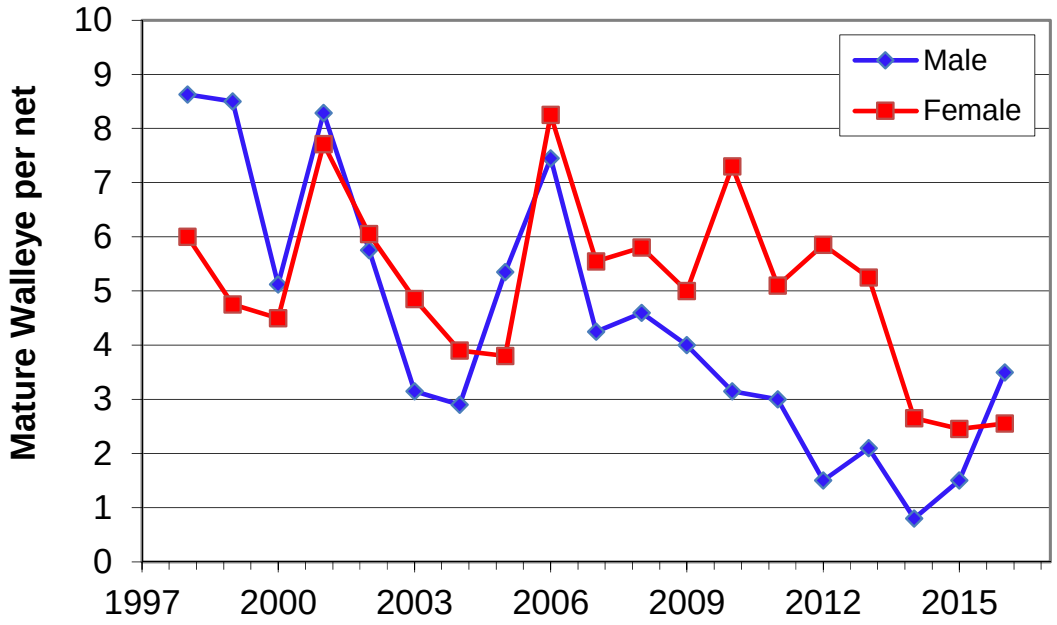

Figure 5. Mature walleye (no/net) from offshore gill nets, Mille Lacs Lake, 1998 - 2016.

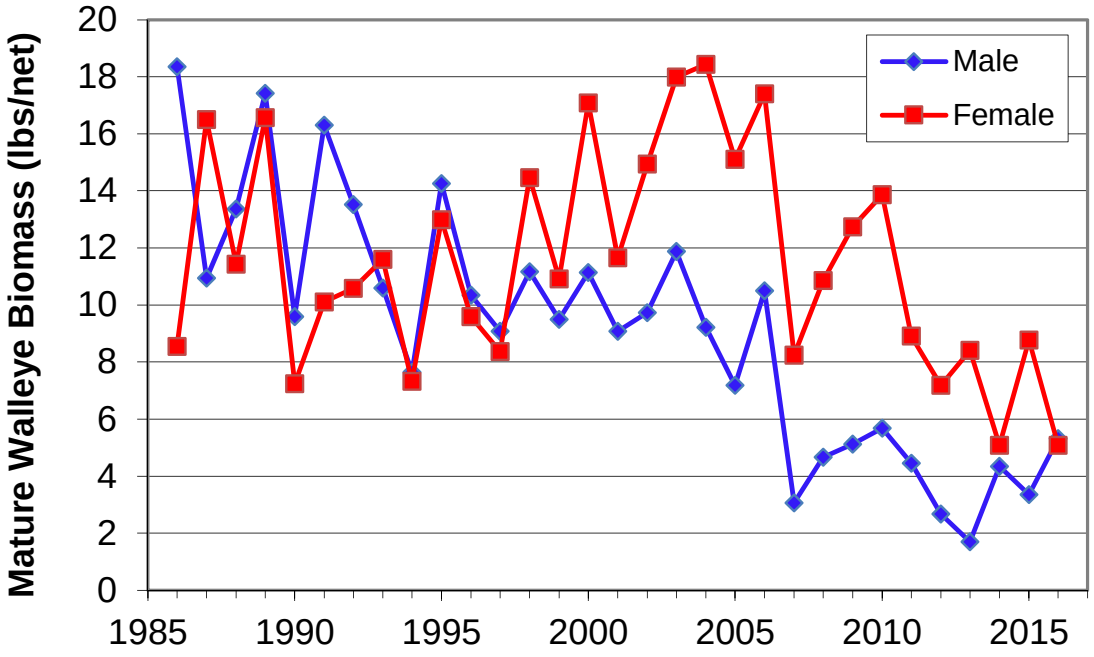

Figure 6. Mature walleye biomass (lbs/net) from inshore gill nets, Mille Lacs Lake, 1986 - 2016. Biomass of mature males walleyes increased mainly due to the maturing of 2013 year class fish. Female walleye biomass decreased due to low condition of the fish.

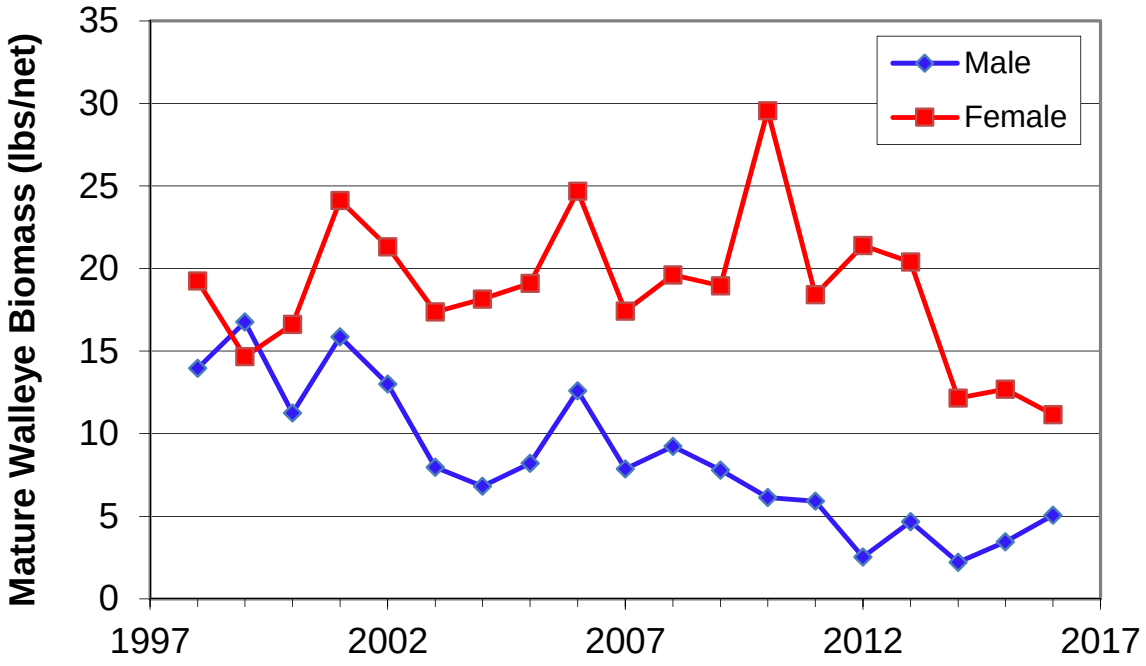

Figure 7. Mature walleye biomass (lbs/net) from offshore gill nets, Mille Lacs Lake, 1999 - 2016.

