



**MONTICELLO AND PARR RESERVOIRS  
FISHERIES SURVEYS:  
SUMMER REPORT**

**FINAL**

**AUGUST 2008**

**NORMANDEAU ASSOCIATES**  
ENVIRONMENTAL CONSULTANTS

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## **1.0 INTRODUCTION**

Monticello and Parr Reservoirs are located in the Piedmont region of South Carolina. Parr Shoals Dam impounds the Broad River to form Parr Reservoir (4,400 acres) while Monticello Reservoir occupies most of the Frees Creek watershed. The two impoundments are connected via a pump-storage hydroelectric project on what was formerly Frees Creek, but is now an engineered canal between the two reservoirs. Monticello Reservoir serves as a source of cooling water for the Virgil C. Summer Nuclear Station operated by South Carolina Electric and Gas Company (SCE&G). Normandeau Associates was retained by Tetra Tech NUS to conduct two surveys of the fisheries in Monticello and Parr Reservoirs, once during the summer (July 2008) and once during winter (December – February 2008-9). This report covers summer 2008.

## **2.0 METHODS**

Fisheries of Monticello and Parr Reservoirs were surveyed over the July 21 - 22 and the July 22 – 23, 2008 period, respectively. Sampling gear included boat electrofishing equipment and gillnets. Monticello Reservoir gillnets were set on July 21 and retrieved on July 22. Electrofishing was performed on July 22. Parr Reservoir gillnets were set on July 22 and retrieved on July 23. Electrofishing was done on July 23.

Electrofishing transects and gillnet stations were pre-determined locations chosen by Tetra Tech and SCE&G. Five gillnet stations were established on Monticello Reservoir. Five electrofishing transects were also sampled on Monticello. Parr Reservoir had three gillnet and electrofishing transect locations. Figure 1 shows these sampling locations. GPS coordinates for these sampling locations are provided in Table 8.

One experimental, monofilament gillnet, 100 feet long by 8 feet deep, was used to sample at each of the pre-determined locations on Monticello and Parr Reservoirs. The nets were constructed of four 25 foot panels of 1, 2, 3, and 4-inch stretch mesh. Gillnets were set perpendicular to shore and allowed to fish overnight. Fishing time ranged from 12.68 to 22.68 hours and averaged 17.31 hours.

The electrofishing was conducted from an aluminum boat equipped with a 4500-W, 230V gasoline powered generator. A four-electrode array was mounted on a boom and suspended in the water approximately 2 m in front of the boat; the cathode array was secured to the bow of the boat. Direct current (DC) discharge was controlled by a Smith-Root Model VI electrofisher set to deliver 672V at 5-6 amps at a frequency of 60 pulses/sec. Current to the electrodes was pulsed by a foot switch operated by a netter at the bow. Electrofishing was done in the early morning hours along the shallow shoreline.

All fish were identified to species, measured to the nearest millimeter and weighed to the nearest gram. When a species exceeded 20 individuals at a station, per sampling method, the individuals were counted, recorded and an aggregate weight was recorded. A few individual specimens were retained for further ID and reference specimens.

### **3.0 ENDANGERED, THREATENED AND SPECIES OF CONCERN**

One species of concern fish was collected during the summer study. A Robust redhorse (*Moxostoma robustum*) collected at Parr Reservoir station 1 in a gillnet on July 23. None of the fish collected was state or federally listed as endangered or threatened. All fish collected were typical of Piedmont lakes, rivers and streams.

### **4.0 RESULTS**

A total of 782 fish (both gear types) representing 20 species were captured on Monticello Reservoir during the summer study period (Tables 1 and 2). Gizzard shad (42.2%), bluegill (23.1%), blue catfish (19.9%), white perch (3.6%) and channel catfish (2.6%) were the five species most commonly collected (Table 3). A total of 450 fish were collected by electrofishing (Table 2). Bluegill and gizzard shad dominated electrofishing collections (Table 4). Gillnets captured a total of 332 fish (Table 2). Blue catfish and gizzard shad were the dominant species collected (Table 5). Almost 91 percent of fish collected in gill nets were either blue catfish or gizzard shad.

A total of 328 fish (both gear types) representing 18 species were captured on Parr Reservoir during the summer study period (Tables 1 and 2). Gizzard shad (52.4%), bluegill (14.3%), white perch (7.6%), largemouth bass (6.1%) and blue catfish (4.3%) were the five most common species (Table 3). A total number of 257 fish were collected by electrofishing (Table 2). Gizzard shad dominated electrofishing samples (Table 4). Bluegills and largemouth bass were also common (Table 4). Gillnets on Parr Reservoir captured a total of 71 fish (Table 2). White perch and blue catfish were the dominant species collected (Table 5).

