

History of the Management of Trout Fisheries in Pennsylvania



Prepared by:

**Robert Weber, Russell T. Greene, John Arway,
R. Scott Carney, and Leroy Young**

**Division of Fisheries Management
Bureau of Fisheries
Pennsylvania Fish and Boat Commission**

June 2010



Table of Contents

	Page
The Beginning	5
Trout Production	6
The Fish Culture Stations	6
Fish Culture Stations Today	8
Tylersville State Fish Hatchery	8
Pleasant Gap State Fish Hatchery	9
Huntsdale State Fish Culture Station.....	9
Benner Spring State Fish Hatchery	9
Bellefonte State Fish Hatchery	9
Corry State Fish Hatchery	9
Oswayo State Fish Hatchery.....	9
Reynoldsdale State Fish Hatchery	9
Cooperative Nursery Program	9
Trout Distribution and Stocking – the Early Days	10
The County Allocation System.....	14
Environmental and Habitat Protection.....	14
Fisheries Management (pre 1981).....	16
Regulations	16
Trout Season – Opening Day	18
Licenses.....	18
A New Way of Thinking.....	19
Fisheries Management – (1981 to present).....	20
Fisheries Management Database	22
Resource Based Allocation	23
Wild Trout Program in Streams	25
Class A streams.....	27
Wild Brook Trout Enhancement Program.....	28
Environmental Protection	28
Stream and Lake Habitat Improvement.....	29
Hatchery Trout Program in Streams.....	30
Hatchery Trout Program in Lakes.....	32
Fingerling Stocking.....	33

Regional Opening Days of Trout Season.....	34
Early Season Trout-Stocked Waters Program	35
Stocking Frequency	35
Brood Trout Allocation Strategy	35
Refuge Areas.....	36
Special Regulation Programs.....	36
Angler Attitude and Opinion Measurement	38
Conclusion	38
Literature Cited.....	40

List of Tables

	Page
Table 1. History of daily creel limit for trout.....	17
Table 2. Resident Fishing License and Trout Stamp Fees	19
Table 3. Criteria to determine classification for individual resource related factors.....	23
Table 4. Various Stream and Lake Stocking Categories and Associated Characteristics.....	24
Table 5. Minimum criteria for Class A classification	27
Table 6. Changes in rates for each stocking category from 1983 to present – Flowing Waters .	31
Table 7. Trout Stocking Rates from 1983 to Present – Lakes.....	32
Table 8. Summary of Changes to Special Regulations Programs from 2004 through 2006	37

List of Figures

	Page
Figure 1. Location of Fish Culture Stations Owned (or Previously Owned) by the Pennsylvania Fish and Boat Commission.....	8
Figure 2. June 1892, Susquehanna railcar on the tracks adjacent to Walnut and 6th Streets, Harrisburg. Person in photo is probably William E. Meehan, who later became President of the Fish Commission. PFBC photo.....	12
Figure 3. Map showing regional opening days by county	34
Figure 4. Thermographic map of Pennsylvania including boundary for regional opening day	34

Acknowledgements

The authors would like to thank Jay Osman and Tim Klinger for much of the original documentation of this historical information. Their initial efforts in researching and organizing the significant events in the history of the Pennsylvania Fish and Boat Commission have been invaluable to this project.

History of the Management of Trout Fisheries in Pennsylvania

The Beginning

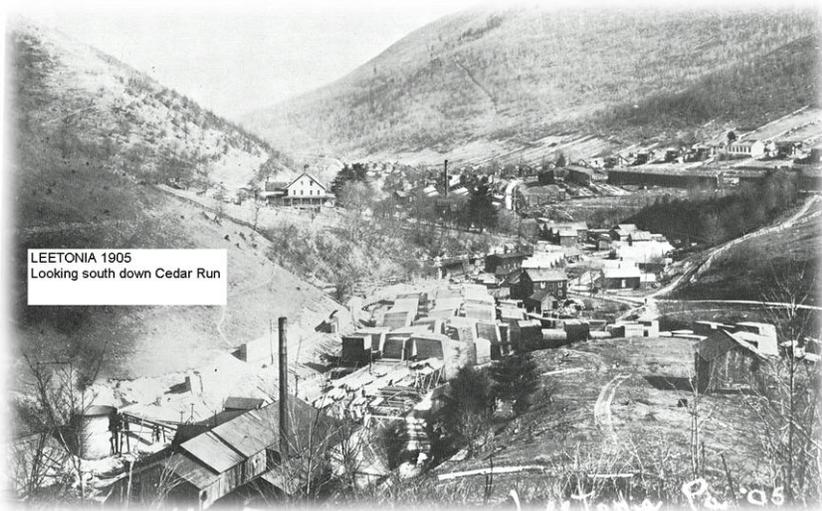
As Pennsylvania developed both in industry and agriculture during the 1800's, the term "conservation" was in direct opposition to the ongoing exploitation of the vast and "limitless" resources of the Commonwealth, and was not a popular concept with early Pennsylvania pioneers. By the mid 1850's, conservation concepts embodied the "wilderness-as-a-paradise" and the growing optimism that applied science can and would solve any problem. As conservation concerns became more and more popular, progressive citizens, researchers, politicians and business leaders sought to return, and hopefully improve upon, the flora and fauna being exploited in this new "wilderness" (Kennedy and Snyder, undated).

One of the most influential of the New Progressives, W. J. McGee (1853-1912) embraced the late Victorian ideal of a rational and learned approach. McGee viewed the laissez-faire economy of the nineteenth century as chaotic, with short-term individual interests devastating the landscape. McGee expressed a view that long-term management of our resources would result in more continuous profit than short-term exploitation. He advocated a system of conscious purpose and science to effectively manage worldwide wilderness resources (Hays 1959).

On March 30, 1866, A convention was held in Harrisburg to discuss and investigate "bad" conditions existing in mountain areas causing wide-spread pollution and the blocking of shad runs by dams. The result of this convention was the signing of legislation by Governor Andrew Curtin which established the Pennsylvania Fish Commission and subsequently James Worrall was appointed the first Commissioner. Commissioner Worrall submitted a *State of the Fisheries* report to the Governor annually; however, significant funding for the new Commission did not occur until 1873 with the creation of the Pennsylvania Board of Commissioners of Fisheries. This legislation expanded the number of Commissioner from one to three and encouraged restoration of fisheries. The new Board's first annual report of the Commissioners stated; "*The large number of streams running through our*

state have become so depopulated of fishes by pollution and persistent wanton slaughter as to render them almost valueless to the people as a source of food” (Kennedy and Snyder, undated).

Fishing, as envisioned by the state legislature during the mid to late 1800s, was the right of the citizens to harvest a food supply. Thus, even from the beginning, the



Pennsylvania Fish Commission had the difficult task of having to be sympathetic to the citizen’s needs, while also having to be responsive to a growing conservation ethic adopted by those in agreement with the McGee philosophy. Their course of action was

clear and mandated by law, which was enacted to address the “composite will of the citizens,” and they have always stayed the course by envisioning protection of the *resource as the first priority* (Kennedy and Snyder, undated). This persistence has allowed the Pennsylvania Fish Commissioners to initiate numerous conservation “firsts” as the vision of fishing has shifted from a food resource to a recreational resource.

Trout Production

The Fish Culture Stations

The Commission’s first hatchery was located near Marietta in Lancaster County. This was known as the Eastern Station and very little is known about this hatchery other than that it operated until 1883. In 1874, the state legislature appropriated \$5,000 to acquire land near Corry and make immediate improvements to construct the Western hatchery. William Buller was appointed hatchery superintendent at the new Corry hatchery which began operation in 1886 and is still in operation today. In 1883, the former hatchery at Marietta

was abandoned and a new Eastern station was constructed on land leased on the Little Lehigh River.

