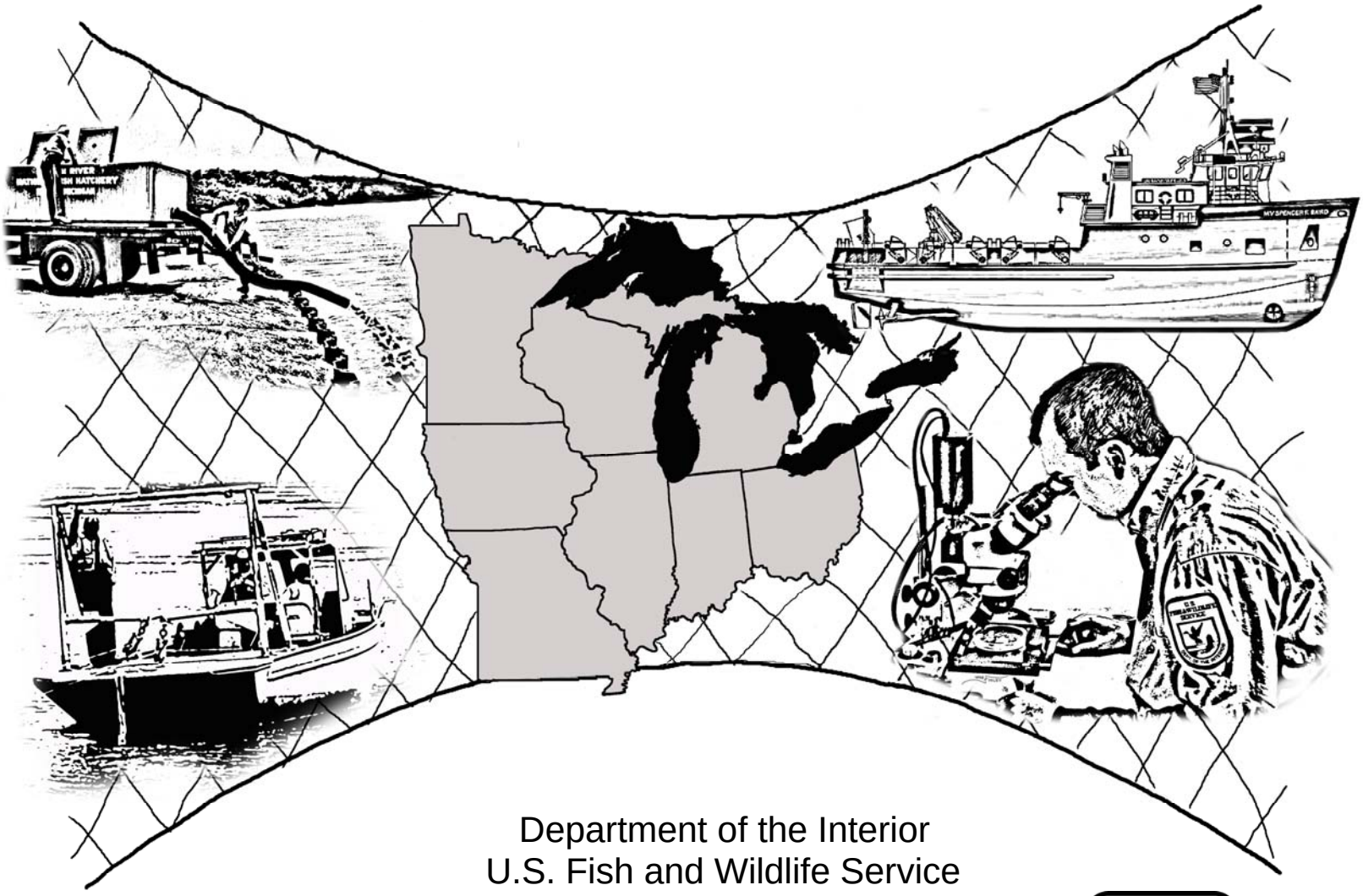
U.S. Fish & Wildlife Service

Region 3 Fisheries Data Series Report

FDS-2007-6

Fisheries Monitoring at Lock & Dam 22: March – May 2007



Department of the Interior
U.S. Fish and Wildlife Service
Great Lakes-Big Rivers Region
Carterville National Fish and Wildlife Conservation Office
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Abstract

We evaluated the spring season species composition of the fishery in the tailwater area of Lock and Dam 22 near Saverton, Illinois. We conducted five sampling trips between March 26 and May 25, 2007. Sampling methods during each trip consisted of deep-water electrofishing, gill netting, and trammel netting at each of three general sampling sites below the dam. Site 1 was the deep scour hole below and parallel to the spillway. Site 2 was the fast-flowing area below the last gate, along the drop-off on the left descending bank side of the river, and perpendicular to the dam. Site 3 was along the right descending bank, in the area below the public boat ramp that included a large eddy. Overall, we caught 2,686 fish representing 26 species, of which, 21 are classified as migratory. The most abundant species was shovelnose sturgeon (*Scaphirhynchus platorynchus*; N=1,648) which accounted for over 61% of the overall catch. Shovelnose sturgeon dominated Sites 1 and 2 with overall catches of 496 and 1,023 individuals, respectively. Fewer fish were captured at Site 3. The most abundant species were gizzard shad (*Dorosoma cepedianum*; N=167), shovelnose sturgeon (N=129), and freshwater drum (*Aplodinotus grunniens*; N=96). The Shannon-Wiener Index and Camargo's Eveness Index were calculated. Site 3 had significantly greater diversity than Site 2 (p=0.005) and significantly greater eveness than Site 1 (p=0.034) and Site 2 (p=0.002). However, Site 3 does not seem to be a likely candidate for any type of fish passage structure, because of its proximity to the lock. Conversely, the upper end of Site 2 would be an ideal site for fish passage. The upper end is in close proximity to the dam gates and thus may attract actively migrating fish more than Sites 1 or 3. Future work should include discussions of further data needs and additional sampling in 2008.

Introduction

The U.S. Army Corps of Engineers (USACE) Upper Mississippi River-Illinois Waterway System (UMR-IWW) Navigation Study was completed in September 2004 after more than 14 years of intensive study and evaluation of the navigation improvement and ecological restoration needs for the UMR-IWW system for the years 2000-2050. The final recommendation included a program of incremental implementation and comprehensive adaptive management to achieve the dual purposes of ensuring a sustainable natural ecosystem and navigation system. The program was initiated in 2005 as the working title of Upper Mississippi River (UMR) System Navigation and Ecosystem Sustainability Program (NESP; USACE 2006).

A series of 29 navigation locks and dams is used to manage water levels on 1,033 km of the northern reach of the UMR. Dams impose at least partial barriers to passage of the 143 indigenous fishes (Pitlo et al. 1995) in the UMR (Fremling et al. 1989). Improving upriver fish passage through the navigation dams is recognized as a way to manage the UMR toward a more sustainable river ecosystem (UMRCC 2001; Wilcox et al. 2004). An interdisciplinary and interagency Fish Passage Team was formed to study fish passage opportunities and alternatives at navigation dams on the UMR (Wilcox et al. 2004). The Fish Passage Team selected Lock and Dam 22 near Saverton, Missouri as the location for one of the first fish passage projects on the UMR navigation system.

