Progress Energy

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RE: Environmental Documents for Progress Energy Carolinas, Inc.
Shearon Harris Nuclear Plant

Dear Bernie,

Enclosed are the 2000 through 2004 Environmental Monitoring Reports for the Harris Plant. I still have several other documents to locate and will send them to you shortly.

If you have any questions, please contact me at (919) 546-7457.

Sincerely,

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Harris Nuclear Plant

2000 Environmental Monitoring Report

Environmental Services Section

HARRIS NUCLEAR PLANT
2000 ENVIRONMENTAL MONITORING REPORT

September 2001

Environmental Services Section

CP&L – A Progress Energy Company
New Hill, North Carolina

Preface

This copy of the report is not a controlled document as detailed in Environmental Services Section Biology Program Procedures and Quality Assurance Manual. Any changes made to the original of this report subsequent to the date of issuance can be obtained from:

Director
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CP&L – A Progress Energy Company
3932 New Hill-Holleman Road
New Hill, North Carolina 27562-0327

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Metric-English Conversion and Units of Measure

Length
1 micron (μm) = 4.0 x 10^{-5} inch
1 millimeter (mm) = 1000 μm = 0.04 inch
1 centimeter (cm) = 10 mm = 0.4 inch
1 meter (m) = 100 cm = 3.28 feet
1 kilometer (km) = 1000 m = 0.62 mile

Area
1 square meter (m^2) = 10.76 square feet
1 hectare (ha) = 10,000 m^2 = 2.47 acres

Volume
1 milliliter (ml) = 0.034 fluid ounce
1 liter = 1000 ml = 0.26 gallon
1 cubic meter = 35.3 cubic feet

Weight
1 microgram (μg) = 10^{-3} mg or 10^{-6} g = 3.5 x 10^{-8} ounce
1 milligram (mg) = 3.5 x 10^{-5} ounce
1 gram (g) = 1000 mg = 0.035 ounce
1 kilogram (kg) = 1000 g = 2.2 pounds
1 metric ton = 1000 kg = 1.1 tons
1 kg/hectare = 0.89 pound/acre

Temperature
Degrees Celsius (°C) = 5/9 (°F-32)

Specific conductance
$\mu S/cm$ = Microsiemens/centimeter

Turbidity
NTU = Nephelometric Turbidity Unit

Water Chemistry Abbreviations

Cl^-	- Chloride	$NO_3^- + NO_2^- - N$	- Nitrate + nitrite-nitrogen	Cd	- Total cadmium
SO_4^{2-}	- Sulfate	TP	- Total phosphorus	Cu	- Total copper
Ca^{2+}	- Total calcium	TOC	- Total organic carbon	Hg	- Total mercury
Mg^{2+}	- Total magnesium	TS	- Total solids		
Na^+	- Total sodium	TDS	- Total dissolved solids		
TN	- Total nitrogen	TSS	- Total suspended solids		
NH_3-N	- Ammonia-nitrogen	Al	- Total aluminum		

EXECUTIVE SUMMARY

Harris Reservoir supplies makeup water to the closed-cycle cooling system for the Harris Nuclear Plant. The Harris Nuclear Plant discharges primarily cooling tower blowdown along with low volume waste discharges into the reservoir near the main dam.

Nutrient concentrations, including total phosphorus and total nitrogen concentrations, remained stable for the reporting period (1996-2000) and were in an acceptable range for a productive reservoir in this area. The concentrations of most chemical constituents did not exhibit any consistent statistically significant temporal changes and were in ranges that were not considered detrimental to the biological community.

Bluegill, redear sunfish, largemouth bass, and black crappie dominated the fish community in Harris Reservoir during 2000. Annual catch rates for bluegill, largemouth bass, and black crappie were similar to catch rates in previous years while the 2000 annual catch rate for redear sunfish was generally greater than previous years. Length-frequency distributions indicated good reproduction with multiple size groups present for all species. The largemouth bass population remains balanced with a large percentage of larger fish present in the population.

Hydrilla stands reaching the surface of the water were not observed in the intake canal in Harris Reservoir or in the littoral zone of the auxiliary reservoir during 2000. The attempt to control hydrilla in the auxiliary reservoir by releasing grass carp in the autumns of 1994, 1996, and 1997 appears to have been effective in reducing the quantity and area covered by this vegetation.

HARRIS NUCLEAR PLANT
2000 ENVIRONMENTAL MONITORING REPORT

Reservoir Description

Harris Reservoir, located in Chatham and Wake Counties, North Carolina, was created by impounding Buckhorn Creek, a tributary of the Cape Fear River (Figure 1). The main body of Harris Reservoir has a surface area of 1680 ha; the auxiliary reservoir has a surface area of 130 ha. The main reservoir has a maximum depth of 18 m, a mean depth of 5.3 m, a volume of 8.9×10^7 m^3, a full-pool elevation of 67.1 m National Geodetic Vertical Datum (NGVD), and an average residence time of 28 months. The reservoir began filling in December 1980 and full-pool elevation was reached in February 1983. The 64.5-km shoreline is mostly wooded and the 183.9-km^2 drainage area is mostly rolling hills with land used primarily for forestry and agriculture. The conversion of areas from forestry or agricultural purposes to residential uses continued in many areas of the drainage.

Harris Reservoir was constructed to supply cooling tower makeup and auxiliary reservoir makeup water to the 900-MW Harris Nuclear Plant, which began commercial operation in May 1987. In 1986 the bottom waters of the reservoir near the main dam began receiving National Pollutant Discharge Elimination System (NPDES)-permitted wastewater discharges from the power plant cooling tower. Tributaries also receive NPDES-permitted discharges from the Harris Energy and Environmental Center and from wastewater treatment plants at Apex and Holly Springs. The reservoir is a source of drinking water for some Company employees.

Objectives

The primary objectives of the 2000 Harris Nuclear Plant non-radiological environmental monitoring program were to: (1) assess the reservoir's overall water quality, (2) identify any natural or power plant-induced effects on the water quality in the reservoir, (3) document the introduction and expansion of nonnative plant and animal populations in the reservoir, and (4) demonstrate the existence of a reasonable recreational fishery. These objectives have also been addressed in previous annual monitoring reports with the most recent detailed in CP&L 1996, 1997, 1998, 1999, and 2000.

Methods

The 2000 environmental program included monitoring the reservoir's: (1) limnological characteristics (water quality, water chemistry, and chlorophyll *a*), (2) distribution of aquatic vegetation, (3) possible introductions of the zebra mussel and the quagga mussel, and (4) fisheries community. Sampling methods, data summaries, and statistical analyses for data collected during 2000 were similar to those used for data collected during 1999 (CP&L 2000) (Tables 2 and 3). Trend analyses of the data were evaluated for the most recent five years of monitoring (1996-2000) for most programs. Supporting data summaries and appropriate statistical analyses were used to describe and interpret the environmental quality of the reservoir (Table 3). Electrofishing data were not collected from 1992 to 1994 and from 1996 to 1998. Therefore, annual catch rates for 2000 data were compared to data from 1988 to 1991 and 1995. Three stock assessment indices were used as indicators of a balanced largemouth bass population (Gablehouse 1984). These indices include: Proportional Stock Density (PSD), the percentage of all fish ≥ 300 mm; Relative Stock Density for preferred length (RSD_P), the percentage of all fish ≥ 380 mm; and Relative Stock Density for memorable length (RSD_M), the percentage of all fish ≥ 510 mm.

All analytical testing, except total phosphorus analyses, completed in support of the Harris Reservoir environmental monitoring program was performed by testing laboratories that are certified by the N. C. Division of Water Quality's Laboratory Certification Program to perform water and wastewater testing. Perkins Limnological Consulting, LLC, a vendor approved by CP&L for this testing, conducted total phosphorus analysis. The accuracy and precision of laboratory analyses of water chemistry data were determined with analytical standards, spikes, and replicates. Quality assurance information including the accuracy and percent recovery of water chemistry standards are available upon request. In this report where concentrations were less than the laboratory-reporting limit, the concentrations were assumed to be at one-half the reporting limit for the calculation of the mean. Where statistically significant results were reported, a Type I error rate of 5% ($\alpha = 0.05$) was used and Fisher's protected least significant difference test was applied to determine where significant differences in mean values occurred.

