



Muskellunge and Tiger Muskellunge Management and Fishing in Pennsylvania

*Prepared by R. Lorantas and D. Kristine
PFBC Warmwater Unit*

May 2005 (updated 2013; R. Lorantas)

Goal: Maintain or create enhanced targeted sport fisheries through judicious stocking of muskellunge and tiger muskellunge that recognize naturally produced muskellunge and enlist harvest management and habitat management approaches that foster increased density of naturally produced and stocked muskellunge.

Muskellunge are indigenous to rivers, streams, and lakes of the western slope of the Ridge and Valley Province in Pennsylvania (Ohio, Allegheny, Monongahela River drainages and Lake Erie Drainage). Two semi-discrete populations likely occurred in Pennsylvania, Great Lakes and Ohio River populations. Currently natural reproduction is very limited. Pennsylvania Fish and Boat Commission stocking programs have carefully expanded the range of muskellunge, east, to locations throughout Pennsylvania. Most muskellunge populations in Pennsylvania are maintained through Pennsylvania Fish and Boat Commission (PFBC) stocking programs. All muskellunge stocked in Pennsylvania are derived from wild-caught brood stock from lakes in northwestern Pennsylvania, reared to fingerling size (~7-9 inches) for late summer or fall stocking. In recent years limited rearing and stocking of yearling size (~10-12 inches) muskellunge has taken place to comparatively evaluate survival.

Tiger Muskellunge are an interspecific hybrid, cultured in Pennsylvania Fish and Boat Commission hatcheries, using wild caught female muskellunge and male northern pike. Both muskellunge and northern pike are indigenous to rivers, streams, and lakes of the western slope of the Ridge and Valley Province in Pennsylvania (Ohio, Allegheny, Monongahela River drainages and Lake Erie Drainage). Although this hybrid is known to occur in the wild it's occurrence is rare. Tiger muskellunge populations in Pennsylvania are maintained exclusively through Pennsylvania Fish and Boat Commission (PFBC) stocking programs. We estimate that 94 % of musky angler trips can be attributed to Pennsylvania Fish and Boat Commission muskellunge and tiger muskellunge stocking programs. Our GIS maps depict where muskellunge and tiger muskellunge fisheries currently occur in Pennsylvania.

Sport harvest limits and stocking represent the most widely applied techniques used by Fishery Managers in Pennsylvania to sustain and enhance muskellunge and tiger muskellunge sport fisheries. Muskellunge stocking was initiated to counter declining natural muskellunge populations. Graff (1986) reported that

muskellunge stocking in Pennsylvania began in the 1890's, was abandoned due to its difficulty, and was reinitiated in 1953. Success in culture of muskellunge in the 1950's and continuing to recent decades has led to expansive stocking programs to the present in Pennsylvania. Stocking programs that make use of tiger muskellunge yield populations can be carefully controlled since the hybrid cannot proliferate naturally (functionally sterile). In addition to more exacting control of population numbers, tiger muskellunge can be more easily reared in a hatchery setting using artificial diets (fish food). Successful large-scale production of tiger muskellunge using an artificial diet was pioneered in Pennsylvania Fish and Boat Commission hatcheries (Bender and Graff 1986). Tiger muskellunge have been cultured at production levels for stocking into Pennsylvania waterways since 1965. Success in culture of muskellunge in the 1960's and continuing to recent decades has led to expansive stocking programs to the present in Pennsylvania. In the years from 2001 to 2012 an average of 111,887 fingerling muskellunge and 81,839 fingerling tiger muskellunge have been stocked annually. Although yearling muskellunge have and are stocked on an experimental basis to comparatively evaluate survival, for the most part, fingerlings are used to sustain and maintain fisheries state-wide. Annual stocking summary details are posted elsewhere on the Commission's website.

Current goals of stocking muskellunge go beyond reducing natural decline to now providing opportunity to catch a trophy sport fish in many waters across the state. The muskellunge and tiger muskellunge stocking programs, guided by newly prepared management plans, have a specific focus upon creating targeted muskellunge and tiger muskellunge fishing opportunities. This focus has led to updates to those waters included in the stocking program, with waters included only where minimum target densities of muskellunge and/or tiger muskellunge are maintained. Waters unable to sustain such minimum densities have appropriately been removed from the stocking program. Stocking programs have, in general, expanded opportunities for anglers to catch a trophy sport fish in a wide variety of waters across the state. Water specific assessments provide perspective on how managers use biological assessments to guide individual stocking programs.

