

Delaware River Basin

Lehigh, Monroe, Northampton, and Pike Counties

2017 & 2022 Muskellunge Surveys

The Delaware and Lehigh rivers, in northeastern Pennsylvania, offer diverse opportunities for angling and boating recreation. The Pennsylvania Fish and Boat Commission (PFBC) manage and monitor each rivers' sport fish populations, including the highly sought-after Muskellunge. Specifically, PFBC stocks both the Delaware (Cummings Creek confluence to the Lehigh River confluence) and Lehigh (Northampton Dam to Easton Dam) rivers with fingerling and/or yearling Muskellunge (Table 1) in support of destination Muskellunge fisheries within those reaches. The Delaware River is managed under [Delaware River and Estuary](#) regulations, and the Lehigh River above Easton Dam is under [Commonwealth Inland Waters](#) regulations.

Monitoring of stocked Muskellunge waters is required under the [Pennsylvania Muskellunge Management Plan](#) to determine the success of stocking. Targeted Muskellunge boat electrofishing surveys were conducted in 2017 and 2022. Surveys completed in April 2017 consisted of two (2) sites on the Lehigh River, Canal Park in Allentown (N = 2 surveys) and in the vicinity of the State Route 33 (SR33) access (N = 2 surveys) in Easton. Within the same timeframe, surveys at two (2) sites were conducted on the Delaware River, Smithfield Beach (N = 2 surveys; Smithfield) and the Delaware Water Gap (N = 2 surveys; Water Gap) near the Interstate 80 bridge. In 2022, Area 5 biologists expanded their efforts to evaluate Muskellunge within the Delaware and Lehigh Rivers. Electrofishing surveys were completed during the months of March (N = 3), April (N = 3), and May (N = 3) at Smithfield, March (N = 2) and May (N = 2) at Canal Park, and March (N = 2) at the Water Gap. Surveys were canceled at SR33 in 2022, Canal Park in April, 2022 and the Water Gap in April, 2022 and May, 2022 due to high river flows and time constraints. All captured Muskellunge and Tiger Muskellunge were measured and implanted with PIT tags. Tiger Muskellunge were not used in the calculated relative abundance estimates by way of catch-per-unit-effort (CPUE, fish/hr.) within this report.

A total of 9 and 19 Muskellunge were captured in 2017 and 2020 surveys respectively, whereas a single Tiger Muskellunge were captured in both years (Table 2). Sizes of captured muskellunge ranged from 15.0" to 48.0" (Table 2). The mean annual CPUEs for Muskellunge (all sites combined, by river) on the Delaware and Lehigh Rivers for the 2017 surveys were 2.2 fish/hr. and 1.2 fish/hr., respectively. In 2022, surveys resulted in mean annual CPUEs of 1.2 fish/hr. for the Delaware River and 4.8 fish/hr. on the Lehigh River (Figure 1). CPUEs of zero (0) occurred at SR33 and Water Gap in April of 2017 and at Water Gap in March 2022 (Figure 2). The relative abundance of Muskellunge observed during March in 2022 (CPUE = 0.7 fish/hr.) was likely adversely influenced by low catchability. Water temperature was 45.5°F, which was below the target temperature for electrofishing surveys of at least 50°F per the Muskellunge Management Plan. Thus, the fish likely remained in deeper, warmer water beyond the reach of our electrofishing survey. Subsequent sampling in April (52.3°F) and May (53.6°F) at Smithfield resulted in CPUEs of 2.9 fish/hr. and 2.7 fish/hr., respectively as fish began to inhabit shallower shoreline habitats.

Habitat availability in both rivers at the various sampling sites, also likely influenced catchability. PFBC biologist observed numerous instances of large woody debris (LWD) in the river at the Canal Park and Smithfield Beach survey locations. This is in contrast with minimal LWD observed at the SR33 and Water Gap survey locations. LWD is an important muskellunge habitat component, as such the absence of LWD could heavily influence the presence of muskellunge and our catch at any survey location.

Table 1. Number of Muskellunge (pure strains only) stocked by the PFBC in the Delaware (Cummings Creek confluence to the Lehigh River) and Lehigh (Northampton Dam to Easton Dam) rivers 2012 – 2021 by river section.