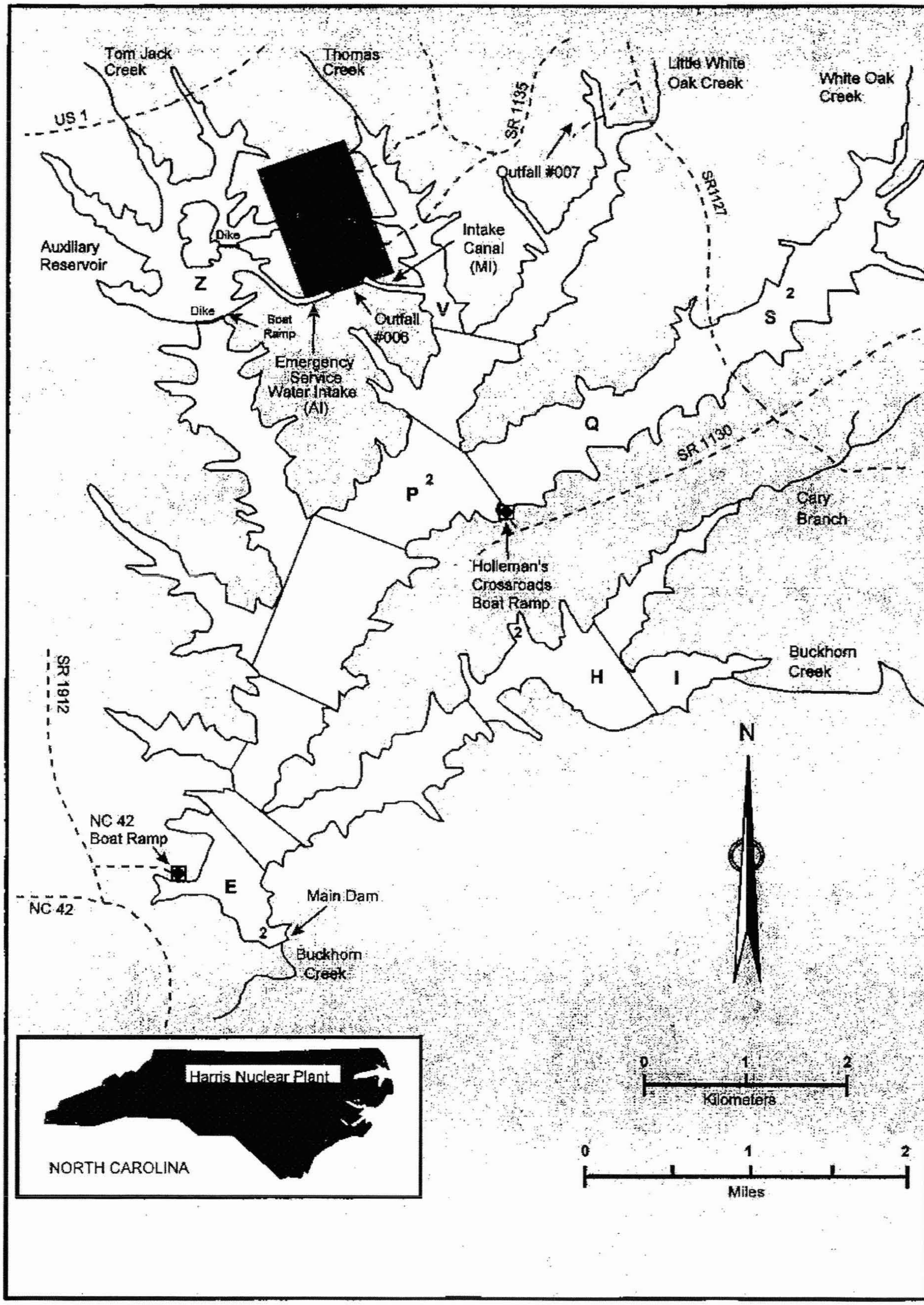

Figure 1. Sampling areas and stations at Harris Reservoir during 2000.

Table 1. Environmental monitoring program at Harris Reservoir for 2000.

Program	Frequency	Location
Water quality	January, May, July, November	Stations E2, H2, P2, and S2 (surface to bottom at 1-m intervals)
Water chemistry	January, May, July, November	Stations E2, H2, P3, and S2 (surface samples at all stations, bottom sample at E2 only)
Plankton^{+}	January, May, July, November	Stations E2, H2, P3, and S2
Biofouling monitoring		
Zebra mussel surveys	January, May, July, November	Areas E, P or Q, and V
Fisheries		
Electrofishing	February, May, August, November	Stations E1, E3, H1, H3, P1, P3, S1, S3, V1, and V3
Aquatic vegetation survey	Once per calendar year (Fall)	Areas MI and Z

$^{+}$Plankton included phytoplankton (algae) and chlorophyll a samples. Phytoplankton samples were collected and preserved but were not identified because all sampled chlorophyll a concentrations were < 40 μg/L.

Table 2. Field sampling and laboratory methods followed in the 2000 environmental monitoring program at Harris Reservoir.

Program	Method
Water quality	Temperature, dissolved oxygen, pH, and specific conductance were measured with calibrated YSI multiparameter instruments and YSI dissolved oxygen meters. Measurements were taken from surface to bottom at 1-m intervals. Water clarity was measured with a Secchi disk.
Water chemistry	Surface (Stations E2, H2, P2, and S2) and bottom samples (Station E2) were collected in appropriate containers, transported to the laboratory on ice, and analyzed according to accepted laboratory methods.
Phytoplankton	Equal amounts of water from the surface, the Secchi disk transparency depth, and twice the Secchi disk transparency depth were obtained with a Van Dorn sampler and mixed in a plastic container. A 250-ml sub sample was taken and preserved with 5 ml of "M3" fixative.
Chlorophyll *a*	Equal amounts of water from the surface, the Secchi disk transparency depth, and twice the Secchi disk transparency depth were obtained with a Van Dorn sampler, placed in a plastic container and mixed, then a 1000-ml sub sample was collected in a dark bottle. All samples were placed on ice and returned to the laboratory. In the laboratory a 250-ml sub sample was analyzed according to Strickland and Parsons (1972) and APHA (1995).
Electrofishing	Fifteen-minute samples were collected at each station using a Smith-Root Type VI-A equipped, Wisconsin-design electrofishing boat with pulsed DC current. Fish were identified, measured to the nearest mm, weighed to the nearest gram, examined for the presence of disease and deformities, and released.
Zebra mussel	The dock at the Holleman's boat ramp, or water quality station marker buoys were visually inspected for the presence of mussels during routine water quality monitoring.
Aquatic vegetation survey	Portions of the shoreline and/or littoral zone of the Harris Plant main reservoir intake canal and auxiliary reservoir were systematically surveyed by boat to document the presence of aquatic vegetation specifically hydrilla and creeping water primrose.

Table 3. Statistical analyses performed on data collected for the 2000 environmental monitoring program at Harris Reservoir.

Program	Variable	Transfor-mation	Statistical Test/model[+]	Main effect(s)
Water quality	Specific conductance and Secchi disk transparency	None	One-way, block on month	Station
	Specific conductance and Secchi disk transparency	None	Two-way, block on month	Station, year
Water chemistry	Select monitoring variables	None	One-way, block on month	Station
	Select monitoring variables	None	Two-way, block on month	Station, year
Phytoplankton	Chlorophyll *a*	None	One-way, block on month	Station
	Chlorophyll *a*	None	Two-way, block on month	Station, year
Fisheries	No. fish per hour	$\ln(x + 1)$	One-way, block on month	Transect
	Relative weight (W_r) [□]		$W_r = W_o/W_s \times 100$	Selected species

[+]Statistical tests used were one-way and two-way analysis of variance models. A Type I error rate of 5% ($\alpha = 0.05$) was used to judge the significance of all tests. Fisher's protected least significant difference (LSD) test was applied to determine where differences in means occurred.