Over the course of history in Pennsylvania many man-made reservoirs have been created, these "man-made" habitats sometimes do not provide attractive fisheries when colonized by indigenous fishes that occur in streams and rivers that drain into the reservoir. The Pennsylvania Fish and Boat Commission assess fish populations in man-made reservoirs as well as natural waters throughout Pennsylvania. Information derived from those assessments guide biologists relative to the suitability for muskellunge and tiger muskellunge stocking. Since muskellunge and tiger muskellunge are stocked as juveniles, appropriate juvenile habitat is necessary as well as availability of appropriately sized forage fish. In addition the presence and density of other predators are considered, as well as the needs and requirements of adult muskellunge. In conjunction with creating targeted fishing opportunities that yield densities meeting minimum program guidelines, fishery managers insure that stocking takes place into a niche not filled and that no adverse impacts occur to desirable indigenous fish populations.

Statewide harvest of muskellunge and tiger muskellunge limits daily angler harvest to 1 fish of at least 40

inches (approximately 17 pounds). It requires approximately 8 years for a muskellunge or tiger muskellunge to attain legal size (Figure 1). The current size and creel limits were established in 2007, and include a year round harvest season. Since most muskellunge populations are maintained by stocking and harvest is restricted to only very large specimens through elevated size limits, current rules while seasonally liberal, accommodate natural spawning and natural recruitment of young where habitats are adequate. Exceptions exist to the year round open season, catch and immediate release is required from April 1 through May 31 on those waters where brood-stock are collected. Angler harvest and consumption of muskellunge is prohibited at these times since brood stock are anesthetized for handling and used in culture of young fish for stocking, with brood fish subsequently returned to source waters. Those waters contained in the brood-stock program are listed in the Summary of Fishing Regulations and Laws.

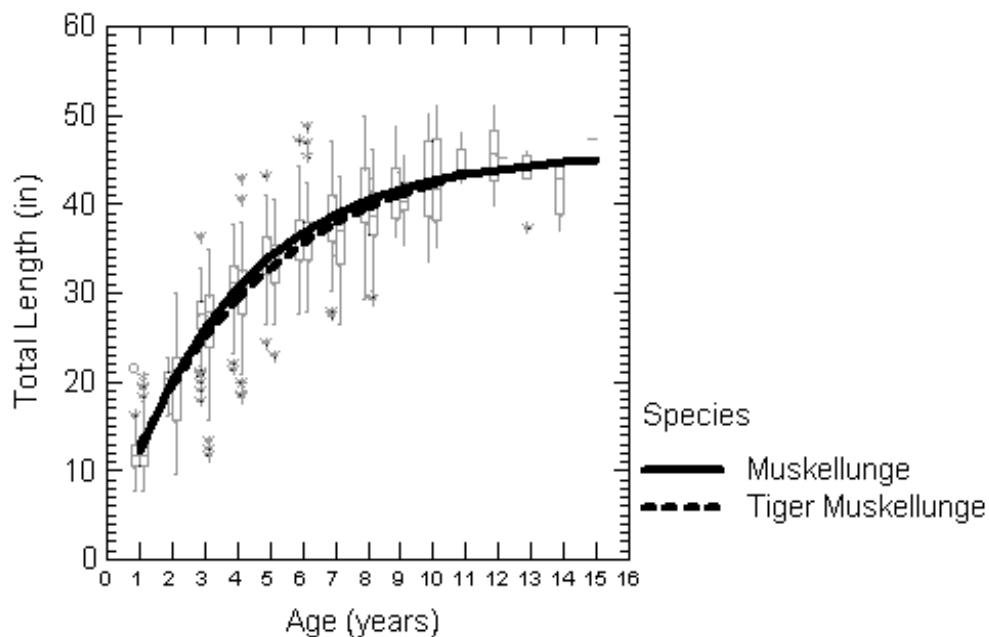


Figure 1. Average length of muskellunge and tiger muskellunge collected by Fisheries Biologists in assessment gear (March – June) in Pennsylvania.

Interest in muskellunge fishing and management has become increasingly popular and many Pennsylvania anglers specialize in pursuing this most noble and largest of game fish. This interest as well as improvement in water quality and aquatic habitats in some locales in Pennsylvania has lead the Pennsylvania Fish and Boat Commission to update strategies associated with managing muskellunge. New management plan strategies focus upon enhancing natural recruitment where feasible, involving anglers in assessment of muskellunge management programs maintained by stocking through data collection and data sharing, as well as other innovative approaches. For most Commonwealth waters recent harvest rule changes that elevate the size limit to 40 inches and reduced the creel limit are anticipated to enhance density of stocked fish or enhance natural reproduction and recruitment. In addition, water specific stocking strategies are designed to maximize angler capture opportunities while not influencing density of other sportfish.