Species richness is presented in Table 6. The two stations that could be impacted by new plant operations are Parr station 1 and Monticello station 3. Parr station 1 has the least amount of diversity in comparison with the other two stations that were sampled. Monticello station 3 has the second greatest amount of diversity along with station 1.

The fish communities sampled of Monticello Reservoir and Parr Reservoir were similar. Gizzard shad, bluegill, blue catfish and white perch were numerically dominant in both reservoirs.

Water quality data for Monticello Reservoir and Parr Reservoir is presented in Table 7. Monticello Reservoir temperatures ranged from 27.8 to 34.1°C at the surface and 27.7 to 27.9°C at the bottom. Parr Reservoir temperatures ranged from 28.6 to 29.6°C at the surface and 28.5 to 29.0° at the bottom. Dissolved oxygen concentrations in Monticello Reservoir ranged from 5.00 to 8.70 mg/l at the surface and 3.60 to 5.30 mg/l at the bottom. Parr Reservoir dissolved oxygen concentrations ranged from 5.40 to 7.20 mg/l at the surface and 5.10 to 5.70 mg/l at the bottom. Both reservoirs exhibited similar water quality parameters. The largest range in temperature occurred on Monticello Reservoir. The widest range of dissolved oxygen occurred in Monticello Reservoir.

### **5.0 CONCLUSIONS**

Both reservoirs exhibited good dissolved oxygen concentrations capable of supporting a wide range of fish species as well as numbers of fish. Monticello and Parr Reservoirs also seem to have diverse fish communities that contain predator / prey species in good numbers as well as ancillary species that

are important to other activities. Gizzard shad and bluegill were very common in both reservoirs. Gizzard shad were the most abundant species in both reservoirs.

