

# Summary Report

## Results of Fyke Netting for Northern Pike in the Goose Island/Stoddard Lake Unit, Navigation Pool 8 of the Upper Mississippi River, Spring 2013

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4 April 2013, Miss. R., Goose Is.



5 April 2013, Miss. R., Goose Is. Checking reproductive condition and sex of n. pike.

## Purpose

The purpose of this work is to continue to monitor the spring population length frequency and catch per unit effort of northern pike and yellow perch in Navigation Pool 8 of the upper Mississippi River.

## Methods

Standard Upper Mississippi River Conservation Committee (UMRCC) fyke nets were set by WDNR personnel. These fyke nets had a 50ft floating lead line, 3ft high 6ft wide frame, and a 0.75 inch bar mesh.

Nets were set at locations thought likely to catch northern pike on spawning runs from April 2 through April 16, 2013 (Figure 1). Over the sampling period, nine different locations were chosen in the Goose Island area, in La Crosse and Vernon counties, Wisconsin and were first set when backwater lakes were completely ice covered. Winter ice was completely gone by April 8 – six days after the first day of netting.

Up to six nets fished on any day, for a total of 34.57 net-days (24 hours) and were emptied every day or every other day during which all northern pike (*Esox lucius*) and yellow perch (*Perca flavescens*) were counted, measured in total length, sexed and their reproductive status was determined. In addition, northern pike were weighed using a hanging Chatillon® spring scale. Sex and reproductive status were determined primarily by the type and ease of which gametes were expressed through the urogenital pore. Fish were either classified as male or female based on the expression of sperm or eggs after manual massage of the abdomen. Based on the ease of and amount of gamete release, both males and females were classified as either green, immature, partially spent, ripe, or spent. For those northern pike that did not express gametes, sex was determined by visual examination of the urogenital region (Casselman, 1974). Sampling ceased nearly to the point in time where the percentage of green female northern pike decreased to nearly zero.

Water temperature was taken at each net every day it was emptied. Water surface elevations for the US Army Corps of Engineers Brownsville gage was found at the St. Paul District's Water Control Center website (<http://www.mvp-wc.usace.army.mil/index.shtml>).

This 2013 data was compared to data similarly collected by the Wisconsin Department of Natural Resources (WDNR) during 1964 in upper Pool 8 (Finke, 1966), 1976 in upper Pool 8 (WDNR Unpublished), 2008 collected in the middle of Pool 8 (Heath, Bailey and Von Ruden, 2009), 2010 collected about 4 river miles upstream of the 2013 Goose Island/Stoddard sampling area on the Minnesota side of the river (Heath, Von Ruden, Schweitzer and Stuhr, 2010) and 2012 (WDNR, 2012) at very similar locations to the 2013 sampling.

Statistical tests were done using SAS® (2002-2003) software for Windows version 9.13's General linear models (ANOVA and ANCOVA) and were done at the  $\alpha=0.05$  level. For catch per effort calculations, tests of means were done natural logarithm transformed data.

## Findings

### Relative abundance

A total of 424 northern pike was caught. Of these, 420 were sexed, 419 had their reproductive condition recorded and 269 were weighed. A total of 415 yellow perch was caught. Of these, 326 were sexed, 316 had their reproductive condition recorded and none were weighed. In addition to these two target fishes, thousands of non-target fish, primarily bluegill, were caught and immediately released. Also, a single brown trout and a tiger trout were caught.

### Water Temperature and Elevation

During 2013, water temperature varied from 1.6 to 5.8°C with a mean of 3.3°C and trended toward slightly rising over the 10 days of sampling (Figure 2). Elevations were fairly stable during sampling and varied as much as 1.2ft. Mean water surface elevation was 0.3ft higher than the mean from 1939 to 2012.

### Sex Ratios

Of the 420 sexed northern pike, 169 (40.2%) were females, 250 (59.5%) were males and 1 (0.2%) was unknown (Table 1). The sex ratio was 1 female to 1.48 males. This compares to 1 female to 2.0- 2.3 males in other studies (Becker, 1983). For WDNR surveys done on Pool 8 sex ratios were 1 to 3.24 in 1976, 1 to 1.15 in

2008, 1 to 0.37 in 2010 study and 1 1.65 in 2012. This suggests that in 2013, there were about the same proportion of females relative to males when compared to other investigations.

**TABLE 1. SEX AND REPRODUCTIVE CONDITION OF SPRING 2013 NORTHERN PIKE, GOOSE ISLAND/STODDARD LAKE UNIT.**

SEX	REPRODUCTIVE CONDITION				
	Green	Immature	Partially Spent	Ripe	Spent
Female	78	1	8	80	2
Male	33		0	217	0
Unknown	0	1	0	0	0

Of the 326 yellow perch that had sex recorded, 168 (51.5%) were females, 148 (45.4%) were males and 10 (3.1%) were unknown (Table 2). The sex ratio was 1 female to 0.88 males. This compares to 1 female to 2.25 males during 2010, 1 female to 1 male in the 2008 study and 1 female to 1.31 males in the 2012 investigation, This suggests a smaller proportion of males in the 2013 investigation compared to other years.

**TABLE 2. SEX AND REPRODUCTIVE CONDITION OF SPRING 2013 YELLOW PERCH, GOOSE ISLAND/STODDARD LAKE UNIT.**

SEX	REPRODUCTIVE CONDITION				
	Green	Immature	Partially Spent	Ripe	Spent
Female	165	0	0	3	0
Male	12	0	0	136	0
Unknown	0	10		0	0

### Northern Pike Male Size Structure

Mean total length for all 2013 males was 20.77 inches (n=244, minimum=8.07, maximum=30.51 (Figure 4). A total of 43.43 percent was greater than 21 inches. In 2012, mean length of males was 19.58 inches (n=328, minimum=8.11, maximum=28.7 (Figure 5) (Table 3). A total of 41.60 percent was greater than 21 inches. Mean total length for all 2010 males was 22.39 inches (n=40, minimum= 13.39, maximum=38.2) (Figure 6). A total of 60.0 percent was greater than 21 inches. During 1976, the mean total length for all males was 22.94 inches (n=847, minimum=10.5, maximum=32.9, standard deviation = 3.25) (Figure 7). A total of 72.56 percent was greater than 21 inches. During 2008, the mean total length for all males was 20.57 inches (n=152, minimum= 8.47, maximum=26.77, standard deviation=3.46) (Figure 8). A total of 43.42 percent was greater than 21 inches. The mean total length for 2013 males was significantly different from all years except 2012 and 2008 (Table 3). The magnitude of this difference between the earlier years and the 2000's was 3 inches.

There was no significant change in total length of males through the 2013 sampling period (n=244,  $r^2=0.0049$ ,  $P=0.2777$ ) (Figure 9) suggesting that the size of males leading up to and during the initial period of spawning did not increase as others have observed (Priegel and Krohn, 1975).

In the present investigation, all of the males caught were sexually mature. The smallest sexually mature male was 8.1 inches in total length. This compares to size at maturity of 16-18 inches for lakes and 11 inches for the Mississippi River, Pool 8 reported by Becker (1983).

A trend analysis of mean lengths of males from 1964 through 2013 from fyke nets shows a significant decrease in size ( $p<0.0001$ , slope = -0.0734). This suggests a decrease in mean size of males of 3.7 inches over

the past 50 years. This decline in size has been noted in another investigations on the upper Mississippi River (WDNR, 2008; Heath et al., 2009).

**TABLE 3. MEAN LENGTH OF MALE NORTHERN PIKE, 1964-2013.**

Year & Location	Mean Length (inches)	Standard Deviation	Minimum	Maximum	n	Percent > 21 inches	Different (means with the same letter are not Sign. Different)
1964, Pool 8	23.73	3.90	11.50	33.5	210	79.52	A
1976, Pool 8	22.94	3.25	10.50	32.9	847	72.56	AB
2010, Pool 8	22.39	5.02	13.39	38.2	40	60.00	B
2008, Pool 8	20.57	3.46	8.47	26.8	152	43.42	C
2012, Pool 8	19.58	4.08	8.11	28.7	328	41.60	C
2013, Pool 8	20.77	3.17	8.07	30.5	250	43.43	C

### Northern Pike Female Size Structure

Mean total length for all 2013 females was 23.66 inches (n=169, minimum=11.1, maximum=35.2 (Figure 10). A total of 34.32 percent was greater than 25 inches. Mean total length for all 2012 females was 21.94 inches (n=199, minimum=8.15, maximum=41.34 (Figure 11). A total of 85.32 percent was greater than 25 inches. In 2010, the mean total length for all females was 30.94 inches (n=109, minimum= 17.3, maximum=40.6, standard deviation= 5.17) (Figure 12) (Table 4). A total of 85.3 percent was greater than 25 inches. During 2008, the mean total length for all females was 25.59 inches (n=131, minimum= 12.21, maximum=39.37, standard deviation= 5.325) (Figure 13). A total of 46.56 percent was greater than 25 inches. During 1976, the mean total length for all females was 26.36 inches (n=262, minimum=16.50, maximum=36.50, standard deviation=4.413) (Figure 14). A total of 58.40 percent was greater than 25 inches. During 1964, the mean total length for all females was 28.73 inches (n=146, minimum=19.50, maximum=40.50, standard deviation=4.836) (Figure 15). A total of 73.29 percent was greater than 25 inches.

During 2013, the mean size of females was smaller than all previous years except for 2012 ( $p < 0.001$ ) (Table 4). Means from 1976 and 2008 were the same. The greatest mean size was caught in 2010.

There was a significant change in total length of females through the 2013 sampling period (n=165,  $p = 0.0034$ ) suggesting that the size of females captured during sampling did increase (Figure 16). In contrast, from 1989 through 2007, no trend in female size was documented during the spawning season in Navigation Pool 9 of the upper Mississippi River (WDNR, 2008). In 2012 we did observe an increase in female size (WDNR, 2012).

In the present investigation, 168 of the 169 total females found were gravid. The smallest female found gravid was 16.1 inches in total length. This compares to size at maturity of 20-22 inches for lakes and 20-36 inches for the Mississippi River, Pool 8 reported by Becker (1983).

As with males, a trend analysis of mean lengths of females from 1964 through 2013 from fyke nets shows a significant decrease in size ( $p < 0.0001$ , slope = - 0.0695). This suggests a decrease in mean size of females of 3.5 inches over the past 50 years.

TABLE 4. MEAN LENGTH OF FEMALE NORTHERN PIKE, 1964-2013.

Year & Location	Mean Length (inches)	Standard Deviation	Minimum	Maximum	n	Percent > 25 inches	Different (means with the same letter are not Sign. Different)
2010, Pool 8	30.94	5.17	17.3	40.55	109	85.32	A
1964, Pool 8	28.73	4.836	19.50	40.50	146	73.29	B
1976, Pool 8	26.36	4.413	16.50	36.50	262	58.40	C
2008, Pool 8	25.59	5.325	12.21	39.37	131	46.56	C
2012, Pool 8	21.94	8.100	8.15	41.34	199	85.32	D
2013, Pool 8	23.66	4.52	11.06	35.16	169	34.32	D

### Proportional Size Structure

Proportional Size Structure for quality northern pike (PSS<sub>Q</sub>) in Pool 8 as summarized by the Graphical Fish Data Browser ([http://www.umesc.usgs.gov/data\\_library/fisheries/graphical/fish\\_front.html](http://www.umesc.usgs.gov/data_library/fisheries/graphical/fish_front.html)) of the Long Term Resource Monitoring Program (LTRMP) suggests a statistically significant ( $p=0.0001$ ) downward trend from 1993 to 2012 (Figure 17). This suggests that quality size fish have gradually comprised a smaller proportion of the sample. This data contained both male and females since fish were not sexed.

