

ANNUAL PERFORMANCE REPORT

For

Statewide Fisheries Investigation Project

Part III of III

Subsection III: Fisheries Habitat Branch



Project Leader: *Mike Hardin*, Assistant Director

Co-Project Leader: *Spencer Phillips*, Statewide Fisheries Habitat Biologist

Project Assistant: *Nick Keeton*, Fish and Wildlife Management Foreman



Department of Fish and Wildlife Resources
Fisheries Division



STATE: Kentucky

PROJECT NO: F-40-46

GRANT TYPE: Research and Survey

GRANT TITLE: Statewide Fisheries Investigations

SUBSECTION III TITLE: Fisheries Habitat Program

PERIOD COVERED: 1 April 2023 – 31 March 2024

RESEARCH AND SURVEY SECTION

Subsection III

Project I: Largescale Fish Habitat Projects

Project Objective: To coordinate and develop largescale habitat projects that increase the volume of structural habitat for fisheries within Kentucky.

A. ACTIVITY

There was activity on three large scale fish habitat projects during this grant cycle for Barren River Lake, Green River Lake, and Lake Cumberland.

The seventh and final phase of the Barren River Lake Largescale Fish Habitat Project was completed in November 2023. The final phase of the Barren River Lake project occurred at the Walnut Creek portion. The project has resulted in a total of 1,300 individual habitat structures placed across 63 sites within Barren River Lake. Habitat structures have been constructed with a variety of material types, including large cedar trees, rock, wooden pallets, pvc, and commercially made products. Site depth ranges from 10 to 20 feet in depth during summer pool. Site locations include main lake points, large flats, pockets, and channel ledges.

Another largescale fish habitat project was started on Green River Lake. The start of the largescale fish habitat project on Green River Lake included 20 habitat sites to date and will continue in the future.

Discussions were held with project managers and real estate staff of the U.S. Army Corps of Engineers to begin scoping another large scale fish habitat project in Lake Cumberland.

Staff spent 49 workdays on the Barren River Lake and Green River Lake Largescale Fish Habitat Projects for planning/coordination, habitat mapping, obtaining material, structure construction, habitat deployment, and staging area cleanup. Additionally, staff spent 6 workdays coordinating and planning for another largescale fish habitat project at Lake Cumberland.

Activities were coordinated out of the headquarters office of the Kentucky Department of Fish and Wildlife Resources (KDFWR) located at #1 Sportman's Lane, Frankfort, KY, 40601 and out of KDFWR's regional office located at 1398 State Route 81 N, Calhoun, KY 42327.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned Achievement Date: March 31, 2024
Work Accomplished: March 31, 2024

C. SIGNIFICANT DEVIATIONS

None.

D. REMARKS

None.

E. RECOMMENDATIONS

None.

Project II: Aquatic Habitat Technical Guidance

Project Objective: To improve and create aquatic habitat projects that increase angler opportunities in lake and streams in Kentucky.

A. ACTIVITY

During 1 April 2023 – 31 March 2024, the Habitat Branch assisted each of the seven Fisheries Districts with various phases of habitat projects. Project phases included planning/coordination, habitat mapping, obtaining material, habitat deployment, liming, and machinery delivery. Staff assisted with staging and deploying 2813 structures for 81 habitat enhancement sites in 9 lakes.

The Christmas tree drop-off program resulted in 4,810 trees from 31 drop-off sites and store donations. Department staff picked up 1,029 trees that were donated from large retailers and municipalities. Tree donations were lower in 2023 when compared to 2022 and the previous three years prior to 2022. There has been a continued effort with advertising and marketing to raise public awareness in hopes of increasing public participation with tree donations. The Information and Education Division staff created a Christmas tree recycling news release and social media post to promote the program and increase awareness. The news release was picked up by several local news stations from Elizabethtown, Lexington, and Richmond.

Activities were coordinated out of the headquarters office of the Kentucky Department of Fish and Wildlife Resources (KDFWR) located at #1 Sportman's Lane, Frankfort, KY, 40601 and out of KDFWR's regional office located at 1398 State Route 81 N, Calhoun, KY 42327.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned Achievement Date: March 31, 2024
Work Accomplished: March 31, 2024

C. SIGNIFICANT DEVIATIONS

None.

D. REMARKS

None.

E. RECOMMENDATIONS

None.

Table of Contents

Project I: Largescale Fish Habitat Projects.....	1
Project II: Aquatic Habitat Technical Guidance.....	14

Project I: Largescale Fish Habitat Projects

Barren River Lake Largescale Fish Habitat Project

The seventh and final phase of the Barren River Lake Largescale Fish Habitat Project was completed in November in 2023. This final phase included four sites at the Walnut Creek portion of Barren River Lake. Fisheries division staff worked with KDFWR's Wildlife division for staging and deployment of the habitat material. Material for the fish habitat structures was stored on the lakeshore in the Dry Creek Unit of the Wildlife Management Area. Within the Walnut Creek site four spider-humps were constructed. Fish habitat structures ranged from 8 to 25 ft deep at summer pool. Additionally, staff worked with the Barren River Lake Fish Habitat Committee (a project committee composed of other agencies, the public, and members of non-profit organizations) to place 40 stake-bucket structures in the area north of Narrows Marina.