In 1885, another legislative appropriation established a hatchery at Erie which is no longer in operation. During the following year (1886) 10,000 brown trout eggs were acquired from Germany and hatched at Corry. A few years later, rainbow trout were first stocked in the Susquehanna River. Development of hatcheries continued through the early 1900s. In 1903 the Pleasant Gap hatchery was opened with J. P. Creveling named as Superintendent. That same year, the deeds to the Pleasant Mount hatchery were turned over to the commission and in October the Bellefonte hatchery was opened with final construction completed in 1934. In 1905, the Union City hatchery was opened and the following year (1906) a hatchery at Spruce Creek was started. Subsequently, in 1913, the Spruce Creek hatchery was sold to private interest.

In 1925 a site was purchased in Bedford County which was to become the Reynoldsdale hatchery and in 1929 the Tionesta hatchery was completed. In 1932 land for the Huntsdale hatchery was purchased and for the first time the Commission's production capacity had grown to result in one million legal-size trout being stocked. Soon afterward, in 1938, the Commission's production system was able to produce its own brown and rainbow trout eggs. In 1951 ground was purchased for the Benner Spring Research station and the facility became fully operational in 1957. The Oswayo hatchery was purchased in 1968. More recently, the Big Spring and Fairview hatcheries were constructed. Big Spring, built in 1970, was taken out of production in 2001 due to pollution concerns while Fairview, built in 1976, continues to produce salmon and steelhead for Lake Erie and its tributaries. In 1984 the PFBC began to lease the Tylersville hatchery from the United States Fish and Wildlife Service. Ownership of the federal hatchery was officially conveyed to the PFBC on April 5, 2007.

Fish Culture Stations Today

Changes to the PFBC hatchery system since 1997 have included phasing the Pleasant Mount hatchery out of trout production in (1997) and the termination of all fish production operations at the Big Spring hatchery in November 2001, as previously stated. Pleasant Mount was phased out of trout production due to very cold winter water temperatures that led to poor growth rates and elevated production costs. Trout production at Big Spring was terminated due to unattainable NPDES permit conditions.

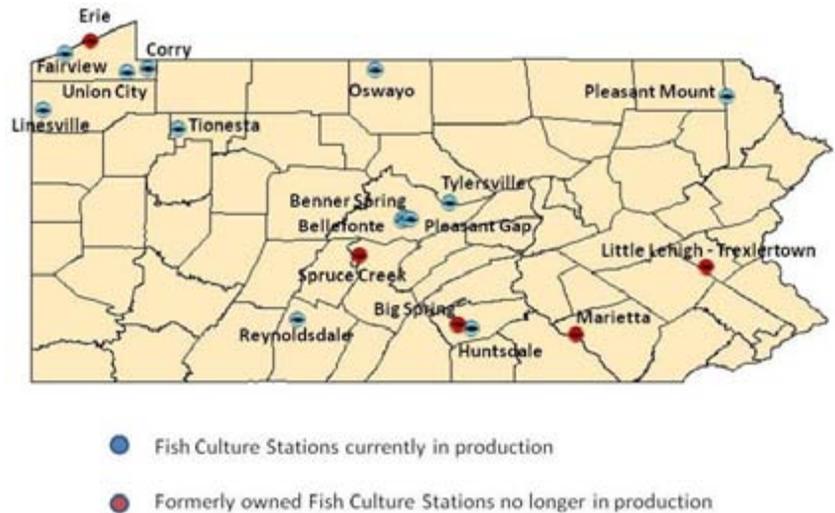


Figure 1. Location of Fish Culture Stations Owned (or Previously Owned) by the Pennsylvania Fish and Boat Commission.

Currently, there are eight hatcheries involved in the production of adult and fingerling trout. These include the Bellefonte, Benner Spring, Corry, Huntsdale, Oswayo, Pleasant Gap, Reynoldsdale, and Tylersville hatcheries (Figure 1).

With the closure of the Big Spring hatchery, the addition of more stringent effluent criteria for PFBC hatcheries, and the decision to raise larger but fewer adult trout beginning in 2007, adult trout production has declined from approximately 5.2 million trout in 1997 to 3.4 million trout by 2007. Since 1997, the annual production of fingerling trout for statewide distribution has ranged from approximately 1.1 to 1.4 million trout. The agency is presently involved in a \$27 million program to upgrade its hatcheries and other infrastructure. The funds used for the hatcheries are largely being used to upgrade the effluent treatment systems to reduce the levels of total suspended solids per the newest NPDES permit limits. The major planned and completed projects are summarized below:

- Tylersville State Fish Hatchery – Installed state-of-the-art microscreen filtration system in 2006 to treat entire hatchery discharge flow. Since this system became operational the amount of total suspended solids (TSS) discharged into Big Fishing Creek has decreased by 67%.

- Pleasant Gap State Fish Hatchery - Installed state-of-the-art microscreen filtration system with recirculation capability in 2007. TSS levels in the hatchery effluent decreased by 74% in the first year of operation.
- Huntsdale State Fish Culture Station - Effluent treatment system including microscreen filtration and a new settling pond has been designed. Renovations will be completed and system will be on-line by the end March 2010.
- Benner Spring State Fish Hatchery – Effluent treatment and recirculation system similar to the one currently in use at the Pleasant Gap facility is in the final design stage. Construction was completed and the system was on-line by the end of the 2009 calendar year.
- Bellefonte State Fish Hatchery – Effluent microscreen filtration system including recirculation capability is currently in final design stage. Construction began in late 2008 and system was online in September 2009.
- Corry State Fish Hatchery – Two new wells have been developed that will provide an additional 2,000 gallons per minute (gpm) fresh water to optimize production. The design for a pipeline to carry water to the hatchery is complete and start of construction is scheduled for spring 2010. Use of this water will eliminate the need to recirculate water within the hatchery resulting in better rearing conditions and lower ammonia levels in the hatchery effluent.
- Oswayo State Fish Hatchery – Rehabilitation of a dormant well will provide an additional 400 – 500 gpm fresh water to optimize production. The design of the pipeline to the hatchery is currently under way. Use of this water will minimize the need to recirculate water within the hatchery, resulting in lower ammonia levels in the hatchery effluent. Construction contingent upon available funding.
- Reynoldsdale State Fish Hatchery – Plans to update this facility are in the preliminary design stage. An effluent microscreen filtration system similar to the ones describe above is among the changes that are planned. Replacement of raceways with state of the art circular tanks or new raceways and a new recirculation system are also planned.

Cooperative Nursery Program

Although early records are sparse, the Cooperative Nursery Program has been in existence since, at least, 1932. At that time, the program was somewhat similar to today, however, the program was initially administered by the United States Bureau of Fisheries with fish provided by the Fish Commission as either eggs, fry or fingerling. Up until the early 1960's the program was not monitored very closely. In 1951, in a letter from C. R. Buller to Charles French, executive director, it was reported that 17 organizations were involved in the program and 115,000 fingerling trout were furnished, however only 25% of

those were actually released. During those years interested clubs were furnished any number of fish, usually brook trout, with a total disregard to the volume and quality of water they were raised in, or the physical condition of the nursery unit. Results varied from fair success to complete failure. Soon afterward, state hatchery superintendents were asked to go out and check out the sites to determine their suitability for rearing fish.

In 1962, by mutual agreement, the United States Fish & Wildlife Service (USFWS) withdrew from the program leaving it to the Fish Commission to govern. In 1965 fishing license sales dropped off dramatically, so to increase interest in fishing a Cooperative Nursery Coordinator was appointed, and the Cooperative Nursery Branch was established. Robert Brown was the first coordinator. One of the first orders of business was to establish a policy or guidelines for participating clubs to follow. Following establishment of the Cooperative Nursery Unit the program grew dramatically. Between 1969 and 1979 the number of cooperative nurseries grew from 55 to 163 and the number of sponsors grew from 54 to 140. Subsequently, the numbers of fish stocked grew from 200,000 to over 860,000.

