

## **North Branch Susquehanna River Muskellunge Management Change**

Beginning in 2017 the Pennsylvania Fish and Boat Commission (PFBC) will manage Muskies in the North Branch through natural reproduction. Intensive sampling of both adult (age 1 and older) and young-of-the year (YOY; age 0) Muskies conducted throughout the river in 2016 led to this management change. The 2016 surveys are detailed below. In summary, the results demonstrated that the North Branch Musky population is supported by a self-sustaining Musky population. Very few (if any) hatchery origin Muskies were present in the adult samples. Wild YOY Muskies were plentiful and were present in all reaches of the river and as such, Muskies will no longer be stocked in the North Branch Susquehanna River.

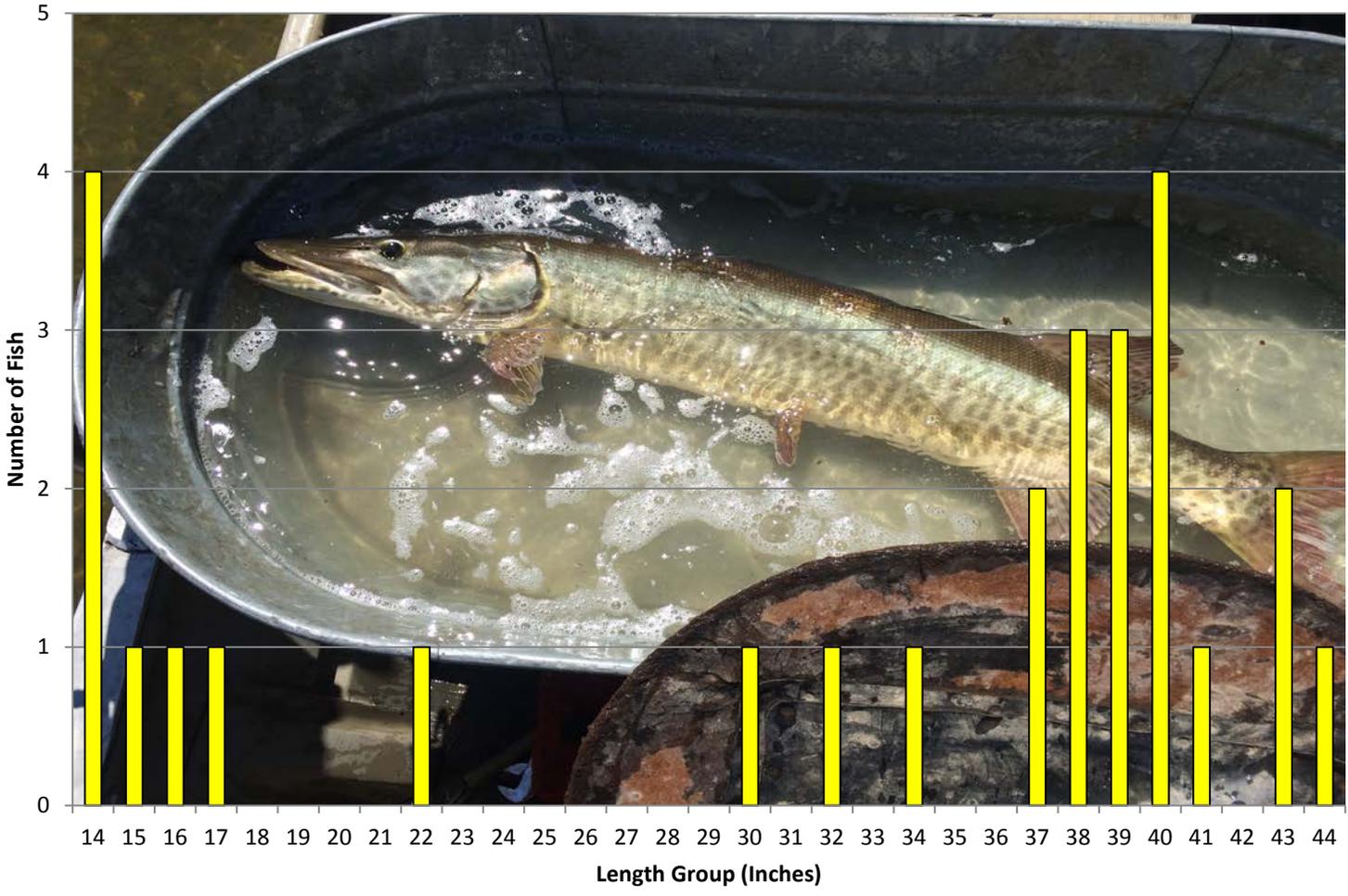
### **2016 Adult Muskellunge Sampling**

*Penn State Interns Marty Kelly (left) and Josh Masich (right) with a 44 inch female Musky captured at Northumberland on May 17, 2016*



We used daylight boat electrofishing to sample adult Muskellunge in 2016. In 13 days of effort we captured 24 adults. During that sampling we also briefly immobilized but missed another 16 adults. Most of the misses occurred in the beginning of the survey when we were still refining our techniques. We caught three additional adult Muskies during other sampling work on the river for a total sample size of 27 fish collected in 2016. The adult Muskies ranged from 14 to 44 inches long (Figure 1).

