Pennsylvania Fish & Boat Commission Biologist Report

Three Rivers Locks and Dams Tailwaters

Southwestern Pennsylvania

Spring 2011, Fall 2011, and Spring 2012 Nighttime Boat Electrofishing Surveys

Over the past 25 years, tailwaters (or reaches located immediately downstream) of navigation locks and dams (L/D) of the Three Rivers have served as fixed-sites (locations visited on a regular basis, although not each and every year) where PFBC biologists survey game and nongame fish species to assess trends in abundance, evaluate harvest regulations directed to sport fish species, update management plans on river sections below these dams, and use fish assemblage diversity to depict environmental quality.

Tailwater habitats of L/D function more like a free-flowing river than upstream impounded reaches, and provide a barrier to fish movement. Turbulent water created below dams tends to remain highly oxygenated, attracting and holding both forage fish and game fish; especially the most sought-after species of the Three Rivers – smallmouth bass, walleye, and sauger. The fast currents of tailwaters create rocky shoals, fast runs, countercurrent eddies, and deep scour pools. Because game fish are known to congregate there, tailwaters attract many anglers and provide some of the best year-round fishing opportunities on the Three Rivers.

In spring and fall 2011 and spring 2012, PFBC biologists surveyed the tailwaters of eight L/D on the Three Rivers – Dashields L/D and Emsworth L/D on the Ohio River (Figure 1); Braddock L/D, L/D 3 (at Elizabeth), Maxwell L/D, and Grays Landing L/D on the Monongahela River (Figure 2); and L/D 2 (at Highland Park) and L/D 5 (at Freeport) on the Allegheny River (Figure 3).

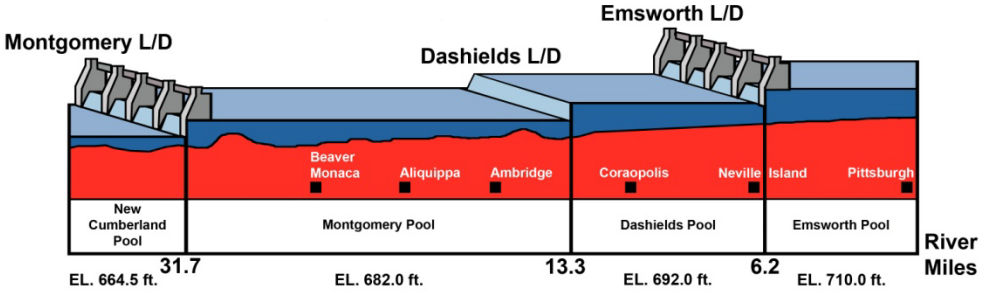


Figure 1. Profile of locks and dams on the upper Ohio River, depicting navigation pool elevations and downstream distances from Pittsburgh (modified from USACE).

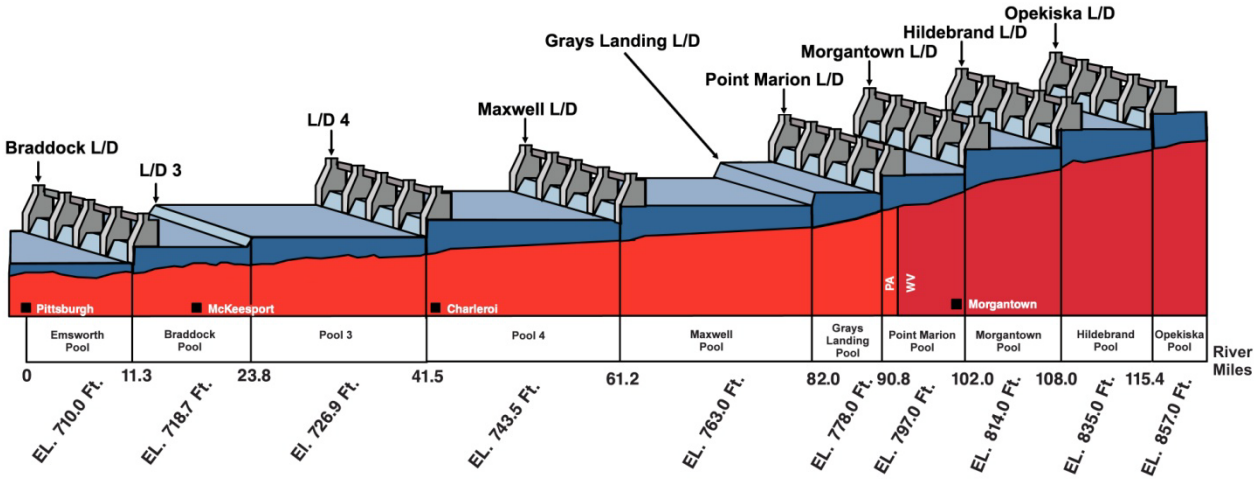


Figure 2. Profile of locks and dams on the Monongahela River, depicting navigation pool elevations and upstream distances from Pittsburgh (modified from USACE).

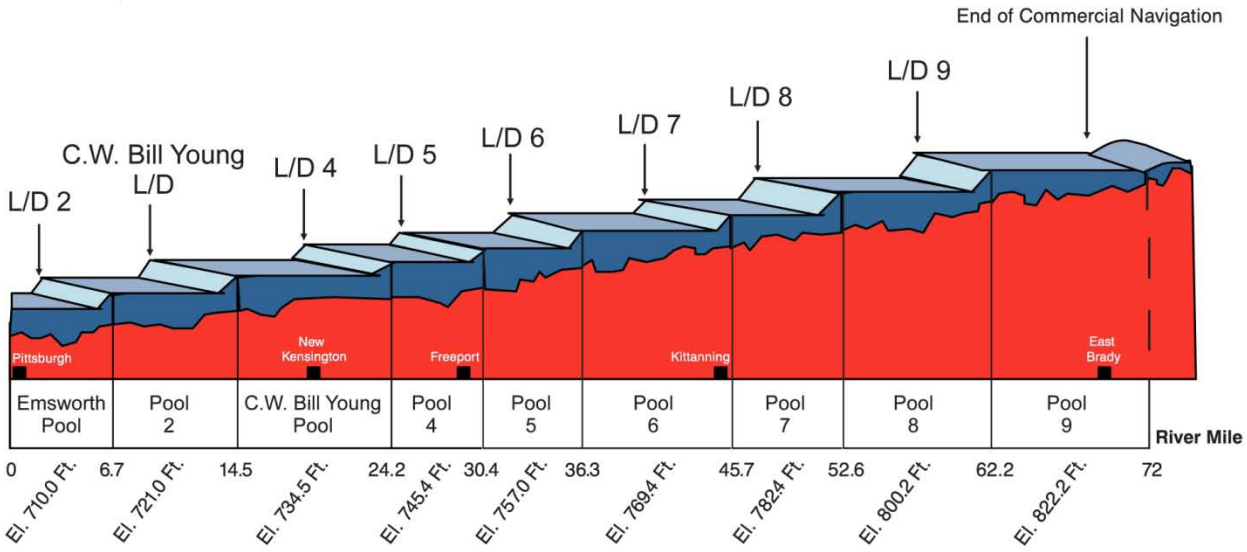


Figure 3. Profile of locks and dams on the lower Allegheny River, depicting navigation pool elevations and upstream distances from Pittsburgh (modified from USACE).

