

Results of Lake Assessment in the Lake Onalaska Lake Unit, Navigation Pool 7 of the Upper Mississippi River, Fall 2012

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Purpose

The purpose of this work is to monitor the fall population length frequency and catch per unit effort of game fishes in the approximately 9400 acres Lake Onalaska (LO) Lake Unit, located in Navigation Pool 7 of the upper Mississippi River. Length and size distributions of other fishes are also included in the analysis.

Introduction

The Wisconsin Department of Natural Resources' Mississippi River Fisheries Team (MRFT) conducts annual fall fish surveys using electro fishing. The river bordering Wisconsin was divided into 34 "lake units", which included all non-main channel waters with depths of 0.5 to 2.5m (Figure 1). Each fall, at least three lake units are sampled, and the highest priority lake units are sampled approximately every four years. During 2012, LO was one of the Lake Units sampled.

Methods

Sampling was done using an 18 foot-long welded aluminum flat-bottomed maxi-boom electro fishing boat using a two-anode-one-cathode system with a Wisconsin Control Box. Two booms extended 8 feet from the bow. Each boom was terminated with an anode which consisted of two stainless steel rings, 1m in diameter, equipped with twelve 15cm by 1.6cm dropper cables. We used pulsed direct current at 16 amps while volts varied from 160 to 300.

A total of 60 randomly selected ~10 minute day-time runs were done during 10.02 hours of electro fishing (Figure 2 and Table 1) between September 14 and 26, 2012. Starting points of random runs were selected using an ArcView GIS 3.3® software random point generating script and the Long Term Resource Monitoring Program (http://www.umesc.usgs.gov/data_library.html) 1998 bathymetric data (Rogala, 1997). Runs were randomly chosen from available aquatic locations that were between 0.6 and 2.5m deep. Once in the field, randomly selected runs that were too shallow or too deep or otherwise adverse to electro fishing were not done and replaced with another randomly selected run, or done within 50m of the initial run.

In addition to randomly selected runs, we electro fished 25 spatially fixed ~10 minute day-time runs done over 4.46 hours during the same dates. Spatially fixed stations were chosen in a biased manner where we had an interest in fish populations or fish habitat. Generally, they were chosen because, based on previous sampling or personal knowledge, they provide higher catch rates. Spatially fixed stations are periodically re-sampled among years. All fish were counted, identified to species, measured by total length and returned to the river.

We calculated Proportional Size Structures (Guy, et al., 2006; Gabelhouse, 1984; Anderson and Gutreuter, 1983) for quality (PSS_Q) and preferred (PSS_P) selected game fishes as well as catch per effort for these size categories. PSS is a measure, expressed as percentage, of the proportion of the number of fish greater than or equal to a "quality" or "preferred" length divided by the number of fish greater than or equal to the stock length. "Quality" and "preferred" lengths vary by species, and are determined by what most anglers consider quality or preferred fish sizes. Stock lengths also vary by species and are determined by recommendations in the literature.

Statistical tests were done using SAS® (2002-2003) software for Windows version 9.13's General linear models (ANOVA) and were done at the alpha=0.05 level. For catch per effort calculations, tests were done on geometric means. Some tests were applied to "target species" which is a group of species including bluegill, black crappie, largemouth bass, northern pike, smallmouth bass, pumpkinseed, rock bass, white crappie and yellow perch.

Findings

During the 2012 sampling, water temperature ranged from 16.1 to 22.4°C. The mean water temperature for the six days of sampling was 16.5°C and generally decreased over the six days of sampling. Water surface elevation measured at Lock and Dam 7 pool gage ranged from 638.94 to 639.23ft (average 639.08ft), changed as much as 0.29ft, and generally decreased over the sampling period (Table 2). This elevation was 0.56ft higher than the mean for these months and days during the period of record from 1939 through 2012 (638.52ft). The mean daily flow in cubic feet per second taken from Dam 7 was 10,401 and ranged from 9400 to 14200 (Table 2). Flow fluctuated as much as 4,800cfs. This mean daily flow was 61% less than the mean flow on these months and days (26,528 cfs) for the period of record of 1959 through 2012.

Electro Fishing Catch per Effort

During the 60 random electro fishing runs, a total of 27 species were recorded from 403 fish captured (Table 3). During the 25 fixed electro fishing runs, a total of 29 species were recorded from 1057 fish captured (Table 4). The mean catch rate for all species combined was 40 for the random sites and 238 for the fixed sites.

The same species were the most common for random and fixed runs. For the fixed runs, bluegill, largemouth bass, yellow perch, spotted sucker and gizzard shad were the most common. Mean catch rates for these were 83.7, 71.0, 16.3, 11.8 and 8.1 per hour, respectively. Random run catch rates were 4.2, 11.3, 4.4, 4.2 and 8.2 per hour, respectively.

We tested for differences in catch rates for common species between random and fixed samples. There was a statistically significant difference in rates for bluegill, largemouth bass, yellow perch, black crappie and spotted sucker but not for gizzard shad. This is not surprising since the bias in fixed stations was toward locations that are known to have more game fish.

Length Distribution

There was no difference in mean lengths of the most common species between random and fixed sampling runs ($p=0.05$). Therefore, we combined summaries of mean lengths and length distributions from both sampling methods. The mean lengths of fish species where there were more than 29 individuals are given in Table 5. A total of 6.02 percent of the largemouth bass was larger than 14 inches. A total of 2.92 percent of bluegill was greater than 7 inches. A total of 32.46 percent of yellow perch was larger than 7 inches and 16.67 percent were larger than 8 inches. The frequency distribution for total length in inches for the most common species (bluegill, largemouth bass, yellow perch, black crappie, gizzard shad, spotted sucker and smallmouth bass), are given in Figures 3 through 9.

Total length values for quality, preferred and stock sizes used to calculate Proportional Size Structures (PSS) are given in Table 6. The PSS_Q and PSS_P by species are presented in Table 7. Bluegill PSS_Q was 22.48, below the “acceptable” range. Also, bluegill (0.78) did not meet the acceptable PSS_P standard. The “acceptable” value of PSS_Q for bluegill is 40 to 60 and the “acceptable” value of PSS_P is a minimum of 5 (Wisconsin Department of Natural Resources, 2010).

Black crappie PSS_Q was 38.89, very close “acceptable” value. Also, black crappie (5.56) met the acceptable PSS_P standard. The “acceptable” value of PSS_Q for black crappie is 40 and the “acceptable” value of PSS_P is a minimum of 5 (Wisconsin Department of Natural Resources, 2010).

No guidance is provided for other fish species where we calculated PSS_Q and PSS_P . The PSS_Q and PSS_P for largemouth bass (51.92 and 21.15), were relatively high. The PSS_Q for yellow perch was the same as bluegill, but the PSS_P was higher (21.15).

A comparison between values from 2008 and 2012 generally showed that the proportion of quality sized fish increased. Bluegill, black crappie and largemouth bass all increased. The proportion of preferred sized fish for bluegill and largemouth bass increased, but decreased for black crappie and yellow perch.

We tested the mean size of fish greater than or equal to the stock size among years. Bluegill and black crappie, were statistically significantly larger in 2012 than 2008. Largemouth bass and yellow perch were the same. This suggests that bluegill and black crappie sizes have increased since 2008 while largemouth bass and yellow perch stayed about the same.

Comparisons of Random Electro Fishing Runs with Other Lake Units

Catch per effort data collected from randomly selected fall electro fishing runs are available for the years 2011 and 2012 from a total of nine lake units. Six lake units were sampled in 2011 and three were sampled in 2012. Catch per hour for all target fish combined (bluegill, black crappie, largemouth bass, northern pike, smallmouth bass, pumpkinseed, rock bass, white crappie and yellow perch) in LO (22.0) was statistically significantly lower than all other lake units (Table 8). This suggests that there is a statistically significantly lower population density in Lake Onalaska than eight other locations.

We also tested mean catch per hour for selected individual species among the nine 2011 and 2012 lake units (Table 9). LO Lake Unit had the same bluegill catch rate (4.19) as two other lake units but was lower than the remaining six. The catch rate for largemouth bass at the LO Lake Unit (11.28) was the same as one other lake unit and was lower than the remaining seven. The LO Lake Unit had the same catch rate of rock bass (0.40) as seven others and was lower than one. LO smallmouth bass catch rate (0.60) was the same as five other lake units but lower than two. LO yellow perch catch rate (4.39) was lower than three other lake units and was the same as five other lake units.

We did a similar test of mean catch per hour for selected individual species among the nine 2011 and 2012 lake units except we excluded any presumed young-of-the-year fish (i.e., age zero). Ranks of catch per effort were identical or similar to those found

using all sizes. This suggests that excluding putative age zero fish from this catch per effort analysis did not have an overwhelming effect on comparisons and that LO still ranked very low in fish abundance among eight other lake units.

We compared mean total length of selected individual species caught with electro fishing among thirty 2011 and 2012 lake units (Table 10). For all four selected species, LO mean total lengths ranked in the bottom half of all lake units. Mean total length of LO bluegill (2.90 inches) was smaller than all but one lake unit. Largemouth bass from LO (6.7 inches) were smaller than 17 other lake units, the same as eight and larger than four. LO black crappie (5.5 inches) were smaller than one lake unit and the same size as 28 lake units. Mean length of LO yellow perch (6.4 inches) was the smaller than two lake units, the same as 26, and larger than two lake units.

We compared PSS from LO to other lake units from 2007 through 2012 where the number of stock sized game fish was greater than or equal to 30 in the LO lake unit during 2012 (Table 11). For bluegill, 2012 LO ranked 16th for quality fish and 15th in preferred sized fish in 30 comparisons. For quality largemouth bass, 2012 LO ranked 16th in 29 comparisons and the 11th for preferred sized fish. For yellow perch, 2012 LO ranked 10th for quality and 4th in preferred sized fish in 13 comparisons.

Explanation of Lower Population Density in LO

In spite of LO's reputation as an outstanding pan fishery, our data shows it to have lower estimated target fish abundance relative to other lake units based on random samples. We hypothesized that this disparity is due to the patchy nature of fish in the lake unit, and that anglers are targeting small areas of highly concentrated fish.

Since our spatially fixed samples are in areas of high fish concentration, which often coincides with high angler effort, we tested the mean catch per hour of target species among lake units using spatially fixed stations. In other words, we compared catch per hour among lake units using only locations with the highest catch rates and those that are most angled. The use these spatially fixed locations was aimed at comparing the "best" with the "best" and eliminated using randomly selected locations which typically have low catch rates and are angled relatively lightly, although they do provide a better evaluation of the lake unit as a whole.

The results of ANOVA showed that LO combined 2008 and 2012 LO catch per effort from spatially fixed samples did not differ from any of the other eleven lake units. The sensitivity of this test was poor due to low sample sizes (as low as 8). In addition to ANOVA, we used a Kruskal-Wallis test. This test resulted in finding a difference between 2 of the other 11 lake units. The Lawrence/Target and Trempealeau lake units had statistically significant higher catch rates than Lake Onasaska. The remaining 9 were the same as LO. Therefore, it is not clear that the disparity between LO's reputation and our findings is due to the patchy nature of fish in the lake. Future sampling efforts, which will provide higher fixed sample sizes, should clarify this question.

