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Impacts of Spawning Habitat Manipulations on Largemouth Bass Year-Class Production in Meldahl Pool, Ohio River

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Final Report

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Abstract

The presences or absence of critical spawning habitats has been shown to impact spawning success and population numbers. Meldahl Pool of the Ohio River has little structure available and much of the substrate is not conducive to successful spawning. Supplemental spawning structures were deployed in two embayments to increase the amount of available spawning habitat for black bass. Nocturnal electrofishing was conducted in the spring and fall from 2003-2010 to assess the impacts of these structures on the black bass population, and they were found to have no noticeable effect on black bass populations. It is likely that other factors, such as flow and siltation, are the predominant limiting factors that negatively impact spawning success of black bass in Meldahl Pool of the Ohio River.

Introduction

Black bass *Micropterus spp.* are among the most popular sport fishes pursued by recreational anglers across the United States (USFW and USCB 2011). Because of this popularity and rising fishing pressure, efforts on understanding the ecology and management of black bass have increased. Black bass make up an important part of the sport fishery in Kentucky. Hale et al. (1992) found that 51% of anglers questioned in a statewide survey fished regularly for black bass, and that 80% of anglers considered black bass one of the top three species to fish for. Black bass are traditionally thought of as lacustrine species, but nearly 50% of Kentucky anglers fished for black bass in the state's large rivers (Hale et al. 1992).

In November 1997, the Kentucky Department of Fish and Wildlife Resources' (KDFWR) staff met with anglers dissatisfied with the black bass fishery in the Meldahl Pool of the Ohio River. Historical electrofishing data indicated that a poor largemouth bass population existed in the Meldahl Pool in comparison with other pools of the Ohio River.

Habitat requirements of largemouth bass have been the focus of many previous studies (Breder 1936; Aggus and Elliott 1975; Eipper 1975; Heidinger 1975; Nack et al. 1993). The presence or absence of critical habitats during different life stages, especially the first year of life, likely restricts populations (Kramer and Smith 1962; Eipper 1975; Durocher et al. 1984; Miranda et al. 1984). Spawning largemouth bass generally associate with firm substrates such as gravel and cobble often located adjacent to other structures (i.e., rocks, stumps, logs [Kramer and Smith 1962; Miller and Kramer 1971; Vogele and Rainwater 1975; Nack et al. 1993; Hunt 1995]). Pearson and Krumholz (1984) documented the importance of embayments for successful spawning of black bass in the Ohio River. Unfortunately, embayments in the Meldahl Pool have filled with silts from erosion within the watershed and very little structure still exists (D. Henley, personal comm.). Central to the sustainability of black bass populations is the recruitment of young-of-year (YOY) fish into the population. Electrofishing surveys performed by KDFWR indicate that year-class production of largemouth bass may be limited by the lack of suitable spawning habitat.

The addition of artificial habitat to aid largemouth bass spawning has been well documented (Allan and Romero 1975; Vogele and Rainwater 1975; Johnson and Stein 1979; Hoff 1991; Hunt 1995; Annett et al. 1996; Hunt and Annett 2002). Positive results (increased spawning success and increased population numbers) would indicate that year-class production of largemouth bass in the Meldahl Pool

of the Ohio River may be improved by the addition of artificial spawning habitat. The objective of this study was to determine if the addition of artificial spawning structures could enhance the reproductive potential of largemouth bass in the Meldahl Pool of the Ohio River and improve YOY largemouth bass year-class contributions to the fishery.

Study Area

The Ohio River extends along the entire 664-mile northern border of Kentucky, and drains 39,210 mi^2 of the state. The Kentucky portion of the Ohio River is comprised of 8 high-lift dams and 2 wicket dams that form a series of pools and tailwaters along the river. The Meldahl Pool runs from Ohio River Mile (ORM) 341 to ORM 436 (95 mi), with a surface area of 170,469 acres. Four embayments in the Meldahl Pool were sampled; Bracken Creek (ORM 426) and Big Snag Creek (ORM 436) were used as study sites with spawning structures added, and Big Turtle Creek (ORM 429) and Big Locust Creek (ORM 433) were used as control sites with no spawning structures added.

Methods

Supplemental spawning structures (SSS) were added to Bracken Creek and Big Snag Creek beginning in 2004 and were maintained annually through 2010 (Figure 1). Additionally, Christmas tree units (2 trees, 1 cinder block) were added near SSS to provide cover for YOY fish, and silt meters were placed in each embayment to record the level of siltation that occurred annually (Table 1). All SSS were removed from each experimental embayment prior to spring sampling in 2010 to evaluate the effect of spawning habitat loss. During the early spring of each year, each SSS was located and manually cleaned of silt. Following a high water even in 2008, the structures had to be cleared of silt a second time (Figure 2). Silt meters were deployed in all embayments in spring 2004-2008 to record siltation depth.

Nocturnal electrofishing, hereafter referred to as catch rates or catch-per-unit-effort (CPUE), (four 15-minute transects per embayment) was conducted in the spring and fall of 2003 to gather preliminary, base-line data from all four embayments in the Meldahl Pool to document largemouth bass population structure before the addition of SSS. After the installation of SSS, nocturnal electrofishing (four 15-minute transects per embayment) was conducted each spring and fall from 2004 to 2010. All black bass collected were measured to the nearest 0.1 in and weighed to the nearest 0.01 pound. Otoliths were taken from up to 10 fish per inch class in spring 2004-2006 and in fall 2001-2005 in order to assess age and growth of largemouth bass in the Meldahl Pool.

Results

Silt meters recorded siltation depth during the spring from 2004-2008. Average depth between experimental and control embayments was similar with mean siltation depth in experimental embayments being 3.8 in and 3.9 in in control embayments; however, there was variation within embayments across years (Table 2). The largest variations in siltation throughout the study occurred in Big Locust Creek (3.0 – 7.2 in) and Bracken Creek (2.8 – 7.5 in), while variations were considerably less in Big Snag Creek (2.1 – 2.8 in) and Big Turtle Creek (2.1 – 4.2 in).

A total of 138 hr of electrofishing effort was expended during spring 2003-2010 in the four embayments (Table 3). Largemouth bass dominated the catch in both control and experimental embayments throughout the study. Mean CPUE of largemouth bass in all embayments from 2003-2010 was 38.2 fish/hr compared to just 6.5 fish/hr for spotted bass. Trends in CPUE data for largemouth bass data were consistent in all embayments throughout the study period and were the highest for each embayment in 2008 (43.0 – 84.0 fish/hr). Mean CPUE of largemouth bass in control embayments (33.9 fish/hr) was higher than mean CPUE in experimental embayments (26.2 fish/hr). Spotted bass followed that same trend. Mean CPUE of spotted bass in control embayments was 12.4 fish/hr compared to 5.1 fish/hr in experimental embayments. No consistent trends were seen in either largemouth bass or spotted bass abundance following the removal of the SSS from the experimental embayments in 2010. Catch rates of largemouth bass declined in Big Snag Creek (8.0 fish/hr), but remained the same in Bracken Creek (30.0 fish/hr). Catch rates of spotted bass following the removal of SSS in experimental embayments decreased in Big Snag Creek (2.0 fish/hr) and increased slightly in Bracken Creek (1.0 fish/hr).