Today the Cooperative Nursery Unit staff has increased to four full time staff and the program has now grown to 169 cooperative nursery units and 158 sponsoring organizations. The unit staff now spend a considerable amount of time providing expertise to clubs in development and maintenance of their cooperative nurseries. Numerous site visits now occur to inspect the facilities as they are developed and to answer any questions from the clubs. In addition the unit staff also monitor when and where the cooperators stock their trout in order to ensure proper use of those stocked trout.

Trout Distribution and Stocking – the Early Days

Before the turn of the century the two main modes of transportation were horse and buggy and the railroad. For stocking fish, which were mostly fry and fingerling size, horse and buggy worked fine for short distances from hatcheries to nearby streams. However, there also was a need to transport fish greater distances. The railroad was the answer.

Beginning in the 1870s, fish culturists with what is now the USFWS devised a simple method of transporting fish in milk cans. Rail baggage cars were used and hatchery "messengers" accompanied the fish to their final destinations. The messengers' primary concern, like today's culturists, was to keep the fish alive and healthy. Messengers did not have today's sophisticated equipment at their disposal. Their options were limited to adding ice to cool the water, manually aerating the water using ladles, or completely exchanging the water in the milk cans. It wasn't too long before Pennsylvania and other states adopted this uncomplicated and very successful "messenger system."

With rapid advancements in fish culture, hatcheries were continually producing more and larger size fish. As expansion continued, the limitations of the messenger system became apparent. The railroads liked having fish stocked in waterways near their tracks and transported the fish free of charge. However, paying customers were still their first priority. After all the freight, passengers, and baggage were loaded, messengers and milk cans occupied whatever space remained. Keeping fish alive under these conditions was difficult, and many times passengers were solicited to aid in this task. It was obvious that the Pennsylvania Fish Commission needed a railcar to call its own.

As early as 1887, Corry identified the need to the Pennsylvania Board of requested, and the appropriated \$5,000 (nearly Commission budget) for a fish car were soon finalized new fish car "Susquehanna" time.



*Corry Superintendent
William Buller*

photo-Corry Area Historical Society Museum

superintendent William Buller purchase a railcar. After convincing Fish Commissioners, funds were Pennsylvania Legislature of 1891 1/3 of that year's entire "fish car." Specifications for the and on June 5, 1892 the brand rolled into Harrisburg for the first

The car was built by Jackson and Sharp of Wilmington, Delaware, one of the world's leading railcar manufacturers of that era. The olive-green wooden car was 64 feet long and 10 feet wide. It could transport up to 84, 10-gallon fish cans. It was fitted with a kitchen, sleeping apartment, wardrobe, and office. Black bass, known today as smallmouth bass, had the honor of being the first species of fish stocked from the Susquehanna. Many other species followed, including brook trout, brown trout, California (rainbow) trout, lake trout, hybrid (brook and brown cross) trout, largemouth black bass, strawberry bass (black crappies), rock bass, white bass, walleye, carp, and shad.

In the early days of the Fish Commission, any person could request fish for stocking by "making application" to one of the commissioners. If approved, an order was sent to one of the hatcheries. If they used the "Susquehanna," the appropriate fish would be loaded into fish cans at the hatchery and delivered to the car by horse and buggy. The fish, usually fry or fingerlings,

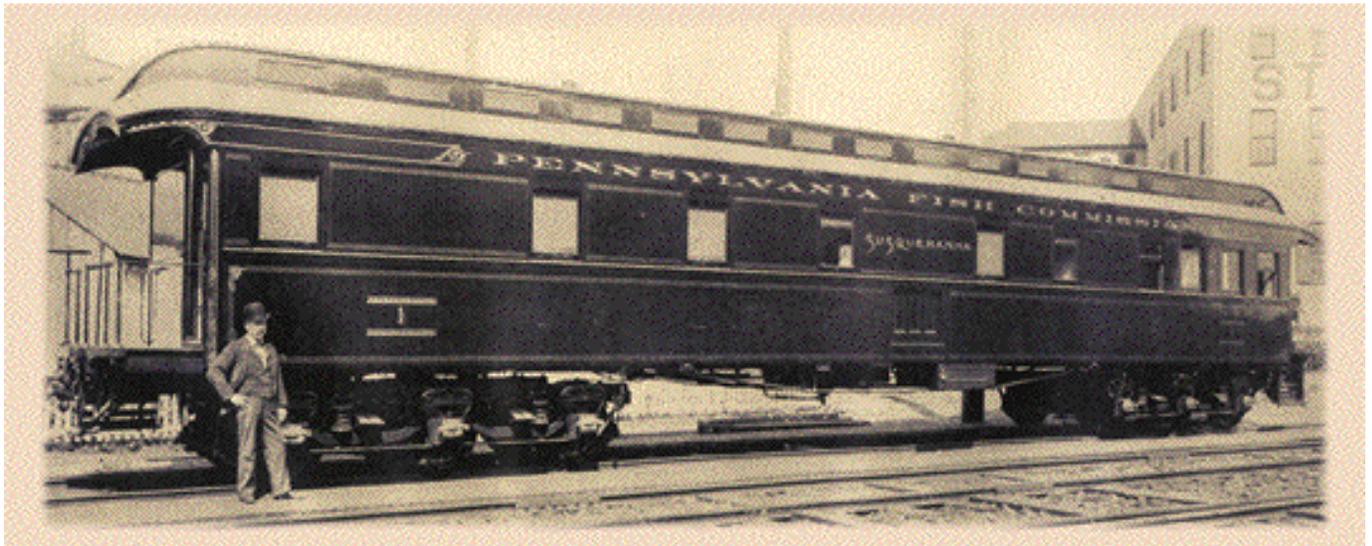


Figure 2. June 1892, Susquehanna railcar on the tracks adjacent to Walnut and 6th Streets, Harrisburg. Person in photo is probably William E. Meehan, who later became President of the Fish Commission. PFBC photo

were delivered to the applicant at a predetermined meeting place. It was the applicant's responsibility to distribute the fish into streams, lakes, or other waterways by any means available. When the car was not occupied with delivering fish for stocking, it was put to good use transferring fish between hatcheries.

Stocking and transferring fish were not the only duties of the new railcar. The "Susquehanna" was used in two world's fairs; the Columbian Exhibition in Chicago in 1893 and the Louisiana Purchase Exposition in St. Louis in 1904. During both fairs, the "Susquehanna" was instrumental in transporting the Pennsylvania Fish Commission's exhibits, including live fish. The exhibits won awards and accolades, and in 1904 won "grand prize" for its live fish display.

Operating and maintaining a wooden railcar was expensive. After only a few years, problems began to surface. Sometimes, when the car was returned from a stocking trip, a bill from the railroad was presented for repairs made along the way. To compound the problem, as early as 1895, some railroads began charging a fee of \$ 0.20 per mile. As a result, the car was used less and less until it was practically not used at all. In the 1899 Report of the Commissioners, William Buller said, "It is in a deplorable state, and exposed constantly to the weather. Twice tramps have broken in, and used it as a roosting place until driven out." Buller's pleas for additional money during the waning years of the 19th century went unheeded. The car was used so infrequently that a barn was erected specifically to house the now derailed "Susquehanna" at the then recently built Bellefonte hatchery. In 1905, the "Susquehanna" was delivered to the "car barn," its final resting place while owned by the Commission. After seeing two world's fairs, and crisscrossing the Commonwealth to stock hundreds of waterways with literally millions of fish, the fate of the "Susquehanna" was sealed. In 1913, the Commission requested permission from the Legislature to dispose of the car. One year later, the car was turned over to the Board of Buildings and Grounds, and sold. The final disposition of the Susquehanna is unknown.