[□]Relative weight (W_r) where W_o is the observed weight of each fish and W_s is the length-specific standard weight predicted by a weight-length regression equation constructed to represent the species as a whole ($W_r = W_o / W_s * 100$). Relative weight (Anderson and Neumann 1996) was calculated for bluegill (Hillman 1982), redear sunfish (Pope et al. 1995), and largemouth bass (Wege and Anderson 1978).

RESULTS OF ENVIRONMENTAL MONITORING AT HARRIS RESERVOIR DURING 2000

Limnology

Temperature and Dissolved Oxygen

- Harris Reservoir waters at all reservoir stations (except Station S2) were strongly stratified during July and were either well mixed or very weakly stratified during January, May, and November, 2000 (Appendix 1). During July, portions of the hypolimnion were anoxic (i.e., conditions where dissolved oxygen concentrations are less than 1 mg/liter) at Stations E2, H2, and P2 (Appendix 1). Station S2, which is comparatively shallow, exhibited a small decrease in oxygenation near the bottom during May and July but otherwise was well mixed and oxygenated for the remainder of the year. A bottom-water oxygen decline is typical at the deeper stations during the warm summer months in Harris Reservoir and in other southeastern productive water bodies when well-defined thermoclines develop and block bottom waters from mixing with the upper, more oxygenated waters.

Water Clarity (Secchi disk transparency, Solids, and Turbidity)

- The Secchi disk transparency depth (a water clarity indicator) generally increased with linear distance from the headwater region (Station S2) to the dam during January and May 2000 (Appendix 1). This spatial pattern is typical of patterns observed during 1995 through 1997 and 1999. However, headwaters were much clearer than downstream stations during November of 2000. Although there monthly spatial differences, there were no significant differences in the annual mean Secchi disk transparencies between stations during 2000.

- While statistical differences were noted in the reservoir-wide annual mean Secchi disk transparency values during the period 1996 to 2000, these variations were considered to minor and not biologically important (Appendix 3).

- There were no significant spatial trends for solids (i.e., total solids, total dissolved solids, and total suspended solids) or turbidity for Harris Reservoir surface waters during 2000 (Appendix 2).

- The annual mean total solids and total dissolved solids were statistically variable during the 1996 through 2000 observation period (Appendix 3). These minor fluctuations were not biologically important.

Chlorophyll *a*

- During 2000, mean chlorophyll *a* concentrations (an indicator of algal biomass) in Harris Reservoir continued to be indicative of moderate to high biological productivity. However, unlike concentrations measured in 1997 and 1998, no chlorophyll *a* concentration exceeded the North Carolina water quality standard of 40 µg/liter during 2000 (NCDEM 1992). There were no significant spatial differences in chlorophyll *a* concentrations during 2000 (Appendix 2).

- While statistically significant fluctuations in annual mean chlorophyll a concentrations were observed during the 1996 through 2000 period, no trends were indicated (Appendix 3).

Nutrients and Total Organic Carbon (surface waters)

- There were no significant spatial differences among stations for mean nutrient (i.e., phosphorus, ammonia-N, nitrate + nitrite-N, and total nitrogen) and total organic carbon concentrations in Harris Reservoir during 2000 (Appendix 2).

- Also, there were no statistically significant temporal trends for nutrient concentrations and 1996 to 2000 (Appendix 3). Total organic carbon concentrations varied significantly during the observations period but were not considered biologically important.

Specific Conductance, Ions, and Hardness (surface waters)

- There were no biologically meaningful spatial differences in conductivity, ion concentration (except chloride), or hardness during 2000 (Appendix 2).

- Annual mean chloride and sulfate concentrations significantly increased during 2000 compared to concentrations during 1999. These values represented only small changes and were similar to concentrations observed during other years within the five-year period from 1996 to 2000 (Appendix 3).

- The annual reservoir mean conductivity was similar among years during the period 1996-2000 (Appendix 3).

pH and Total Alkalinity

- The median pH in the surface waters of Harris Reservoir was 7.2 during 2000 (Appendix 1).

- In 2000 total alkalinity concentrations were not statistically different among stations (Appendix 2). The annual mean total alkalinity concentrations fluctuated significantly but with no consistent pattern during the 1996 to 2000 comparison period (Appendix 3).

Trace Metals and Metalloids (surface waters)

- Overall, the concentrations of trace elements in Harris Reservoir were generally low in 2000 with most concentrations less than or near their respective laboratory reporting limits (Appendices 2 and 5). No spatial trends in any of measure trace elements were observed during 2000 (Appendix 2). Aluminum concentrations ranged from < 50 to 440 μg/liter during 2000 with the greater value recorded in a headwater region where aluminum concentrations may have been influenced by upstream watershed sources (Appendices 2 and 5).

- Copper exhibited statistically significant variations in surface waters but no true temporal trend was observed during the 1996 to 2000 comparison period (Appendix 3). No other temporal differences were observed among trace element concentrations in either surface or bottoms waters of Harris Reservoir for the period 1996 to 2000 (Appendix 3 and 4).

Chemical Constituents in the Bottom Waters at Station E2

- The concentrations of most chemical constituents in the bottom waters of the deepest station (Station E2) near the dam and Harris Plant blowdown pipe were within typical ranges expected for a productive, southeastern reservoir and were not considered detrimental to the biological community (Appendix 4).

- Only chlorides showed statistical variations among years in the bottom waters at Station E2, but these differences were minor and did not represent a temporal trend (Appendix 4).

Sulfate and aluminum concentrations appeared to increase dramatically during May 2000 in the bottom waters of Station E2 (Appendix 5). Also, marked shifts in alkalinity, total nitrogen, ammonia, and total phosphorus concentrations during July of 2000 in the bottom waters at Station E2 were noted. These very notable shifts in the magnitude of chemical concentrations in the bottom waters is typical is Harris Reservoir each year and believed to be related to stratification processes and possibly intermittent blowdown from the power plant. Since this chemical shifting generally occurs in the deepest part of the lake and primarily in anoxic waters, it was not considered to be biologically detrimental to aquatic community.

Biofouling Monitoring Surveys

- No zebra mussels (*Dreissena polymorpha*) or quagga mussels (D. *bugensis*), potentially serious biofouling organisms to power plant operations, were found in Harris Reservoir or the auxiliary reservoir during 2000. Zebra mussels and quagga mussels are not expected to thrive in Harris Reservoir because concentrations of alkalinity, calcium, total hardness, and pH are sub optimal for mussel growth and reproduction (Claudi and Mackie 1993).

Fisheries

- Twenty fish species were collected with quarterly electrofishing sampling during 2000 (Appendix 6). For the second year in a row, a *Morone* spp. (white perch) was collected from Harris Reservoir. Three species collected in 1999--comely shiner, spottail shiner, and yellow bullhead--were not collected during 2000 (CP&L 2000). These species have historically been numerically minor in Harris Reservoir and the absence in the electrofishing samples were considered to be related to geartype selectivity and/or random spatial distribution.

- Bluegill, redear sunfish, largemouth bass, and black crappie comprised approximately 82% of the mean number per hour collected (Appendix 6). While black crappie catch appeared to have tapered off slightly during 2000, these recreationally important species have historically dominated electrofishing samples from Harris Reservoir (Appendix 7 and CP&L 2000).

- Significant differences in the mean catch rate between transects were observed for redear sunfish, largemouth bass, and total catch. As the following table of log-e transformed mean catch rates indicates, significantly more redear sunfish were collected from Transects E and H compared to Transects P, S, and V (means with different superscripts are significantly different). Largemouth bass exhibited uniform catch rates reservoir-wide except at Transect H where the catch rates were lower compared to other transects. The catch rates of other recreational species were uniform among transects.