To date, the project has resulted in 1,300 individual habitat structures placed in 64 sites of Barren River Lake (Table 1). The majority of sites were built with wooden pallet structures and large cedar trees. Other materials used included rock, pvc, and commercially made products. Sites have been updated on the department's "Lakes with Fish Attractors" webpage and a pdf map with habitat location information has been created to provide to anglers. In addition, GPX files of habitat site locations were made publicly available for download from the KDFWR's, "Lakes with Fish Attractors" webpage.

Electrofishing of habitat sites was conducted at Barren River Lake in fall 2023 to evaluate the effectiveness of various habitat structures and to continue work from fall 2022 sampling. Sites were sampled during the fall drawdown at the 545-546 feet pool elevation (summer pool is 552 ft, winter pool is 528 ft). One 6-minute electrofishing sample was conducted at each habitat site. Two MEGA stakebeds, five brush piles, three rock piles, one plastic tree, and two mossback structures were sampled. The 13 sites were sampled with boat-mounted DC electrofishing for a total effort of 1.3 hours. The CPUE of sportfish collected at each site sampled is shown in Figure 4. Habitat sites built with natural material (brush piles, MEGA stakebeds, and rock) had the highest total abundances of fish with 5 of the 13 sites above the average of 812 fish/hour (figure 4). A total of 734 fish of 7 species were collected from habitat sites made from natural materials (table 2). For attractors built from natural materials, Bluegill (401 fish/hour) were most abundant, followed by Crappie (312 fish/hour), and Largemouth Bass (267 fish/hour), shown in figure 5. Bluegill ranged from 3.0-7.9 inches with 39% being above quality size (≥ 6.0 inches), shown in table 4. Crappie ranged from 4.4-11.6 inches with 74% being above quality size (≥ 8.0 inches), indicated in table 2. Largemouth Bass ranged from 3.2-20 inches with 75% being above quality size (≥ 12.0 inches, table 3). A total of 72 fish of 6 species were collected from plastic habitat sites (table 2). For attractors built from plastic materials, Crappie (143 fish/hour) were most abundant, followed by Largemouth Bass (67 fish/hour), and Bluegill (60 fish/hour), shown in figure 5. Crappie ranged from 6.7-11.4 inches with 79% being above quality size (≥ 8.0 inches), shown in table 2. Largemouth Bass ranged from 3.0-20.4 inches with 42% being above quality size (≥ 12.0 inches), shown in table 3. Bluegill ranged from 5.2-6.8 inches with 22% being above quality size (≥ 6.0 inches), shown in table 4.

In a similar pattern to the fall 2022 electrofishing samples, catch rates were higher on natural sites compared to plastic sites. Natural sites had a 160% increase in fish abundance as compared to plastic sites (Figure 5). Catch rates for Largemouth Bass, Crappie, and Bluegill more than doubled for natural habitat types compared to plastic sites (Figure 5).

Less electrofishing effort was conducted during this report period when compared to fall 2022 sampling. Staffing changes left the habitat branch with one employee, who focused their time on constructing rather than evaluating habitat sites. Of the most notable difference was no control sites were sampled for 2023 samples.

The Barren River Lake Fish Habitat Committee was created at the start of the project in 2019 to guide development and consists of members from USACE, KDFWR, Barren River Fishing League, Barren River Outdoors, Josh Morris Fishing, Kentucky Bass Federation, Western Kentucky University Bass Fishing Team, Friends of Barren River Lake and Park, Kentucky Bass Federation, and local anglers. The Committee selected seven work areas and phases for the largescale habitat project. These areas included Peninsula/Baileys Point, Finney, Narrows, Barren River Lake State Park, lower Peter Creek, lower Skaggs Creek, and Beaver Creek. Lower Skaggs Creek was removed from the list in 2022 due to access issues. Instead, the location was Dry Creek and Canoe Creek in the Walnut area of Barren River Lake. Due to changes in staffing within the habitat branch, no committee meetings were held this past year. However, staff still worked with local anglers who were apart of the committee to place 40 stake bucket fish habitat structures near the Narrows Marina.

Green River Lake Largescale Fish Habitat Project

The first and initial phases of the new Green River Lake Largescale Fish Habitat Project was completed in July 2023, September 2023, and in March 2024. To date, the project has resulted in 20 fish habitat structures. The initial 12 sites were completed in July 2023 around the Goat Island area of Green River Lake, with the other 8 sites completed in September 2023 and March 2024 around the Corbin's Bend area of the lake (Figure 6). Most sites thus far have been brush piles (sometimes mixed with pallet structures) constructed with large cedar trees and anchored with 8-inch concrete blocks. Phase 2 sites will occur within the boundary shown in figure 6, as of March 26, 2024 staff have fallen Cedar Trees in preparation of creating brush piles when Green River Lake reaches summer pool levels.