This study was a follow-up to the initial fish monitoring work conducted by the Carterville National Fish and Wildlife Conservation Office (Carterville NFWCO) in 2005-06 (Caswell 2006). Our objective was to determine the spring season species composition of the fishery in known aggregation areas identified through hydroacoustics below Lock and Dam 22. This report is a synopsis of our findings from March through May 2007.

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Study Site

The study site for this project was the tailwater area of Lock and Dam 22 near Saverton, Missouri. Sampling sites for 2007 were the same as those identified by the USACE M/V Boyer in 2005-2006 (Caswell 2006). Site 1 was the deep scour hole below and parallel to the spillway (Figure 1). Site 2 was the area below the last gate, along the drop-off on the left descending bank side of the river, and perpendicular to the dam. This site included a small wing dike and its associated scour hole. In addition, a large eddy in the shallow area between the dam and Cottel Island created a current seam and complex flow patterns along the length of Site 2. Site 3 was along the right descending bank (RDB), generally in the area below the public boat ramp.

Methods

We made five 3-day sampling trips to Lock and Dam 22 between 26 March and 25 May 2007 to repeatedly sample sites 1-3. Sampling methods during each trip included deep-water electrofishing, gill netting, and trammel netting. We used a 5000-W, 3-phase AC generator (Multi-Quip Model GDP 5000H) wired to three 1.2-m x 6.0-cm diameter electrodes constructed from galvanized steel fence posts. A 12-V powered relay was used with a dual dead-man safety switch system. Wires running to the individual electrodes were 16-ga. multi-strand copper wire. Ropes were used to suspend the electrodes and attach the wires. A chase boat was used to retrieve fish that surfaced away from the electrofishing boat, and each boat had one person to net fish. Each site was electrofished once with the electrodes suspended at the approximate center of any fish concentrations visible on the boat's depth finder and once with the electrodes continuously on or near the substrate.

Nets used at Lock and Dam 22 included: 1) 5.1-cm bar mesh monofilament gill nets (45.7 m X 2.4 m), 2) experimental multifilament gill nets (30.5-m X 1.8 m), and 3) 8.9-cm bar mesh trammel nets (91.4 m X 3.0 m). Trammel nets were set independently and monofilament gill nets were set in tandem with the experimental multifilament gill nets. All nets were set on the bottom. One of each net type was set overnight at each site for two consecutive nights.

Fish captured at Lock and Dam 22 were identified to species and total length (TL) was measured to the nearest mm, except for sturgeons and paddlefish (*Polyodon spathula*), which were measured to fork length (FL) and eye-fork length (EFL), respectively. We constructed length-frequency histograms for the most abundant species at each site. We calculated the species richness, Shannon-Wiener Diversity Index, and Camargo's Evenness Index for each site sampled (Krebs 1999). A two-way analysis of variance (ANOVA) was used to test for temporal (trip) and spatial (site) variability of mean species diversity and eveness with no assumption of trip*site interaction. In addition, catch-per-unit-effort (CPUE) of the most abundant species, shovelnose sturgeon (*Scaphirhynchus platorynchus*), was compared between sites and trips using the same test. A Tukey test for all pairwise comparisons was used when the ANOVA revealed a significant difference. All statistical analyses were performed with SigmaStat software (Systat Software 2004). Statistical differences were predetermined at α=0.05. We would like to point out that these tests are for illustrative purposes only. They allow us to examine the observed differences between the sites, but repeated measurements through time, especially one or two weeks apart, are not independent observations and are not valid replicates.

The intent for the 2007 sampling was to survey the tailwater of Lock and Dam 22 before and after the river reached "open river" conditions. "Open river" is the stage at which the dam gates are opened and the river is then free-flowing. Unfortunately, open river conditions were well

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established before our first sampling trip and continued throughout much of the spring at Lock and Dam 22. As a result, sampling was conducted multiple times during open river conditions.

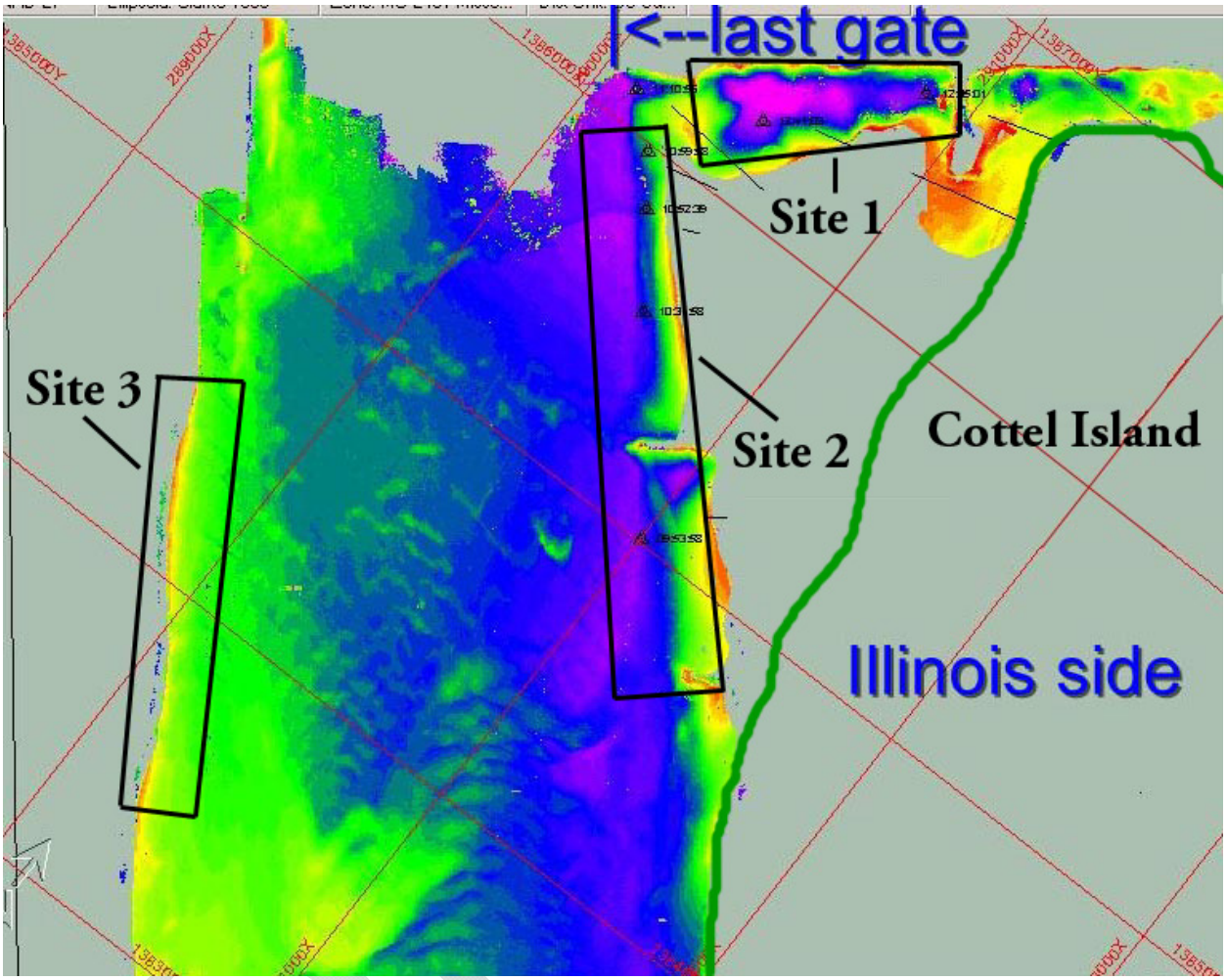

Figure 1.—Bathymetric map of the Lock and Dam 22 tailwater area showing sampling sites for deep-water electrofishing and netting from July 2005 to May 2006.

