

**SUMMARY REPORT:
MISSISSIPPI RIVER CHANNEL CATFISH SAMPLING, POOLS 8 AND 9, 2009.**

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Purpose

The purpose of this work is to continue monitoring channel catfish populations in navigation pools 8 and 9 of the Mississippi River.

Introduction

Navigation Pool 8 of the Mississippi River is entirely in Wisconsin-Minnesota boundary waters. Navigation Pool 9 is primarily in Wisconsin-Iowa boundary waters. From before 1982 to the present, the commercial catfish size limit on Wisconsin-Minnesota boundary waters was 15 inches. Prior to 1982, the commercial size limit on catfish in Wisconsin-Iowa boundary waters was 13 inches. During 1982, Wisconsin adopted a 15-inch size limit for commercially caught channel catfish along Wisconsin-Iowa boundary waters of the Mississippi River (part of Navigation Pool 9 to 12). The state of Iowa adopted a 15-inch size limit for commercially caught channel catfish along the Iowa-Wisconsin border beginning in the 1984 fishing season. This investigation was conducted to determine the long-term impact of an increased commercial size limit on channel catfish. It is a continuation of work conducted in 1982-1986 (Schellhaass and Holzer (1989), 1993-1997 (Endris, 1999) and 2007-2008 (Heath, et. al., 2009).

Methods

Collection methods were identical to those used by Schellhaass and Holzer (1989) with the following exceptions: from 2007 through 2009, no fish were aged or marked, commercial nets were not set and data was not taken on the commercial catch. Locations of netting stations are given in Figure 1 and were identical to locations used in two previous studies including Endris (1999).

We sampled fish using combination gear of hoop net and slat trap baited with soy cake on August 17, 19, 21, 24, 26 and 28, 2009. SAS[®] Version 9.1 was used for data analysis. Tests of significance on catch rates were done using geometric means. Comparisons of slopes were done using the GLM Procedure (ANCOVA). All tests of significance were done using $\alpha=0.05$. Trends in total length through time were determined by regression using sample sizes normalized by year.

Findings

The mean daily ambient water temperatures during 2009 Pool 8 sampling was 23.4°C and generally declined over the six days (Table 1). During sampling, the mean water surface elevation measured at the La Crosse, Wisconsin gage was 631.5 ft and changed as much as 0.44

feet. The mean daily flow in cubic feet per second was 25217 and generally increased during this study. Flows fluctuated as much as 5000 cubic feet per second during sampling.

During 2007 and 2008, the mean temperatures in Pool 8 were very similar to 2009 (24.4°C and 24.7°C, respectively). Mean elevation was higher in 2007 (632.46 ft) but lower in 2008 (631.13 ft). Mean flow was similar in 2007 (26717 cfs) but lower in 2008 (14475 cfs).

Catch per Effort, combined Gears

During 2009 in Pool 8, a total of 361 channel catfish were caught in combined gear of hoop nets and slat traps and comprised 86.57 percent of the total (Table 2). The mean channel catfish catch / net-day was 2.98 (standard deviation = 4.07, n = 54) during 125.7 net-days of fishing and varied from a minimum of 0 to a maximum of 17.78. Similar sampling done in Pool 9 had a channel catfish catch rate of 3.27 per net-day (Table 3).

Mean catch rates for both Pool 8 and Pool 9 through time are given in Figure 2. The 2009 Pool 8 channel catfish catch rate was significantly lower from all other years except 2007 and was well below the 1993-2009 long-term mean of 11.90 (Table 4). Also, the 2009 catch rate was well below those experienced from 1982 to 1986 Pool 8 sampling. During the 1980's, the mean channel catfish catch rate varied from 4.2 to 7.8. The Pool 8 catch rates of channel catfish larger than 13.5 inches fell into two statistically distinct groups: those from the 1990's and those from the 2000's. Values from within each group were the same. During the 1990's, the mean catch rate was 4.68; during the 2000's the mean catch rate was about 1.69. This suggests that the catch rate of larger fish has decreased since the 1990's.

The 2009 Pool 9 channel catfish catch rate was significantly different from the years 1993 and 1994, and was below the 1993-2009 long-term mean of 6.15 (Table 5). In addition, the 2009 catch rate was within the range of Pool 9 catch rates from 1982 to 1986. During the 1980's, the mean channel catfish catch rate varied from 3.33 to 14.6.

We compared 2009 Pool 8 and Pool 9 catch rates. We caught 3.27 fish per net-day (n = 48) was not significantly different from Pool 8. This suggests that the very low 2009 catch rate in Pool 8 was not unique to this pool.

Length Distributions

Figure 3 details the 2009 Pool 8 channel catfish length distribution from combined gears. The 2009 Pool 8 channel catfish mean size was 15.97 inches (n=361) with 46.81% larger than the State of Wisconsin commercial size limit of 15 inches. The mean size of channel catfish during 2009 in Pool 8 was significantly larger than any other year since 1982 (Figure 4). The year 2009 also had the highest percentage of fish over 15 inches.

Figure 6 details the 2009 Pool 9 channel catfish length distribution from combined gears. The 2009 Pool 9 mean size was 13.14 inches (n=351) with 17.95% larger than the State of Wisconsin commercial size limit of 15 inches. The mean size was significantly larger than all years sampled since 1982 (Figure 7). The year 2009 also had the second highest percentage of fish over 15 inches. The mean length between pools 8 and 9 were significantly different ($p < 0.001$).