Species	Transect				
	E	H	P	S	V
Redear sunfish	4.3^{a}	4.7^{a}	3.0^{c}	2.2^{c}	3.3^{b}
Largemouth bass	3.0^{a}	2.3^{b}	3.3^{a}	3.1^{a}	3.3^{a}

- The length-frequency distribution for bluegill indicated strong recruitment during 2000 (Appendix 8). Additionally, there were adequate numbers of older, larger fish to support a recreational fishery. The mean relative weight (84) of bluegill collected during 2000 was less than optimal (100 = optimum) but was consistent with the range that might be expected under relatively high population densities (Appendix 9).

- The annual mean electrofishing catch rate for redear sunfish of 67 fish per hour, while somewhat lower than the 1995 and 1999 values, was still in a range substantially greater than the catches of the late 1980s and early 1990s (Appendix 7). Similar to previous years, the length-frequency distribution for redear sunfish indicated a low reproductive success rate during 2000 (Appendix 8). However, the relatively high mean electrofishing catch rate, increasing population size in recent years, and the presence of older, larger fish in the population indicate a viable redear sunfish fishery exists in Harris Reservoir. Similar to bluegill, the less than optimal mean relative weight (78) was in the range consistent with a relatively large population density (Appendix 9).

- The annual mean electrofishing catch rate for largemouth bass of 27 fish per hour was within the range reported for quarterly data from 1988 through 1999 (Appendix 7). The values for Proportional Stock Density (PSD) and Relative Stock Density preferred length (RSD_P) (Appendix 8) were consistent with objectives for a large bass management strategy (Gablehouse 1984; Willis et al. 1993). The management objective for the largemouth bass population is for the reservoir to contain a large number of big bass equating to a PSD in the range of values from 50 to 80 and an RSD_P in the range from 30 to 60. Also, the relative stock density memorable length index was 9 during 2000, which was in the range (0-10) of values indicative of a balanced largemouth bass population. The mean relative weight of largemouth bass collected during 2000 was 94 indicating a healthy, robust body conditions for the average fish (Appendix 9).

- No disease outbreaks were noted in Harris Lake during 2000. However, a small number (approximately 20) of dead 6-10 pound largemouth bass were reported during the week following the 4th of July weekend of 2000. During that weekend, multiple bass tournaments and heavy fishing pressure occurred. The mortality observed was thought to be related to delayed mortality from improper handling techniques associated with catch and release practices.

- Habitat improvements (Christmas tree reefs) were conducted in the Harris Plant auxiliary reservoir during 2000. Limited fishing is allowed in the auxiliary reservoir.

Aquatic Vegetation

- A visual survey revealed no stands of hydrilla (*Hydrilla verticillata*), a non-native submersed plant, reaching the surface of the water of the intake canal in Harris Reservoir during 2000. However, creeping water primrose (*Ludwigia uruguayensis*) was noted along both sides of the canal and existed in amounts similar to those observed during 1999. Although creeping water primrose was well established in this region, no impacts to the Harris Plant have occurred nor are they expected because of the low velocity of water drawn from the main reservoir into the cooling tower makeup water intake structure.

- During November 2000 large hydrilla stands extending to the water surface were observed in the littoral zone at Station S. At Station E hydrilla and creeping water primrose dominated the aquatic plant community. Small amounts if *Eleocharis* sp. and *Utricularia* sp. were observed. No significant quantities of aquatic vegetation were observed in the auxiliary reservoir during 2000. The continued presence of grass carp (*Ctenopharyngodon idella*) from previous stockings has provided adequate control of potential nuisance overgrowth stands in the auxiliary reservoir.

CONCLUSIONS

During 2000, the Harris Reservoir continued to show characteristics of a typical southeastern, biologically productive reservoir with seasonally occurring oxygen-deficient subsurface waters, elevated nutrient concentrations, and an abundance of rooted shallow-water aquatic plants.

The environmental monitoring program conducted during 2000 continued to provide an assessment of the effects of the Harris Nuclear Plant's operation on the various components of the aquatic environment. Most key indicators of the environmental quality in Harris Reservoir were unchanged from the previous five years. Nutrient concentrations have been a concern in Harris Reservoir since phosphorous and nitrogen concentrations increased rapidly in the late 1980s and early 1990s. Water quality assessments determined that nutrient concentrations have remained stable since 1995 and at levels acceptable for southeastern, productive reservoirs. Assessments of other water quality parameters, including solids, turbidity, total organic carbon, ions (calcium, chloride, magnesium, sodium, and sulfate), total alkalinity, hardness, and metals, indicate few if any consistent statistically significant spatial or temporal trends with none of these variables at concentrations which would be detrimental to the aquatic community.

No nuisance algal blooms, as indicated by chlorophyll *a* concentrations, or exotic mussels were detected in the main reservoir during 2000. Reservoir-wide chlorophyll *a* concentrations demonstrated no consistent statistically significant temporal trend for the period 1996-2000.

Based on surveys conducted during 2000, no stands of the aquatic plant, hydrilla, extending to the surface of the water were observed in the littoral zone of the intake canal of the main reservoir. The reduced size and extent of aquatic vegetation stands in the auxiliary reservoir indicates that grass carp released in the fall of 1994, 1996, and 1997 continued to control the amount and area coverage of hydrilla during 2000. No operational impacts have occurred at the Harris Nuclear Plant because of aquatic vegetation biofouling.

Bluegill, redear sunfish, and largemouth continued to dominate the fishery in Harris Reservoir during 2000. Black crappie catches were slightly lower that usual for 2000. Results indicate the presence of a balanced largemouth bass population exhibiting strong reproduction and the presence of a large percentage of older, larger fish. Abundant forage species such as shad and other sunfish have resulted in very healthy, robust body condition for largemouth bass.

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Appendix 1. Water temperature, dissolved oxygen, conductivity, pH, and Secchi disk transparency data collected from Harris Reservoir during 2000.

January 7, 2000

Depth (m)	Temperature (°C)				Dissolved oxygen (mg/L)				Conductivity (µS/cm)				pH				Secchi disk depth (m)			
	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2
0.2	10.5	10.9	10.5	10.1	11.2	11.7	11.4	10.6	72	70	69	66	7.2	6.9	7.0	6.9	1.7	1.6	1.2	0.8
1.0	10.5	10.5	10.5	9.7	11.2	11.6	11.4	10.5	72	70	69	65	7.2	6.9	7.0	6.9				
2.0	10.5	10.2	10.4	9.4	11.2	11.0	11.4	10.1	72	69	68	65	7.2	6.9	7.0	6.9				
3.0	10.3	10.1	9.9	9.0	11.2	10.7	10.5	9.8	71	69	68	65	7.2	6.9	7.0	6.9				
4.0	10.1	9.7	9.8		11.4	10.0	10.3		71	68	68		7.2	7.0	7.0					
5.0	10.0	9.5	9.8		11.3	9.0	10.2		71	68	68		7.2	7.0	7.1					
6.0	9.7	9.5	9.8		10.4	8.9	9.8		70	68	68		7.2	7.0	7.1					
7.0	9.7	9.5	9.8		10.2	8.9	9.8		70	68	68		7.2	7.0	7.1					
8.0	9.6	9.5	9.8		10.1	8.9	9.7		70	68	68		7.2	7.0	7.1					
9.0	9.5	9.5	9.8		9.9	8.8	9.6		70	68	68		7.2	7.0	7.0					
10.0	9.5				9.8				70				7.2							
11.0	9.5				9.8				70				7.2							
12.0	9.3				9.5				70				7.2							
13.0	9.3				9.5				69				7.2							
14.0	9.3				9.4				69				7.2							
15.0	9.3				9.4				69				7.2							
16.0	9.3				9.4				69				7.2							