Results

We captured 2,686 fish representing 26 species during all 2007 sampling trips to Lock and Dam 22 combined (Table 1). The most abundant species was shovelnose sturgeon which accounted for over 61% of the overall catch (N=1,648). The next most abundant species were gizzard shad (*Dorosoma cepedianum*; N=278) and freshwater drum (*Aplodinotus grunniens*; N=138). The overall catch at Lock and Dam 22 included 21 of the 37 species defined as migratory by Wilcox et al. (2004).

Electrofishing accounted for less than 11% of the overall catch with 285 individuals from 15 species (Table 2). We expended 7.31 h of electrofishing effort with 3.51 h at midwater and 3.80 h on the bottom. This resulted in an overall electrofishing CPUE of 39 fish/h. The most abundant fishes in the overall electrofishing sample were gizzard shad (N=80), freshwater drum (N=69), and channel catfish (*Ictalurus punctatus*; N=60). Netting yielded 2,401 fish from 26 species with a CPUE of 2.4 fish/h. Shovelnose sturgeon (N=1,648) and gizzard shad (N=198) were the most abundant species captured with the nets.

We captured 21 species in Site 1 including 496 shovelnose sturgeon, 22 paddlefish, and 19 lake sturgeon (*Acipenser fulvescens;* Table 3). Shovelnose sturgeon accounted for nearly 65% of the overall catch (N = 768), and gizzard shad (N = 64) accounted for about 8% of the catch. Of the 37 Upper Mississippi River "migratory" species identified by Wilcox et al. (2004), we caught 16 in this site. With the exception of shovelnose sturgeon and gizzard shad, however, these species were represented by few individuals. The shovelnose sturgeon length range was 250 mm – 809 mm fork length (Figure 2). Gizzard shad ranged from 252 mm to 407 mm (Figure 3).

Sampling in Site 2 during March – May 2007 resulted in the capture of 1,215 fish from 22 species including seven lake sturgeon, 20 paddlefish, and 1,023 shovelnose sturgeon (Table 4). Shovelnose sturgeon accounted for 84% of the overall catch at Site 2. Similar to Site 1, the next most abundant species was gizzard shad (N = 47). Seventeen of the 22 species we captured at this site were classified as migratory (Wilcox et al. 2004). Shovelnose sturgeon exhibited a length range similar to that observed at Site 1 (Figure 4).

We captured fewer fish at Site 3 (N = 703) than we did at Sites 1 and 2 (Table 5). However, species richness was greatest (S = 25) in the Site 3 sample. The most abundant species were gizzard shad (N = 167), shovelnose sturgeon (N = 129), and freshwater drum (N = 96). Of the 25 species captured in this site, 21 were migratory (Wilcox et al. 2004). Length ranges for the abundant species were similar to ranges observed at the other sampling sites (Figures 5-7). The freshwater drum exhibited at least two obvious age classes in its length-frequency histogram.

The Shannon-Wiener Diversity Index and Camargo's Evenness Index were plotted through time for the three sites we sampled at Lock and Dam 22 (Figures 8-9). With the exception of trip two for both indices and trip five for diversity, the three sites are clearly separated. Site 2 had the lowest diversity and evenness while Site 3 had the highest. The ANOVA showed significant differences between sites for both diversity ($F = 10.661$; $p = 0.006$) and evenness ($F = 14.312$; $p = 0.002$). Tukey tests showed that Site 3 had significantly greater diversity than Site 2 ($p = 0.005$) and significantly greater evenness than Site 1 ($p = 0.034$) and Site 2 ($p = 0.002$). The ANOVA did not show significant differences between trips across sites for diversity ($F = 0.840$; $p = 0.537$) or evenness ($F = 3.387$; $p = 0.067$). The CPUE of shovelnose sturgeon was also plotted through time (Figure 10). ANOVA revealed a significant difference between the sites ($F = 16.928$; $p = 0.001$). Tukey tests showed that Site 2 had a significantly higher catch rate than Site 1 ($p = 0.012$) and Site 3 ($p = 0.001$).

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Table 1.—Totals and species of fish captured at Lock and Dam 22 during March – May 2007. Asterisks denote migratory species as defined in Wilcox et al. (2004).

Species	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Total
Bighead carp, *Hypophthalmichthys nobilis**	8	1		2	3	14
Bigmouth buffalo, *Ictiobus cyprinellus**					1	1
Blue catfish, *Ictalurus furcatus**			2	13	21	36
Blue sucker, *Cycleptus elongatus**		1			4	5
Channel catfish, *Ictalurus punctatus**	9	38	3	4	11	65
Common carp, *Cyprinus carpio*	15	11	8	4	13	51
Flathead catfish, *Pylodictis olivaris**	1	1	3	6	7	18
Freshwater drum, *Aplodinotus grunniens**	14	49	34	18	23	138
Gizzard shad, *Dorosoma cepedianum*	20	178	68	12		278
Goldeye, *Hiodon alosoides**	1		1			2
Hybrid striped bass, *Morone saxatilis* x *chrysops*	10	13	8	3	1	35
Lake sturgeon, *Acipenser fulvescens**	24	4	11	6	9	54
Longnose gar *Lepisosteus osseus**		1	3	5		9
Mooneye, *Hiodon tergisus**	1		5	1		7
Paddlefish, *Polydon spathula**	7	26	8	5	2	48
Quillback, *Carpoides cyprinus**	3	16	5		4	28
River carpsucker, *Carpoides carpio*	4	4	17	8	9	42
Sauger, *Sander canadensis**	18		2	1	5	26
Shorthead redhorse, *Moxostoma macrolepidotum**	2		1	1	1	5
Shortnose gar *Lepisosteus platostomus*	19	15	3	8	1	46
Shovelnose sturgeon, *Scaphirhynchus platorynchus**	304	214	364	185	581	1648
Silver carp, *Hypophthalmichthys molitrix**	1	4	6	9	1	21
Skipjack herring, *Alosa chrysochloris**		1				1
Smallmouth buffalo, *Ictiobus bubalus**	7	30	11	14	4	66
Walleye, *Sander vitreum**	1	1			2	4
White bass, *Morone chrysops**	14	17	7			38
Total	483	625	570	305	703	2686

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Table 2.—Totals and species of fish captured with electrofishing (EF), and netting at Lock and Dam 22 during March – May 2007. Asterisks denote migratory species as defined in Wilcox et al. (2004).