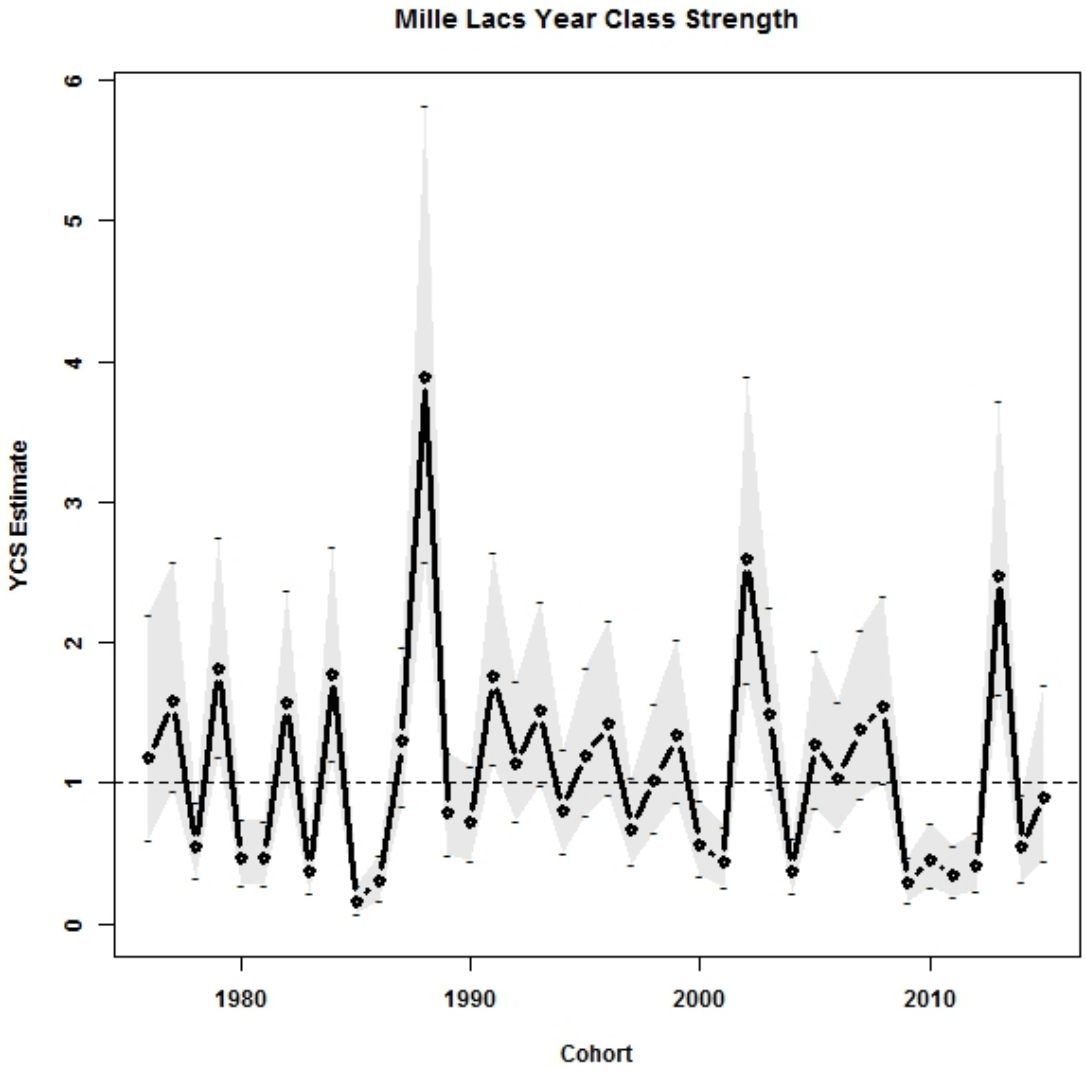

Figure 8. Year class strength index based on age 1-3 walleye. Median YCSI = 1.

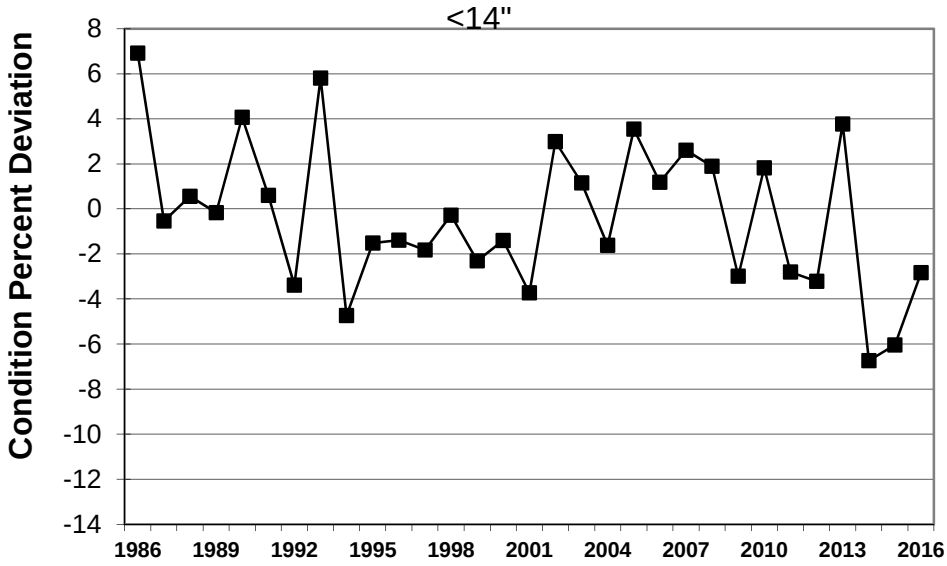

Figure 9. Relative condition of walleye less than 14 inches from the fall gill nets, Mille Lacs Lake, 1986-2016.

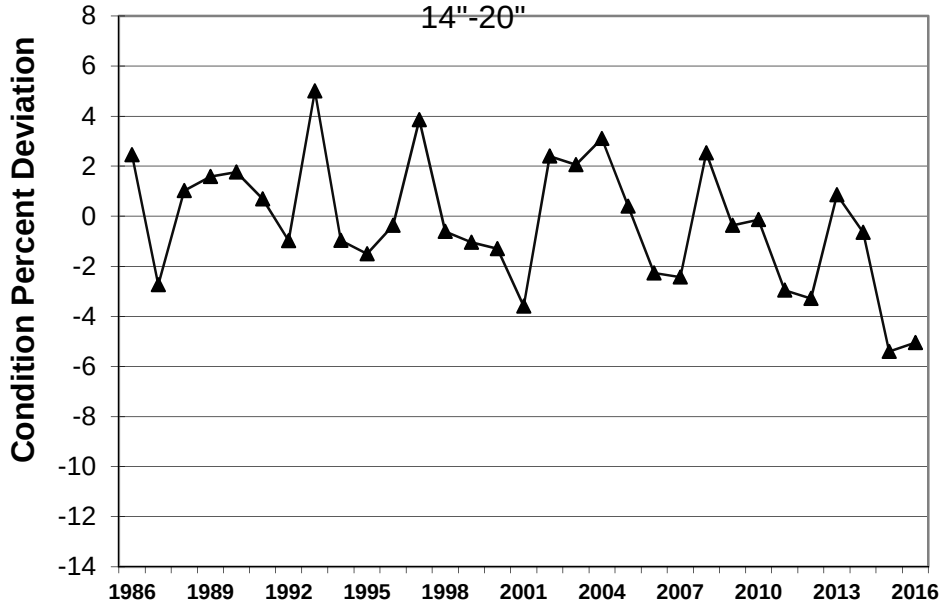

Figure 10. Relative condition of walleye between 14 and 20 inches from the fall gill nets, Mille Lacs Lake, 1986-2016.

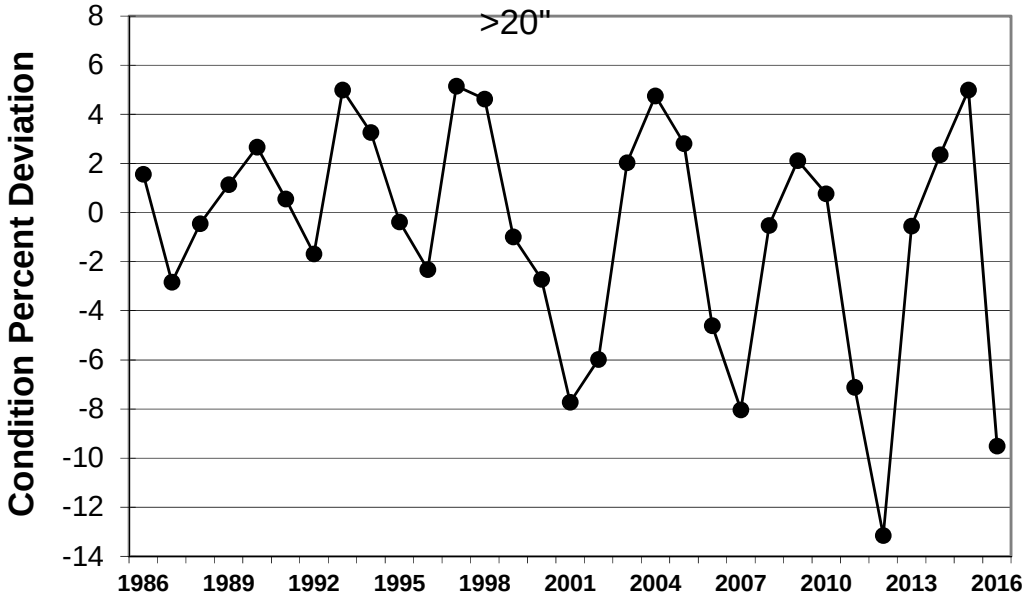

Figure 11. Relative condition of walleye greater than 20 inches from the fall gill nets, Mille Lacs Lake, 1986-2016.