Using nighttime boat electrofishing gear (Photograph 1), the objectives of these surveys included collecting all fish, both game and nongame species, as well as collecting stock assessment information on game fish species, including smallmouth bass, walleye, sauger, freshwater drum, rock bass, and white bass. This *Biologist Report* summarizes findings for these six species of angler interest collected during the 2011-2012 L/D tailwaters surveys.

Photograph 1. Three Rivers fisheries biologist aide Josh Reffner (left) and Three Rivers biologist Bob Ventorini (right) search for fish to net at the tailwaters of Allegheny River L/D 2 near Highland Park (photograph by Erica Hilliard, used with permission courtesy of Mary Ann Thomas, *Valley News Dispatch*).

All fish collected were identified to species, and game fish were weighed and measured for total length. Scale samples for age and growth determinations were taken on all smallmouth bass, walleye, sauger, rock bass, and white bass. At each L/D tailwater, 50-minute electrofishing runs were made on both the left bank and right bank, typically extending from the lock wall downstream for approximately 1.5 miles.

Table 1 summarizes our catch data for six game fish species collected during the 2011-2012 L/D tailwater surveys.

Table 1. Numbers of individuals (and range of total lengths in inches) of smallmouth bass, sauger, walleye, freshwater drum, rock bass, and white bass collected from Three Rivers L/D tailwater surveys in 2011-2012.

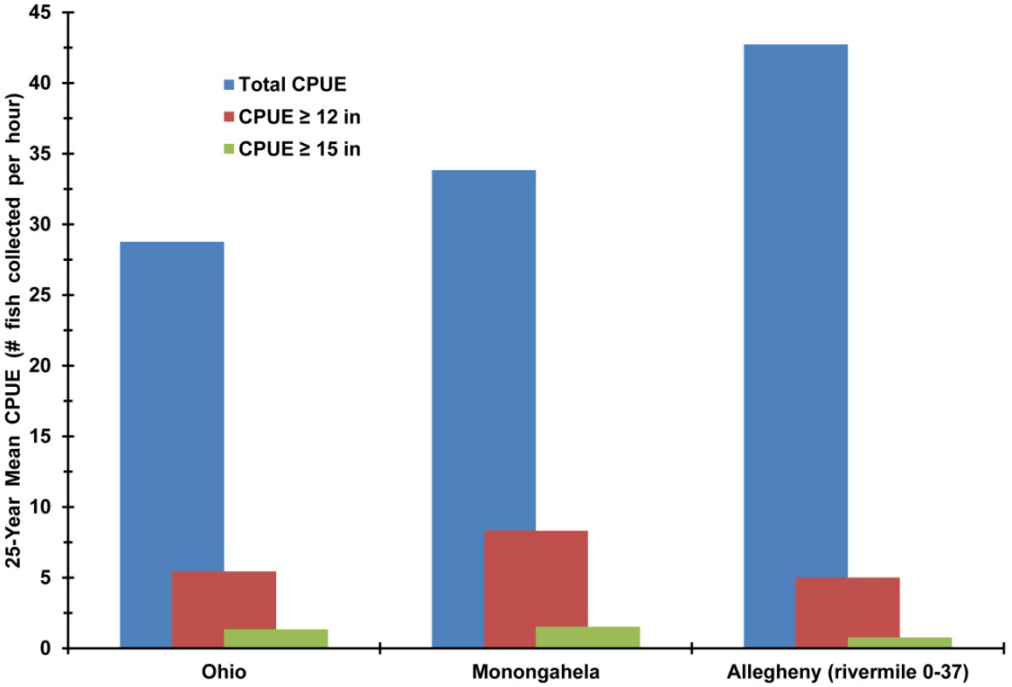
	Ohio River			Monongahela River					Allegheny River		
	Dashields Spring 2011	**Dashields** Fall 2011	**Emsworth** Spring 2012	**Braddock** Spring 2011	**Maxwell** Spring 2011	**Grays Landing** Spring 2011	**Maxwell** Fall 2011	**L/D 3** Spring 2012	**L/D 5** Spring 2011	**L/D 5** Fall 2011	**L/D 2** Spring 2012
Smallmouth bass	100 (5-18)	45 (4-17)	49 (3-17)	103 (5-16)	84 (3-19)	92 (3-20)	53 (5-14)	71 (3-16)	111 (3-14)	152 (3-17)	101 (4-18)
Walleye	5 (9-13)	20 (7-17)	23 (5-31)	8 (11-17)	10 (9-15)	11 (8-14)	9 (11-17)	4 (8-17)	87 (6-16)	133 (4 to 15)	15 (10 to 15)
Sauger	62 (9-15)	71 (11-16)	28 (11-15)	7 (13-16)	13 (12-15)	9 (8-15)	21 (11-19)	4 (12-16)	15 (9-14)	32 (11-16)	9 (12-16)
Freshwater drum	18 (12-20)	17 (5-22)	50 (7-23)	34 (4-21)	18 (3-19)	4 (15-19)	13 (6-21)	45 (6-18)	9 (12-22)	19 (4-29)	21 (12-22)
Rock bass	12 (5-11)	1 (5)	15 (4-9)	14 (2-8)	61 (2-8)	40 (4-9)	24 (4-8)	98 (2-8)	31 (2-8)	11 (1-7)	57 (3-9)
White bass	35 (6-10)	44 (5-11)	9 (6-15)	22 (5-8)	4 (8)	9 (6-10)	3 (4-10)	8 (5-9)	1 (7)	7 (4-6)	3 (6-9)

Three Rivers 25 year Comparison

As part of routine stock assessments of managed fisheries, PFBC biologists use catch-per-unit-effort (CPUE; typically expressed as number of fish collected per hour of electrofishing) values to estimate population relative abundances and serve as the main evaluation tool, primarily for legal-size fish. Every year, for each of the Three Rivers, mean CPUE values are updated using the previous 25 years of nighttime boat electrofishing data. These mean CPUE values are used to make comparisons among the Three Rivers, as well as to serve as evaluation benchmarks for L/D tailwaters of each river.