We looked for any similar patterns in 1964-2013 WDNR data. For males and both sexes combined, there was a significant decreasing trend in PSS<sub>Q</sub> (Figures 18 – 20) ( $p=0.0084$  and  $0.0491$ , respectively). This trend is consistent with the observed decrease in mean size. There was no significant trend for females ( $p=0.1686$ ), although, as noted above, the mean size has decreased.

### Spawning Progression

Unlike some previous years, during 2013 we did not continue sampling until most female northern pike were spent. We discontinued sampling when about half of the females were partially spent. In 2013, most northern pike females were green (46.15%), followed by ripe (47.34%), partially spent (4.73%), spent (1.18%) and sexually immature (0.59%). Reproductive condition changed through time. During the first three days of sampling, a total of 71% of sexually mature females was green, During the last 3 days of sampling, 12.5% were green (Figure 2). Spawning *runs* have been recorded to occur at temperatures between 1.1 and 4.4°C (Becker, 1983). These temperatures correspond to our highest catch rates, (see Figure 21) but not our observed spawning temperatures. Interestingly, nearly our entire sampling period was done within this temperature window, yet, mean catch rates decreased through time. This suggests that the lower end of this temperature window initiates a spawning run and the run decreases even though the temperature may not rise.

In 2013, 98.2% of yellow perch females were recorded as green, followed by 1.79% ripe. Reproductive condition did not change through time (Figure 3) unlike previous years. This is probably due to the sustained, low water temperatures and the climatologically early netting season. In previous years, the proportion of ripe and green females precipitously fell when water temperatures exceeded 9.1°C. The maximum mean water temperature we saw during 2013 was 4.4 °C. Spawning *runs* have been recorded to occur at temperatures between 7.2 and 11.1°C (Becker, 1983). In the present investigation, the spawning run peaked when the water temperature was about 4.3°C (Figure 21).

### Catch per Effort

Mean daily 2013 catch rates by species are given in Figure 21. Northern pike catch rates peaked on the third day of netting when the water temperature was about 4.3°C, then gradually decreased as temperatures generally decreased.

For northern pike, 2013 mean catch per net-day for all sampling dates was 12.28 (Table 5). This was not significantly different than the 2008 Pool 8 catch per net-day (8.73), the 2012 (7.54), and the 1976 catch rate

(7.40). It was different from the 2010 catch rate (1.57). This suggests that, with the exception of 2010, WDNR Pool 8 catch rates have been similar through time. During hatchery netting on the Mississippi River near Guttenberg, Iowa from 1995 to 2000, the catch rate was 2.2 fish per net set (Pitlo and Rasmussen, 2004), lower than the 2008, 2012, 2013 and 1976 rates but about the same as the 2010 rate.

Trend analysis of nearly annual year-round sampling by the LTRMP from 1993 through 2012 suggests an increase in northern pike catch rates in Pool 8 through time (n=1043, p<0.0001) (Figure 22). Mean catch rates from these data are substantially lower than WDNR because LTEMP samples were not taken during the spring spawning run.

A similar examination of WDNR data from 1976-2013 did not show any trend in catch rates (n=398, p=0.1358) although trend analysis from 2008 through 2013 did show an increasing catch rate (n=232, p=0.0165, slope=1.05). This suggests that most of the evidence suggests that the abundance of northern pike in Pool 8 may have increased over the past 20 years.

**TABLE 5. NORTHERN PIKE MEAN CATCH PER NET-DAY, SPRING 2013, 2012, 2010, 2008 AND 1976.**

<b>Year &amp; Location</b>	<b>Mean</b>	<b>Standard Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>Net-Days</b>	<b>Different (means with the same letter are not Sign. Different)</b>
2013, Pool 8	12.28	19.64	0	93.86	34.57	A
2008, Pool 8	8.73	7.70	0	28.84	33.2	A
2012, Pool 8	7.54	11.16	0	62.05	71.52	A
1976, Pool 8	7.40	9.10	0	47.00	199.0	A
2010, Pool 8	1.57	2.73	0	17.71	98.9	B

Identical to northern pike, mean daily catch rates of 2013 yellow perch peaked on the third day of netting when the water temperature was about 4.3°C, then gradually decreased as temperatures generally decreased.

It appears that yellow perch abundance has significantly increased since about 1976. The 2013 mean catch per net-day for all sampling dates was 107.3. This was the same as 2012 and 2010 but significantly greater than 2008 and 1976 (Table 6). Similar increases in Pool 8 yellow perch catch rates were found in recent WDNR electroshocking conducted in the fall of 2010 and 2011 as well as the LTRMP data from 1993-2012 (Figure 22). It appears yellow perch abundance is very high compared to pre-2010 levels possibly due to substantially lower ambient suspended solids and turbidity during the last few years.

**TABLE 6. YELLOW PERCH MEAN CATCH PER NET-DAY SPRING 2013, 2012, 2010, 2008 AND 1976.**

<b>Year &amp; Location</b>	<b>Mean</b>	<b>Standard Dev</b>	<b>Min.</b>	<b>Max.</b>	<b>Net-Days</b>	<b>Different (means with the same letter are not Sign. Different)</b>
2012, Pool 8	18.60	51.86	0	334.05	71.52	A
2013, Pool 8	14.34	26.83	0	107.26	34.57	A
2010, Pool 8	8.01	14.98	0	94.0	98.91	A
2008, Pool 8	1.12	2.43	0	11.91	33.24	B
1976, Pool 8	0.29	0.76	0	6.0	199.00	B

### **Weight and Length Relationship**

Northern pike length and weight regressions using 2013 data were done for various combinations of sex and reproductive condition (Figures 24, 25). Regressions were generated for green and ripe, and all conditions combined, for both male and female fish. Regression parameters are presented in Table 7.

**TABLE 7. TOTAL LOG<sub>10</sub> LENGTH (INCHES) AND LOG<sub>10</sub> WEIGHT (POUNDS) REGRESSION PARAMETERS FOR THE EQUATION LOG<sub>10</sub>(WEIGHT) = SLOPE(LOG<sub>10</sub> (LENGTH)) + INTERCEPT.**

SEX	REPRODUCTIVE CONDITION	SLOPE	INTERCEPT	R <sup>2</sup>	N	P
F	GREEN & RIPE	3.2183	-3.8689	0.9523	112	<0.0001
M	GREEN & RIPE	3.1624	-3.8597	0.9522	150	<0.0001
F	ALL CONDITIONS	3.1649	-3.8020	0.9397	118	<0.0001
M	ALL CONDITIONS	3.1616	-3.8587	0.9522	151	<0.0001

### Conclusions

Northern pike and yellow perch continue to comprise an important part of the sport fish community in Navigation Pool 8 of the upper Mississippi River. Trend analysis of northern pike catch rates suggest an increase over the last 20 years. Yellow perch catch rates have increased about several-fold since about 2010.

There are indications, from both WDNR and LTRMP data going back to 1964, that the proportion of quality size northern pike males and both sexes combined has decreased over the years and the trend in size of each sex has also declined. This is reason for concern.

Female and male northern pike minimum size at sexual maturity in the 2013 investigation was less than found in other studies.

The abundance of northern pike in Pool 8 appears to be increasing. Two of the three trend analyses showed an increase in abundance as measured by catch per net-day. Also, the abundance of yellow perch has dramatically increased since about 2009. Both of these trends have been confirmed by convincing anecdotal reports from anglers over the past several years.

In the Mississippi River bordering Minnesota, the northern pike bag and size limits are more liberal than Wisconsin's general inland regulations. The river is open all year, with no size limit and a bag limit of five fish. Inland, the general season extends from the first Saturday in May through the first Monday in March. In the northern zone the bag limit is five fish; there is no minimum size limit. In the southern zone the bag limit is two fish, with a 26 inch minimum size limit.

In the Mississippi River bordering Minnesota, the yellow perch bag limit is slightly more liberal than the general inland regulations. The river is open all year and has a bag limit of 25 perch. Inland, the season extends all year as well, but the bag limit is a total of 25 panfish combined.

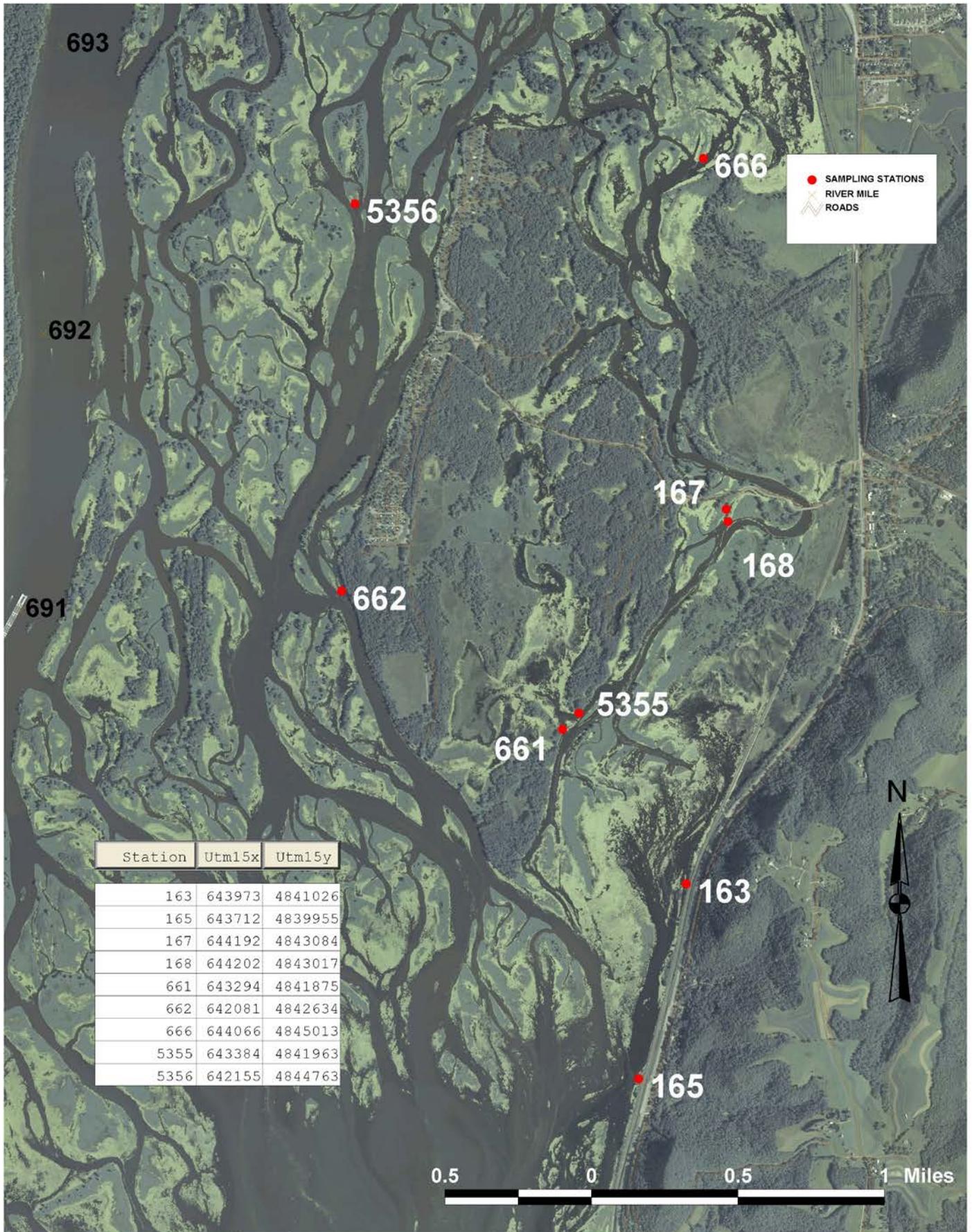
### Recommendations

1. Continue to monitoring northern pike populations in Pool 8 to verify or invalidate these findings.
2. Continue to monitoring northern pike catch by the Genoa National Fish Hatchery in Pool 9 to determine long-term trends in the upper Mississippi River outside of Pool 8.
3. Examine any other evidence of northern pike abundance and size trends on the upper Mississippi River, especially data from the Guttenberg, IA hatchery collections.