Comparisons of Electro Fishing Runs among Years

We compared mean total length among years within the LO lake unit for selected fish species that were not young-of-the-year. Mean total length of 2008 bluegill greater than 3 inches (non young-of-the-year) was 4.8 inches and was statistically significantly different from 2012 (5.0 inches) ($p=0.03$). The magnitude of this difference was 0.2 inches. This difference may be due to a weaker age 1+ year class in 2012 and a stronger age 2+ and older year classes compared to 2008 (Figure 10) and does not appear biologically relevant. Small changes in annual mean lengths are normal. Largemouth bass mean length for those greater than 5.2 inches in 2008 was 9.7 inches, and was the same as 2012 (9.2 inches) ($p=0.09$) (Figure 11). Non young-of-the-year yellow perch were statistically the same mean size between years (about 7.5 inches) (Figure 12). Black crappie mean length for fish greater than 4 inches did not change between 2008 and 2012 (about 6.6 inches, $p=0.89$) (Figure 13).

Comparisons using Fixed Electro Fishing Runs, 2008 and 2012

Eighteen spatially fixed electro fishing runs were done in the LO lake unit each year during 2008 and 2012. During these two years, mean water temperatures were similar, 16.1°C in 2008 and 16.5°C in 2012, and the flows and water surface elevations were nearly identical. A total of 33 kinds of fish were caught among all years totaling 1695 fish (Table 12). Bluegill was the most common followed by largemouth bass, spotted sucker, yellow perch, gizzard shad, black crappie and pumpkinseed.

Catch per hour for all target fish combined in LO was 159.0 in 2012 and was 264.8 in 2008. These means differed statistically ($p=0.0050$). Target species included black crappie, bluegill, largemouth bass, northern pike, smallmouth bass, pumpkinseed, white crappie, rock bass and yellow perch. In addition, when all game and non-game fish species were combined, these means between years differed as well ($p=0.0335$). This suggests that catch rates were statistically significantly lower in 2012 than 2008.

Conclusions

In 2012, bluegill sizes increased, on average, since 2008 while largemouth bass, black crappie and yellow perch stayed about the same. The percent of "quality" and "preferred" sized bluegill were below the WDNR's recommendations while black crappie were at or above these recommendations.

Compared to 29 other lake units in the Mississippi River bordering Wisconsin, LO ranked medium to low in size of fish. Bluegills were smaller than all but one lake unit and largemouth bass were smaller than 17 others. Black crappie and yellow perch were about the same as most other lake units. The proportion of "quality" and "preferred" sized fish for these four species generally was average to below average compared to other lake units and years.

Game fish catch rates from our samples suggest a lower abundance than eight other lake units similarly sampled since 2011. Combined game fish catch rates were lower in 2012 than in 2008 within LO.

In general, our samples suggest that LO has a relatively mediocre to low abundance of game fish, and has bluegill and largemouth bass that are relatively small. Size of black crappie and yellow perch are normal for the Mississippi River.

In Navigation Pool 7 of the Mississippi River bordering Minnesota, Wisconsin fishing regulations limit harvest to 25 each of yellow perch, rock bass and crappie, with no size limit. Bluegill and pumpkinseed are limited to 25 in total with no size limit. White bass and yellow bass are limited to 25 in total with no size limit. Largemouth bass and smallmouth bass are limited to 5 in total with a 14 inch minimum size limit. Northern pike have a bag limit of 5 and no size limit. All these fish species have continuous open seasons.

Recommendations

1. Continue to monitoring backwater fish in Pool 7 and other pools to determine any trends.
2. Using additional data explore any longitudinal trends in mean total length or catch per effort along the Mississippi River bordering Wisconsin.

Literature Cited

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FIGURE 1. LOCATION OF 34 WDNR LAKE UNITS, UPPER MISSISSIPPI RIVER.
 (based on 1989 Long Term Resource Monitoring Program Land/Water and Aquatic Area Coverage)

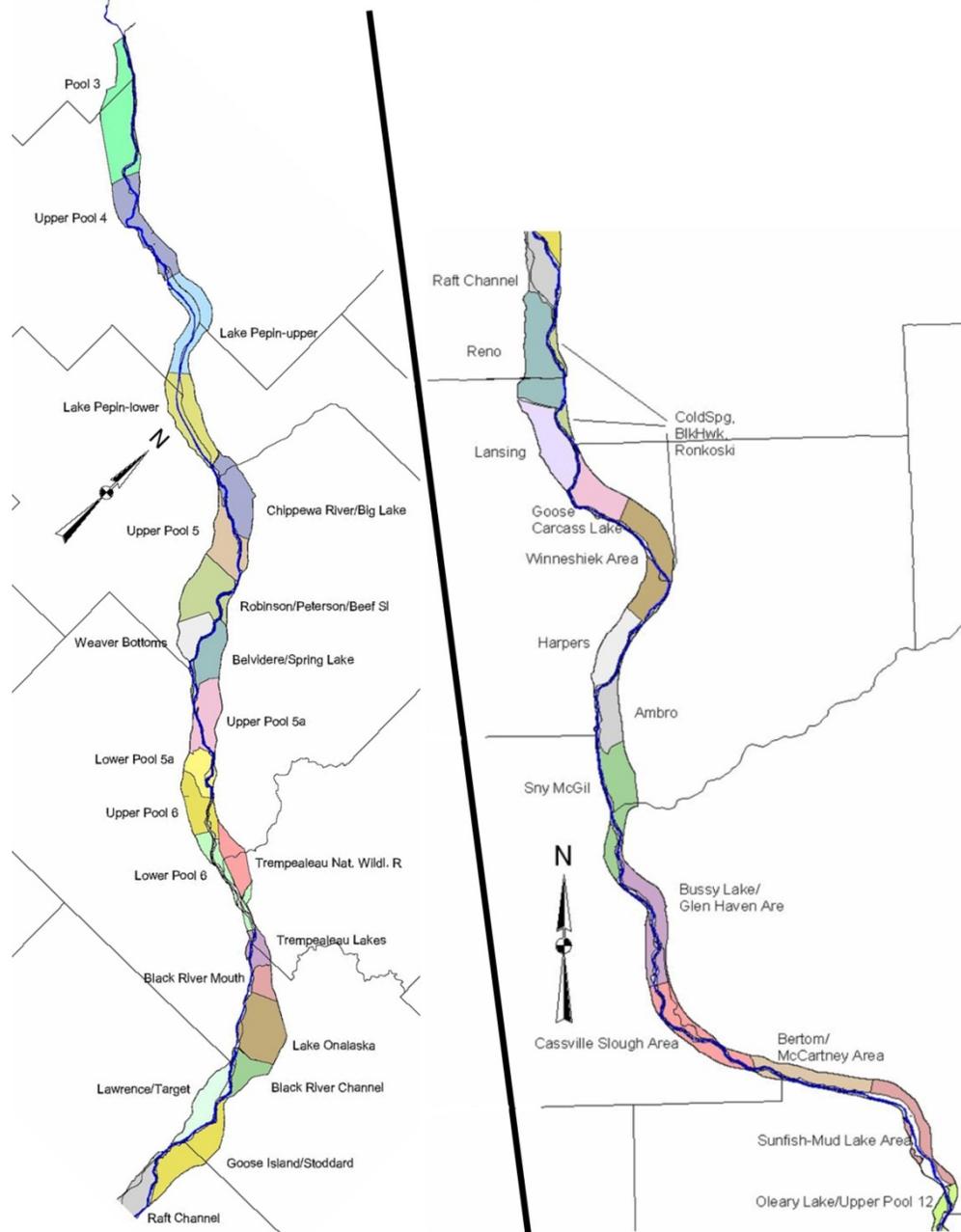


FIGURE 2. LOCATIONS OF FALL 2012 ELECTRO FISHING RUNS, THE LO LAKE UNIT. 2010 NAIP photo.

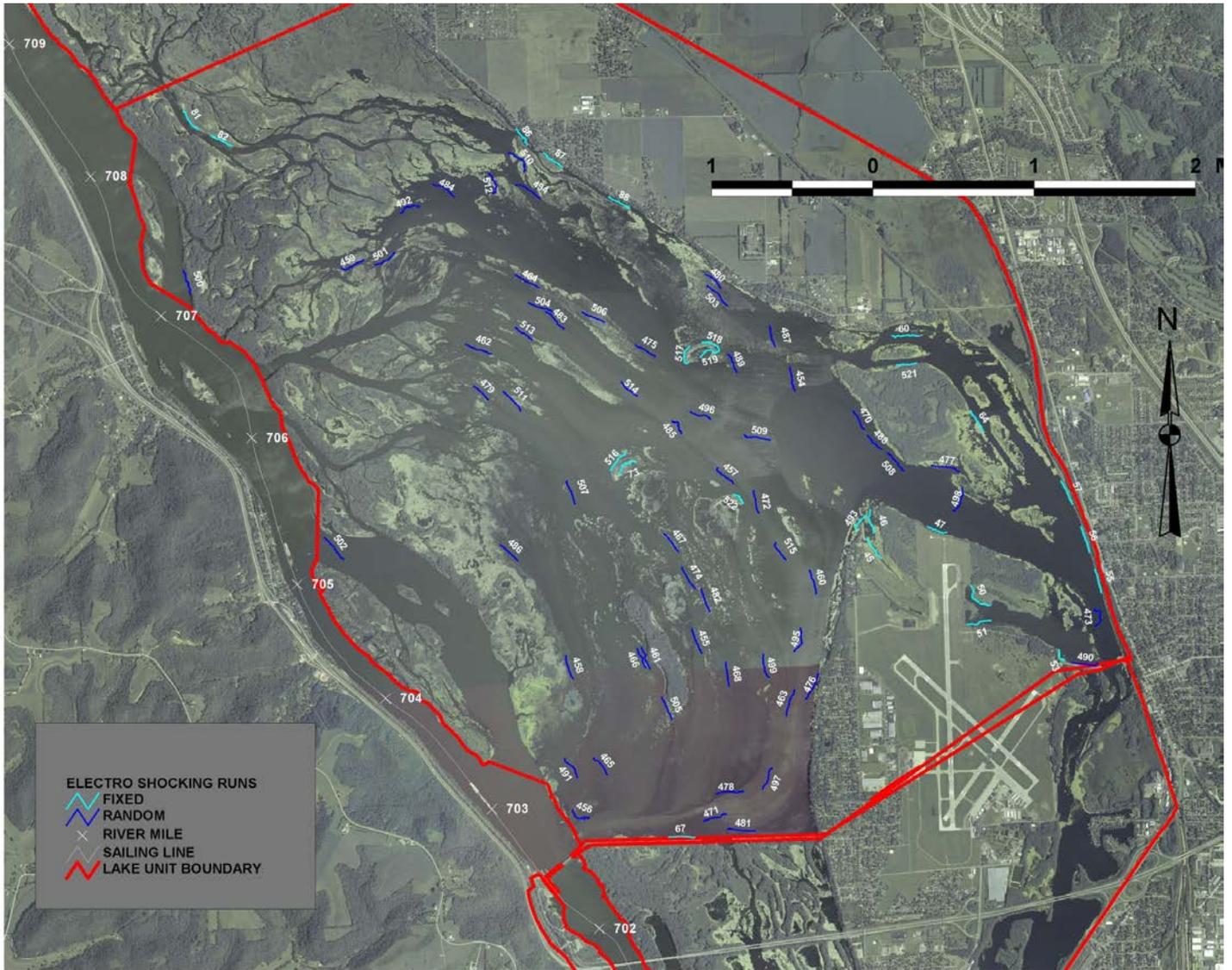


TABLE 1 LOCATIONS OF FALL 2012 ES ELECTRO FISHING RUNS, THE LO LAKE UNIT INCLUDING STATION LENGTHS IN METERS AND STARTING AND ENDING COORDINATES (Z15N UTM NAD83.