Spring electrofishing CPUE of <8.0, 8.0 – 11.9, 12.0 – 14.9, and ≥15 in largemouth bass was compared between embayments (Table 4). Mean CPUE of <8.0 in largemouth bass for experimental embayments was 5.1 fish/hr and was slightly higher that mean CPUE in control embayments (4.5 fish/hr). Catch rates varied in all embayments throughout the study but followed the same general trends. Catch rates of <8.0 in largemouth bass peaked in 2008 for all embayments, while 2009 and 2010 yielded catch rates that were below average in each embayment. Mean CPUE of 8.0 – 11.9 in fish was 10.2 fish/hr in experimental embayments and 14.2 fish/hr in control embayments, and catch rates in all embayments decreased with the removal of SSS in 2010. Mean CPUE of 12.0 – 14.9 in fish was 8.5 fish/hr in experimental embayments and 11.2 fish/hr in control embayments and decreased in all embayments except Big Turtle Creek with the removal of SSS in 2010. Catch rates of largemouth bass

over 15 in varied greatly in and among embayments throughout the study, but mean catch rates were similar. Mean CPUE of largemouth bass ≥ 15 in in experimental embayments was 2.6 fish/hr and 4.0 fish/hr in control embayments.

Spring electrofishing CPUE of <7.0, 7.0 – 10.9, 11.0 – 13.9, and ≥14 in spotted bass were also evaluated (Table 5). Mean CPUE of spotted bass <7 in was 1.1 fish/hr in experimental embayments and 3.8 fish/hr in control embayments and fluctuated greatly in all embayments throughout the study. Catch rates of 7.0 – 10.9 in spotted bass in averaged 2.8 fish/hr in experimental embayments and 6.0 fish/hr in control embayments with consistently higher catch rates for all embayments occurring in 2006. Mean catch rates of 11.0 – 13.9 fish/hr was 0.9 fish/hr in experimental embayments and 2.2 fish/hr in control embayments. For spotted bass ≥14 in, mean CPUE in experimental embayments was 0.3 fish/hr and 0.4 fish/hr in control embayments. All length classes that were evaluated yielded catch rates of 0.0 fish/hr in multiple years within each embayment.

Age frequency for largemouth bass was determined for each embayment from spring bass data (Table 6). Mean CPUE of all ages except for age-7 and age-10 largemouth bass were greater in control embayments than in experimental embayments. Age-1 catch rates were low in all embayments in 2004 and 2009, indicating poor survival from the 2003 and 2008 year classes. Age frequency of spotted bass was also examined from spring bass data and followed trends similar to largemouth bass (Table 7). Mean CPUE of spotted bass of all ages were greater in control embayments than in experimental embayments, and poor year class survival from 2003 and 2008 were evident from no age-1 spotted bass captured in 2004 and below average catch rates in 2009.

A total of 104 hr of electrofishing effort was expended during fall 2003-2010 (Table 8). Fall sampling in 2006 was not conducted due to dangerously high river levels. Largemouth bass were the predominate black bass species in all four embayments throughout the study. Mean CPUE of largemouth bass in all embayments from 2003-2010 was 37.3 fish/hr, while mean CPUE of spotted bass was just 6.8 fish/hr. Mean CPUE of largemouth bass in control embayments (41.5 fish/hr) was higher than mean CPUE in experimental embayments (33.1 fish/hr). Spotted bass followed that same trend. Mean CPUE of spotted bass in control embayments was 16.3fish/hr compared to 6.6 fish/hr in experimental embayments. No negative effects on CPUE of largemouth bass or spotted bass were seen with the removal of SSS in 2010. All embayments displayed increased catch rates from 2009 when SSS were still in place.

Fall electrofishing CPUE of <8.0, 8.0 – 11.9, 12.0 – 14.9, and ≥15 in largemouth bass were compared between embayments (Table 9). Mean CPUE of largemouth bass <8.0 in in experimental embayments (12.9 fish/hr) was higher than in control embayments (8.2 fish/hr). Catch rates for <8.0 in largemouth bass increased in 2010 after SSS were removed in all but one embayment, Big Snag Creek (experimental embayment). For all other length classes evaluated, mean CPUE of control embayments was higher than experimental embayments. The removal of SSS in 2010 showed no consistent effects on CPUE of other length classes.

Fall electrofishing CPUE of <7.0, 7.0 – 10.9, 11.0 – 13.9, and ≥14 in spotted bass were also evaluated (Table 10). Mean CPUE for all length classes of spotted bass were higher in control embayments than in experimental embayments. Similar to largemouth bass, catch rates for <7.0 in spotted bass increased from 2009 to 2010 after SSS were removed in all embayments. Catch rates of other length classes had mixed results with the removal of SSS.

Electrofishing CPUE for black bass by age-classes for fall 2003-2010 are compared in (Tables 11 and 12). Mean CPUE of age-0 largemouth bass in experimental embayments (11.0 fish/hr) was slightly higher than in control embayments (9.2 fish/hr); however, catch rates of age-1, age-2, and age-3 fish were all higher in control embayments. Mean CPUE of age-4 largemouth bass were similar across all embayments. Age-0 catch rates were below average in all embayments in 2003 and 2008 indicating poor year classes. Conversely, CPUE of age-0 largemouth bass were consistently above average in 2005 and 2007. Age frequency of spotted bass was also examined from fall data. Mean CPUE of all age classes examined were higher in control embayments than in experimental embayments. No age-0 spotted bass were sampled in any embayments in 2003 and were only captured in control embayments in 2008 (still below average). As with largemouth bass this is indicative of weak year classes in 2003 and 2008.

Discussion

Multiple studies have shown that the addition of bass spawning habitat can increase spawning success and overall population numbers (Allan and Romero 1975; Vogele and Rainwater 1975; Johnson and Stein 1979; Hoff 1991; Hunt 1995; Annett et al. 1996; Hunt and Annett 2002); however, results from the Meldahl Pool of the Ohio River were contrary. Noticeable increases in CPUE of black bass in experimental embayments were not observed after the deployment of SSS. Often times, spring and fall CPUE was higher in control embayments with no added structure than in experimental embayments in

any given year. Additionally, the removal of SSS prior to 2010 sampling did not have any noticeable effects on catch rates of black bass in experimental embays as both spring and fall CPUE was higher in 2010 than in 2009.

The lack of success shown by the addition of SSS likely indicates that the availability of suitable spawning habitat is not the main limiting factor to reproductive success of black bass in Meldahl Pool. Additional factors such as flow, flood pulse length, siltation, and dissolved oxygen all likely play a role in the spawning success of largemouth and spotted bass in Meldahl Pool. Of particular interest in this study is flow and the timing of high-flow events. Poor catch rates of age-0 black bass in the fall and age-1 bass the following spring indicate that 2003 and 2008 were poor year classes for black bass. Above average spring river flow and an extended flood pulse were observed in both years. In 2005 and 2007 below average spring flows were observed on the Ohio River, and catch rates of age-0 black bass were far above average in all embayments during those years. Bettoli and Maceina (1998) found that largemouth bass year class strength was inversely related to late spring discharge on the Tennessee River. Weaker year classes were associated with high flow events after spawning, while stronger year classes were associated with prolonged periods of low water. Conversely, Raibley et al. (2011) found that an extended flood pulse provided stronger year classes on the Illinois River. Spawning success was associated with prolonged inundation of floodplain habitat that was more conducive to spawning than many of the river's backwater lakes. Inundation of the floodplain of Meldahl Pool does not provide the habitat as described by Raibley et al. (2001), and spawning success was generally lower when spring flow was higher.

