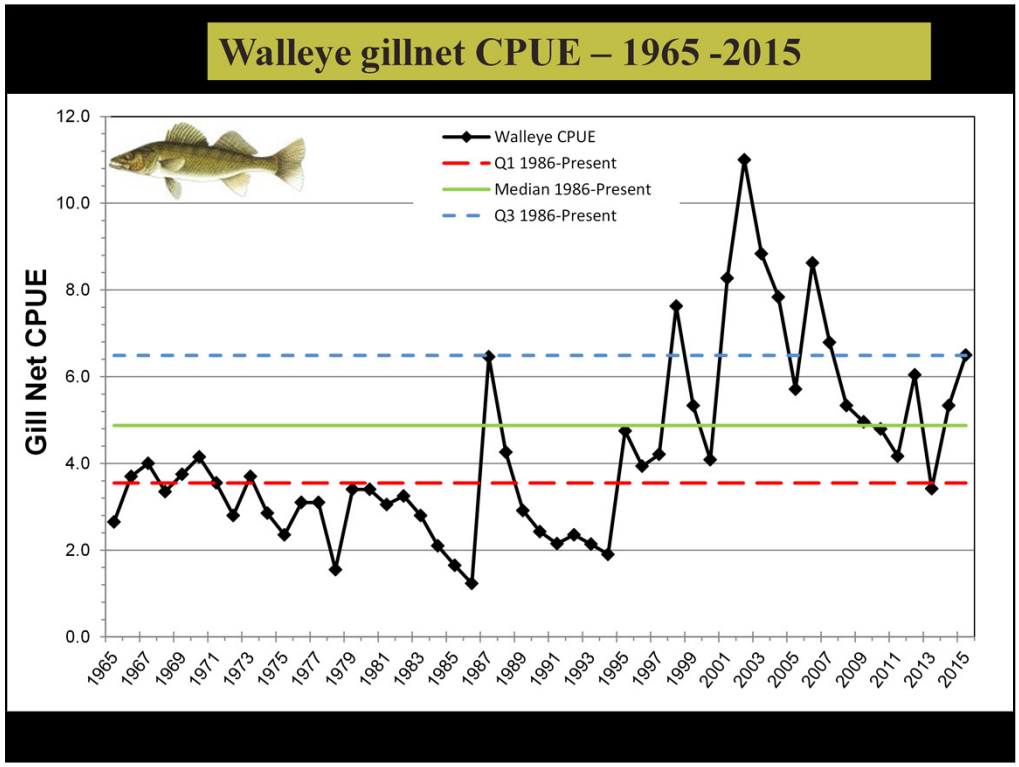
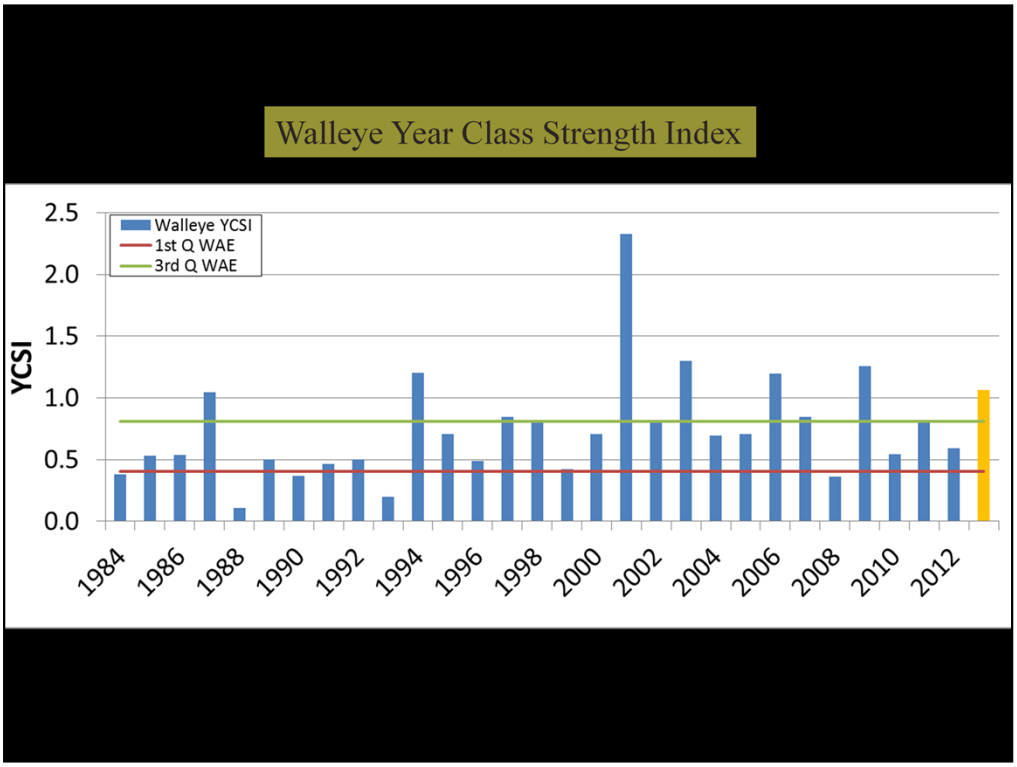

Lake Pepin / Pool 4
2015 Update
Minnesota
DEPARTMENT OF
NATURAL RESOURCES
Large Lake Specialist: Nick Schlesser



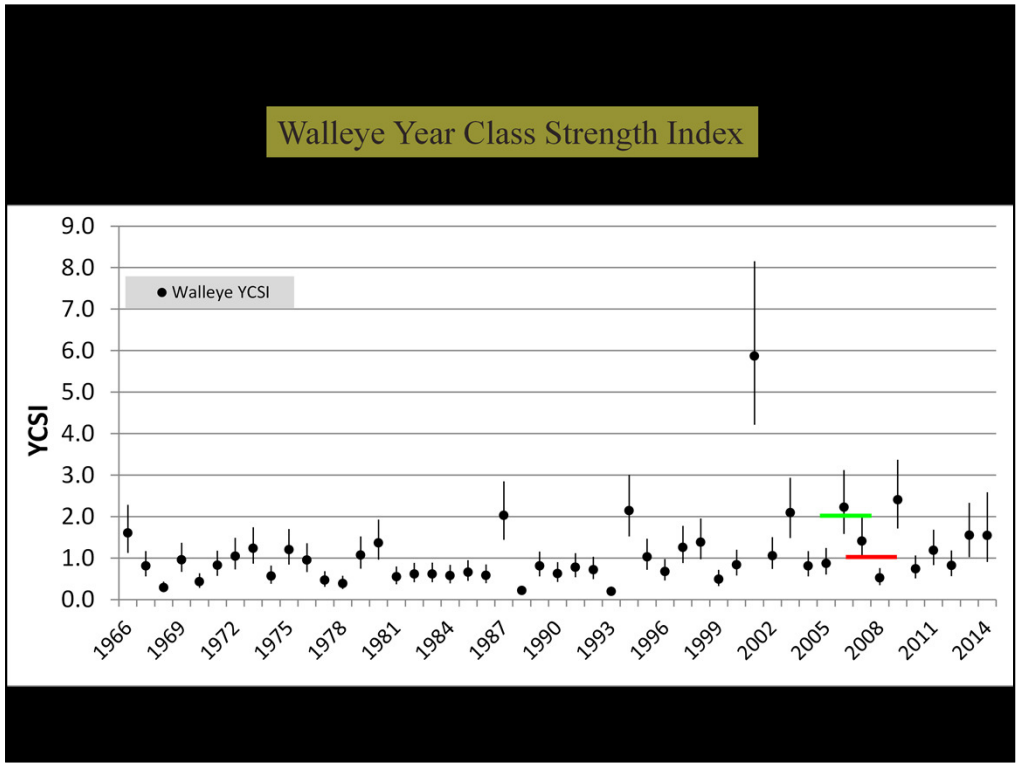
Catch per Unit Effort (CPUE) represents the average number of fish captured per net. Annually as part of the large lake survey 24 gill nets are set for ~24 hour periods in the first week of October. These gillnets provide a cross section look at the adult populations of some of the most popular gamefish in our lakes (Walleye, Sauger, Yellow Perch, etc). It should be noted that some gamefish like Largemouth and Smallmouth Bass are poorly sampled using this type of gear.