STATION	STATION LENGTH (M)	UTM_START_X	UTM_START_Y	UTM_END_X	UTM_END_Y	RANDOM OR FIXED
45	260	639067	4861742	639207	4861546	FIXED
46	266	639102	4862028	639131	4861793	FIXED
47	214	639671	4861861	639863	4861800	FIXED
50	331	640293	4861073	640106	4861262	FIXED
51	258	640069	4860886	640306	4860921	FIXED
53	166	640985	4860624	641039	4860532	FIXED
55	252	641342	4861435	641408	4861197	FIXED
56	285	641206	4861855	641289	4861605	FIXED
57	267	641006	4862315	641118	4862080	FIXED
60	290	639322	4863764	639590	4863761	FIXED
64	249	640104	4863017	640223	4862815	FIXED
67	266	637095	4858756	637351	4858753	FIXED
73	254	636766	4862498	636601	4862386	FIXED
81	264	632248	4866015	632406	4865828	FIXED
82	241	632521	4865763	632731	4865661	FIXED
86	244	635571	4865834	635678	4865672	FIXED
87	264	635842	4865592	636034	4865446	FIXED
88	250	636494	4865151	636704	4865037	FIXED
454	259	638300	4863452	638356	4863215	RANDOM
455	263	637323	4860836	637419	4860595	RANDOM
456	271	636133	4859025	636296	4858955	RANDOM
457	242	637581	4862445	637733	4862289	RANDOM
458	251	636066	4860568	636140	4860335	RANDOM
459	263	633829	4864443	634047	4864524	RANDOM
460	252	638499	4861419	638561	4861184	RANDOM
461	243	636822	4860650	636905	4860435	RANDOM
462	283	635066	4863679	635320	4863586	RANDOM
463	281	638348	4860229	638266	4859967	RANDOM
464	274	635559	4864374	635797	4864247	RANDOM
465	224	636342	4859543	636478	4859379	RANDOM
466	214	636777	4860637	636860	4860451	RANDOM
467	233	637044	4861785	637189	4861609	RANDOM
468	247	637659	4860504	637693	4860265	RANDOM
470	225	638934	4863009	639041	4862835	RANDOM
471	244	637662	4858987	637439	4858916	RANDOM
472	239	637939	4862218	637993	4861995	RANDOM
473	263	641350	4860862	641347	4861034	RANDOM
474	257	637226	4861451	637356	4861239	RANDOM
475	231	636759	4863672	636955	4863563	RANDOM
476	285	638582	4860389	638460	4860137	RANDOM
477	291	639718	4862473	639988	4862411	RANDOM
478	283	637838	4859217	637565	4859187	RANDOM

STATION	STATION LENGTH (M)	UTM_START_X	UTM_START_Y	UTM_END_X	UTM_END_Y	RANDOM OR FIXED
479	199	635150	4863263	635288	4863128	RANDOM
480	221	637457	4864383	637606	4864243	RANDOM
481	281	637680	4858838	637956	4858817	RANDOM
482	253	637418	4861239	637502	4861007	RANDOM
483	261	635859	4864009	636046	4863836	RANDOM
484	258	634738	4865283	634946	4865156	RANDOM
485	196	637124	4862910	637217	4862790	RANDOM
486	239	635410	4861677	635584	4861518	RANDOM
487	226	638098	4863862	638152	4863656	RANDOM
488	202	639075	4862765	639215	4862632	RANDOM
489	222	637679	4863581	637772	4863404	RANDOM
490	283	641117	4860497	641374	4860492	RANDOM
491	240	636057	4859539	636178	4859353	RANDOM
492	240	634410	4864986	634607	4865057	RANDOM
493	204	639050	4861968	638956	4861824	FIXED
494	285	635562	4865273	635800	4865143	RANDOM
495	267	638404	4860842	638342	4860614	RANDOM
496	229	637307	4863008	637507	4862931	RANDOM
497	248	638123	4859446	638031	4859236	RANDOM
498	264	640017	4862238	639930	4862018	RANDOM
499	253	638034	4860582	638094	4860349	RANDOM
500	286	632249	4864412	632315	4864184	RANDOM
501	241	634162	4864478	634350	4864597	RANDOM
502	306	633654	4861751	633849	4861527	RANDOM
503	294	637476	4864266	637675	4864067	RANDOM
504	259	635691	4864096	635931	4864010	RANDOM
505	248	637122	4859930	637021	4860153	RANDOM
506	251	636228	4864000	636449	4863901	RANDOM
507	250	636077	4862312	636156	4862085	RANDOM
508	250	639275	4862593	639436	4862415	RANDOM
509	278	637847	4862771	638102	4862727	RANDOM
510	288	635492	4865597	635648	4865401	RANDOM
511	266	635439	4863208	635612	4863015	RANDOM
512	241	635296	4865381	635339	4865187	RANDOM
513	223	635562	4863847	635728	4863724	RANDOM
514	221	636617	4863305	636777	4863162	RANDOM
515	214	638159	4861696	638259	4861530	RANDOM
516	242	636512	4862415	636666	4862584	FIXED
517	224	637284	4863495	637301	4863658	FIXED
518	250	637425	4863699	637571	4863599	FIXED
519	200	637557	4863592	637412	4863555	FIXED
521	205	639561	4863496	639366	4863472	FIXED
522	158	637829	4862091	637737	4862180	FIXED

TABLE 2. MEAN WATER TEMPERATURE, WATER SURFACE ELEVATION AND FLOW DURING FALL 2012 LO LAKE UNIT SAMPLING.

DATE	MEAN DAILY TEMPERATURE °C	WATER SURFACE ELEVATION (ft), DAM 7 POOL	FLOW (cfs) DAM 7
09/14/2012	22.4	639.13	14200
09/18/2012	17	639.08	10700
09/19/2012	16.1	638.94	9400
09/20/2012	16	639.08	9900
09/21/2012	16.1	639.23	10500
09/26/2012	16.4	639.04	11100
MEAN (by date, station)	16.5	639.08	10401

TABLE 3. RELATIVE ABUNDANCE, MEAN CATCH PER HR, ELECTRO FISHING, FALL 2012, LO LAKE UNIT. RANDOM RUNS.

	SPECIES	FREQ.	PERCENT	MEAN PER HR	STANDARD DEV.	MIN.	MAX.	NO. OF RUNS	TOTAL HRS
1	bigmouth buffalo	1	0.248	0.0998	0.7730	0	5.988	60	10.02
2	black crappie	6	1.489	0.5988	2.1207	0	11.976	60	10.02
3	Bluegill	42	10.422	4.1916	8.4898	0	29.940	60	10.02
4	bowfin	9	2.233	0.8982	2.8802	0	11.976	60	10.02
5	brook silverside	1	0.248	0.0998	0.7730	0	5.988	60	10.02
6	common carp	2	0.496	0.1996	1.0839	0	5.988	60	10.02
7	emerald shiner	7	1.737	0.6986	2.9359	0	17.964	60	10.02
8	freshwater drum	10	2.481	0.9980	2.5060	0	11.976	60	10.02
9	gizzard shad	82	20.347	8.1836	27.2955	0	131.737	60	10.02
10	golden redhorse	1	0.248	0.0998	0.7730	0	5.988	60	10.02
11	golden shiner	4	0.993	0.3992	1.8666	0	11.976	60	10.02
12	largemouth bass	113	28.040	11.2774	19.1620	0	95.808	60	10.02
13	logperch	1	0.248	0.0998	0.7730	0	5.988	60	10.02
14	mooneye	3	0.744	0.2994	1.7168	0	11.976	60	10.02
15	northern pike	4	0.993	0.3992	1.8666	0	11.976	60	10.02
16	pumpkinseed	1	0.248	0.0998	0.7730	0	5.988	60	10.02
17	quillback	1	0.248	0.0998	0.7730	0	5.988	60	10.02
18	rock bass	4	0.993	0.3992	1.8666	0	11.976	60	10.02
19	sauger	1	0.248	0.0998	0.7730	0	5.988	60	10.02
20	shorthead redhorse	6	1.489	0.5988	2.3901	0	11.976	60	10.02
21	silver redhorse	5	1.241	0.4990	1.6690	0	5.988	60	10.02
22	smallmouth bass	6	1.489	0.5988	3.9289	0	29.940	60	10.02
23	spottail shiner	1	0.248	0.0998	0.7730	0	5.988	60	10.02
24	spotted sucker	42	10.422	4.1916	10.8749	0	59.880	60	10.02
25	walleye	5	1.241	0.4990	2.0002	0	11.976	60	10.02
26	white sucker	1	0.248	0.0998	0.7730	0	5.988	60	10.02
27	yellow perch	44	10.918	4.3912	8.0915	0	47.904	60	10.02
	ALL SPECIES	403	100.000	40.2195	47.3567	0	215.569	60	10.02

TABLE 4. RELATIVE ABUNDANCE, MEAN CATCH PER HR, ELECTRO FISHING, FALL 2012, LO LAKE UNIT. FIXED RUNS.