Among the Three Rivers, over the past 25 years, the lower Allegheny River (rivermile 0 at Pittsburgh upstream to rivermile 37 near L/D 6) has produced higher catch rates for smallmouth bass. However, the Monongahela River has provided more legal (≥ 12 inch and ≥ 15 inch) smallmouth bass than the other two rivers (Figure 4).

Figure 4. Mean smallmouth bass catch rates from nighttime boat electrofishing surveys of the Three Rivers over the past 25 years.



Likewise, over the past 25 years, the lower Allegheny River has produced higher catch rates for all walleye and legal (≥ 15-inch) walleye among the Three Rivers (Figure 5). However, the Monongahela River continues to be the leader in maintaining the most productive sauger fishery (even in all of Pennsylvania; Figure 6).

Figure 5. Mean walleye catch rates from nighttime boat electrofishing surveys of the Three Rivers over the past 25 years.

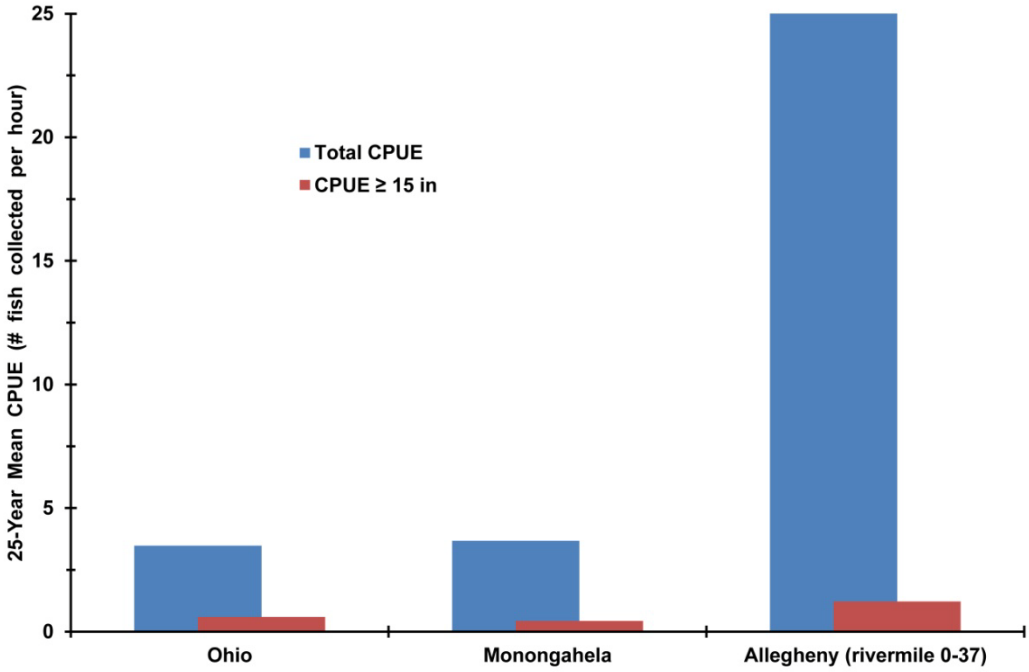
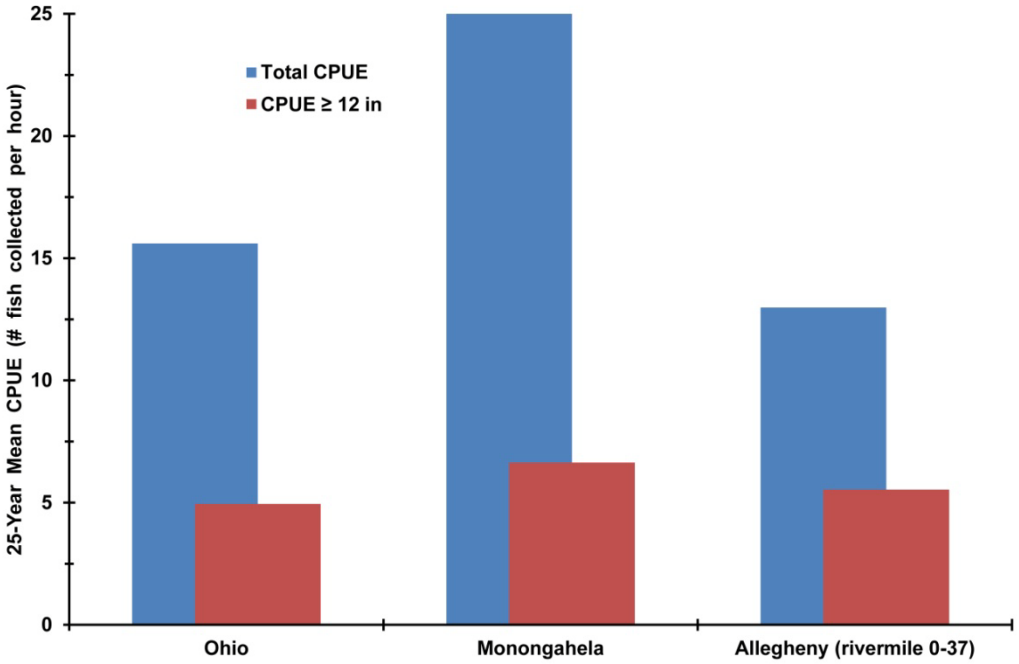
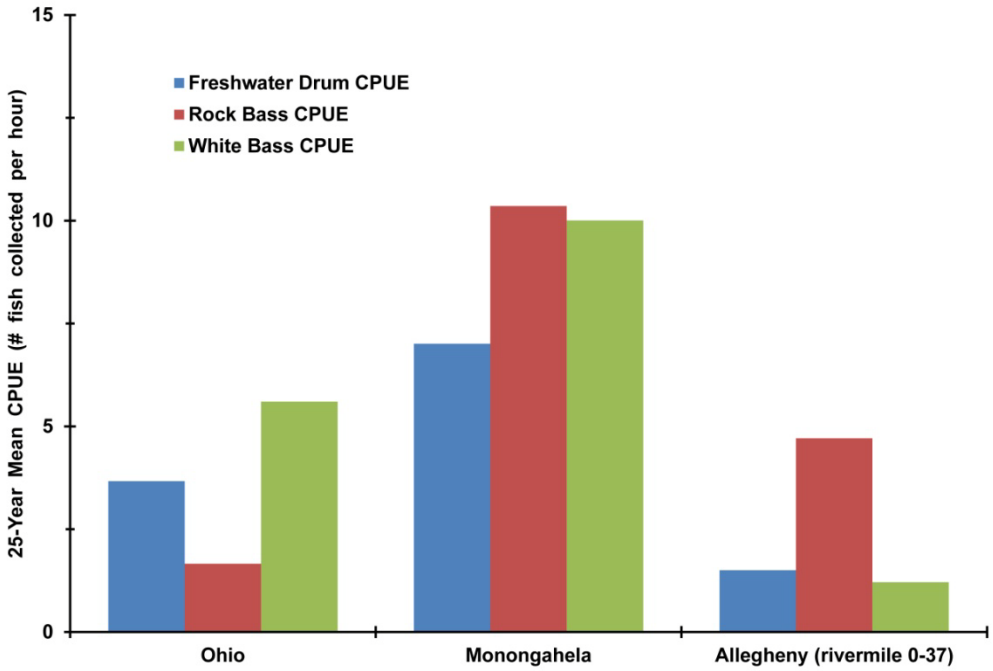


Figure 6. Mean sauger catch rates from nighttime boat electrofishing surveys of the Three Rivers over the past 25 years.