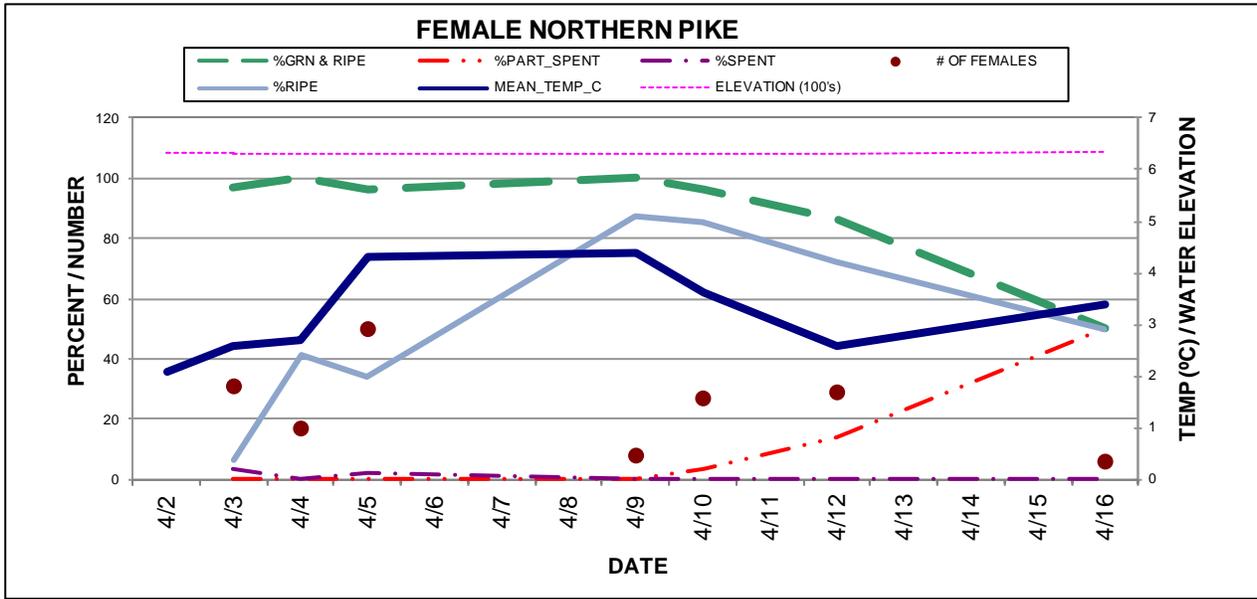
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- Wisconsin Department of Natural Resources, Mississippi River Fisheries Team. 2012. Results of Fyke Netting for Northern Pike in the Goose Island/Stoddard Lake Unit, Navigation Pool 8 of the upper Mississippi River, Spring 2012. WDNR, La Crosse, WI. 24 pp.

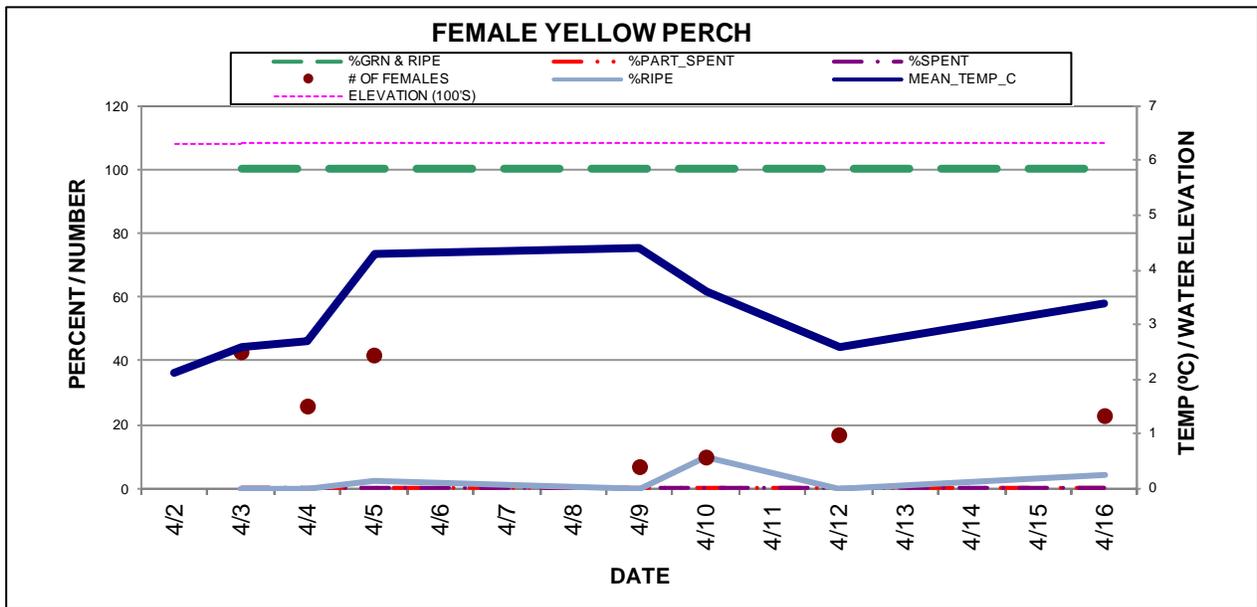
**FIGURE 1. LOCATION OF NINE FYKE NET SETS, MISSISSIPPI RIVER, NAVIGATION POOL 8, SPRING 2013.**  
*(2010 NAIP PHOTO).*



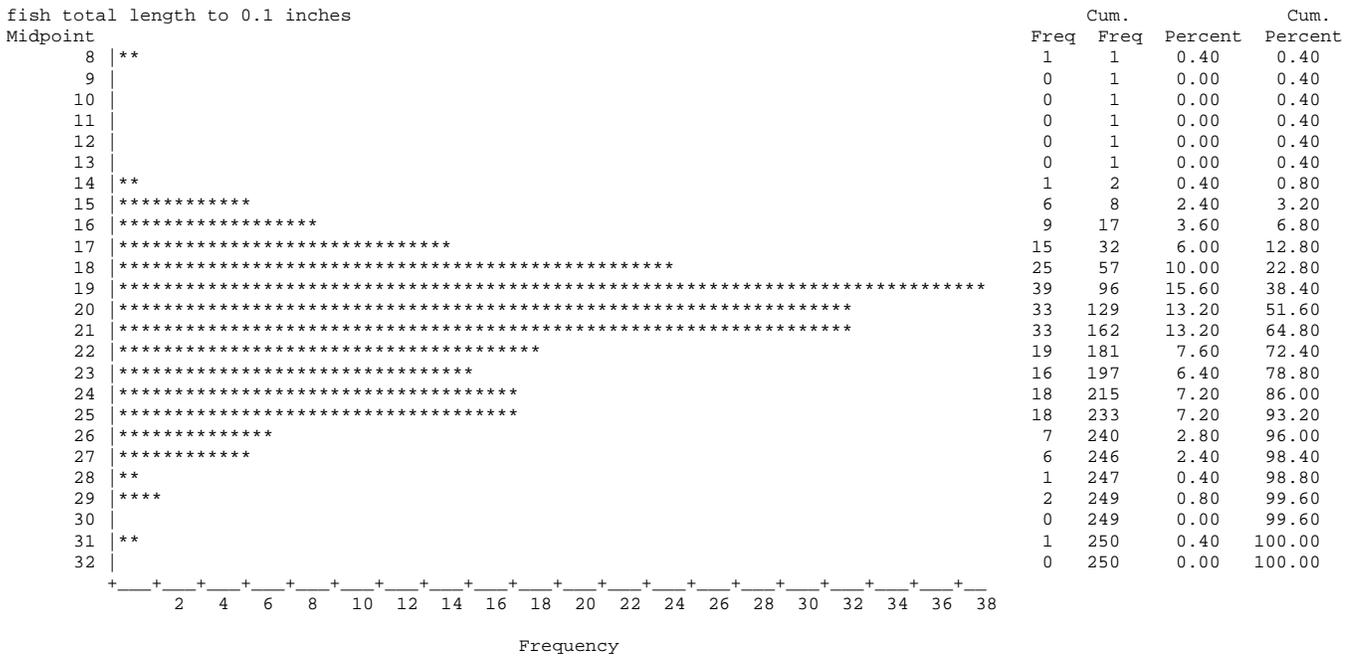
**FIGURE 2. REPRODUCTIVE CONDITION OF 2013 FEMALE NORTHERN PIKE BY DATE, TEMPERATURE AND WATER SURFACE ELEVATION.**