	SPECIES	FREQ.	PERCENT	MEAN PER HR	STANDARD DEV.	MIN.	MAX.	NO. OF RUNS	TOTAL HRS
1	black crappie	29	2.74	6.01	7.33	0.00	29.96	25	4.46
2	bluegill	369	34.91	83.74	116.50	5.00	544.91	25	4.46
3	bowfin	21	1.99	4.32	9.76	0.00	35.93	25	4.46
4	brook silverside	13	1.23	3.73	15.32	0.00	75.19	25	4.46
5	common carp	10	0.95	2.40	5.73	0.00	23.95	25	4.46
6	emerald shiner	4	0.38	0.96	3.32	0.00	11.98	25	4.46
7	freshwater drum	18	1.70	4.29	10.15	0.00	41.92	25	4.46
8	gizzard shad	34	3.22	8.14	24.19	0.00	89.82	25	4.46
9	golden redhorse	1	0.10	0.24	1.20	0.00	5.99	25	4.46
10	golden shiner	32	3.03	5.69	17.56	0.00	85.84	25	4.46
11	green sunfish	1	0.10	0.24	1.20	0.00	5.99	25	4.46
12	largemouth bass	319	30.18	71.00	40.01	11.98	131.74	25	4.46
13	logperch	9	0.85	2.16	6.44	0.00	29.94	25	4.46
14	longnose gar	1	0.10	0.24	1.20	0.00	5.99	25	4.46
15	pirate perch	4	0.38	0.82	2.89	0.00	11.98	25	4.46
16	pumpkinseed	15	1.42	3.35	6.75	0.00	29.94	25	4.46
17	quillback	5	0.47	1.20	3.87	0.00	17.96	25	4.46
18	rock bass	9	0.85	2.16	6.20	0.00	23.95	25	4.46
19	shorthead redhorse	1	0.10	0.24	1.20	0.00	5.99	25	4.46
20	silver lamprey	1	0.10	0.24	1.20	0.00	5.99	25	4.46
21	silver redhorse	1	0.10	0.24	1.20	0.00	5.99	25	4.46
22	smallmouth bass	27	2.55	6.43	16.12	0.00	65.87	25	4.46
23	spotted sucker	53	5.01	11.76	11.09	0.00	38.25	25	4.46
24	walleye	2	0.19	0.41	1.44	0.00	5.99	25	4.46
25	warmouth	2	0.19	0.39	1.39	0.00	5.99	25	4.46
26	weed shiner	4	0.38	0.89	2.72	0.00	11.98	25	4.46
27	white bass	1	0.10	0.24	1.20	0.00	5.99	25	4.46
28	yellow bullhead	1	0.10	0.24	1.20	0.00	5.99	25	4.46
29	yellow perch	70	6.62	16.29	25.30	0.00	101.80	25	4.46
	ALL SPECIES	1057	100	238.04	149.42	55	748.50	25	4.46

TABLE 5. MEAN LENGTH IN INCHES FOR SELECTED GAME FISH SPECIES, FALL 2012, LO LAKE UNIT, FROM ELECTRO FISHING AT RANDOM AND FIXED STATIONS.

SPECIES	MEAN LENGTH	STANDARD DEV.	MIN.	MAX.	N
black crappie	5.45	2.33	2.36	10.75	35
bluegill	2.90	1.63	1.06	8.19	410
gizzard shad	7.67	2.81	3.54	12.72	116
largemouth bass	6.66	3.70	2.24	19.76	432
smallmouth bass	7.03	2.70	3.54	15.39	33
spotted sucker	12.44	4.51	3.94	19.88	95
yellow perch	6.41	2.22	1.06	16.81	114

FIGURE 3. FALL 2012 BLUEGILL LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

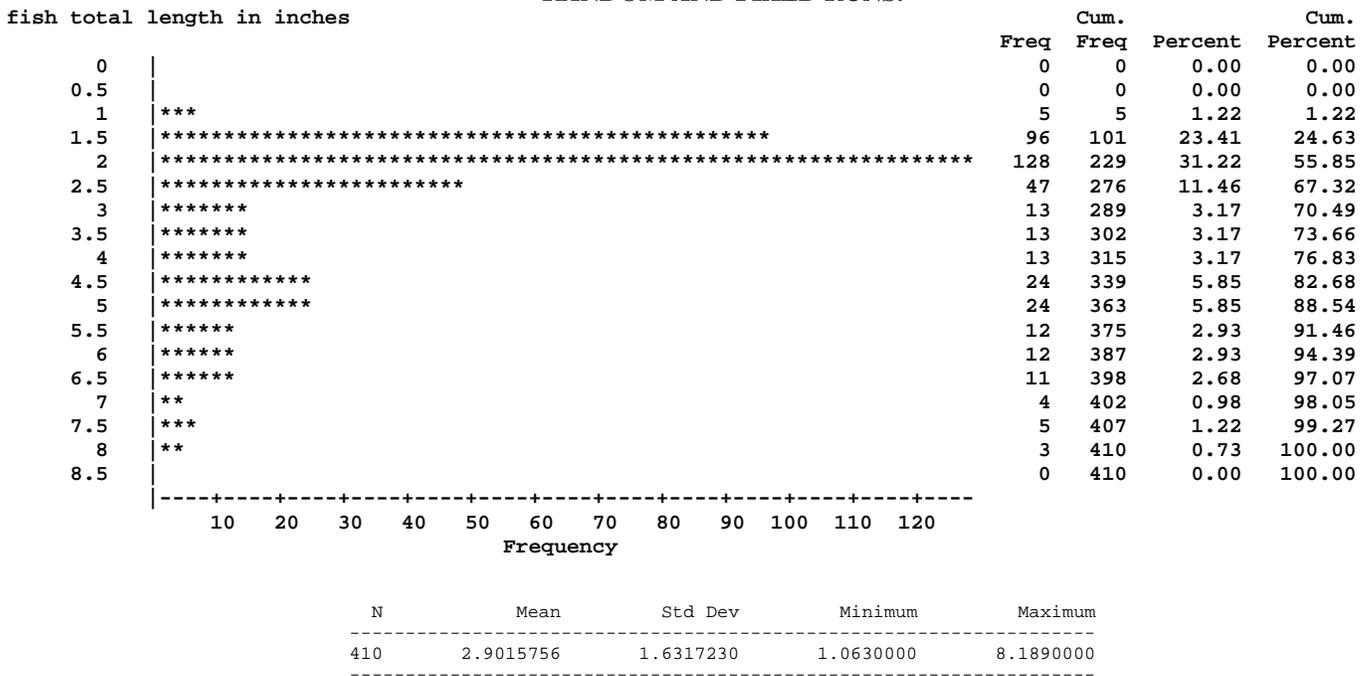
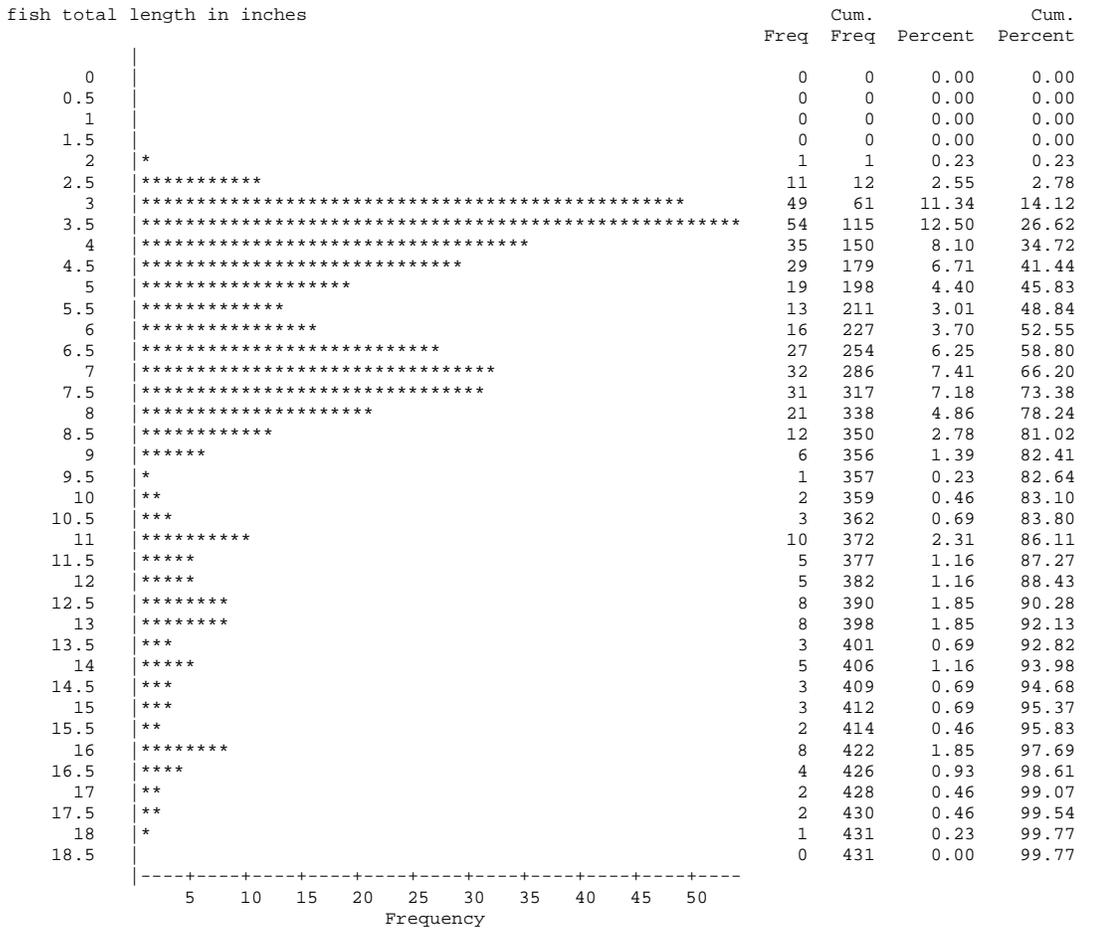
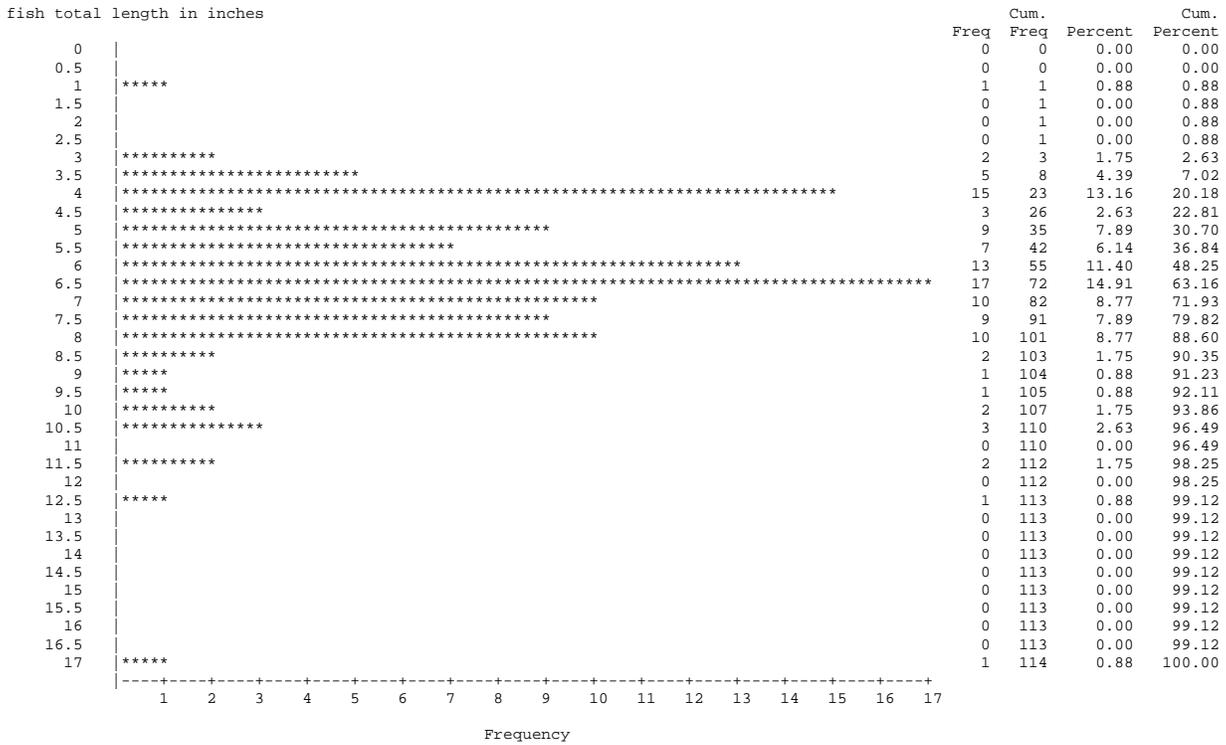


FIGURE 4. FALL 2012 LAREMOUTH BASS LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.