This figure shows that while Lake Pepin's walleye population is down from historic highs driven by the incredibly strong 2001 year class it is still above the long term (1986-Present) median.



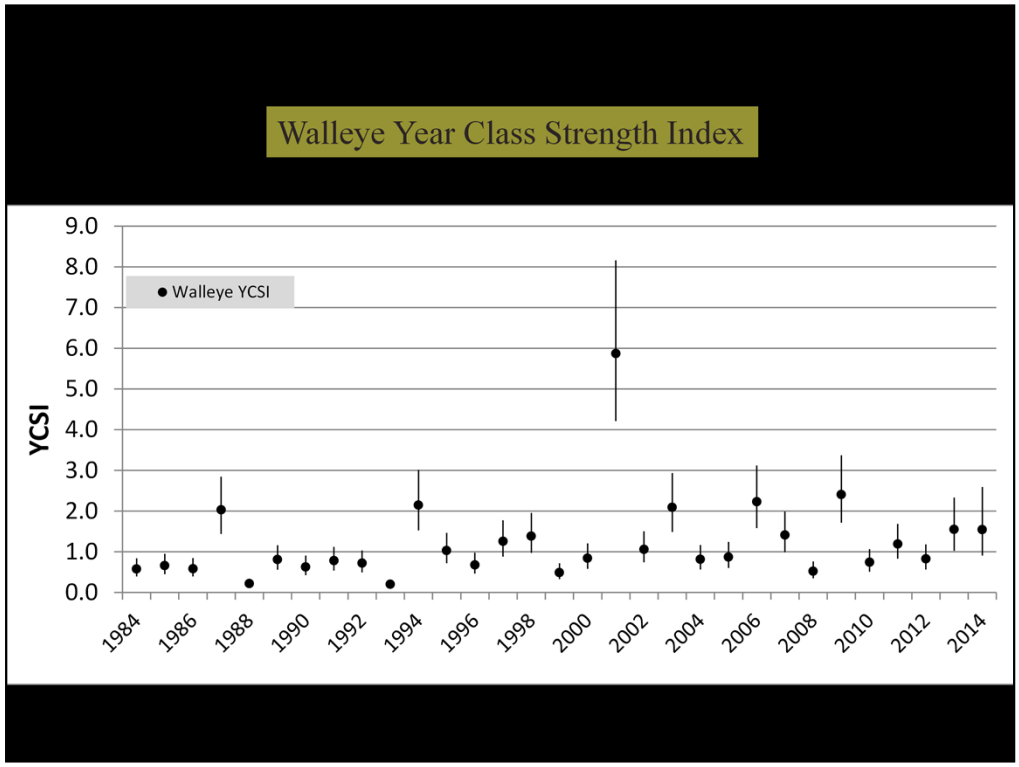
Year class strength Index (YCSI) is a normalized way of representing how important the contributions of a particular years hatch of a species is to the population in a body of water by looking at the contribution of the year class at ages 1 and 2 to the gill net catch. Note 2011 is a borderline strong year class and 2013 was confirmed as a strong year-class in the 2015 gill nets.

In this case the incredibly strong 2001 Walleye year class that I noted on Slide 2 is very obvious. Typically we consider a year class to be "strong" if it is above the green line and "weak" if it falls below the red line. The orange bar representing the 2013 year class has proved to be a strong driving factor in the last two years of fishing and with an average length of 16.5" in October 2015 it should continue to provide anglers with quality fish in the coming year.

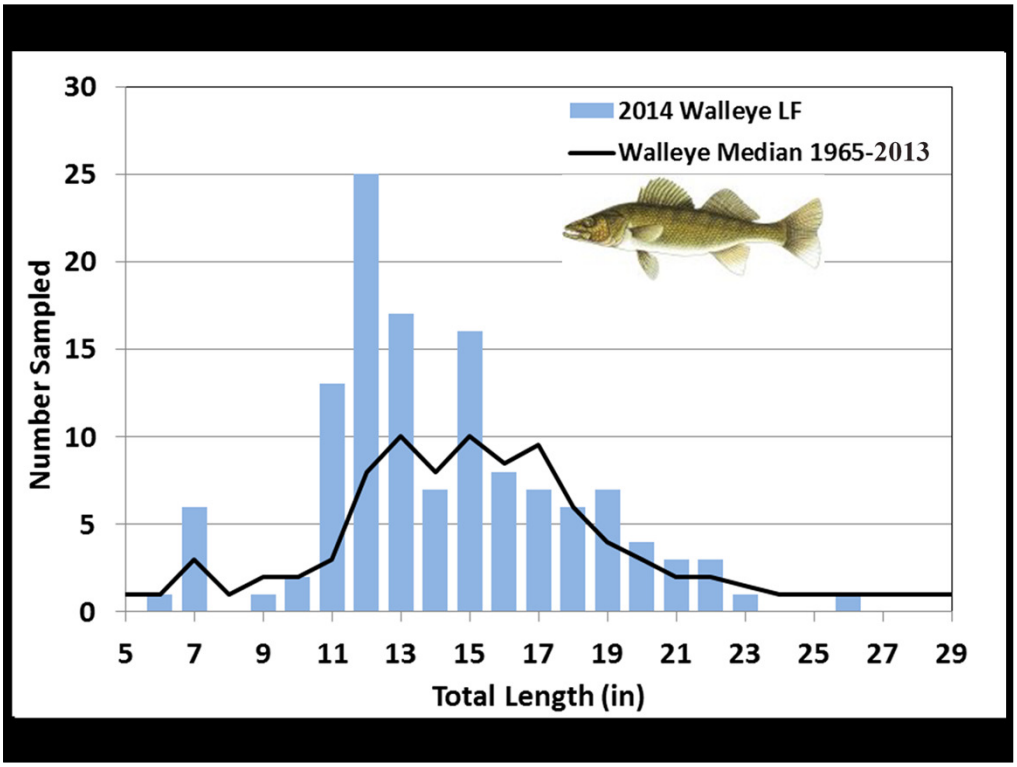


The large lake program in MN is attempting to standardize estimates of year class strength across lakes which has led to a new (for those of you who have become used to my YCSI figures in the last several years) way of displaying the year class strength estimate data. The Dots represent the estimate of year class strength and the ends of the line represent statistical boundaries for that estimate. If you draw two horizontal lines from the tips (upper and lower) of a points lines and they cross another points as the green line from 2007 crosses the 2006 line then we cannot say that they are statistically different. If however the line does not cross another points lines like the red line above from 2007 which does not cross the lines from 2008 point we can then say that those two year class strengths were statistically different. Based on the methods used here an average year class should be approximately 1.0 on the y-axis.

Note: The estimate of year class strength relies on 3 years of catch data, so the last two estimates will typically have longer lines above and below them because they are estimates with only partial data. In this case I would expect the lines to tighten up around the 2013 and 2014 year class estimates as we gather more data in the coming years.



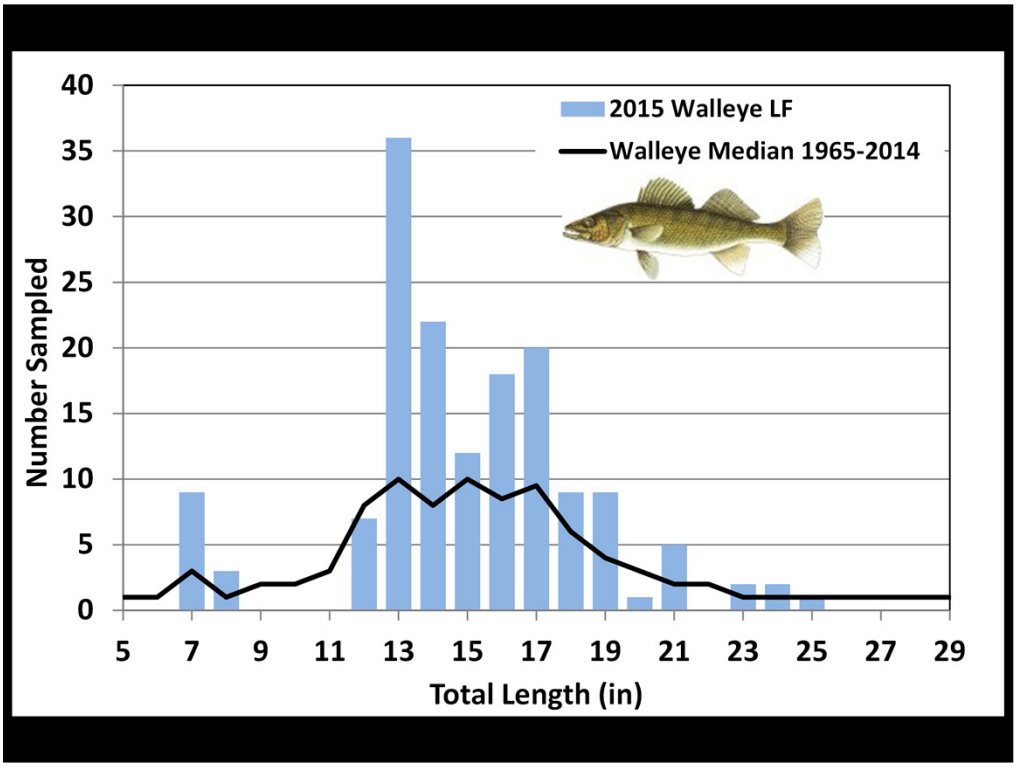
Shows the same information as the previous slide with the time span shortened to the period that the Large Lake program has been in place on Lake Pepin.