Electrofishing of habitat sites was conducted at Green River Lake in January 2024 to train a new habitat branch staff member on the methodology, and to obtain an initial sample of the new sites constructed. A majority of habitat sites range from 15-20 feet in depth, which is too deep for effective electrofishing at summer pool (675.0 ft). Sites were sampled in one day, in which the winter pool elevation was 670.8. One 5-minute electrofishing sample was conducted at each habitat site. Sites chosen were believed to be shallow enough (<12ft) in depth for an effective sample. However, some sites were potentially biased due to greater than anticipated depths. Eight (8) electrofishing runs were conducted, for a total sampling effort of 0.67 hours. The CPUE of sportfish collected at each site sampled is shown in Figure 7. All 8 electrofishing samples were

on sites built with natural materials (i.e. brush). A total of 310 fish of 7 species were collected from habitat sites made from natural materials. Crappie (236 fish/hour) were most abundant, followed by Largemouth Bass (139 fish/hour), and Bluegill (87 fish/hour), shown in table 6. Crappie ranged from 5.6-13.5 inches with 71% being above quality size (≥ 8.0 inches), indicated in table 6. Largemouth Bass ranged from 5.4-20.5 inches with 41% being above quality size (≥ 12.0 inches), shown in table 7. Bluegill ranged from 3.0-6.8 inches with 14% being above quality size (≥ 6.0 inches), shown in table 8.

Lake Cumberland Largescale Fish Habitat Project

Staff have sought to start another Largescale Fish Habitat Project at Lake Cumberland in 2024 to run alongside the project at Green River Lake. The initial meetings with KDFWR fisheries and USACE staff have been successful in allowing us to conduct a project at Lake Cumberland later this year. Planning/coordination will continue to occur throughout 2024 in terms of seeking grant funding, organizing a fish habitat committee, and deciding which potential areas work will be conducted in. Staging/construction of fish habitat sites will occur in the fall 2024 through early 2025 when the water levels are drawn down to allow staff to work in the dry.

Table 1. Habitat material summary for the Barren River Lake Largescale Fish Habitat Project.

Phase	Year	# of Sites	Cedar Trees	Christmas Trees	Pallet Structures (3 Pallet Triangle)	MEGA Stakebed	PVC Trees	Rock Reef	Mossback and Fishiding Structures	Pennsylvania Spider Hump Structures	Bamboo Bundles	Totals
Phase 1 - Peters Creek	2019	14	250	80	40		25	1	30			426
Phase 2 - Narrows	2020	15	107	70	35	5	5	2	20	7	5	256
Phase 3 - State Park	2020	13	73	50	44	7		1	30	4		209
Phase 4 - Beaver Creek	2021	8	100		26	7	12	1		9		155
Phase 5 - Peninsula	2022	3	40		45							85
Phase 6 - Finney	2022	6	110		45					10		165
Phase 7 - Walnut	2023	4	19									19
Totals		63	699	200	235	19	42	5	80	30	5	1296

Table 2. Length frequency and CPUE (fish/hour) of sportfish collected from Barren River Lake by habitat type in fall 2023.

Habitat Type	Species	Inch Class																		Total	CPUE	Std err
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Natural	Warmouth				2		1													3	3	0.2
	Bluegill	20	19	71	120	57	3													290	290	11.0
	Spotted Bass	1	1							2	3	1	3	2	2					15	15	1.1
	Largemouth Bass	2	1	3	1	6	1	3	1	7	11	9	12	13	7	10	12	5	4	108	108	2.3
	White Crappie		1	1	1		5	11	18	20	2									59	59	1.8
	Black Crappie				3	22	94	56	60	18										253	253	7.7
	Yellow Bass					1	1	1												3	3	0.2
Plastic	Bluegill			3	13	2														18	54.1	3.8
	Spotted Bass		1																	1	3.0	0.3
	Largemouth Bass	4	3	1			1			2			1	1			1	2	3	19	57.1	1.2
	White Crappie							1	5	3										9	27.0	3.0
	Black Crappie					3	13	11	6	1										34	102.1	8.5
	White Bass												1							1	3.0	0.3

Table 3. Electrofishing CPUE (fish/hr) for each length group of Largemouth Bass by habitat type collected from Barren River Lake in fall 2023.

Habitat Type	Length group (in)					Total
	<8.0	8.0-11.9	12.0-14.9	>15	>20	
Natural	14.0 (0.7)	13.0 (0.2)	37.0 (1.2)	43.0 (1.2)	1.0 (0.1)	108.0 (2.3)
Plastic	27.0 (1.1)	6.0 (0.2)	6.0 (0.4)	15.0 (0.9)	3.0 (0.2)	57.1 (1.2)

Table 4. Electrofishing CPUE (fish/hr) for each length group of Bluegill by habitat type collected from Barren River Lake in fall 2023.

