MONTICELLO RESERVOIR ICHTHYOPLANKTON STUDIES, SEPTEMBER 2008 THROUGH AUGUST 2009

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1.0 INTRODUCTION

Ichthyoplankton (fish eggs and larvae) samples were collected in Monticello Reservoir to provide estimates of entrainment of ichthyoplankton at the proposed V.C. Summer Nuclear Station Units 2 and 3 Raw Water Intake Structure. Although both units would use closed-cycle cooling (mechanical draft cooling towers), evaporative losses would require withdrawal of makeup water from Monticello Reservoir. Makeup water withdrawal rates would be 36,214 gpm (137.08 m^3/min) under typical operating conditions and 58,800 gpm (222.58 m^3/min) under maximum operating conditions. The purpose of this study was to collect ichthyoplankton data from Monticello Reservoir to estimate the number of ichthyoplankton potentially lost due to withdrawal of make-up water.

2.0 METHODS AND MATERIALS

Ichthyoplankton samples were collected at two parallel transects in the vicinity of the proposed intake (Figure 2-1) using 0.5 m-diameter, 0.300 mm-mesh bongo nets fitted with calibrated flowmeters (Figure 2-2). Tow length was about 250 m and each side of the bongo net filtered at least 50 m^3. The two sides of the bongo net were composited in the field, resulting in samples that ranged in volume from 105 to 191 m^3. Samples were preserved in the field with 5% formalin (Figure 2-3). Sampling started in September 2008 and continued for 12 consecutive months. Samples were collected once per month from September 2008 through February 2009, twice per month from March through July 2009, and once in August 2009 for a total of 17 sampling events (Table 2-1). This sampling regime was designed to reflect the reproductive behavior of resident fish species, all of which spawn in the spring and early summer. During each sampling event, samples were collected at the surface and mid depth during both the day and night for a total of 68 samples collected during the study.

Additional information collected during sampling included surface, mid-depth, and near bottom water temperature (°C) and dissolved oxygen concentration (mg/l), air temperature (°C), and weather conditions (% cloud cover, precipitation, wind speed and direction, and wave height) (Figure 2-4).

Samples were forwarded to Normandeau Associates' biological laboratory where ichthyoplankton were identified to the lowest practical taxon, usually species, and enumerated as to lifestage: egg, yolk-sac larvae (YSL), post yolk-sac larvae (PYSL), young of the year (YOY), and yearling (age 1) (Figure 2-5). No eggs were found in any samples and subsampling was not required for any species or lifestage.

Data were standardized to no./100 m^3 of water sampled. Since the proposed Raw Water Intake Structure will withdraw from all depths and operate 24 hours per day, monthly mean ichthyoplankton densities and 95% confidence intervals were calculated across depth and diel samples collected each month to provide water column and time-integrated estimate of densities. To estimate potential entrainment of ichthyoplankton on a monthly basis, monthly mean densities and their upper and lower 95% confidence limits (no./100 m^3) were multiplied by the estimated monthly water withdrawal rates (typical: 137.08 m^3/min; maximum: 222.58 m^3/min). These monthly estimates were then summed to provide annual estimates of entrainment under the two proposed water withdrawal rates. Although YOY and yearling fish (Figure 2-6) were sometimes captured in the nets, which were towed at about 3 ft/sec, it is unlikely that they would be entrained at the proposed Raw Water Intake which would have a through-screen velocity of 0.5 ft/sec. These fish are included in data tables where the entire catch is presented but

excluded from analyses of ichthyoplankton density and percent composition because they are not part of the ichthyoplankton community. Furthermore, YOY and yearling fish in most cases would be too large to be entrained through the proposed screens which will have 3/8-inch perforations.

3.0 RESULTS

Although ichthyoplankton were sampled from September 2008 through August 2009, fish larvae were found in samples only from March through August (Table 3-1, Appendix Table 1). No fish eggs were collected in any samples, presumably because all resident species have demersal and adhesive eggs that would not normally be found in the water column. Prior to the first appearance of fish larvae in samples, a YOY catfish was captured in September 2008 and a YOY threadfin shad was captured in December 2008. Fish larvae first appeared in March 2009 samples and peaked in density in May at 125.15 organisms/100 m^3 (Figure 3-1). After this peak, density decreased rapidly to 0.41/100 m^3 in August (Figure 3-1).

In March, threadfin shad YSL were numerically dominant (21.76/100 m^3), but small numbers of white perch, true percids (yellow perch and darters), and black crappie larvae were present. In April, substantial numbers of both YSL (17.97/100 m^3) and PYSL (14.72/100 m^3) threadfin shad were collected as the YSL larvae from March matured into PYSL. White perch YSL (15.55/100 m^3) and PYSL (7.41/100 m^3) increased in abundance in April. By May, most threadfin shad larvae had developed into PYSL (98.27/100 m^3) but some YSL were still present (17.91/100 m^3). Densities of YSL (0.46/100 m^3) and PYSL (3.46/100 m^3) white perch decreased from their monthly high in April. In June, PYSL clupeids (28.00/100 m^3) were dominant and total density of fish larvae was markedly lower, approximately 25% of the total density in May. PYSL *Lepomis* sp. (1.42/100 m^3) and PYSL clupeids (1.35/100 m^3) were predominant in July. By August, total density of fish larvae was very low and only yearling blue catfish (0.21/100 m^3) and PYSL *Lepomis* sp. (0.21/100 m^3) and clupeids (0.20/100 m^3) were present.

For the 12-month sampling period, PYSL and YSL threadfin shad had the highest density and together with undetermined-stage threadfin shad composed approximately 71% of the total catch (Table 3-2). White perch larvae were next in abundance with YSL and PYSL lifestages making up approximately 13% of the catch. The family Clupeidae, which was most likely a combination of threadfin shad and gizzard shad larvae, made up approximately 12% of the catch. All other species and lifestages combined made up less than 4% of the catch.

Estimates of potential entrainment were developed by multiplying ichthyoplankton densities by estimated monthly water withdrawal rates (typical: 137.08 m^3/min; maximum: 222.58 m^3/min). An estimated 15.3 million larvae would be entrained annually under the typical water withdrawal rate and 24.9 million under the maximum water withdrawal rate (Table 3-3, Appendix Table 2), based on 2008-2009 densities. The monthly pattern and species composition of entrainment estimates mirrored the monthly patterns in larval density (Figure 3-1) because the estimates are the product of larval densities and a constant (the two water withdrawal rates). Entrainment is expected to be very low in the fall and winter (September through February), begin to increase in March, reach a peak in May, and decrease rapidly through August (Appendix Table 2).