May 1, 2000

Depth (m)	Temperature (°C)				Dissolved oxygen (mg/L)				Conductivity (µS/cm)				pH				Secchi disk depth (m)			
	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2
0.2	19.9	19.4	19.0	19.6	10.9	10.4	10.8	10.2	71	69	69	70	8.8	7.8	8.7	7.5	1.6	1.4	1.3	0.8
1.0	19.9	19.4	18.9	19.5	10.9	10.4	10.8	10.2	70	69	69	70	8.8	7.8	8.7	7.5				
2.0	16.8	17.4	18.2	18.0	9.4	9.5	10.6	8.9	66	67	67	69	8.5	7.8	8.5	7.4				
3.0	16.6	16.8	17.3	16.8	8.1	8.1	9.6	5.7	65	65	66	69	8.3	7.7	8.3	7.2				
4.0	16.5	16.6	16.6	15.5	8.0	6.6	8.3	2.9	65	64	65	74	8.1	7.3	8.1	6.9				
5.0	16.5	16.4	16.5		7.8	6.4	7.8		65	65	65		8.0	7.2	7.9					
6.0	16.4	16.3	16.4		7.6	5.6	7.4		65	64	65		8.0	7.2	7.7					
7.0	16.4	16.2	16.3		7.4	5.0	6.9		65	65	65		7.9	7.1	7.7					
8.0	16.3	15.9	16.2		6.9	3.8	6.4		66	75	66		7.8	7.1	7.6					
9.0	16.2	15.8	16.1		6.7	2.8	6.0		66	72	66		7.7	7.0	7.6					
10.0	16.1				6.7				66				7.7							
11.0	16.0				6.6				66				7.6							
12.0	15.3				5.3				67				7.6							
13.0	14.8				3.1				70				7.4							
14.0	14.6				2.6				71				7.3							
15.0	14.5				2.0				72				7.3							
16.0	14.3				0.3				75				7.2							
17.0	14.1				0.0				84				7.4							

Appendix 1 (continued)

July 5, 2000

Depth (m)	Temperature (°C)				Dissolved oxygen (mg/L)				Conductivity (μS/cm)				pH				Secchi disk depth (m)			
	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2
0.2	29.0	29.9	28.7	29.5	9.9	10.1	10.0	10.2	107	105	106	108	7.3	7.7	6.7	7.6	1.6	1.7	1.7	2.0
1.0	28.8	28.8	28.5	29.4	10.0	10.3	10.1	10.4	106	104	106	107	7.4	7.7	6.7	7.7				
2.0	28.2	28.6	28.1	28.7	10.1	10.0	9.8	11.0	105	102	105	107	7.4	7.8	6.8	8.3				
3.0	27.1	28.5	28.0	27.7	7.2	9.7	9.7	7.3	103	102	104	105	7.3	7.7	6.9	7.8				
4.0	26.7	26.2	27.9	27.0	5.8	1.0	9.5	3.2	102	98	104	107	7.2	7.5	6.9	6.9				
5.0	25.9	23.5	24.6		1.7	0.2	2.3		102	114	114		7.0	7.1	6.8					
6.0	22.5	22.1	22.5		0.2	0.1	0.6		121	114	119		6.8	7.0	6.6					
7.0	21.6	21.0	21.9		0.1	0.1	0.2		121	116	118		6.7	6.9	6.5					
8.0	20.7	20.7	21.5		0.1	0.1	0.1		118	117	115		6.7	6.7	6.4					
9.0	19.7	20.3	20.1		0.1	0.1	0.0		113	121	116		6.6	6.6	6.3					
10.0	18.7				0.1				110				6.6							
11.0	18.5				0.1				110				6.6							
12.0	17.0				0.0				115				6.6							
13.0	16.2				0.0				124				6.5							
14.0	16.0				0.0				127				6.5							
15.0	15.9				0.0				128				6.5							
16.0	15.7				0.0				135				6.6							

November 14, 2000

Depth (m)	Temperature (°C)				Dissolved oxygen (mg/L)				Conductivity (μS/cm)				pH				Secchi disk depth (m)			
	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2	E2	H2	P2	S2
0.2	16.7	16.8	16.5	15.6	6.3	8.8	7.9	10.3	99	96	95	93	6.8	7.0	6.9	6.9	1.6	1.5	1.5	2.5
1.0	16.7	16.8	16.5	15.6	6.3	8.6	7.8	10.1	99	95	95	92	6.8	7.0	6.9	6.8				
2.0	16.7	16.6	16.5	15.6	6.3	8.5	7.8	10.0	99	95	95	92	6.8	7.0	6.9	6.8				
3.0	16.7	16.6	16.5	15.6	6.3	8.4	7.8	10.0	99	95	95	92	6.8	7.0	6.9	6.8				
4.0	16.7	16.6	16.5	15.4	6.3	8.4	7.7	9.9	99	95	95	93	6.8	7.0	6.8	6.8				
5.0	16.6	16.6	16.5		6.2	8.3	7.7		99	95	95		6.7	6.9	6.8					
6.0	16.6	16.6	16.5		6.2	8.3	7.7		99	95	95		6.7	6.9	6.8					
7.0	16.6	16.5	16.5		6.2	8.2	7.7		99	95	95		6.7	6.9	6.8					
8.0	16.6	16.5	16.5		6.2	5.1	7.5		99	95	95		6.7	6.9	6.8					
9.0	16.6				6.2				99				6.7							
10.0	16.6				6.2				99				6.7							
11.0	16.6				6.2				99				6.7							
12.0	16.6				6.2				98				6.7							
13.0	16.5				6.1				98				6.7							
14.0	16.5				6.1				99				6.7							

Appendix 2. Means, ranges, and spatial trends of selected limnological variables from the surface waters of Harris Reservoir during 2000.+

Variable	Station E2	Station H2	Station P2	Station S2
Solids (mg/liter)				
Total	49 (46-52)	57 (42-68)	55 (48-60)	38 (< 20-58)
Total dissolved	58 (49-67)	58 (47-70)	56 (40-64)	62 (57-69)
Total suspended	< 5 NA	< 5 (< 5-5)	< 5 NA	< 5 (< 5-6)
Turbidity (NTU)	7.2 (3.4-17)	4.5 (2.6-6.0)	4.6 (3.0-6.4)	8.5 (2.5-17)
Secchi disk transparency (m)	1.6 (1.6-1.7)	1.6 (1.4-1.7)	1.4 (1.2-1.7)	1.5 (0.8-2.5)
Chlorophyll *a* (µg/liter)	18 (4.8-27)	23 (17-31)	19 (9.3-32)	19 (7.2-25)
Nutrients (mg/liter)				
Ammonia-N	< 0.05 (< 0.05-0.07)	< 0.05 NA	< 0.05 (< 0.05-0.06)	< 0.05 (< 0.05-0.05)
Nitrate + Nitrite-N	0.04 (< 0.02-0.14)	0.03 (< 0.02-0.08)	0.03 (< 0.02-0.09)	0.02 (< 0.02-0.04)
Total nitrogen	0.64 (0.47-0.74)	0.58 (0.50- 0.74)	0.62 (0.51-0.75)	0.49 (0.29-0.67)
Total phosphorus	0.036 (0.029-0.042)	0.032 (0.024-0.036)	0.028 (0.022-0.034)	0.031 (0.022-0.038)
Total organic carbon (mg/liter)	8.2 (7.8-8.6)	8.1 (7.4-8.6)	8.3 (7.7-8.9)	8.6 (8.0-9.5)
Ions (mg/liter)				
Calcium	3.7 (3.4-3.9)	3.5 (3.0-3.7)	3.6 (3.4-3.8)	3.8 (3.6-3.9)
Chloride	12^{a} (12-14)	12^{b} (11-13)	12^{ab} (11-13)	12^{b} (11-12)
Magnesium	1.7 (1.6-1.8)	1.6 (1.4-1.8)	1.7 (1.6-1.8)	1.6 (1.5-1.8)
Sodium	11 (10-12)	10 (8.9-12)	10 (9.6-11)	10 (8.4-11)
Sulfate	12 (11-13)	12 (11-13)	12 (11-13)	12 (11-12)
Total alkalinity (mg/liter as $CaCO_3$)	14 (11-20)	14 (11-16)	12 (10-16)	15 (11-20)
Hardness (calculated as mg equivalents $CaCO_3$/liter)	16 (15-17)	15 (13-17)	16 (15-17)	16 (16-17)
Conductivity (µS/cm)	87 (71-107)	85 (69-105)	85 (69-106)	84 (66-108)

Appendix 2 (continued)

Variable	N.C. water quality standard	Station			
		E2	H2	P2	S2
Metals (µg/liter)					
Aluminum	None	56 (< 50-150)	< 50 (< 50-59)	< 50 (< 50-79)	167 (< 50-440)
Cadmium	2	< 0.5 NA	< 0.5 NA	< 0.5 NA	< 0.5 NA
Copper	7[□]	2.6 (1.4-5.9)	1.3 (< 1.0-3.0)	1.5 (< 1.3-2.0)	1.0 (< 1.0-1.7)
Mercury	0.012	< 0.2 NA	< 0.2 NA	< 0.2 NA	< 0.2 NA

[+]Fisher's protected least significant difference test was applied only if the overall F test for the treatment was significant. Means followed by the same superscript were not significantly different ($P > 0.05$)—see shaded row. Sample size equaled 4 for all variables unless otherwise noted. The mean separation technique may yield separations that are obscured by data rounding.

