

**Appendix C – Vital Signs Reservoir Fish Assemblage
Index (RFAI) Scores**

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Table C-1. Individual Metric Scores and the Overall RFAI Scores Downstream (TRM 390.0) and Upstream (TRM 393.0) of Bellefonte Nuclear Plant, Spring 2009

Spring 2009		TRM 390.0		TRM 393.0	
Metric	Gear Type	Obs	Score	Obs	Score
A. Species richness and composition					
1. Number of species		21 Species	3	26 Species	3
2. Number of centrarchid species (less micropterus)		6 Species Black Crappie Bluegill Green Sunfish Redbreast Sunfish Redear Sunfish Warmouth	5	6 Species Black Crappie Bluegill Longear Sunfish Redbreast Sunfish Redear Sunfish Warmouth	5
3. Number of benthic invertivore species		2 Species Freshwater drum Logperch	1	1 Species Freshwater drum	1
4. Number of intolerant species		0 Species	1	2 Species Skipjack Herring Longear Sunfish	1
5. Percent tolerant individuals	Electrofishing	72.7% Bluegill 51.5% Largemouth Bass 13.3% Spotfin Shiner 2.2% Gizzard Shad 2.0% Redbreast Sunfish 2.0% Bluntnose Minnow 1.1% Common Carp 0.4% Green Sunfish 0.2%	0.5	73.6 % Bluegill 54.5% Largemouth Bass 8.9% Gizzard Shad 3.4% Common Carp 3.2% Spotfin Shiner 2.8% Redbreast Sunfish 0.3% Western Mosquitofish 0.3% Bluntnose Minnow 0.1% Yellow Bullhead 0.1%	0.5
	Gill Netting	41.0% Longnose Gar 19.4% Common Carp 11.2% Largemouth Bass 5.2% Bluegill 4.5% Gizzard Shad 0.7%	0.5	17.2% Gizzard Shad 7.0% Longnose Gar 5.7% Common Carp 1.9% Largemouth Bass 1.4% Bluegill 0.6% Brown Bullhead 0.6%	1.5
6. Percent dominance by one species	Electrofishing	51.5% Bluegill	1.5	54.5% Bluegill	1.5
	Gill Netting	22.4% Yellow Bass	1.5	49.0% Yellow Bass	0.5
7. Percent non-native species	Electrofishing	12.4% Inland Silverside 11.6% Common Carp 0.4% Yellow Perch 0.4%	0.5	3.5% Common Carp 3.2% Yellow Perch 0.3%	0.5
	Gill Netting	11.2% Common Carp 11.2%	0.5	2.5% Common Carp 1.9% Grass Carp 0.6%	0.5

Table C-1 (Continued)

Spring 2009		TRM 390.0		TRM 393.0	
Metric	Gear Type	Obs	Score	Obs	Score
8. Number of top carnivore species		8 Species Black Crappie Flathead Catfish Largemouth Bass Longnose Gar Spotted Bass Spotted Gar White Bass Yellow Bass	5	9 Species Black Crappie Flathead Catfish Largemouth Bass Longnose Gar Skipjack Herring Spotted Bass Spotted Gar White Bass Yellow Bass	5
B. Trophic composition					
9. Percent top carnivores	Electrofishing	15.7% Largemouth Bass 13.2% Yellow Bass 1.5% Spotted Gar 0.6% Spotted Bass 0.4%	2.5	11.7% Largemouth Bass 8.9% Spotted Bass 1.4% Yellow Bass 1.0% White Bass 0.3% Black Crappie 0.1%	2.5
	Gill Netting	64.2% Yellow Bass 22.5% Longnose Gar 19.3% White Bass 6.1% Largemouth Bass 5.2% Spotted Bass 4.5% Black Crappie 3.6% Flathead Catfish 3.0%	2.5	73.9% Yellow Bass 49.0% Spotted Bass 8.4% Longnose Gar 5.7% White Bass 4.5% Flathead Catfish 2.5% Black Crappie 1.3% Largemouth Bass 1.3% Skipjack Herring 0.6% Spotted Gar 0.6%	2.5
10. Percent omnivores	Electrofishing	9.0% Channel Catfish 5.5% Gizzard Shad 2.0% Bluntnose Minnow 1.1% Common Carp 0.4%	2.5	12.3% Channel Catfish 5.4% Gizzard Shad 3.3% Common Carp 3.2% Bluntnose Minnow 0.1% Yellow Bullhead 0.1%	2.5
	Gill Netting	23.9% Common Carp 11.2% Blue Catfish 7.5% Channel Catfish 4.5% Gizzard Shad 0.7%	1.5	20.4% Blue Catfish 7.6% Gizzard Shad 7.0% Channel Catfish 3.2% Common Carp 1.9% Brown Bullhead 0.6%	1.5
C. Fish abundance and health					
11. Average number per run	Electrofishing	36.1	0.5	47.8	0.5
	Gill Netting	13.4	1.5	15.7	1.5
12. Percent anomalies	Electrofishing	4.1%	1.5	8.1%	0.5
	Gill Netting	0.0%	2.5	1.3%	2.5
Overall RFAI Score			35	34	
			Fair	Fair	