This slide represents the number of Walleyes from each 1 inch size group that was captured in the 2014 gillnets (blue bars) and the long term median for the same information from 1965-2013 represented by the black line.

As you can see the 2013 year class is represented here primarily by the 11-13 inch range and seems to be over performing the long term median as indicated in the YCSI slide. Also the 19-22" fish are present in higher than average numbers due primarily to the 2009 year class.

Note: This Slide is a carry over from the 2014 sampling season to be used as a comparison with the next slide to visualize the movement of a strong 2013 year class through the size structure.



This slide represents the number of Walleyes from each 1 inch size group that was captured in the 2015 gillnets (blue bars) and the long term median for the same information from 1965-2014 represented by the black line.

As you can see the 2013 year class is represented here primarily by the 15-18 inch range (mean length for females ~ 17" mean length for males ~ 16") and seems to be over performing the long term median as indicated in the YCSI slide.

The high peak at 13" are age-1 Walleyes from 2014 and the fish at 7-8" were Age-0 (YOY) fish from 2015. See next slide for length at age data.

Length Group	Sample size	Subsample size	Age 0	1	2	3	4	5	6	7	8	9	10
5.0 - 5.9	0	0											
6.0 - 6.9	0	0											
7.0 - 7.9	9	9	9										
8.0 - 8.9	3	3	3										
9.0 - 9.9	0	0											
10.0 - 10.9	0	0											
11.0 - 11.9	0	0											
12.0 - 12.9	7	6		6	1								
13.0 - 13.9	36	27		36									
14.0 - 14.9	22	19		16	5	1							
15.0 - 15.9	12	12		1	10	1							
16.0 - 16.9	18	18			14	3	1						
17.0 - 17.9	20	20			15	2	3						
18.0 - 18.9	9	9			5	2	2						
19.0 - 19.9	9	9				2	3	3	1				
20.0 - 20.9	1	1						1					
21.0 - 21.9	5	5				1	2		2				
22.0 - 22.9	0	0											
23.0 - 23.9	2	2				1						1	
24.0 - 24.9	2	2						1	1				
25.0 - 25.9	1	1							1				
26.0 - 26.9	0	0											
Totals	156	143	12	59	50	13	11	5	5	0	0	1	0
Percent			7.7	37.8	31.9	8.4	7.1	3.2	3.2	0.0	0.0	0.6	0.0
	Mean Length (in)		7.8	13.7	16.5	18.2	18.8	20.8	22.5			23.1	
	Standard Deviation		0.41	0.66	1.19	2.42	1.60	2.19	2.50				
	Minimum Length (in)		7.1	12.2	12.5	14.6	16.9	19.3	19.4			23.1	
	Maximum Length (in)		8.6	15.6	18.5	23.3	21.4	24.6	25.7			23.1	

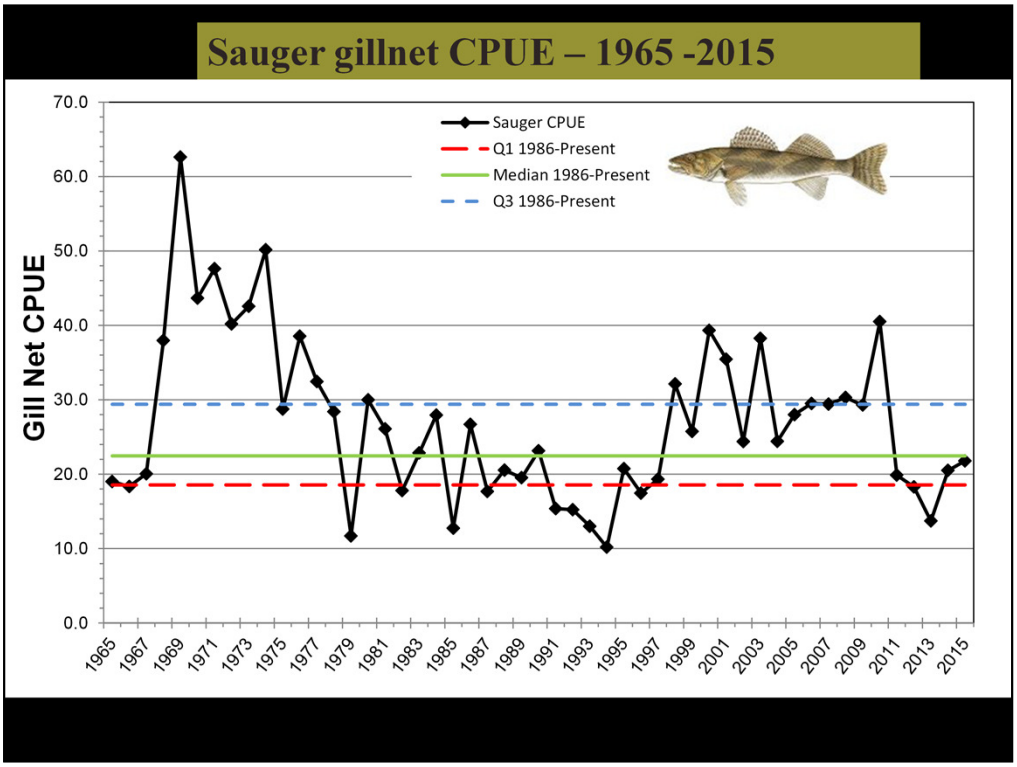
* Unable to age fish in this group.

This is an Age-Length Frequency table that shows how many Walleye of each age group were captured in the gillnets in 2015 by one inch increments. For example there were 59 Age-1 Walleye (hatched in 2014) that were between 12.2 and 15.6 inches in length. The sample size column represents the total number of Walleye sampled from that length group in the gill nets in 2015. The subsample size column represents the number of fish for each size group that I aged by removing a bone called an otolith (ear stone) from inside the fish's head. This bone can then be cracked in half, toasted over a candle flame, and looked at under a microscope where the heat from the candle causes distinct light and dark annual rings to emerge much like those found on a cross section of a tree. When all of the fish in a size group are not aged the unaged fish are proportionally distributed across the represented ages indicated by those fish that were aged.

One important thing to note when looking at Age-Length Frequencies, particularly for Lake Pepin, is the speed at which the fish, Walleyes in this case, are growing. This growth is much faster than most other bodies of water in Minnesota when combined with what is also a relatively short lifespan (typically <10 years in Lake Pepin and potentially >20 in the northern lakes in MN) and represents some interesting management and regulation challenges.

Also important to note on Walleye in particular the 2008 year class (Age-7)

appeared weak (but present) in the YCSI figure, but no individuals were captured in the 2015 gill nets. This may be due to the potential for Walleye to outgrow our nets (get too big to be sampled effectively by our gear), it may be due to the fact that they have been in the harvestable size for four years and have likely experienced considerable angling pressure, or it may be due to natural mortality from old age or in the case of a year like 2012 an extended period of time with water temperatures near or above 90 °F.