[□]This value is an action level, not a water quality standard. An action level is for toxic substances, which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics, or associated waste characteristics (NCDEM 1994b).

NA = All measured values were less than the laboratory lower reporting limit.

Appendix 3. Annual mean water chemistry variables from the surface waters of Harris Reservoir 1996-2000.[+]

Variable	Year				
	1996	1997	1998	1999	2000
Solids (mg/liter)					
Total	89^{a}	54^{c}	68^{b}	76^{ab}	50^{c}
Total dissolved	78^{a}	54^{c}	69^{ab}	73^{a}	58^{bc}
Total suspended[□]	< 6	< 6	4	< 5	< 5
Turbidity (NTU)	4.7	5.7	5.8	8.9	6.2
Secchi disk transparency (m)	1.6^{ab}	1.3^{ab}	1.2^{b}	1.3^{ab}	1.5^{a}
Chlorophyll *a* (µg/liter)	12^{c}	24^{a}	25^{a}	14^{bc}	20^{ab}
Nutrients (mg/liter)					
Ammonia-N	0.05	< 0.07	0.05	< 0.05	< 0.05
Nitrate + nitrite-N	0.03	0.05	0.04	0.08	0.03
Total nitrogen	0.86	0.74	0.56	0.62	0.58
Total phosphorus	0.032	0.034	0.034	0.033	0.032
Total organic carbon (mg/liter)	6.5^{b}	7.2^{b}	7.2^{b}	7.8^{a}	8.3^{a}
Ions (mg/liter)					
Calcium	3.8	3.7	5.3	3.9	3.6
Chloride	9.8^{b}	6.3^{c}	8.6^{b}	9.3^{b}	12^{a}
Magnesium	1.7	1.7	1.6	1.7	1.6
Sodium	9.2	8.9	9.8	11	10
Sulfate	13	11	[illegible]	9.9^{b}	12^{a}
Total alkalinity (mg/liter as $CaCO_3$)	13^{b}	12^{b}	13^{c}	15^{a}	14^{a}
Hardness (mg equivalents $CaCO_3$/liter)	17	16	20	17	16
Conductivity (µS/cm)	7	81	76	88	85
Metals (µg/liter)					
Aluminum	58	76	83	169	77
Cadmium	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	2.0^{ab}	1.5^{b}	3.5^{a}	2.6^{ab}	1.6^{b}
Mercury	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

[+]Fisher's protected least significant difference test was applied only if the overall F test for the treatment was significant. Means followed by the same superscript were not significantly different ($P > 0.05$)—see shaded rows. Data were rounded to conform to significant digit requirements. The mean separation technique may yield separations that are obscured by data rounding.

[□]In June 1998, the lower reporting limits (LRLs) changed for total suspended solids from 6 to 3 mg/L and in 1999, the LRLs changed for total suspended solids from 3 to 5 mg/l.

Appendix 4. Temporal trends of selected limnological variables from the bottom waters of Harris Reservoir at Station E2, 1996-2000.⁺

	Year				
Variable	**1996**	**1997**	**1998**	**1999**	**2000**
Solids (mg/liter)					
Total	113	71	82	90	52
Total dissolved	87	78	74	81	65
Total suspended	< 6	6	6	13	< 5
Turbidity (NTU)	4.0	7.2	13	15	14
Nutrients (mg/liter)					
Ammonia-N	0.09	0.70	0.47	0.42	0.57
Nitrate + nitrite-N	0.19	0.06	0.14	0.08	0.06
Total nitrogen	1.3	1.3	1.2	1.0	1.0
Total phosphorus	0.147	0.105	0.147	0.146	0.144
Total organic carbon (mg/liter)	7.4	7.8	8.5	8.4	9.2
Ions (mg/liter)					
Calcium	4.6	4.5	4.7	4.4	4.0
Chloride	9.7^{ab}	6.8^{b}	9.1^{ab}	9.2^{ab}	12^{a}
Magnesium	2.0	1.9	2.0	1.9	1.8
Sodium	10	10	11	12	10
Sulfate	14	11	7.1	9.2	11
Total alkalinity (mg/liter as $CaCO_3$)	25	26	21	21	22
Hardness (mg equivalents $CaCO_3$/liter)	20	19	20	19	17
Metals (µg/liter)					
Aluminum	42	56	155	222	100
Cadmium	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper	2.2	1.9	3.7	5.6	1.4
Mercury	< 0.2	< 0.2	0.2	0.2	< 0.2

⁺Fisher's protected least significant difference test was applied only if the overall F test for the treatment was significant. Annual means followed by the same superscript were not significantly different ($P > 0.05$)—see shaded row.

Appendix 5. Concentrations of chemical variables in Harris Reservoir during 2000.+

Station E2 (surface)

Month	Alkalinity	Hardness	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	TN	NH_3-N	$NO_3^- + NO_2^-$-N
Jan	20	15	12	13	3.4	1.6	10	0.64	< 0.05	0.02
May	12	16	12	13	3.8	1.6	10	0.47	0.06	< 0.02
Jul	11	16	12	11	3.7	1.7	11	0.74	< 0.05	< 0.02
Nov	12	17	14	13	3.9	1.8	12	0.70	0.07	0.14

Month	TP	TOC	Turbidity	TS	TDS	TSS	Al	Cd	Cu	Hg	TN:TP
Jan	0.036	8.1	5.1	48	57	< 5	< 50	< 0.5	1.7	< 0.20	18
May	0.038	8.6	17	46	57	< 5	150	< 0.5	1.4	< 0.20	12
Jul	0.029	8.2	3.5	NA	49	NA	< 50	< 0.5	5.9	< 0.20	26
Nov	0.042	7.8	3.4	52	67	< 5	< 50	< 0.5	1.5	< 0.20	17

Station H2

Month	Alkalinity	Hardness	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	TN	NH_3-N	$NO_3^- + NO_2^-$-N
Jan	16	13	11	13	3.0	1.4	8.9	0.50	< 0.05	< 0.02
May	13	16	12	12	3.6	1.6	9.6	0.50	< 0.05	< 0.02
Jul	11	16	11	11	3.6	1.7	9.9	0.74	< 0.05	< 0.02
Nov	16	17	13	13	3.7	1.8	12	0.59	< 0.05	0.08

Month	TP	TOC	Turbidity	TS	TDS	TSS	Al	Cd	Cu	Hg	TN:TP
Jan	0.036	7.8	6.0	60	62	5	52	< 0.5	1.3	< 0.20	14
May	0.034	8.6	5.5	42	53	5	59	< 0.5	< 1.0	< 0.20	15
Jul	0.024	8.5	3.8	NA	47	NA	< 50	< 0.5	< 1.0	< 0.20	31
Nov	0.035	7.4	2.6	68	70	< 5	< 50	< 0.5	3.0	< 0.20	17