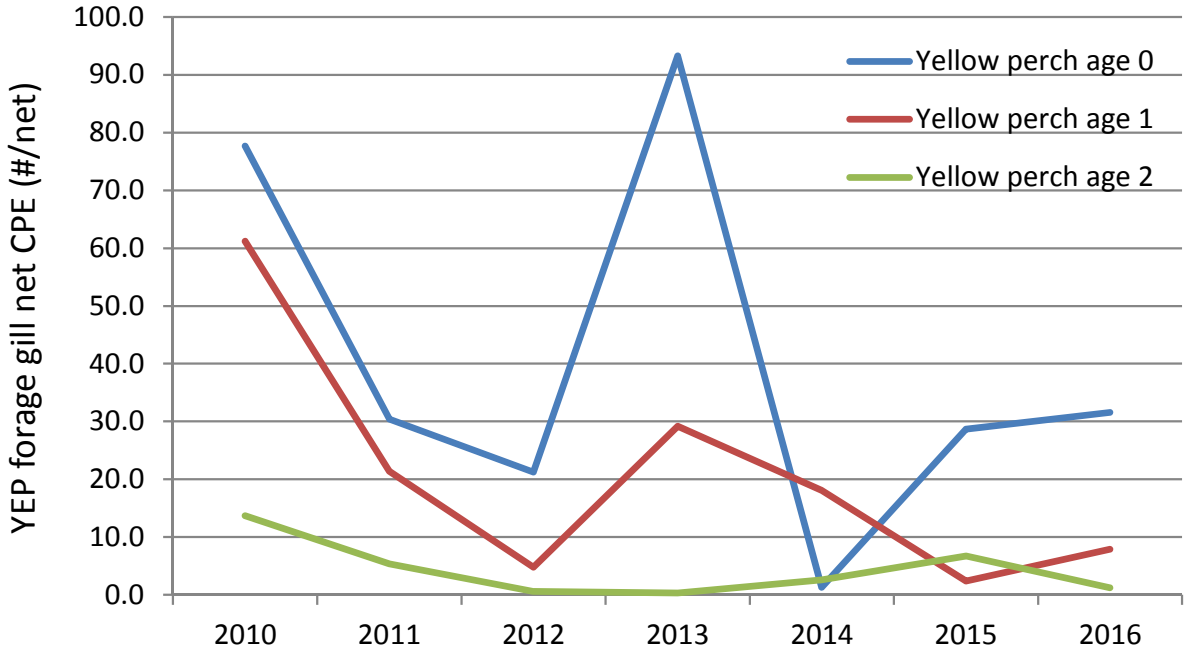

Figure 12. Yellow perch per net in the forage gill nets, Mille Lacs Lake, 2010-2016.

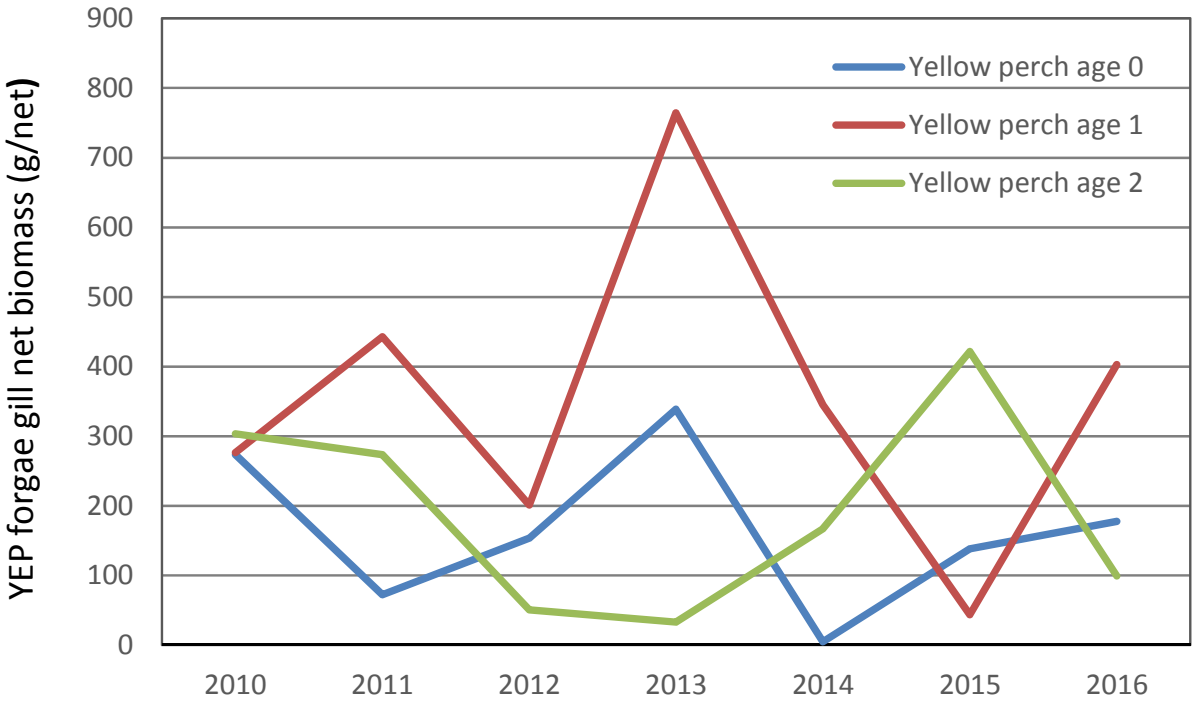

Figure 13. Biomass of yellow perch per net in the forage gill nets, Mille Lacs Lake, 2010 – 2016.

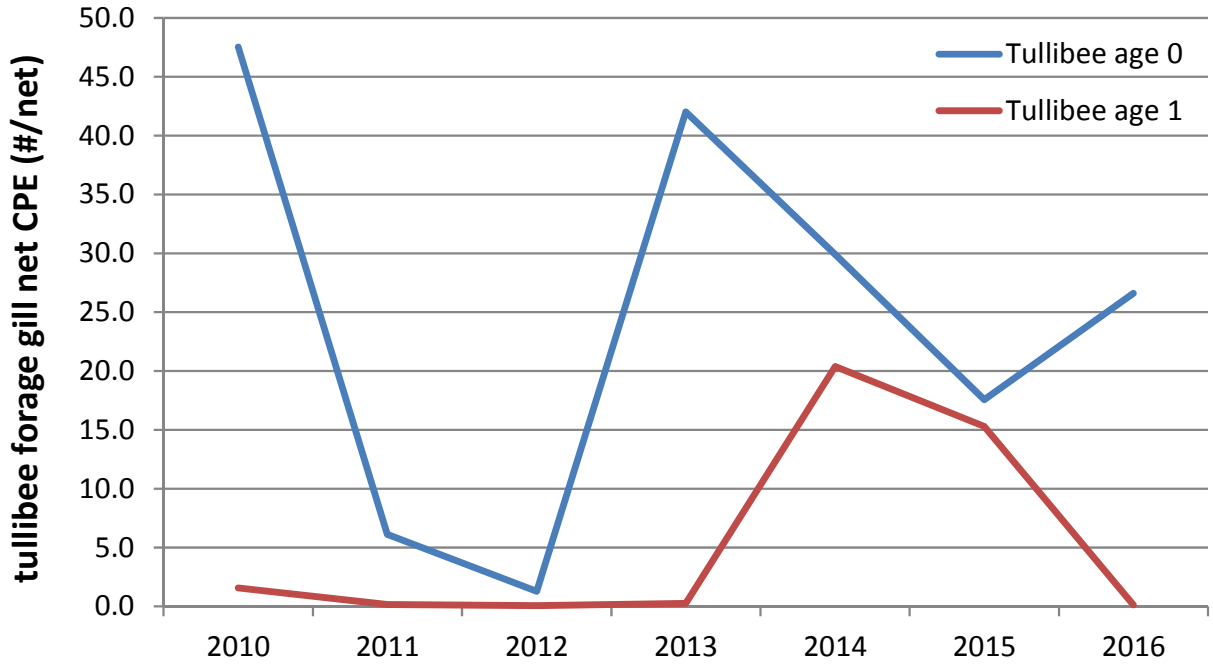

Figure 14. Tullibee per net in the forage gill nets, Mille Lacs Lake, 2010 - 2016.