The demise of the fish car reflected a greater movement. The automobile had already begun to take the place of the once mighty railroad as the primary mode of transportation. The Fish Commission was not immune to this transition. In 1927, a fleet of brand new stocking trucks was purchased and dispatched to Commission hatcheries to distribute fish to waterways throughout the Commonwealth.

The County Allocation System

With advances in fish culture and development of the automobile, the Commission began to slowly shift from stocking primarily fingerling trout to stocking more and more adult size trout. This provided more and more angling recreation; however, the distribution of hatchery trout was somewhat haphazard and inequitable. In 1974, the County Allocation System was developed as a means to distribute adult trout to the anglers. This system basically determined an allocation for each county based on three factors: percent of county license sales, percent population and percent of public land and water. From there, it was primarily up to the county waterways officer to determine what streams got stocked with trout and the number stocked in each.

While this was a good first step in attempting to allocate trout across the commonwealth, the system had many problems. First of all, the system was influenced by county lines. For some streams, the amount of fish stocked would change drastically as you crossed the county line. Additionally, the system did not take into account any information on the water to be stocked, particularly the number of wild trout that might already be present or the amount of private land adjacent to the stream. This led to trout being stocked into unfavorable environmental conditions and landowner/angler conflicts. Essentially, the program was a “rob Peter to pay Paul” system. A new system, designed to allocate trout more equitably, replaced the county allocation system in 1983. The new system did away with stocking based on political boundaries and subjective stocking criteria, instead instituting stocking allocations based on the resource. For the first time, waters with similar physical, biological and social characteristics will be stocked in a similar manner.

Environmental and Habitat Protection

Although the Pennsylvania Fish Commission was established in 1866 in response to “bad” conditions in mountain areas causing widespread pollution and dams blocking shad runs, it wasn’t until 1888 that the Commissioners reported that “hundreds of depleted streams have been restored”. Although some improvement was the result of the development of early fishways, most of the restoration was due to re-stocking of fish.

Relatively little was done to address the problem of pollution and habitat protection as viewed by McGee. In 1909 the state legislature passed the first law which forbid the emptying into any waters of the Commonwealth any waste deleterious to fish. In 1915, fish wardens were granted the power to make arrests, which included those in violation of the 1909 act. This was a good first step, but for most of the early 20th century, environmental and habitat protection was thought of as keeping the waters supplied with fish and enforcing the few existing laws.

As a nation-wide environmental movement grew throughout the 1960s, the Commission's emphasis on environmental and habitat protection grew as well. The first Commission program to focus on protection of native trout fisheries was the Wilderness Trout Stream Program, officially established in 1969. The Wilderness Trout Stream Program is designed to protect and promote "native" trout fisheries, the ecological requirements necessary for natural reproduction of trout, and wilderness aesthetics. The program has five management guidelines: no industrial development and road construction, no impounding of the stream, no introduction of beavers, and no introductions of non-native fishes.

Following passage of the federal Clean Water Act in 1972, the Commission once again elevated its emphasis on protection of the resource with the establishment of the Division of Environmental Services. This new division was primarily responsible for providing technical support and assistance to other state agencies responsible for enforcement of the Clean Water Act as well as the earlier Pennsylvania Clean Streams Law (P.L. 1987, Act 394 of 1937, as amended (35 P.S. 691.1 et seq.)). Currently, among its many duties, the Division of Environmental Services provides input to the Pennsylvania Department of Environmental Protection (DEP) concerning the numerous permits required under the Clean Water Act. The Division also reviews licenses and or permits issued for development activities by other state and federal agencies, including the Pennsylvania Department of Transportation, the U. S. Army Corps of Engineers, the Susquehanna River Basin Commission, the Delaware River Basin Commission, and the Federal Energy Regulatory Commission.

During the early 1970s the Adopt-a-Stream and Adopt-a-Lake programs were formalized. These programs have provided funding and technical support for habitat projects across the commonwealth. As sportsmen and other environmental groups began to pay closer attention to the habitat of their favorite waters, the Commission was stepping up to assist them in making improvements to that habitat. In the early part of the 21st century, the Commission gave even greater emphasis to this program by creating a Division of Habitat Management within the Bureau of Fisheries and increasing its professional staff dedicated to habitat protection and enhancement. The new Division is comprised of a Regional Habitat Section that includes six regionally-based habitat biologists, a Stream Habitat Section, a Lake Habitat Section and a Fish Passage/Dam Removal Section. The Division has opened many miles of flowing water to the free migration of fish, including trout, by the removal of over 150 dams since 1995.

Fisheries Management (pre 1981)

Regulations

During the 1870s, shortly after the Commission was created, fishing regulations consisted primarily of closed seasons, closed fishing areas, and limits on what types of devices could be used to catch fish. One of the earliest fishing regulations, was enacted in 1878, which made it unlawful to fish on Sundays. This law stayed into effect until 1937 when House Bill no. 6 again made it lawful to fish on Sundays. During these early days “wardens” had very little enforcement powers and it was constantly noted in annual reports that wanton pollution and non-compliance with the fish laws were hampering good fishing in most streams. This situation continued until the early 1900s.

In 1925, the Board of Fish Commissioners was established and creel limits were set for several species, including trout. Creel limits for trout were set higher than for any other species at 25 per day. This limit has been reduced on five occasions, most recently in 2000, when the creel limit was changed from eight to five trout per day (Table 1).

Table 1. History of daily creel limit for trout.

DAILY CREEL LIMIT FOR TROUT	
<u>Year</u>	<u>Limit</u>
1925	25
1933	20
1937	15
1938	10
1952	8
2000	5

It is unclear when size limits were first established for trout. However, the size limit was six inches until 1983 when it was raised to its current seven inches. This was done primarily to protect older and faster growing wild brook trout for an additional year before they were subject to harvest.

Trout in Pennsylvania were also regulated using conservation or “special regulations” as early as 1934 when “Fisherman’s Paradise” was established. The “Paradise” was the first specially regulated stretch of stream in the nation. The regulations included: fly-fishing only using a single barbless hook, and catch-and-release fishing, except that one trophy fish per day was allowed to be harvested. This concept was touted as Fish-for-Fun, which allowed for high catch rates for trout and still allow the angler to harvest a trophy-size trout. Many of the regulations developed in the future were based on the initial ideas of the “Paradise.”

By the late 1950s and early 1960s, 26 streams, totaling 81 miles, had fly-fishing-only regulations with harvest of six trout nine inches or longer permitted per day. An additional three streams had fly-only, fish-for-fun special regulation areas established totaling 8.6 miles. These regulations were designed to acknowledge and maintain the history of fly fishing in Pennsylvania.

The concept of special regulations for biological and social purposes, was now well established and growing both in Pennsylvania and nationwide. By the early 1970s, thirty-six streams had fly-fishing-only areas and five streams had fish-for-fun regulations. Additionally, an experimental fish-for-fun project that included artificial lures as well as flies was established on the West Branch Caldwell Creek. This marked the beginning of

including other artificial lures besides flies in the development of special regulations. Several of these new “artificial lure only” regulations were established throughout the 1970s.

Trout Season – Opening Day

In 1950 an opening day for trout was established by regulation under the Fish Law of 1949 (Act 65) This Act prohibited fishing of any kind in all waters of the Commonwealth between March 14 and 5:00 a.m., April 15 in any year, except in rivers, ponds and lakes not stocked with trout by the Commission. It should be noted that opening day did not always occur on a Saturday.

The Fish Law of 1959 listed opening day as 5:00 a.m. on April 12 (if a Saturday), or the first Saturday thereafter, effective beginning in 1960. This law also authorized the Commission to change opening days by regulation. Sometime after 1959 opening day was changed to the Saturday closest to April 15. This works out to be the same Saturday as the original 1959 law and the current definition (1st Saturday after April 11).