Table C-2. Individual Metric Scores and the Overall RFAI Scores Downstream (TRM 390.0) and Upstream (TRM 393.0) of Bellefonte Nuclear Plant, Summer 2009

Summer 2009		TRM 390.0		TRM 393.0	
Metric	Gear Type	Obs	Score	Obs	Score
A. Species richness and composition					
1. Number of species		20 Species	3	23 Species	3
2. Number of centrarchid species (less micropterus)		7 Species Black Crappie Bluegill Longear Sunfish Redbreast Sunfish Redear Sunfish Warmouth White Crappie	5	7 Species Black Crappie Bluegill Green Sunfish Longear Sunfish Redbreast Sunfish Redear Sunfish Warmouth	5
3. Number of benthic invertivore species		1 Species Freshwater drum	1	1 Species Freshwater drum	1
4. Number of intolerant species		1 Species Longear Sunfish	1	2 Species Skipjack Herring Longear Sunfish	1
5. Percent tolerant individuals	Electrofishing	59.7% Largemouth Bass 20.6% Bluegill 14.7% Western mosquitofish 10.0% Gizzard Shad 5.7% Spotfin Shiner 4.1% Golden Shiner 2.3% Common Carp 1.4% Redbreast Sunfish 0.6% White Crappie 0.3%	0.5	63.3 % Bluegill 22.2% Largemouth Bass 11.8% Gizzard Shad 11.7% Spotfin Shiner 8.9% Golden Shiner 7.4% Longnose Gar 0.7% Yellow bullhead 0.2% Redbreast Sunfish 0.2% Green Sunfish 0.2%	0.5
	Gill Netting	41.0% Longnose gar 14.0% Common Carp 13.0% Gizzard Shad 9.0% Largemouth Bass 3.0% Bluegill 2.0%	0.5	38.4% Longnose Gar 17.4% Gizzard Shad 10.5% Largemouth Bass 8.1% Common Carp 2.3%	0.5
6. Percent dominance by one species	Electrofishing	20.5% Largemouth Bass	2.5	25.4% Spotted Gar	2.5
	Gill Netting	17.0% Channel Catfish	1.5	26.7% Channel Catfish	1.5
7. Percent non-native species	Electrofishing	3.1% Inland Silverside 1.7% Common Carp 1.4%	0.5	2.0% Inland Silverside 2.0%	1.5
	Gill Netting	13.0% Common Carp 13.0%	0.5	3.5% Common Carp 2.3% Yellow Perch 1.2%	0.5

Table C-2 (Continued)