Increased siltation as a result of high spring flows may also play a factor in poor year classes. Negative effects of siltation on spawning have been documented for multiple species (Kemp et al. 2011). Spawning largemouth bass generally associate with firm substrates such as gravel and cobble (Kramer and Smith 1962; Miller and Kramer 1971; Vogele and Rainwater 1975; Nack et al. 1993; Hunt 1995). Increased siltation in the Meldahl Pool of the Ohio River likely rendered portions of spawning substrate in embayment unusable or lead to an unsuccessful hatch. Although, a relation between increased siltation levels and high spring flows was not directly observed in this study, no siltation levels less than 2.1 in were recorded from 2004-2008. Siltation in all years was sufficient enough to have a possible negative impact on spawning success.

The addition of artificial spawning structures has been used to increase year class production in other systems (Breder 1936; Aggus and Elliott 1975; Eipper 1975; Heidinger 1975 Nack et al. 1993). Data

from 2003-2010 indicates that the addition of SSS in Meldahl Pool of the Ohio River did not have the desired effect, and their application in large river systems to improve year class strength appears to have little if any merit. We believe that black bass year class production (i.e., spawning) in the Ohio River is the first issue that limits abundance. To combat this, the Department has begun stocking fingerling (2 in) largemouth bass in the Markland and Meldahl Pools of the Ohio River. Stockings occur in June and likely avoid many of the problems caused by high spring flows and siltation. Preliminary results indicate strong survival and bolstered year classes due to departmental stockings. Although a more in depth investigation of environmental impacts on spawning success may be needed, it is possible that flow and increased siltation are the limiting factors of spawning success in Meldahl Pool.

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Table 1. Summary of habitat activities in experimental study embayments in the Meldahl Pool of the Ohio River from 2004 - 2010.

Site	Year	No. of Supplemental Spawning Structures Added (Maintained)	No. of Trees Added
Big Snag Creek	2004	55 (55)	44
	2005	48 (103)	51
	2006	0 (65)	80
	2007	0 (65)	70
	2008	0 (64)	44
	2009	0 (63)	64
	2010	0 (0)	96
Bracken Creek	2004	50 (50)	78
	2005	48 (98)	68
	2006	0 (85)	104
	2007	0 (80)	90
	2008	0 (70)	52
	2009	0 (73)	56
	2010	0 (0)	80

Table 2. Summary of silt recording in embayments of Meldahl Pool of the Ohio River spring 2004 - 2008.

Experimental		Siltation Depth (in)
Big Snag Creek	2004	2.1
	2005	3.2
	2006	2.3
	2007	2.8
	2008	2.8
	Mean	2.6
Bracken Creek	2004	7.5
	2005	3.6
	2006	2.8
	2007	5
	2008	5.8
	Mean	4.9
Overal	Mean	3.8
Control		
Big Locust Creek	2004	
	2005	7.2
	2006	3
	2007	3.9
	2008	4.3
	Mean	4.6
Big Turtle Creek	2004	
	2005	4.2
	2006	2.1
	2007	3.3
	2008	3.3
	Mean	3.2
Overall	Mean	3.9

Table 3. Electrofishing effort and CPUE (fish/hr) of black bass collected from Meldahl Pool embayments of the Ohio River in spring 2003 - 2010. Standard errors are in parentheses.

Experimental	Year	No. of transects	Effort (hr)	No. of largemouth bass	CPUE	No. of spotted bass	CPUE
Big Snag Creek	2003	8	2.0	47	23.5 (7.0)	16	8.0
	2004	4	1.0	13	13.0 (3.8)	1	1.0 (1.0)
	2005	4	1.0	25	16.7 (6.0)	4	2.7 (1.7)
	2006	4	1.0	23	23.0 (10.3)	22	22.0 (15.5)
	2007	4	1.0	30	30.0 (11.1)	19	19.0 (6.6)
	2008	4	1.0	43	43.0 (17.4)	6	6.0 (3.8)
	2009	4	1.0	17	17.0 (6.2)	10	10.0 (3.8)
	2010	4	1.0	8	8.0 (6.7)	2	2.0 (2.0)
	Total	36	9.0	206		80	
	Mean				21.8 (3.9)		8.8 (2.8)
Bracken Creek	2003	8	2.0	57	28.5 (7.1)	5	7.5
	2004	4	1.0	11	11.0 (4.4)	0	0.0
	2005	4	1.0	35	20.0 (4.1)	1	0.6 (0.6)
	2006	4	1.0	27	27.0 (3.0)	1	1.0 (1.0)
	2007	4	1.0	39	39.0 (9.6)	0	0.0
	2008	4	1.0	64	64.0 (4.3)	0	0.0
	2009	4	1.0	30	30.0 (2.6)	0	0.0
	2010	4	1.0	30	30.0 (9.4)	1	1.0 (1.0)
	Total	36	9.0	293		8	
	Mean				31.2 (5.5)		1.3 (0.9)
Overall	Total	72	18.0	499		88	
	Mean				26.2 (3.5)		5.1 (1.7)
Control							
Big Locust Creek	2003	8	2.0	84	42.0	38	19.0
	2004	4	1.0	14	14.0 (6.2)	9	9.0 (4.1)
	2005	4	1.0	26	11.6 (2.4)	7	3.1 (1.5)
	2006	4	1.0	21	21.0 (9.6)	21	21.0 (13.3)
	2007	8	2.0	13	6.5 (2.3)	17	8.5 (2.3)
	2008	4	1.0	50	50.0 (16.9)	41	41.0 (6.6)
	2009	4	1.0	23	23.0 (8.1)	28	28.0 (7.1)
	2010	4	1.0	8	8.0 (4.0)	11	11.0 (3.4)
	Total	40	10.0	239		172	
	Mean				22.0 (5.7)		17.6 (4.4)
Big Turtle Creek	2003	6	1.5	87	58.0	24	16.0
	2004	2	0.5	12	24.0 (12.0)	1	2.0 (2.0)
	2005	3	0.8	28	14.0 (2.3)	6	3.0 (2.0)
	2006	3	0.8	45	60.0 (18.0)	10	13.3 (9.6)
	2007	3	0.8	30	40.0 (10.6)	7	9.3 (7.4)
	2008	3	0.8	63	84.0 (10.1)	1	1.3 (1.3)
	2009	3	0.8	41	54.7 (21.0)	10	13.3 (7.4)
	2010	3	0.8	24	32.0 (2.3)	0	0.0
	Total	26	6.8	330		59	
	Mean				45.8 (8.0)		7.3 (2.3)
Overall	Total	66	16.8	569		231	
	Mean				33.9 (5.7)		12.4 (2.7)

Table 4. Catch-per-unit-effort (fish/hr) estimates for four size classes of largemouth bass from Meldahl Pool embayments in the Ohio River in spring 2003 - 2010. Standard errors are in parentheses.