The starting time, which was 5:00 a.m. in both the 1949 and 1959 legislations, stayed that way until 1969, when the opening day started at 8:00 a.m. According to the April 1969 Pennsylvania Angler magazine, "The new opening hour was set by the Commission when numerous complaints were filed by property owners after fishermen camped, built fires, and littered private grounds throughout the night as they awaited the 5:00 a.m. opening last year..." It was hoped the later starting hour would discourage overnight waiting along the waterways by fishermen and ultimately keep some of that ground open to public use.

Licenses

In 1919, only non-resident fishermen were required to buy a fishing license to fish in Pennsylvania. Its cost was \$5. Only 50 were sold that initial year. In 1921 the Resident Fish License Law was passed and in 1922 the first resident fishing license was established and sold to persons over age 21. The cost of the license was \$1.00, which generated \$207,000 for the Commission in the first year. This is significant because for the first time in

its history, the Commission had become self-sufficient. In 1923 the age requirement for a license was reduced to 18 and finally to age 16 in 1926.

Also in 1923, license buttons were produced for the first time. The buttons were used until 1960, when they simply became too expensive to produce. The Commission then issued paper licenses, but it produced buttons again in 1974 and 1975; however, the cost again put an end to the license button and in 1976, Pennsylvania returned to paper licenses. For the first time, artwork was added to the license. Since it was the bicentennial year, the 1976 licenses featured a large blue Liberty Bell. Starting the next year and continuing through 2007, licenses featured line art of various fish species found in the Commonwealth.

License fees have increased steadily over the years, reaching \$22 the last times fees were raised in 2005. A \$5 trout stamp was instituted in 1991. The stamp fee was increased to \$9 in 2005 (Table 2).

Table 2. Resident Fishing License and Trout Stamp Fees

<u>Year</u>	<u>License Cost</u>	<u>Trout Stamp Cost</u>
1922	\$1.00	None
1928	\$1.50	None
1948	\$2.00	None
1954	\$2.50	None
1957	\$3.25	None
1964	\$5.00	None
1974	\$7.50	None
1979	\$9.00	None
1983	\$12.00	None
1991	\$12.00	\$5.00
1996	\$17.00	\$5.00
2005	\$22.00	\$9.00

A New Way of Thinking

At the January 5, 1981, meeting of the Pennsylvania Fish Commission (now Pennsylvania

Fish and Boat Commission), the Commissioners unanimously approved the Policy for the Conservation and Management of Fishery Resources. This policy statement formally declared a shift in the philosophy and mission of the agency from recreation first to resource first.

As stated in Chapter 57.1 of the Pennsylvania Fish and Boat Code, “It will be the policy of the Commission to protect, conserve, and enhance the quality and diversity of the fishery resources of this Commonwealth including reptiles and amphibians and to provide

continued and varied angling opportunity through scientific inventory, classification, and management of that resource. To achieve the objective of this policy the Commission will:

1. Establish and maintain a current database on the quality and quantity of the aquatic and fishery resources of the Commonwealth for effective environmental protection and resource conservation.
2. Develop statewide management programs to assure consistent treatment of all resources within any given class. Similar waters will be managed to meet the same objectives under the same philosophy on a statewide basis.
3. Manage self-sustaining fish populations as a renewable natural resource to conserve that resource and the angling it provides.
4. Use hatchery fish to provide recreation in those waters where fish populations are inadequate to sustain the fishery at desired levels.
5. Develop appropriate regulations and operational strategies to replace policies that are not compatible with management through resource classification.”

Fisheries Management – (1981 to present)

Based on the new Policy for the Conservation and Management of Fishery Resources, the first (Anonymous, 1986), and second editions (Anonymous, 1987) of the “Management of Trout Fisheries in Pennsylvania Waters” were developed to outline the programs and strategies that would be employed to manage trout fisheries in Pennsylvania waters. The most dramatic change from the previous philosophy was that each stream section to be managed would be classified based on its biological, chemical, physical and social characteristics. For the first time, similar streams would be managed in the same way. Additionally, wild trout were to be managed differently than stocked trout in that no stocking would occur in sections managed exclusively for wild trout.

Significant changes also occurred in several special regulation programs. The Fish-for-Fun programs were discontinued and those waters either shifted to other existing special regulation programs or placed into the newly created “Limestone Springs Wild Trout Waters” program, which later evolved into the Heritage Trout Program. The daily creel limit on Fly-Fishing Only waters was dropped from six to three in order to better reflect an emphasis on recreation rather than harvest. Biologically-designed Trophy Trout regulations were initially established on Cedar Run, Tioga County and Fishing Creek in Clinton County in 1983, and stocking was eliminated on any special regulation section with a “Class A” wild trout population.

In 1984, the Delayed Harvest program was established on a stocked section of Cool Spring Creek in Mercer County. This program uses hatchery trout to provide a seasonal no-kill fishery, followed by a limited harvest opportunity when conditions become less favorable for stocked trout survival through the summer. The Delayed Harvest program expanded rapidly during the late 1980s and 1990s while the no-kill period was extended from June 1st to June 14th. Additionally, a new program was developed called “Selective Harvest”. This program was specifically designed for brown trout populations where habitat constraints may limit the population’s ability to produce trophy-size trout, but some benefit may be gained from a 12 inch elevated size limit. An “all tackle” option was included for the Trophy Trout program and for the Catch and Release program during the 1990’s.

In the time frame between the second (Anonymous 1987) and third editions (Anonymous 1997) of “Management of Trout Fisheries in Pennsylvania Waters,” a number of evaluations were conducted that enabled staff to further refine trout management. These evaluations included: stream and lake examination inventories, angler use and harvest and angler opinion surveys, a statewide Trout Angler Telephone survey (Hummond 1992), and development of an Agency Strategic Plan (PFBC 1994). This information was used in the third edition of the “Management of Trout Fisheries in Pennsylvania Waters” to build upon the concepts outlined in previous editions (Anonymous 1997).

A variety of evaluations have been conducted since the third edition of the “Management of Trout Fisheries in Pennsylvania Waters” was published in 1997. These evaluations include the following: angler use and harvest evaluations from 2000-2001 on trout stocked lakes; the 2002 Trout Summit to gather angler ideas and opinions on trout management in Pennsylvania; a statewide angler use, harvest and economic assessment on wild trout streams in 2004; a statewide angler use, harvest and economic assessment on stocked trout streams in 2005; preseason stocked trout residency assessments in 2006 and 2007; and opening weekend angler use and cost benefit assessments on stocked trout streams in 2006 and 2007, and a second statewide trout angler telephone survey in 2008 (Responsive Management 2008).

During this same time frame a number of operational changes have occurred that pertain to trout management. These changes include: a reduction in the statewide creel limit from eight to five trout per day beginning with the 2000 season; a reduction in hatchery production of adult trout in 2002 due to hatchery water quality and quantity concerns; the revision of special regulations programs in 2005 and 2006; the addition of two regional opening days of trout season in 2007; and a revision in adult trout production that resulted in fewer but larger adult trout stocked in 2007.

The evaluations and operational changes mentioned above will be discussed below within the context of the five elements of the PFBC’s policy. Emphasis will be placed on those changes that have been made since 1997.

1. Establish and maintain a current database on the quality and quantity of the aquatic and fishery resources of the Commonwealth for effective environmental protection and resource conservation.

Fisheries Management Database

One of the early objectives of Operation Future was to develop and maintain a current database on the quality and quantity of the aquatic and fishery resources of the Commonwealth. Stream survey protocols were formally developed in 1986 which are designed to document the existing water quality (pH, alkalinity, hardness, temperature, and

dissolved oxygen), habitat conditions, species composition, trout population size, and biomass (Anonymous 1986). By dividing streams into homogeneous stream sections and then sampling at least 10% of each section, the overall quality of the section is determined. This data is stored, maintained and analyzed in order to assist in making management decisions about Pennsylvania's trout resources.