**FIGURE 3. REPRODUCTIVE CONDITION OF 2013 FEMALE YELLOW PERCH BY DATE, TEMPERATURE AND WATER SURFACE ELEVATION.**

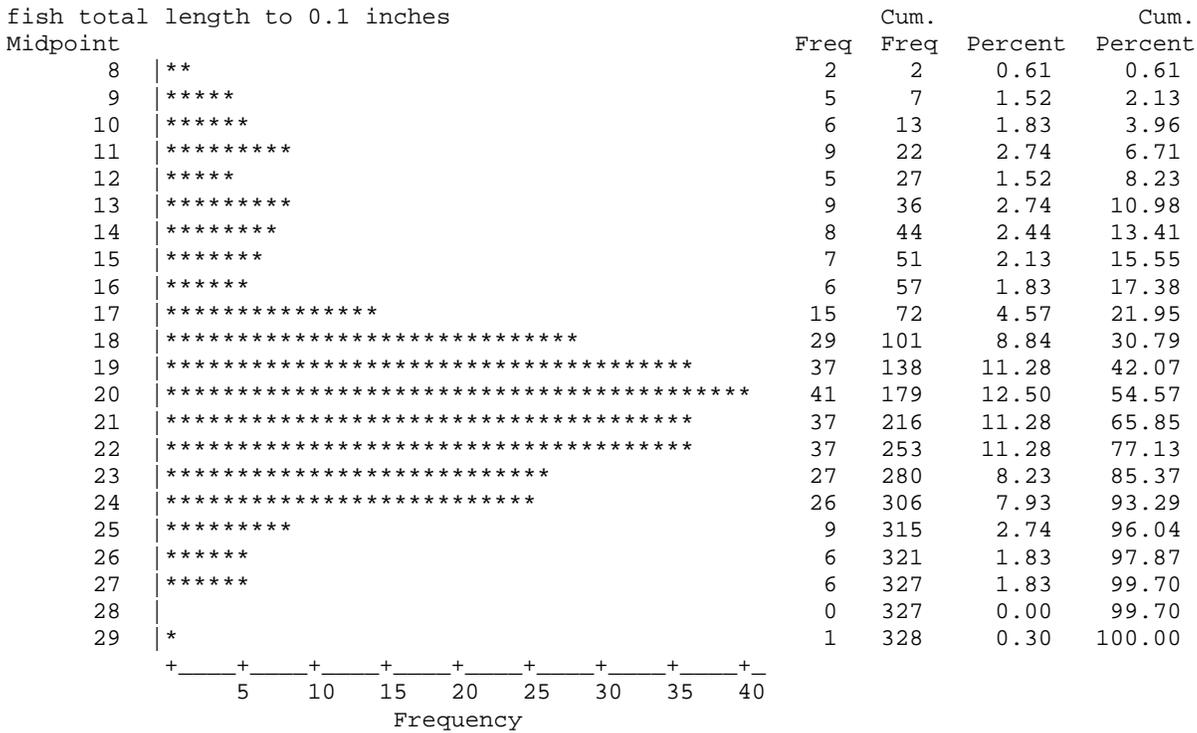


**FIGURE 4. SPRING 2013 MALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), GOOSE ISLAND/STODDARD LAKE UNIT.**



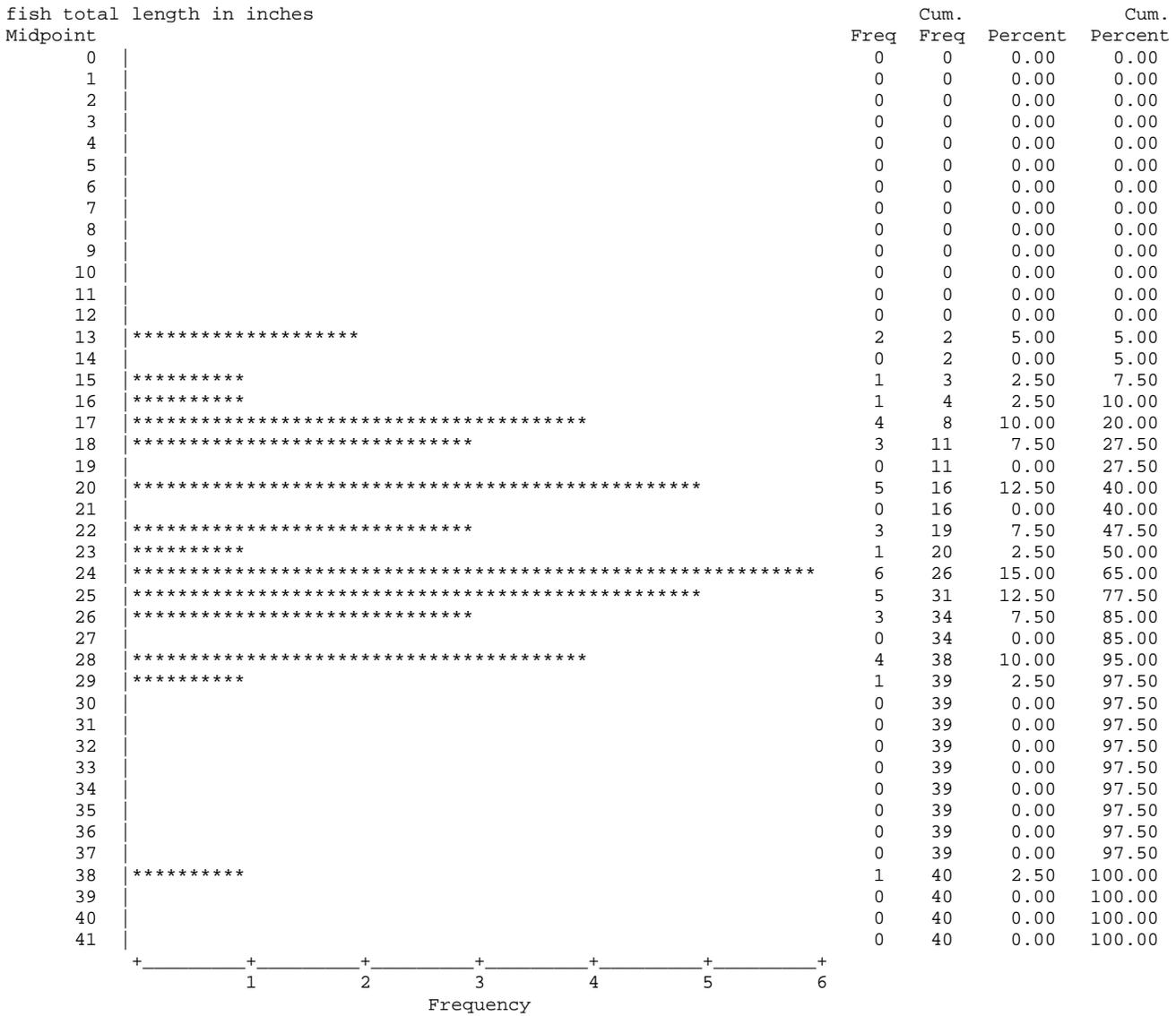
N	Mean	Std Dev	Minimum	Maximum
250	20.7650200	3.1676464	8.0710000	30.5120000

**FIGURE 5. SPRING 2012 MALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), GOOSE ISLAND/STODDARD LAKE UNIT.**

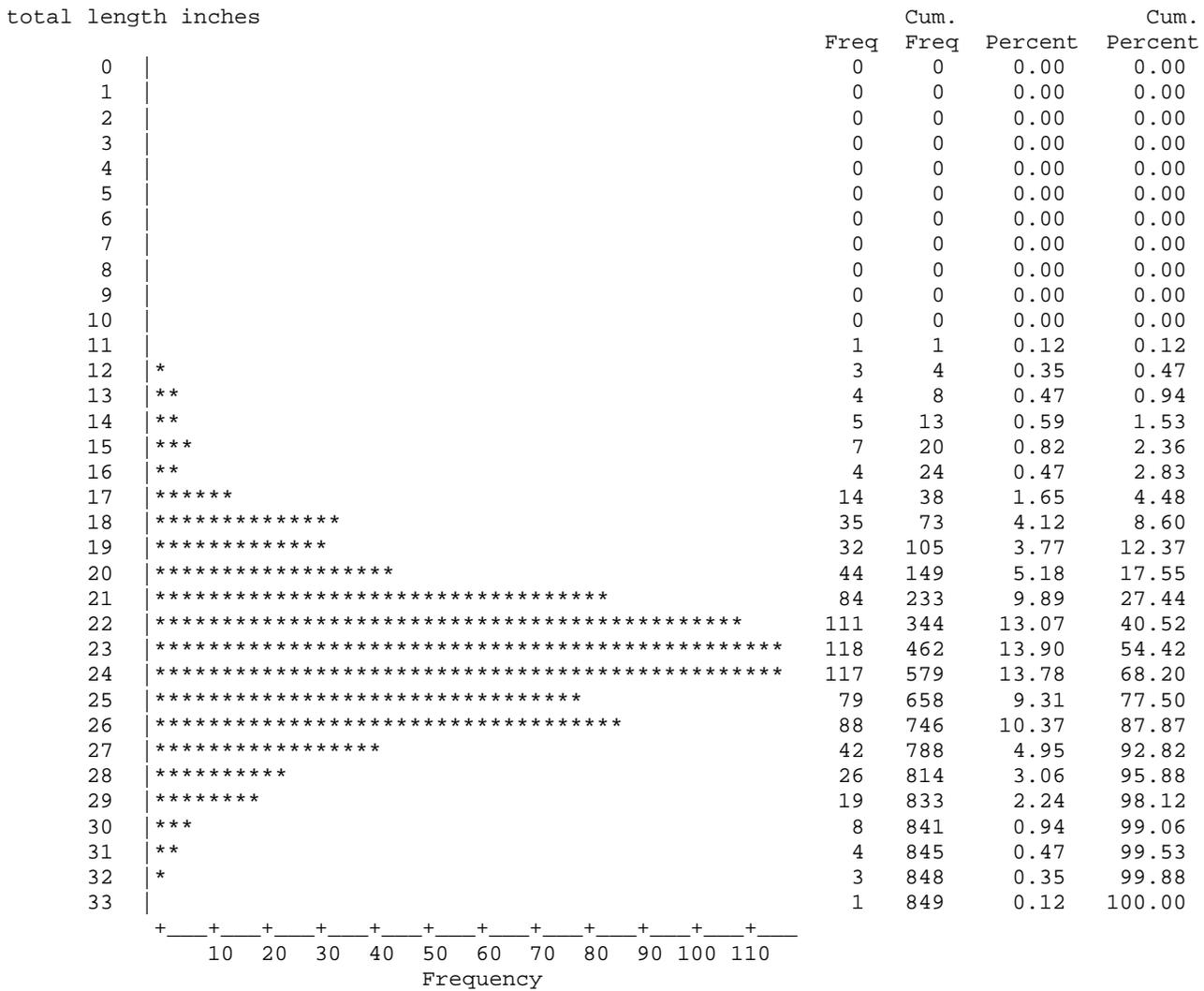


N	Mean	Std Dev	Minimum	Maximum
328	19.5820488	4.0754823	8.1100000	28.7010000

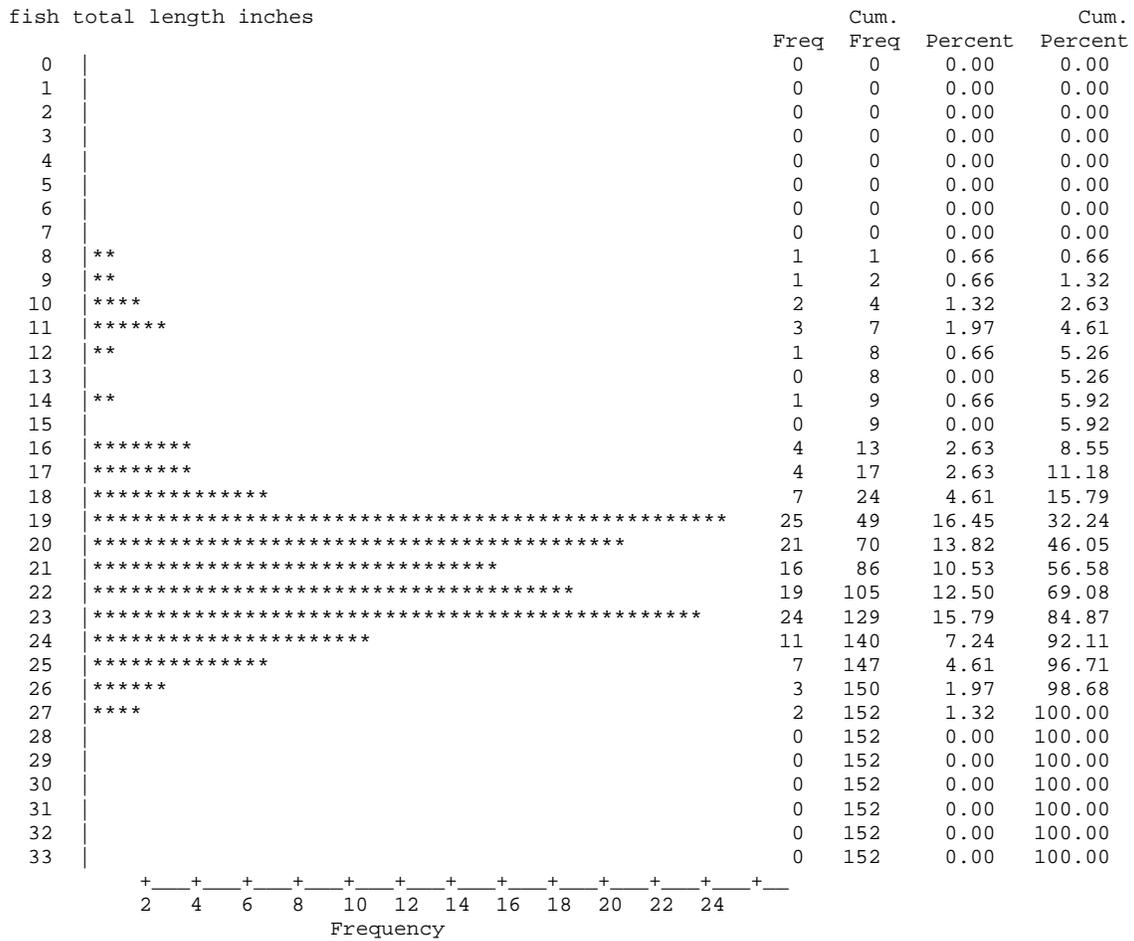
**FIGURE 6. SPRING 2010 MALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**