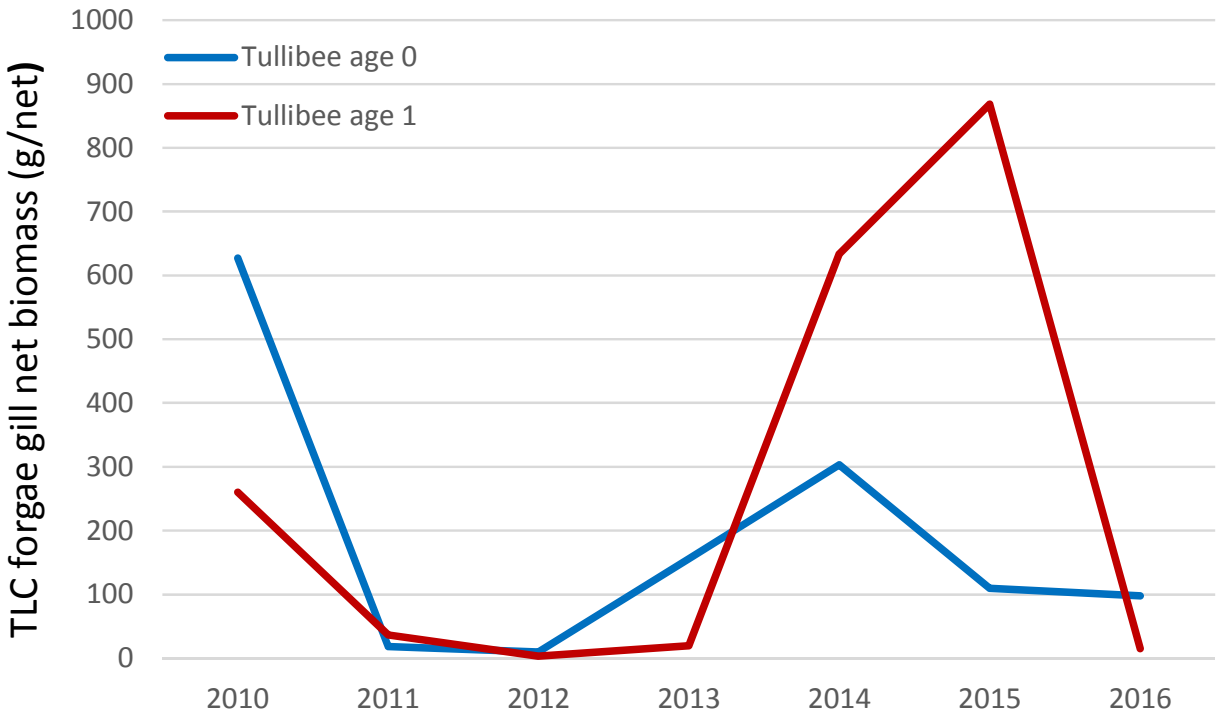

Figure 15. Biomass of tullibee per net in the forage gill nets, Mille Lacs Lake, 2010 – 2016.

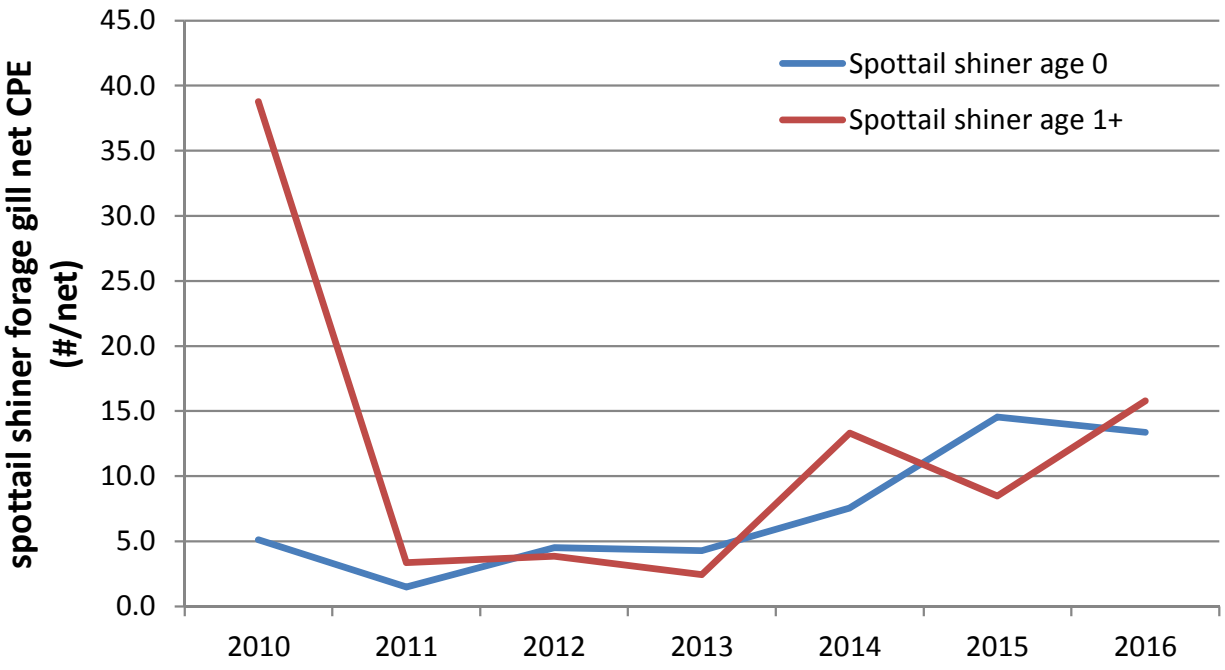

Figure 16. Spottail shiner per net in the forage gill nets, Mille Lacs Lake, 2010 - 2016.

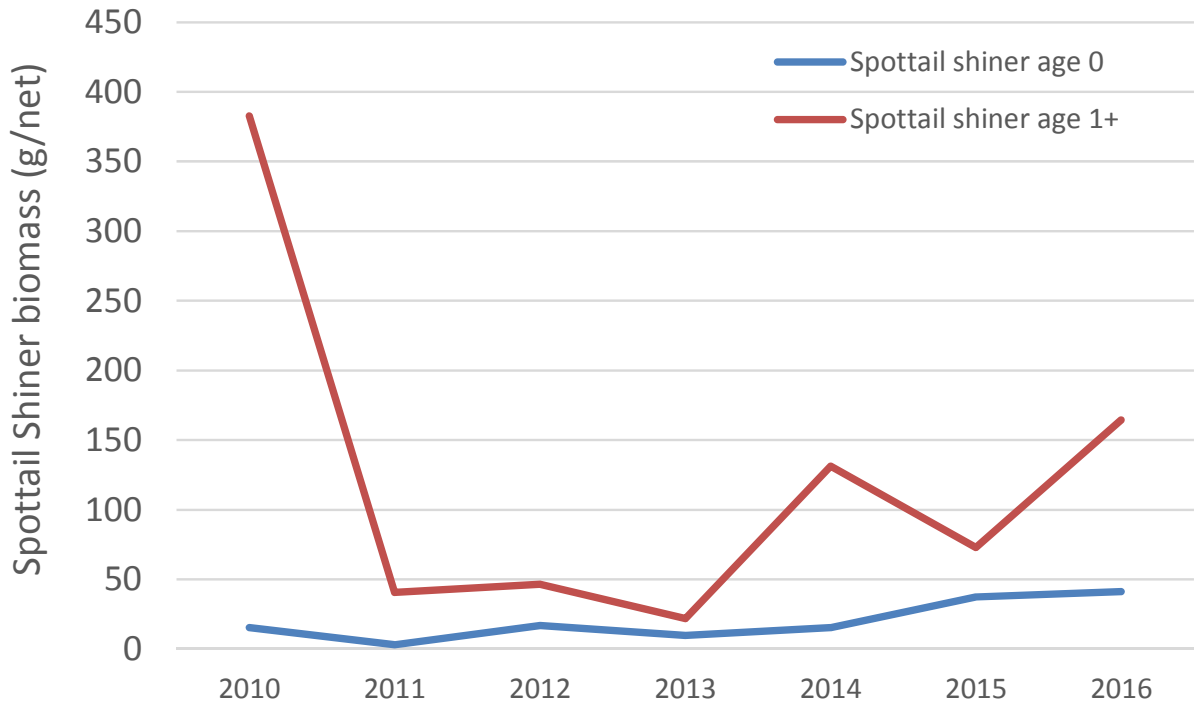

Figure 17. Spottail shiner biomass (g/net) in the forage gill nets, Mille Lacs Lake, 2010 - 2016.