Since 1976, Commission staff have examined more than 4,100 stream sections and over 300 lakes. Inventory information has been used to classify almost 14,000 miles of flowing water. This has led to the classification and protection of 473 stream sections and almost 1,400 miles of stream as Class A wild trout waters.

2. Develop statewide management programs to assure consistent treatment of all resources within any given class. Similar waters will be managed to meet the same objectives under the same philosophy on a statewide basis.

Resource Based Allocation

The assignment of stream sections to resource categories is based on a rating of biological, physical, and social factors including status of the wild trout population, stream width, and recreational use potential (Table 3). Stream sections are classified as Class A (excellent standing stock of wild trout), Class B (good standing stock of wild trout), Class C (fair standing stock of wild trout), Class D (few wild trout present), and Class E (no wild trout present).

Table 3. Criteria to determine classification for individual resource related factors.

Class	Subprogram	Criteria
A	Wild Trout	See Wild Trout Program below
B	Hatchery Trout - Wild Trout	a. Total wild brook trout biomass of at least 20 kg/ha (17.8 lbs/acre and less than 30 kg/ha (26.7 lbs/ac) b. Total wild brown trout or brown and brook trout combined biomass of at least 20 kg/ha (17.8 lbs/ac) and less than 40 kg/ha (35.6 lbs/ac)
C	Hatchery Trout	Total wild trout biomass of at least 10 kg/ha (8.9 lbs/ac) and less than 30 kg/ha (26.7 lbs/ac)
D	Hatchery Trout	Total wild trout biomass greater than 0 and less than 10 kg/ha (8.9 lbs/ac)
E	Hatchery Trout	Total wild trout biomass of 0 kg/ha (0 lbs/ac)

Stream sections that meet the minimum Class A biomass criteria and are approved by the Commission are managed for wild trout with no stocking. Stream sections that are not approved by the Commission as Class A wild trout waters may be eligible for stocking providing that other physical, chemical, and social factors are satisfactory. Along with the biological rating, ratings for stream width and recreational use potential are applied and then combined to determine the appropriate management option for each stream section in the stocking program (Table 4). Recreational use potential is determined by a combination of social factors including, the proximity of a stream section to a road, number of parking spaces, ownership and human population density.

Table 4. Various Stream and Lake Stocking Categories and Associated Characteristics

Class	General Characteristics
High Yield	Mostly Public Owned, High Rec Use Potential, Low Wild Trout Pop
High Yield (Metro)	Same as High Yield, Human Pop Density > 300 persons/sq km
Opt Yield 1	Mostly Public Owned, High Rec Use Potential, Good Wild Trout Pop
Opt Yield 2 (Metro)	Mix Public & Pvt, Good Rec Use Potential, Pop Density > 300 persons/sq km
Opt Yield 2 (Urban)	Opt Yield 2 located in Urban setting
Opt Yield 2 (Suburban)	Opt Yield 2 located in Suburban setting
Opt Yield 2 (Rural)	Opt Yield 2 located in Rural setting
Opt Yield 2 (Dest Water)	Opt Yield 2 (Rural) with higher angler use than typical Opt Yield 2 (Rural)
Opt Yield 3	Small Physical size (< 13.2 feet in width)
Low Yield	Minimal stocking intensity for various reasons, usually preseason or inseason only
1S Rivers	Small Rivers (65.5 to 98.5 feet in width)
1L Rivers	Large Rivers (> 98.5 feet)
1L Rivers (Tailwaters)	Year-round trout potential
Delayed Harvest Areas	Waters in Delayed Harvest Management Program
Catch and Release	Waters in Catch and Release Management program
Class 1 Lake	Lakes < 20 acres
Class 2 Lakes	Lakes > 20 acres and < 50 acres, Mostly public owned, developed boating access
Class 3 Lakes	Lakes > 50 acres and < 100 acres, Public owned, Excellent to good access, boating allowed
Class 4 Lakes	Lakes > 100 acres and ≤ 200 acres, Public owned, Well developed parking and boating access
Class 5 Lakes	Lakes > 200 acres, Stocked at low rates, Usually elevated size limits and reduced creel limits

In Lakes stocked with trout, lake size and human population density are related to the management intensity, angler use and creel returns in lakes. Evaluations by Selcher (1972) suggest that as lakes increase in size, returns tend to decline. In large lakes returns of stocked trout are relatively low (Curtis 1951). On larger lakes, angling can be predominately boat anglers. Conversely, small lakes can be intensively managed for excellent returns. Thus stocking rates for lakes have been developed to reflect trends in diminishing angler use and creel returns with increased lake size (Anonymous 1997).

Angler effort on lakes is also related to human population density. Stocked trout angling in lakes is generally more acceptable to urban anglers than rural anglers (Anonymous 1997). The problems and opportunities for public access on lakes are more clearly defined than with streams. Thus, for lakes, stocking rates are adjusted upward to more evenly distribute recreational trout fishing in more populated areas.

3. Manage self-sustaining fish populations as a renewable natural resource to conserve that resource and the angling it provides.

Wild Trout Program in Streams

The wild trout program is designed to outline strategies for waters that support populations of naturally reproducing trout, including those waters where angling is provided over wild trout populations with no stocking. Changes that apply to this program since 1997 include the revision in the statewide creel limit for trout, the addition of a Commission policy on listing of wild trout streams, and some revisions in special regulations options.

Prior to the beginning of the 2000 season, the statewide creel limit for trout was changed from eight trout per day to five trout per day. The change was primarily a value judgment stemming from the idea that a five trout creel limit was a sufficient number to harvest per day and the fact that hatchery trout were much larger than when the creel limit of eight trout per day was first established in 1952.

To accurately identify and classify streams supporting naturally reproducing populations of trout as wild trout streams, the policy for the listing of wild trout streams was

formally adopted by the Commission at its April 28, 2003 meeting. This action stemmed from the Commission's involvement in an Environmental Hearing Board permit appeal in 1997 which considered DEP's use of the Commission wild trout stream list in the issuance and subsequent revocation and denial of stream and wetland encroachment permits (*Eagle Environmental, L.P. v. DEP*, 1997 EHB 733). The resulting opinion by EHB Chairman and Chief Judge Miller stated:

“Given this overall regulatory structure, together with the definition of “wild trout stream” at 25 Pa. Code § 105.1, *we believe the Department cannot blindly defer to the Commission's classification of streams as wild trout streams. Instead, the Department has a duty to ascertain that the Commission's determination is correct.* Such a determination may require the Department to evaluate whether the standard the Commission applies accurately indicates whether a stream supports naturally reproducing trout populations. It may also require the Department to assure itself that the Commission has considered all available evidence relevant to its determination. It is the duty of this Board to determine whether the Department properly exercised its discretionary powers based on the evidence before it. If the Board so chooses, it may determine based on the evidence before it whether the Department's action was proper.” (1997 EHB at 742 (*emphasis added*)).

In this case, after hearing testimony from Commission staff and expert witnesses from all parties, the Board concluded through *de novo* review that the streams in question were wild streams. The Commission then attempted to remedy the issue by adopting the policy for the Listing of Wild Trout Streams at the April 28, 2003 Meeting of the Pennsylvania Fish and Boat Commission. The policy, which is codified in 58 PA Code §57.1, discusses the criteria for classifying wild trout streams and the public review process that is required before adoption.

The effect of the EHB decision and subsequent PFBC policy clarifies and strengthens the Commonwealth's (DEP and PFBC) ability to protect wild trout streams.