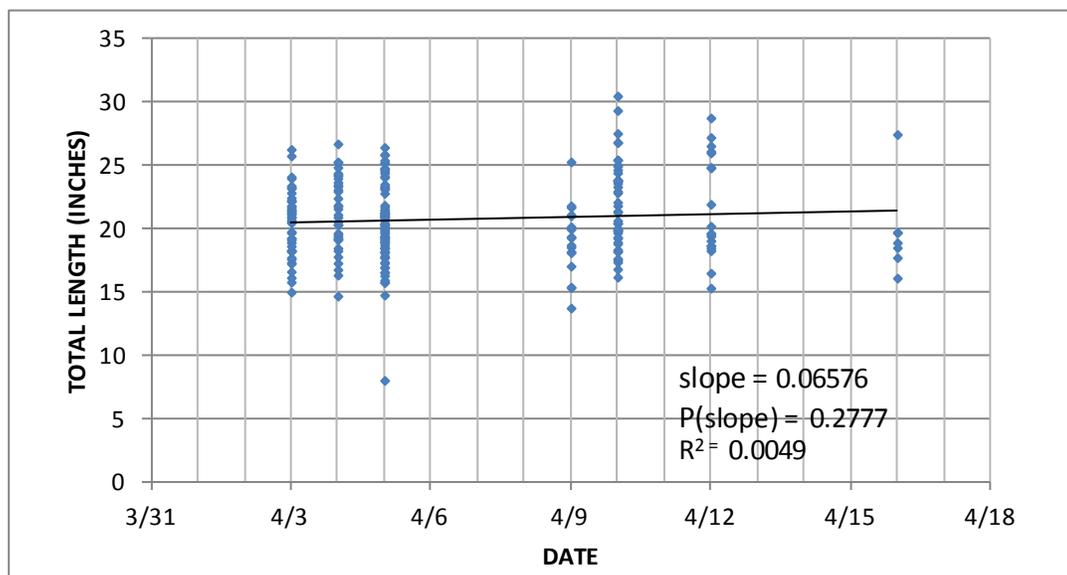
**FIGURE 7. SPRING 1976 MALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**



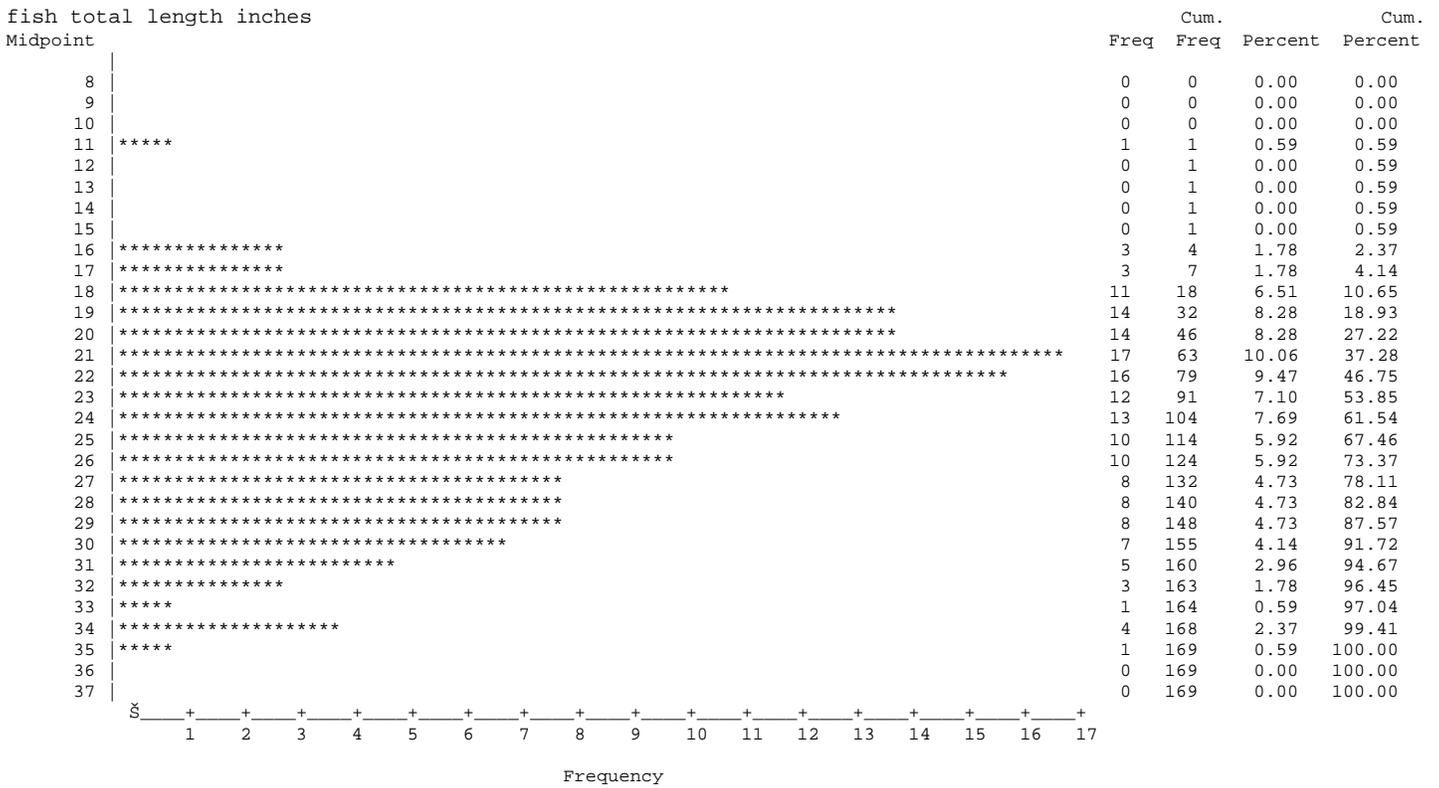
**FIGURE 8. SPRING 2008 MALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**