Trends in length distributions through time using data from combined gears were observed. From 1982 through 2009, there was a statistically significant ($p < 0.001$) increasing trend in the size of Pool 8 channel catfish (Figure 5). During this time, fish size increased an average of 0.049 inches per year. This trend was heavily influenced by the unusually large fish captured in 2009. Without 2009 fish, there was no trend in total length from 1982 through 2008

($p=0.9569$). This suggests that lengths of Pool 8 channel catfish may not have changed through time.

In Pool 9, the trend through time was greater. From 1982 through 2009 there was a statistically significant ($p<0.001$) increasing trend in size of about 0.125 inches per year (Figure 8). When the anomalous 2009 data was dropped from the analysis, this trend was still statistically significant ($p<0.001$). This suggests that since 1982, the mean size of Pool 9 catfish has generally increased. The cumulative increase through time was about 3.5 inches.

We compared the slopes of total length through time among the two pools. The slopes between Pool 8 and Pool 9 were significantly different ($p<0.001$) suggesting that the observed long-term rate of change in size of Pool 9 fish significantly differed from what little changes occurred in Pool 8.

Commercial Harvest

We examined the Pool 8 channel catfish harvest reported by licensed commercial fishers. For the years 1953 through 1991, the catfish catch was not separated by species. Therefore, we have only combined reporting data for these years. From 1992 through 2008, the reported catch was separated by species. The 1992 through 2008 Pool 8 harvest of channel catfish from Minnesota licensed fishers was not used since it only 4 percent of the total catch in any year.

The annual harvest of channel catfish and flathead catfish combined from Pool 8 increased an average of about 2,455 pounds per year from 1953 through 1976. From 1977 through 2007, the combined catfish catch declined an average of 2,484 pounds per year. Assuming flathead catfish comprised 16% of the combined catfish harvest (calculated from 1992-2008 data) it's likely that Pool 8 channel catfish harvest indeed declined from 1977 through 2007.

From 1992 through 2008, the reported commercial catch of channel catfish from Wisconsin licensed fishers clearly declined. During the early 1990's, the catch was about 50,000 pounds per year (Figure 9). It declined an average of 3,457 pounds per year and by 2008 it was only 5,389 pounds.

Conclusions

The 2009 Pool 8 channel catfish catch rate was significantly lower than almost all years dating back to 1982. This lower catch rate may have been due to the paucity of fish due to weak representation by shorter fish as reflected in the large mean size. The mean size of channel catfish during 2009 was significantly larger than any year sampled since 1982.

Lengths of Pool 8 channel catfish have generally not changed through time as opposed to Pool 9 where the mean size of Pool 9 catfish has generally increased. This observed experimental change was likely due to the 1982-1984 increase in the commercial size limit.

Presently, Wisconsin's Pool 8 commercial channel catfish regulations allow only gill nets, setlines and seines; all other commercial gear is not allowed (Wisconsin Administrative Code, Chapter NR 21). Dead set gill nets can be used on specified parts of Pool 8 year round. Seines can be used in specified parts of Pool 8 much of the year although a commercial fisher and crew may not remove more than 100 pounds of catfish per haul or take more than 100 pounds of catfish per day from the Saturday nearest October 1 to April 30. Setlines, with up to 400 hooks, can be used from the Saturday nearest April 1 to October 31 in most of Pool 8. The size limit on channel catfish is 15 inches long or longer or, 12 inches long or longer dressed.

Along with the commercial fishery, sport fishing for catfish is regulated as well in Pool 8. The season is open continuously with a daily catfish (channel catfish and flathead catfish) bag limit of 25 fish in aggregate. There is no size limit. These commercial fishing and sport fishing regulations have been in effect since the early 1980's.

Recommendations

1. Continue to monitor channel catfish catch rates and total lengths from Pool 8 for two additional years to determine if differences from the 1990's.
2. Continue monitoring Pool 9 channel catfish for four additional years for comparison with data from the 1980's and 1990's.
3. Repeat pool 8 and 9 catfish monitoring beginning in the year 2017.

REFERENCES

- Endris, Mark B. 1999. Channel Catfish Population Assessment Comparing Mississippi River Pool 8 and 9 with Differing Commercial Fishing Regulations. Wi. DNR, La Crosse, WI. 32 pp. DRAFT.
- Heath, David, Kenneth Von Ruden and Jacob Schweitzer. 2009. Summary Report: Mississippi River Channel Catfish Sampling, Pool 8, 2007, 2008. Wisconsin Department of Natural Resources, Mississippi River Fisheries Team, La Crosse, WI. 12 pp.
- Schellhaass, S. and J. Holzer. 1989. Monitor changes in the size structure of channel catfish populations in Pool 9 resulting from implementation of a 15-inch commercial size limit. Wisc. Dept. Nat. Res. Miss. R. Work Unit Fish. Summ. Rpts.-1989: 130-148.

FIGURE 1. SUMMER 2009 CHANNEL CATFISH SAMPLING STATION LOCATIONS. (2009 NAIP PHOTO).

