



## FISHERIES MANAGEMENT OVERVIEW

# Largemouth Bass, Smallmouth Bass, and Spotted Bass Management and Fishing in Pennsylvania

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**Goal:** Maintain or enhance Largemouth, Smallmouth, and Spotted Bass sport fishing through harvest management of naturally sustained bass populations and through habitat preservation and enhancement. Judiciously stock Largemouth and Smallmouth Bass in compatible new and reclaimed habitats.

Largemouth Bass and Smallmouth Bass occur throughout Pennsylvania and were originally indigenous to the Ohio River and Lake Erie Drainage. Spotted Bass, Pennsylvania's most rare black bass, occurs only in the Ohio River drainage. The Ohio drainage includes the Ohio River, Allegheny River and Monongahela River drainages. Largemouth Bass typically predominate in reservoirs and lakes and occur at lower densities in slow moving rivers and streams within these drainages. Smallmouth Bass are typically abundant in rivers, warmwater streams and medium to large size lakes and reservoirs in these drainages. Spotted Bass are most abundant within a 20 mile radius of the confluence of the Ohio, Allegheny and Monongahela Rivers.

In the Lake Erie drainage Largemouth Bass are largely confined to Presque Isle Bay, however Smallmouth Bass are abundant in Lake Erie as well as Presque Isle Bay. Smallmouth Bass and Largemouth Bass stocking by the Pennsylvania Fish and Boat Commission and other agencies over a century ago into the Delaware, Susquehanna, and Potomac River Drainages lead to colonization of waters within these drainages, and both species are now self-sustaining in these drainages. Most natural warm-water lakes and man-made reservoirs in Pennsylvania contain self-sustaining Largemouth and Smallmouth Bass populations. In the Delaware and Schuylkill Rivers Smallmouth Bass predominate with Largemouth Bass largely confined to the tidal portions of these rivers where they

outnumber Smallmouth Bass. In the Susquehanna River, Smallmouth Bass also predominate, whereas Largemouth Bass are only occasionally encountered in low density, primarily in power dam pools. Generally in Pennsylvania Largemouth Bass occur at lower densities in rivers compared to Smallmouth Bass. However, Largemouth Bass are frequently found at greater densities in shallow reservoirs or shallow lakes compared to Smallmouth Bass. In large and medium size deeper reservoirs frequently both Largemouth Bass and Smallmouth Bass occur.

Largemouth Bass and Smallmouth Bass populations, both indigenous and those that have become naturalized are managed for sport fishing through harvest management, habitat management, habitat enhancement, and through stocking. Stocking Smallmouth Bass and Largemouth Bass, in particular, typically occurs in conjunction with establishing self-sustaining populations in newly filled or newly reclaimed reservoirs. Stocking Smallmouth Bass in warmwater streams and rivers takes place when water quality improvements, in previously impaired habitats, will accommodate survival of black bass. Stocking is carried out for one to several years to establish a self-sustaining population. Since 1974, fingerling and adult Largemouth Bass have been stocked to establish or re-establish diminished populations. In the years from 2001 to 2012 an average of 23,505 fingerling Largemouth and 5,493 fingerling Smallmouth have been stocked annually. Annual stocking summary details are posted on the PA Fish & Boat Commission website. Largemouth Bass and Smallmouth Bass populations in Pennsylvania waterways are not sustained through annual maintenance stocking. Spotted Bass stocking does not take place and occurrence in reservoirs and lakes in Pennsylvania is unknown.

With respect to harvest management, inland harvest regulations differ slightly on rivers and on lakes. Prior to 2000, a closed season existed from mid-April to mid-June, no bass fishing was permitted at that time. This period generally corresponded to the time of black bass spawning in Pennsylvania and some anglers and scientists were concerned that fishing during this period would reduce juvenile production and ultimately adult bass density. Currently, there is no field study that conclusively indicates that catch and release fishing during the spawning period subsequently reduces density of adult bass at the population level (Hanson et al. 2008). Many other fish species are pursued in Pennsylvania waters from mid-April to mid-June, black bass can be inadvertently or intentionally caught at that time. Recognizing that black bass capture would inevitably take place from mid-April to mid-June, the Pennsylvania Fish and Boat Commission accommodated limited catch and immediate release bass fishing at that time, however additional harvest restrictions were put in place in conjunction with the change. Specifically greater harvest restrictions were put