			Size Group				
Location	Treatment	Year	<8 in	8-11.9 in	12-14.9 in	≥15.0	Total
Big Snag Creek	Experimental	2003	4.0 (1.1)	8.0 (1.3)	9.5 (1.4)	2.0 (0.6)	23.5 (7.0)
		2004	1.0 (1.0)	5.0 (1.3)	5.0 (1.4)	2.0 (1.0)	13.0 (3.8)
		2005	4.0 (3.3)	2.7 (2.7)	7.3 (4.1)	2.7 (2.7)	16.7 (6.0)
		2006	5.0 (3.1)	7.0 (5.0)	7.0 (4.5)	4.0 (2.9)	23.0 (10.3)
		2007	2.0 (1.2)	20.0 (13.8)	8.0 (6.9)	0.0 (0.0)	30.0 (11.1)
		2008	18.0 (10.2)	15.0 (9.1)	7.0 (3.8)	3.0 (1.9)	43.0 (17.4)
		2009	0.0 (0.0)	9.0 (5.4)	8.0 (4.5)	0.0 (0.0)	17.0 (6.2)
		2010	0.0 (0.0)	0.0 (0.0)	6.0 (4.9)	2.0 (2.0)	8.0 (6.7)
		Mean	4.3 (2.1)	8.3 (2.3)	7.5 (0.5)	2.0 (0.5)	21.8 (3.9)
Bracken Creek	Experimental	2003	7.5 (1.3)	6.0 (1.1)	13.5 (1.9)	1.5 (0.6)	28.5 (7.1)
		2004	4.0 (2.8)	4.0 (1.2)	3.0 (1.0)	0.0 (0.0)	11.0 (4.4)
		2005	8.0 (3.4)	6.9 (4.9)	3.4 (2.3)	1.7 (1.3)	20.0 (4.1)
		2006	9.0 (4.2)	11.0 (5.0)	6.0 (2.9)	1.0 (1.0)	27.0 (3.0)
		2007	3.0 (2.9)	18.0 (11.7)	15.0 (8.6)	2.0 (2.0)	39.0 (9.6)
		2008	10.0 (5.6)	22.0 (8.0)	21.0 (9.6)	11.0 (4.6)	64.0 (4.3)
		2009	2.0 (2.0)	17.0 (5.5)	6.0 (4.1)	5.0 (3.0)	30.0 (2.6)
		2010	4.0 (4.0)	11.0 (6.9)	11.0 (5.2)	4.0 (2.9)	30.0 (9.5)
		Mean	5.9 (1.1)	12.0 (2.3)	9.9 (2.3)	3.3 (1.2)	31.2 (5.5)
Overall	Experimental	Mean	5.1 (1.1)	10.2 (1.6)	8.5 (1.2)	2.6 (0.7)	26.2 (3.5)
Big Locust Creek	Control	2003	11.0 (1.6)	17.0 (1.4)	12.0 (1.3)	2.0 (0.8)	42.0 (9.7)
		2004	1.0 (1.0)	10.0 (1.7)	2.0 (2.0)	1.0 (1.0)	14.0 (6.2)
		2005	1.3 (1.0)	1.8 (1.5)	8.4 (3.7)	0.0 (0.0)	11.6 (2.4)
		2006	4.0 (2.9)	10.0 (5.9)	5.0 (3.9)	2.0 (2.0)	21.0 (9.6)
		2007	0.0 (0.0)	5.0 (2.7)	1.5 (0.7)	0.0 (0.0)	6.5 (2.3)
		2008	14.0 (6.7)	20.0 (9.3)	9.0 (4.8)	7.0 (6.2)	50.0 (16.9)
		2009	1.0 (1.0)	11.0 (5.8)	6.0 (2.6)	5.0 (5.0)	23.0 (8.1)
		2010	1.0 (1.0)	2.0 (2.0)	3.0 (1.9)	2.0 (2.0)	8.0 (4.0)
		Mean	4.2 (1.9)	9.6 (2.3)	5.9 (1.3)	2.4 (0.9)	22.0 (5.7)
Big Turtle Creek	Control	2003	12.0 (2.4)	27.3 (2.3)	14.7 (1.9)	4.0 (0.4)	58.0 (7.7)
		2004	2.0 (2.0)	12.0 (2.0)	6.0 (2.0)	4.0 (2.0)	24.0 (12.0)
		2005	1.0 (1.0)	4.0 (2.1)	7.0 (3.2)	2.0 (1.2)	14.0 (2.3)
		2006	4.0 (4.0)	28.0 (7.6)	20.0 (13.7)	8.0 (4.6)	60.0 (18.0)
		2007	1.3 (1.3)	12.0 (5.0)	20.0 (10.7)	6.7 (5.3)	40.0 (10.6)
		2008	16.0 (8.8)	28.0 (18.9)	32.0 (6.3)	8.0 (8.0)	84.0 (10.1)
		2009	2.7 (2.7)	29.3 (15.2)	17.3 (10.2)	5.3 (3.6)	54.7 (21.0)
		2010	0.0 (0.0)	9.3 (5.0)	16.0 (6.7)	6.7 (6.7)	32.0 (2.3)
		Mean	4.9 (2.1)	18.7 (3.7)	16.6 (2.9)	5.6 (0.8)	45.8 (8.0)
Overall	Control	Mean	4.5 (1.4)	14.2 (2.4)	11.2 (2.1)	4.0 (0.7)	33.9 (5.7)

Table 5. Catch-per-unit-effort (fish/hr) estimates for four size classes of spotted bass from Meldahl Pool embayments in the Ohio River in spring 2003 - 2010. Standard errors are in parentheses.