The primary vehicle to do this is through the Dam Safety and Encroachments Act (Dam Safety Act), Act of November 26, 1978, P.L. 1375, *as amended*, 32 P.S. §§ 693.1 – 693.27 and attendant 25 Pa. Code Chapter 105 regulations which are administered and enforced by DEP. Section 9 of the act provides the Department of Environmental Protection with the power to grant an encroachment permit if it determines that a proposed project complies with all applicable laws administered by, *inter alia*, the Fish and Boat Commission. Commission staff review all Chapter 105 stream and wetland encroachment permits and advise DEP about adverse impacts to wild trout waters. DEP then protects these waters by not authorizing projects that encroach upon exceptional value wetlands. These wetlands are defined to include those “that are located in or along the floodplain of the reach of a wild trout stream ... and the floodplain of streams tributary thereto...” (25 PA Code Chapter 93.17 (1) (iii)). The criteria for classifying wild trout streams in 58 PA Code §57.1 state that classification as a wild trout stream means that trout found there have resulted from natural reproduction and that the habitat supports wild trout.

Class A streams

The purpose of the Class A wild trout streams program is to identify and manage exceptional wild trout populations to provide fisheries sustained by natural reproduction. Analysis of the results of statewide inventories conducted in the late 1970s provided the basis for development of biomass standards and the establishment of the Class A wild trout streams program (Table 5). Trout biomass criteria were established to provide minimum qualifying guidelines for Class A wild trout management in 1983.

Table 5. Minimum criteria for Class A classification.

Sub-subprogram	Criteria
1. Wild brook trout fisheries	a. Total brook trout biomass of at least 30 kg/ha (26.7 lbs/acre) b. Total biomass of brook trout less than 15 cm (5.9 in.) total length of at least 0.1 kg/ha c. Brook trout biomass must comprise at least 75% of total trout biomass
2. Wild brown trout fisheries	a. Total brown trout biomass of at least 40 kg/ha (35.6 lbs/acre) b. Total biomass of brown trout less than 15 cm (5.9 in.) total length of at least 0.1 kg/ha c. Total brown trout biomass must comprise at least 75% of total trout biomass

3. Mixed wild brook/brown fisheries	<p>a. Combined brook and brown fisheries trout biomass of at least 40 kg/ha (35.6 lbs/acre)</p> <p>b. Brook trout biomass must comprise less than 75% of total trout biomass</p> <p>c. Brown trout biomass must comprise less than 75% of total trout biomass</p> <p>d. Total biomass of brook trout less than 15 cm (5.9 in.) total length of at least 0.1 kg/ha</p> <p>e. Total biomass of brown trout less than 15 cm (5.9 in.) total length of at least 0.1 kg/ha</p>
4. Wild rainbow trout	<p>a. Total biomass of rainbow trout less than 15 cm (5.9 in.) total length of at least 2.0 kg/ha (1.78lbs/acre)</p>

These criteria were formally adopted as a Statement of Commission Policy (58 PA Code §57.8a) during the January 21, 1996 meeting of the Pennsylvania Fish and Boat Commission. Stream sections that meet the minimum criteria and are approved by the Commission as “Class A” are managed for wild trout with no stocking.

Wild Brook Trout Enhancement Program

Beginning with the 2004 season, the Wild Brook Trout Enhancement Program was added as a new special regulations option. The intent of the program was to improve the size and abundance of larger wild brook trout. Under these regulations, angling is permitted on a year-round basis with no tackle restrictions, and no brook trout may be harvested at any time. Commonwealth Inland Waters regulations apply to other trout species in these waters, i.e., a seven-inch minimum length limit and five trout per day creel limit from the opening day of trout season through Labor Day, and no harvest from the day after Labor Day until the following opening day of trout season.

Environmental Protection

The Division of Environmental Services reviews and comments on thousands of state and federal permit applications every year. These involve activities such as stream and wetland encroachments; dam construction; coal and non-coal mining; surface and groundwater withdrawals; lake and pond drawdowns; surface water applications of aquatic herbicides; municipal, residual and hazardous waste management; blasting in Commonwealth waters; acid deposition; oil and gas development; hydropower development, and erosion and sedimentation controls. These reviews are coordinated with other affected

PFBC program areas including engineering and development, fisheries management, habitat management, boating and education, and law enforcement. Environmental Services staff assist both state (PFBC and DEP) and federal (U.S. EPA) law enforcement agencies which have authority for water pollution control. Damages to fish and aquatic life communities and associated recreational use losses resulting from water pollution are estimated and recovered as compensation to the Commonwealth. In the late 1990s, staff chaired a committee and the agency helped to fund and conduct an interagency statewide instream flow study on wild trout streams that resulted in the agencies' development of a computer model that is used routinely in water allocation permit reviews by the PFBC as well as two agencies that authorize water withdrawals in Pennsylvania, DEP and the Susquehanna River Basin Commission. The model allows estimation of habitat loss on wild trout streams from various amounts of withdrawals and passby flows. Habitat protection criteria have been developed that are linked to the PFBC wild trout biomass classification system (A, B, C, D).

Stream and Lake Habitat Improvement

The PFBC Cooperative Habitat Improvement Programs (Adopt-a-Lake, Adopt-a-Stream) have been advancing projects to enhance Pennsylvania's fisheries and aquatic habitat for the past thirty years. Recently, under the direction of Executive Director Dr. Douglas Austen, the PFBC made a commitment to strengthen the agency's role as a leader in habitat protection and restoration. This increased focus was initiated in response to the recognized need and increased public demand to conserve and improve aquatic habitat throughout Pennsylvania. It is also intended to fulfill objectives outlined in the National Fish Habitat Initiative (NFHI) - specifically, to "protect, restore, and enhance the Nation's fish and aquatic communities through partnerships that foster fish habitat conservation and improve the quality of life for the American people". To this end, the PFBC has made organizational changes and directed additional resources to protect, restore, and enhance critical habitat for its trust species.

In July 2006, the Division of Habitat Management (DHM) was created under the Bureau of Fisheries. The mission of the DHM is to "Provide leadership, coordination, technical guidance, and resources to advance habitat conservation, restoration, and

enhancement activities that benefit PFBC trust species and their habitats, and develop partnerships to protect and provide public access to the Commonwealth's aquatic resources." Over the last decade, the DHM and its predecessor organizational units have obtained millions of dollars from grants and other sources to support over 1,000 projects that directly benefit wild and stocked trout fisheries. These projects include dam removals, in-stream habitat enhancements, riparian buffer restoration, and lake habitat improvement projects. DHM staff are aggressively seeking funding and establishing new partnerships to advance projects that benefit cold water resources. Significant milestones that have helped facilitate this effort include the PFBC's participation in the Eastern Brook Trout Joint Venture and an amendment to the State Wildlife Action Plan to include the eastern brook trout as a "species of greatest conservation need."

4. Use hatchery fish to provide recreation in those waters where fish populations are inadequate to sustain the fishery at desired levels.

Hatchery Trout Program in Streams

Prior to the beginning of the 2002 season, the annual production of adult trout was reduced from approximately 5.2 million trout to 3.8 million trout. This 27% reduction stemmed from water quality and quantity concerns at Pennsylvania Fish and Boat Commission hatcheries. As a result of more stringent effluent criteria in National Pollution Discharge Elimination System permits issued for PFBC hatcheries by DEP, fish production was discontinued at one hatchery (Big Spring), and reduced at most other hatcheries. To maintain compliance with these standards, a total PFBC hatchery trout biomass restriction of 1.9 million pounds was established. To account for the reduction of 1.4 million trout from the statewide production system, stocking rates were reduced for most of the stocking categories and some waters were removed from the stocking program.

Through some adjustments in production, a contract to purchase trout from a commercial trout hatchery, and a cooperative agreement with the United States Fish and Wildlife Service to raise trout at one of their hatcheries, the number of adult trout available for statewide distribution increased to 4.2 million trout for the 2004 season. As a result, stocking rates were slightly elevated on most stocking categories, and a number of the waters

removed from the stocking program in 2002 were reinstated in the stocking program. The number of adult trout produced for the 2005 and 2006 seasons was similar to the number produced in 2004.