in place during cold weather periods. Greater harvest restrictions were designed to ameliorate catch-and-release loss that was expected to occur in conjunction with catch-and-release fishing from mid-April to mid-June. Making up for loss required that a cool weather harvest restriction yield sufficient saving of adult black bass to effectively make up for catch-and-release losses. On lakes it was expected that harvest restrictions during cool weather and during ice fishing periods would yield sufficient saving if restrictions began in November. On rivers, surveys showed limited black bass fishing after November, thus few bass would be “saved” after November. This finding indicated that it was necessary to apply restrictions to rivers beginning in October so that sufficient numbers of bass were preserved to make up for anticipated catch and release loss. For lakes, application of restrictions in November was deemed sufficient to make up for losses. Thus, the 12 inch minimum size limit and 6 bass creel limit was applied from mid-June through September on rivers and through October on lakes. (Tip: to remember the last month of the “regular” bass season for inland waters, the “S” in September can be thought of as symbolizing a river or stream and the “O” in October can be thought of as symbolizing a lake). Harvest restrictions in the cold weather period included a 15 inch minimum size limit and 4 fish creel limit, which extends through the following year to mid-April. The restricted catch and release period from mid-April to mid-June requires immediate release of all bass caught, forbids anglers from repeatedly casting into a clearly visible bass spawning nest, and does not permit bass tournaments.

In addition to inland bass harvest regulations, a more restrictive set of harvest regulations, Big Bass regulations, apply to a selected sub-set of waters that meet specific criteria with respect to resource productivity, bass growth, and bass exploitation characteristics. The number of waters in this program now number in excess of 50 lakes and reservoirs. Specifically more productive waters with above average length at each age and in which fishing pressure and harvest are above average, qualify for inclusion. Biologists have found that waters meeting these criteria are capable of supporting greater densities of larger size Largemouth Bass and Smallmouth Bass and higher length limits foster increased density of both Largemouth Bass and Smallmouth Bass. Pennsylvania Fish and Boat Commission biologists have documented increases in densities of Largemouth Bass and Smallmouth Bass over 15 inches in most waters where Big Bass regulations apply compared to densities prior to implementing these more restrictive regulations. Waters in this program have become popular destinations for bass fishing enthusiasts seeking trophy size black bass.

The restricted catch and release period for bass also applies to waters in the Big Bass

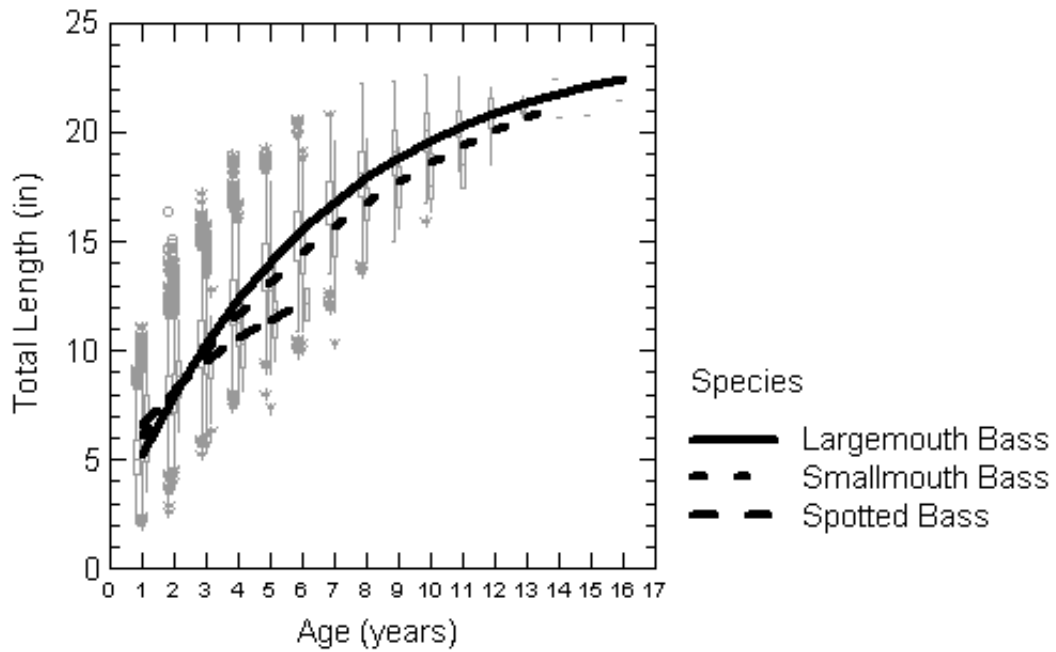
program. For these waters catch and release loss was accounted for differently. Generally, mitigation for catch and release losses was considered to occur “in advance” for lakes and reservoirs in the Big Bass program, that is restrictive harvest to make up for losses occurred when these regulations were initially applied. For these waters a 15 inch minimum size limit with a 4 fish creel limit applied from mid-June through the following mid-April.