Casting or trolling a variety of bucktails, stick baits, jerk baits, jigs, or live-baits using medium or heavy freshwater tackle will catch muskellunge. However, anglers should be prepared to be patient as they pursue the fish of 1,000 casts. Surveys carried out by the Pennsylvania Fish and Boat Commission serve to illustrate the number of fish caught per angler hour in medium size reservoirs (Figure 2), large size reservoirs (Figure 3) and rivers (Figure 4). Although considerable time is required to catch a muskellunge or tiger muskellunge, anglers should note that the highest monthly catch per hour tends to occur in the spring and particularly in the fall season, although these fish can be caught most any time of year. Once an angler catches a large muskellunge or tiger muskellunge they are often interested in how much the fish weighs and how old it is. Data collected by Fishery Managers and summarized in Table 1 provide average values for muskellunge and tiger muskellunge. Differences in weight and age for a given length fish exhibit only slight differences for these species. Anglers should note that these listings represent average values and values for individual fish will vary and variation will occur between water bodies.

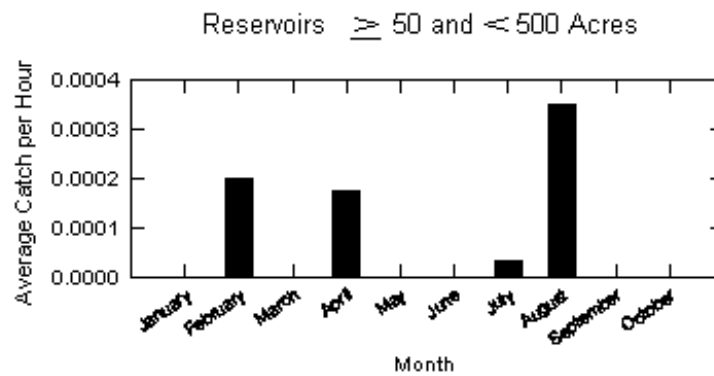


Figure 2. Average catch per angler hour from medium size Pennsylvania reservoirs.

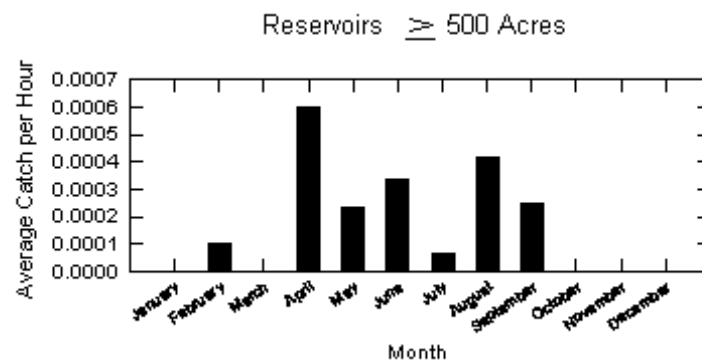


Figure 3. Average catch per angler hour from medium size Pennsylvania reservoirs.

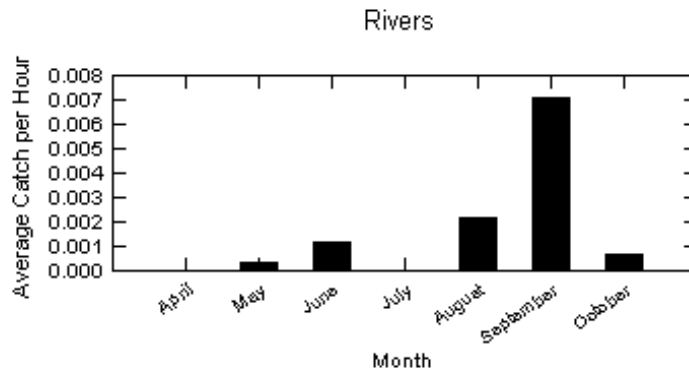


Figure 4. Average catch per angler hour from Pennsylvania rivers.

Table 1. Average weight and average age of muskellunge at a given length.