			Size Group				
Location	Treatment		<7 in	7-10.9 in	11-13.9 in	≥14.0 in	Total
Big Snag Creek	Experimental	2003	4.0 (0.7)	2.5 (0.5)	1.5 (0.6)	0.0 (0.0)	8.0 (2.3)
		2004	0.0 (0.0)	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	1.0 (1.0)
		2005	0.0 (0.0)	2.0 (2.0)	0.7 (0.7)	0.0 (0.0)	2.7 (1.7)
		2006	8.0 (5.1)	12.0 (9.5)	2.0 (2.0)	0.0 (0.0)	22.0 (15.5)
		2007	1.0 (1.0)	12.0 (6.3)	3.0 (2.2)	3.0 (3.0)	19.0 (6.6)
		2008	0.0 (0.0)	1.0 (1.0)	4.0 (3.2)	1.0 (1.0)	6.0 (3.8)
		2009	0.0 (0.0)	9.0 (5.7)	1.0 (1.0)	0.0 (0.0)	10.0 (3.8)
		2010	1.0 (1.0)	1.0(1.0)	0.0 (0.0)	0.0 (0.0)	2.0 (2.0)
		Mean	1.8 (1.0)	5.1 (1.8)	1.5 (0.5)	0.5 (0.4)	8.8 (2.8)
Bracken Creek	Experimental	2003	2.0 (0.7)	3.0 (0.8)	2.0 (0.6)	0.5 (0.5)	7.5 (3.3)
		2004	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2005	0.6 (0.6)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.6 (0.6)
		2006	0.0 (0.0)	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	1.0 (1.0)
		2007	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2008	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2009	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2010	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1.0 (1.0)
		Mean	0.5 (0.3)	0.5 (0.4)	0.3 (0.3)	0.1 (0.1)	1.3 (0.9)
Overall	Experimental	Mean	1.1 (0.5)	2.8 (1.1)	0.9 (0.3)	0.3 (0.2)	5.1 (1.7)
Big Locust Creek	Control	2003	8.0 (1.1)	9.0 (1.3)	1.0 (1.0)	0.0 (0.0)	19.0 (6.9)
		2004	4.0 (1.3)	4.0 (2.0)	1.0 (1.0)	0.0 (0.0)	9.0 (4.1)
		2005	0.4 (0.4)	2.7 (2.3)	0.0 (0.0)	0.0 (0.0)	3.1 (1.5)
		2006	8.0 (5.9)	13.0 (9.7)	0.0 (0.0)	0.0 (0.0)	21.0 (13.3)
		2007	0.5 (0.5)	6.5 (3.7)	1.5 (1.2)	0.0 (0.0)	8.5 (2.3)
		2008	18.0 (11.0)	7.0 (3.0)	14.0 (8.3)	2.0 (2.0)	41.0 (6.6)
		2009	0.0 (0.0)	22.0 (13.4)	5.0 (3.3)	1.0 (1.0)	28.0 (7.1)
		2010	5.0 (3.9)	6.0 (5.2)	0.0 (0.0)	0.0 (0.0)	11.0 (3.4)
		Mean	5.5 (2.1)	8.8 (2.2)	2.8 (1.7)	0.4 (0.3)	17.6 (4.4)
Big Turtle Creek	Control	2003	12.0 (1.4)	2.7 (1.0)	1.3 (0.7)	0.0 (0.0)	16.0 (2.9)
		2004	0.0 (0.0)	2.0 (2.0)	0.0 (0.0)	0.0 (0.0)	2.0 (2.0)
		2005	1.0 (0.7)	2.0 (2.0)	0.0 (0.0)	0.0 (0.0)	3.0 (2.0)
		2006	4.0 (2.7)	6.7 (6.7)	0.0 (0.0)	2.7 (2.7)	13.3 (9.6)
		2007	0.0 (0.0)	5.3 (5.3)	4.0 (4.0)	0.0 (0.0)	9.3 (7.4)
		2008	0.0 (0.0)	0.0 (0.0)	1.3 (1.3)	0.0 (0.0)	1.3 (1.3)
		2009	0.0 (0.0)	6.7 (6.7)	6.7 (3.6)	0.0 (0.0)	13.3 (7.4)
		2010	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		Mean	2.1 (1.5)	3.2 (1.0)	1.7 (0.9)	0.3 (0.3)	7.3 (2.3)
Overall	Control	Mean	3.8 (1.3)	6.0 (1.4)	2.2 (0.9)	0.4 (0.2)	12.4 (2.7)

Table 6. Electrofishing catch rates (fish/hr) for each age of largemouth bass collected in each Meldahl Pool embayment in the Ohio River in spring 2003-2010.

				Age									
Location	Treatment	Year	No.	1	2	3	4	5	6	7	8	9	10
Big Snag Creek	Experimental	2003	43	4.9	9.4	3.7	3.6	0.0	0.0	0.0	0.0	0.0	0.0
		2004	13	1.0	3.7	5.7	0.0	0.7	1.0	0.0	0.0	0.0	1.0
		2005	24	2.9	1.2	8.1	1.6	0.2	1.3	0.0	0.7	0.0	0.0
		2006	21	7.7	11.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	30	6.4	8.2	12.1	2.7	0.6	0.0	0.0	0.6	0.0	0.0
		2008	43	19.3	12.0	4.1	4.6	1.6	1.5	0.0	0.0	0.0	0.0
		2009	17	0.0	3.1	11.7	2.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	8	0.0	0.0	2.7	3.2	1.1	1.0	0.0	0.0	0.0	0.0
		Mean		5.3	6.1	6.3	2.2	0.5	0.6	0.0	0.2	0.0	0.1
Bracken Creek	Experimental	2003	47	4.4	8.4	3.4	7.2	0.0	0.0	0.0	0.0	0.0	0.0
		2004	7	0.0	3.5	3.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0
		2005	34	8.9	1.4	6.7	0.6	0.4	1.5	0.0	0.0	0.0	0.0
		2006	27	13.8	2.5	5.8	3.6	0.6	0.7	0.0	0.0	0.0	0.0
		2007	37	9.2	6.6	15.8	3.8	1.1	0.5	0.0	0.0	0.0	0.0
		2008	64	16.0	9.9	16.5	11.4	4.5	3.7	1.0	1.0	0.0	0.0
		2009	30	3.6	6.7	11.1	4.1	1.7	1.8	0.0	0.0	1.0	0.0
		2010	30	6.0	3.4	14.5	2.8	1.0	1.5	0.0	0.0	1.0	0.0
		Mean		7.7	5.3	9.6	4.2	1.2	1.2	0.1	0.1	0.3	0
Overall	Experimental	Mean		6.5	5.7	8.0	3.2	0.9	0.9	0.1	0.1	0.1	0.1
Big Locust Creek	Control	2003	77	13.0	16.7	4.3	4.5	0.0	0.0	0.0	0.0	0.0	0.0
		2004	14	1.0	6.4	5.3	0.0	1.3	0.0	0.0	0.0	0.0	0.0
		2005	26	1.4	0.9	8.1	1.2	0.0	0.0	0.0	0.0	0.0	0.0
		2006	21	6.4	4.6	7.4	1.2	0.3	1.2	0.0	0.0	0.0	0.0
		2007	13	1.6	2.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	48	17.2	11.0	9.3	5.6	1.7	1.2	0.0	0.0	2.0	0.0
		2009	22	1.0	7.3	9.7	0.8	0.8	1.3	0.0	1.0	0.0	0.0
		2010	7	1.0	0.9	4.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0
		Mean		5.3	6.2	6.4	1.7	0.5	0.5	0.0	0.1	0.4	0.0
Big Turtle Creek	Control	2003	78	18.8	21.4	6.1	5.7	0.0	0.0	0.0	0.0	0.0	0.0
		2004	11	0.0	9.3	7.3	0.0	0.0	2.0	0.0	2.0	0.0	2.0
		2005	27	0.8	0.6	8.9	1.3	0.8	1.0	0.0	0.0	0.0	0.0
		2006	45	13.0	9.0	21.0	10.2	2.1	4.7	0.0	0.0	0.0	0.0
		2007	29	2.9	5.6	17.3	7.9	1.9	1.8	0.0	0.0	1.3	0.0
		2008	62	25.6	13.7	26.8	10.1	3.3	3.3	0.0	0.0	0.0	0.0
		2009	41	5.2	16.2	23.9	5.3	1.7	2.4	0.0	0.0	0.0	0.0
		2010	24	0.0	3.8	18.1	4.7	2.3	3.1	0.0	0.0	0.0	0.0
		Mean		8.3	10.0	16.2	5.7	1.5	2.3	0.0	0.3	0.2	0.3
Overall	Control	Mean		6.8	8.1	11.3	3.7	1.0	1.4	0.0	0.2	0.3	0.1

Table 7. Electrofishing catch rates (fish/hr) for each age of spotted bass collected in each Meldahl Pool embayment in the Ohio River in spring 2003-2010.