Species	Bottom EF	Mid EF	Total EF	Gill	Trammel	Total Nets	Total
Bighead carp, *Hypophthalmichthys nobilis**					14	14	14
Bigmouth buffalo, *Ictiobus cyprinellus**					1	1	1
Blue catfish, *Ictalurus furcatus**	6	2	8	1	27	28	36
Blue sucker, *Cycleptus elongatus**				5		5	5
Channel catfish, *Ictalurus punctatus**	55	5	60	5		5	65
Common carp, *Cyprinus carpio*				4	47	51	51
Flathead catfish, *Pylodictis olivaris**	5		5	2	11	13	18
Freshwater drum, *Aplodinotus grunniens**	66	3	69	48	21	69	138
Gizzard shad, *Dorosoma cepedianum*	3	77	80	196	2	198	278
Goldeye, *Hiodon alosoides**				2		2	2
Hybrid striped bass, *Morone saxatilis* x *chrysops*		1	1	2	32	34	35
Lake sturgeon, *Acipenser fulvescens**	2	1	3	42	9	51	54
Longnose gar *Lepisosteus osseus**				9		9	9
Mooneye, *Hiodon tergisus**		4	4	2	1	3	7
Paddlefish, *Polydon spathula**		2	2	7	39	46	48
Quillback, *Carpoides cyprinus**	17	5	22	4	2	6	28
River carpsucker, *Carpoides carpio*	11	4	15	25	2	27	42
Sauger, *Sander canadensis**				22	4	26	26
Shorthead redhorse, *Moxostoma macrolepidotum**				3	2	5	5
Shortnose gar *Lepisosteus platostomus*				45	1	46	46
Shovelnose sturgeon, *Scaphirhynchus platorynchus**				1464	184	1648	1648
Silver carp, *Hypophthalmichthys molitrix**		2	2		19	19	21
Skipjack herring, *Alosa chrysochloris**				1		1	1
Smallmouth buffalo, *Ictiobus bubalus**	4		4	6	56	62	66
Walleye, *Sander vitreum**	1	1	2	2		2	4
White bass, *Morone chrysops**	4	4	8	29	1	30	38
Total	174	111	285	1926	475	2401	2686

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Table 3.—Totals and species of fish captured at Site 1 below Lock and Dam 22 during March – May 2007. Asterisks denote migratory species as defined in Wilcox et al. (2004).

Species	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Total
Bighead carp, *Hypophthalmichthys nobilis**	1					1
Bigmouth buffalo, *Ictiobus cyprinellus**						
Blue catfish, *Ictalurus furcatus**				3	1	4
Blue sucker, *Cycleptus elongatus**					3	3
Channel catfish, *Ictalurus punctatus**		34	1	1		36
Common carp, *Cyprinus carpio*	4	5	5	3	2	19
Flathead catfish, *Pylodictis olivaris**	1			4		5
Freshwater drum, *Aplodinotus grunniens**	2	7	13	5	1	28
Gizzard shad, *Dorosoma cepedianum*		46	12	6		64
Goldeye, *Hiodon alosoides**						
Hybrid striped bass, *Morone saxatilis* x *chrysops*		5		2		7
Lake sturgeon, *Acipenser fulvescens**	7		9	2	1	19
Longnose gar *Lepisosteus osseus**						
Mooneye, *Hiodon tergisus**						
Paddlefish, *Polydon spathula**	4	8	4	5	1	22
Quillback, *Carpoides cyprinus**	1	1				2
River carpsucker, *Carpoides carpio*	2	1		1		4
Sauger, *Sander canadensis**	1		1	1		3
Shorthead redhorse, *Moxostoma macrolepidotum**	1					1
Shortnose gar *Lepisosteus platostomus*	6	1		1		8
Shovelnose sturgeon, *Scaphirhynchus platorynchus**	110	58	163	32	133	496
Silver carp, *Hypophthalmichthys molitrix**		1		1		2
Skipjack herring, *Alosa chrysochloris**		1				1
Smallmouth buffalo, *Ictiobus bubalus**	3	20	6	8		37
Walleye, *Sander vitreum**						
White bass, *Morone chrysops**	2	3	1			6
Total	145	191	215	75	142	768

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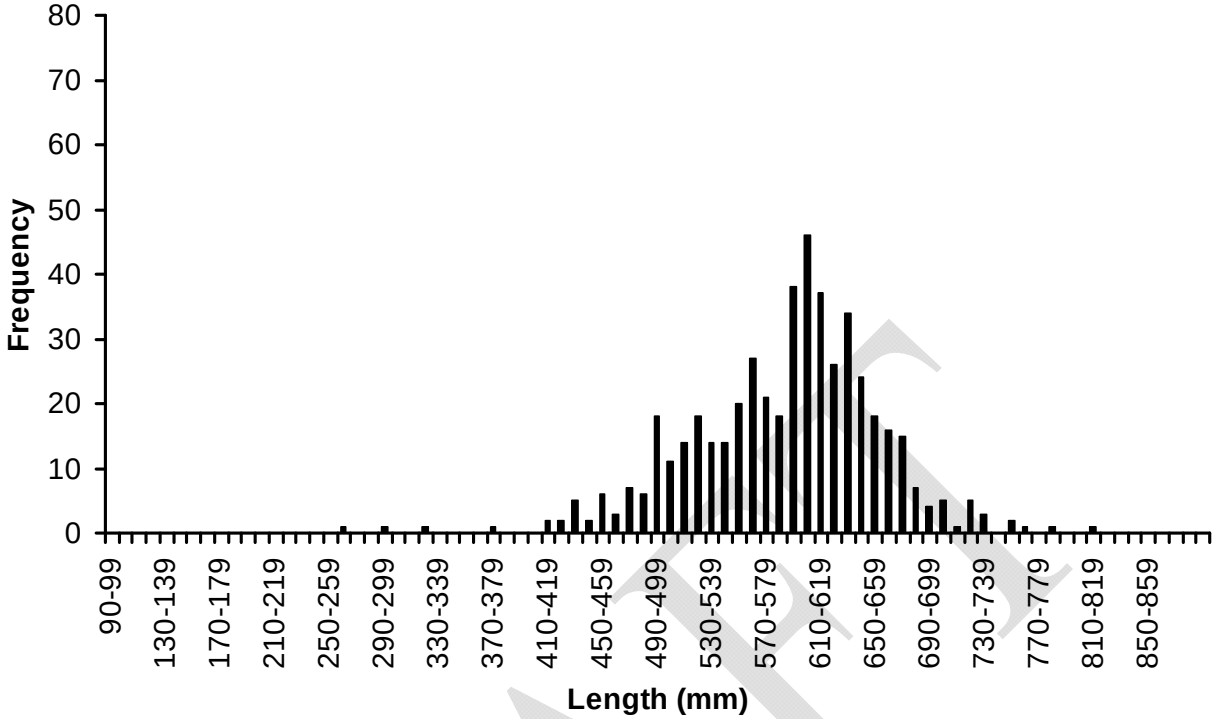

Figure 2.—Length-frequency distribution for shovelnose sturgeon (*Scaphirhynchus platorynchus*; N = 496) captured at Site 1 below Lock and Dam 22 during March – May 2007.