In consideration of catch rates of freshwater drum, rock bass, and white bass, the Monongahela River was also more productive over the past 25 years than the other two rivers (Figure 7).

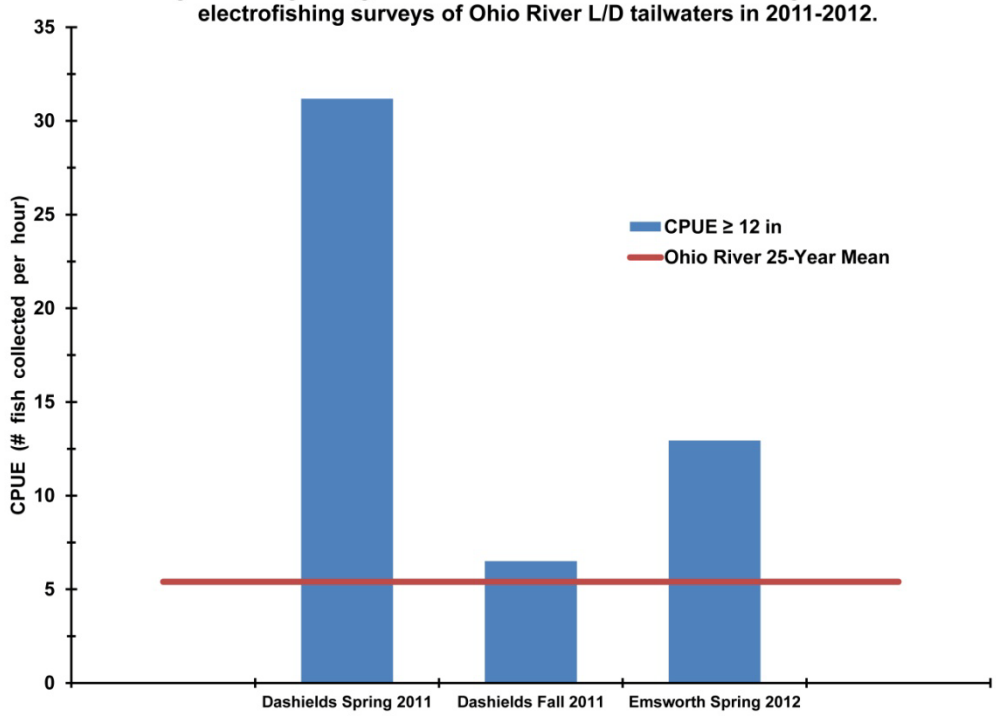
Figure 7. Mean freshwater drum, rock bass, and white bass catch rates from nighttime boat electrofishing surveys of the Three Rivers over the past 25 years.



2011-2012 Ohio River Evaluation

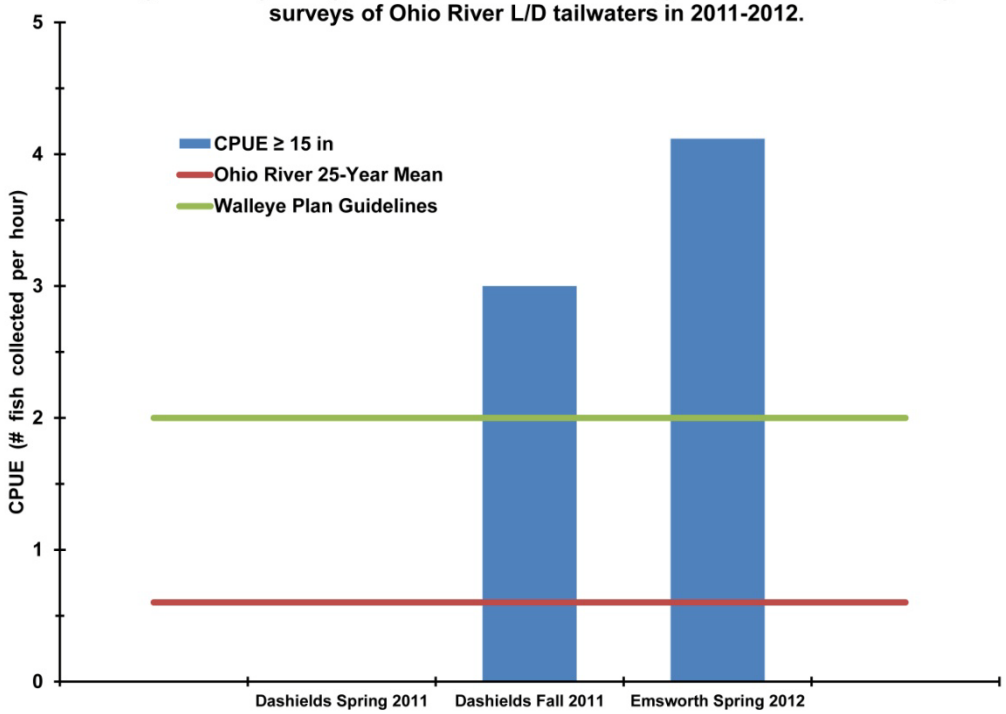
Catch rates of legal (≥ 12-inch) smallmouth bass were above average at Dashields L/D in 2011 and at Emsworth L/D in 2012 (Figure 8).

Figure 8. Legal-length smallmouth bass catch rates from nighttime boat electrofishing surveys of Ohio River L/D tailwaters in 2011-2012.



Although no legal (≥ 15-inch) walleye were collected at Dashields L/D in spring 2011, a greater than average number were collected there in fall 2011, as well as at Emsworth L/D this past spring (Figure 9; Photograph 2). Catch rates at these two locations exceeded the minimum 2.0 legal walleye per hour guidelines presented in the PFBC's Walleye Fisheries Management Plan.