Station P2

Month	Alkalinity	Hardness	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	TN	NH_3-N	$NO_3^- + NO_2^-$-N
Jan	16	15	12	13	3.4	1.6	9.9	0.51	< 0.05	< 0.02
May	10	15	12	13	3.5	1.6	9.6	0.63	0.06	< 0.02
Jul	10	16	11	11	3.8	1.7	10	0.75	< 0.05	< 0.02
Nov	12	17	13	12	3.7	1.8	11	0.60	< 0.05	0.09

Month	TP	TOC	Turbidity	TS	TDS	TSS	Al	Cd	Cu	Hg	TN:TP
Jan	0.030	8.4	6.4	58	58	< 5	79	< 0.5	1.4	< 0.20	17
May	0.034	8.9	5.7	48	40	< 5	54	< 0.5	2.0	< 0.20	18
Jul	0.022	8.3	3.4	NA	60	NA	< 50	< 0.5	1.4	< 0.20	34
Nov	0.028	7.7	3.0	60	64	< 5	< 50	< 0.5	1.3	< 0.20	21

Appendix 5 (continued)

Station S2

Month	Alkalinity	Hardness	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	TN	NH_3-N	$NO_3^- + NO_2^-$-N
Jan	20	16	11	11	3.9	1.5	8.4	0.56	< 0.05	0.04
May	14	16	12	12	3.9	1.6	9.6	0.29	0.05	< 0.02
Jul	11	17	11	11	3.9	1.7	11	0.67	< 0.05	< 0.02
Nov	14	16	13	12	3.6	1.8	11	0.43	< 0.05	< 0.02

Month	TP	TOC	Turbidity	TS	TDS	TSS	Al	Cd	Cu	Hg	TN:TP
Jan	0.038	8.7	17	58	59	6	440	< 0.5	1.7	< 0.20	15
May	0.037	9.5	11	46	57	< 5	110	< 0.5	< 1.0	< 0.20	7.8
Jul	0.026	8.0	3.5	NA	61	NA	< 50	< 0.5	< 1.0	< 0.20	26
Nov	0.022	8.3	2.5	< 20	69	< 5	94	< 0.5	< 1.0	< 0.20	20

Station E2 (bottom)

Month	Alkalinity	Hardness	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Na^+	TN	NH_3-N	$NO_3^- + NO_2^-$-N
Jan	20	13	12	13	2.9	1.4	8.9	0.37	< 0.05	0.05
May	16	18	12	13	4.1	1.8	10	0.92	0.48	0.02
Jul	38	21	12	5.0	5.1	2.1	10	2.18	1.69	< 0.02
Nov	14	18	14	13	3.9	1.9	12	0.71	0.07	0.16

Month	TP	TOC	Turbidity	TS	TDS	TSS	Al	Cd	Cu	Hg	TN:TP
Jan	0.034	9.1	22	50	63	5	64	< 0.5	2.1	0.20	11
May	0.080	8.9	26	48	58	< 5	260	< 0.5	1.4	< 0.20	12
Jul	0.422	11	6.1	NA	72	NA	53	< 0.5	< 1.0	< 0.20	5.2
Nov	0.041	7.6	3.7	58	67	< 5	< 50	< 0.5	1.8	< 0.20	17

+Units are in mg/L except for trace elements (μg/L), turbidity (NTU), total alkalinity (mg/L as $CaCO_3$), and hardness (calculated as mg equivalents $CaCO_3$/L).

NA = July water sample was not analyzed for total solids and total suspended solids due to laboratory error.

Appendix 6. Mean number per hour for fish collected with electrofishing sampling by transect from Harris Reservoir during 2000.

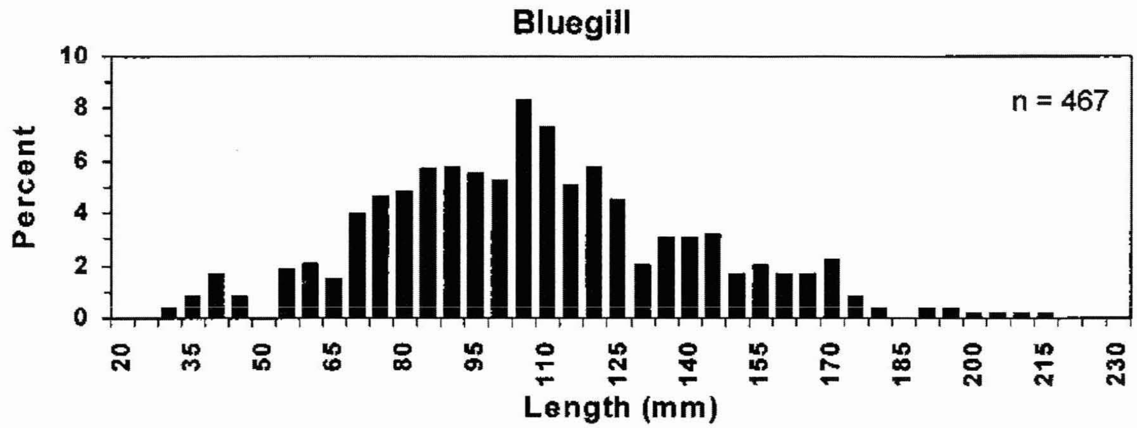
Taxon	Transect E	Transect H	Transect P	Transect S	Transect V	Reservoir mean
Bowfin	0	0	0	2	0	< 1
Gizzard shad	17	6	6	6	2	8
Threadfin shad	6	0	4	26	0	3
Common carp	0	0	0	0	< 1	< 1
Chain pickerel	0	2	0	4	0	1
Golden shiner	11	2	12	18	4	9
Coastal shiner	8	52	4	1	23	18
White catfish	0	0	12	< 1	< 1	3
Flat bullhead	< 1	< 1	0	0	< 1	< 1
Brown bullhead	0	0	1	2	< 1	1
Channel catfish	0	< 1	< 1	0	0	< 1
Bluespotted sunfish	0	0	0	6	2	1
Redbreast sunfish	0	0	0	0	< 1	< 1
Warmouth	2	2	1	< 1	4	2
Bluegill	140	132	63	66	78	96
Redear sunfish	121	110	44	25	36	67
Largemouth bass	30	12	32	24	36	27
Black crappie	2	0	4	1	16	5
White crappie	0	0	0	3	0	1
White perch	1	0	0	0	0	< 1
Total[+]	**337**	**318**	**184**	**162**	**203**	**241**

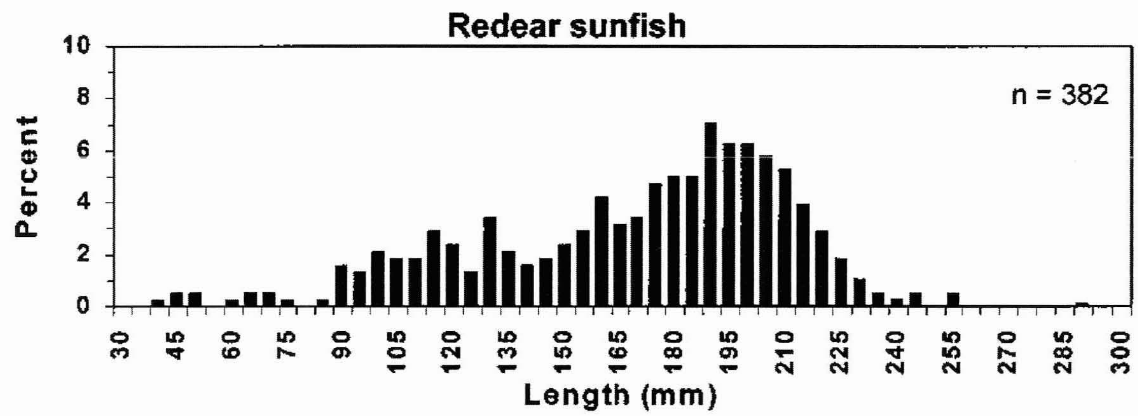
[+]Summations may vary from column totals due to rounding.