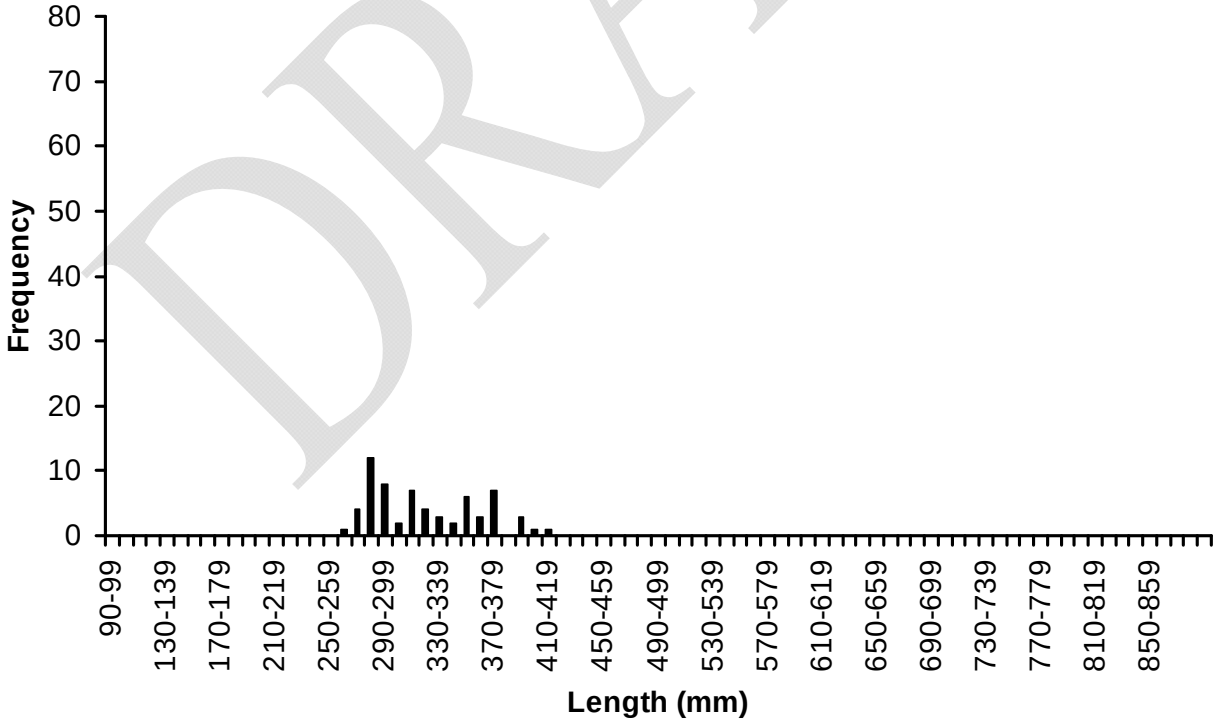

Figure 3.—Length-frequency distribution for gizzard shad (*Dorosoma cepedianum*; N = 64) captured at Site 1 below Lock and Dam 22 during March – May 2007.

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Table 4.—Totals and species of fish captured at Site 2 below Lock and Dam 22 during March – May 2007. Asterisks denote migratory species as defined in Wilcox et al. (2004).

Species	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Total
Bighead carp, *Hypophthalmichthys nobilis**	1				2	3
Bigmouth buffalo, *Ictiobus cyprinellus**						
Blue catfish, *Ictalurus furcatus**				4	16	20
Blue sucker, *Cycleptus elongatus**		1				1
Channel catfish, *Ictalurus punctatus**	3	4	2			9
Common carp, *Cyprinus carpio*					7	7
Flathead catfish, *Pylodictis olivaris**		1	2	1	5	9
Freshwater drum, *Aplodinotus grunniens**		6	2	5	1	14
Gizzard shad, *Dorosoma cepedianum*	2	36	9			47
Goldeye, *Hiodon alosoides**						
Hybrid striped bass, *Morone saxatilis* x *chrysops*		2				2
Lake sturgeon, *Acipenser fulvescens**		1	1	1	4	7
Longnose gar *Lepisosteus osseus**		1				1
Mooneye, *Hiodon tergisus**			1			1
Paddlefish, *Polydon spathula**		18	2			20
Quillback, *Carpoides cyprinus**		2	3		2	7
River carpsucker, *Carpoides carpio*	1	3	11			15
Sauger, *Sander canadensis**	2					2
Shorthead redhorse, *Moxostoma macrolepidotum**			1	1		2
Shortnose gar *Lepisosteus platostomus*	2					2
Shovelnose sturgeon, *Scaphirhynchus platorynchus**	137	153	177	149	407	1023
Silver carp, *Hypophthalmichthys molitrix**			2		1	3
Skipjack herring, *Alosa chrysochloris**						
Smallmouth buffalo, *Ictiobus bubalus**	1	9	5		2	17
Walleye, *Sander vitreum**						
White bass, *Morone chrysops**	1	2				3
Total	150	239	218	161	447	1215

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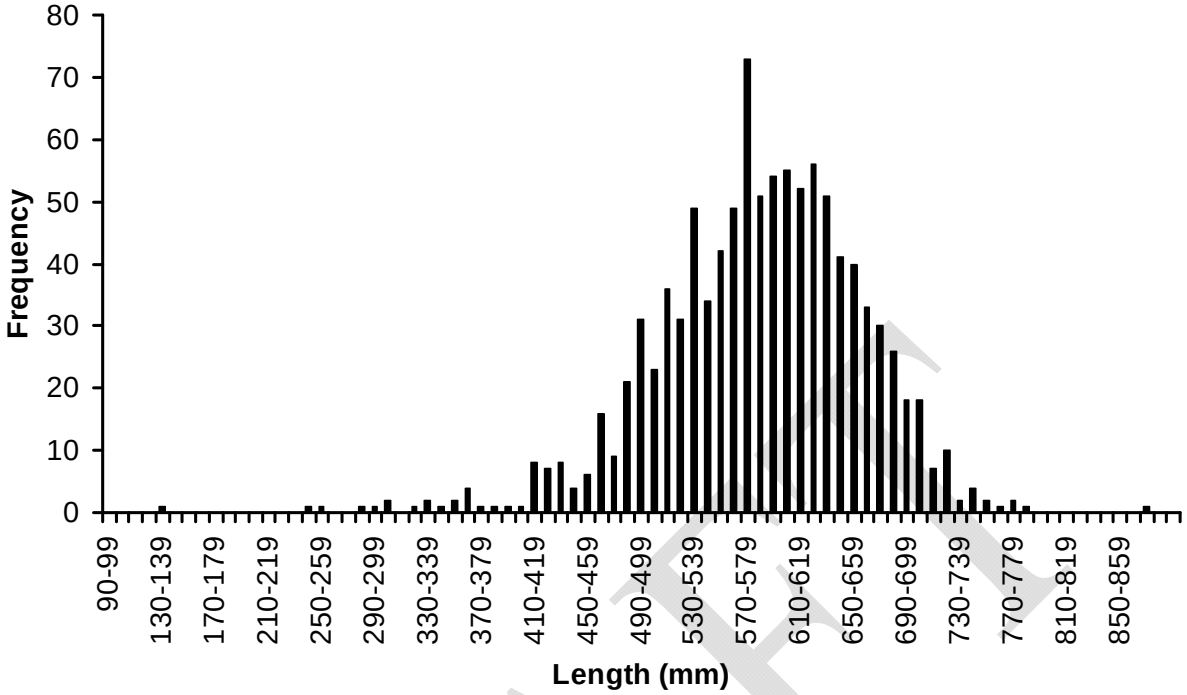

Figure 4.—Length-frequency distribution for shovelnose sturgeon (*Scaphirhynchus platorynchus*; N = 1,023) captured at Site 2 below Lock and Dam 22 during March – May 2007.