More specialized harvest regulations apply to some waters, including slot limits where harvest of black bass from 12 to 18 inches is prohibited. A goal of the slot limit is to reduce density of smaller bass to enhance growth, and protect the faster growing bass at intermediate sizes such that they attain large size. Successful application depends upon bass populations consistently producing large numbers of young and the willingness of anglers to harvest and remove small bass from those populations. This regulation has been demonstrated to be effective in Pennsylvania at Lake Winola (Wyoming County).

Apart from inland inland harvest regulation programs, that biologists have applied and evaluated to sustain high quality black bass fishing. Biologist have also collaborated with biologist in neighboring states to develop harvest regulations that apply to border waters, such as: the Delaware River and tributaries, Lake Erie, Pymatuning Reservoir, and Conowingo Reservoir on the lower Susquehanna River to sustain high quality fishing experiences. Anglers should consult the current Summary of Fishing Laws and Regulations and reference and abide by harvest rules applicable to boundary waters they fish.

Habitat enhancement involves careful evaluation of a water body’s physical, biological, and chemical characteristics. Enhancement of a water body may mean identification of an acidified discharge or tributary that limits biological productivity and exploration of means to minimize its impacts. Contrarily, in the case of reservoirs, high densities of aquatic vegetation may negatively affect Largemouth Bass size structure and abundance by limiting access of Largemouth Bass to prey (too much cover). Here vegetation control through planned over winter partial draw-down will freeze and desiccate some species of near shore aquatic vegetation and serve to restore predator and prey balance following spring-time re-filling. Assessments may show a lack of spawning or nursery habitat, in these instances artificial or natural materials may be added to create such habitat. Habitat structure designed to provide attraction cover are also installed by the PFBC to enhance angling success. The Pennsylvania Fish and Boat Commission has an active corps of volunteers that apply habitat attraction or enhancement techniques after an approved plan has been developed. We encourage organizations interested in volunteering time to contact our Habitat Management Division to learn more.

Biologists regularly monitor adult bass abundance and young bass abundance, and tabulate catch and harvest of bass by anglers. In association with these evaluations growth of black bass species is also examined by measuring length, weight, and examining a few scales to determine age. In Pennsylvania, a 12 inch Largemouth Bass is approximately 4 years old (Figure 1) and weighs 0.8 pounds (Table 1), when Largemouth Bass are 15 inches in length they are approximately 5.6 years old and weigh approximately 1.7 pounds. We have tabulated average ages and weights for a variety of lengths of Largemouth Bass in Pennsylvania (Table 1). In Pennsylvania, a 12 inch Smallmouth Bass is approximately 4 years old (Figure 1) and weighs 0.8 pounds (Table 1), when Smallmouth Bass are 15 inches in length they are approximately 6.4 years old, about a year older than Largemouth Bass, and weigh approximately 1.7 pounds. We have tabulated average ages and weights for a variety of lengths of Smallmouth Bass in Pennsylvania (Table 1). In Pennsylvania, a 12 inch Spotted Bass is approximately 6 years old (Figure 1), much older than a Smallmouth or Largemouth Bass of this length, and weighs 0.9 pounds, in Pennsylvania Spotted Bass rarely reach 15 inches in length. We have tabulated average ages and weights for a variety of lengths of Spotted Bass in Pennsylvania (Table 2). Anglers find these tables useful in approximating the weight and age of their catch. In standard biological collections, the decrease in relative or absolute number of black bass at each age, can be used to describe the total annual mortality rate of Largemouth Bass. On average the total annual mortality rate for adult Largemouth Bass is 58 % annual mortality is 60% for adult Smallmouth Bass, these include annual losses due to fishing and loss due to natural circumstances such as predation and disease.