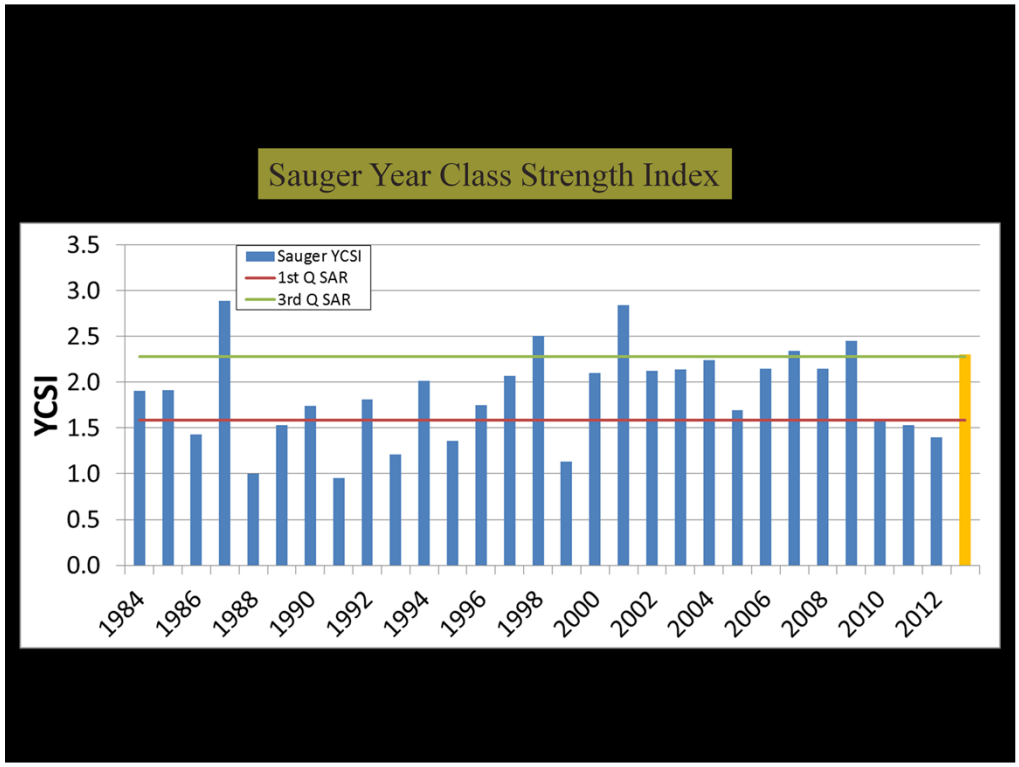


See Slide 2 for more complete description of this type of figure.

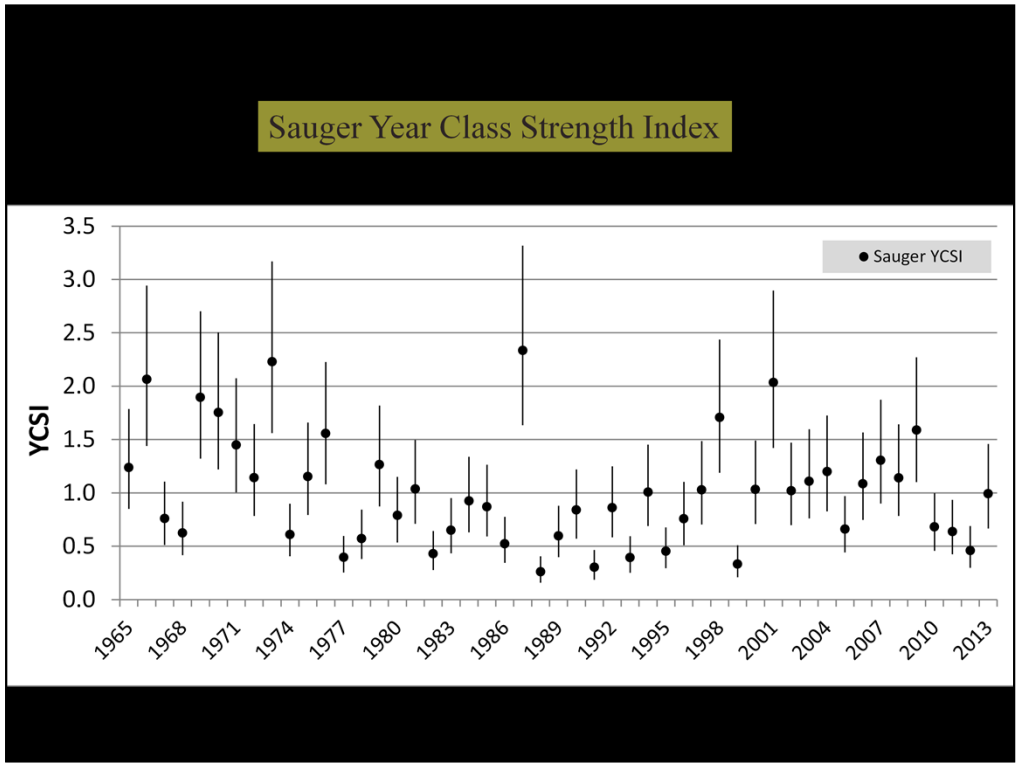
This figure shows that Lake Pepin's Sauger population is down from recent high levels driven by the incredibly strong 2001 year class and a series of strong year classes in the late 2000s.

While the catch number has fallen to below the median for the 1986-Present dataset it remains high compared to most other lakes in MN. The dramatic drop between 2010 and 2011 remains a bit of a mystery, but may be partially due to high water and open dams allowing fish populations to freely move around the river system (This assertion was supported by Xcel Energy sampling which showed dramatic increases in catch rate for Sauger and Walleye in lower Pool 3 in 2011 indicating likely upstream migration). Regardless, the relatively low YCSI for Sauger in 2010, 2011, and 2012 have not produced an abundance of surplus fish to rapidly increase net catch, but the apparently strong year-class of Sauger in 2013 bumped the 2014 net catches up by more than 25% from 2013.

The 2015 net catches confirm that 2013 produced a strong Sauger year class. Though catch rates did not increase as much as with Walleye I anticipate it will likely increase again in 2016 as the 2014 year class recruits more fully to the gill nets.

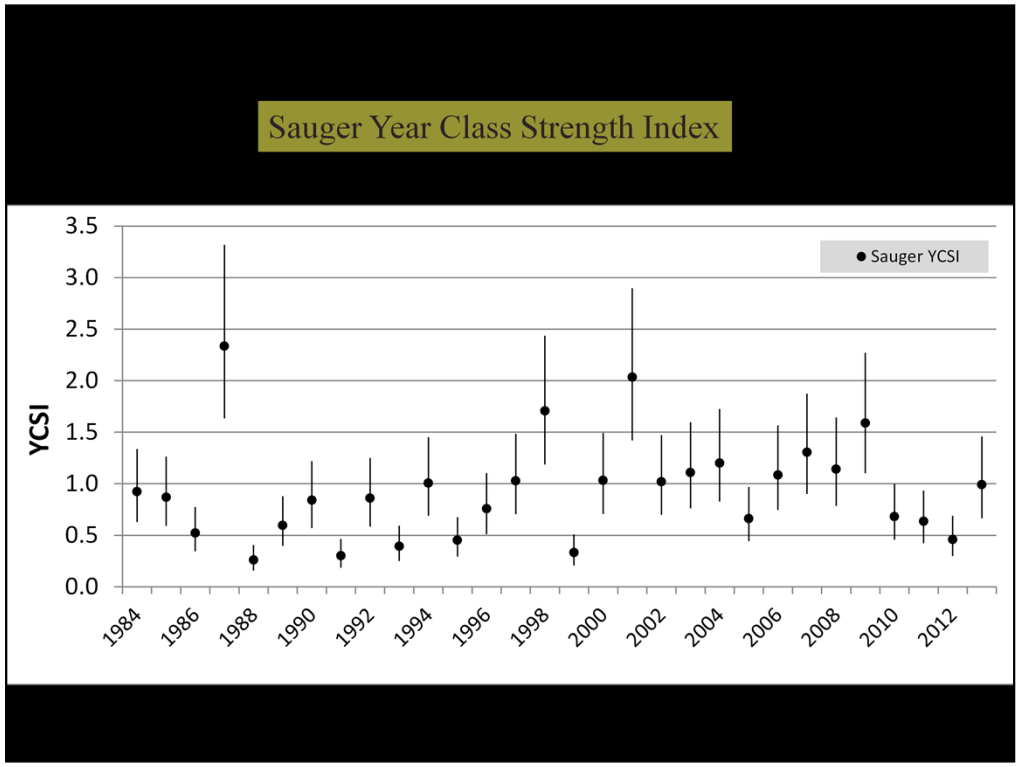


Lake Pepin Sauger have been incredibly consistent in their reproduction during the early 2000s, with no year class until potentially the 2011 year class being considered weak. While it is important to get another good year class before too long in a system where sauger rarely live longer than 10 years one important thing to consider is the effect of long term high production on expectations and metrics. Continued strong production shifts both angler expectations and averages (net catch, YCSI, etc) higher such that what was once considered good might now be considered average. That being said, 2015 sampling confirmed that 2013 produced a strong year-class, representing almost 75% of the Sauger captured. For the second year in a row we were unable to complete our fall Young of Year Walleye & Sauger sampling in November. In 2015 Lake Pepin froze abruptly preventing the sampling and in November of 2015 high water prevented effective sampling, but despite what appeared to be poor spawning conditions in the spring of 2015 there are indications from other sampling efforts that more reproduction might have occurred than we expected.