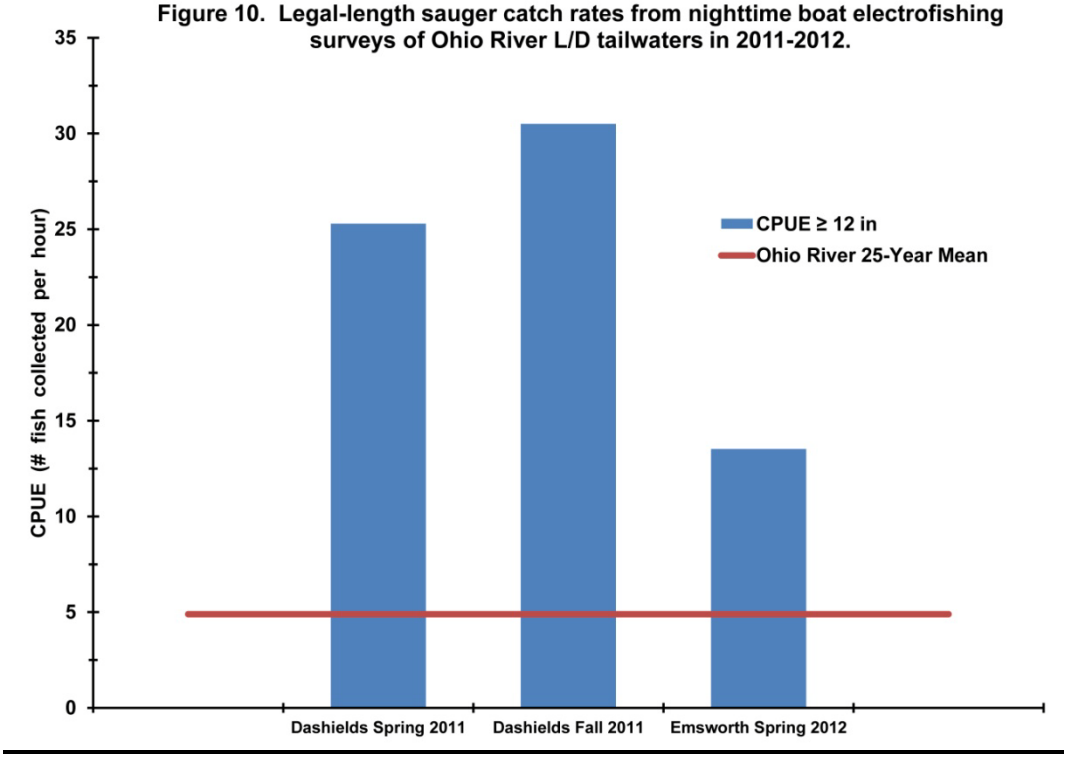
Figure 9. Legal-length walleye catch rates from nighttime boat electrofishing surveys of Ohio River L/D tailwaters in 2011-2012.



Photograph 2. Mike Hosack, fisheries biologist with PFBC's Lake Erie Research Unit, wanted to spend an evening this past spring electrofishing a large river with Area 8's seasoned crew. Mike was glad that he did, as he was afforded the opportunity to handle the largest walleye collected by PFBC biologists from the Three Rivers – this 31-inch, 10-pound-5-ounce bruiser collected from the Emsworth L/D tailwaters on the Ohio River.

Legal (≥ 12-inch) sauger catch rates at all Ohio River L/D tailwater sites were well above average (Figure 10).

Figure 10. Legal-length sauger catch rates from nighttime boat electrofishing surveys of Ohio River L/D tailwaters in 2011-2012.

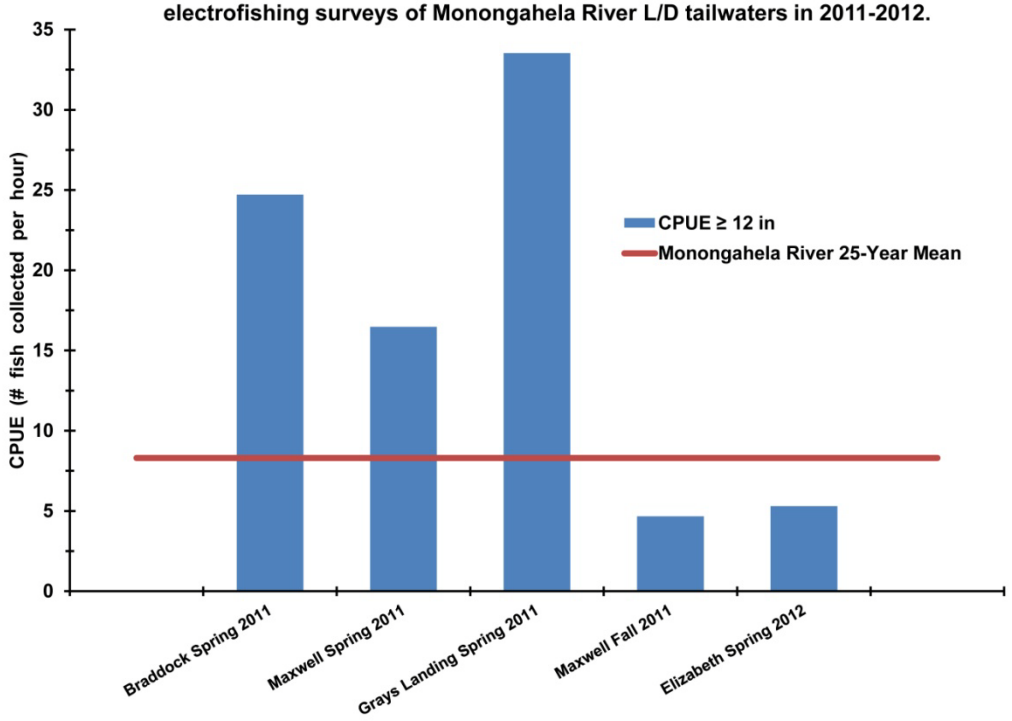


2011-2012 Monongahela River Evaluation

Catch rates of legal (≥ 12 -inch) smallmouth bass were above average at Braddock L/D, Maxwell L/D, and Grays Landing L/D in spring 2011, and below average at Maxwell L/D in fall 2011 and Elizabeth L/D in spring 2012 (Figure