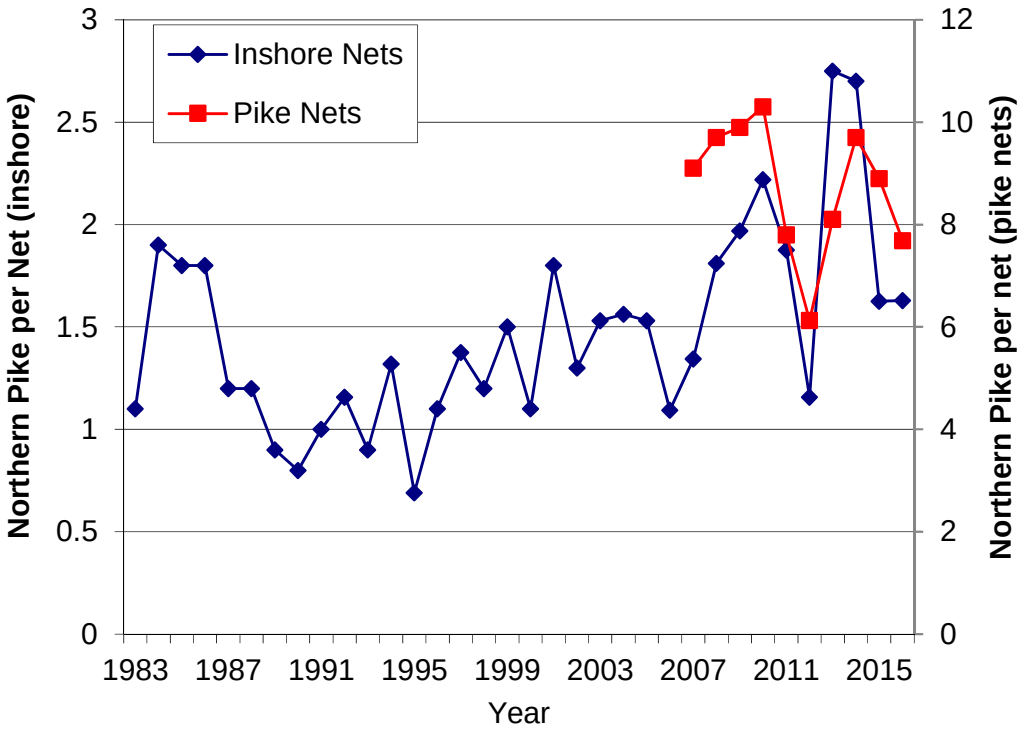

Figure 18. Northern pike CPE (no/net) from inshore gill nets and northern pike gill nets, Mille Lacs Lake, 1983-2016.

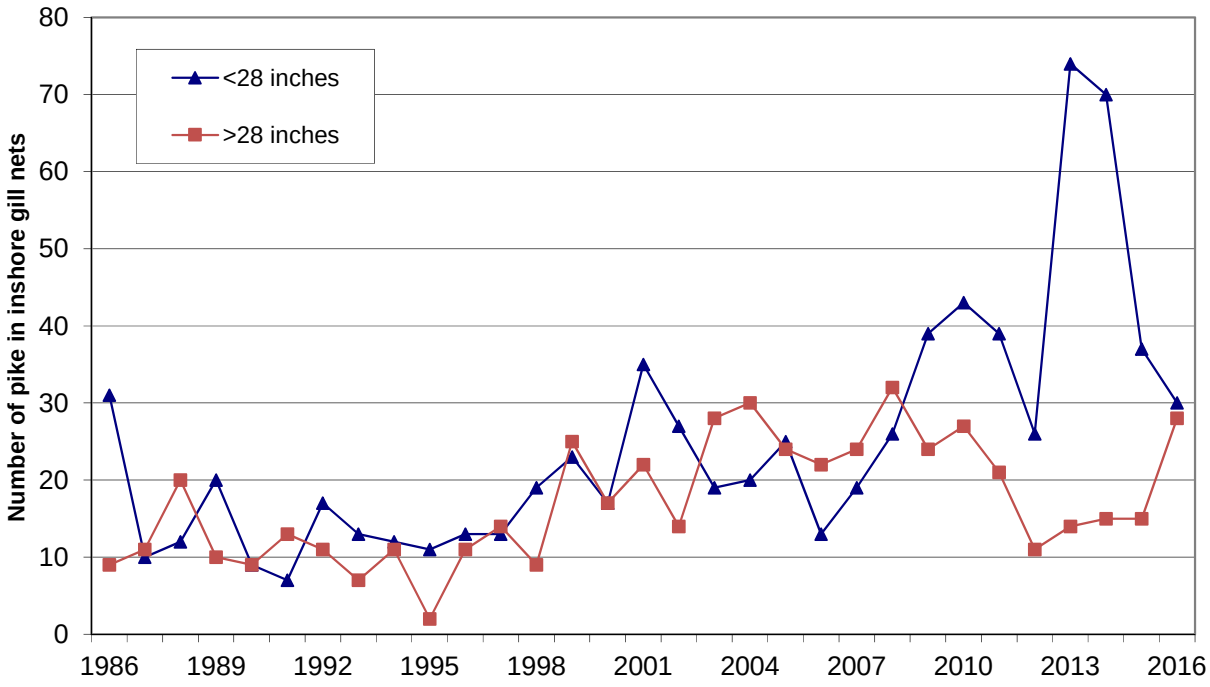

Figure 19. Numbers of all northern pike sampled in inshore gill nets, Mille Lacs Lake, 1986-2016.

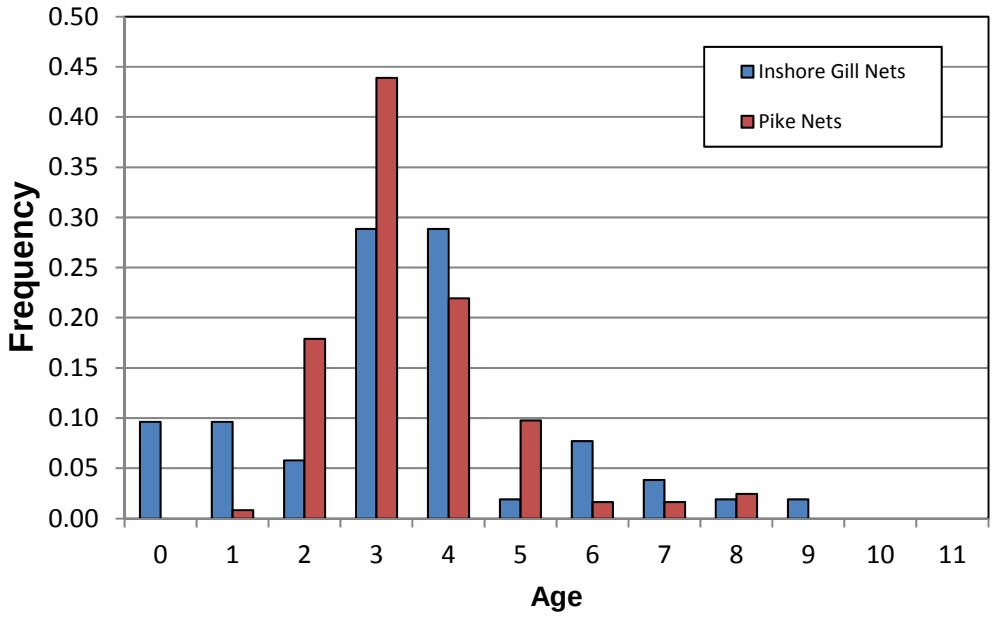

Figure 20 Age frequency of northern pike in inshore gill nets and specialized pike nets, Mille Lacs Lake, 2016. The gill net catch of pike was mostly 2012 and 2103 year class fish (around 60%), which were first observed in the gill nets at age 0 (Table 10). We observed five age 0 fish, which may be indicative of another relatively strong year class.

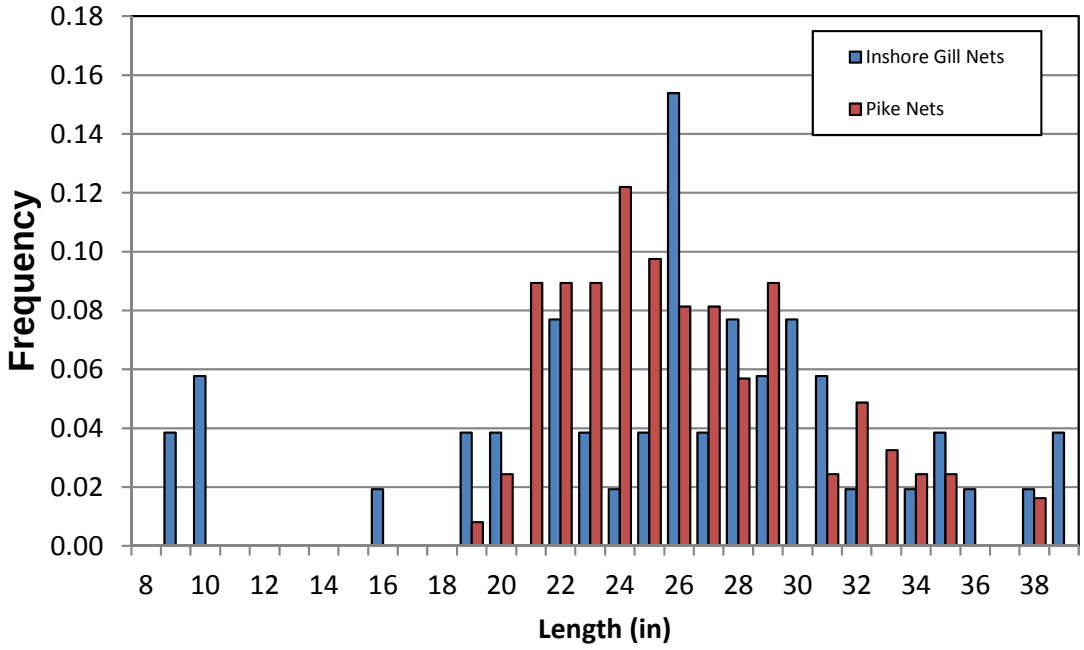

Figure 21. Length frequency of northern pike from the inshore gill nets and specialized pike nets, Mille Lacs Lake, 2016.