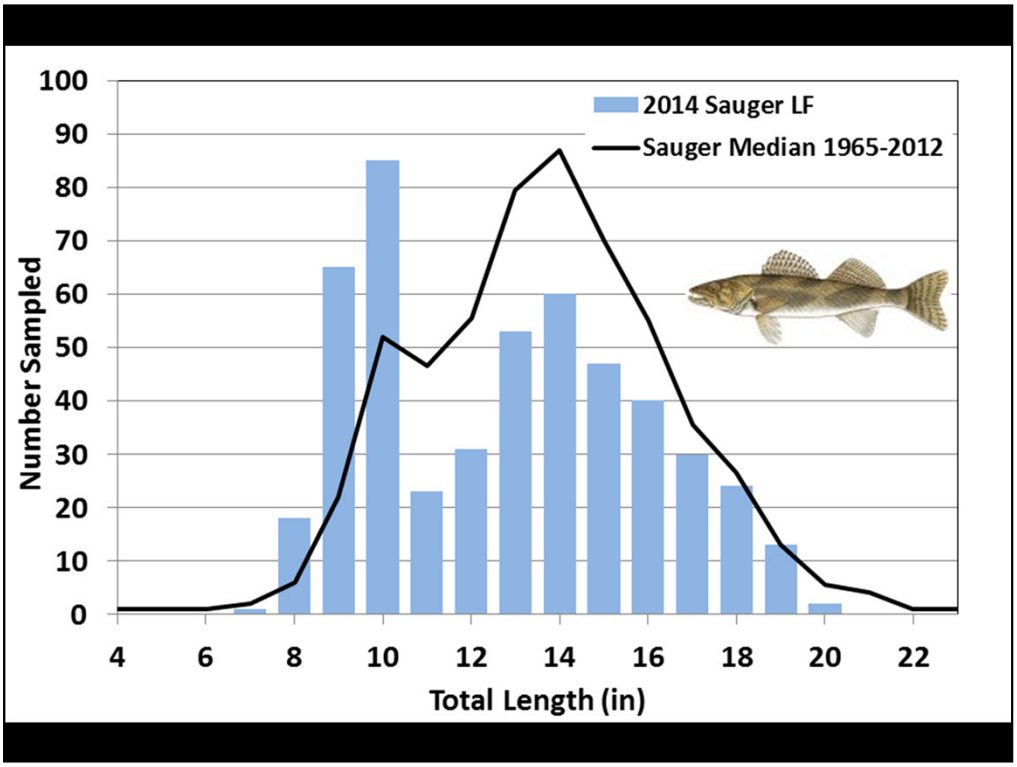


See Slide 4 for more description

Note: The estimate of year class strength relies on 3 years of catch data, so the last two estimates will typically have longer lines above and below them because they are estimates with only partial data. In this case I would expect the lines to tighten up around the 2013 year class estimate as we gather more data in the coming years.



Shows the same information as the previous slide with the time span shortened to the period that the Large Lake program has been in place on Lake Pepin.

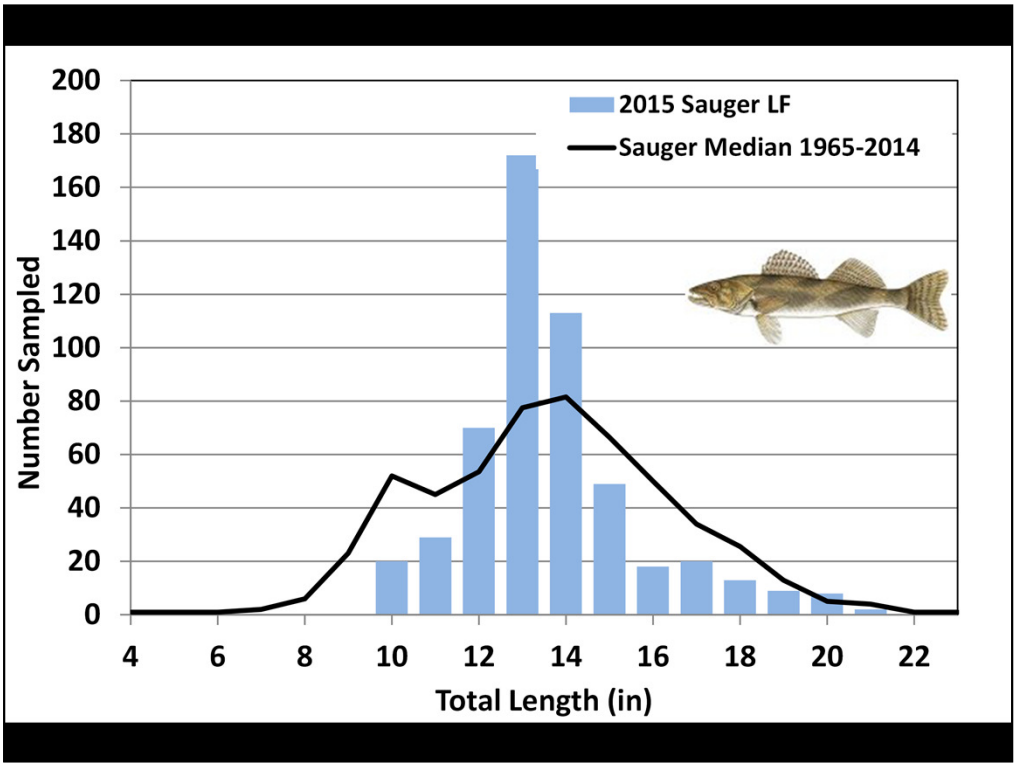


See Slide 6 for a more complete description of this figure.

The Sauger catch in 2014 clearly shows the good production of Sauger in 2013 (8”-10”) as well as the general underrepresentation of the previous three years of production. Unlike the past year or two however the larger size classes of Sauger (18”+) though not abundant, are once again available to anglers.

Because Sauger often don’t fully recruit to our gillnets until Age 2 we will likely see the peaks in the 9 and 10 inch columns go up next year during the 2015 netting as they recruit more fully to the gear as Age-2 fish.

Note: This Slide is a carry over from the 2014 sampling season to be used as a comparison with the next slide to visualize the movement of a strong 2013 year class through the size structure.



This slide represents the number of Sauger from each 1 inch size group that was captured in the 2015 gillnets (blue bars) and the long term median for the same information from 1965-2014 represented by the black line.

As you can see the 2013 year class is represented here primarily by the 12-15 inch range (mean length for females ~ 14" mean length for males ~ 13") and are clearly over performing the long term median as indicated in the YCSI slide. Also the 20" fish are present in slightly higher than average for the first time in several years.