Entrainment estimates were highest for threadfin shad larvae, which made up 71% of all larvae potentially entrained, under typical (10.9 million larvae) and maximum (17.6 million larvae) water withdrawal rate scenarios (Table 3-3). White perch entrainment estimates ranked second under typical

(1.9 million larvae) and maximum (3.1 million larvae) water withdrawal rates. White perch larvae made up 13% of the total entrainment estimate. Clupeids were the third most abundant species potentially entrained under typical (1.8 million) and maximum water withdrawal rates (2.9 million). Clupeids were 12% of the total entrainment estimate.

Appendix Table 3 presents the water quality information collected during the ichthyoplankton study. As expected, temperature and DO levels had an inverse relationship due to the higher saturation levels of DO in colder water. DO levels were consistently highest in January (11.1-11.3 mg/l) when water temperatures were among the lowest (10.6-12.2 °C). Conversely, the lowest DO levels (3.3-3.9 mg/l) occurred in August and September when water temperatures were greater than 27.0 °C. There was a general trend of decreasing DO levels with increasing depth. Appendix Table 4 presents the environmental conditions during sampling. All environmental parameters were within ranges that allowed collection of valid ichthyoplankton samples.

4.0 DISCUSSION

Threadfin shad and gizzard shad, members of the family Clupeidae, together made up approximately 73% of all the larvae collected in Monticello Reservoir and the same percentage of the entrainment estimate. The category Clupeidae probably included only threadfin shad and gizzard shad, as no other clupeids are known to occur in Monticello Reservoir. Blueback herring have been reported from the Broad River, but these alleged occurrences have been described as "perplexing" (Rohde et al. 2009) and "questionable" (Bettinger et al. 2003) by authorities on South Carolina's fishes. Assuming all the clupeid larvae were threadfin and gizzard shad, these two species made up 85% of all the larvae collected and the entrainment estimate. Both threadfin and gizzard shad are important prey species in southern reservoirs and often contribute the most to fish biomass (Allen and DeVries 1993). Threadfin shad normally reach sexual maturity as yearlings. Threadfin shad may spawn once or several times over a spawning season, with fecundity (number of eggs per ovary) ranging from 800 to 21,000, depending on age and size of the female (Johnson 1971; Jenkins and Burkhead 1994). Gizzard shad typically mature at age 2 or 3. Each female produces 22,400 to 543,900 eggs (Jenkins and Burkhead 1994), depending on age and size, with some studies showing declining fecundity in older fish (Williamson and Nelson 1985). Both species spawn in the spring when water temperature is greater than 15 °C, but gizzard shad usually spawn slightly earlier (Netsch et al. 1971). Both species use shallow water habitats for spawning, but threadfin shad tend to spawn near the surface while gizzard shad tend to spawn near the bottom (Shelton et al. 1982). Larval threadfin shad tend to move offshore and larval gizzard shad remain evenly distributed within 50 m of shore (Allen and DeVries 1993). After the larval stage both species are important prey species, but gizzard shad quickly grow to be too large to be consumed by most predators (Noble 1981). Therefore, threadfin shad is more valuable as a prey species.

White perch were the next most abundant larvae, accounting for 13% of both the larvae collected and the entrainment estimate. The white perch is a semi-anadromous species, native to Atlantic Coast estuaries, but has been established in many freshwater lakes and impoundments. They have apparently been introduced to the Santee River watershed and Monticello Reservoir (Rohde et al. 2009; Warren et al. 2000). Female white perch mature at age 3 or 4, and may produce from 20,000 to 150,000 eggs (Jenkins and Burkhead 1994). White perch spawn in the spring over sand and gravel substrates and there is evidence that reservoir populations may migrate to shallower water to spawn (Rohde et al. 2009). White

perch are important recreational fish through much of their native range; however, when stocked in reservoirs they can become stunted and compete with native fish.

Dames and Moore (1985) conducted an ichthyoplankton study in Monticello Reservoir in 1983-1984 as part of the original 316(b) demonstration for V.C. Summer Station. In their study, total larval density was 53.9 larvae/100 m^3 at the surface and 11.8 larvae/100 m^3 at mid-depth at a station that was a short distance from our sampling stations. At both depths combined, gizzard shad (61.9/100 m^3; 94%) were the dominant larval species and white bass ranked second in abundance (3.1/100 m^3; 5%). These densities are higher than those observed in the current study and threadfin shad, the dominant species in this study, was not observed.

Reservoirs in the southeastern United States are generally most productive in the first several years after impoundment, as topsoils containing agricultural fertilizers and decaying organic matter are inundated by the rising waters of the reservoir. After this initial burst of productivity, these reservoirs tend to show a decline as nutrients are depleted and sedimentation effectively seals the reservoir bottom. With increasing age, reservoirs depend more and more on nutrients brought in by inflowing river water, levels of which may vary seasonally and annually depending on weather and the degree of watershed development. It's unclear if the apparent decline in Monticello Reservoir ichthyoplankton densities observed between the 1983-1984 study (Dames and Moore 1985) and the current study is related to lower reservoir productivity or is a reflection of normal biological variability. Spawning success and survival of larval threadfin and gizzard shad (which dominated larval fish collections) are unpredictable and influenced by an array of density-dependent (intra-specific and inter-specific competition, predation) and density-independent (weather, which determines temperatures and rainfall patterns) factors that are outside of the scope of this study.

Based on the current study, an estimated 15.3 million fish larvae would be entrained under typical operating conditions with 95% confidence limits of 2.2 million and 30.8 million. These confidence limits vary by a factor of about 15 and reflect seasonal variability. Annual variability is demonstrated by the differing results between the current study and the Dames and Moore (1985) study which reported ichthyoplankton densities an order of magnitude greater. Furthermore, threadfin shad, the dominant larval species in the current study was not reported by Dames and Moore (1985). The ichthyoplankton community of Monticello reservoir is dominated by very few species and therefore is potentially subject to high variability. A complete or partial failure to spawn by a dominant species such as either threadfin shad or white perch due to natural causes would result in low ichthyoplankton density and a similar reduction in potential entrainment. Considering the dynamic nature of the fish community in Monticello Reservoir, especially the possibility of further introductions of non-native fish such as white perch, large variations in ichthyoplankton density and potential entrainment is to be expected.