				Age					
Location	Treatment	Year	No.	1	2	3	4	5	6
Big Snag Creek	Experimental	2003	11	2.0	2.2	0.1	1.3	0.0	0.0
		2004	1	0.0	0.7	0.0	0.0	0.0	0.0
		2005	4	0.0	0.7	2.0	0.0	0.0	0.0
		2006	22	8.4	10.9	0.7	1.6	0.4	0.0
		2007	19	2.1	5.3	6.2	5.3	0.0	0.0
		2008	6	0.2	0.8	0.7	4.1	0.2	0.0
		2009	10	1.1	5.0	2.8	0.8	0.2	0.0
		2010	2	1.0	0.0	1.0	0.0	0.0	0.0
		Mean		1.9	3.2	1.7	1.6	0.1	0.0
Bracken Creek	Experimental	2003	12	2.0	2.2	0.3	1.5	0.0	0.0
		2004	0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	1	0.6	0.0	0.0	0.0	0.0	0.0
		2006	1	0.0	1.0	0.0	0.0	0.0	0.0
		2007	0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	1	1.0	0.0	0.0	0.0	0.0	0.0
		Mean		0.4	0.4	0.1	0.2	0.0	0.0
Overall	Experimental	Mean		1.1	1.8	0.9	0.9	0.1	0.0
Big Locust Creek	Control	2003	30	5.5	7.6	0.4	1.5	0.0	0.0
		2004	5	0.0	2.3	2.2	0.5	0.0	0.0
		2005	7	0.4	0.9	1.8	0.0	0.0	0.0
		2006	21	6.4	4.6	7.4	1.2	0.3	1.2
		2007	17	1.4	3.5	2.4	1.2	0.0	0.0
		2008	41	16.8	6.8	3.4	13.0	1.0	0.0
		2009	28	2.1	8.0	13.3	4.3	0.4	0.0
		2010	11	4.9	2.3	3.8	0.0	0.0	0.0
		Mean		4.7	4.5	4.3	2.7	0.2	0.2
Big Turtle Creek	Control	2003	12	4.0	2.9	0.1	1.0	0.0	0.0
		2004	1	0.0	2.0	0.0	0.0	0.0	0.0
		2005	6	1.0	0.5	1.5	0.0	0.0	0.0
		2006	10	5.8	6.2	0.4	0.9	0.0	0.0
		2007	7	0.2	1.7	4.3	2.8	0.3	0.0
		2008	1	1.3	0.0	0.0	0.0	0.0	0.0
		2009	10	0.0	1.5	7.6	3.5	0.0	0.0
		2010	0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean		1.5	1.8	1.7	1.0	0.1	0.0
Overall	Control	Mean		3.1	3.2	3.0	1.9	0.1	0.1

Table 8. Electrofishing effort and CPUE (fish/hr) of black bass collected from Meldahl Pool embayments of he Ohio River in fall 2003 - 2010. Standard errors are in parentheses.

Experimental	Year	No. of transects	Effort (hr)	No. of largemouth bass	CPUE	No. of spotted bass	CPUE
Big Snag Creek	2003	4	1.0	14	14.0 (6.2)	4	4.0 (1.6)
	2004	4	1.0	13	13.0 (1.0)	3	3.0 (1.9)
	2005	4	1.0	14	14.0 (2.0)	32	32.0 (8.2)
	2006						
	2007	4	1.0	13	13.0 (5.3)	13	13.0 (3.0)
	2008	4	1.0	11	11.0 (1.9)	5	5.0 (2.5)
	2009	4	1.0	4	4.0 (2.8)	3	3.0 (3.0)
	2010	4	1.0	9	9.0 (4.4)	6	6.0 (1.2)
	Total	28	7.0	78		66	
	Mean				11.1 (1.4)		9.4 (4.0)
Bracken Creek	2003	4	1.0	26	26.0 (10.1)	1	1.0 (1.0)
	2004	4	1.0	46	46.0 (14.3)	1	1.0 (1.0)
	2005	4	1.0	87	87.0 (31.9)	21	21.0 (6.0)
	2006						
	2007	4	1.0	136	136.0 (24.7)	0	0.0
	2008	4	1.0	43	43.0 (8.7)	0	0.0
	2009	4	1.0	17	17.0 (3.4)	0	0.0
	2010	4	1.0	30	30.0 (5.3)	3	3.0 (1.0)
	Total	28	7.0	385		26	
	Mean				55.0 (16.0)		3.7 (2.9)
Overall	Total	56	14.0	463		92	
	Mean				33.1 (9.8)		6.6 (2.5)
Control							
Big Locust Creek	2003	4	1.0	22	22.0 (11.0)	17	17.0 (1.9)
	2004	4	1.0	21	21.0 (9.4)	24	24.0 (2.3)
	2005	4	1.0	40	40.0 (19.8)	64	64.0 (20.8)
	2006						
	2007	4	1.0	31	31.0 (17.5)	42	42.0 (23.2)
	2008	4	1.0	18	18.0 (3.8)	10	10.0 (4.2)
	2009	4	1.0	11	11.0 (6.0)	6	6.0 (1.2)
	2010	4	1.0	20	20.0 (6.7)	16	16.0 (2.8)
	Total	28	7.0	163		179	
	Mean				23.3 (3.6)		25.6 (7.8)
Big Turtle Creek	2003	2	0.5	11	22.0 (10.0)	0	0.0
	2004	3	0.8	36	48.0 (12.9)	7	9.3 (3.5)
	2005	3	0.8	88	117.3 (8.7)	12	16.0 (4.0)
	2006						
	2007	3	0.8	65	86.7 (19.4)	4	5.3 (1.3)
	2008	3	0.8	53	70.7 (22.4)	10	13.3 (4.8)
	2009	3	0.8	26	34.7 (10.9)	1	1.3 (1.3)
	2010	3	0.8	29	38.7 (11.6)	3	4.0 (4.0)
	Total	20	5.0	308		37	
	Mean				59.7 (12.7)		7.0 (2.3)
Overall	Total	48	12.0	471		216	
	Mean				41.5 (8.1)		16.3 (6.6)

Table 9. Catch-per-unit-effort (fish/hr) estimates of four size classes of largemouth bass from Meldahl Pool embayments in the Ohio River, fall 2003-2010. Standard errors are in parentheses.