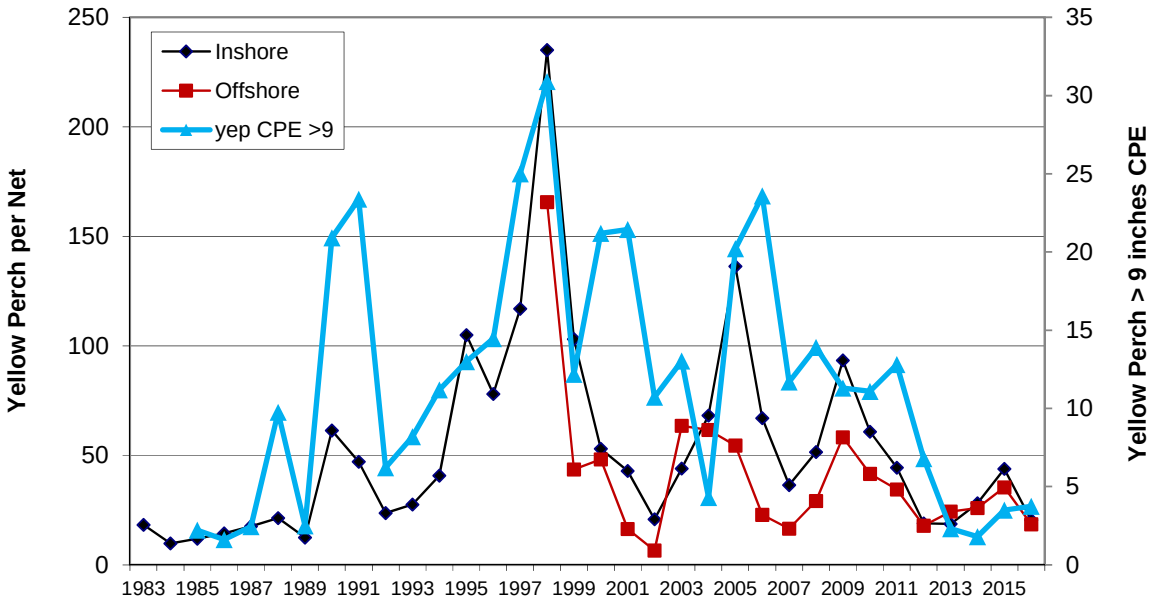

Figure 22. Yellow perch gill net CPE (no/net), Mille Lacs Lake, 1983-2016. Yellow perch catches in the fall gill nets decreased below median levels in both the inshore and offshore sets. The number of yellow perch greater than 9 inches remains well below median levels.

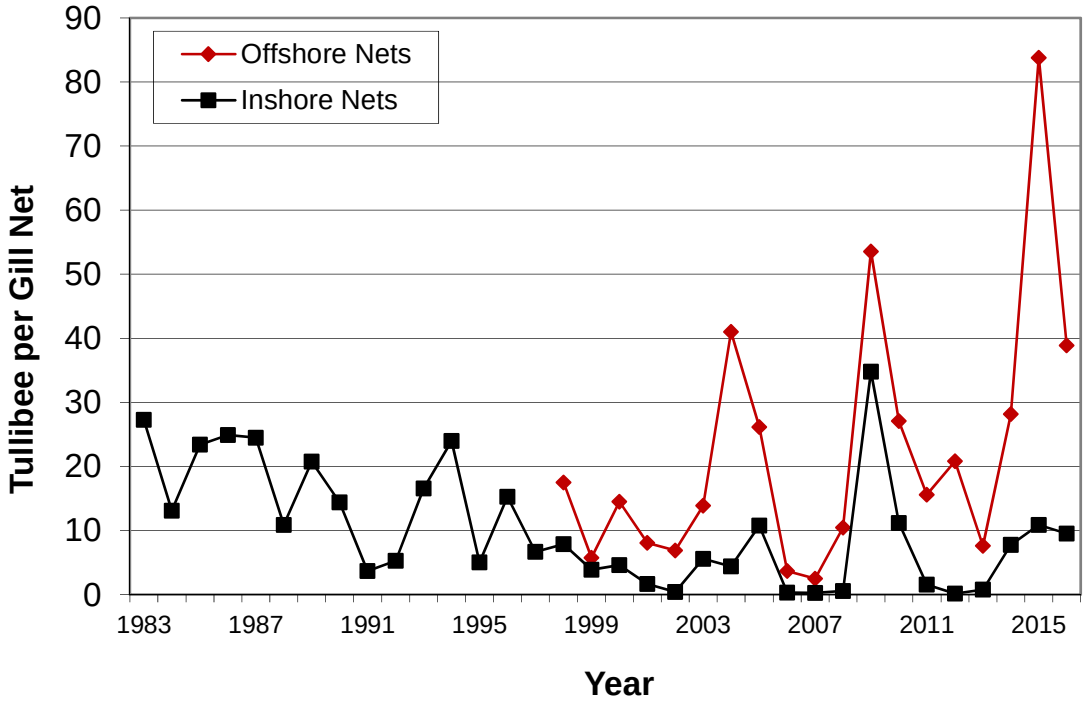

Figure 23. Tullibee gill net CPE (no/net), Mille Lacs Lake, 1983-2016.

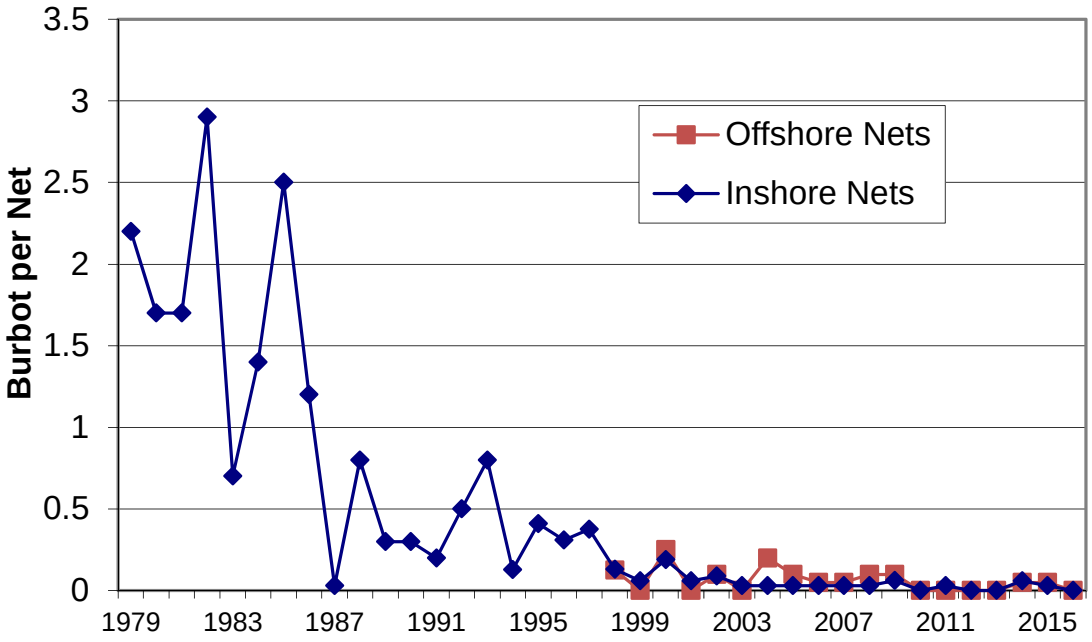

Figure 24. Burbot gill net CPE, Mille Lacs Lake, 1979-2016.