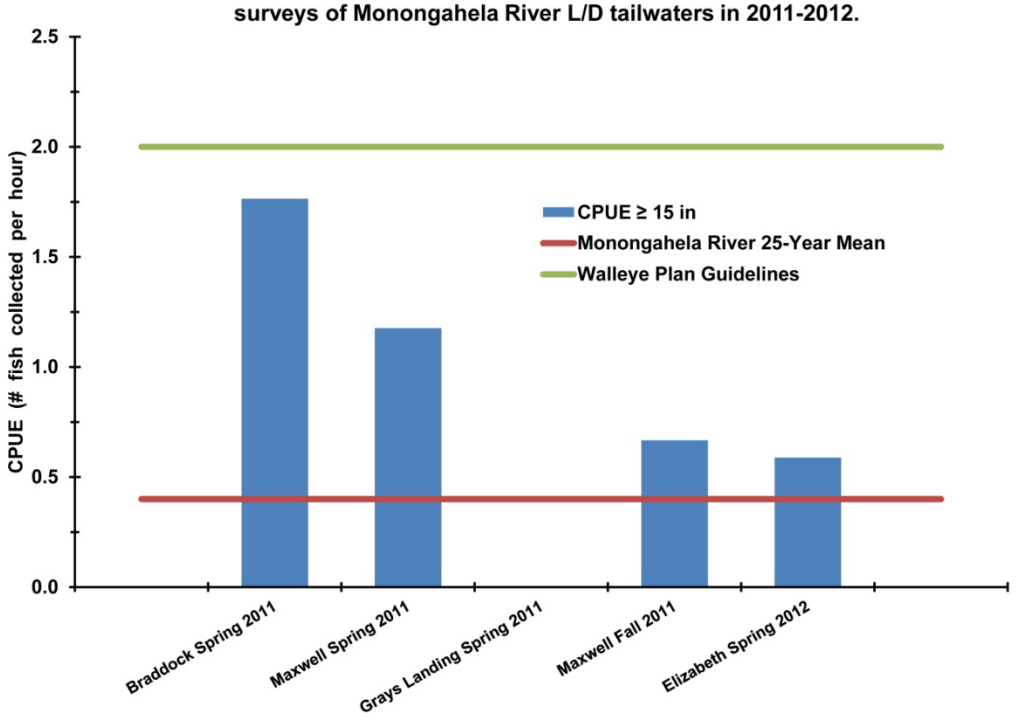
11). The catch rate of legal (≥ 12 inches) smallmouth bass at Grays Landing was remarkable (one of the highest catch rates on record for legal-size smallmouth bass on the Three Rivers).

Figure 11. Legal-length smallmouth bass catch rates from nighttime boat electrofishing surveys of Monongahela River L/D tailwaters in 2011-2012.



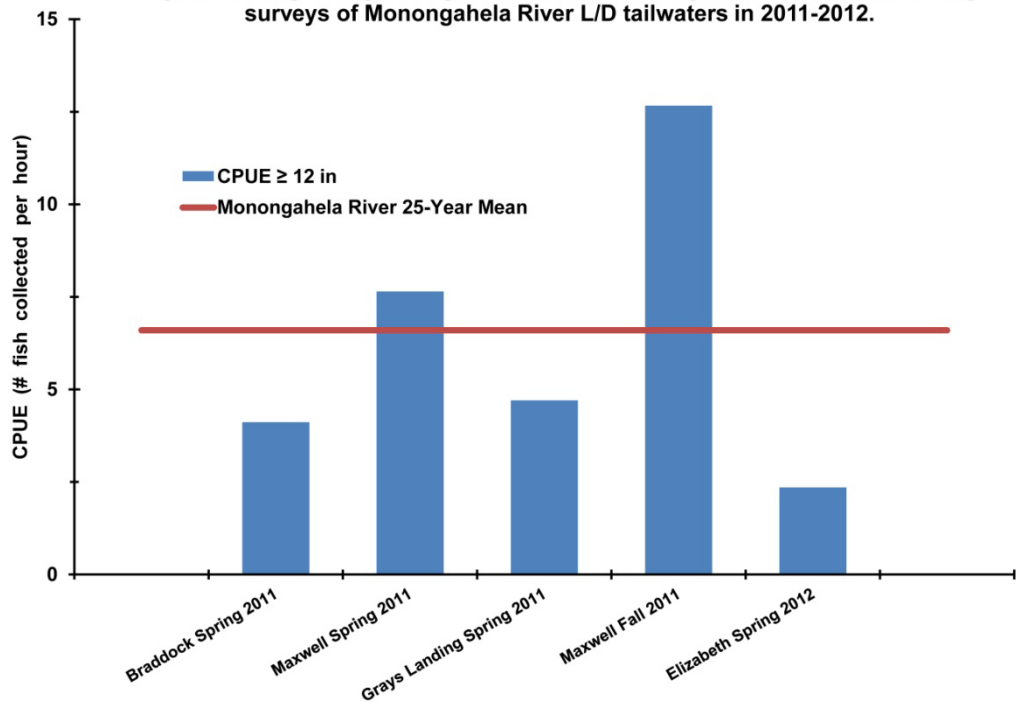
A greater than average number of legal (≥ 15 -inch) walleye were collected at all Monongahela River L/D tailwater sites with the exception of Grays Landing L/D – a stark contrast to the legal-size smallmouth bass catch rates there (Figure 12). However, none of these locations met the minimum 2.0 legal walleye per hour guidelines presented in the PFBC's Walleye Fisheries Management Plan.

Figure 12. Legal-length walleye catch rates from nighttime boat electrofishing surveys of Monongahela River L/D tailwaters in 2011-2012.



Only at Maxwell L/D (both in spring and fall 2011) did legal (≥ 1 2-inch) sauger catch rates exceed the average (Figure 13).

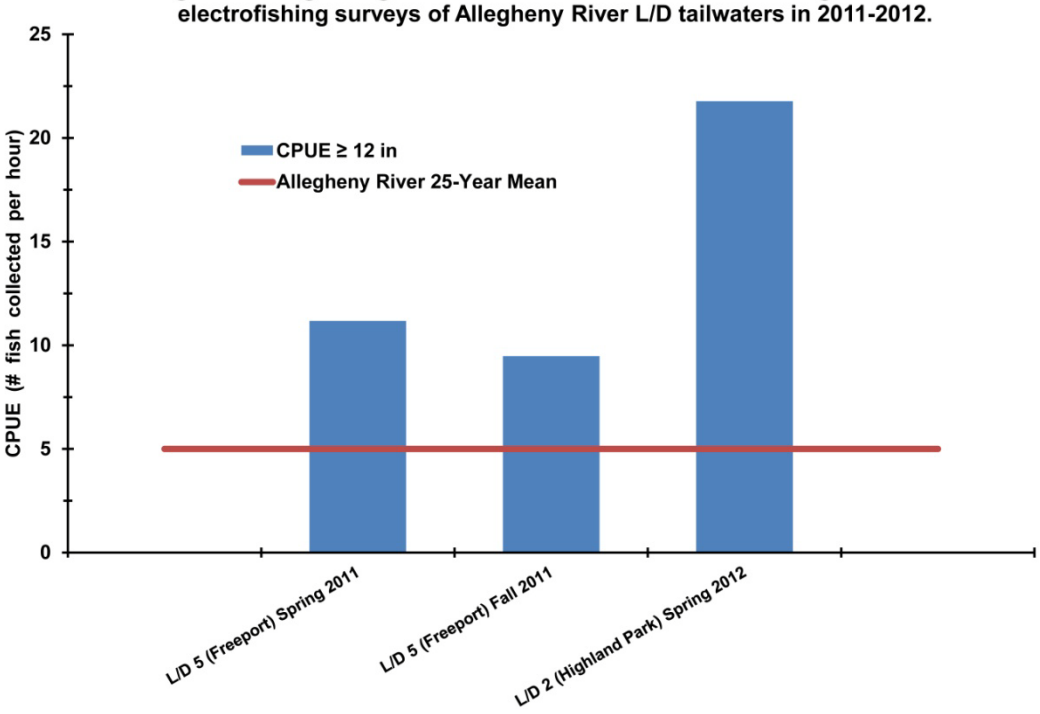
Figure 13. Legal-length sauger catch rates from nighttime boat electrofishing surveys of Monongahela River L/D tailwaters in 2011-2012.