Habitat Type	Length group (in)			Total
	3.0-5.9	6.0-7.9	>8.0	
Natural	174.0 (6.1)	113.0 (5.1)	0 (0.0)	290.0 (11.0)
Plastic	42.0 (1.6)	12.0 (0.5)	0 (0.0)	54.1 (3.8)



Figure 1. (left photo). Spider-hump construction during drawdown. Figure 2 (right photo). MEGA stake-bed structures placed during drawdown.

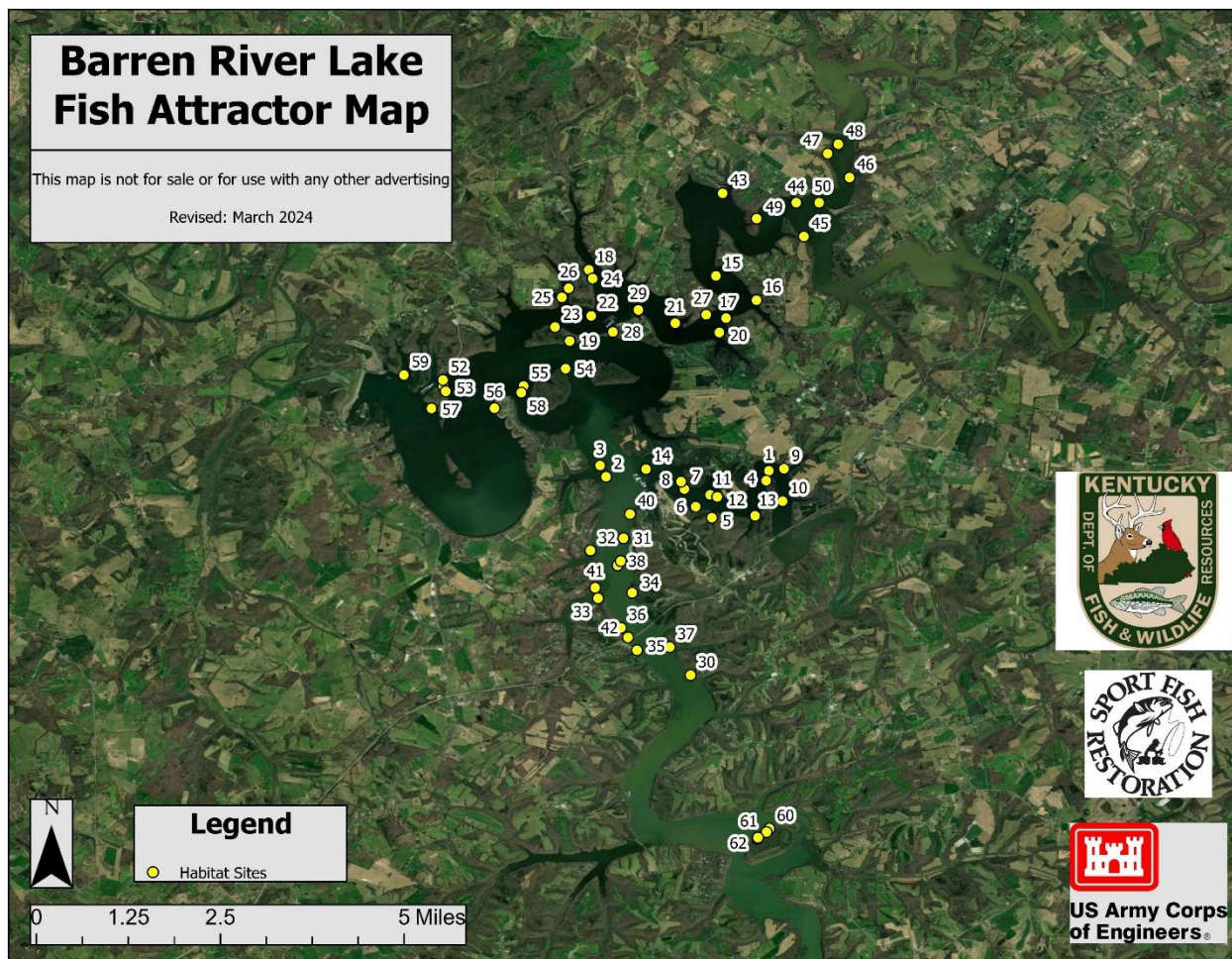


Figure 3. 2019-2023 Barren River Lake FHP habitat enhancement locations for Phases 1-7.