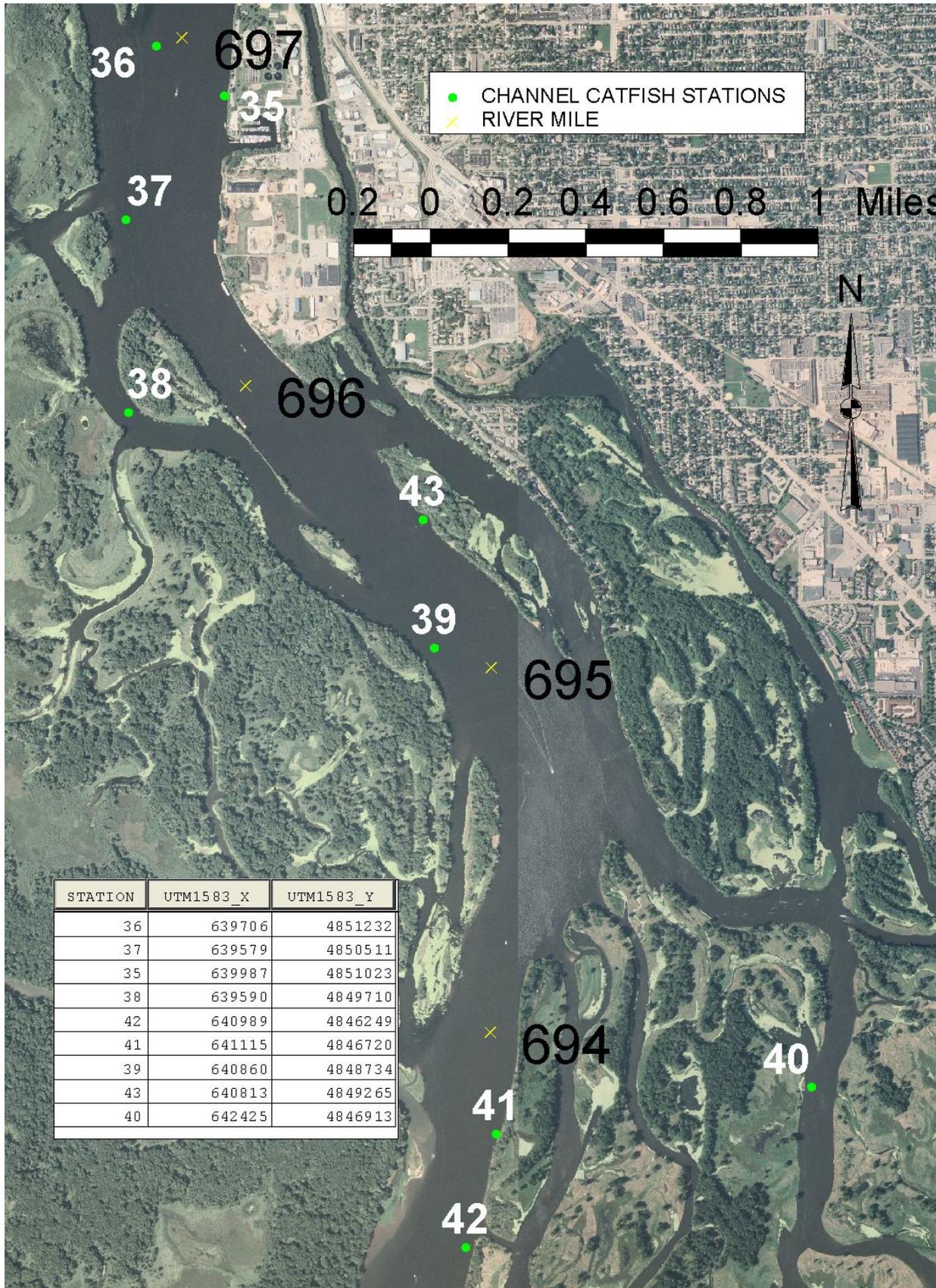


TABLE 1. MEAN TEMPERATURE, WATER SURFACE ELEVATION AND FLOW DURING SUMMER 2009 CHANNEL CATFISH SAMPLING.

DATE	MEAN DAILY TEMPERATURE °C	WATER SURFACE ELEVATION (ft), LA CROSSE	FLOW (cfs) DAM 8
08/17/2009	25.4	631.71	23800
08/19/2009	24.2	631.27	22500
08/21/2009	22.8	631.41	22700
08/24/2009	22.6	631.62	27400
08/26/2009	22.7	631.53	27500
08/28/2009	22.6	631.44	27400
2009 MEAN	23.4	631.5	25217

TABLE 2. RELATIVE ABUNDANCE, MEAN CATCH PER NET-DAY, COMBINED GEARS, POOL 8, AUGUST 2009.

	SPECIES	FREQUENCY	PERCENT	MEAN	STANDARD DEV.	MIN.	MAX.	NET-DAYS
1	black crappie	4	0.96	0.03	0.10	0.00	0.52	125.748
2	bluegill	36	8.63	0.30	0.56	0.00	2.05	125.748
3	channel catfish	361	86.57	2.98	4.07	0.00	17.78	125.748
4	common carp	2	0.48	0.02	0.09	0.00	0.51	125.748
5	flathead catfish	5	1.2	0.04	0.12	0.00	0.53	125.748
6	freshwater drum	3	0.72	0.02	0.10	0.00	0.51	125.748
7	rock bass	5	1.2	0.03	0.20	0.00	1.35	125.748
8	silver redhorse	1	0.24	0.01	0.07	0.00	0.51	125.748
	ALL SPECIES	417	100.00	3.79	4.09	0.00	18.79	125.748

TABLE 3. FREQUENCY, PERCENT, MEAN CATCH PER NET-DAY OF CATFISHES, COMBINED GEARS, POOL 9, AUGUST 2009.