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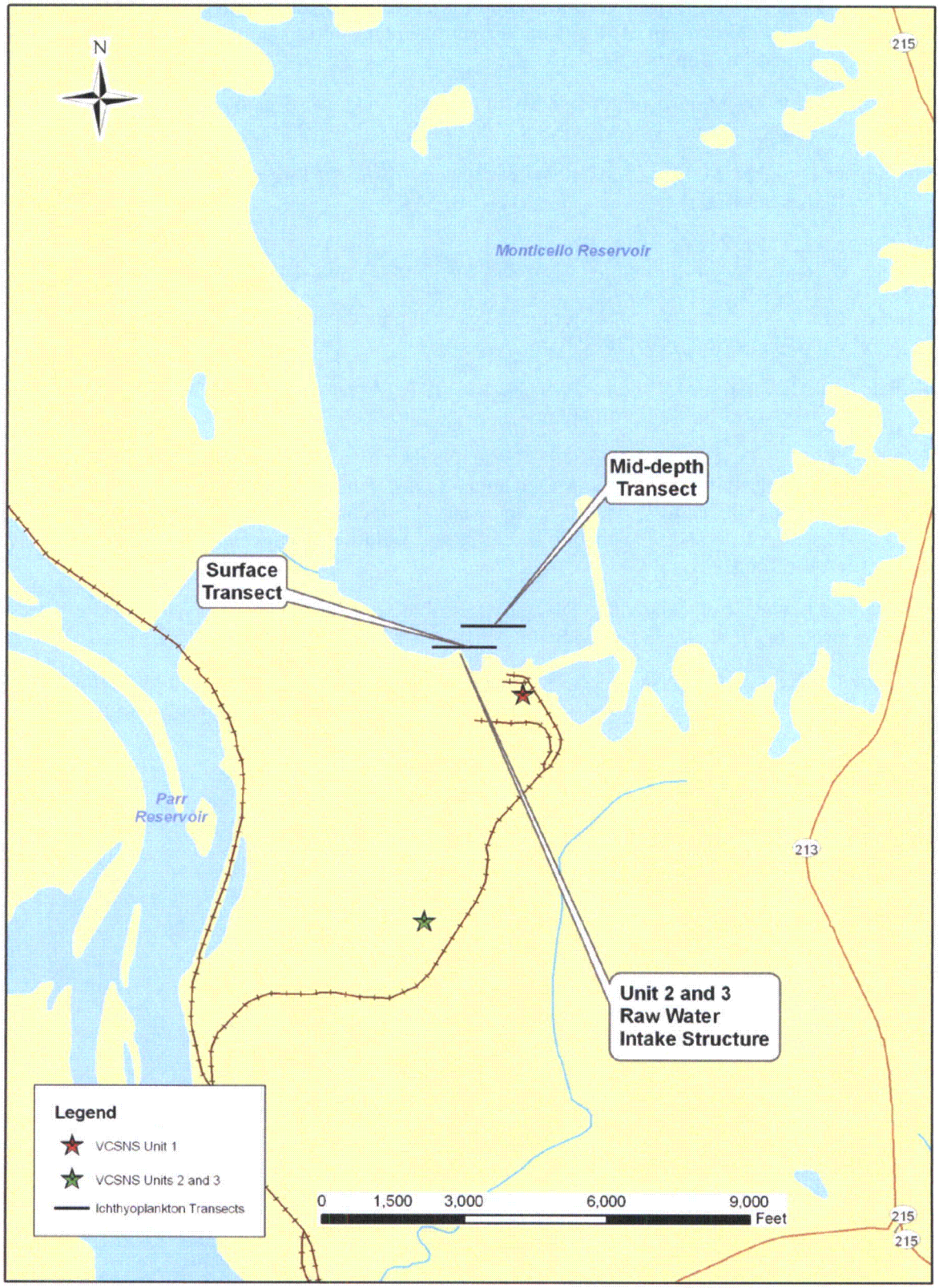

Figure 2-1. Ichthyoplankton sampling locations in Monticello Reservoir September 2008 through August 2009.

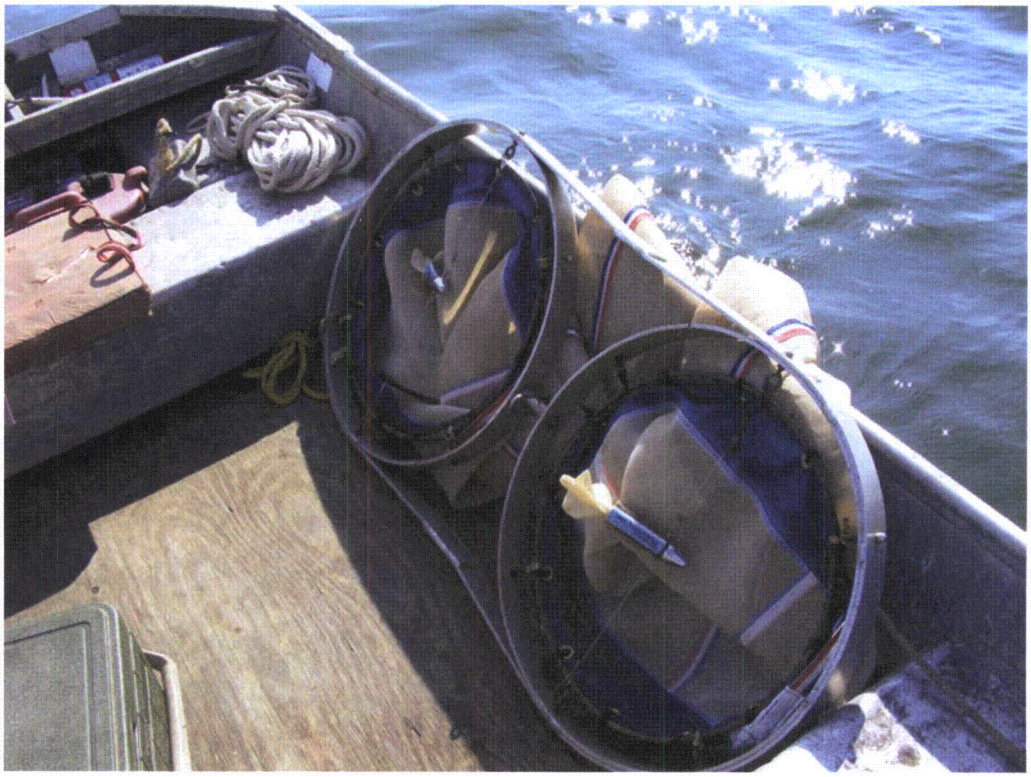

Figure 2-2. Sampling gear used in the Monticello Reservoir ichthyoplankton studies.