**FIGURE 9. POOL 8, SPRING 2013 MALE NORTHERN PIKE TOTAL LENGTH THROUGH TIME.**

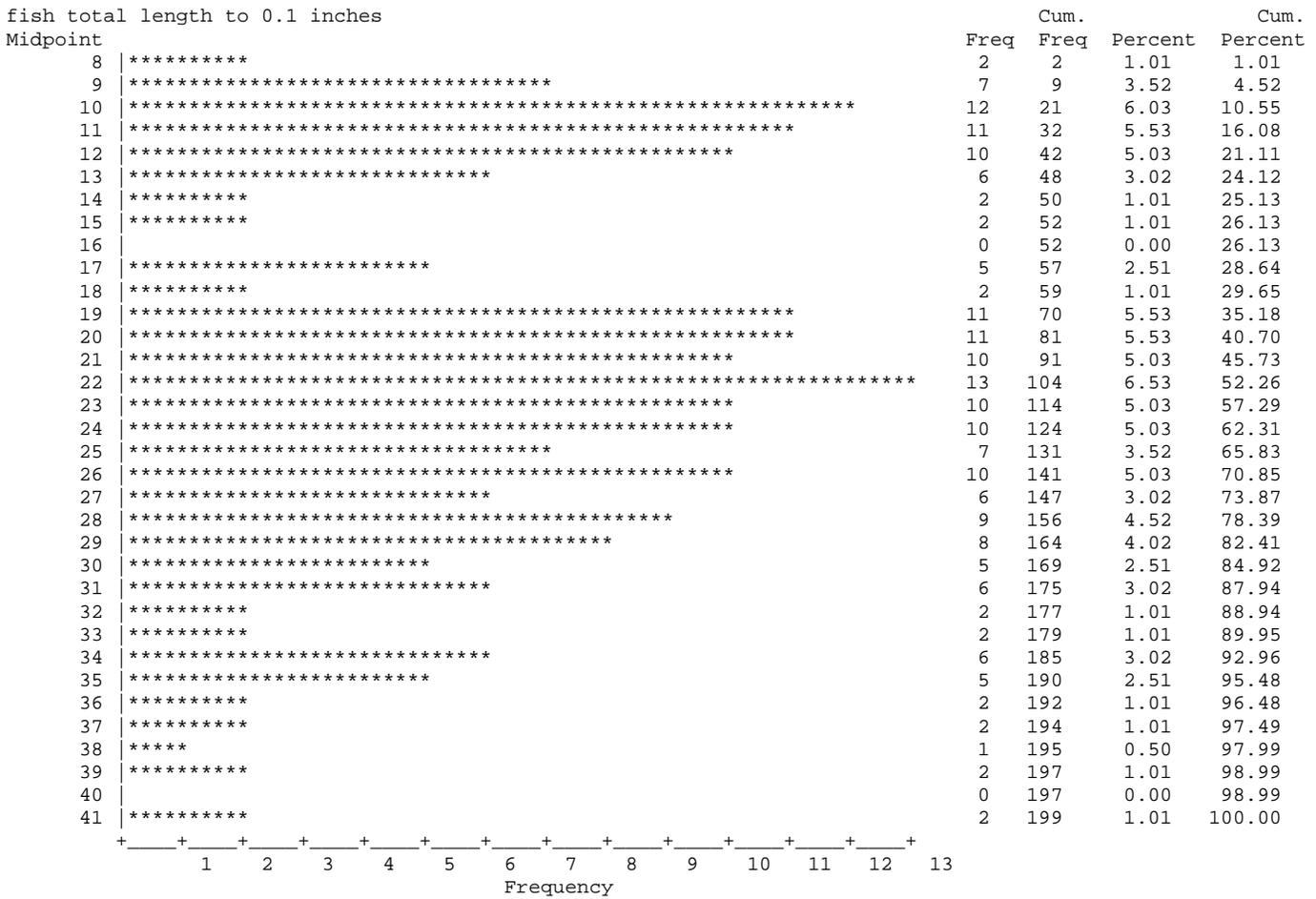


**FIGURE 10. SPRING 2013 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), GOOSE ISLAND/STODDARD LAKE UNIT.**



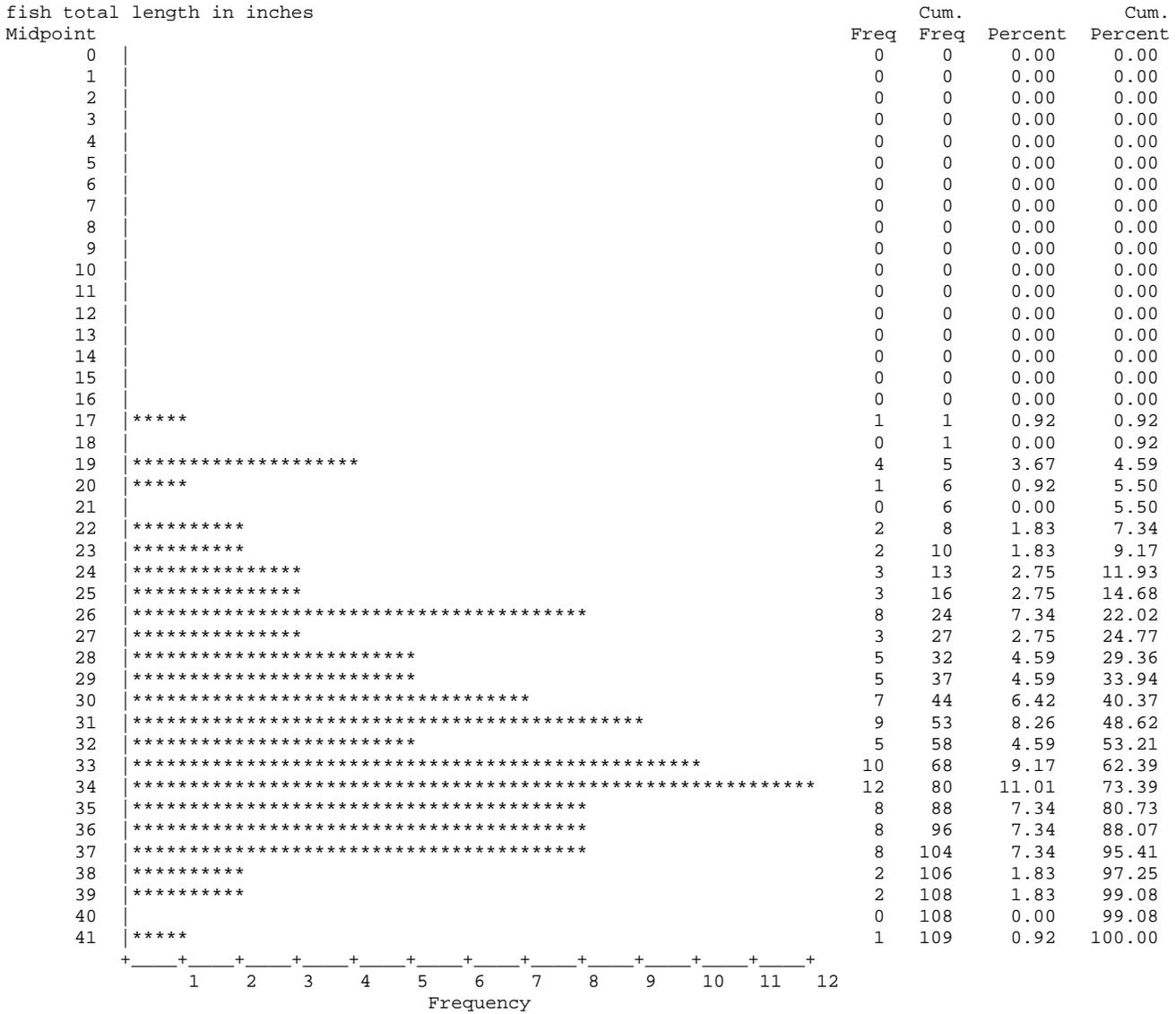
N	Mean	Std Dev	Minimum	Maximum
169	23.6562544	4.5196555	11.0630000	35.1570000

**FIGURE 11. SPRING 2012 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), GOOSE ISLAND/STODDARD LAKE UNIT.**

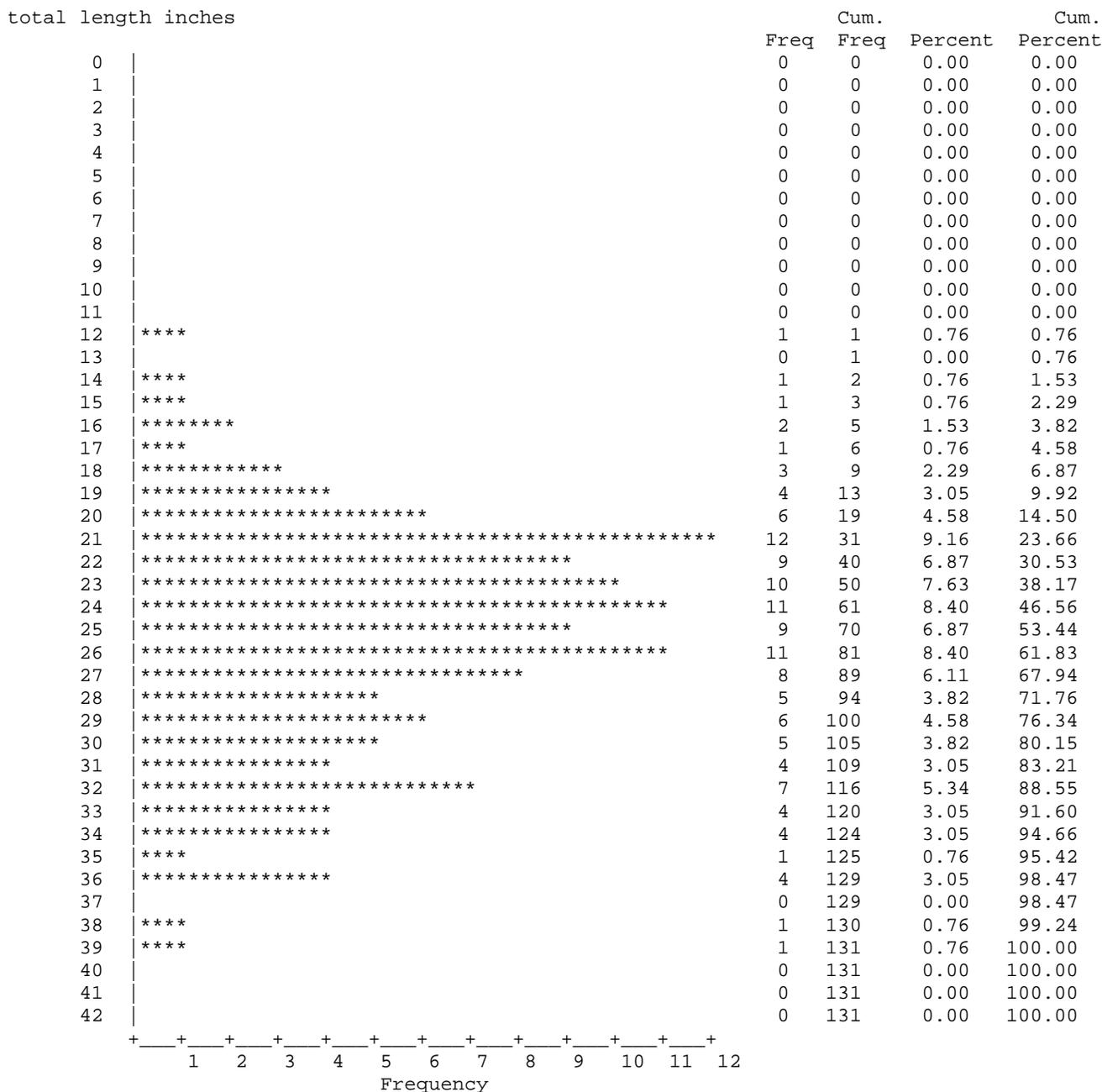


N	Mean	Std Dev	Minimum	Maximum
199	21.9376281	8.1023598	8.1500000	41.3390000

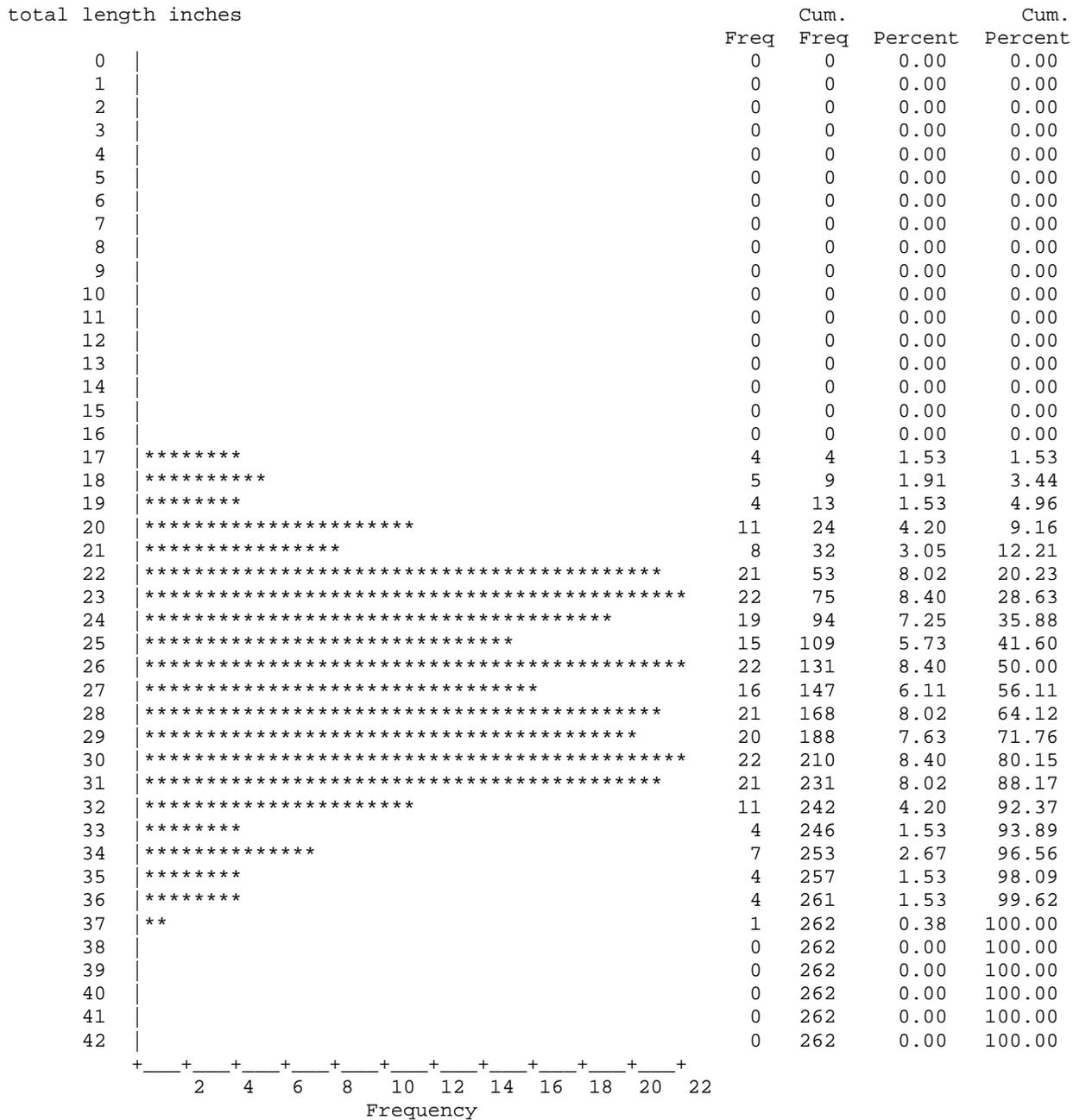
**FIGURE 12. SPRING 2010 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES) POOL 8.**