2011-2012 Allegheny River Evaluation

Catch rates of legal (≥ 12 -inch) smallmouth bass were well above average at all the Allegheny River L/D tailwater sites, especially at L/D 2 near Highland Park (Figure 14; Photograph 3).

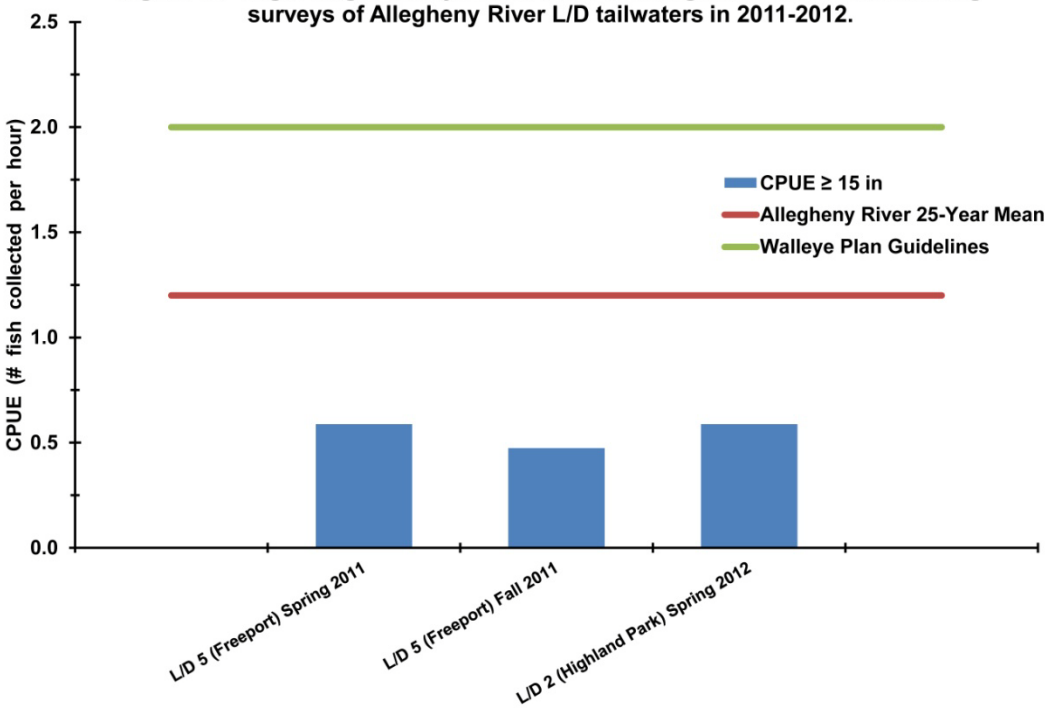
Figure 14. Legal-length smallmouth bass catch rates from nighttime boat electrofishing surveys of Allegheny River L/D tailwaters in 2011-2012.



Photograph 3. Joe Cocco, Area 8 fisheries biologist aide, with a nice 18-inch smallmouth bass collected from the tailwaters of L/D 2 on the Allegheny River – only about six miles upriver from downtown Pittsburgh.

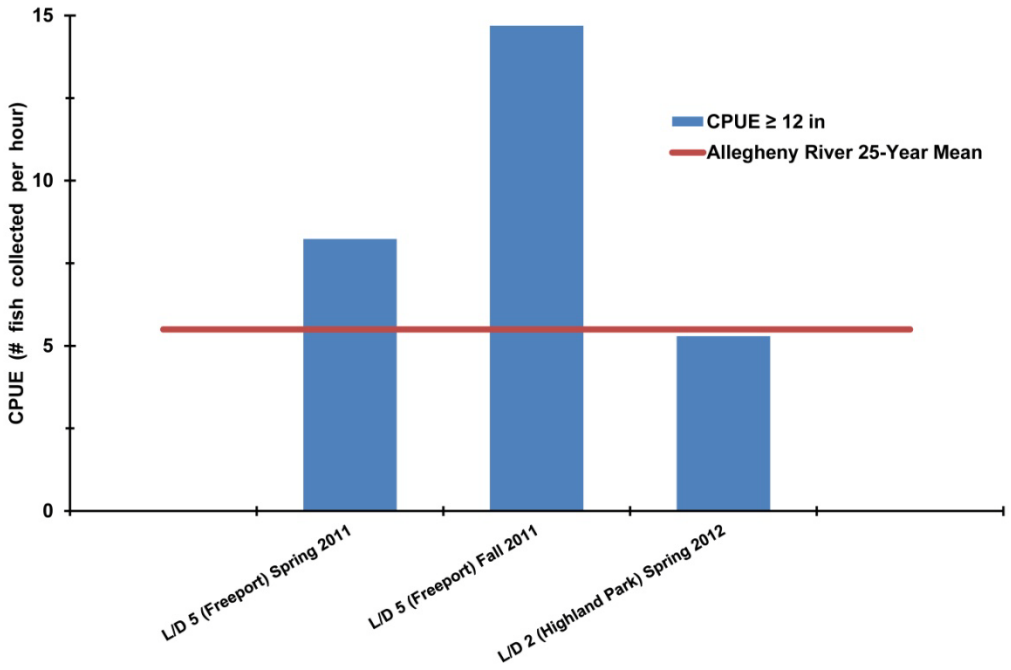
Catch rates of legal (≥ 15 -inch) walleye were well below average at all the Allegheny River L/D tailwater sites; and none met the minimum 2.0 legal walleye per hour guidelines presented in the PFBC's Walleye Fisheries Management Plan. (Figure 15).

Figure 15. Legal-length walleye catch rates from nighttime boat electrofishing surveys of Allegheny River L/D tailwaters in 2011-2012.