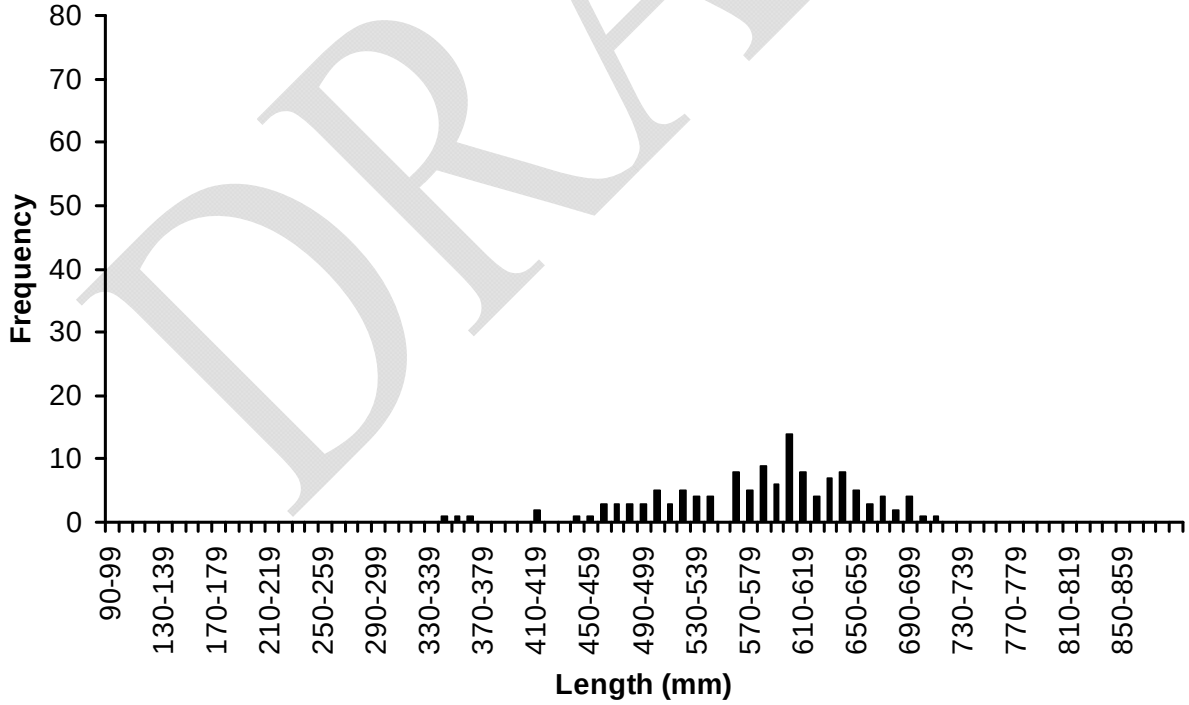

Figure 5.—Length-frequency distribution for shovelnose sturgeon (*Scaphirhynchus platorynchus*; N = 129) captured at Site 3 below Lock and Dam 22 during March – May 2007.

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Table 5.—Totals and species of fish captured at Site 3 below Lock and Dam 22 during March – May 2007. Asterisks denote migratory species as defined in Wilcox et al. (2004).

Species	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Total
Bighead carp, *Hypophthalmichthys nobilis**	6	1		2	1	10
Bigmouth buffalo, *Ictiobus cyprinellus**					1	1
Blue catfish, *Ictalurus furcatus**			2	6	4	12
Blue sucker, *Cycleptus elongatus**					1	1
Channel catfish, *Ictalurus punctatus**	6			3	11	20
Common carp, *Cyprinus carpio*	11	6	3	1	4	25
Flathead catfish, *Pylodictis olivaris**			1	1	2	4
Freshwater drum, *Aplodinotus grunniens**	12	36	19	8	21	96
Gizzard shad, *Dorosoma cepedianum*	18	96	47	6		167
Goldeye, *Hiodon alosoides**	1		1			2
Hybrid striped bass, *Morone saxatilis* x *chrysops*	10	6	8	1	1	26
Lake sturgeon, *Acipenser fulvescens**	17	3	1	3	4	28
Longnose gar *Lepisosteus osseus**			3	5		8
Mooneye, *Hiodon tergisus**	1		4	1		6
Paddlefish, *Polydon spathula**	3		2		1	6
Quillback, *Carpoides cyprinus**	2	13	2		2	19
River carpsucker, *Carpoides carpio*	1		6	7	9	23
Sauger, *Sander canadensis**	15		1		5	21
Shorthead redhorse, *Moxostoma macrolepidotum**	1				1	2
Shortnose gar *Lepisosteus platostomus*	11	14	3	7	1	36
Shovelnose sturgeon, *Scaphirhynchus platorynchus**	57	3	24	4	41	129
Silver carp, *Hypophthalmichthys molitrix**	1	3	4	8		16
Skipjack herring, *Alosa chrysochloris**						
Smallmouth buffalo, *Ictiobus bubalus**	3	1		6	2	12
Walleye, *Sander vitreum**	1	1			2	4
White bass, *Morone chrysops**	11	12	6			29
Total	188	195	137	69	114	703

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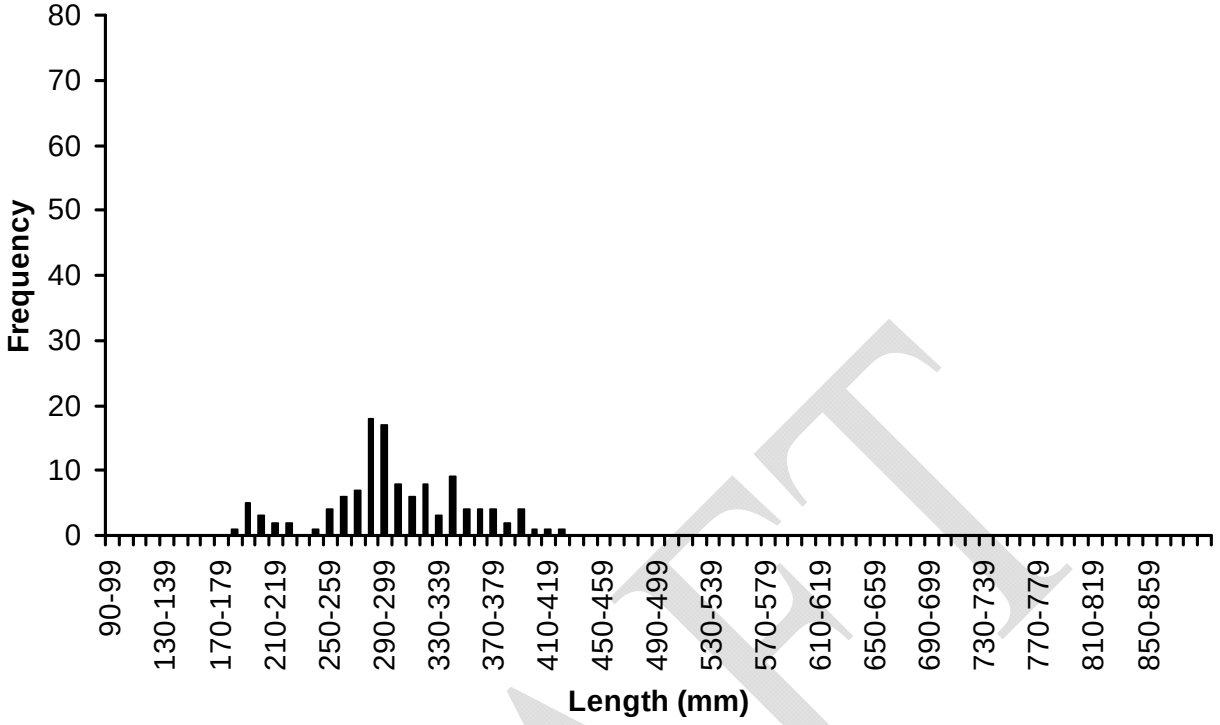