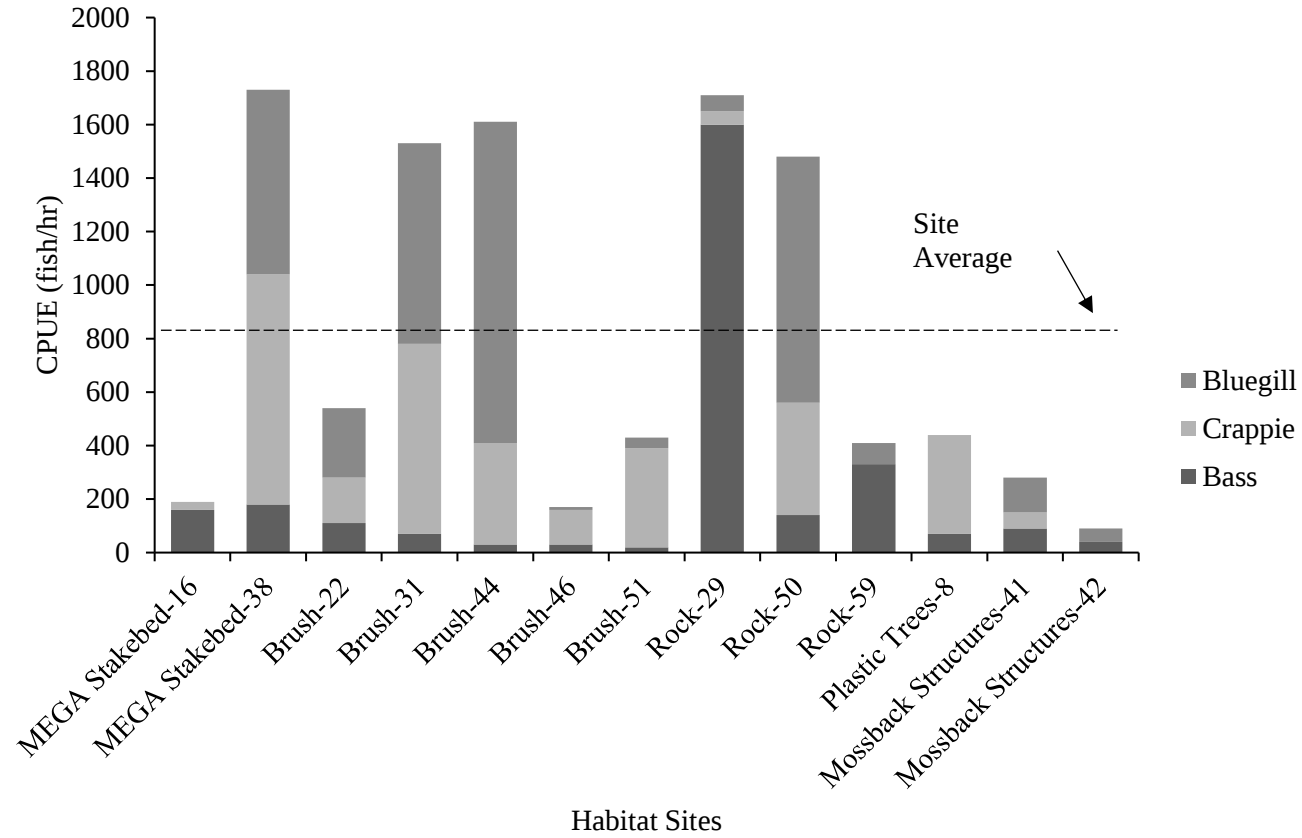


Figure 4. Electrofishing CPUE (fish/hour) of sportfish collected by habitat type from Barren River Lake in fall 2023.