			Size Groups				
Location	Treatment	Year	<8 in	8-11.9 in	12-14.9 in	≥15.0	Total
Big Snag Creek	Experimental	2003	1.0 (1.0)	6.0 (2.0)	5.0 (1.0)	2.0 (1.2)	14.0 (6.2)
		2004	5.0 (1.3)	2.0 (1.0)	5.0 (1.1)	1.0 (1.0)	13.0 (1.0)
		2005	9.0 (3.9)	4.0 (2.0)	1.0 (1.0)	0.0 (0.0)	14.0 (2.0)
		2006					
		2007	1.0 (1.0)	2.0 (1.2)	9.0 (6.8)	1.0 (1.0)	13.0 (5.3)
		2008	0.0 (0.0)	8.0 (5.8)	2.0 (1.2)	1.0 (1.0)	11.0 (1.9)
		2009	4.0 (3.2)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	4.0 (2.8)
		2010	3.0 (2.2)	4.0 (4.0)	1.0 (1.0)	1.0 (1.0)	9.0 (4.4)
		Mean	3.3 (1.2)	3.7 (1.0)	3.3 (1.2)	0.9 (0.3)	11.1 (1.4)
Bracken Creek	Experimental	2003	8.0 (1.6)	12.0 (2.3)	6.0 (1.2)	0.0 (0.0)	26.0 (10.1)
		2004	21.0 (2.3)	10.0 (1.6)	13.0 (2.2)	2.0 (1.0)	46.0 (14.3)
		2005	35.0 (18.8)	25.0 (13.4)	25.0 (9.5)	2.0 (1.2)	87.0 (31.9)
		2006					
		2007	72.0 (20.3)	27.0 (11.5)	32.0 (8.0)	5.0 (4.2)	136.0 (24.7)
		2008	6.0 (4.8)	28.0 (13.8)	5.0 (3.3)	4.0 (4.0)	43.0 (8.7)
		2009	2.0 (1.2)	7.0 (5.9)	7.0 (3.5)	1.0 (1.0)	17.0 (3.4)
		2010	13.0 (3.9)	8.0 (5.2)	5.0 (3.3)	4.0 (3.2)	30.0 (5.3)
		Mean	22.4 (9.3)	16.7 (3.6)	13.3 (4.1)	2.6 (0.7)	55.0 (16.0)
Overall	Experimental	Mean	12.9 (5.2)	10.2 (2.5)	8.3 (2.5)	1.7 (0.4)	33.1 (9.8)
Big Locust Creek	Control	2003	0.0 (0.0)	17.0 (2.8)	2.0 (1.0)	3.0 (1.0)	22.0 (11.0)
		2004	3.0 (1.5)	3.0 (1.1)	13.0 (2.0)	2.0 (1.0)	21.0 (9.4)
		2005	9.0 (6.6)	16.0 (11.8)	14.0 (8.0)	1.0 (1.0)	40.0 (19.8)
		2006					
		2007	8.0 (5.7)	5.0 (5.0)	13.0 (8.3)	5.0 (5.0)	31.0 (17.5)
		2008	2.0 (1.2)	14.0 (5.7)	2.0 (2.0)	0.0 (0.0)	18.0 (3.8)
		2009	5.0 (3.9)	4.0 (3.2)	1.0 (1.0)	1.0 (1.0)	11.0 (6.0)
		2010	8.0 (5.7)	2.0 (2.0)	8.0 (3.2)	2.0 (2.0)	20.0 (6.7)
		Mean	5.0 (1.3)	8.7 (2.5)	7.6 (2.2)	2.0 (0.6)	23.3 (3.6)
Big Turtle Creek	Control	2003	2.0 (2.0)	12.0 (4.0)	4.0 (2.0)	4.0 (2.0)	22.0 (10.0)
		2004	4.0 (1.3)	13.3 (1.8)	26.7 (1.8)	4.0 (4.0)	48.0 (12.9)
		2005	24.0 (10.2)	57.3 (21.0)	30.7 (9.4)	5.3 (3.6)	117.3 (8.7)
		2006					
		2007	26.7 (12.1)	28.0 (10.3)	30.7 (9.4)	1.3 (1.3)	86.7 (19.4)
		2008	4.0 (2.7)	42.7 (20.1)	24.0 (6.2)	0.0 (0.0)	70.7 (22.4)
		2009	4.0 (4.0)	14.7 (7.3)	12.0 (10.2)	4.0 (2.3)	34.7 (10.9)
		2010	14.7 (7.5)	8.0 (6.7)	13.3 (5.0)	2.6 (2.6)	38.7 (11.6)
		Mean	11.3 (4.0)	25.1 (7.0)	20.2 (3.9)	3.0 (0.7)	59.7 (12.7)
Overall	Control	Mean	8.2 (2.2)	16.9 (4.2)	13.9 (2.8)	2.5 (0.5)	41.5 (8.1)

Table 10. Catch-per-unit-effort (fish/hr) estimates of four size classes of spotted bass from Meldahl Pool embayments in the Ohio River, fall 2003-2010. Standard errors are in parentheses.

			Size Groups				
Location	Treatment	Year	<7 in	7-10.9 in	11-13.9 in	≥14.0 in	Total
Big Snag Creek	Experimental	2003	0.0 (0.0)	4.0 (1.1)	0.0 (0.0)	0.0 (0.0)	4.0 (1.6)
		2004	1.0 (1.0)	2.0 (1.0)	0.0 (0.0)	0.0 (0.0)	3.0 (1.9)
		2005	13.0 (6.1)	18.0 (5.7)	1.0 (1.0)	0.0 (0.0)	32.0 (8.2)
		2006					
		2007	3.0 (2.2)	5.0 (2.6)	5.0 (2.2)	0.0 (0.0)	13.0 (3.0)
		2008	0.0 (0.0)	5.0 (5.0)	0.0 (0.0)	0.0 (0.0)	5.0 (2.5)
		2009	2.0 (2.0)	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	3.0 (3.0)
		2010	2.0 (2.0)	2.0 (2.0)	2.0 (2.0)	0.0 (0.0)	6.0 (1.2)
		Mean	3.0 (1.7)	5.3 (2.2)	1.1 (0.7)	0.0 (0.0)	9.4 (4.0)
Bracken Creek	Experimental	2003	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	1.0 (1.0)
		2004	0.0 (0.0)	1.0 (1.0)	0.0 (0.0)	0.0 (0.0)	1.0 (1.0)
		2005	9.0 (5.4)	11.0 (4.2)	0.0 (0.0)	1.0 (1.0)	21.0 (6.0)
		2006					
		2007	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2008	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2009	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2010	2.0 (2.0)	0.0 (0.0)	1.0 (1.0)	0.0 (0.0)	3.0 (1.0)
		Mean	1.7 (1.2)	1.7 (1.6)	0.1 (0.1)	0.1 (0.1)	3.7 (2.9)
Overall	Experimental	Mean	2.4 (1.0)	3.5 (1.4)	0.6 (0.4)	0.1 (0.1)	6.6 (2.5)
Big Locust Creek	Control	2003	6.0 (1.8)	11.0 (1.8)	0.0 (0.0)	0.0 (0.0)	17.0 (1.9)
		2004	6.0 (1.4)	13.0 (2.0)	5.0 (1.3)	0.0 (0.0)	24.0 (2.3)
		2005	23.0 (9.9)	37.0 (16.1)	3.0 (2.2)	1.0 (1.0)	64.0 (20.8)
		2006					
		2007	22.0 (12.8)	7.0 (5.9)	11.0 (8.5)	2.0 (2.0)	42.0 (23.2)
		2008	1.0 (1.0)	8.0 (4.9)	1.0 (1.0)	0.0 (0.0)	10.0 (4.2)
		2009	1.0 (1.0)	3.0 (2.2)	1.0 (1.0)	1.0 (1.0)	6.0 (1.2)
		2010	8.0 (6.1)	4.0 (4.0)	4.0 (2.9)	0.0 (0.0)	16.0 (2.8)
		Mean	9.6 (3.5)	11.9 (4.4)	3.6 (1.4)	0.6 (0.3)	25.6 (7.8)
Big Turtle Creek	Control	2003	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		2004	6.7 (1.7)	2.7 (1.3)	0.0 (0.0)	0.0 (0.0)	9.3 (3.5)
		2005	5.3 (3.6)	10.7 (5.3)	0.0 (0.0)	0.0 (0.0)	16.0 (4.0)
		2006					
		2007	2.7 (2.7)	0.0 (0.0)	2.7 (1.3)	0.0 (0.0)	5.3 (1.3)
		2008	1.3 (1.3)	12.0 (7.8)	0.0 (0.0)	0.0 (0.0)	13.3 (4.8)
		2009	0.0 (0.0)	1.3 (1.3)	0.0 (0.0)	0.0 (0.0)	1.3 (1.3)
		2010	4.0 (4.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	4.0 (4.0)
		Mean	2.9 (1.0)	3.8 (2.0)	0.4 (0.4)	0.0 (0.0)	7.0 (2.3)
Overall	Control	Mean	6.2 (2.0	7.8 (2.6)	2.0 (0.8)	0.3 (0.2)	16.3 (4.7)