Figure 6.—Length-frequency distribution for gizzard shad (*Dorosoma cepedianum*; N = 167) captured at Site 3 below Lock and Dam 22 during March – May 2007.

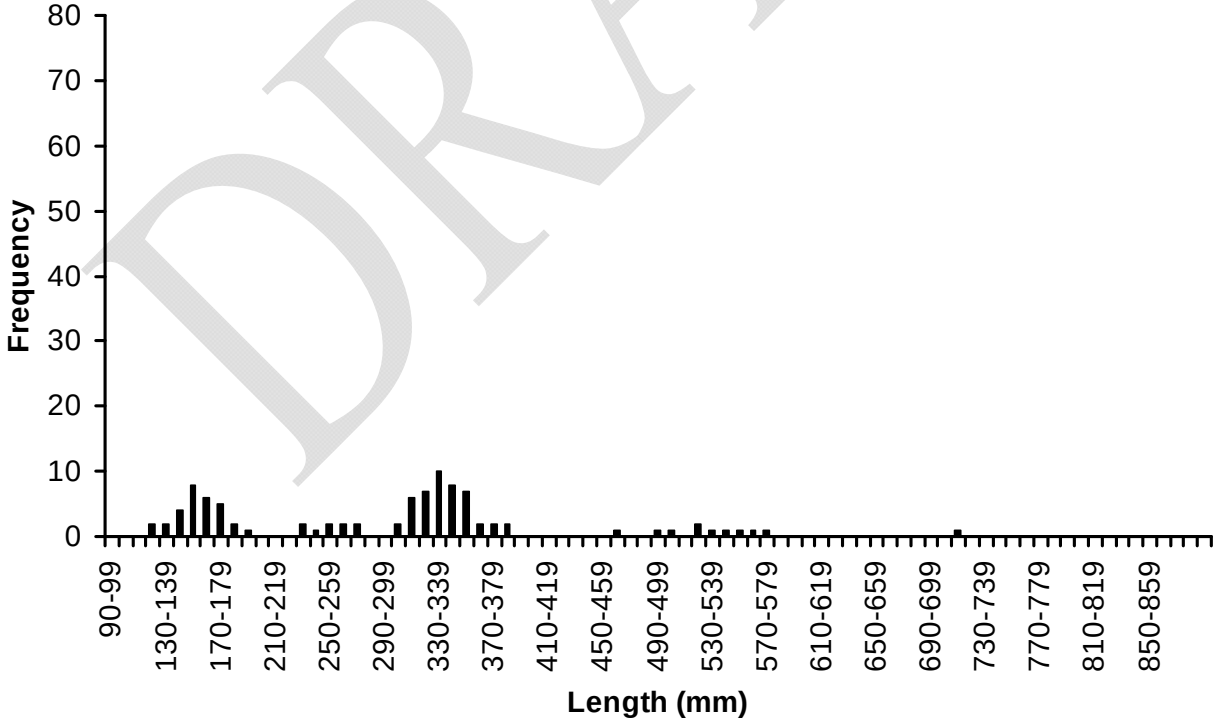

Figure 7.—Length-frequency distribution for freshwater drum (*Aplodinotus grunniens*; N = 96) captured at Site 3 below Lock and Dam 22 during March – May 2007.

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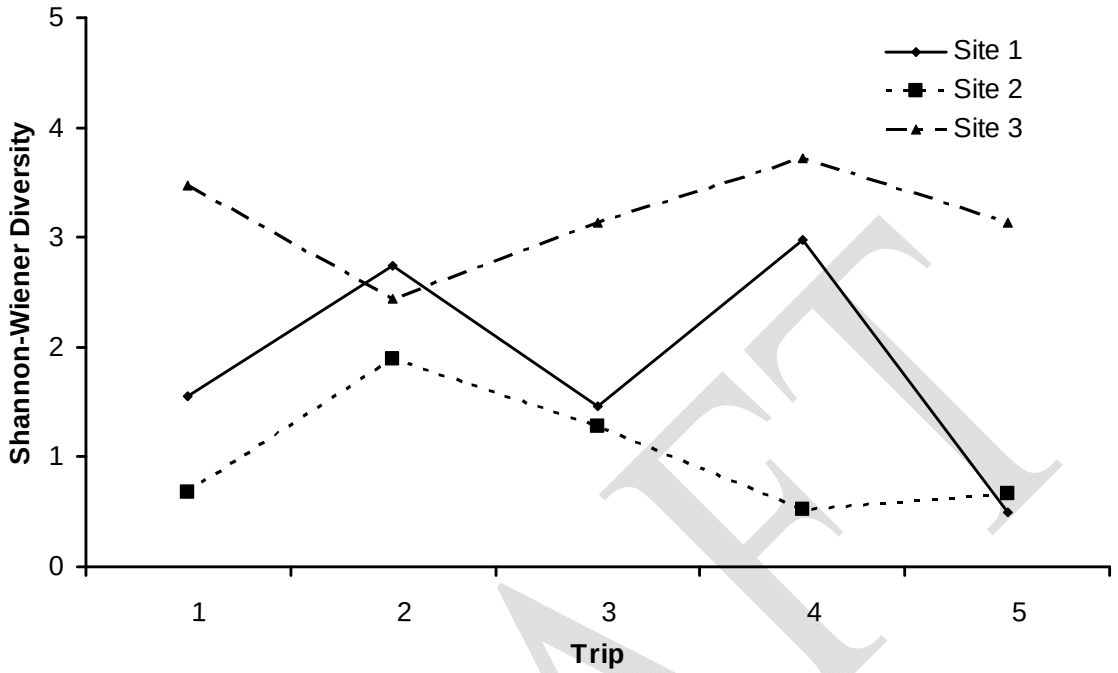

Figure 8.—Shannon-Wiener Diversity Index (Krebs 1999) for the three sites sampled below Lock and Dam 22 during March – May 2007.