N	Mean	Std Dev	Minimum	Maximum
432	6.6600972	3.7034912	2.2440000	19.7640000

FIGURE 5. FALL 2012 YELLOW PERCH LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.



N	Mean	Std Dev	Minimum	Maximum
114	6.4083246	2.2172303	1.0630000	16.8110000

FIGURE 6. FALL 2012 BLACK CRAPPIE LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

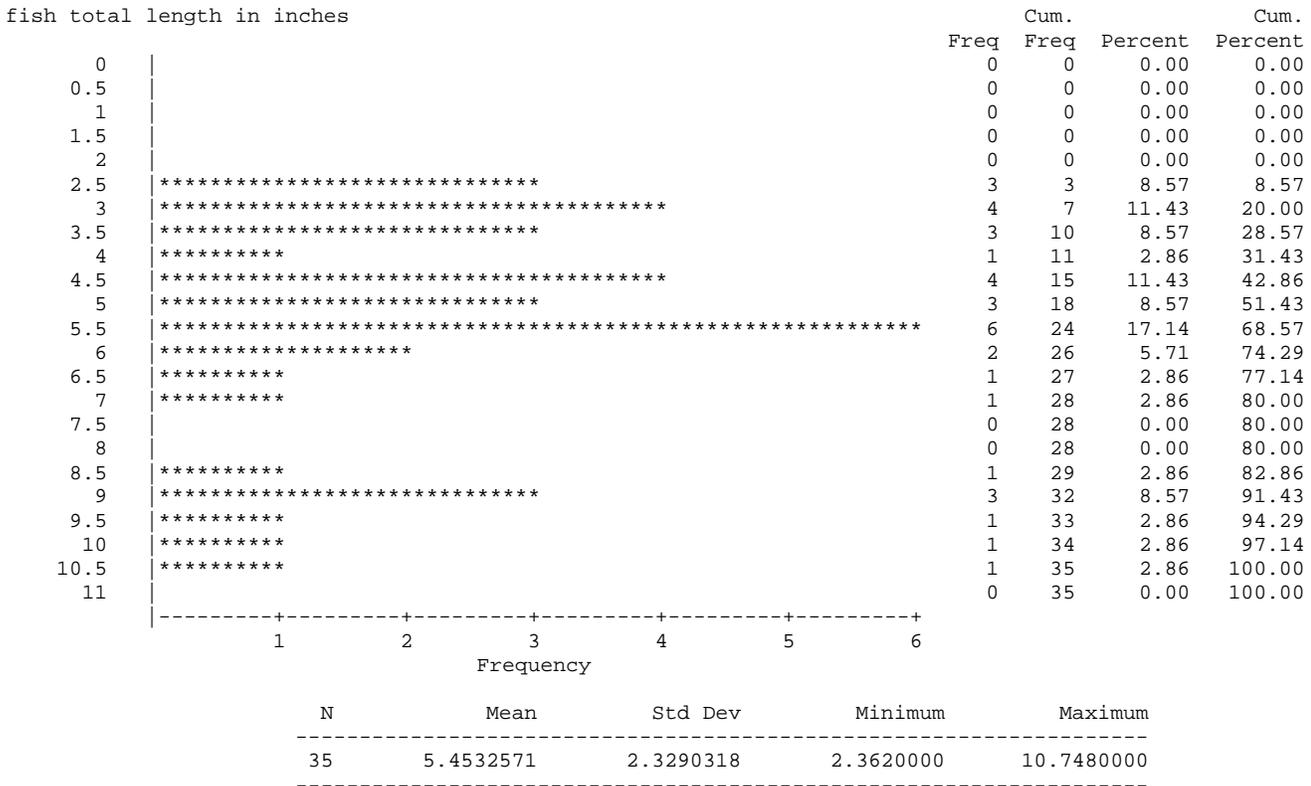


FIGURE 7. FALL 2012 GIZZARD SHAD LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

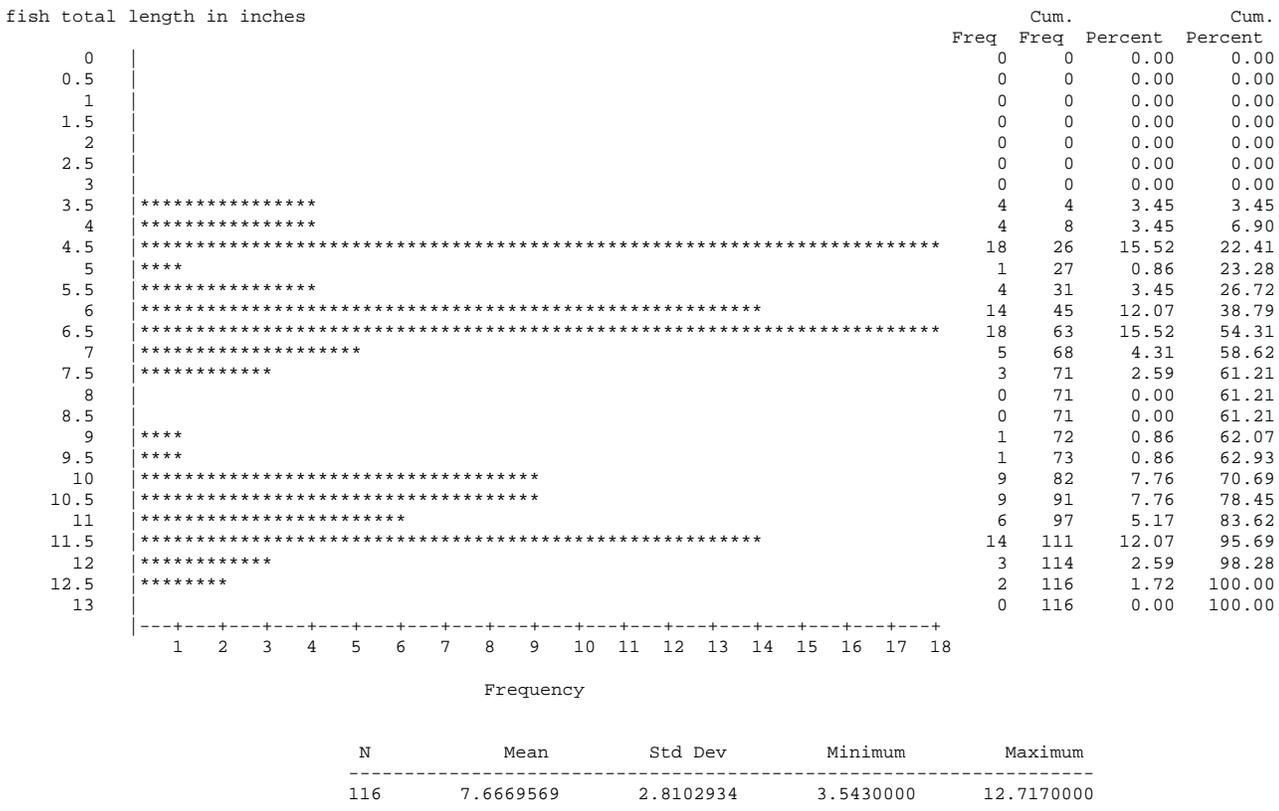


FIGURE 8. FALL 2012 SPOTTED SUCKER LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

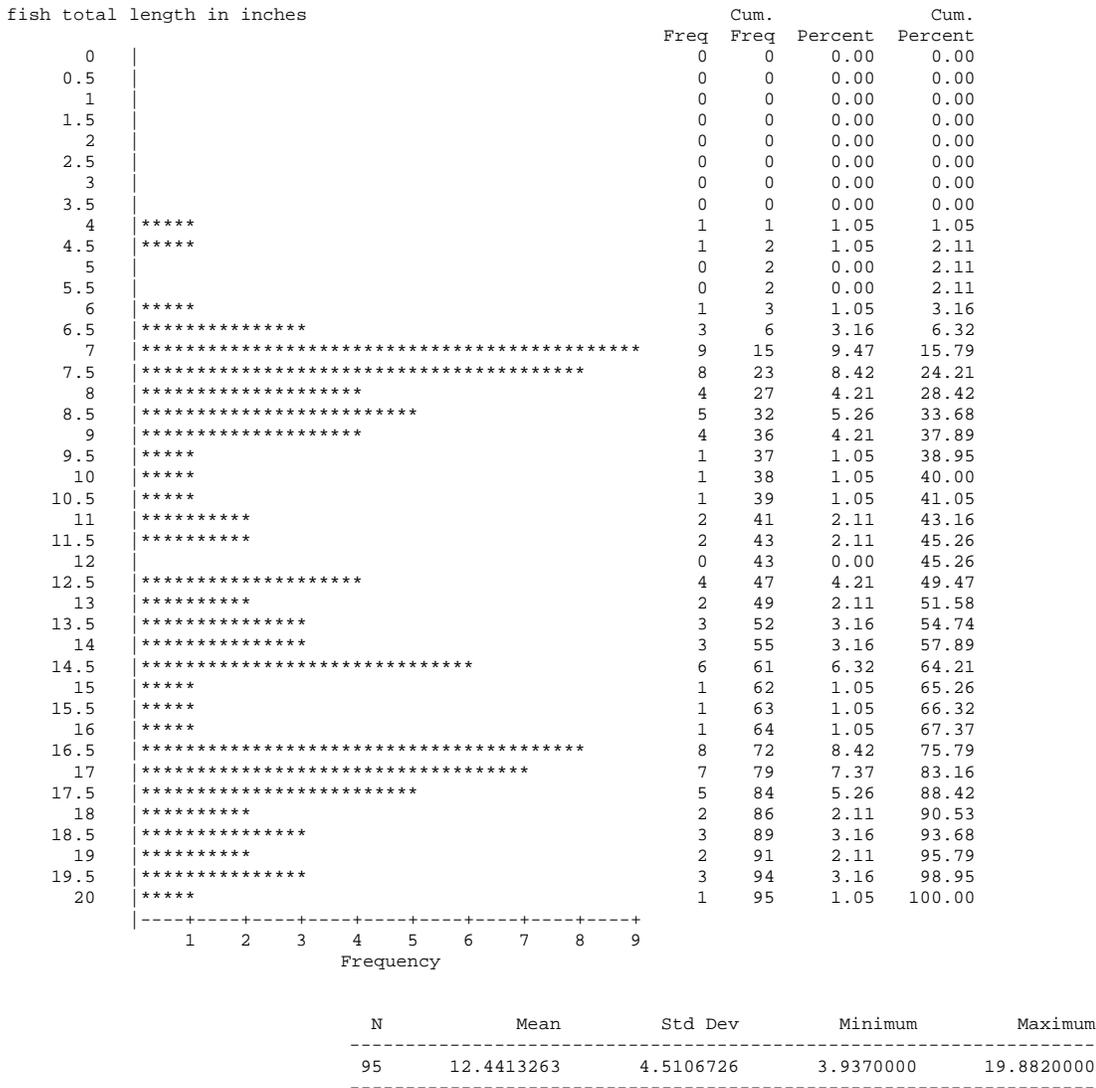


TABLE 6. LIST OF STOCK SIZE, QUALITY SIZE (PSS_Q) AND PREFERRED SIZE (PSS_P) IN INCHES FOR SELECTED FISH SPECIES.