Table 11. Electrofishing catch rate (fish/hr) for each age of largemouth bass collected in each Meldahl Pool embayment of the Ohio River in fall 2003-2010.

				Age				
Location	Treatmeant	Year	No.	0	1	2	3	4
Big Snag Creek	Experimental	2003	17	3.0	6.0	3.8	1.3	0.0
		2004	6	0.0	2.0	2.0	2.0	0.0
		2005	14	11.8	1.9	0.0	0.3	0.0
		2006						
		2007	13	1.6	2.6	5.1	2.3	0.3
		2008	10	0.0	6.5	3.0	0.3	0.1
		2009	4	4.0	0.0	0.0	0.0	0.0
		2010	8	3.7	2.9	1.2	0.0	0.0
		Mean		3.4	3.1	2.2	0.9	0.1
Bracken Creek	Experimental	2003	26	1.8	18.0	1.8	4.3	0.0
		2004	34	5.0	11.0	12.0	6.0	0.0
		2005	85	39.6	20.5	8.8	13.4	2.7
		2006						
		2007	126	63.0	30.7	19.8	11.8	0.7
		2008	39	6.5	23.7	6.3	2.5	0.1
		2009	16	2.4	6.5	5.8	1.1	0.2
		2010	26	11.7	9.3	2.5	2.5	0.0
		Mean		18.6	17.1	8.1	5.9	0.5
Overall	Experimental	Mean		11.0	10.1	5.1	3.4	0.3
Big Locust Creek	Control	2003	22	3.4	14.3	4.4	0.0	0.0
		2004	18	1.0	3.0	11.0	3.0	0.0
		2005	39	10.2	12.6	5.2	10.5	0.5
		2006						
		2007	26	8.7	6.1	5.6	5.4	0.3
		2008	18	2.0	11.1	3.8	1.2	0.0
		2009	10	5.2	3.1	1.6	0.2	0.0
		2010	18	6.8	4.1	3.2	3.8	0.0
		Mean		5.3	7.8	5.0	3.4	0.1
Big Turtle Creek	Control	2003	11	3.5	14.0	3.5	0.0	0.0
		2004	27	1.3	6.7	22.7	5.3	0.0
		2005	84	38.7	42.2	12.0	17.8	1.3
		2006						
		2007	64	25.9	25.9	23.5	9.3	0.7
		2008	53	4.4	42.1	16.7	7.1	0.4
		2009	23	5.8	11.5	9.1	4.1	0.2
		2010	26	11.9	12.4	8.1	2.1	0.0
		Mean		13.1	22.1	13.7	6.5	0.4
Overall	Control	Mean		9.2	14.9	9.3	5.0	0.2

Table 12. Electrofishing catch rate (fish/hr) for each age of spotted bass collected in each Meldahl Pool embayment of the Ohio River in fall 2003-2010.

				Age				
Location	Treatmeant	Year	No.	0	1	2	3	4
Big Snag Creek	Experimental	2003	4	0.0	2.9	1.1	0.0	0.0
		2004	3	0.8	0.2	1.5	0.5	0.0
		2005	32	30.0	1.0	0.5	0.5	0.0
		2006						
		2007	13	2.4	4.6	3.6	2.5	0.0
		2008	5	0.0	3.1	1.9	0.0	0.0
		2009	3	1.9	1.0	0.0	0.0	0.0
		2010	6	1.7	1.9	1.4	1.0	0.0
		Mean		5.3	2.1	1.4	0.6	0.0
Bracken Creek	Experimental	2003	1	0.0	1.0	0.0	0.0	0.0
		2004	0	0.0	0.0	0.0	0.0	0.0
		2005	20	20.0	0.0	0.0	0.0	0.0
		2006						
		2007	0	0.0	0.0	0.0	0.0	0.0
		2008	0	0.0	0.0	0.0	0.0	0.0
		2009	0	0.0	0.0	0.0	0.0	0.0
		2010	3	1.7	0.0	0.0	0.7	0.0
		Mean		3.1	0.1	0.0	0.1	0.0
Overall	Experimental	Mean		4.2	1.1	0.7	0.4	0.0
Big Locust Creek	Control	2003	17	0.0	14.0	3.0	0.0	0.0
		2004	20	5.8	1.2	9.5	3.5	0.0
		2005	61	53.0	7.0	0.5	0.5	0.0
		2006						
		2007	40	18.8	9.5	5.4	5.6	0.7
		2008	10	1.2	4.9	3.4	0.5	0.0
		2009	5	1.3	1.9	1.6	0.3	0.0
		2010	17	7.5	3.7	3.3	1.5	0.0
		Mean		12.5	6.0	3.8	1.7	0.1
Big Turtle Creek	Control	2003	0	0.0	0.0	0.0	0.0	0.0
		2004	7	5.1	1.6	2.0	0.7	0.0
		2005	12	13.3	2.7	0.0	0.0	0.0
		2006						
		2007	4	2.4	0.3	0.8	1.9	0.0
		2008	10	1.8	6.5	4.9	0.1	0.0
		2009	1	0.0	1.3	0.0	0.0	0.0
		2010	3	3.0	0.0	0.0	0.0	0.0
		Mean		3.7	1.8	1.1	0.4	0.0
Overall	Control	Mean		8.1	3.9	2.5	1.0	0.1

Figure 1. A supplemental spawning structure deployed in Bracken Creek of Meldahl Pool of the Ohio River displaying clean and available spawning substrate.

Figure 2. Two supplemental spawning structures deployed in Bracken Creek of Meldahl Pool of the Ohio River showing the amount of siltation that occurred following high spring flows in 2008.