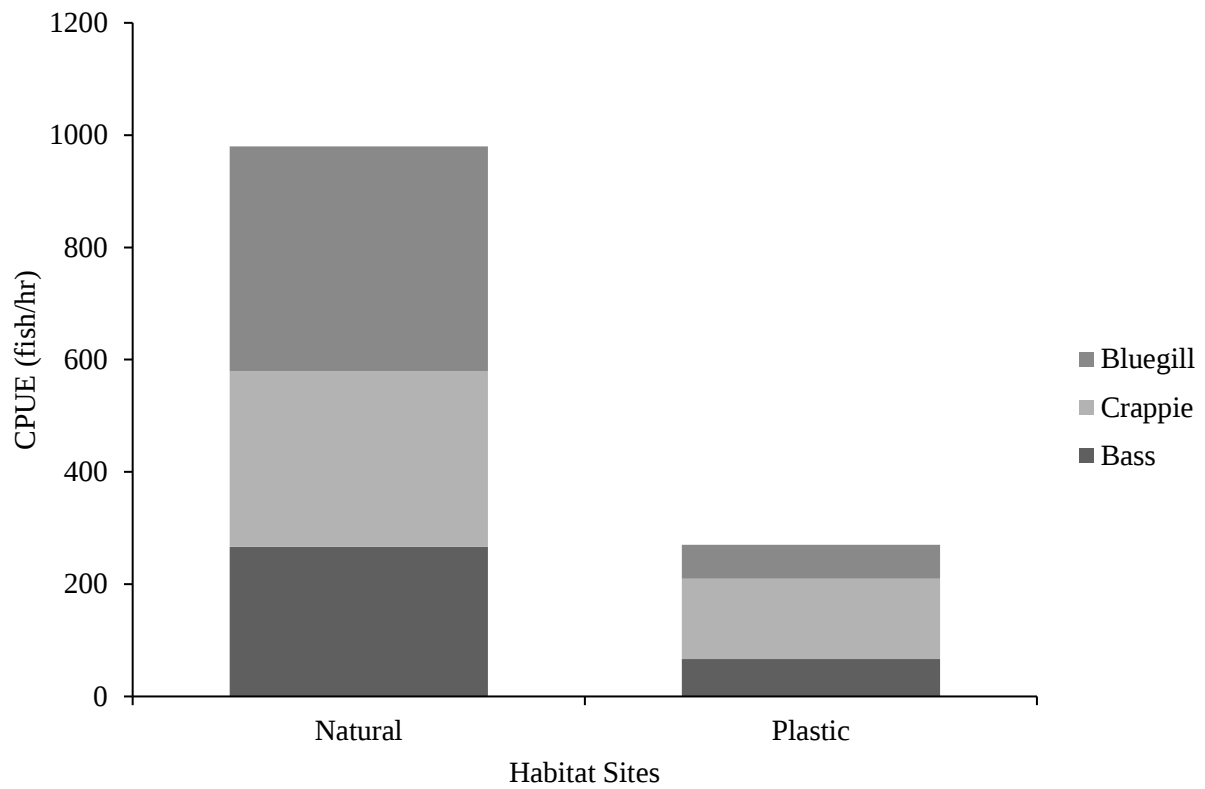


Figure 5. Electrofishing mean CPUE (fish/hour) of sportfish collected by habitat type from Barren River Lake in fall 2023.

Table 5. Habitat material summary for the Green River Lake Largescale Fish Habitat Project

Phase	Year	# of Sites	Cedar Trees	Pallet Structures (3 Pallet Triangle)	8-Inch Block	Totals
Phase 1 - Goat Island	2023	12	124	30	1260	1394
Phase 2 - Corbin's Bend	2024	8	85	30	900	995
Totals		20	209	60	2160	2389

Table 6. Length frequency and CPUE (fish/hr) of sportfish collected from Green River Lake by habitat type in January 2023.

Habitat Type	Species	Inch Class																			Total	CPUE	Std err
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
Natural	Warmouth					1															1	1.5	0.1
	Bluegill	1	13	29	14	1															58	87.1	2.9
	Spotted Bass			1	10	10	2	1	1				3								28	42.0	1.1
	Largemouth Bass			2	12	7	8	3	4	1	4	1	1	6	7	5		2		1	64	96.1	1.9
	White Crappie				9	18	33	39	40	9	6	1	1								156	234.2	6.0
	Black Crappie					1															1	1.5	0.1
	Muskellunge												1	1							2	3.0	0.3

Table 7. Electrofishing CPUE (fish/hr) for each length group of Largemouth Bass by habitat type collected from Green River Lake in January 2023.

Habitat type	Length group (in)					Total
	<8.0	8.0-11.9	12.0-14.9	>15	>20	
Natural	42.0 (1.6)	13.5 (0.4)	9.0 (0.3)	25.5 (0.9)	1.5 (0.1)	96.1 (1.9)

Table 8. Electrofishing CPUE (fish/hr) for each length group of Bluegill by habitat type collected from Green River Lake in January 2023.

Habitat Type	Length group (in)			Total
	3.0-5.9	6.0-7.9	>8.0	
Natural	75.1 (2.6)	12.0 (0.5)	0.0 (0.0)	87.1 (2.9)