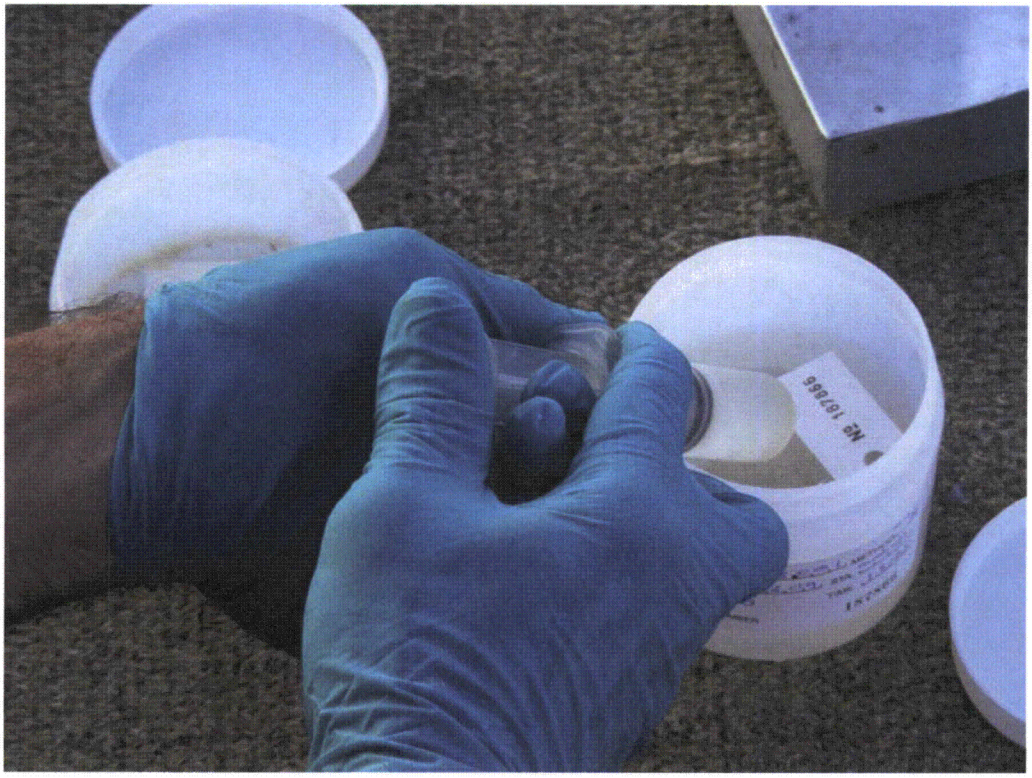

Figure 2-3. Preservation of samples from the Monticello Reservoir ichthyoplankton studies.

Figure 2-4. Collection of water quality data during the Monticello Reservoir ichthyoplankton studies.

Figure 2-5. Analysis of ichthyoplankton samples collected during the Monticello Reservoir ichthyoplankton studies.

Figure 2-6. Young-of-the-year white perch collected during the Monticello Reservoir ichthyoplankton studies.

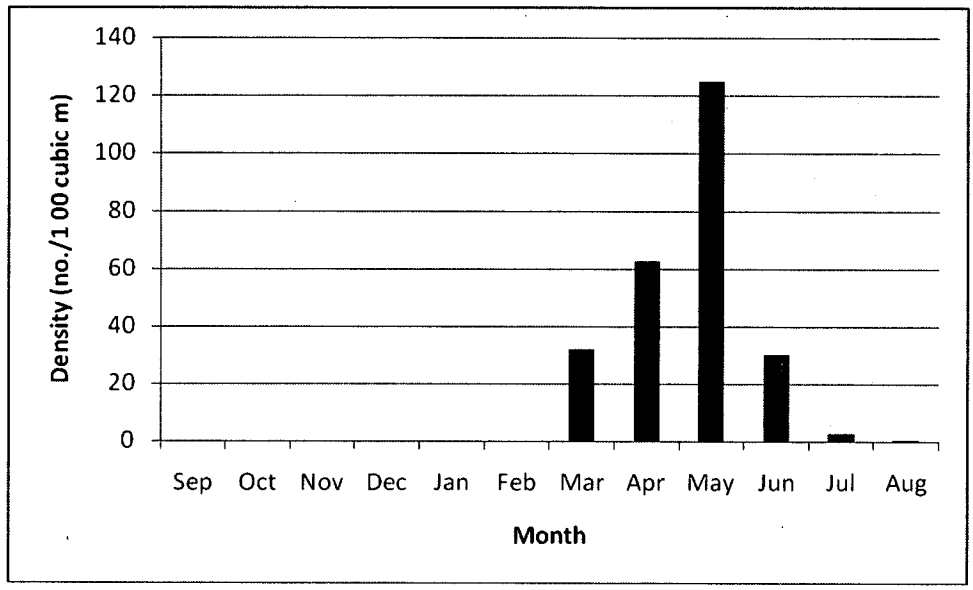

Figure 3-1. Monthly density (no./100 m^3) of ichthyoplankton in Monticello Reservoir, September 2008 through August 2009.

Table 2-1. Sample design for the V.C. Summer Nuclear Station Ichthyoplankton Studies.

Month	Sampling Events	Depths	Diel Periods	Samples
September	1	2	2	4
October	1	2	2	4
November	1	2	2	4
December	1	2	2	4
January	1	2	2	4
February	1	2	2	4
March	2	2	2	8
April	2	2	2	8
May	2	2	2	8
June	2	2	2	8
July	2	2	2	8
August	1	2	2	4
Total	**17**	**2**	**2**	**68**

Table 3-1. Monthly density (no./100 m^3) of ichthyoplankton, young-of-the-year and yearling fish collected in Monticello Reservoir September 2008 through August 2009.