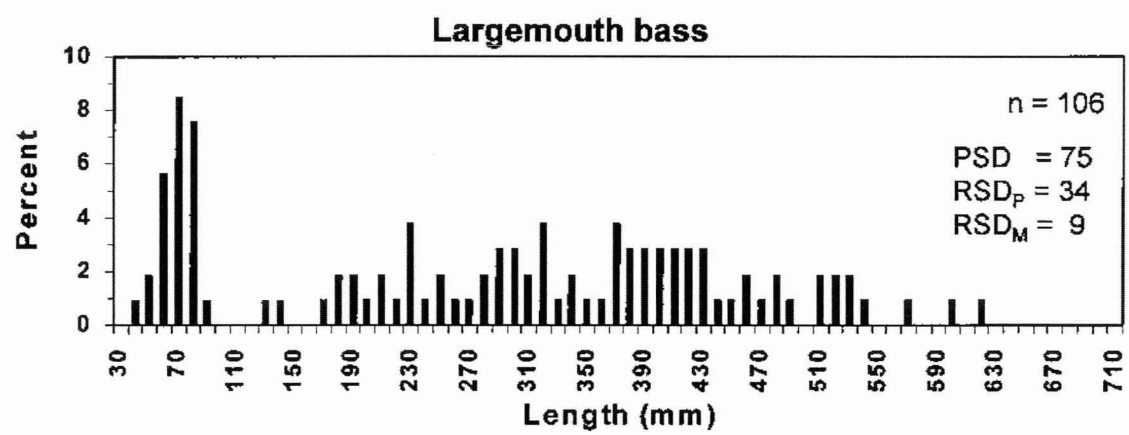
Appendix 7. Mean catch rates (number per hour) for the numerically dominant recreational and forage fish species collected with quarterly electrofishing sampling from Harris Reservoir, 1988-1991, 1995, 1999, and 2000.[+]

Taxon	Year						
	1988	1989	1990	1991	1995	1999	2000
Gizzard shad	8	29	20	19	5	7	8
Threadfin shad	< 5	12	< 5	< 5	< 5	5	3
Golden shiner	5	9	9	5	7	8	9
Bluegill	86	101	105	92	77	119	96
Redear sunfish	7	14	21	24	73	90	67
Largemouth bass	33	42	24	29	20	43	27
Black crappie	8	14	15	12	6	19	5
Total (all species)	**195**	**299**	**249**	**214**	**203**	**311**	**241**

[+]Annual catch rates for 1992-1994 and 1998 were collected semiannually and were not included in this comparison. Data for these years can be obtained from CP&L (1996, 1999, 2000). Sampling was not conducted during 1996 and 1997.

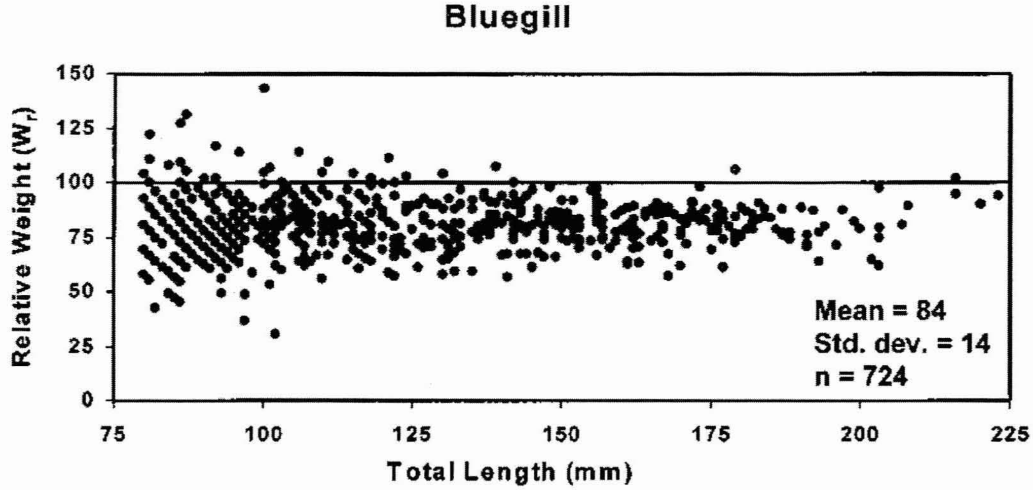


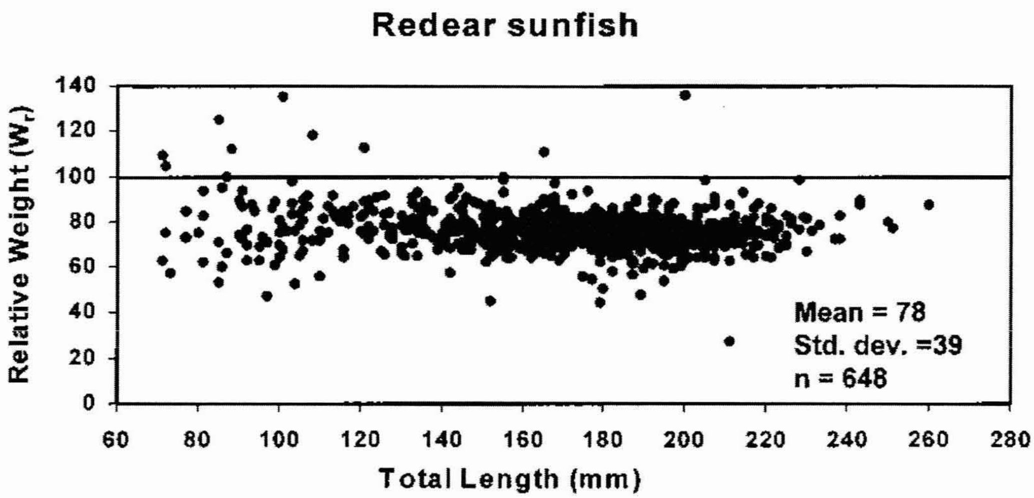


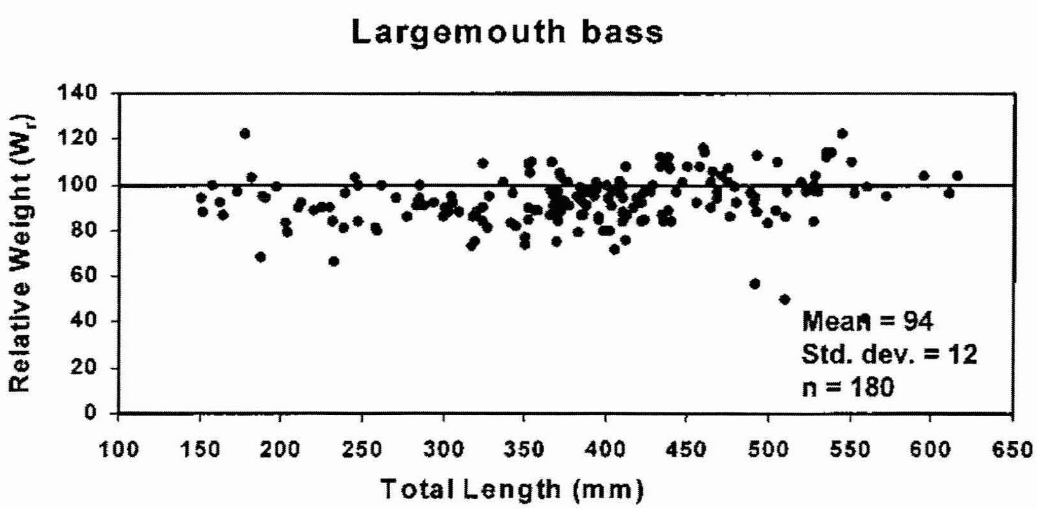


Note: PSD = Proportional Stock Density, RSD$_P$ = Relative Stock Density preferred length, RSD$_M$ = Relative Stock Density memorable length

Appendix 8. Length-frequency distributions for bluegill, redear sunfish, and largemouth bass collected with electrofishing sampling from Harris Reservoir during 2000.







Appendix 9. **Relative weight values for bluegill, redear sunfish, and largemouth bass collected with electrofishing sampling from Harris Reservoir during 2000.**