**Figure 1. Average length of Largemouth Bass (March-June), Smallmouth Bass (July-September), Spotted Bass (March-October) collected by Fisheries Biologists in assessment gear in Pennsylvania.**

**Table 1. Average weight and average age of Largemouth Bass (March-June), Smallmouth Bass (July-September) and Spotted Bass (March-October).**

Inches	Largemouth Bass		Smallmouth Bass		Spotted Bass	
	Pounds	Years	Pounds	Years	Pounds	Years
4	0.1	0.6	0.1	0.1	< 0.1	< 0.1
4.5	0.1	0.8	0.1	0.3	< 0.1	< 0.1
5	0.1	1	0.1	0.5	0.1	0.2
5.5	0.1	1.1	0.1	0.7	0.1	0.5
6	0.1	1.3	0.1	0.9	0.1	0.7
6.5	0.1	1.5	0.1	1.2	0.1	1
7	0.1	1.7	0.2	1.4	0.2	1.3
7.5	0.2	1.8	0.2	1.7	0.2	1.5
8	0.2	2	0.2	1.9	0.2	1.9
8.5	0.3	2.2	0.3	2.2	0.3	2.2
9	0.3	2.4	0.3	2.4	0.4	2.6
9.5	0.4	2.7	0.4	2.7	0.4	3
10	0.5	2.9	0.5	3	0.5	3.4
10.5	0.5	3.1	0.5	3.3	0.6	3.9
11	0.6	3.3	0.6	3.6	0.7	4.5
11.5	0.7	3.6	0.7	3.9	0.8	5.1
12	0.8	3.8	0.8	4.2	0.9	5.9

12.5	0.9	4.1	0.9	4.5	1	6.7
13	1.1	4.4	1.1	4.9	1.1	7.9
13.5	1.2	4.7	1.2	5.3	1.3	9.3
14	1.4	5	1.3	5.6	1.4	11.6
14.5	1.5	5.3	1.5	6	1.6	16.3
15	1.7	5.6	1.7	6.4	1.8	> 16.3
15.5	1.9	6	1.8	6.8	2	> 16.3
16	2.1	6.4	2	7.3	2.2	> 16.3
16.5	2.3	6.8	2.2	7.7	2.4	> 16.3
17	2.6	7.2	2.4	8.2	2.6	> 16.3
17.5	2.8	7.6	2.7	8.8	...	...
18	3.1	8.1	2.9	9.3	...	...
18.5	3.4	8.7	3.2	9.9	...	...
19	3.7	9.2	3.5	10.5	...	...
19.5	4	9.9	3.8	11.2	...	...
20	4.3	10.6	4.1	11.9	...	...
20.5	4.7	11.4	4.4	12.7	...	...
21	5.1	12.3	4.7	13.5	...	...
21.5	5.5	13.3	5.1	14.4	...	...
22	5.9	14.6	5.5	15.5	...	...
22.5	6.4	16.1	5.9	16.6	...	...
23	6.8	> 16.1	6.3	> 16.6	...	...
23.5	7.3	> 16.1	6.7	> 16.6	...	...
24	7.9	> 16.1	7.2	> 16.6	...	...
24.5	8.4	> 16.1	7.7	> 16.6	...	...
25	9	> 16.1	8.2	> 16.6	...	...
25.5	9.6	> 16.1	...	...	...	...

Tabulating catch and harvest by anglers from various waterways is essential in developing harvest regulations. Information derived from agency “creel surveys” is of interest to anglers since seasonal peaks in catch occur for most species. Black bass can be caught most any time of year, generally though, highest catch per hour occurs in spring through fall with highest catch rates occurring during fall in medium and large size reservoirs (Figure 2 and 3). On rivers Smallmouth Bass catch rates are highest in summer (Figure 4). With fishing destinations identified from maps on this site and information describing the best seasons to catch black bass, anglers need only select effective baits or lures. For Largemouth Smallmouth and Spotted Bass, all top predators, there are a plethora of fishing lure options that include live shiners and live worm rigs to a host of artificial baits. Artificial baits are the mainstay of many bass anglers and range from jigs, rubber worms, spinners,