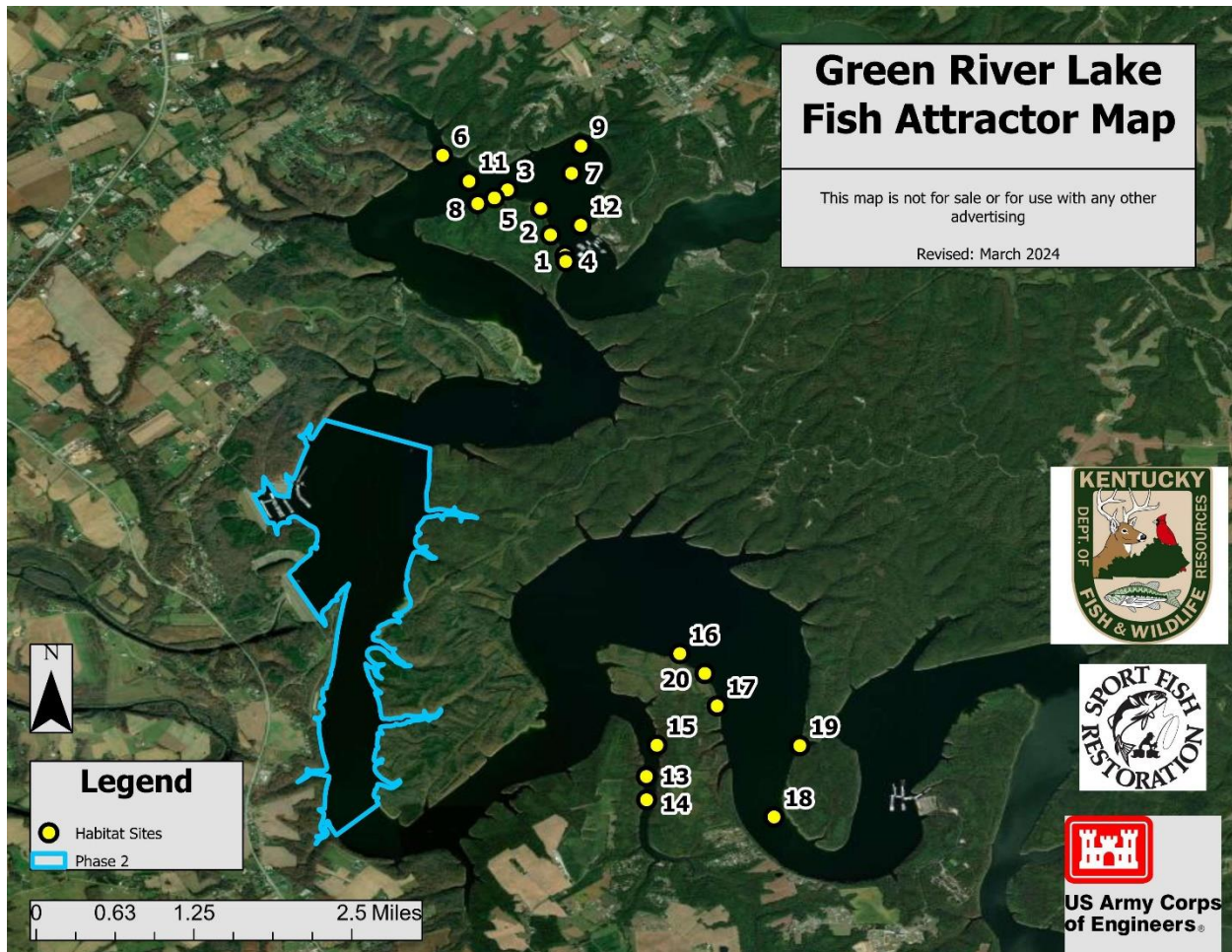


Figure 6. 2023- March 2024 Green River Lake FHP habitat enhancement locations for Phase 1 & 2 of the project. Phase 3 locations will be within the blue area during FY2024.

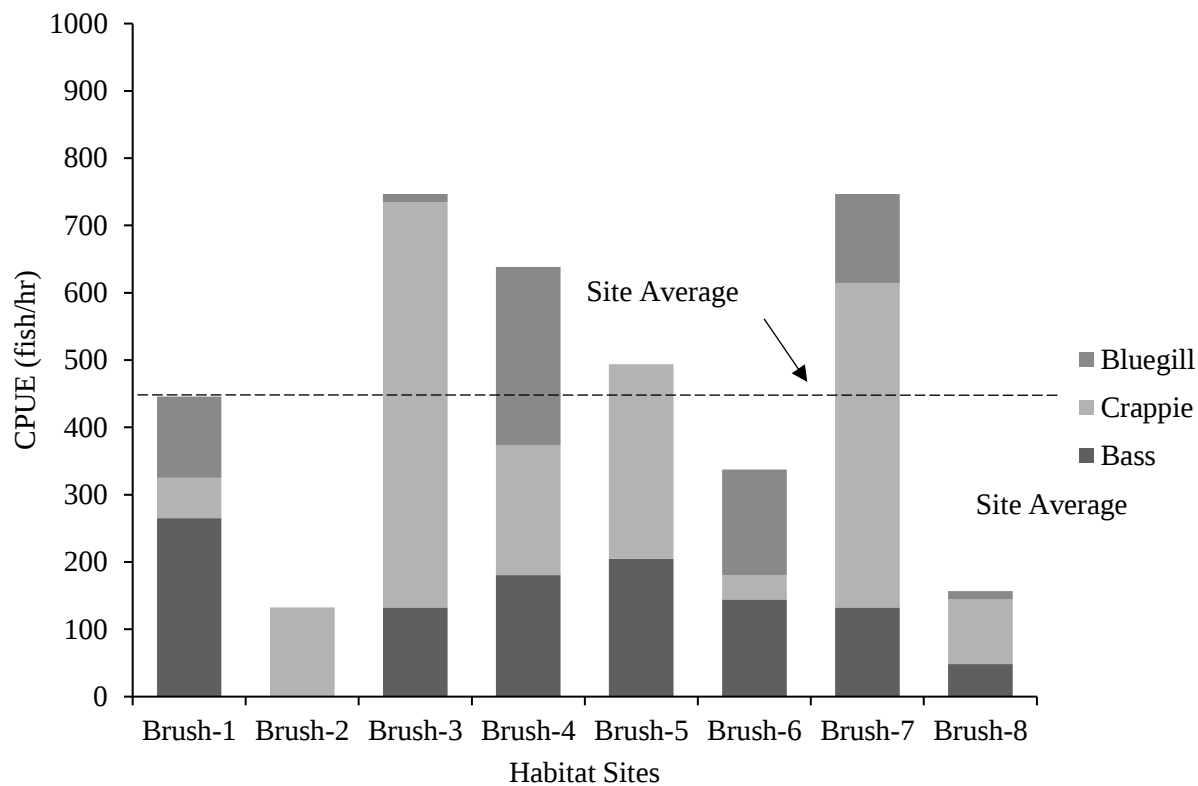


Figure 7. Electrofishing CPUE (fish/hour) of sportfish collected by habitat type from Green River Lake in January 2024.