FISH SPECIES	PSS SOURCE	STOCK	QUALITY	PREFERRED
bluegill	Gabelhouse (1984)	3.0	6.0	8.0
black crappie	Gabelhouse (1984)	5.0	8.0	10.0
gizzard shad	Anderson and Gutreuter (1983)	7.0	11.0	-
largemouth bass	Gabelhouse (1984)	8.0	12.0	15.0
yellow perch	Gabelhouse (1984)	5.0	8.0	10.0

TABLE 7. COMPARISON OF AND PSS FOR SELECTED SPECIES IN LO LAKE UNIT. ELECTRO FISHING, FALL 2008 AND 2012, RANDOM AND FIXED RUNS.

SPECIES	2008			2012		
	# OF STOCK	PSS _Q	PSS _P	# OF STOCK	PSS _Q	PSS _P
bluegill	279	13.26	0.00	129	22.48	0.78
black crappie	15	26.67	6.67	18	38.89	5.56
gizzard shad				50	46	
largemouth bass	117	41.88	11.97	104	51.92	21.15
yellow perch	36	38.89	11.1	84	22.62	8.33

TABLE 8. COMPARISON OF MEAN CATCH PER HOUR FROM ELECTRO FISHING AT RANDOMLY SELECTED LOCATIONS FOR ALL TARGET SPECIES* COMBINED AMONG NINE FALL 2011 AND 2012 LAKE UNITS.

MEAN	STD. DEV.	N	LAKE UNIT	DIFFERENT (means with the same letter are not Sign. Different)		
189.180	149.976	86	2011 GOOSE ISLAND/STODDARD	A		
228.481	215.693	32	2012 UPPER POOL 5	A		
151.212	142.394	63	2011 COLD SPRG/BLKHWK/RONK	A	B	
124.750	114.050		2011 CHIPPEWA RIVER/BIG LA	A	B	
129.360	121.860		2011 AMBRO	A	B	C
85.115	95.713	42	2011 HARPERS	A	B	C
48.675	49.323	39	2012 GOOSE CARCASS LAKE		B	C
39.122	38.957	30	2011 WEAVER BOTTOMS			C
21.956	30.626	60	2012 LAKE ONALASKA			D
119.019	137.172	445	ALL			

- Target species include: bluegill, black crappie, largemouth bass, northern pike, smallmouth bass, pumpkinseed, rock bass, white crappie and yellow perch.

TABLE 9. COMPARISON OF MEAN CATCH PER HOUR FROM ELECTRO SHOCKED RANDOMLY SELECTED STATIONS FOR SELECTED INDIVIDUAL SPECIES, AMONG NINE FALL 2011 AND 2012 LAKE UNITS. ALL FISH SIZES.

SPECIES	MEAN	STD. DEV.	N	LAKE UNIT	DIFFERENT (means with the same letter are not Sign. Different)	
BLACK CRAPPIE	10.29	19.37	32	2012 UPPER POOL 5	A	
	5.70	11.60	30	2011 CHIPPEWA RIVER/BIG LA	B	A
	3.99	6.36	63	2011 AMBRO	B	A
	2.99	4.23	42	2011 HARPERS	B	A
	1.25	2.92	86	2011 GOOSE ISLAND/STODDARD	B	C
	1.23	3.41	39	2012 GOOSE CARCASS LAKE	B	C
	1.14	3.01	63	2011 COLD SPRG/BLKHWK/RONK	B	C
	0.60	2.12	60	2012 LAKE ONALASKA		C
	0.40	1.52	30	2011 WEAVER BOTTOMS		C
BLUEGILL	125.19	140.91	32	2012 UPPER POOL 5	A	
	74.71	93.49	42	2011 HARPERS	A	
	66.41	74.93	63	2011 COLD SPRG/BLKHWK/RONK	A	
	76.51	88.65	63	2011 AMBRO	A	
	44.91	68.54	86	2011 GOOSE ISLAND/STODDARD	A	
	28.74	41.29	30	2011 CHIPPEWA RIVER/BIG LA	A	
	7.26	9.92	39	2012 GOOSE CARCASS LAKE		B
	9.18	20.91	30	2011 WEAVER BOTTOMS		B
	4.19	8.49	60	2012 LAKE ONALASKA		B
LARGEMOUTH BASS	99.85	108.66	86	2011 GOOSE ISLAND/STODDARD		A
	59.13	66.15	32	2012 UPPER POOL 5	B	A
	52.19	66.13	63	2011 COLD SPRG/BLKHWK/RONK	B	
	37.92	45.12	30	2011 CHIPPEWA RIVER/BIG LA	B	
	32.67	41.45	39	2012 GOOSE CARCASS LAKE	B	
	33.46	46.89	63	2011 AMBRO	B	
	22.16	21.28	30	2011 WEAVER BOTTOMS	B	
	11.28	19.16	60	2012 LAKE ONALASKA		C
	4.13	6.81	42	2011 HARPERS		C
NORTHERN PIKE	4.79	5.97	30	2011 CHIPPEWA RIVER/BIG LA		A
	3.44	4.69	63	2011 COLD SPRG/BLKHWK/RONK	B	A
	1.6	3.49	30	2011 WEAVER BOTTOMS	B	C
	1.39	3.40	86	2011 GOOSE ISLAND/STODDARD	B	C
	1.33	3.31	63	2011 AMBRO	B	C
	0.94	2.68	32	2012 UPPER POOL 5		C
	0.57	1.78	42	2011 HARPERS		C
	0.40	1.87	60	2012 LAKE ONALASKA		C
	0.15	0.96	39	2012 GOOSE CARCASS LAKE		C
ROCK BASS	5.78	12.41	86	2011 GOOSE ISLAND/STODDARD	A	
	5.89	16.85	63	2011 COLD SPRG/BLKHWK/RONK	A	B
	0.61	1.84	39	2012 GOOSE CARCASS LAKE	C	B
	0.60	1.83	30	2011 CHIPPEWA RIVER/BIG LA	C	B

SPECIES	MEAN	STD. DEV.	N	LAKE UNIT	DIFFERENT (means with the same letter are not Sign. Different)	
SAUGER	0.40	1.87	60	2012 LAKE ONALASKA	C	B
	0.19	1.06	63	2011 AMBRO	C	
	0.19	1.06	32	2012 UPPER POOL 5	C	
	0.00		30	2011 WEAVER BOTTOMS	C	
	0.00		42	2011 HARPERS	C	
	4.42	5.30	42	2011 HARPERS	A	
	4.85	6.79	63	2011 AMBRO	A	
	6.00	10.20	63	2011 COLD SPRG/BLKHWK/RONK	A	
	1.23	3.13	39	2012 GOOSE CARCASS LAKE		B
	1.11	3.25	86	2011 GOOSE ISLAND/STODDARD		B
	0.10	0.77	60	2012 LAKE ONALASKA		B
	0.00		30	2011 CHIPPEWA RIVER/BIG LA		B
	0.00		30	2011 WEAVER BOTTOMS		B
	0.00		32	2012 UPPER POOL 5		B
SMALLMOUTH BASS	10.54	22.83	63	2011 COLD SPRG/BLKHWK/RONK	A	
	5.64	10.92	86	2011 GOOSE ISLAND/STODDARD	A	
	2.20	6.94	30	2011 CHIPPEWA RIVER/BIG LAKE		B
	1.12	3.20	32	2012 UPPER POOL 5		B
	1.07	3.03	39	2012 GOOSE CARCASS LAKE		B
	0.38	1.47	63	2011 AMBRO		B
	0.60	3.93	60	2012 LAKE ONALASKA		B
	0.00		30	2011 WEAVER BOTTOMS		B
	0.00		42	2011 HARPERS		B
	WALLEYE	4.56	7.19	63	2011 AMBRO	A
3.39		5.14	30	2011 CHIPPEWA RIVER/BIG LA	A	
2.48		5.12	63	2011 COLD SPRG/BLKHWK/RONK	A	B
2.16		4.68	86	2011 GOOSE ISLAND/STODDARD	A	B
1.57		5.13	39	2012 GOOSE CARCASS LAKE	A	B
0.60		1.83	30	2011 WEAVER BOTTOMS		B
0.50		2.00	60	2012 LAKE ONALASKA		B
0.43		1.56	42	2011 HARPERS		B
0.00		0.00	32	2012 UPPER POOL 5		B
YELLOW PERCH		43.31	39.37	30	2011 CHIPPEWA RIVER/BIG LA	
	28.55	45.08	86	2011 GOOSE ISLAND/STODDARD	B	A
	31.25	40.66	32	2012 UPPER POOL 5	B	
	10.17	13.76	63	2011 AMBRO	B	C
	11.32	28.02	63	2011 COLD SPRG/BLKHWK/RONK	D	C
	5.37	10.71	39	2012 GOOSE CARCASS LAKE	D	C
	4.39	8.09	60	2012 LAKE ONALASKA	D	C
	4.39	7.19	30	2011 WEAVER BOTTOMS	D	C
	1.85	3.62	42	2011 HARPERS	D	