Year	Month	Species	Lifestage[a]	Density (no./100 m^3)	LCL[b] (no./100 m^3)	UCL[c] (no./100 m^3)
2008	Sep	Channel Catfish	YOY	0.19	0.00	0.81
	Oct	None captured				
	Nov	None captured				
	Dec	Threadfin Shad	YOY	0.17	0.00	0.73
2009	Jan	None captured				
	Feb	None captured				
	Mar	Black Crappie	PYSL	0.25	0.00	0.54
		Threadfin Shad	Undetermined	0.42	0.00	1.23
			YSL	21.76	0.00	44.90
			PYSL	4.43	0.00	10.24
		Darter	YSL	0.09	0.00	0.29
		Unidentifiable larvae	Undetermined	0.29	0.00	0.98
		White Perch	YSL	3.93	0.00	9.91
			PYSL	0.60	0.00	1.40
		Yellow Perch	PYSL	0.09	0.00	0.29
	Apr	Black Crappie	PYSL	0.31	0.00	0.84
		Gizzard Shad	YSL	2.48	0.00	7.88
		Threadfin Shad	Undetermined	3.06	0.00	7.94
			YSL	17.97	0.00	43.23
			PYSL	14.72	1.37	28.06
		Catastomidae	YSL	0.10	0.00	0.35
			PYSL	0.54	0.00	1.32
		Cyprinidae	YSL	0.33	0.00	1.11
			PYSL	0.31	0.00	0.68
		Lepomis sp.	PYSL	0.11	0.00	0.38
		White Perch	YSL	15.55	1.08	30.02
			PYSL	7.41	0.67	14.15
	May	Gizzard Shad	YSL	2.99	0.00	7.57
		Threadfin Shad	YSL	17.91	0.00	41.43
			PYSL	98.27	31.73	164.81
		Catastomidae	PYSL	0.49	0.00	1.09
		Cyprinidae	PYSL	0.37	0.00	0.83
		Darter	YSL	0.09	0.00	0.31
			PYSL	0.19	0.00	0.64
		Lepomis sp.	PYSL	0.92	0.00	2.65
		White Perch	YSL	0.46	0.00	1.54
			PYSL	3.46	0.00	7.72
	Jun	Blue Catfish	YOY	0.39	0.00	1.08
		Brown Bullhead	YOY	0.09	0.00	0.31
		Channel Catfish	YOY	0.92	0.00	3.09
		Spottail Shiner	YOY	0.10	0.00	0.33
		Threadfin Shad	YOY	0.09	0.00	0.31
		Clupeidae	YSL	0.71	0.00	2.37
			PYSL	28.00	0.00	62.23
		Cyprinidae	PYSL	0.69	0.00	1.58
		Lepomis sp.	PYSL	0.52	0.00	1.34
		White Catfish	YOY	0.10	0.00	0.33
		White Perch	PYSL	0.29	0.00	0.99
	Jul	Blue Catfish	Yearling	0.10	0.00	0.35
		Clupeidae	PYSL	1.35	0.40	2.30
		Cyprinidae	PYSL	0.10	0.00	0.35
		Lepomis sp.	PYSL	1.42	0.00	3.16
	Aug	Blue Catfish	Yearling	0.21	0.00	0.86
		Clupeidae	PYSL	0.20	0.00	0.85
		Lepomis sp.	PYSL	0.21	0.00	0.89

Table 3-1. Continued)

Footnotes:
[a] Undetermined = specimen was damaged and lifestage could not be determined.
YSL = Yolk-sac larvae
PYSL = Post yolk-sac larvae
YOY = Young-of-the-year
Yearling = Age 1
[b] LCL = Lower 95% confidence limit.
[c] UCL = Upper 95 % confidence limit.

Table 3-2. Average density (no./100 m^3) and percent composition of ichthyoplankton collected in Monticello Reservoir September 2008 through August 2009.

Species	Lifestage[a]	Average Density (no./100 m^3)	Percent Composition
Black Crappie	PYSL	0.02	0.2
Gizzard Shad	YSL	0.16	2.2
Threadfin Shad	Undetermined	0.10	1.4
	YSL	1.70	22.8
	PYSL	3.45	46.4
Catastomidae	YSL	<0.01	<0.1
	PYSL	0.03	0.4
Clupeidae	YSL	0.02	0.3
	PYSL	0.87	11.6
Cyprinidae	YSL	0.01	0.1
	PYSL	0.04	0.6
Darter	YSL	0.01	0.1
	PYSL	0.01	0.1
Lepomis sp.	PYSL	0.09	1.2
Unidentifiable larvae	Undetermined	0.01	0.1
White Perch	YSL	0.59	7.9
	PYSL	0.35	4.7
Yellow Perch	PYSL	<0.01	<0.1

Footnotes:
[a] Undetermined = specimen was damaged and lifestage could not be determined.
YSL = Yolk-sac larvae
PYSL = Post yolk-sac larvae

Table 3-3. Annual entrainment estimates for V.C. Summer Nuclear Station Units 2 and 3 under typical and maximum water withdrawal rates.

		Typical Flow (137.08 m^3/min)			Maximum Flow (222.58 m^3/min)		
Species	Lifestage[a]	LCL[b]	Mean	UCL[c]	LCL	Mean	LCL
Black Crappie	Undetermined		0			0	
	YSL		0			0	
	PYSL	0	33,656	82,714	0	54,648	134,305
	Total	**0**	**33,656**	**82,714**	**0**	**54,648**	**134,305**
Gizzard Shad	Undetermined		0			0	
	YSL	0	329,828	929,431	0	535,549	1,509,139
	PYSL		0			0	
	Total	**0**	**329,828**	**929,431**	**0**	**535,549**	**1,509,139**
Threadfin Shad	Undetermined	0	206,910	545,243	0	335,964	885,324
	YSL	0	3,491,664	7,842,631	0	5,669,497	12,734,263
	PYSL	2,022,666	7,156,168	12,373,370	3284250	11,619,638	20,090,929
	Total	**2,022,666**	**10,854,742**	**20,761,243**	**3,284,250**	**17,625,099**	**33,710,516**
Catastomidae	Undetermined		0			0	
	YSL	0	5,922	20,904	0	9,615	33,943
	PYSL	0	61,962	144,742	0	100,610	235,020
	Total	**0**	**67,884**	**165,646**	**0**	**110,225**	**268,963**
Clupeidae	Undetermined		0			0	
	YSL	0	42,045	140,508	0	68,270	228,146
	PYSL	24,196	1,752,968	3,877,847	39,287	2,846,335	6,296,551
	Total	**24,196**	**1,795,013**	**4,018,355**	**39,287**	**2,914,605**	**6,524,697**
Cyprinidae	Undetermined		0			0	
	YSL	0	19,542	65,608	0	31,731	106,530
	PYSL	0	87,979	205,698	0	142,854	333,996
	Total	**0**	**107,521**	**271,306**	**0**	**174,585**	**440,526**
Darter	Undetermined		0			0	
	YSL	0	11,015	36,660	0	17,885	59,526
	PYSL	0	11,627	39,408	0	18,878	63,988
	Total	**0**	**22,641**	**76,068**	**0**	**36,763**	**123,514**
Lepomis sp.	Undetermined		0			0	
	YSL		0			0	
	PYSL	0	193,349	512,018	0	313,945	831,375
	Total	**0**	**193,349**	**512,018**	**0**	**313,945**	**831,375**
Unidentifiable Larvae	Undetermined	0	17,746	59,724	0	28,814	96,975
	YSL		0			0	
	PYSL		0			0	
	Total	**0**	**17,746**	**59,724**	**0**	**28,814**	**96,975**
White Perch	Undetermined		0			0	
	YSL	64,205	11,89,484	2,478,440	104,251	1,931,393	4,024,301
	PYSL	39,896	704,425	1,454,043	64,779	1,143,791	2,360,964
	Total	**104,100**	**1,893,908**	**3,932,483**	**169,030**	**3,075,183**	**6,385,265**
Yellow Perch	Undetermined		0			0	
	YSL		0			0	
	PYSL	0	5,507	18,040	0	8,942	29,291
	Total	**0**	**5,507**	**18,040**	**0**	**8,942**	**29,291**
Total		**2,150,962**	**15,321,796**	**30,827,028**	**3,492,567**	**24,878,358**	**50,054,566**