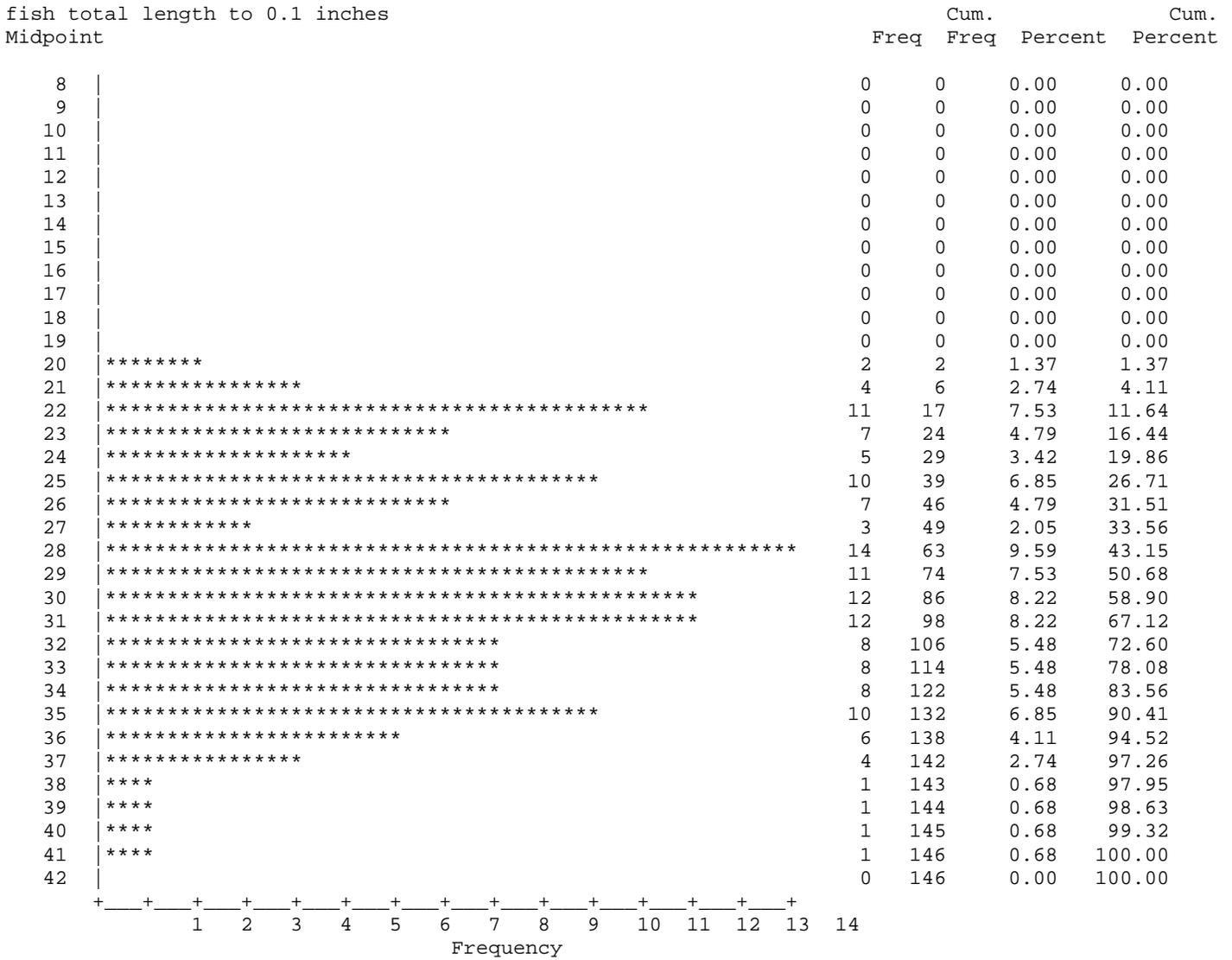
**FIGURE 13. SPRING 2008 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**



**FIGURE 14. SPRING 1976 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**

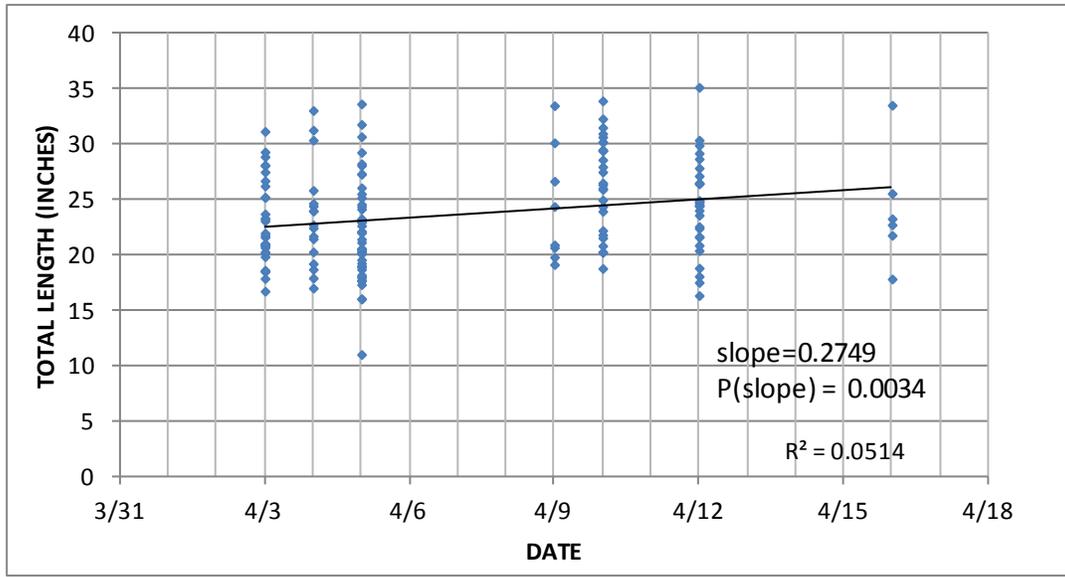


**FIGURE 15. SPRING 1964 FEMALE NORTHERN PIKE LENGTH DISTRIBUTION (INCHES), POOL 8.**

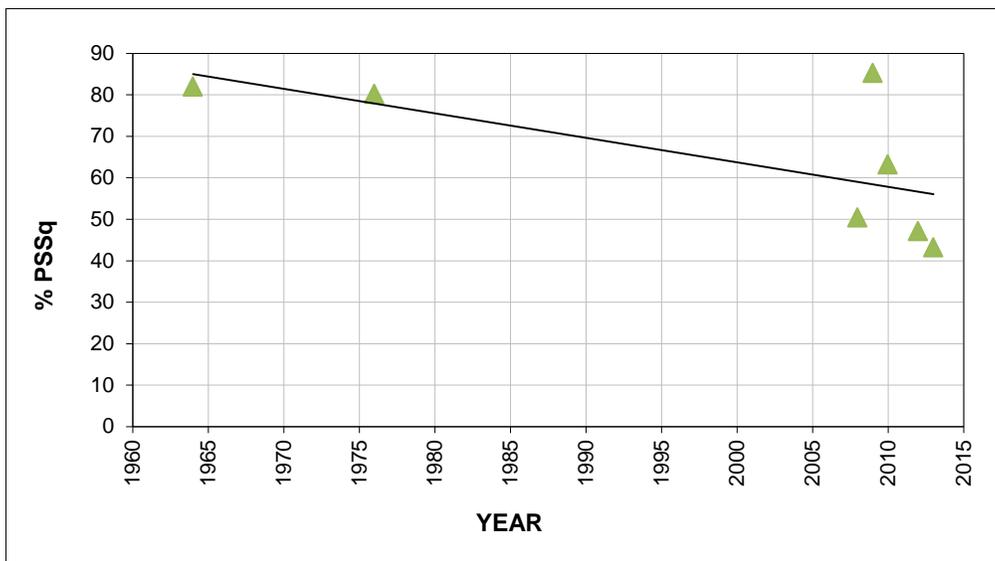


N	Mean	Std Dev	Minimum	Maximum
146	28.7260274	4.8363146	19.5000000	40.5000000

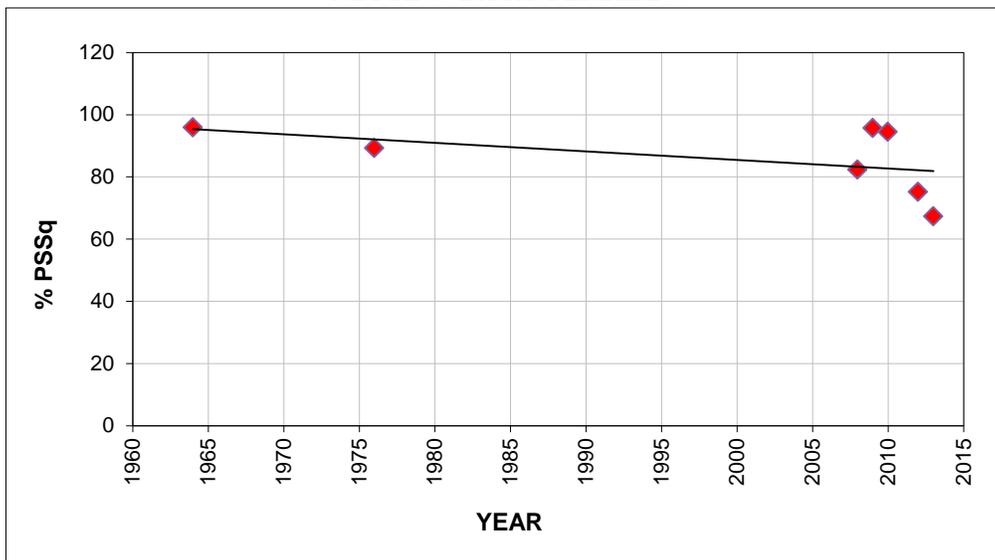
**FIGURE 16. POOL 8, 2013 FEMALE NORTHERN PIKE TOTAL LENGTH THROUGH TIME.**



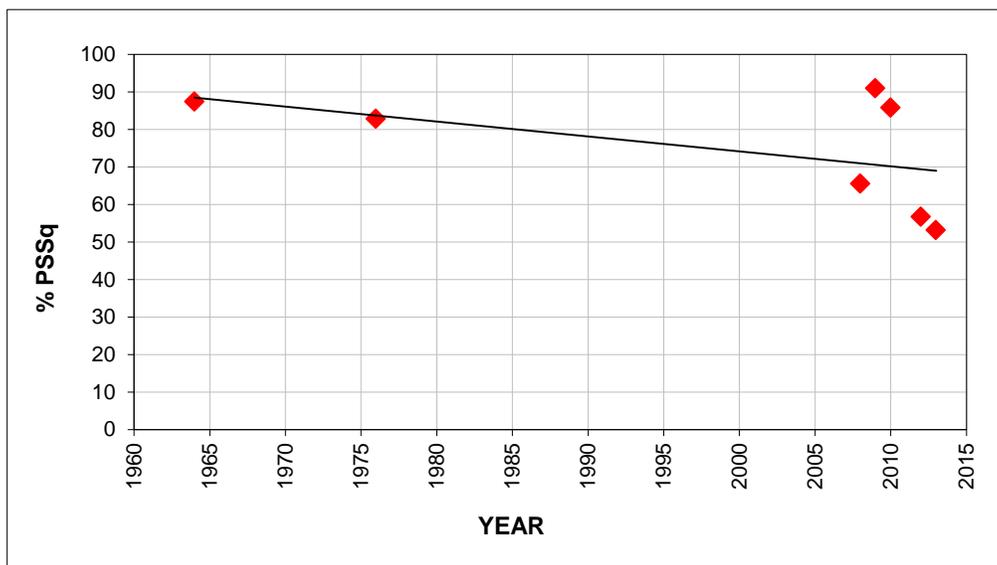
**FIGURE 18. POOL 8, 1964-2013 NORTHERN PIKE PROPORTIONAL SIZE STRUCTURE ( $PSS_q$ ) FROM WDNR FYKE NETTING DATA. MALES.**