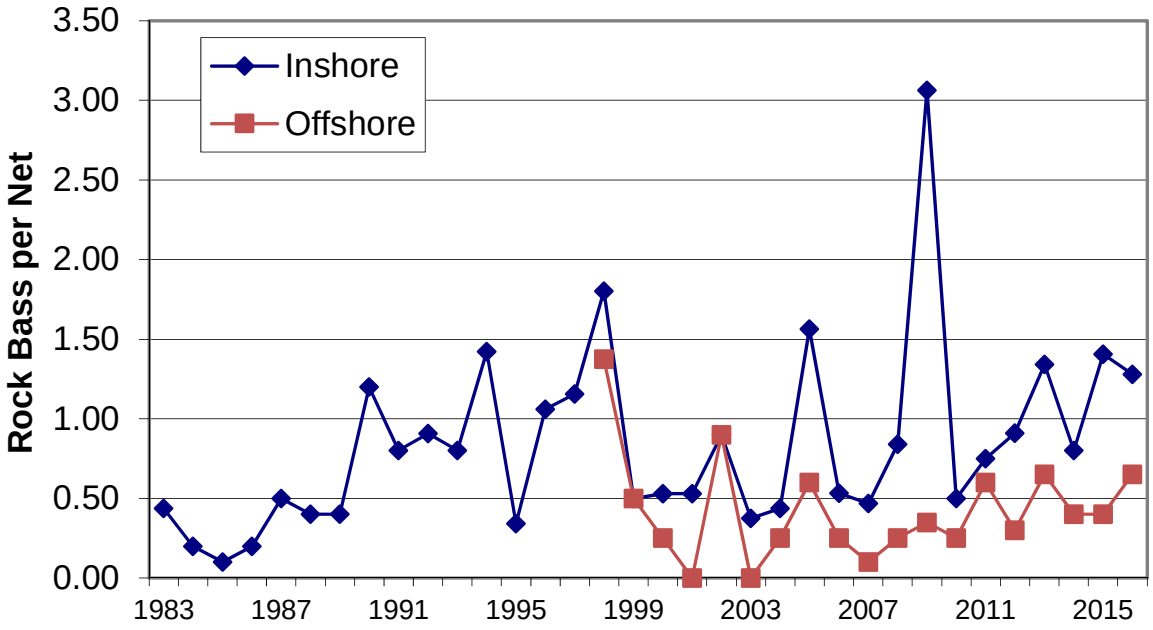

Figure 25. Rock bass gill net CPE, Mille Lacs Lake, 1983-2016.

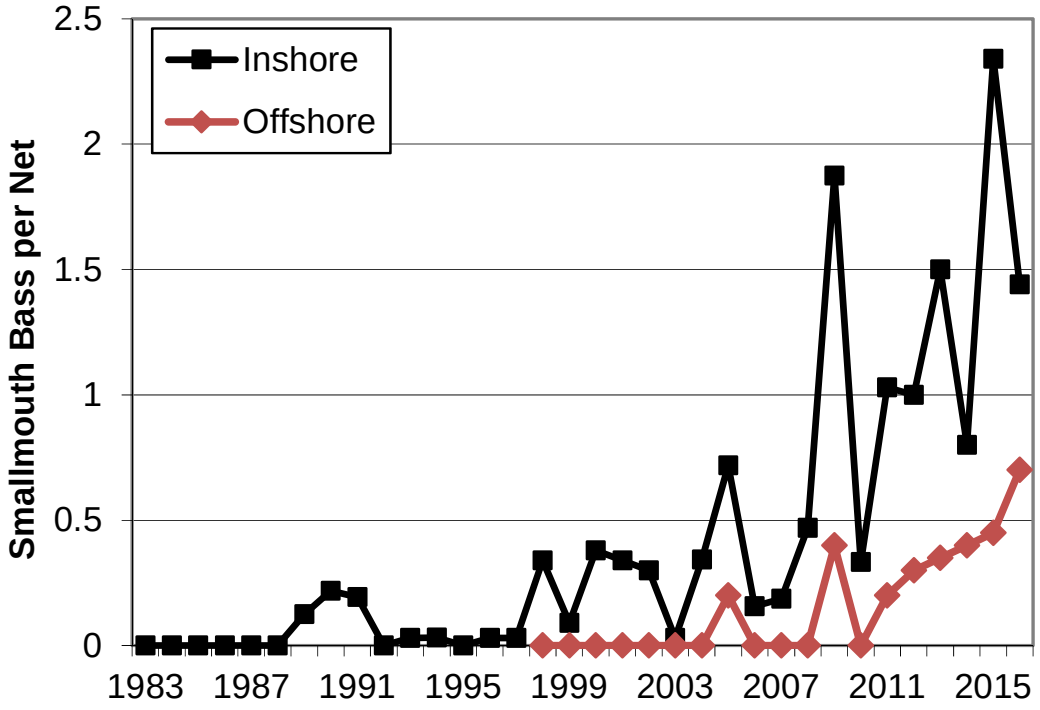

Figure 26. Smallmouth bass gill net CPE, inshore and offshore gill nets, Mille Lacs Lake, 1983-2016.

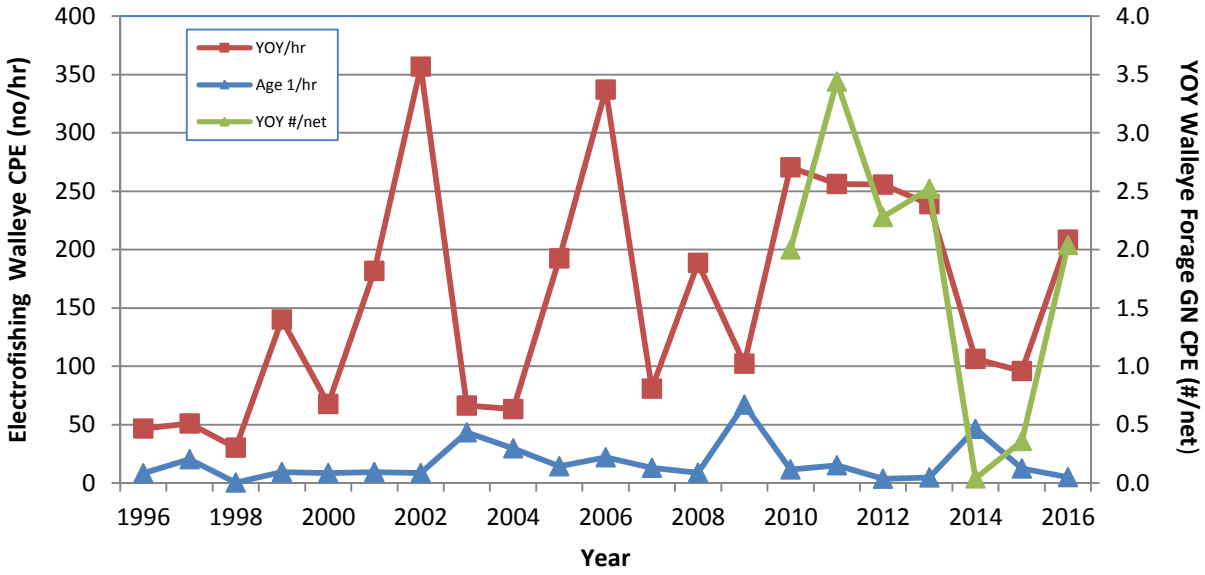

Figure 27. Walleye electrofishing CPE (number/hr), Mille Lacs Lake, 1996-2016

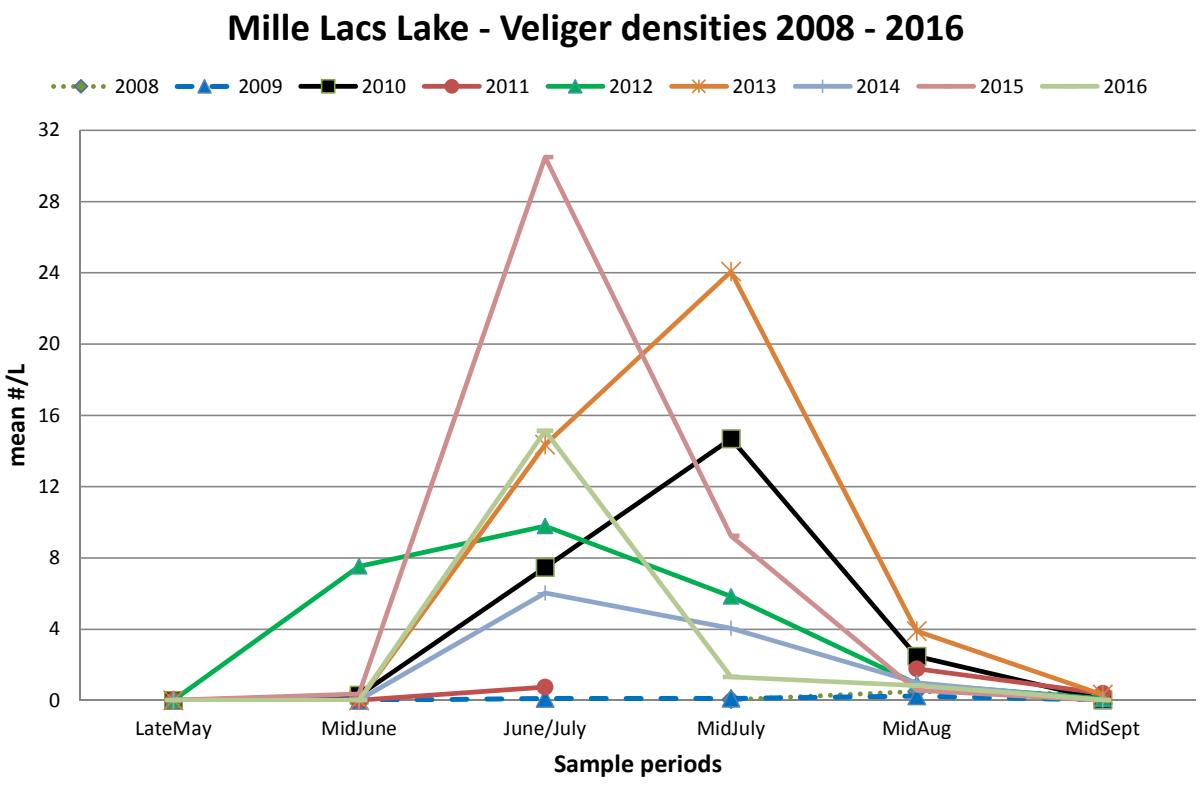

Figure 28. Seasonal density of zebra mussel veligers, Mille Lacs Lake, 2008-2016.