Summer 2009		TRM 390.0		TRM 393.0	
Metric	Gear Type	Obs	Score	Obs	Score
8. Number of top carnivore species		7 Species Black Crappie Flathead Catfish Largemouth Bass Longnose Gar Spotted Bass Spotted Gar White Crappie	3	8 Species Black Crappie Flathead Catfish Largemouth Bass Longnose Gar Spotted bass Skipjack Herring Spotted Gar Yellow Bass	5
B. Trophic composition					
9. Percent top carnivores	Electrofishing	42.0% Largemouth Bass 20.9% Spotted Gar 19.5% Black Crappie 0.8% Flathead Catfish 0.4% White Crappie 0.4%	2.5	38.5% Spotted Gar 25.4% Largemouth Bass 11.8% Longnose Gar 0.7% Black Crappie 0.4% Flathead Catfish 0.2%	2.5
	Gill Netting	45.0% Flathead Catfish 15.0% Longnose Gar 14.0% Spotted Bass 7.0% Spotted Gar 4.0% Largemouth Bass 3.0% Black Crappie 2.0%	2.5	48.8% Longnose Gar 17.4% Flathead Catfish 10.4% Spotted Bass 9.3% Largemouth Bass 8.1% Black Crappie 1.2% Skipjack Herring 1.2% Yellow Bass 1.2%	2.5
10. Percent omnivores	Electrofishing	12.6% Gizzard Shad 5.8% Channel Catfish 3.1% Golden Shiner 2.3% Common Carp 1.4%	2.5	20.5% Gizzard Shad 11.6% Golden Shiner 7.4% Channel Catfish 1.3% Yellow Bullhead 0.2%	2.5
	Gill Netting	41.0% Channel Catfish 17.0% Common Carp 13.0% Gizzard Shad 9.0% Blue Catfish 2.0%	0.5	41.9% Channel Catfish 26.7% Gizzard Shad 10.6% Blue Catfish 2.3% Common Carp 2.3%	0.5
C. Fish abundance and health					
11. Average number per run	Electrofishing	19.5	0.5	29.9	0.5
	Gill Netting	10.0	0.5	8.6	0.5
12. Percent anomalies	Electrofishing	2.4%	1.5	1.3%	2.5
	Gill Netting	6.0%	0.5	3.5%	1.5
Overall RFAI Score			30	35	
			Poor	Fair	

Table C-3. Comparison of RFAI Scores From Autumn Sampling Conducted During 1993-2008 as Part of the Vital Signs Monitoring Program in Guntersville Reservoir

Location	Site	1993	1994	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	Average
Inflow	TRM 424	36	46	42	34	28	---	46	42	---	38	---	34	38
Inflow	TRM 410	---	---	---	---	34	32	34	---	32	38	30	28	33
Inflow	TRM 405	---	---	---	---	38	40	32	---	36	34	32	24	35
Transition	TRM 375.2	42	35	38	32	41	---	34	33	---	36	---	37	36
Forebay	TRM 350	45	38	48	41	42	---	36	41	---	44	---	35	41

Downstream of BLN

Transition	TRM 390	Spring 2009	Summer 2009
		35	30

Upstream of BLN

Transition	TRM 393	Spring 2009	Summer 2009
		34	35

Note: Spring and summer 2009 RFAI scores from sites located upstream and downstream of BLN are also included for comparison. RFAI Scores: 12-21 (Very Poor); 22-31 (Poor); 32-40 (Fair); 41-50 (Good); or 51-60 (Excellent)

Table C-4. Individual Metric Ratings and Overall RBI Scores for Upstream and Downstream Sampling Sites Near Bellefonte Nuclear Plant, Guntersville Reservoir, Spring 2009

Spring 2009 Metric	Downstream TRM 389		Upstream TRM 393.7	
	Obs	Rating	Obs	Rating
1. Average number of taxa	10.4	5	8.3	3
2. Proportion of samples with long-lived organisms	1	5	0.9	5
3. Average number of EPT taxa	1	3	0.9	3
4. Average proportion of oligochaete individuals	12.7	3	9.1	5
5. Average proportion of total abundance comprised by the two most abundant taxa	76.5	3	76	3
6. Average density excluding chironomids and oligochaetes	250.9	1	214.1	1
7. Zero-samples - proportion of samples containing no organisms	0	5	0	5
Reservoir Benthic Index Score		25 Good		25 Good