plugs, crank baits, stick baits all of which can be fished or rigged to attractively present the bait to the bass shallow or deep, in cover or open water. Local tackle shops, guides, outdoor writers, and local bass clubs have the most knowledge about baits and presentations that are most effective in waters in their “backyard.” With modest perseverance any angler willing to experiment with baits and presentations can be very successful in catching bass on any water in which they occur in Pennsylvania. Tournament angling for black bass is a popular activity in Pennsylvania with over 1,000 permitted events hosted annually across the state each year. Anglers seeking to host a fishing event involving 10 or more anglers, or where facility rules require permission (State Parks, US Army Corps of Engineer facilities, and other municipal facilities) are required to secure a permit from the Pennsylvania Fish and Boat Commission and/or facility owners. Tournament fishing hosting requirements are posted elsewhere on this web site.

Catch and release bass fishing is a popular practice among bass anglers in Pennsylvania. Anglers should quickly remove hooks or lures from bass they intend to release and quickly return the fish to water to insure the fish will survive to be caught again. Return of fish to the water quickly, with limited air exposure, is important to insure high post-release survival.

### **Lower Susquehanna River and Lower Juniata River No Harvest Rules**

Recently, in 2005 and 2007 anglers and biologists noted substantive mortality and disease (lesions, erosions) in collections of young of year Smallmouth Bass derived from the lower Susquehanna River and lower Juniata River. Collections of young occur annually, beginning in July on most rivers since at least 1989. The purpose of collections is to index annual production of young of year Smallmouth Bass. Prior to 2005, observations of disease and mortality among young Smallmouth Bass were not documented in any river collections in Pennsylvania. Annual production of young of year (age 0) or yearling (age 1) are often used to coarsely forecast abundance of adults in subsequent years. Annual production of young in most naturally sustained healthy fish populations is quite variable. Often prevailing weather or environmental conditions at the time of spawning and early life influence production of young. In the case of river Smallmouth Bass, low or modest spring flow coupled with gradual spring warming usually yield an abundance of young. High flow may cause mechanical damage to eggs and fry. Cooler or fluctuating temperatures may lengthen incubation and delay hatching of fry which accommodates increases in egg predation and disease loss. Thus high flows and variable or cooler spring temperatures often lead to lesser production of young. It was noted in 2005 and 2007 that low flows and warm spring conditions yielded an abundance of young Smallmouth Bass, but that such



conditions were also accompanied by disease and mortality among young as noted above. Mortality and disease were suspected to be caused by seasonally stressful water quality conditions (low dissolved oxygen) in near shore habitats occupied by young Smallmouth Bass. Circumstances leading to stress, disease, and mortality among Smallmouth Bass remain under study, concern about periodic low dissolved oxygen, and other issues have lead the PFBC to make the public aware of the problem, and encourage regulatory agencies to recognize impacts to fish populations such that remediation efforts can be undertaken.

Protracted low abundance and production of young has reduced the abundance of intermediate sizes of Smallmouth Bass. Abundance of young and intermediate sizes of Smallmouth Bass (<15 inches), typically those sizes most abundant in healthy black bass populations in Pennsylvania, have become sufficiently sparse in the lower Susquehanna River and lower Juniata River that more restrictive harvest rule changes to preserve and potentially enhance abundance were put in place in 2011 and expanded in 2012. On the lower Susquehanna River and lower Juniata River, harvest of black bass is not permitted, catch and release fishing is permitted with one exception. During the period from May to mid-June fishing for black bass is completely prohibited (fishing for other species is welcomed, see current Summary of fishing Laws and Regulations). The period from May to mid-June is the principal spawning and egg incubation period for black bass, a period when nest guarding males become more aggressive and become vulnerable to angler capture. Temporary removal of a nest guarding male may lead to increased predation upon contents of a nest, depending upon the type of angling; however population level changes have not been linked with such temporary removal in healthy self-sustaining black bass populations (Hanson et al. 2008). Diminished production of young in the lower Susquehanna River and lower Juniata Rivers have led to application of these restrictive rule changes which, in 2012, were extend one half mile into tributaries which join these river reaches. These rule changes were designed to preserve abundance and potentially enhance abundance while accommodating catch and release fishing during most of the year. Rule changes do not represent a solution to conditions causing mortality and disease among young and intermediate sizes of Smallmouth Bass. The PFBC has broadly summarized Susquehanna River management and monitoring goals in the Susquehanna River Management Plan and provided a historical synopsis of past findings. Goals focus in this document upon monitoring and maintaining healthy aquatic communities in the Susquehanna River drainage.