Figure 1. Length-frequency distribution of 27 adult Muskellunge captured in the North Branch Susquehanna River in 2016.



Mean catch per unit effort (CPUE) of adult Muskies was 1.56 per hour. In similar work, Musky CPUE was 1.36 per hour on the New River, Virginia (Brenden et al. 2007); 2.61 per hour on the upper Niagara River, New York (Kapuscinski et al. 2010); and 0.60 per hour in Kentucky streams (Axon and Kornman 1986). The CPUE on the North Branch Susquehanna River in 2016 compared favorably to the above waters, indicating that the North Branch supported a good quality Muskellunge population.

We took scale samples from all of the adult Muskies we captured in 2016. Scale samples tell biologists how old a fish is and how fast it grows. We found that Muskies in the North Branch grow very fast (Table 1).

Table 1. Mean lengths at age for Muskellunge captured in the North Branch Susquehanna River in 2016.

Age	Mean Length (Inches) at Age for Muskellunge in the North Branch Susquehanna River
1	13.5
2	24.5
3	30.7
4	34.5
5	37.2
6	38.8
7	40.2

Mean length at age 1 (13.5 inches) was extremely high. The PFBC usually stocks the North Branch with 6 to 7 inch Muskies at the end of September. The growing season usually lasts until the end of October so the stocked fish would have one month to grow. In that time they would probably grow another inch or two but they couldn't possibly reach 13 inches. By comparison, mean length at age 1 for Muskies captured in Frances Slocum Lake in 2016 was only 8.4 inches. The Musky population at Frances Slocum Lake is almost entirely supported by stocking. Thus, we concluded that most if not all of the adult Muskies we caught from the river in 2016 were wild fish.

## 2016 YOY Muskellunge Sampling

*6.1 inch YOY Muskellunge captured at Shickshinny on August 2, 2016.*



We first attempted to sample wild YOY Muskies from the North Branch Susquehanna River in [2015](#). That year we collected 15 YOY through backpack electrofishing. We determined that backpack electrofishing was inefficient so, in 2016, we attempted to collect YOY Muskies through daylight boat electrofishing. This technique worked much better. We sampled at 33 sites between August 2 and September 6. In 13 days of effort we captured 31 wild YOY Muskies and missed six others. We know these fish were wild because we sampled before the hatcheries stocked fingerling Musky. The YOY measured between 6.0 and 10.4 inches total length. Mean CPUE values were 2.85 YOY per hour and 0.48 YOY per mile.

The YOY CPUE from the North Branch Susquehanna River was similar to other Musky rivers managed for natural reproduction. On the New River, Virginia, YOY CPUE has ranged from 1.2 to 7.7 per hour ([New River Management History](#)). In the Upper Caney Fork River System of Tennessee, YOY CPUE was 1.90 per hour (Warren 2013). Finally, the North Branch value of 0.43 YOY per mile was above the 0.24 YOY per mile figure that Wisconsin uses to define a self-sustaining lake Muskellunge population (Simonsin 2013).

## Future Muskellunge Sampling

We will initiate annual monitoring of both adult and YOY Muskellunge on the North Branch Susquehanna River in 2017. The purpose of adult monitoring is to measure the response of the Musky population to the management change. There is some evidence that Musky populations increase following stocking termination. However, if the opposite happens and the population unexpectedly begins to decrease, we'll be able to resume stocking without serious impact to the fishery. The purposes of YOY monitoring are to 1) continue identification of Musky spawning and nursery areas; 2) determine what CPUE values constitute strong and weak year classes; and 3) determine what environmental factors influence Muskellunge year class strength. This effort was inspired by the Fishery Management Divisions recently approved Musky Management plan that identified need to more comprehensively index and assess river populations of Muskellunge.

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### Literature Cited

- Axon, J.R., and L.E. Kornman. 1986. Characteristics of native muskellunge streams in eastern Kentucky. Pages 263-272 in G.E. Hall, editor. Managing muskies: a treatise on the biology and propagation of muskellunge in North America. American Fisheries Society, Special Publication 15, Bethesda, Maryland.
- Brenden, T.O., E.M. Hallerman, B.R. Murphy, J.R. Copeland, and J.A. Williams. 2007. The New River, Virginia, Muskellunge fishery: population dynamics, harvest regulation monitoring, and angler attitudes. *Environmental Biology of Fishes* 78: 11-25.
- Kapuscinski, K.L., M.A. Wilkinson, and J.M. Farrell. 2010. Sampling for Muskellunge, Rudd, and the nearshore fish community of the Buffalo Harbor (Lake Erie) and the upper Niagara River, 2009. NYSDEC Lake Erie Annual Report 2009.
- Simonson, T.D. (2013). DRAFT Muskellunge management – species management – FM handbook. Wisconsin Department of Natural Resources, Madison.
- Warren, L.H. 2013. Spawning and nursery habitat of wild Muskellunge and fate of stocked Muskellunge in middle Tennessee Rivers. Masters Thesis, Tennessee Technological University, Cookeville.