Table C-5. Average Mean Density per Square Meter of Benthic Taxa Collected at Upstream and Downstream Sampling Sites Near Bellefonte Nuclear Plant, Guntersville Reservoir, Spring 2009

Taxa	Downstream TRM 389 Mean Density	Upstream TRM 393.7 Mean Density
Turbellaria		
Tricladida		
Planariidae		
Dugesia tigrina	2	2
Annelida		
Oligocheata		
Lumbriculidae	1	---
Naididae	2	---
Ophidonais serpentina	---	1
Tubificidae	112	111
Limnodrilus hoffmeisteri	14	2
Branchiura sowerbyi	---	1
Hirudinea		
Rhynchobdellida		
Glossiphoniidae		
Helobdella stagnalis	2	---
Crustacea		
Amphipoda		
Corophiidae		
Apocorophium lacustre	---	5
Crangonyctidae		
Crangonyx sp.	5	8
Gammaridae		
Gammarus sp.	31	63
Talitridae		
Hyalella azteca	---	2
Insecta		
Odonata		
Anisoptera		
Gomphidae		
Gomphus sp.	---	1
Libellulidae	---	1
Ephemeroptera		
Caenidae		
Caenis sp.	---	5
Ephemeridae		
Hexagenia limbata <10mm	8	1
Hexagenia limbata >10mm	101	47
Trichoptera		
Leptoceridae	3	1
Oecetis sp.	---	3

Table C-5. (Continued)

Taxa	Downstream TRM 389 Mean Density	Upstream TRM 393.7 Mean Density
Diptera		
Chironomidae		
Ablabesmyia annulata	9	3
Ablabesmyia rhamphe	---	1
Axarus sp.	---	3
Chironomus sp.	15	9
Coelotanypus sp.	233	64
Cricotopus sp.	---	1
Cryptochironomus sp.	3	5
Dicrotendipes neomodestus	2	1
Epoicocladius sp.	4	2
Paracladopelma sp.	4	2
Polypedilum halterale sp.	27	28
Procladius sp.	5	3
Stictochironomus cafrarius	124	77
Tanytarsus sp.	2	---
Coleoptera		
Elmidae		
Dubiraphia sp.	---	1
Hydrophilidae		
Berosus gp.	1	---
Mollusca		
Gastropoda		
Lymnophila		
Ancylidae		
Ferrissia rivularis	1	---
Mesogastropoda		
Hydrobiidae		
Amnicola sp.	---	1
Birgella subglobosa	2	1
Pleuroceridae		
Pleurocera canaliculata	3	16
Viviparidae		
Campeloma decisum	4	---
Bivalvia		
Veneroida		
Corbiculidae		
Corbicula fluminea <10 mm	15	29
Corbicula fluminea >10 mm	72	25
Sphaeriidae		
Pisidium sp.	---	2
Unionoida		
Unionidae		
Potamilus alatus	1	---
Density of organisms per m²	804	525
Number of samples	10	10
Total area sampled (m²)	1.05	1.1

Table C-6. Comparison of RBI Scores from Autumn Sampling Conducted During 1994-2008 as Part of the Vital Signs Monitoring Program in Guntersville Reservoir

Location	Site	1994	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	Average
Inflow	TRM 420	21	27	23	25	---	25	21	---	23	---	29	24
Inflow	TRM 408	---	---	---	23	21	21	---	19	29	25	27	24
Inflow	TRM 406.7	---	---	---	23	23	23	---	27	27	27	27	25
Transition	TRM 375.2	33	33	33	31	---	31	29	---	29	---	25	31
Forebay	TRM 350	27	35	35	23	---	25	35	---	23	---	17	28
Downstream of BLN													
Transition	TRM 389	Spring 2009											
		25											
Upstream of BLN													
Transition	TRM 393.7	Spring 2009											
		25											

Note: Spring 2009 RBI scores from sites located upstream and downstream of BLN are also included for comparison.
RBI Scores: 7-12 (Very Poor); 13-18 (Poor); 19-23 (Fair); 24-29 (Good); or 30-35 (Excellent)

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