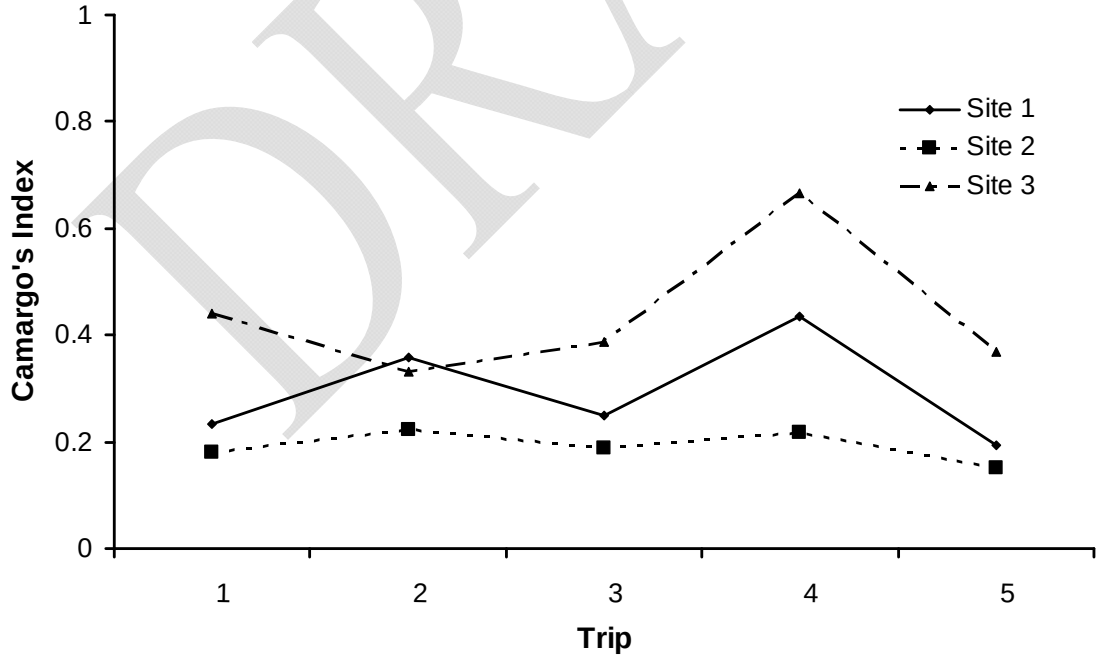

Figure 9.—Camargo's Evenness Index (Krebs 1999) for the three sites sampled below Lock and Dam 22 during March – May 2007.

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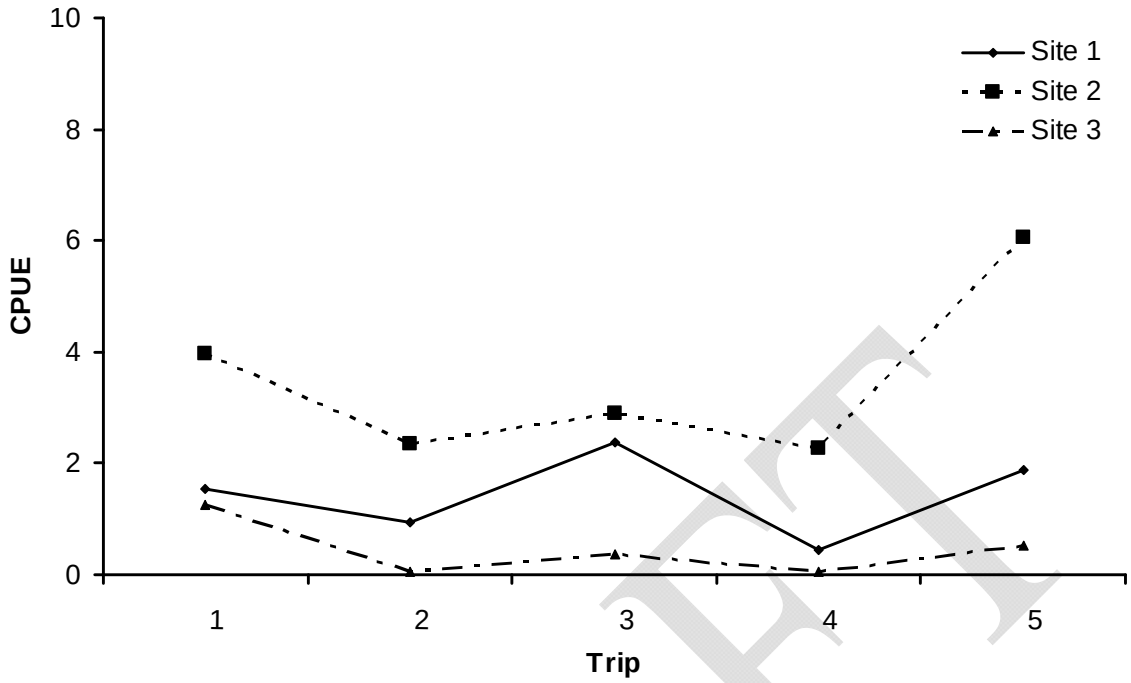

Figure 10.—Catch-per-unit-effort (CPUE) of shovelnose sturgeon for the three sites sampled below Lock and Dam 22 during March – May 2007.

Discussion and Recommendations

Catch distributions at Lock and Dam 22 during 2007 were similar to previous sampling in 2005-06 (Caswell 2006). Our effort through the spring of 2007 was more intensive than in previous samples, and we caught more species in greater numbers. However, like the previous samples, the most abundant species at any given site were shovelnose sturgeon, gizzard shad, and freshwater drum. Perhaps the most interesting facet of the overall 2007 sample was the diversity and evenness of the catch at Site 3. Unlike Sites 1 and 2, Site 3 did not have a single species (e.g., shovelnose sturgeon) that repeatedly dominated the catch for each trip. Rather, the data show that the species richness at Site 3 was higher than the other sites, and the catch was more evenly distributed across species. Nearly 62% of the species captured at Site 1 were represented by fewer than 10 individuals. We saw an even greater proportion (68%) of rare species at Site 2. However, only 36% of the species captured at Site 3 had less than 10 individuals in the overall sample.

Our findings at Site 3 are somewhat contradictory to our findings from 2005-06 (Caswell 2006). We did not recommend Site 3 for any type of fish passage structure because it did not appear to attract numbers of the species that would most likely be the targets of such a structure. Although this is still true for species such as shovelnose sturgeon, our 2007 results indicate that this site is more diverse and has a more even species distribution than we previously thought. Unfortunately, the scheduled lock expansion will change the characteristics of this site to such an extent that assisted fish lockage has already been screened out of the fish passage planning.

Like our recommendations from 2005-06, we believe that the upper end of Site 2 would be ideal for a fish passage structure, but given its proximity to Site 2, the west end of Site 1 would be suitable as well. Current plans for fish passage structures at Lock and Dam 22 require that the scour hole in Site 1 be at least partially filled in. This allows for the entrance to the structure to

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be located near the last gate on the dam. Although part of Site 1 would be lost as a result, we do not feel that this would have a substantial negative effect on the fish community below Lock and Dam 22. We feel that the entrance to any fish passage structure needs to be close to the dam gates in order to attract fish, and we feel that the drop-off below the last gate may serve as a natural guide for fish migrating upriver.

We believe we have good information on what fishes are using the tailwater at Lock and Dam 22 during the spring season. We feel that within the limitations of our gear and sampling periods, we have learned what we can about fish in aggregation areas below this dam. We are uncertain whether or not additional sampling in the same places with the same effort will provide significant new information in 2008. We suggest that the Fish Passage Team discuss what additional information needs to be collected in 2008 to provide the most benefit to this project and subsequent projects.

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