Year	Development	Lehigh River	Delaware River
2012	Fingerling	4750	20300
	Yearling	0	0
2013	Fingerling	4750	20300
	Yearling	0	0
2014	Fingerling	4750	20300
	Yearling	0	0
2015	Fingerling	1900	9000
	Yearling	0	0
2016	Fingerling	1900	9000
	Yearling	0	0
2017	Fingerling	0	0
	Yearling	0	0
2018	Fingerling	0	0
	Yearling	0	0
2019	Fingerling	800	2750
	Yearling	800	2725
2020	Fingerling	900	2850
	Yearling	0	0
2021	Fingerling	0	0
	Yearling	800	2725

Table 2. Date, water body, and location of capture; Species; and Total Length (TL, inches) for Muskellunge and Tiger Muskellunge during the 2017 and 2022 electrofishing surveys on the Delaware and Lehigh rivers.

Date	Water Body	Location	Species	TL (in)
4/27/2017	Delaware River	Smithfield Beach	Muskellunge	25.8
4/27/2017	Delaware River	Smithfield Beach	Muskellunge	35.4
4/27/2017	Delaware River	Smithfield Beach	Muskellunge	15.0
4/27/2017	Delaware River	Smithfield Beach	Muskellunge	15.3
4/27/2017	Delaware River	Smithfield Beach	Muskellunge	34.6
4/28/2017	Delaware River	Smithfield Beach	Muskellunge	26.2
3/16/2022	Delaware River	Smithfield Beach	Muskellunge	32.7
4/25/2022	Delaware River	Smithfield Beach	Muskellunge	28.5
4/25/2022	Delaware River	Smithfield Beach	Muskellunge	31.5
4/25/2022	Delaware River	Smithfield Beach	Muskellunge	44.9
5/9/2022	Delaware River	Smithfield Beach	Muskellunge	32.2
5/9/2022	Delaware River	Smithfield Beach	Muskellunge	32.5
5/9/2022	Delaware River	Smithfield Beach	Muskellunge	42.2
4/24/2017	Lehigh River	Canal Park	Muskellunge	30.1
4/24/2017	Lehigh River	Canal Park	Muskellunge	41.7
4/24/2017	Lehigh River	Canal Park	Tiger Muskellunge	38.2
4/24/2017	Lehigh River	Canal Park	Muskellunge	25.8
3/18/2022	Lehigh River	Canal Park	Muskellunge	20.0
3/18/2022	Lehigh River	Canal Park	Muskellunge	18.7
3/18/2022	Lehigh River	Canal Park	Muskellunge	35.2
3/18/2022	Lehigh River	Canal Park	Muskellunge	35.0
3/18/2022	Lehigh River	Canal Park	Muskellunge	32.0
3/18/2022	Lehigh River	Canal Park	Muskellunge	18.7
3/18/2022	Lehigh River	Canal Park	Muskellunge	19.0
3/18/2022	Lehigh River	Canal Park	Tiger Muskellunge	48.0
5/11/2022	Lehigh River	Canal Park	Muskellunge	35.4
5/11/2022	Lehigh River	Canal Park	Muskellunge	35.0
5/11/2022	Lehigh River	Canal Park	Muskellunge	42.5
5/11/2022	Lehigh River	Canal Park	Muskellunge	33.5
5/11/2022	Lehigh River	Canal Park	Muskellunge	33.5

Figure 1. Mean annual catch per unit effort (CPUE, fish/hr) of Muskellunge for the Delaware (Cummings Creek confluence to Lehigh River confluence) and Lehigh (Northampton Dam to Easton Dam) rivers from boat electrofishing surveys conducted in 2017 and 2022 with associated Muskellunge Management Plan CPUE benchmark.