Footnotes:
[a] Undetermined = specimen was damaged and lifestage could not be determined.

YSL = Yolk-sac larvae
PYSL = Post yolk-sac larvae
[b] LCL = Lower 95% confidence limit.
[c] UCL = Upper 95 % confidence limit.

APPENDIX

Appendix Table 1. Ichthyoplankton density data (no./100 m^3) from Monticello Reservoir, September 2008 through August 2009.

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
2008	Sep	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.39	0.19	0.00	0.81
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Oct	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Nov	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Dec	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.35	0.17	0.00	0.73
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
2009	**Jan**	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
	Feb	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Mar	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.18	0.32	0.25	0.00	0.54
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0.69	0.15	0.42	0.00	1.23
			YSL	27	16.52	21.76	0.00	44.90
			PYSL	3.69	5.16	4.43	0.00	10.24
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0.17	0	0.09	0.00	0.29
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0.58	0.29	0.00	0.98
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		White Perch	Undetermined	0	0	0		
			YSL	1.9	5.95	3.93	0.00	9.91
			PYSL	0.52	0.68	0.6	0.00	1.40
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.18	0	0.09	0.00	0.29
			YOY	0	0	0		
			Yearling	0	0	0		
	Apr	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0.62	0.31	0.00	0.84
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	4.96	2.48	0.00	7.88
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	1.98	4.15	3.06	0.00	7.94
			YSL	7.85	28.09	17.97	0.00	43.23
			PYSL	9.05	20.38	14.72	1.37	28.06
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0.21	0.1	0.00	0.35
			PYSL	0.23	0.86	0.54	0.00	1.32
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0.66	0.33	0.00	1.11
			PYSL	0	0.63	0.31	0.00	0.68
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.23	0	0.11	0.00	0.38
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	4.08	27.03	15.55	1.08	30.02
			PYSL	2.99	11.83	7.41	0.67	14.15
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	May	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	2.3	3.69	2.99	0.00	7.57
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	6.56	29.26	17.91	0.00	41.43
			PYSL	52.55	143.99	98.27	31.73	164.81
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.61	0.37	0.49	0.00	1.09
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0.73	0.37	0.00	0.83
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0.18	0.09	0.00	0.31
			PYSL	0	0.38	0.19	0.00	0.64
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	1.85	0.92	0.00	2.65
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0.92	0.46	0.00	1.54
			PYSL	2.12	4.79	3.46	0.00	7.72
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Jun	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.77	0.39	0.00	1.08
			Yearling	0	0	0		
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.18	0.09	0.00	0.31
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	1.83	0.92	0.00	3.09
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.2	0.1	0.00	0.33
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.18	0.09	0.00	0.31
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	1.41	0.71	0.00	2.37
			PYSL	11.83	44.17	28	0.00	62.23
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.2	1.18	0.69	0.00	1.58
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	1.03	0	0.52	0.00	1.34
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0.2	0.1	0.00	0.33
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0.59	0.29	0.00	0.99
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
	Jul	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0.21	0.1	0.00	0.35
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.67	2.03	1.35	0.40	2.30
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0.21	0.1	0.00	0.35
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	1.79	1.06	1.42	0.00	3.16
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
	Aug	Black Crappie	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Blue Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0.41	0.21	0.00	0.86
		Brown Bullhead	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Channel Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All Density (no./100 m^3)	All LCL (no./100 m^3)[b]	All UCL (no./100 m^3)[c]
		Gizzard Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Spottail Shiner	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Threadfin Shad	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Catastomidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Clupeidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0.41	0.2	0.00	0.85
			YOY	0	0	0		
			Yearling	0	0	0		
		Cyprinidae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Darter	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Lepomis sp.	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0.43	0	0.21	0.00	0.89
			YOY	0	0	0		
			Yearling	0	0	0		
		Unidentifiable Larvae	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		White Catfish	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

(continued)

Appendix Table 1. (Continued)

Year	Month	Species	Lifestage[a]	Day Density (no./100 m^3)	Night Density (no./100 m^3)	All		
						Density (no./100 m^3)	LCL (no./100 m^3)[b]	UCL (no./100 m^3)[c]
		White Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		
		Yellow Perch	Undetermined	0	0	0		
			YSL	0	0	0		
			PYSL	0	0	0		
			YOY	0	0	0		
			Yearling	0	0	0		

Footnotes:
[a] Undetermined = specimen was damaged and lifestage could not be determined.
YSL = Yolk-sac larvae
PYSL = Post yolk-sac larvae
YOY = Young-of-the-year
Yearling = Age 1
[b] LCL = Lower 95% confidence limit.
[c] UCL = Upper 95 % confidence limit.

Appendix Table 2. Monthly larval entrainment estimates for V.C. Summer Nuclear Station Units 2 and 3 under typical and maximum water withdrawal rates.