	SPECIES	FREQUENCY	PERCENT	MEAN	STANDARD DEV.	MIN.	MAX.	NET-DAYS
1	channel catfish	351	99.72	3.27	3.43	0.00	15.48	112.0
2	flathead catfish	1	0.28	0.007	0.05	0.00	0.33	112.0
	ALL SPECIES	352	100.00	3.59	3.48	0.00	15.98	112.0

TABLE 4. COMPARISON OF MEAN POOL 8 CHANNEL CATFISH CATCH PER NET-DAY FOR COMBINED GEARS AMONG VARIOUS YEARS.

YEAR	MEAN	STD. DEV.	NET-DAYS	N	DIFFERENT (means with the same letter are not Sign. Different)	
1994	22.93	19.69	208	73	A	
1995	17.28	11.76	213	71	A	B
1993	12.85	14.92	208	72	C	B
2008	9.23	11.85	67.18	27	C	
1996	8.03	6.91	208	72	C	
1997	7.79	8.11	205	71	C	
2007	6.25	7.38	52.58	23	C	D
2009	2.98	4.07	125.75	54		D
ALL YEARS	11.90	13.61	1287.5	463		

TABLE 5. COMPARISON OF MEAN POOL 9 CHANNEL CATFISH CATCH PER NET-DAY FOR COMBINED GEARS AMONG VARIOUS YEARS.

YEAR	MEAN	STD. DEV.	NET-DAYS	N	DIFFERENT (means with the same letter are not Sign. Different)	
1994	10.43	9.88	196.0	68	A	
1993	7.84	10.51	201.0	70	A	B
1995	6.57	5.18	210.0	73	A	B
1996	4.89	4.87	208.0	71	C	B
2009	3.27	3.43	112.0	48	C	D
1997	3.21	4.94	208.0	72		D
ALL YEARS	6.15	7.51	1135.0	402		

FIGURE 2. CHANNEL CATFISH CATCH PER NET-DAY, COMBINED GEARS, MISSISSIPPI RIVER, POOLS 8 AND 9, 1982-2009.

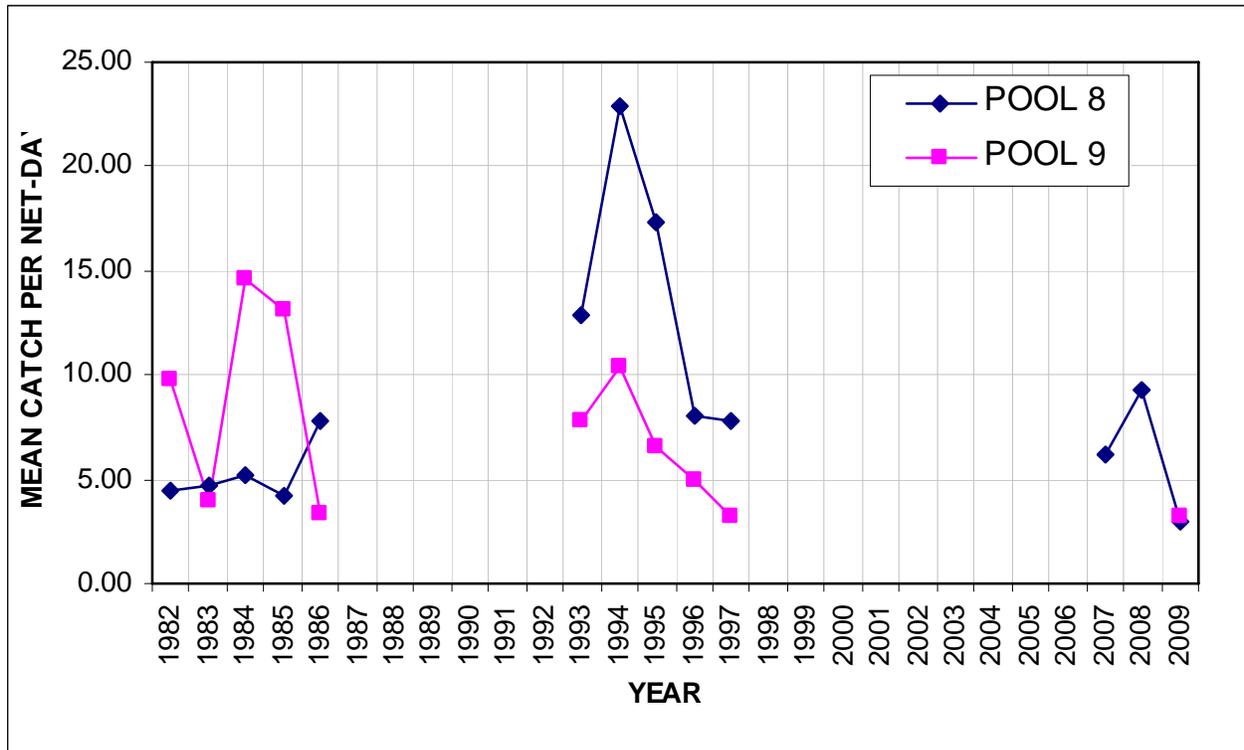
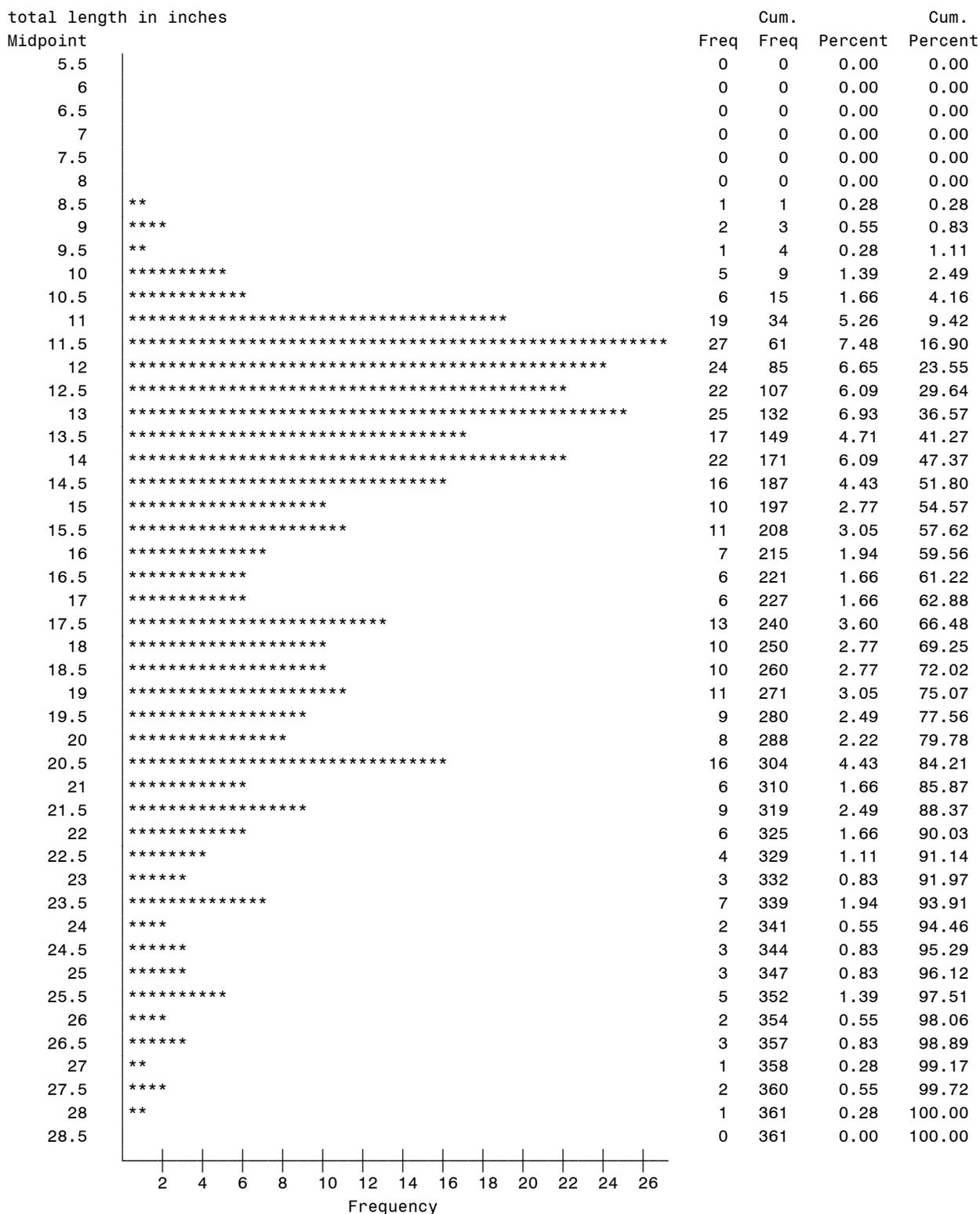