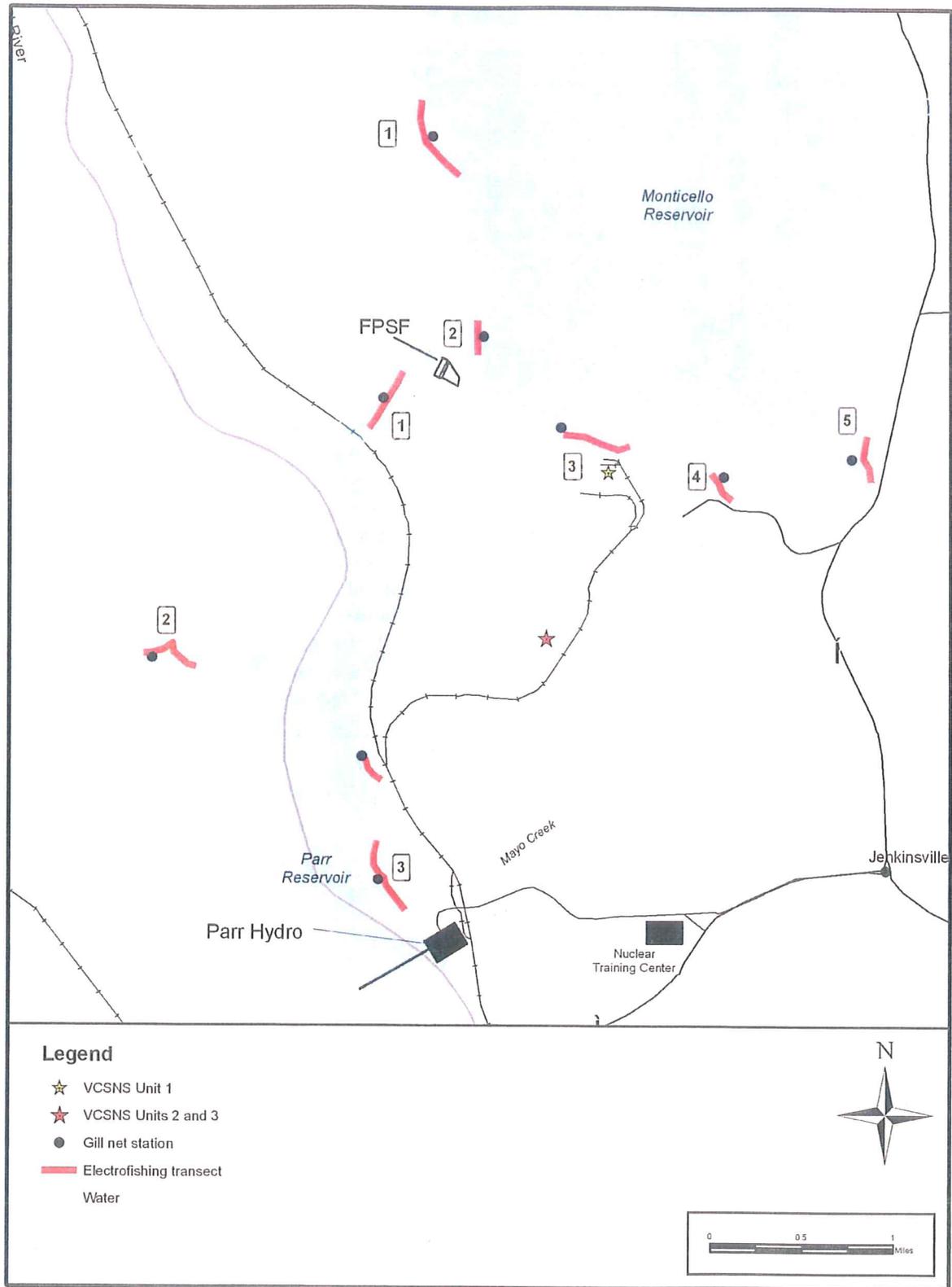


Figure 1. Monticello Reservoir and Parr Reservoir Sampling Locations.

**Table 1. Species Collected on Monticello and Parr Reservoirs, Summer 2008.**

Common Name	Scientific Name	Parr	Monticello
Quillback	<i>Carpriodes cyprinus</i>	X	
Northern Hogsucker	<i>Hypentelium nigricans</i>		X
Notchlip Redhorse	<i>Moxostoma collapsum</i>	X	X
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	X	X
Robust Redhorse	<i>Moxostoma robustum</i>	X	
Redbreast	<i>Lepomis auritus</i>		X
Pumpkinseed	<i>Lepomis gibbosus</i>	X	X
Bluegill	<i>Lepomis macrochirus</i>	X	X
Redear	<i>Lepomis microlophus</i>	X	X
Smallmouth Bass	<i>Micropterus dolomieu</i>	X	X
Largemouth Bass	<i>Micropterus salmoides</i>	X	X
White Perch	<i>Morone americana</i>	X	X
Black Crappie	<i>Pomoxis nigromaculatus</i>	X	X
Gizzard Shad	<i>Dorosoma cepedianum</i>	X	X
Whitefin Shiner	<i>Cyprinella nivea</i>		X
Spottail Shiner	<i>Notropis hudsonius</i>	X	X
Snail Bullhead	<i>Ameiurus brunneus</i>		X
White Catfish	<i>Ameiurus catus</i>	X	X
Yellow Bullhead	<i>Ameiurus natalis</i>		X
Flat Bullhead	<i>Ameiurus platycephalus</i>		X
Blue Catfish	<i>Ictalurus furcatus</i>	X	X
Channel Catfish	<i>Ictalurus punctatus</i>	X	X
Longnose Gar	<i>Lepisosteus osseus</i>	X	
Yellow Perch	<i>Perca flavescens</i>	X	

Table 2. Total Fish Collected by gear on Monticello and Parr Reservoirs, Summer 2008.

Season	Location	Gear	
		Electrofishing Total Count	Gill Net Total Count
Summer 2008	Monticello Reservoir	450	332
	Parr Reservoir	257	71

Table 3. Relative Abundance (%) of Fish Species collected on Monticello and Parr Reservoirs, Summer 2008.

Common Name	Parr		Monticello	
	Total	Abundance	Total	Abundance
Quillback	2	0.6	0	0
Northern Hogsucker	0	0	1	0.1
Notchlip Redhorse	2	0.6	9	1.2
Shorthead Redhorse	11	3.4	4	0.5
Robust Redhorse	1	0.3	0	0
Redbreast	0	0	3	0.4
Pumpkinseed	3	0.9	6	0.8
Bluegill	47	14.3	181	23.1
Redear	3	0.9	4	0.5
Smallmouth Bass	1	0.3	1	0.1
Largemouth Bass	20	6.1	11	1.4
White Perch	25	7.6	28	3.6
Black Crappie	1	0.3	7	0.9
Gizzard Shad	172	52.4	330	42.2
Whitefin Shiner	0	0	2	0.3
Spottail Shiner	5	1.5	4	0.5
Snail Bullhead	0	0	1	0.1
White Catfish	5	1.5	11	1.4
Yellow Bullhead	0	0	1	0.1
Flat Bullhead	0	0	2	0.3
Blue Catfish	14	4.3	156	19.9
Channel Catfish	12	3.7	20	2.6
Longnose Gar	2	0.6	0	0
Yellow Perch	2	0.6	0	0

**Table 4. Electrofishing CPUE (# of fish per hour of shock time) for Monticello and Parr Reservoirs, Summer 2008.**

<b>Common Name</b>	<b>Parr</b>	<b>Monticello</b>
Northern Hogsucker		3.99
Notchlip Redhorse	3.97	35.88
Shorthead Redhorse		3.99
Redbreast		5.98
Pumpkinseed	11.97	23.92
Bluegill	89.76	143.99
Redear	11.97	7.95
Smallmouth Bass	3.96	3.99
Largemouth Bass	26.44	13.27
White Perch	7.98	33.92
Gizzard Shad	333.05	182.40
Whitefin Shiner		3.98
Spottail Shiner	9.97	7.98
Snail Bullhead		3.97
White Catfish	3.99	14.58
Yellow Bullhead		3.97
Flat Bullhead		7.94
Blue Catfish		3.97
Channel Catfish	15.95	11.96
Yellow Perch	7.98	