Project II: Aquatic Habitat Technical Guidance

FINDINGS

During 1 April 2023 – 31 March 2024, the Habitat Branch assisted four of the seven Fisheries Districts with various phases of habitat project implementation. The previous Habitat Branch coordinator resigned, and a new coordinator was hired during the grant period. There was only one employee available for a majority of the grant period, spending a total of 35 working days with various districts for fish habitat technical guidance.

Project phases included planning and coordination, obtaining material, habitat deployment, and machinery delivery. Staff assisted with staging and deploying 2,813 structures for 81 habitat enhancement sites in 9 lakes (Table 1). The majority of the work included building brush pile sites from various species of trees. Other project types included reefball construction/deployment, angler access improvement, and spawning boxes.

The Christmas tree drop-off program resulted in 4,810 trees from 31 drop-off sites and store donations. Department staff picked up 1,029 trees that were donated from large retailers and municipalities. Tree donations were lower in 2023 when compared to 2022 and the previous three years prior to 2022. There has been a continued effort with advertising and marketing to raise public awareness in hopes of increasing public participation with tree donations. The Information and Education Division staff created a Christmas tree recycling news release and social media post to promote the program and increase awareness. The news release was picked up by several local news stations from Elizabethtown, Lexington, and Richmond.

Table 1. Habitat Branch technical guidance projects for FY2023

Date	Lake	Material Amount	# of Sites	Material Type
May 2023	Elmer Davis	15	15	Catfish spawning boxes
July 2023	Cave Run Lake	30	1	Reef Balls
August 2023	Beaver Lake	0	0	Angler access improvement project
August 2023	Benjy Kinman Lake	0	0	Angler access improvement project
August 2023	Boltz Lake	0	0	Angler access improvement project
November 2023	Taylorsville Lake	105	6	Cedar Trees
January 2024	Guist Creek Lake	740	18	Christmas Trees
February 2024	Lake Mauzey	86	2	Christmas Trees
February 2024	McNeely Lake	101	5	Christmas Trees
February 2024	Benjy Kinman Lake	1736	34	Christmas Trees
TOTAL		2813	81	

Table 2. Christmas tree drop-off locations for FY2023.

Fisheries District	County	Location	Trees	Store Pickup
Western District	Calloway	Western District Fisheries Office	60	135
Northwestern District	McLean	Northwest District Fisheries Office	15	121
	Breckinridge	North Fork Boat Ramp Parking Lot	100	
	Edmonson	Nolin Lake State Park		
Southwestern District	Warren	Southwest District Fisheries Office	222	
	Taylor	Crazy Horse Archery and Tackle		
	Barren	Barren River Lake Port Oliver Boat Ramp		
Central District	Warren	Cabela's Outpost		
	Franklin	KDFWR Headquarters	80	
	Franklin	Forks of Elkhorn Hatchery	139	
	Shelby	Guist Creek Lake Marina	115	
	Jefferson	McNeely Lake Boat Ramp	809	
	Fayette	Jacobson Park	1181	
	Anderson	Ace Hardware	70	
	Scott	Lusby Lake/Scott County Park	233	
	Campbell	Pendery Sports Park	228	
	Boone	Camp Ernst Lake-Boat Ramp Area	95	
Southeastern District	Laurel	London Region Recycling Center	12	
	Pulaski	KDFWR Somerset Regional Office	27	173
	Whitley/Laurel	Corbin City Garage	20	
Northeastern District	Rowan	Minor Clark Fish Hatchery	50	600
	Carter	Grayson Lake USACE Emergency Spillway Area	25	
Eastern District	Madison	Lake Reba Recreational Complex	200	
	Floyd	Eastern District Fisheries Office	100	
	Lawrence	Lawrence County Community Center		
	Harlan	Martin's Fork Lake Boat Ramp		
	Pike	Fishtrap Lake		
	Perry	Perry County Conservation District		
	Knott	Carr Creek Lake Marina Parking Lot		
	Johnson	Ferguson Excavating		
	Johnson	Ferguson Construction Site		
Total Trees			3781	1029

Table 3. Summary of Christmas Tree donations by Fisheries District.

District	2017	2018	2019	2020	2021	2022	2023
Western District	411	350	709	0	306	220	195
Northwestern District	30	60	110	650	688	372	236
Southwestern District	729	510	834	1000	700	315	222
Central District	1189	1507	4101	3314	2321	3166	2950
Southeastern District	290	177	989	697	395	216	232
Northeastern District	80	375	690	650	375	900	875
Eastern District	330	150	750	495	523	341	100
Total	3059	3129	8183	6806	5308	5530	4810