Only at L/D 5 near Freeport did catches of legal (≥ 12-inch) sauger exceed the average (both in spring and fall 2011; Figure 16).

Figure 16. Legal-length sauger catch rates from nighttime boat electrofishing surveys of Allegheny River L/D tailwaters in 2011-2012.

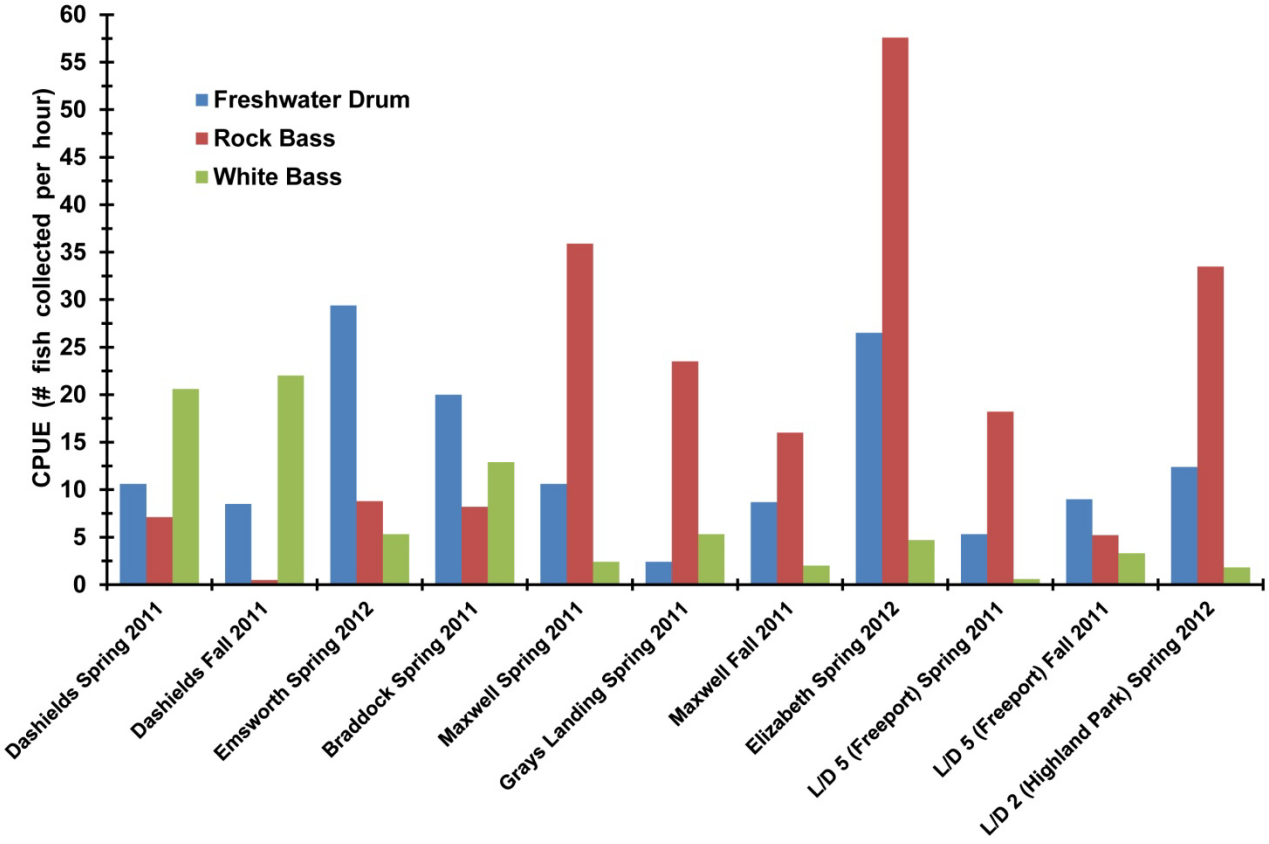


Angler Options

Because of their popularity with anglers fishing the Three Rivers and relative abundance, one of our main objectives for conducting nighttime boat electrofishing surveys of L/D tailwaters is to collect data on what we call "The Big Three" – smallmouth bass, walleye, and sauger. In addition to these three species, we also typically collect bluegill, pumpkinseed, muskellunge, tiger muskellunge, northern pike, common carp, hybrid striped bass, channel catfish, and flathead catfish; however, not usually in any great abundances. However, we do collect freshwater drum, rock bass, and white bass in relatively high abundances, and these three species can provide anglers with fishing alternatives to The Big Three and/or fishing alternatives to catfish.

For 2011-2012, Emsworth L/D, Elizabeth L/D, and Braddock L/D produced the highest catch rates for freshwater drum (that can attain a large size, Photograph 4); Elizabeth L/D appeared to be the best place to go to target rock bass; and Dashields L/D for white bass (Figure 17).

Figure 17. Freshwater drum, rock bass, and white bass catch rates from nighttime boat electrofishing surveys of Three Rivers L/D tailwaters in 2011-2012.



Photograph 4. Sizeable freshwater drum collected near the tailwaters of L/D 2 on the Allegheny River. You can get an idea how much bait this fish can fit in its mouth (crayfish are good bait to target drum).

Three Rivers L/D Tailwaters Fishing Recommendations

This is a Summary of highest abundance based on our sampling data.

- Smallmouth bass – Ohio River Dashields L/D; Monongahela River Grays Landing L/D; and Allegheny River L/D 2.
- Walleye – Ohio River Emsworth L/D and Dashields L/D.
- Sauger – Any of the L/D tailwaters on the Three Rivers.
- Freshwater drum – Ohio River Emsworth L/D; and Monongahela River Elizabeth L/D.
- Rock bass – Monongahela River Elizabeth L/D (good location to also target bluegill).
- White bass – Ohio River Dashields L/D.

Future Analysis and Field Work

Another objective of conducting nighttime boat electrofishing surveys of L/D tailwaters is to collect data on nongame fish species, like minnows and suckers, and to use the diversity of fish assemblages to depict the relative health of the Three Rivers. Some of this work has already been accomplished (see these Biologist Reports: PFBC 2010 Biologist Report - Monongahela River; PFBC 2009 Biologist Report - Monongahela River). After we identify the many small fish (mostly minnows) we collected during the 2012 L/D tailwaters surveys, we will analyze the data using a multimetric index method used to depict biological integrity (we typically use ORSANCO's Modified Ohio River Fish Index).

For 2013, we will survey a new set of L/D on the Three Rivers – probably Montgomery L/D on the Ohio River, L/D 4 (at Charleroi) on the Monongahela River, and L/D 4 (at Natrona) on the Allegheny River. See you on the river!

Bob Ventorini
Three Rivers Fisheries Biologist