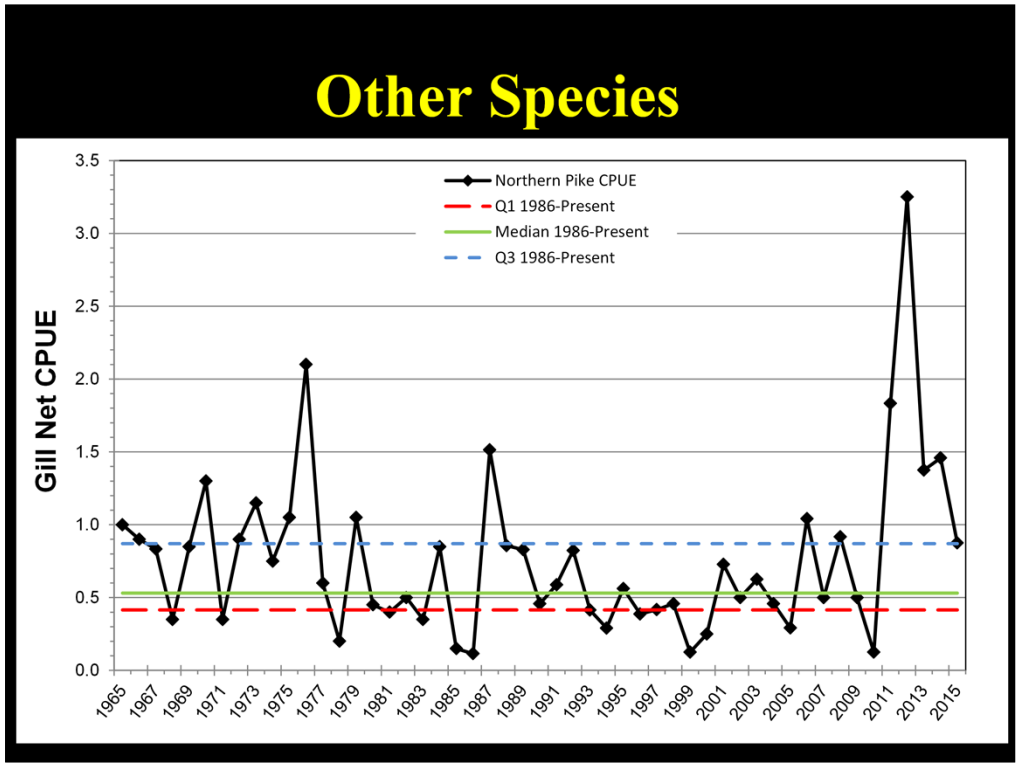
Comparing this slide to the previous one will clearly show the progression of the 2013 year class. Read my notes from last year and not the scale on the y-axis which doubles between the two slides.

Length Group	Sample size	Subsample size	Age 0	1	2	3	4	5	6	7	8	9	10
5.0 - 5.9	0	0											
6.0 - 6.9	0	0											
7.0 - 7.9	0	0											
8.0 - 8.9	0	0											
9.0 - 9.9	0	0											
10.0 - 10.9	20	20		19	1								
11.0 - 11.9	29	23		18	11								
12.0 - 12.9	70	29		2	68								
13.0 - 13.9	172	43			168	4							
14.0 - 14.9	113	32			106	7							
15.0 - 15.9	49	27			31	11	5	2					
16.0 - 16.9	18	18			2	7	5	3	1				
17.0 - 17.9	20	19			2	11	2	2	3				
18.0 - 18.9	13	13				4	4	2	3				
19.0 - 19.9	9	9						7	2				
20.0 - 20.9	8	8						1	6		1		
21.0 - 21.9	2	2							1			1	
Totals	523	243	0	39	389	43	17	17	16	0	1	1	0
Percent			0.0	7.5	74.3	8.3	3.2	3.2	3.1	0.0	0.2	0.2	0.0
	Mean Length (in)			11.0	13.8	16.6	16.8	18.4	19.2		20.9	21.3	
	Standard Deviation			0.49	1.26	1.22	1.18	1.47	1.38				
	Minimum Length (in)			10.1	10.3	13.7	15.1	15.4	16.5		20.9	21.3	
	Maximum Length (in)			12.6	17.8	18.4	18.5	20.2	21.3		20.9	21.3	

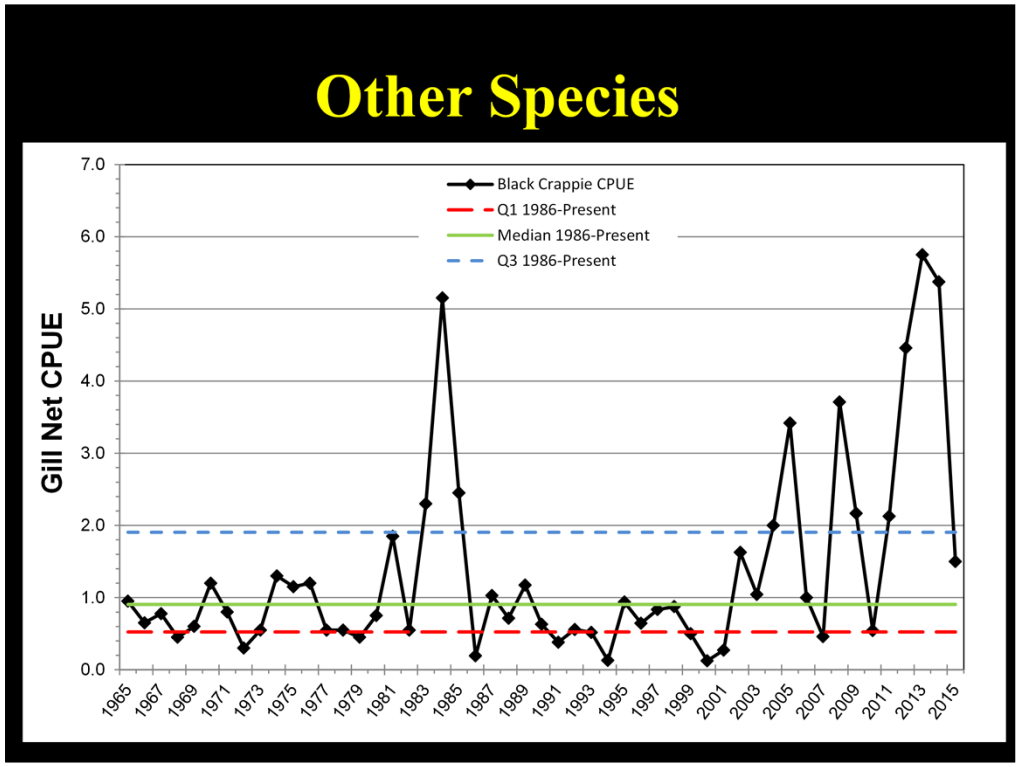
* Unable to age fish in this group.

See Slide 5 for a more complete explanation of this figure.

I have often told groups that Lake Pepin Sauger rarely live longer than 10 years (particularly females) and this year we only made it to Age-9.

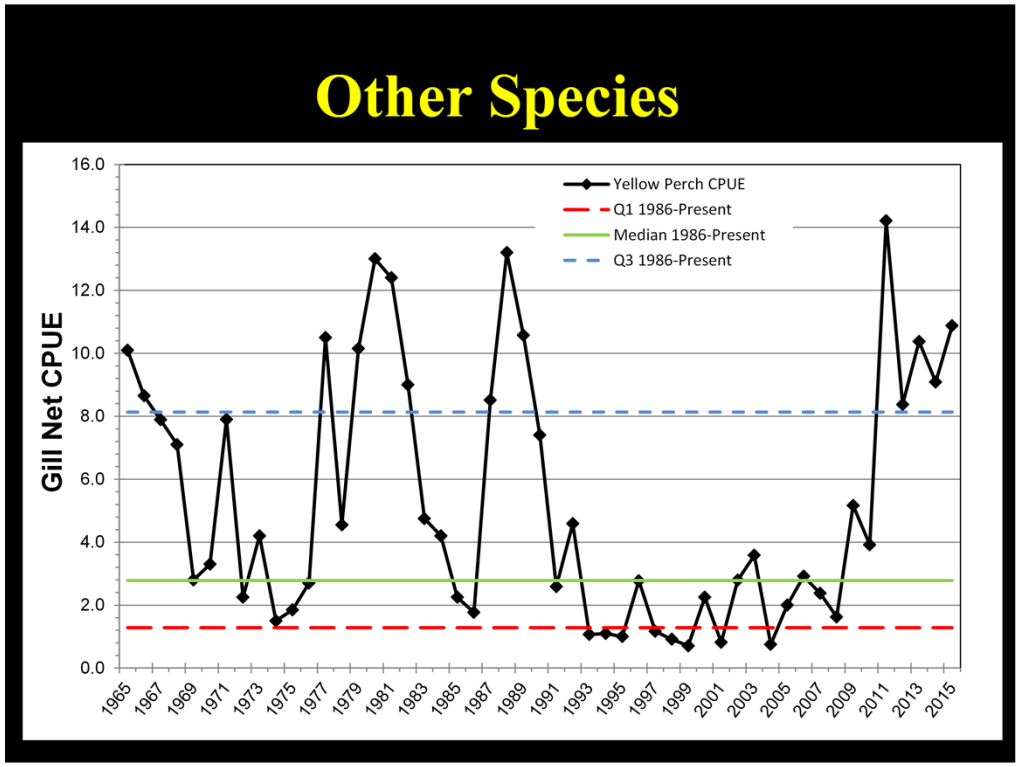


Northern Pike gill net catch history showing the recent increase in Northern Pike population likely as a result of increased water clarity and submerged aquatic vegetation. Though the recent catch rates have come down considerably they are still quite good compared to the past, and there are many large fish in the system.