**Table 5. Gillnet counts for Monticello and Parr Reservoirs, Summer 2008.**

<b>Common Name</b>	<b>Parr</b>	<b>Monticello</b>
Quillback	2	
Shorthead Redhorse	11	3
Robust Redhorse	1	
Bluegill	2	
Largemouth Bass		1
White Perch	21	11
Black Crappie	1	7
Gizzard Shad	5	147
White Catfish	4	
Blue Catfish	14	155
Channel Catfish	8	8
Longnose Gar	2	
<b>Total</b>	<b>71</b>	<b>332</b>

Table 6. Species Richness for Monticello and Parr Reservoirs, Summer 2008.

	RESERVOIR	
	PARR	MONTICELLO
	N	N
All Stations	18	20
1	8	11
2	14	13
3	9	11
4	•	5
5	•	8

Table 7. Water quality Data for Monticello and Parr Reservoirs, Summer 2008.

Reservoir	Station	Depth	Gear					
			Electrofishing			Gillnet		
			Temperature (0°)	DO (mg/L)	Conductivity mmhos	Temperature (0°)	DO (mg/L)	Conductivity mmhos
Parr	1	1	28.7	5.5	108	28.7	5.4	111
		3				28.6	5.4	108
		6				28.6	5.4	108
	2	1	29.1	5.9	108	29.6	7.2	109
		2				29.3	6.4	109
		3				29.0	5.7	109
	3	1	28.6	5.5	108	28.8	5.9	107
		5				28.5	5.4	107
		10				28.5	5.1	107
Monticello	1	1	28.4	6.5	102	31.4	8.7	104
		8				28.1	5.9	102
		16				27.7	4.1	102
	2	1	28.3	6.5	102	31.1	8.0	103
		6				28.3	6.0	103
		13				27.9	5.3	103
	3	1	27.8	5.0	103	28.2	5.4	103
		5				27.9	5.0	103
		10				27.9	5.0	102
	4	1	32.9	5.5	103	34.1	5.7	104
		5				28.3	5.1	103
		10				27.8	3.6	103
	5	1	30.6	6.0	103	30.7	6.0	102
		4				29.9	5.9	103
		8				27.9	3.7	102

**Table 8. GPS Coordinates for all sampling locations on Monticello and Parr Reservoirs, Summer 2008.**

	Monticello		Parr Reservoir	
Electrofishing 1	N34°19'46.4"	W081°20'01.0" (start)	N34°18'05.1"	W081°20'15.8"(start)
	N34°19'35.3"	W081°20'01.7" (end)	N34°18'16.6"	W081°20'07.3"(end)
Electrofishing 2	N34°18'54.4"	W081°19'43.5" (start)	N34°17'05.0"	W081°21'26.2"(start)
	N34°18'36.0"	W081°19'38.5" (end)	N34°17'02.4"	W081°21'11.1"(end)
Electrofishing 3	N34°18'02.6"	W081°19'08.0" (start)	N34°16'12.9"	W081°20'09.6"(start)
	N34°18'00.6"	W081°18'56.9 (end)	N34°15'57.1"	W081°20'07.3"(end)
Electrofishing 4	N34°17'55.7"	W081°18'19.8" (start)		
	N34°17'49.3"	W081°18'15.1" (end)		
Electrofishing 5	N34°17'52.1"	W081°17'25.9" (start)		
	N34°18'01.7"	W081°17'24.5" (end)		
Gill Net 1	N34°19'42.7"	W081°19'55.9"	N34°18'08.7"	W081°20'14.6"
Gill Net 2	N34°18'50.8"	W081°19'41.0"	N34°17'02.2"	W081°21'26.9"
Gill Net 3	N34°18'05.6"	W081°19'06.9"	N34°16'04.1"	W081°20'12.8"
Gill Net 4	N34°17'51.9"	W081°18'14.8"		
Gill Net 5	N34°18'02.8"	W081°17'29.4"		
Hoopnet 1	N34°19'46.4"	W081°19'59.7"	N34°18'03.9"	W081°20'17.1"
Hoopnet 2	N34°18'52.9"	W081°19'42.5"	N34°17'02.2"	W081°21'29.5"
Hoopnet 3	N34°18'02.1"	W081°19'05.3"	N34°16'15.9"	W081°20'08.9"
Hoopnet 4	N34°17'51.5"	W081°18'16.3"		
Hoopnet 5	N34°17'53.8"	W081°17'28.3"		