SPECIES	MEAN	STD. DEV.	N	LAKE UNIT	DIFFERENT (means with the same letter are not Sign. Different)							
					E	B	D	A	C	F		
	7.96	2.82	9	2010 CASSVILLE SLOUGH AREA	E	B	D	A	C			
	7.84	4.14	13	2008 GOOSE CARCASS LAKE	E	B	D	A	C			
	7.42	2.33	8	2008 SNY MCGIL	E	B	D	A	C	F		
	7.31	2.38	14	2011 COLD SPRG/BLKHWK/RONK	E	B	D	A	C	F		
	7.16	2.78	8	2010 BLACK RIVER MOUTH	E	B	D	A	C	F		
	6.86	3.7	5	2008 BELVIDERE/SPRING LAKE	E	B	D	A	C	F		
	6.75	3.29	6	2011 WEAVER BOTTOMS	E	B	D	A	C	F		
	6.57	2.91	10	2009 LANSING	E	B	D	A	C	F		
	6.48	2.86	35	2008 TREMPEALEAU LAKES	E	B	D	A	C	F		
	6.41	1.93	9	2010 BUSSY LAKE/GLEN HAVEN	E	B	D	A	C	F		
	6.37	2.84	15	2009 UPPER POOL 6	E	B	D	A	C	F		
	5.63	2.9	49	2011 CHIPPEWA RIVER/BIG LK	E	B	D		C	F		
	5.53	3.42	17	2008 ROBINSON/PETERSON/BEE	E	B	D		C	F		
	5.45	2.33	35	2012 LAKE ONALASKA	E	B	D		C	F		
	5.2	3.06	15	2012 GOOSE CARCASS LAKE	E		D		C	F		
	5.1	2.82	54	2009 LAWRENCE/TARGET	E		D			F		
	4.83	3.54	18	2011 GOOSE ISLAND/STODDARD	E					F		
	4.76	3.05	71	2012 UPPER POOL 5	E					F		
	4.22	2.49	34	2008 LAKE ONALASKA						F		
	7.2	3.04	845	ALL								
LARGEMOUTH BASS	11.86	3.41	29	2011 HARPERS				A				
	11.68	3.52	328	2007 UPPER POOL 5A				A				
	11.33	3.67	251	2008 SNY MCGIL		B		A				
	11.12	3.48	352	2011 AMBRO		B		A	C			
	10.99	3.41	272	2007 UPPER POOL 5		B		A	C			
	10.72	3.53	481	2007 AMBRO		B		A	C			
	10.30	2.58	595	2011 COLD SPRG/BLKHWK/RONK		B		D	C			
	10.06	3.37	260	2007 HARPERS		E		D	C			
	9.93	3.76	819	2007 GOOSE ISLAND/STODDARD		E	F	D	C			
	9.48	5.08	295	2008 ROBINSON/PETERSON/BEE		E	F	D	G			
	9.15	4.97	314	2009 UPPER POOL 6	H	E	F	D	G			
	9.04	3.86	260	2009 BERTOM/MCCARTNEY AREA	H	E	F		G			
	9.03	3.20	688	2007 COLD SPRG/BLKHWK/RONK	H	E	F		G			
	8.70	5.13	256	2008 BELVIDERE/SPRING LAKE	H		F	I	G			
	8.27	4.83	466	2008 GOOSE CARCASS LAKE	H	J		I	G			
	8.13	4.18	387	2012 GOOSE CARCASS LAKE	H	J		I				
	8.12	4.38	231	2010 CASSVILLE SLOUGH AREA	H	J		I				
	8.01	4.28	296	2010 LOWER POOL 5A	H	J		I				
	7.59	4.22	321	2008 TREMPEALEAU LAKES		J		I	K			
	7.56	4.34	413	2011 WEAVER BOTTOMS		J		I	K			
	7.17	4.53	446	2012 UPPER POOL 5		J		L	K			
	7.15	4.00	445	2009 LANSING		J		L	K			
	6.73	3.95	645	2009 LAWRENCE/TARGET				L	K			
	6.66	3.70	432	2012 LAKE ONALASKA				L	K			

SPECIES	MEAN	STD. DEV.	N	LAKE UNIT	DIFFERENT (means with the same letter are not Sign. Different)										
	6.50	4.01	1052	2010 BLACK RIVER CHANNEL		M		L	K						
	6.05	3.19	160	2010 BLACK RIVER MOUTH		M		L	N						
	5.29	3.60	627	2008 LAKE ONALASKA		M		O	N						
	5.27	3.27	673	2011 CHIPPEWA RIVER/BIG LK		M		O	N						
	5.02	2.89	282	2010 BUSSY LAKE/GLEN HAVEN				O	N						
	4.36	2.94	1434	2011 GOOSE ISLAND/STODDARD				O							
	7.78	4.36	13510	ALL											
YELLOW PERCH	8.55	1.29	5	2007 UPPER POOL 5A					A						
	8.52	2.18	5	2007 HARPERS					A						
	7.70	1.69	29	2007 UPPER POOL 5		B			A						
	7.58	3.01	18	2008 BELVIDERE/SPRING LAKE		B			A			C			
	7.54	2.01	49	2011 WEAVER BOTTOMS		B			A			C			
	7.47	2.44	13	2011 HARPERS		B	D		A			C			
	7.33	2.04	21	2010 LOWER POOL 5A	E	B	D		A			C			
	7.27	1.86	107	2011 AMBRO	E	B	D		A			C			
	7.19	1.90	19	2007 AMBRO	E	B	D		A			C			
	7.08	1.62	55	2010 BUSSY LAKE/GLEN HAVEN	E	B	D		A			C			
	6.89	2.50	57	2012 GOOSE CARCASS LAKE	E	B	D		A			C	F		
	6.88	1.46	121	2011 COLD SPRG/BLKHWK/RONK	E	B	D		A			C	F		
	6.84	2.29	24	2010 CASSVILLE SLOUGH AREA	E	B	D		A			C	F		
	6.48	1.94	498	2011 CHIPPEWA RIVER/BIG LK	E	B	D		G			C	F		
	6.45	2.17	12	2007 COLD SPRG/BLKHWK/RONK	E	B	D		G			C	F		
	6.41	2.22	114	2012 LAKE ONALASKA	E	B	D		G	H		C	F		
	6.39	1.99	410	2011 GOOSE ISLAND/STODDARD	E	B	D		G	H		C	F		
	5.86	2.15	45	2007 GOOSE ISLAND/STODDARD	E	B	D	I	G	H		C	F		
	5.84	1.62	248	2010 BLACK RIVER CHANNEL	E	B	D	I	G	H		C	F		
	5.77	1.61	97	2009 UPPER POOL 6	E	B	D	I	G	H		C	F		
	5.72	2.77	33	2008 GOOSE CARCASS LAKE	E		D	I	G	H		C	F		
	5.55	2.54	62	2008 ROBINSON/PETERSON/BEE	E		D	I	G	H			F		
	5.45	1.96	185	2012 UPPER POOL 5	E			I	G	H			F		
	5.10	2.35	95	2008 LAKE ONALASKA				I	G	H			F		
	5.09	1.58	8	2008 SNY MCGIL				I	G	H			F		
	5.00	2.45	107	2009 LANSING				I	G	H			F		
	4.65	1.24	518	2009 LAWRENCE/TARGET				I	G	H					
	4.49	1.76	103	2008 TREMPEALEAU LAKES				I		H					
	4.25	1.17	91	2009 BERTOM/MCCARTNEY AREA				I							
	4.22	1.91	82	2010 BLACK RIVER MOUTH				I							
	5.85	2.09	3231	ALL											

TABLE 11. COMPARISON OF QUALITY AND PREFERRED PSS FOR SELECTED SPECIES FROM 2007-2012 LAKE UNITS WHERE COUNT OF STOCK WAS GREATER THAN 29 AND OCCURRED IN THE 2012 LAKE ONALASKA LAKE UNIT. FALL ELECTRO FISHING. RANDOM AND FIXED STATIONS.

Common Name	Lake Unit	PSS q	PSS p
bluegill	2007 UPPER POOL 5	45.57	0.84
bluegill	2009 UPPER POOL 6	40.91	3.03
bluegill	2007 AMBRO	39.76	0.89
bluegill	2007 UPPER POOL 5A	38.42	1.58
bluegill	2011 CHIPPEWA RIVER/BIG LA	36.72	2.30
bluegill	2011 COLD SPRG/BLKHWK/RONK	34.25	0.28
bluegill	2011 AMBRO	32.02	2.29
bluegill	2010 LOWER POOL 5A	30.42	1.14
bluegill	2010 BUSSY LAKE/GLEN HAVEN	29.55	0.00
bluegill	2008 SNY MCGIL	29.14	0.00
bluegill	2008 TREMPEALEAU LAKES	28.45	0.00
bluegill	2009 LAWRENCE/TARGET	27.76	1.67
bluegill	2012 GOOSE CARCASS LAKE	27.06	4.71
bluegill	2011 WEAVER BOTTOMS	24.94	2.66
bluegill	2011 HARPERS	24.02	0.59
bluegill	2012 LAKE ONALASKA	22.48	0.78
bluegill	2012 UPPER POOL 5	21.88	0.64
bluegill	2011 GOOSE ISLAND/STODDARD	21.71	0.00
bluegill	2010 CASSVILLE SLOUGH AREA	20.77	0.77
bluegill	2008 GOOSE CARCASS LAKE	20.59	1.68
bluegill	2007 COLD SPRG/BLKHWK/RONK	20.16	1.83
bluegill	2009 LANSING	18.89	1.11
bluegill	2008 ROBINSON/PETERSON/BEE	18.01	0.31
bluegill	2009 BERTOM/MCCARTNEY AREA	16.79	0.00
bluegill	2007 GOOSE ISLAND/STODDARD	16.57	0.45
bluegill	2008 BELVIDERE/SPRING LAKE	15.95	0.61
bluegill	2010 BLACK RIVER CHANNEL	14.63	0.17
bluegill	2007 HARPERS	13.53	1.88
bluegill	2008 LAKE ONALASKA	13.26	0.00
bluegill	2010 BLACK RIVER MOUTH	5.70	0.00
largemouth bass	2009 LANSING	83.33	22.22
largemouth bass	2008 GOOSE CARCASS LAKE	79.02	20.98
largemouth bass	2009 UPPER POOL 6	78.92	24.70
largemouth bass	2012 GOOSE CARCASS LAKE	73.91	19.25
largemouth bass	2008 BELVIDERE/SPRING LAKE	73.44	25.78
largemouth bass	2008 ROBINSON/PETERSON/BEE	71.35	25.73
largemouth bass	2009 LAWRENCE/TARGET	70.73	18.29
largemouth bass	2008 SNY MCGIL	65.10	20.83
largemouth bass	2012 UPPER POOL 5	64.81	16.05
largemouth bass	2010 LOWER POOL 5A	63.37	35.64

Common Name	Lake Unit	PSS q	PSS p
largemouth bass	2011 CHIPPEWA RIVER/BIG LA	60.87	23.91
largemouth bass	2007 UPPER POOL 5A	58.30	22.88
largemouth bass	2011 AMBRO	57.53	21.62
largemouth bass	2007 AMBRO	57.31	18.71
largemouth bass	2009 BERTOM/MCCARTNEY AREA	57.04	8.45
largemouth bass	AMBRO	54.05	16.22
largemouth bass	2012 LAKE ONALASKA	51.92	21.15
largemouth bass	2007 UPPER POOL 5	51.36	16.36
largemouth bass	2008 TREMPLEAU LAKES	51.13	8.27
largemouth bass	2010 BUSSY LAKE/GLEN HAVEN	48.39	29.03
largemouth bass	2010 CASSVILLE SLOUGH AREA	46.55	22.41
largemouth bass	2010 BLACK RIVER CHANNEL	45.85	17.94
largemouth bass	2007 HARPERS	45.35	14.53
largemouth bass	2007 GOOSE ISLAND/STODDARD	44.01	11.99
largemouth bass	2008 LAKE ONALASKA	41.88	11.97
largemouth bass	2011 GOOSE ISLAND/STODDARD	39.74	20.53
largemouth bass	2011 WEAVER BOTTOMS	37.50	17.39
largemouth bass	2007 COLD SPRG/BLKHWK/RONK	35.19	5.57
yellow perch	2012 GOOSE CARCASS LAKE	53.85	20.51
yellow perch	2011 WEAVER BOTTOMS	47.62	9.52
yellow perch	2011 AMBRO	40.00	5.00
yellow perch	2008 LAKE ONALASKA	38.89	11.11
yellow perch	2010 BUSSY LAKE/GLEN HAVEN	34.04	4.26
yellow perch	2011 GOOSE ISLAND/STODDARD	28.34	4.89
yellow perch	2012 UPPER POOL 5	27.37	6.32
yellow perch	2011 COLD SPRG/BLKHWK/RONK	26.13	1.80
yellow perch	2011 CHIPPEWA RIVER/BIG LA	24.41	6.30
yellow perch	2012 LAKE ONALASKA	22.62	8.33
yellow perch	2010 BLACK RIVER CHANNEL	14.59	2.16
yellow perch	2009 UPPER POOL 6	9.38	0.00
yellow perch	2009 LAWRENCE/TARGET	3.81	0.95

TABLE 12. RELATIVE ABUNDANCE, MEAN CATCH PER HR, ELECTRO FISHING, FALL 2012 AND 2008, LO LAKE UNIT. FOR FIXED RUNS DONE BOTH IN 2008 AND 2012.