				Typical Flow (137.08 m^3/min)			Maximum Flow (222.58 m^3/min)		
Year	Month	Species	Lifestage[a]	LCL[b]	Mean	UCL[c]	LCL[b]	Mean	LCL[c]
2008	September	None			0			0	
	October	None			0			0	
	November	None			0			0	
	December	None			0			0	
2009	January	None			0			0	
	February	None			0			0	
	March	Black Crappie	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	15298	32977	0	24840	53545
		Threadfin Shad	Undetermined	0	25701	75261	0	41731	122203
			YSL	0	1331549	2747415	0	2162067	4461042
			PYSL	0	271083	626458	0	440164	1017195
		Darter	Undetermined		0			0	
			YSL	0	5507	17807	0	8942	28914
			PYSL		0			0	
		Unidentifiable larvae	Undetermined	0	17746	59724	0	28814	96975
			YSL		0			0	
			PYSL		0			0	
		White Perch	Undetermined		0			0	
			YSL	0	240487	606295	0	390484	984456
			PYSL	0	36716	85419	0	59616	138696
		Yellow Perch	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	5507	18040	0	8942	29291
	March Total			0	1949593	4269396	0	3165600	6932317
	April	Black Crappie	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	18358	49738	0	29808	80760
		Gizzard Shad	Undetermined		0			0	
			YSL	0	146862	466394	0	238463	757294
			PYSL		0			0	
		Threadfin Shad	Undetermined	0	181209	469982	0	294233	763121
			YSL	0	1064158	2560095	0	1727897	4156887
			PYSL	80881	871697	1661963	131328	1415395	2698568
		Catastomidae	Undetermined		0			0	
			YSL	0	5922	20904	0	9615	33943
			PYSL	0	31978	78115	0	51923	126837
		Cyprinidae	Undetermined		0			0	
			YSL	0	19542	65608	0	31731	106530
			PYSL	0	18358	40168	0	29808	65222
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	6514	22521	0	10577	36568
		White Perch	Undetermined		0			0	
			YSL	64205	920849	1777877	104251	1495203	2886781
			PYSL	39896	438810	837806	64779	712505	1360366
	April Total			184981	3724255	8051172	300356	6047160	13072876

(continued)

Appendix Table 2. (Continued)

Year	Month	Species	Lifestage	Typical Flow (137.08 m³/min) LCL[b]	Mean	UCL[c]	Maximum Flow (222.58 m³/min) LCL[b]	Mean	LCL[c]
2009	May	Gizzard Shad	Undetermined		0			0	
			YSL	0	182966	463038	0	297086	751845
			PYSL		0			0	
		Threadfin Shad	Undetermined		0			0	
			YSL	0	1095958	2535120	0	1779532	4116334
			PYSL	1941785	6013388	10084948	3152922	9764079	16375166
		Catastomidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	29984	66626	0	48686	108183
		Cyprinidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	22641	50765	0	36763	82429
		Darter	Undetermined		0			0	
			YSL	0	5507	18853	0	8942	30613
			PYSL	0	11627	39408	0	18878	63988
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	56297	162197	0	91411	263363
		White Perch	Undetermined		0			0	
			YSL	0	28149	94267	0	45705	153064
			PYSL	0	211726	472186	0	343785	766699
	May Total			1941785	7658243	13987409	3152922	12434868	22711683
	June	Clupeidae	Undetermined		0			0	
			YSL	0	42045	140508	0	68270	228146
			PYSL	0	1658120	3685195	0	2692328	5983737
		Cyprinidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	40861	93506	0	66347	151828
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	30794	79128	0	50000	128482
		White Perch	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	17173	58632	0	27885	95203
	June Total			0	1788993	4056969	0	2904829	6587395
	July	Clupeidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	24196	82610	140712	39287	134136	228478
		Cyprinidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	6119	21258	0	9936	34518
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	86893	193423	0	141091	314066
	July Total			24196	175623	355394	39287	285162	577061
	August	Clupeidae	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	12239	51940	0	19872	84337
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	12850	54749	0	20866	88897
	August Total			0	25089	106689	0	40737	173234

(continued)

Appendix Table 2. (Continued)

Year	Month	Species	Lifestage	Typical Flow (137.08 m³/min) LCL[b]	Mean	UCL[c]	Maximum Flow (222.58 m³/min) LCL[b]	Mean	LCL[c]
	All	Black Crappie	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	33656	82714	0	54648	134305
		Gizzard Shad	Undetermined		0			0	
			YSL	0	329828	929431	0	535549	1509139
			PYSL		0			0	
		Threadfin Shad	Undetermined	0	206910	545243	0	335964	885324
			YSL	0	3491664	7842631	0	5669497	12734263
			PYSL	2022666	7156168	12373370	3284250	11619638	20090929
		Catastomidae	Undetermined		0			0	
			YSL	0	5922	20904	0	9615	33943
			PYSL	0	61962	144742	0	100610	235020
		Clupeidae	Undetermined		0			0	
			YSL	0	42045	140508	0	68270	228146
			PYSL	24196	1752968	3877847	39287	2846335	6296551
		Cyprinidae	Undetermined		0			0	
			YSL	0	19542	65608	0	31731	106530
			PYSL	0	87979	205698	0	142854	333996
		Darter	Undetermined		0			0	
			YSL	0	11015	36660	0	17885	59526
			PYSL	0	11627	39408	0	18878	63988
		Lepomis sp.	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	193349	512018	0	313945	831375
		Unidentifiable larvae	Undetermined	0	17746	59724	0	28814	96975
			YSL		0			0	
			PYSL		0			0	
		White Perch	Undetermined		0			0	
			YSL	64205	1189484	2478440	104251	1931393	4024301
			PYSL	39896	704425	1454043	64779	1143791	2360964
		Yellow Perch	Undetermined		0			0	
			YSL		0			0	
			PYSL	0	5507	18040	0	8942	29291
	TOTAL			2,150,962	15,321,796	30,827,028	3,492,567	24,878,358	50,054,566

Footnotes:
[a] Undetermined = specimen was damaged and lifestage could not be determined.
YSL = Yolk-sac larvae
PYSL = Post yolk-sac larvae
[b] LCL = Lower 95% confidence limit.
[c] UCL = Upper 95 % confidence limit.

Appendix Table 3. Water quality data associated with ichthyoplankton sampling in Monticello Reservoir, September 2008 through August 2009.