FIGURE 3. CHANNEL CATFISH LENGTH DISTRIBUTION, MISSISSIPPI RIVER, POOL 8, 2009.



N	Mean	Std Dev	Minimum	Maximum
361	15.9691994	4.3941558	8.7400000	27.7950000

FIGURE 4. POOL 8 CHANNEL CATFISH MEAN LENGTH AND PERCENT GREATER THAN 15 INCHES, BY YEAR, 1982-2009.

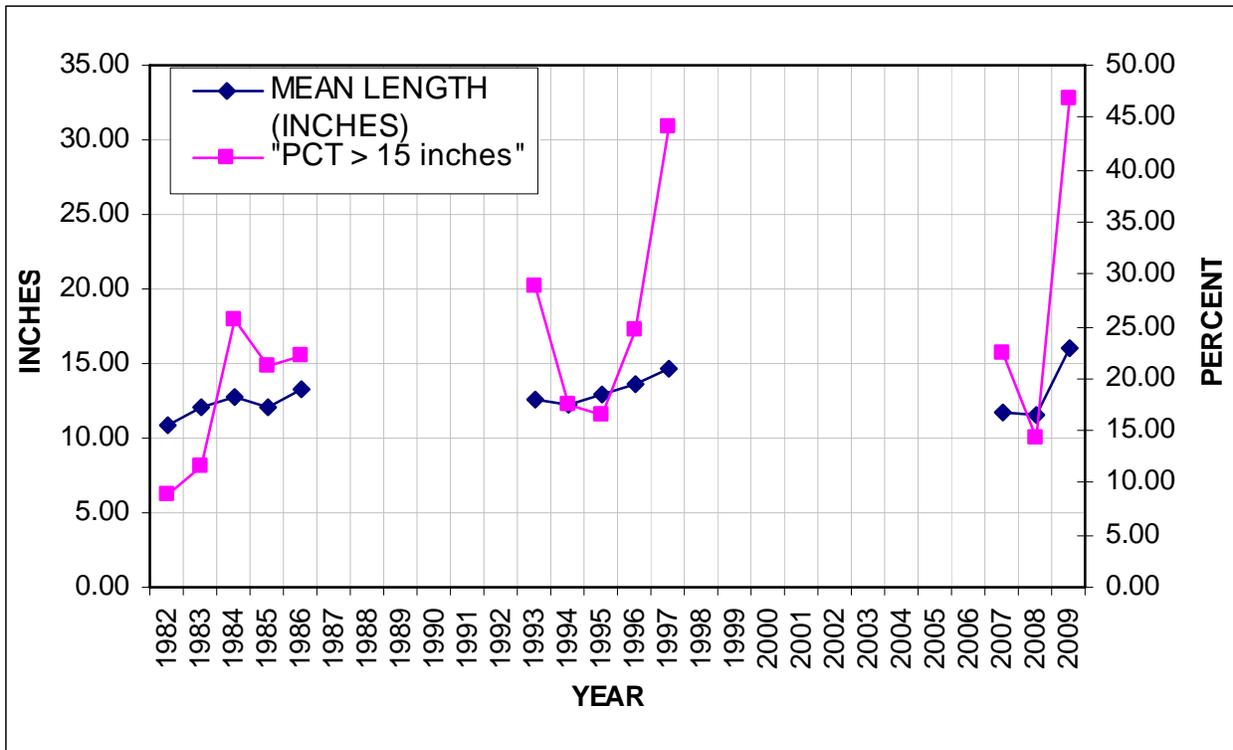


FIGURE 5. POOL 8 CHANNEL CATFISH TOTAL LENGTH TREND, 1982-2009 FOR ANNUALLY NORMALIZED SAMPLE SIZES.

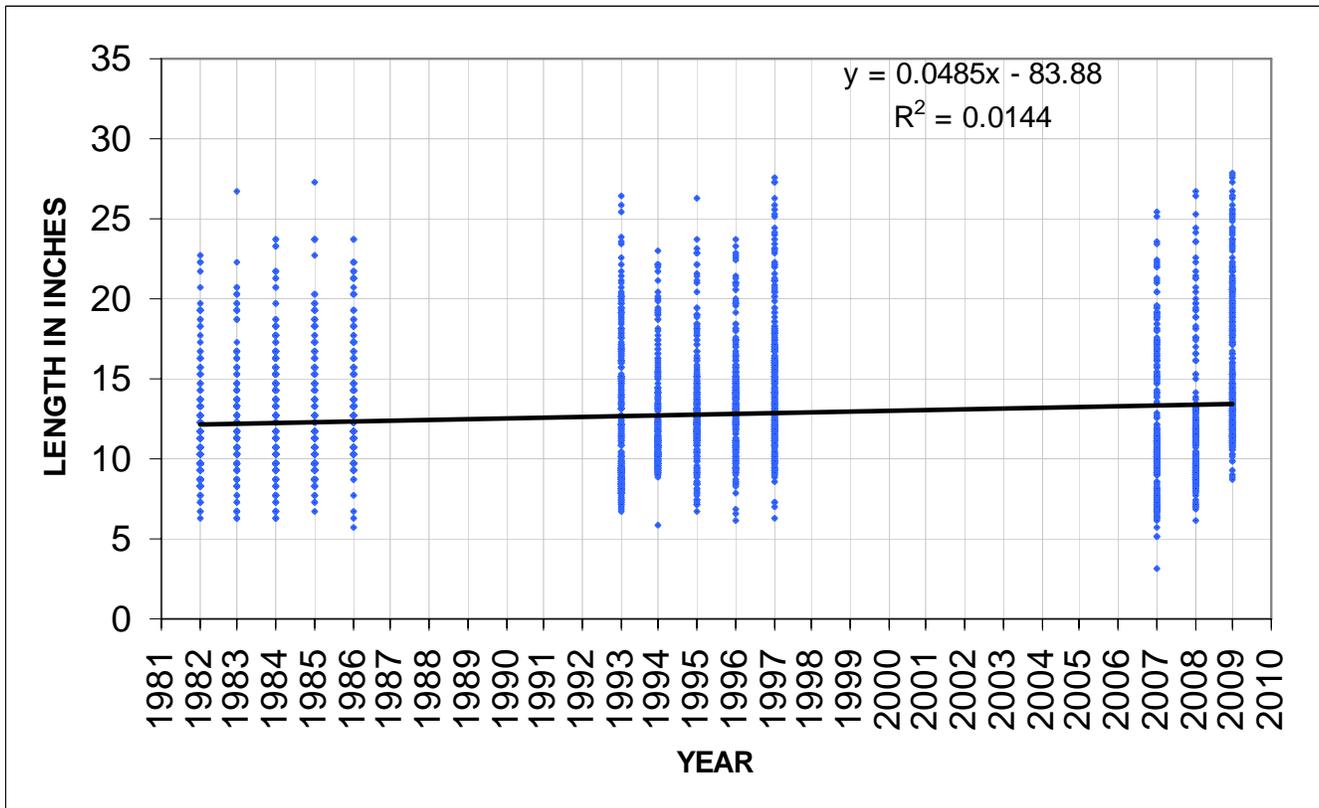
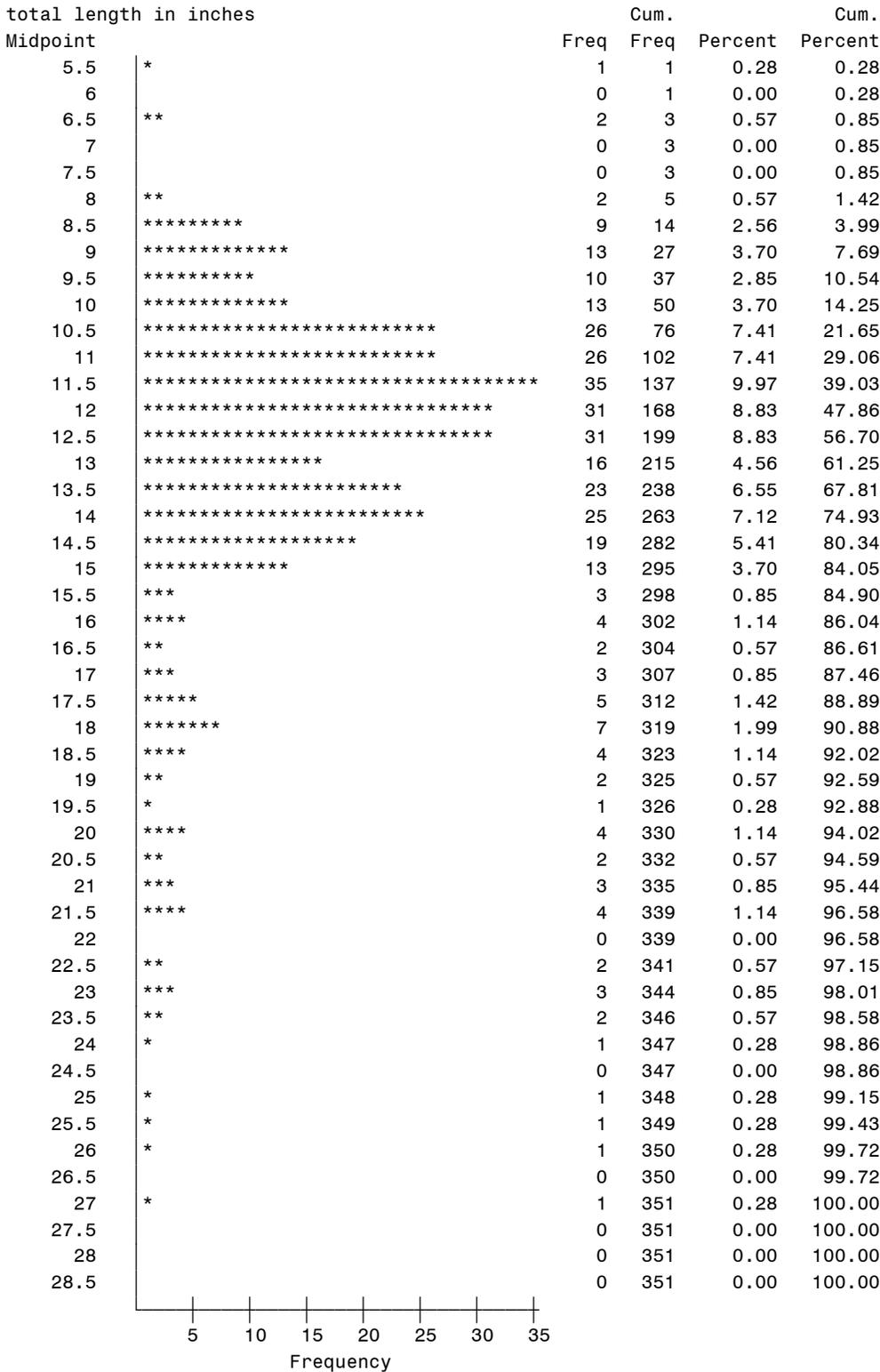