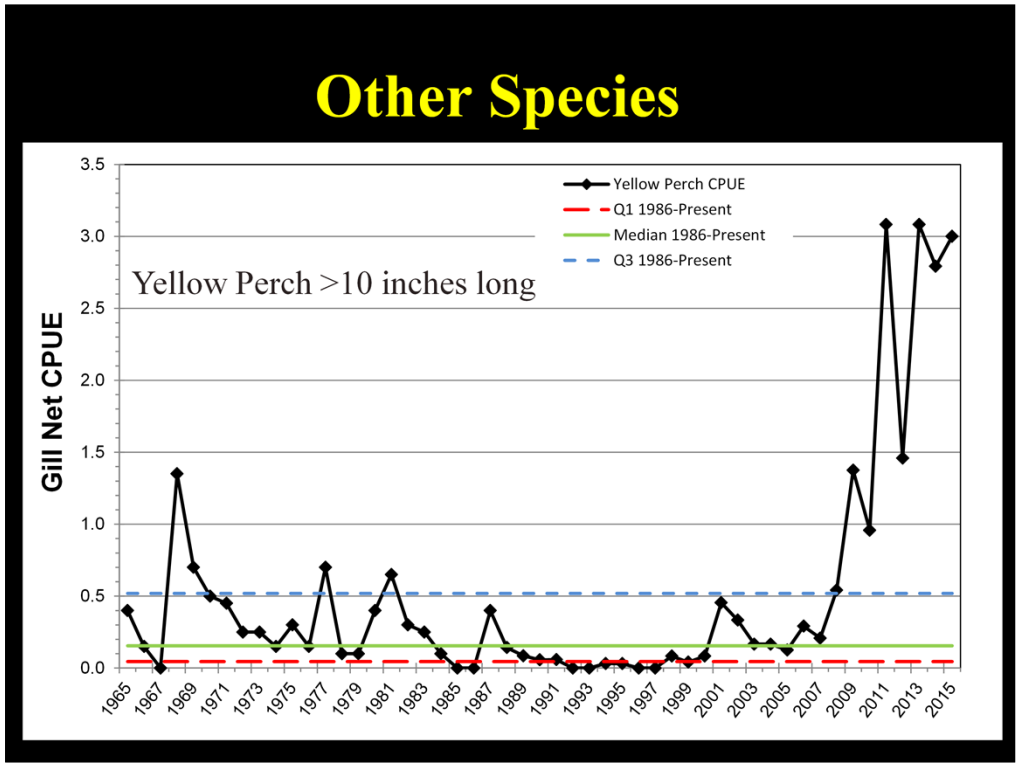


Black Crappie gill net catch history showing the recent increase in Black Crappie population likely as a result of increased water clarity and submerged aquatic vegetation combined with the last three years of record breaking or near record breaking Black Crappie year-classes in Lake Pepin.

Fewer YOY Black Crappie in the gill nets in 2015 led to the drop in overall catch rates, but there are still good numbers of crappies in the system. Many of the peaks in the graph above come from high numbers of YOY crappie that wedge easily in the nets unlike the deep bodied adults, so often the peak years in the figure above represent good reproduction as opposed to high numbers of catchable fish that would be represented by a similar graph of Walleye catch.



Yellow Perch gill net catch history showing the recent increase in Yellow Perch population likely as a result of increased water clarity and submerged aquatic vegetation needed for perch reproduction.



Gill net catch of Yellow Perch >10" showing the recent and unprecedented increase in the population of large Yellow Perch.

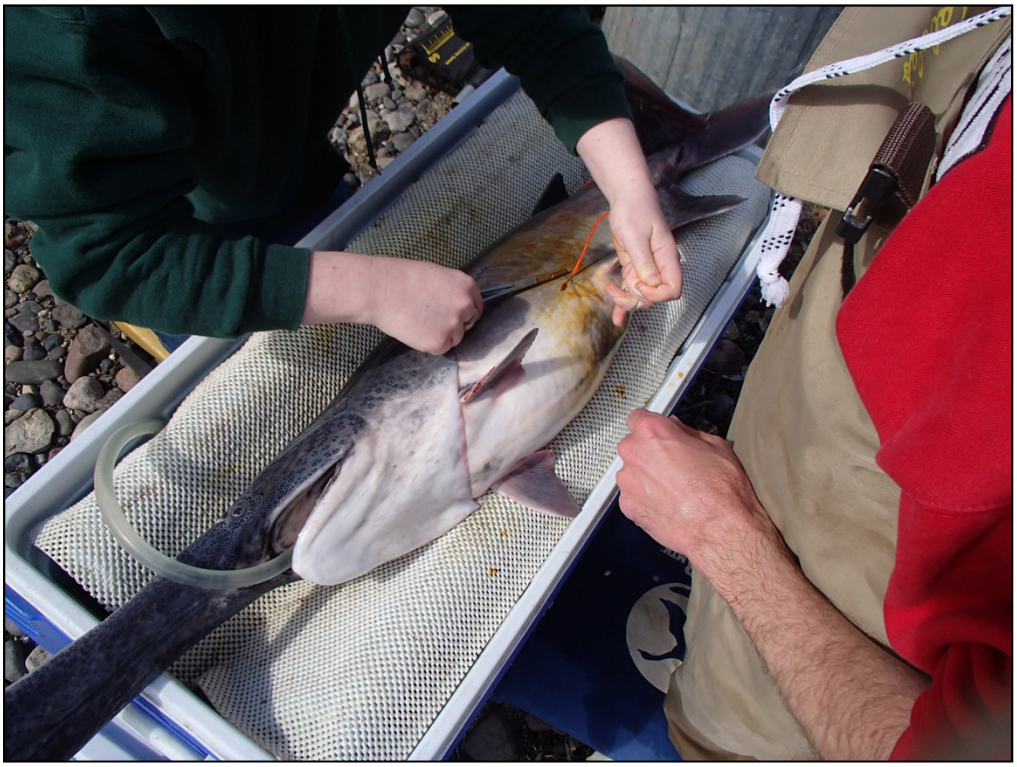
Preparing to surgically implant acoustic transmitters into 10 Paddlefish as part of a tracking study begun in spring of 2015.

Use of a bilge pump as a respirator to keep water flowing over the gills of a Paddlefish during surgery.

An incision is made into the side of a Paddlefish to insert the acoustic transmitter that is approximately 4” long by 1/2” in diameter and inserted into the body cavity of the fish.

Sutures are used to close the incision.