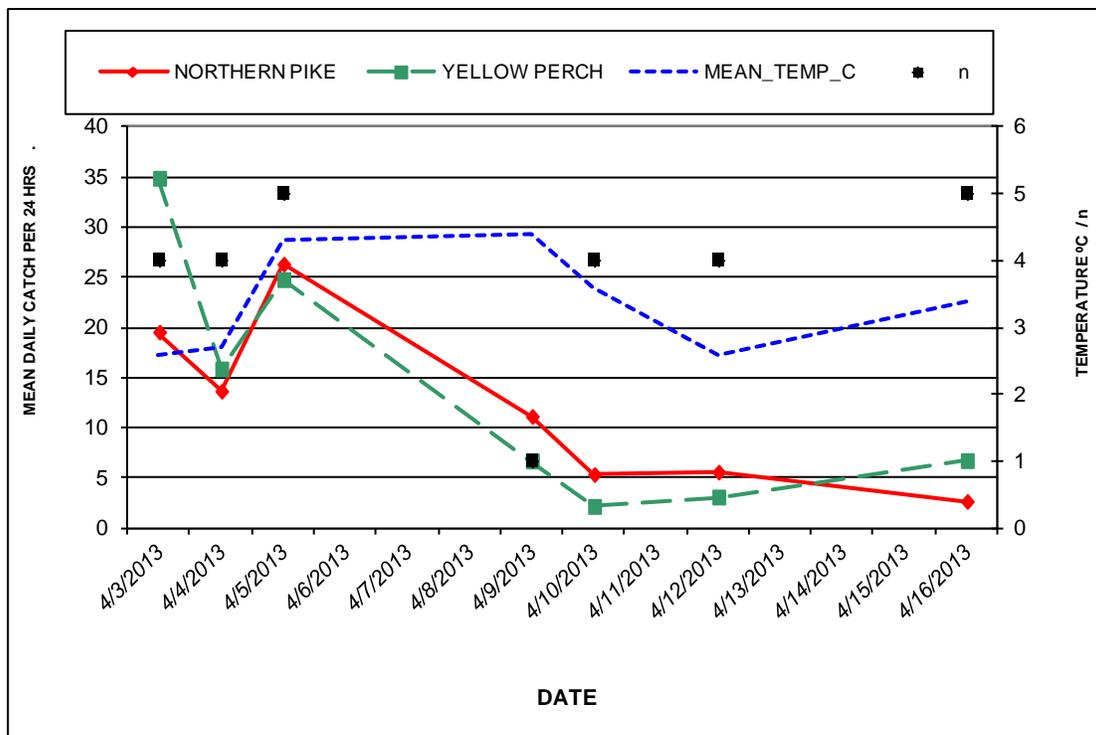
**FIGURE 19. POOL 8, 1964-2013 NORTHERN PIKE PROPORTIONAL SIZE STRUCTURE ( $PSS_q$ ) FROM WDNR FYKE NETTING DATA. FEMALES.**



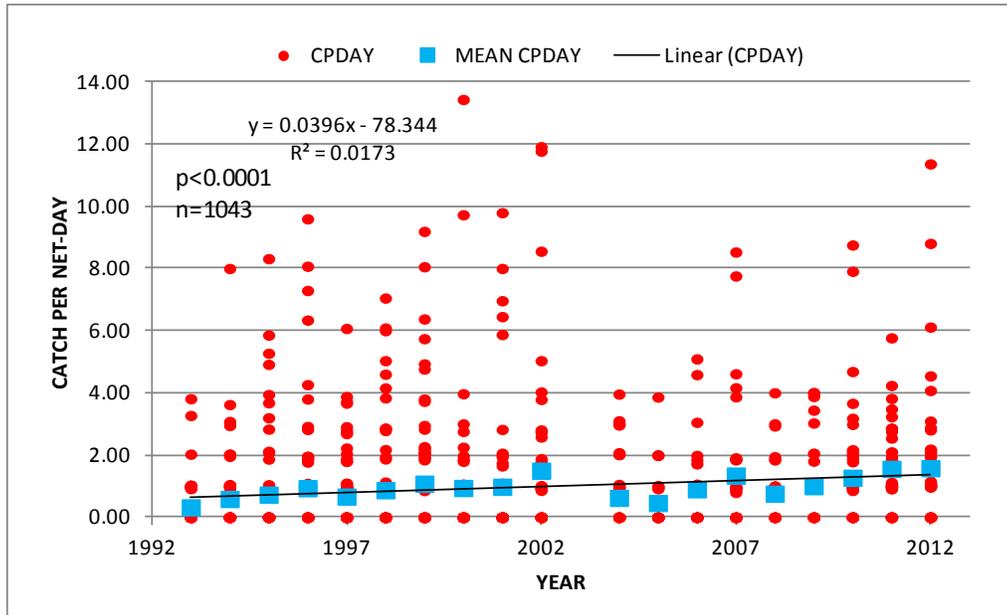
**FIGURE 20. POOL 8, 1964-2013 NORTHERN PIKE PROPORTIONAL SIZE STRUCTURE (PSS<sub>q</sub>) FROM WDNR FYKE NETTING DATA. ALL SEXES.**



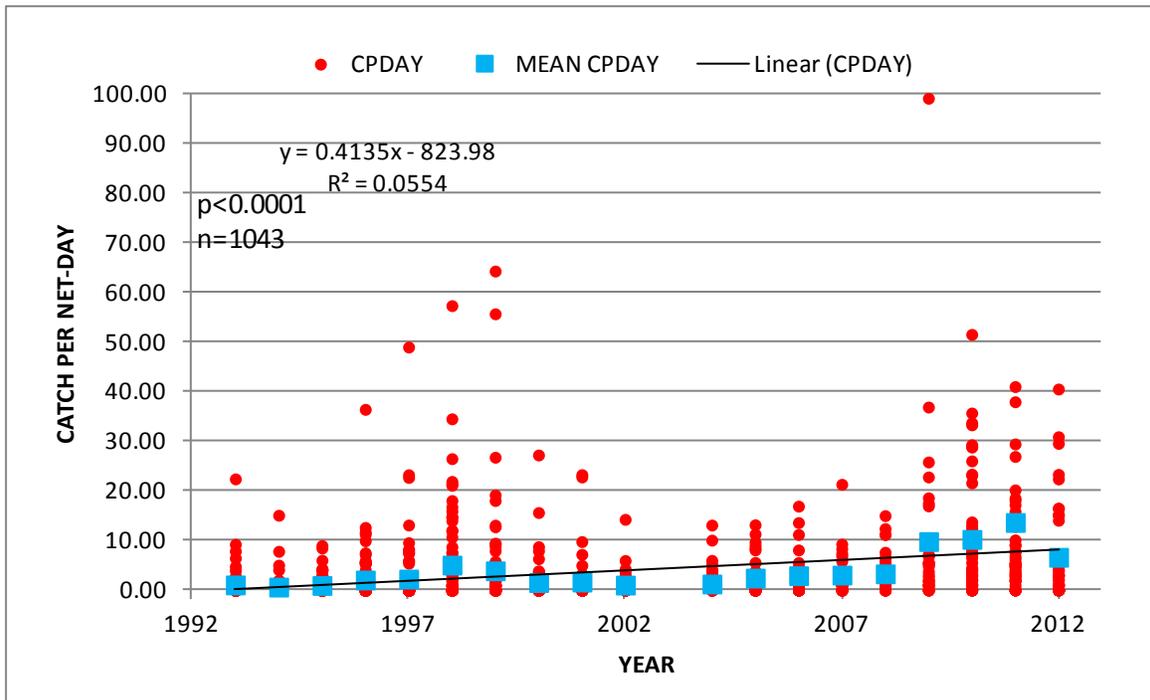
**FIGURE 21. POOL 8 SPRING 2013 CATCH PER NET-DAY (24 HOURS) THROUGH TIME.**



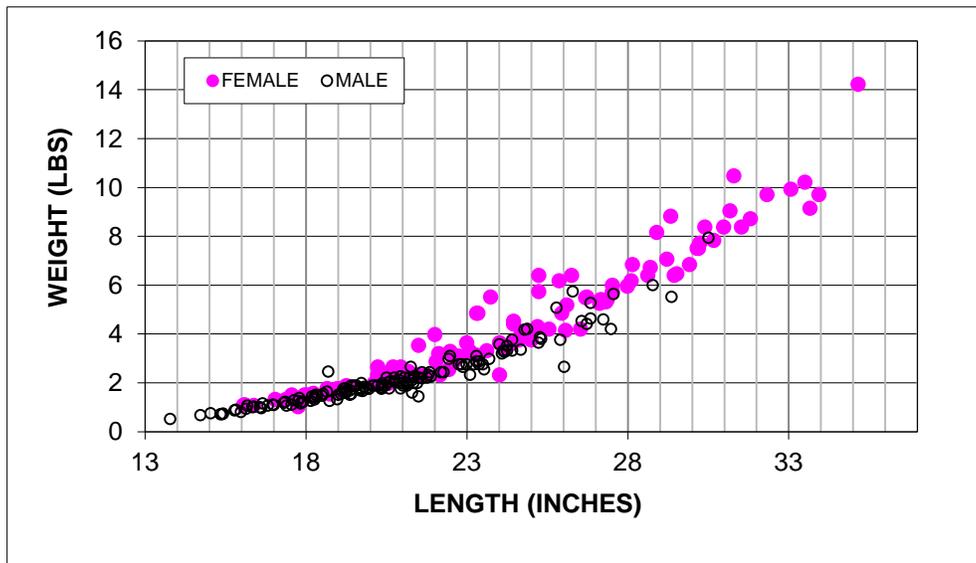
**FIGURE 22. POOL 8, 1993-2012 NORTHERN PIKE CATCH PER NET-DAY FROM LTRMP FYKE NETTING DATA. ALL SEXES.**



**FIGURE 23. POOL 8, 1993-2012 YELLOW PERCH CATCH PER NET-DAY FROM LTRMP FYKE NETTING DATA. ALL SEXES.**



**FIGURE 24. POOL 8, 2013 TOTAL LENGTH AND WEIGHT RELATIONSHIP, GREEN AND RIPE MALES AND FEMALES.**



**FIGURE 25. POOL 8, 2013 TOTAL LENGTH AND WEIGHT RELATIONSHIP, ALL REPRODUCTIVE CONDITIONS MALES AND FEMALES.**