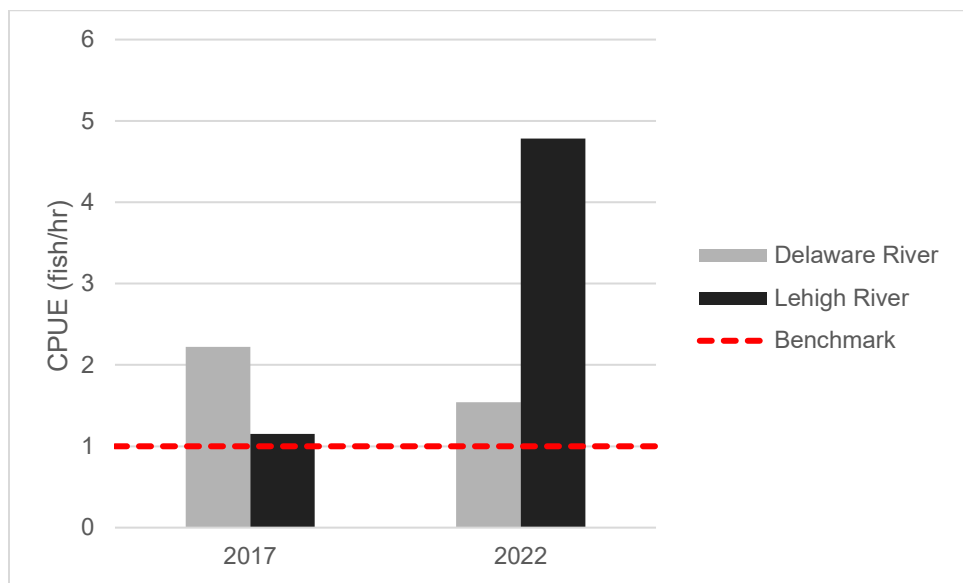
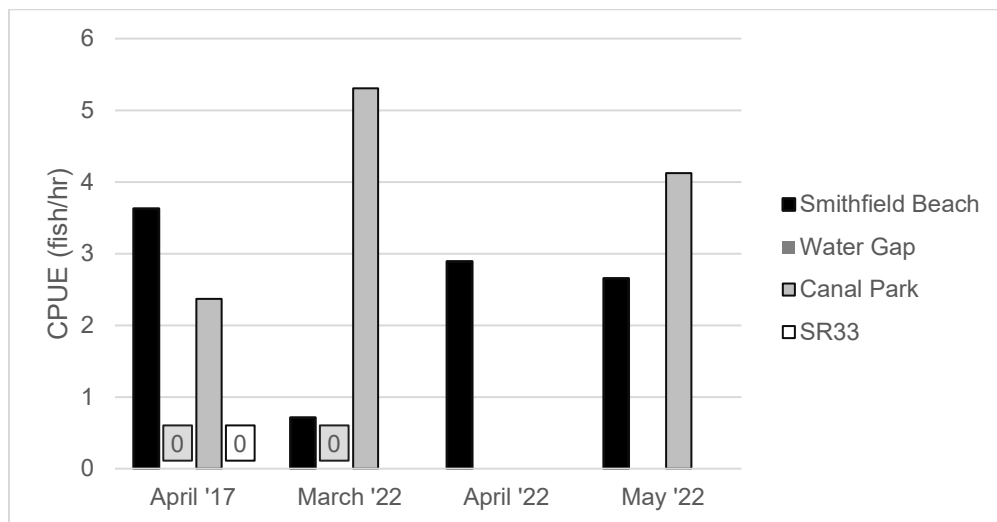


Figure 2. Catch per unit effort (fish/hr) of Muskellunge from boat electrofishing surveys conducted in 2017 and 2022 at Canal Park, State Route 33 (SR33, Lehigh River), Smithfield Beach, and the Delaware Water Gap (Water Gap, Delaware River). Surveys were canceled at SR33 in 2022, Canal Park in April 2022, and the Water Gap in April and May 2022 due to high river flows and time constraints.



Observed relative abundance of Muskellunge were suggestive of well-established populations in both rivers. Indeed, the observed 2022 CPUE values at the Canal Park site were exceptional in both March (5.3 fish/hr.) and May (4.1 fish/hr., Figure 2) sampling events. However, no young-of-year Muskellunge were observed, suggesting natural reproduction is not occurring. The PFBC's Muskellunge Management Plan establishes a CPUE benchmark of 1.0 fish/hr. for stocking evaluations. Observed annual CPUE values from both the Delaware and Lehigh Rivers surpassed this benchmark in both the 2017 and 2022 surveys. We are extremely

pleased with these survey results, particularly at Smithfield and Canal Park. The Lehigh and Delaware Rivers provide exceptional Muskellunge opportunities for anglers within Area 5.



Biologist Anthony Winn with a 44.9 inch Muskellunge captured on April 25, 2022 at Smithfield Beach on the Delaware River

***Anthony Winn
Area 5 Fisheries Biologist***