	SPECIES	2012						2008					
		FREQ.	PERCENT	MEAN PER HR	STND. DEV.	NO. OF RUNS	TOTAL HRS	FREQ.	PERCENT	MEAN PER HR	STND. DEV.	NO. OF RUNS	TOTAL HRS
1	black crappie	24	3.32	6.69	7.91	18	3.286	25	2.57	8.32	12.18	18	3.006
2	bluegill	217	30.06	65.73	68.24	18	3.286	382	39.26	127.08	116.79	18	3.006
3	bowfin	20	2.77	5.66	11.21	18	3.286	7	0.72	2.33	4.18	18	3.006
4	brook silverside	13	1.80	5.18	17.98	18	3.286	7	0.72	2.33	5.09	18	3.006
5	channel catfish							1	0.10	0.33	1.41	18	3.006
6	common carp	8	1.11	2.66	6.24	18	3.286	1	0.10	0.33	1.41	18	3.006
7	emerald shiner	4	0.55	1.33	3.87	18	3.286						
8	freshwater drum	17	2.35	5.63	11.70	18	3.286	8	0.82	2.66	8.52	18	3.006
9	gizzard shad	34	4.71	11.31	28.08	18	3.286	18	1.85	5.99	13.47	18	3.006
10	golden redhorse	1	0.14	0.33	1.41	18	3.286						
11	golden shiner	32	4.43	7.90	20.42	18	3.286						
12	johnny darter							1	0.10	0.33	1.41	18	3.006
13	largemouth bass	229	31.72	68.68	45.95	18	3.286	307	31.55	102.13	59.90	18	3.006
14	logperch	2	0.28	0.67	1.94	18	3.286	1	0.10	0.33	1.41	18	3.006
15	longnose gar	1	0.14	0.33	1.41	18	3.286	1	0.10	0.33	1.41	18	3.006
16	northern pike							2	0.21	0.67	1.94	18	3.006
17	pirate perch	4	0.55	1.14	3.38	18	3.286	24	2.47	7.98	24.13	18	3.006
18	pumpkinseed	13	1.80	3.99	7.73	18	3.286	27	2.77	8.98	16.07	18	3.006
19	quillback	5	0.69	1.66	4.50	18	3.286	1	0.10	0.33	1.41	18	3.006
20	rock bass							1	0.10	0.33	1.41	18	3.006
21	sauger							1	0.10	0.33	1.41	18	3.006
22	shiners m20-29 m31-33 m35-40							22	2.26	7.32	17.62	18	3.006
23	shorthead redhorse	1	0.14	0.33	1.41	18	3.286						
24	silver lamprey	1	0.14	0.33	1.41	18	3.286						
25	silver redhorse	1	0.14	0.33	1.41	18	3.286	1	0.10	0.33	1.41	18	3.006
26	smallmouth bass	1	0.14	0.28	1.18	18	3.286						
27	spotted sucker	44	6.09	13.34	11.84	18	3.286	80	8.22	26.61	68.84	18	3.006
28	walleye	2	0.28	0.57	1.69	18	3.286						
29	warmouth	2	0.28	0.54	1.62	18	3.286	2	0.21	0.67	1.94	18	3.006
30	weed shiner	2	0.28	0.57	1.69	18	3.286						
31	white crappie							3	0.31	1.00	4.23	18	3.006
32	yellow bullhead	1	0.14	0.33	1.41	18	3.286	1	0.10	0.33	1.41	18	3.006
33	yellow perch	43	5.96	13.65	23.38	18	3.286	49	5.04	16.30	22.48	18	3.006
	ALL SPECIES	722	100.01	219.17	121.45	18	3.286	973	99.98	323.69	182.12	18	3.006

FIGURE 10. FALL 2008 AND 2012 NON-YOUNG-OF-THE-YEAR BLUEGILL NORMALIZED LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

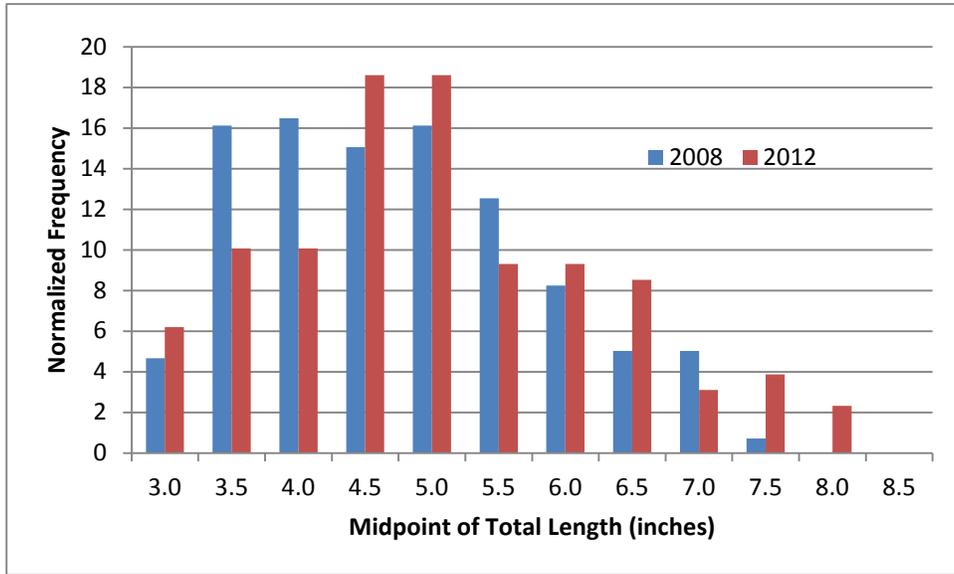


FIGURE 11. FALL 2008 AND 2012 NON-YOUNG-OF-THE-YEAR LARGEMOUTH BASS NORMALIZED LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

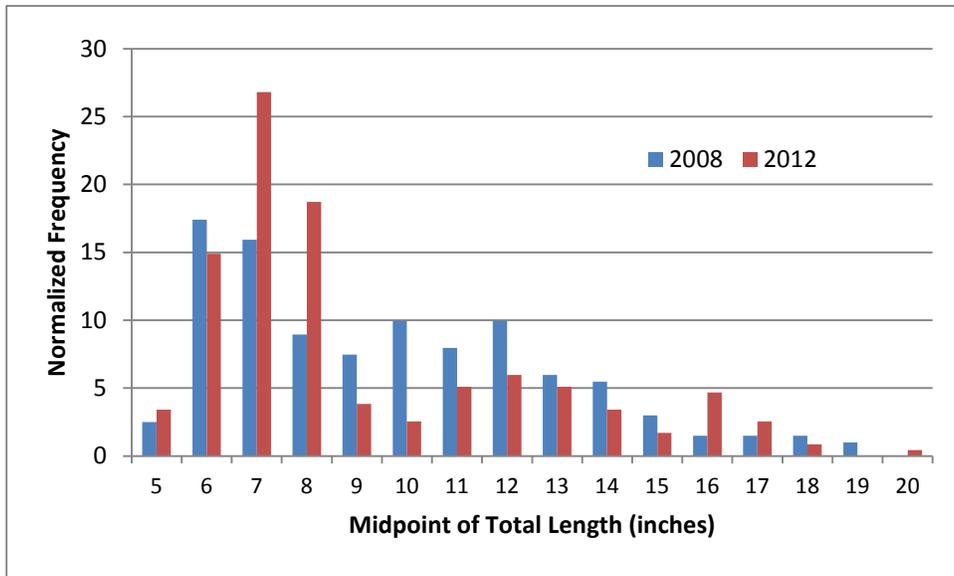


FIGURE 12. FALL 2008 AND 2012 NON-YOUNG-OF-THE-YEAR YELLOW PERCH NORMALIZED LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

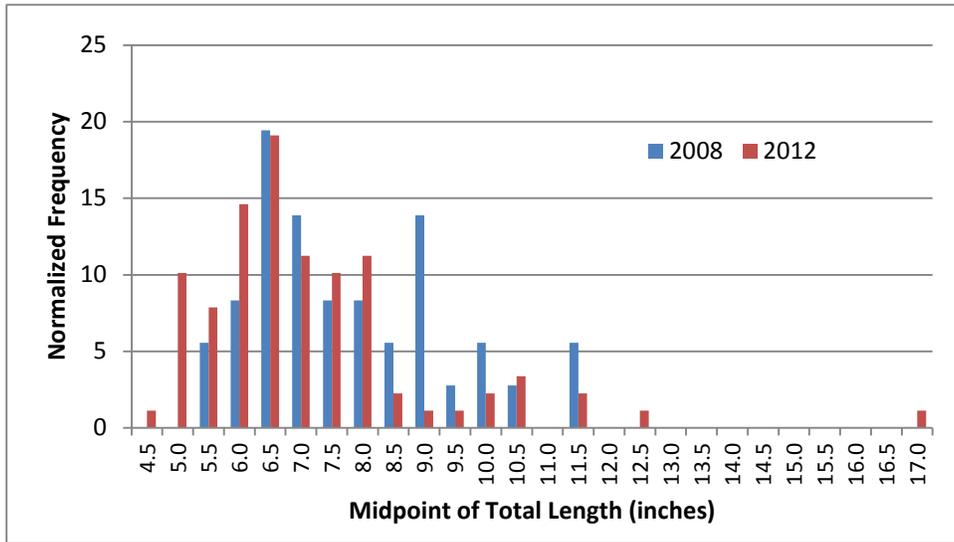


FIGURE 13. FALL 2008 AND 2012 NON-YOUNG-OF-THE-YEAR BLACK CRAPPIE NORMALIZED LENGTH DISTRIBUTION (INCHES), LO LAKE UNIT, ELECTRO FISHING. RANDOM AND FIXED RUNS.