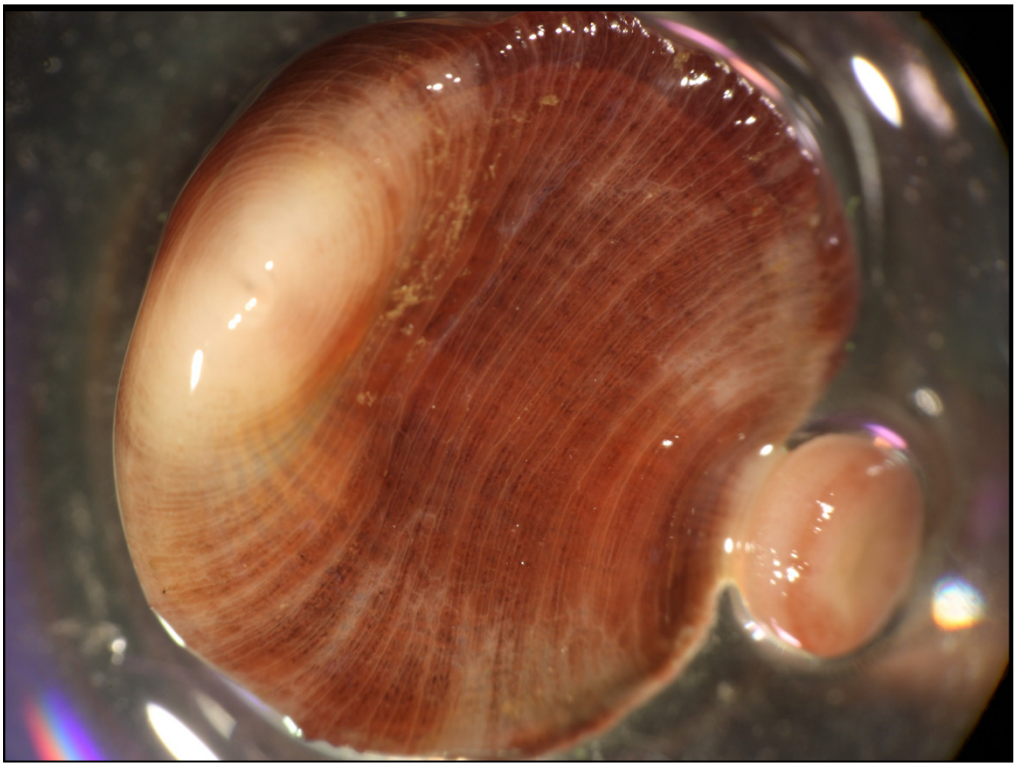
Not the orange tag on the dorsal fin in the lower left hand corner. There is also an orange tag inserted into the incision and secured with the sutures.



Locking second orange tag in place using sutures.

Returning Paddlefish to recovery pen after surgery note the two orange tags.

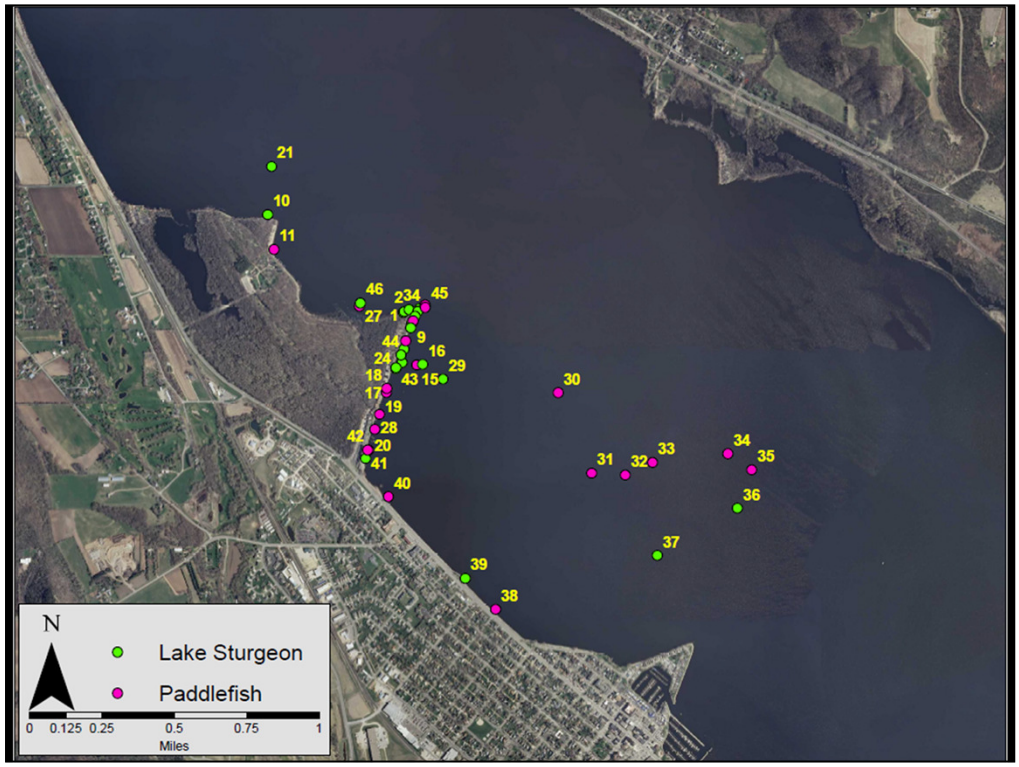
After tagging the 10 Paddlefish were released near the DNR office in Lake City and within ~24 hours all the fish had been picked up either near the head or foot of the lake, and with one exception that will be noted later all 10 fish moved extensively throughout Pool 4 and into some of the tributaries like the Chippewa R. throughout the summer.



We worked with some researchers from the Smithsonian to gather some samples of a host specific leech that targets Freshwater Drum in a small side project over the summer.

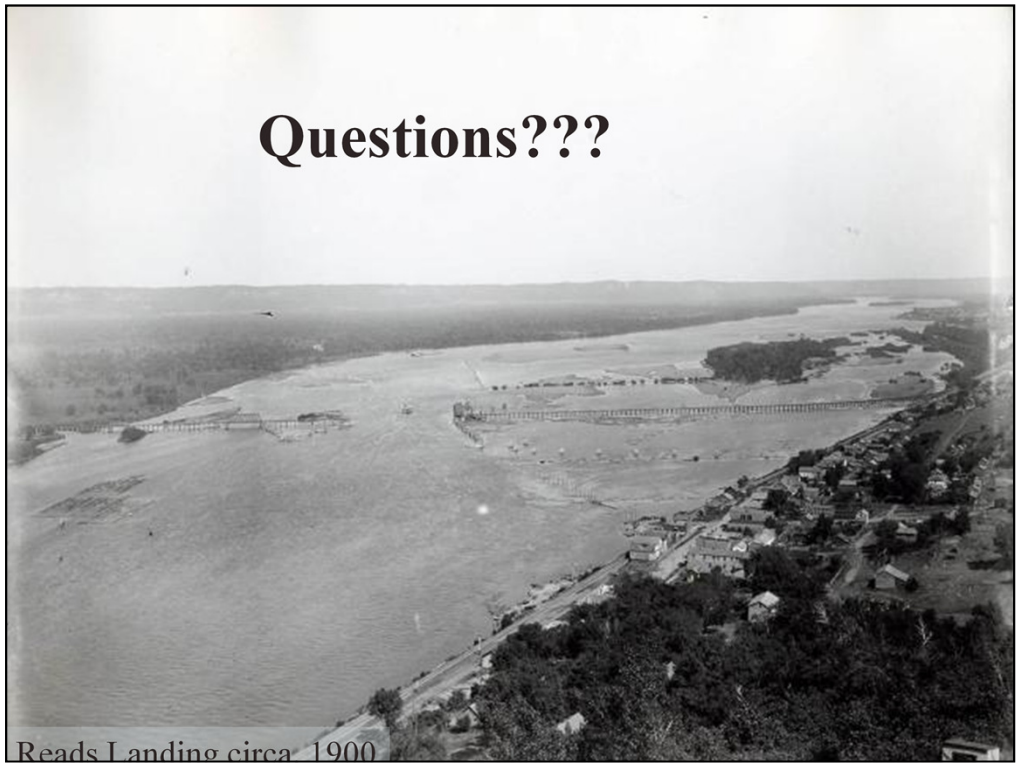
A photo of one of the leeches attached to the isthmus (area between the gills on either side of a fishes head). When you know where to look the adult and engorged leeches were very obvious.

A picture of the characteristic wound left by one of the leeches after feeding.



A map of Lake Sturgeon and Paddlefish mortalities from an event in the summer of 2015 involving bycatch in a commercial gill net fishery. As a result the commercial gill net fishery on Lake Pepin was suspended for the summer and is being evaluated with other commercial fishing regulations on the border waters. Commercial seining (which is not an entanglement gear and poses much lower mortality risk for Paddlefish and Lake Sturgeon) remains open on Lake Pepin.

Unfortunately the Paddlefish in this picture was one of our tagged paddlefish from the spring. We were able to recover the transmitter and hope to implant it again in a new fish in the spring of 2016 when we are planning on tagging approximately 15 more Paddlefish and 25 Lake Sturgeon to add to our tracking study.


Questions???
Reads Landing circa 1900