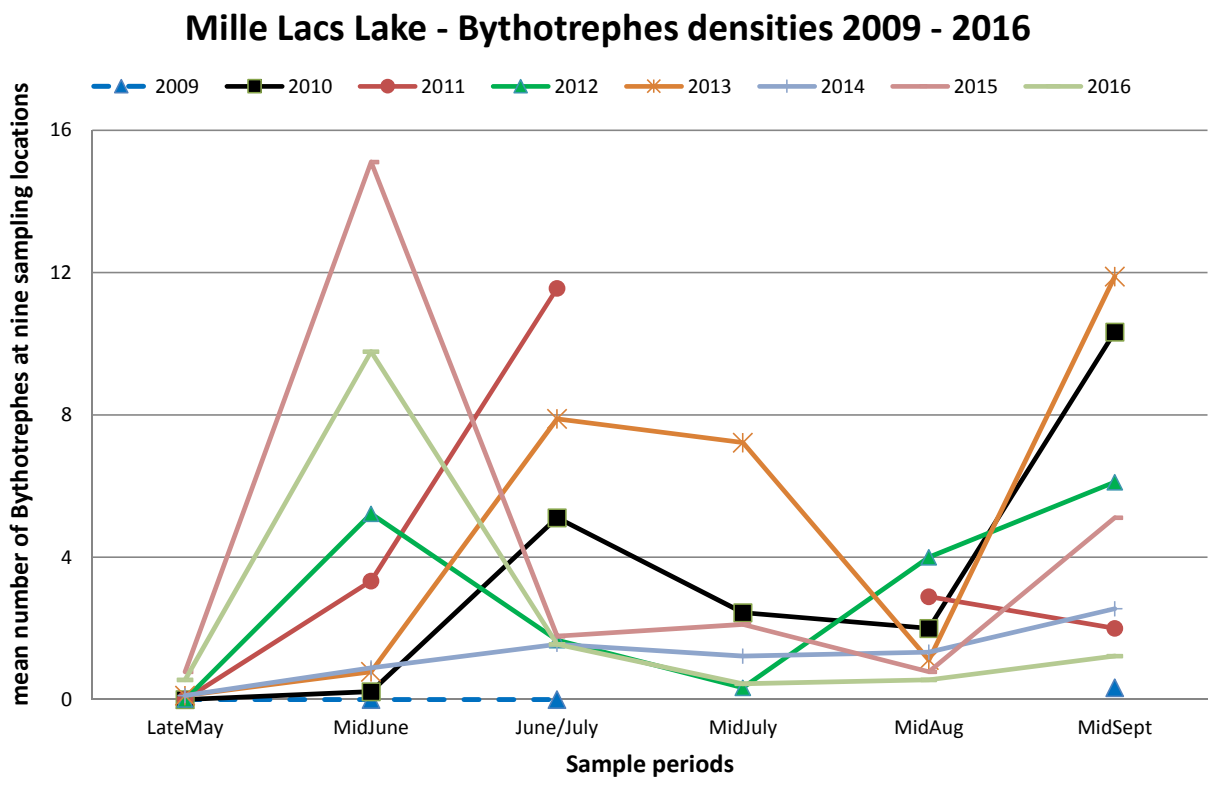

Figure 29. Seasonal density of Spiny Water Flea, Mille Lacs Lake, 2009-2016.

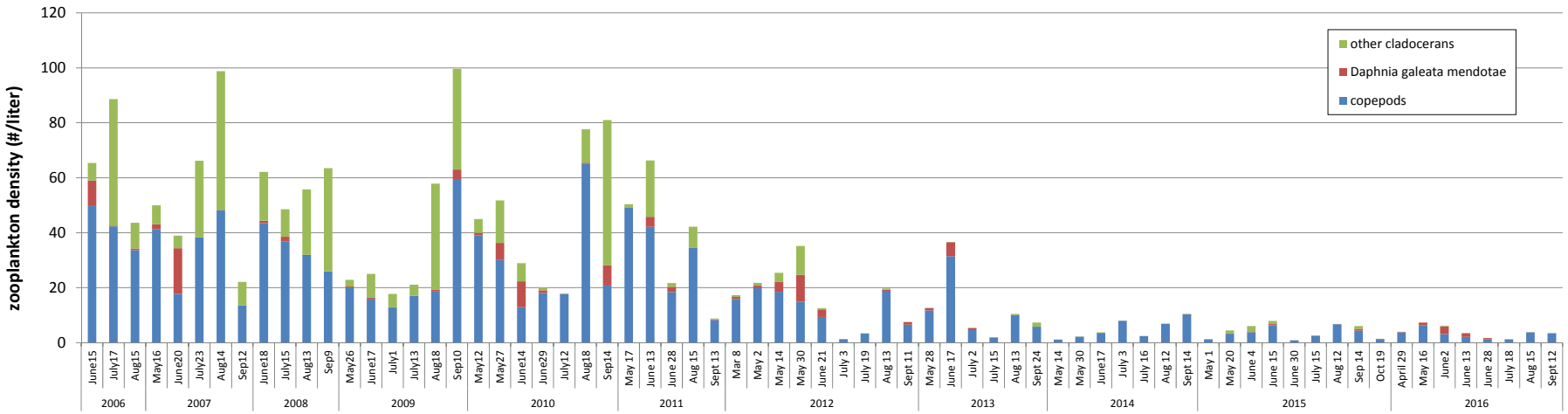

Figure 30. Timeline of zooplankton density, Mille Lacs Lake, 2006-2016. Zooplankton density, particularly smaller species, continues to decline, likely due to *Bythotrephes* and possibly zebra mussels.

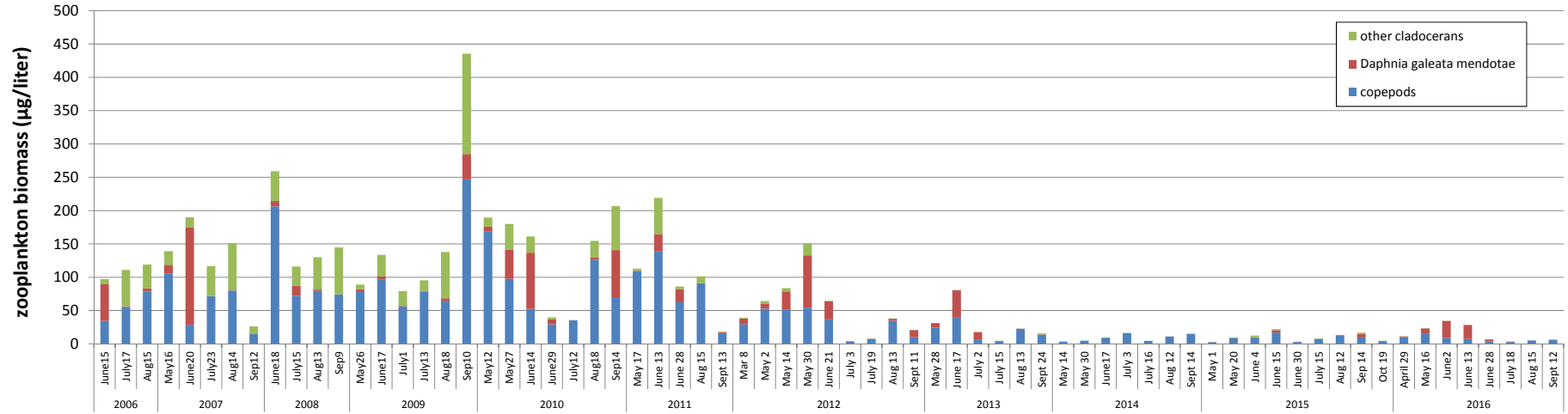

Figure 31. Timeline of zooplankton biomass, Mille Lacs Lake, 2006-2016.