Date	Diel	Time	Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/l)
09/11/08	day	17:55	0.9	28.2	6.2
			3.0	27.9	5.2
			5.8	27.5	3.9
09/11/08	night	23:20	0.9	28.5	6.1
			4.0	27.9	5.3
			7.3	27.4	3.3
10/16/08	day	16:00	0.9	24.5	7.8
			12.2	23.6	6.2
			24.1	23.4	6.1
10/16/08	night	21:55	0.9	24.3	7.1
			13.7	23.5	6.1
			27.4	23.3	5.3
11/20/08	day	15:40	0.9	17.4	9.2
			12.2	16.9	9.0
			24.4	16.8	8.9
11/20/08	night	20:15	0.9	16.9	9.3
			12.2	16.6	9.1
			24.4	16.4	9.1
12/16/08	day	15:30	0.9	15.3	10.0
			15.2	13.0	9.5
			29.0	12.0	9.5
12/16/08	night	20:10	0.9	14.1	10.0
			15.2	13.2	9.4
			29.0	12.0	9.4
01/17/09	day	14:45	0.9	12.2	11.3
			13.7	11.6	11.2
			27.4	11.3	11.2
01/17/09	night	20:30	0.9	11.8	11.3
			13.7	11.6	11.1
			29.0	10.6	11.2
02/21/09	day	15:50	0.9	12.1	11.3
			13.7	10.6	10.6
			27.4	10.2	10.0
02/21/09	night	21:00	0.9	11.4	11.2
			13.7	10.4	10.7
			29.0	9.9	10.3
03/14/09	day	16:50	0.9	15.4	10.7
			13.7	11.7	10.6
			29.0	10.5	10.4

(continued)

Appendix Table 3. (Continued)

Date	Diel	Time	Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/l)
03/14/09	night	20:10	0.9	15.0	11.1
			13.7	11.3	11.1
			29.0	10.5	10.3
03/28/09	day	17:00	0.9	15.5	9.8
			13.7	13.2	9.6
			29.0	11.2	9.0
03/28/09	night	22:25	0.9	15.7	9.6
			13.7	13.0	9.3
			27.4	11.1	8.9
04/18/09	day	17:40	0.9	18.3	11.0
			7.6	15.7	9.3
			15.2	15.1	8.8
04/18/09	night	22:35	0.9	18.0	10.5
			7.6	15.5	9.1
			15.2	15.1	8.6
04/25/09	day	17:02	0.9	20.5	9.6
			7.6	17.1	8.8
			15.2	15.9	8.5
04/25/09	night	22:55	0.9	19.3	8.9
			7.6	17.5	8.7
			15.2	16.2	8.4
05/09/09	day	17:20	0.9	22.6	8.8
			7.6	19.7	7.9
			15.2	18.3	7.5
05/09/09	night	22:45	0.9	22.9	8.8
			7.6	20.1	7.7
			15.2	18.9	7.5
05/23/09	day	17:00	0.9	22.1	7.8
			7.6	21.4	7.6
			15.2	20.7	7.1
05/23/09	night	23:00	0.9	22.3	8.4
			7.6	21.4	7.9
			15.2	20.8	7.2
06/06/09	day	18:07	0.9	26.9	9.6
			7.6	24.9	7.8
			15.2	22.8	6.7
06/06/09	night	23:09	0.9	26.2	9.2
			7.6	24.0	7.3
			15.2	22.9	6.6

(continued)

Appendix Table 3. (Continued)

Date	Diel	Time	Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/l)
06/20/09	day	18:00	0.9	30.8	10.3
			7.6	25.9	6.7
			15.2	25.4	5.4
06/20/09	night	23:15	0.9	30.0	9.9
			7.6	26.0	6.1
			15.2	25.4	5.2
07/11/09	day	17:45	0.9	29.4	8.7
			7.6	27.7	6.0
			15.2	27.3	4.3
07/11/09	night	23:17	0.9	29.1	9.3
			7.6	27.7	5.4
			15.2	27.5	4.7
07/25/09	day	17:40	0.9	29.7	7.7
			7.6	28.4	5.4
			15.2	27.9	4.0
07/25/09	night	23:10	0.9	29.7	8.4
			7.6	28.2	5.0
			15.2	27.8	3.7
08/22/09	night	19:00	0.9	29.9	7.4
			7.6	29.3	5.6
			15.2	28.9	3.7
08/22/09	night	22:45	0.9	29.6	6.9
			7.6	29.1	4.4
			15.2	29.0	3.5

Appendix Table 4. Environmental conditions associated with ichthyoplankton sampling in Monticello Reservoir September 2008 through August 2009.

Date	Diel	Time	Air Temp (°C)	Cloud Cover (%)	Precipitation	Wind Direction	Wind Speed (mph)	Wave Height
09/11/08	day	17:55	25	90-100	none	east	8-11	light chop
	night	23:20	23	90-100	light rain	east	8-11	light chop
10/16/08	day	16:00	29	1-9	none	west	8-11	light chop
	night	21:55	23	10-19	none	no wind	0-7	calm
11/20/08	day	15:40	17	1-9	none	west	0-7	calm
	night	20:15	13	1-9	none	south	0-7	calm
12/16/08	day	15:30	19	70-79	none	no wind	0-7	calm
	night	20:10	16	30-39	none	south	0-7	calm
01/17/09	day	14:45	4	1-9	none	south	8-11	light chop
	night	20:30	5	90-100	none	south	8-11	light chop
02/21/09	day	15:50	14	1-9	none	south	0-7	calm
	night	21:00	8	20-29	none	south	0-7	calm
03/14/09	day	16:50	8	90-100	light rain	east	8-11	light chop
	night	20:10	8	90-100	light rain	east	0-7	light chop
03/28/09	day	17:00	15	90-100	heavy rain	north	12-16	heavy chop
	night	22:25	15	50-59	none	north	0-7	calm
04/18/09	day	17:40	23	90-100	none	west	0-7	light chop
	night	22:35	17	10-19	none	no wind	0-7	calm
04/25/09	day	17:02	30	20-29	none	south	8-11	calm
	night	22:55	23	10-19	none	south	0-7	calm
05/09/09	day	17:20	28	70-79	none	south	12-16	light chop
	night	22:45	24	10-19	none	no wind	0-7	calm
05/23/09	day	17:00	24	90-100	none	east	8-11	light chop
	night	23:00	22	90-100	none	south	0-7	calm
06/06/09	day	18:07	28	60-69	none	east	8-11	calm
	night	23:09	23	60-69	none	east	8-11	calm
06/20/09	day	18:00	35	20-29	none	west	8-11	calm
	night	23:15	28	10-19	none	west	0-7	calm
07/11/09	day	17:45	33	60-69	none	west	0-7	calm
	night	23:17	25	30-39	none	no wind	0-7	calm
07/25/09	day	17:40	34	20-29	none	south	0-7	calm
	night	23:10	28	10-19	none	no wind	0-7	calm
08/22/09	night	19:00	31	50-59	none	west	0-7	calm
	night	22:45	28	50-59	none	north	8-11	light chop