Inches	Muskellunge		Tiger Muskellunge		Inches	Muskellunge		Tiger Muskellunge		Inches	Muskellunge		Tiger Muskellunge	
	Pounds	Years	Pounds	Years		Pounds	Years	Pounds	Years		Pounds	Years	Pounds	Years
4	0.1	0.2	0.1	--	20	1.6	2.0	1.6	2.1	36	12.0	5.7	12.3	6.1
4.5	0.1	0.2	0.1	--	20.5	1.8	2.1	1.7	2.2	36.5	12.6	5.9	12.9	6.4
5	0.1	0.3	0.1	0.1	21	1.9	2.1	1.9	2.2	37	13.2	6.1	13.5	6.6
5.5	0.1	0.3	0.1	0.1	21.5	2.1	2.2	2.0	2.3	37.5	13.8	6.3	14.2	6.8
6	0.1	0.4	0.1	0.2	22	2.2	2.3	2.2	2.4	38	14.5	6.5	14.8	7.1
6.5	0.1	0.4	0.1	0.2	22.5	2.4	2.4	2.4	2.5	38.5	15.1	6.8	15.5	7.3
7	0.1	0.5	0.1	0.3	23	2.6	2.5	2.6	2.6	39	15.8	7.0	16.2	7.6
7.5	0.1	0.5	0.1	0.3	23.5	2.8	2.5	2.8	2.7	39.5	16.5	7.3	17.0	7.9
8	0.1	0.5	0.1	0.4	24	3.0	2.6	3.0	2.8	40	17.3	7.7	17.7	8.2
8.5	0.1	0.6	0.1	0.5	24.5	3.2	2.7	3.2	2.9	40.5	18.0	8.0	18.5	8.6
9	0.1	0.7	0.1	0.5	25	3.5	2.8	3.4	3.0	41	18.8	8.4	19.3	8.9
9.5	0.1	0.7	0.1	0.6	25.5	3.7	2.9	3.7	3.1	41.5	19.6	8.8	20.2	9.3
10	0.2	0.8	0.1	0.6	26	4.0	3.0	3.9	3.2	42	20.4	9.3	21.0	9.8
10.5	0.2	0.8	0.2	0.7	26.5	4.2	3.1	4.2	3.3	42.5	21.2	9.8	21.9	10.2
11	0.2	0.9	0.2	0.8	27	4.5	3.2	4.5	3.4	43	22.1	10.5	22.8	10.8
11.5	0.2	0.9	0.2	0.8	27.5	4.8	3.3	4.8	3.5	43.5	23.0	11.2	23.8	11.4
12	0.3	1.0	0.3	0.9	28	5.1	3.4	5.1	3.7	44	23.9	12.2	24.7	12.1
12.5	0.3	1.0	0.3	1.0	28.5	5.4	3.5	5.4	3.8	44.5	24.8	13.5	25.7	13.0
13	0.4	1.1	0.4	1.0	29	5.8	3.6	5.8	3.9	45	25.8	15.5	26.7	14.0
13.5	0.4	1.1	0.4	1.1	29.5	6.1	3.7	6.1	4.0	45.5	26.8	20.1	27.8	15.4
14	0.5	1.2	0.5	1.2	30	6.5	3.8	6.5	4.2	46	27.8	>20.1	28.9	17.4
14.5	0.5	1.3	0.5	1.2	30.5	6.8	4.0	6.9	4.3	46.5	28.8	>20.1	30.0	21.2
15	0.6	1.3	0.6	1.3	31	7.2	4.1	7.3	4.4	47	29.9	>20.1	31.1	>21.2
15.5	0.7	1.4	0.7	1.4	31.5	7.6	4.2	7.7	4.6	47.5	31.0	>20.1	32.3	>21.2
16	0.8	1.4	0.7	1.4	32	8.1	4.4	8.1	4.7	48	32.1	>20.1	33.5	>21.2
16.5	0.8	1.5	0.8	1.5	32.5	8.5	4.5	8.6	4.9	48.5	33.3	>20.1	34.7	>21.2
17	0.9	1.6	0.9	1.6	33	9.0	4.6	9.1	5.0	49	34.4	>20.1	36.0	>21.2
17.5	1.0	1.6	1.0	1.7	33.5	9.4	4.8	9.6	5.2	49.5	35.7	>20.1	37.3	>21.2
18	1.1	1.7	1.1	1.7	34	9.9	5.0	10.1	5.4	50	36.9	>20.1	38.6	>21.2

18.5	1.2	1.8	1.2	1.8	34.5	10.4	5.1	10.6	5.6	50.5	38.2	>20.1	40.0	>21.2
19	1.4	1.8	1.3	1.9	35	10.9	5.3	11.1	5.7	51	39.5	>20.1	41.4	>21.2
19.5	1.5	1.9	1.4	2.0	35.5	11.5	5.5	11.7	5.9	51.5	40.8	>20.1	42.8	>21.2

References

- Bender, T, and D. R. Graff. 1986. Pennsylvania's practices for intensive culture of hybrid muskellunge. American Fisheries Society Special Publication 15: 279-284.
- Graff, D. 1986. Musky Management – A Changing Perspective from Past to Present. American Fisheries Society Special Publication 15: 195-198.