River black bass fishing is an important recreational activity in Pennsylvania. Management

plans that focus upon healthy aquatic communities to sustain native or naturalized populations of black bass in major rivers are also broadly detailed in our Three Rivers Management Plan and Delaware River Management Plan. Biologists have not identified disease problems, as of 2012, in these systems as has been observed in the Susquehanna River, although monitoring annually takes place.

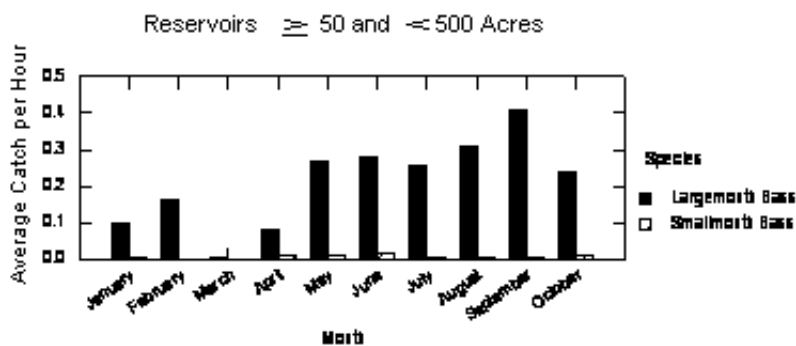


Figure 2. Average catch per angler hour of black bass from medium size Pennsylvania reservoirs.

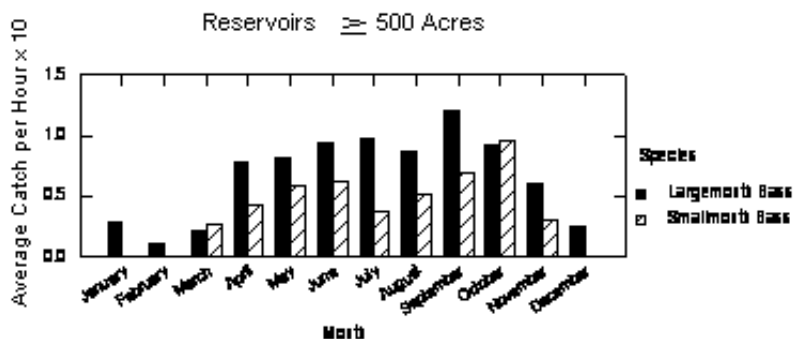


Figure 3. Average catch per angler hour of black bass from large size Pennsylvania reservoirs.

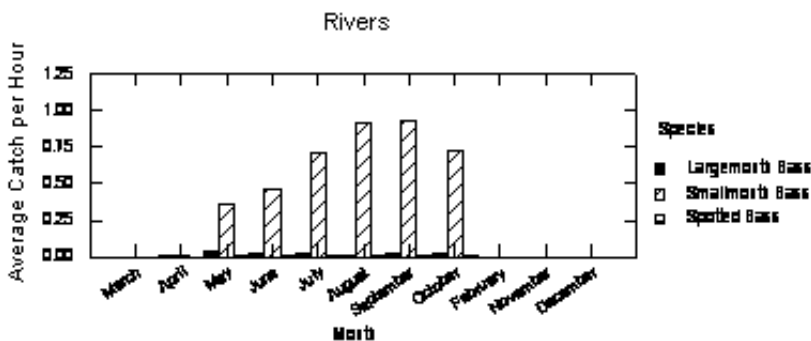


Figure 4. Average catch per angler hour of black bass from Pennsylvania rivers.

## References

- Hanson, K C., M. Gravel, T. Redpath, S J. Cooke and M. J. Siepker . 2008. Latitudinal Variation in Physiological and Behavioral Responses of Nest-guarding Smallmouth Bass to Common Recreational Angling Practices. Transactions of the American Fisheries Society 137:1558-1566