FIGURE 6. CHANNEL CATFISH LENGTH DISTRIBUTION, MISSISSIPPI RIVER, POOL 9, 2009.



N	Mean	Std Dev	Minimum	Maximum
351	13.1372536	3.4818152	5.5120000	27.2050000

FIGURE 7. POOL 9 CHANNEL CATFISH MEAN LENGTH AND PERCENT GREATER THAN 15 INCHES, BY YEAR, 1982-2009.

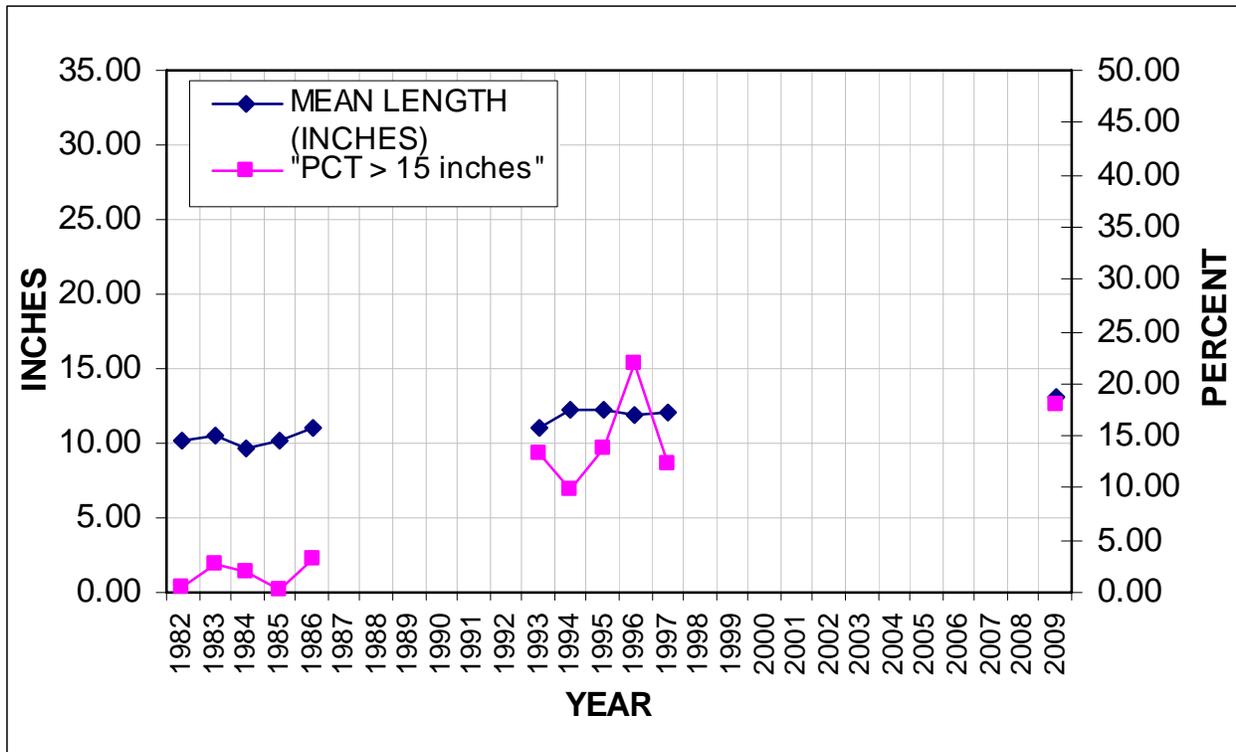


FIGURE 8. POOL 9 CHANNEL CATFISH TOTAL LENGTH TREND, 1982-2009 FOR ANNUALLY NORMALIZED SAMPLE SIZES.

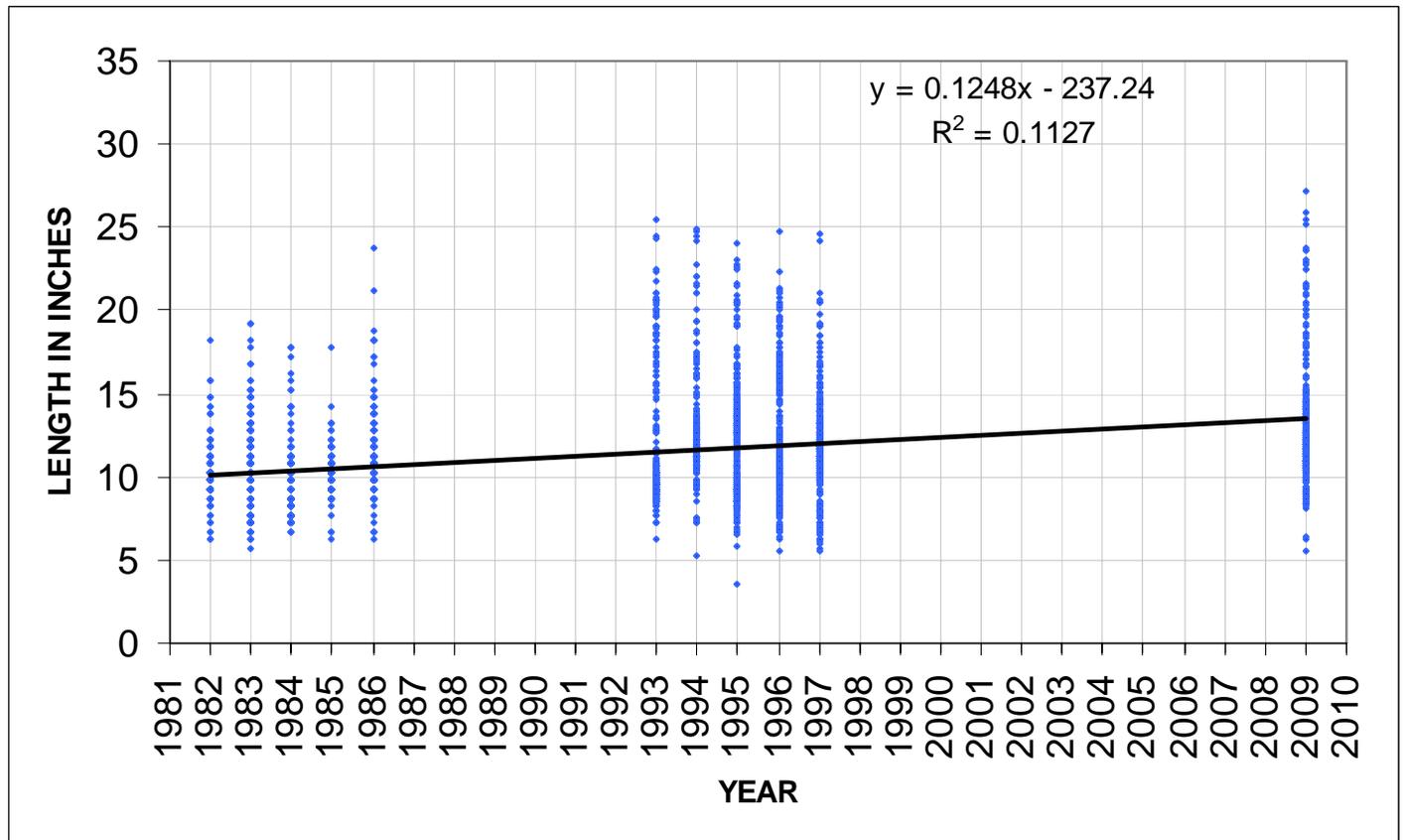


FIGURE 9.CHANNEL CATFISH HARVEST POOL 8, WISCONSIN LICENSED COMMERCIAL FISHERS, 1992-2008.