Beginning with the 2007 season, based on angler opinions solicited from Pennsylvania’s anglers at the 2002 Trout Summit and subsequent surveys, the Commission decided to increase the average size of adult trout produced for stocking from 10.25 to 11 inches. To accomplish this and maintain the 1.9 million pounds biomass limit, some trade-off was required in the number of trout that could be produced. By increasing the average length of trout from 10.25 to 11 inches, there was a corresponding 30 percent increase in the weight of the fish. To raise trout that were 30% larger in weight, the number of trout produced needed to be reduced by 20%. As a result, a 20% reduction in the stocking rate was applied to all stocking categories. The current number of adult trout available for annual statewide distribution is approximately 3.4 million trout.

Beginning with the 2004 season, Human Population Density Classification was modified to include a Metropolitan (Metro) rating for stocked waters located in proximity to dense population centers. Subsequently, the urban human population density classification was modified to: greater than or equal to 125 persons per square kilometer but less than 300 persons per square kilometer. As a result of this change, two stocking categories were added for the 2007 season. These categories are referred to as the High Yield Metro and the Optimum Yield II Metro category (Table 6).

Table 6. Changes in rates for each stocking category from 1983 to present – Flowing Waters.

Annual Stocking Rates Per Acre							
	1983 – 1993	1994 – 2000	2001	2002	2003	2004	2007
High Yield	425	425	475	400	425	425	340
High Yield Metro						475	380
Optimum Yield 1	275	200	195	75-165	75-195	75-195	60-155
Optimum Yield 2 Metro						425	340
Optimum Yield 2 Urban	400	425	425	350	375	375	300
Optimum Yield 2 Suburban	300	300	300	235	250	250	200
Optimum Yield 2 Rural	200	180	175	125	125	125	100
Optimum Yield 2 Des Wtrs		250	245	175	175	175	140
Optimum Yield 3	150	75	75	75	75	75	60
Low Yield	75	75	75	75	75	75	60
1S Rivers	50-185	50-185	50-185	35-170	45-180	45-180	36-144

1L Rivers	50-125	50-125	50-125	35-115	40-120	40-120	32-96
Tailwaters		400-425	400-425	325-350	325-350	325-350	260-280
Delayed Harvest Areas	300	300	300	175-225	175-250	175-250	140-220
Catch and Release Area			300	100	100	100	140-200

** Programs with a range of stocking rates are mostly determined by human population density (Urban, Surban, Rural).

Hatchery Trout Program in Lakes

The assignment of lakes to resource categories is based on a rating of biological, physical, and social factors primarily including human population density and lake size (Table 7). Human population density is determined from the Pennsylvania Industrial Census Series for the townships and municipalities in which the lake is located in combination with human population density for the watershed in which the lake is located. Lake size is established by determining the surface area of the lake. Other factors which could influence the management of the lake include posting against public ingress, lack of boating opportunity, and the lack of space for public parking.

Table 7. Trout Stocking Rates from 1983 to Present – Lakes.

Annual Stocking Rates Per Acre							
	1983 – 1993	1994 – 2000	2001	2002	2003	2004	2007
Class 1 Lakes	525-625	525-625	525-625	550-650	550-650	550-650	440-520
Class 2 Lakes	400-500	400-500	400-500	275-375	300-400	300-400	240-320
Class 3 Lakes	200-300	200-300	200-300	100-200	125-225	125-225	100-180
Class 4 Lakes	125-200	125-200	120-195	50-125	75-150	75-150	60-120
Class 5 Lakes	10-40	5-10	5-10	5-10	5-10	5-10	4-8

** Programs with a range of stocking rates are mostly determined by human population density (Urban, Surban, Rural).

During the 2000 and 2001 seasons, angler use and harvest surveys were completed on trout stocked lakes. Surveys were conducted on a representative sample of lakes within the Class 1 (≤ 20 acres), Class 2 (≥ 20 acres but ≤ 50 acres), Class 3 (≥ 50 acres but ≤ 100 acres), and Class 4 (> 100 acres but ≤ 200 acres) lake categories. Results from these examinations indicated that angler use was very high for lakes in the Class 1 stocking category. Based on these findings, stocking rates were increased by a total of 25 trout/acre for lakes within the Class 1 category in 2002.

Fingerling Stocking

As the state's fish hatchery system developed and increased through the years, the Commission stocked the majority of their fish as fingerlings. Techniques to produce larger adult-size trout were still being developed, but the majority of streams and lakes stocked with trout were stocked with fingerlings with seemingly little emphasis on how successful these stockings were. As the trout production system was able to produce more and more adult size trout, emphasis on fingerling stocking was reduced, primarily to those waters that could support trout year-round but for one reason or another recruitment was limited. Generally, the growth potential of trout currently stocked in fingerling program is good. However, factors such as siltation, lack of spawning habitat or fluctuations in water levels due to reservoir releases precludes the development of a natural fishery.

In lakes, the principle goal of trout management is to supplement existing warmwater/coolwater fisheries and enhance the variety of the catch (Anonymous 1997). Use of fingerling trout stockings to maintain a fishery in two-story lakes offers a number of advantages. Use of a relatively fast growing trout species that feeds at a lower trophic level usually results in fish of a higher quality in the creel. Other advantages in using trout in lakes are a year-round growing season, cost effectiveness, and the ability to provide trout fishing opportunities in more waters (Anonymous 1997).

Regional Opening Days of Trout Season

Beginning with the 2007 season, the “Regional Opening Day of Trout Season Program” was initiated for waters within an 18 County region located in southeastern and southcentral Pennsylvania (Figure 3).

The opening day for this region is scheduled to occur on the first Saturday after March 28, which is two weeks earlier than the traditional statewide opening

day. The traditional time period for opening day (the first Saturday after April 11) remains in place for waters over the remainder of the state.



Figure 3. Map showing regional opening days by county.

The addition of the regional opening day is an attempt to tailor the season to the unique biological and angling conditions in the southwest corner of Pennsylvania. Long-term weather patterns indicate that air temperatures within the 18-county region tend to be warmer earlier in the spring compared to other regions of the state (Figure 4). These

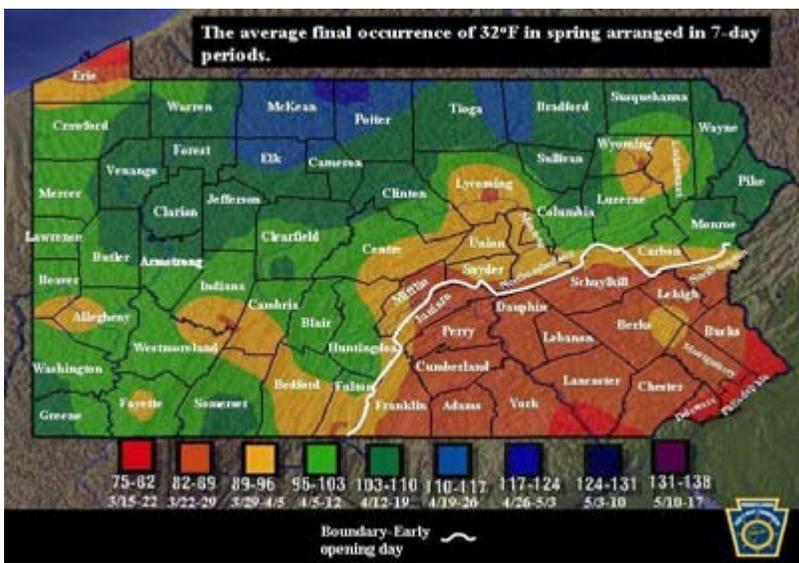


Figure 4. Thermographic map of Pennsylvania including boundary for regional opening day.

warmer temperatures provide conditions that are typically better suited for trout angling earlier in the spring than in the rest of the state.

Water temperatures also become too warm for

stocked trout earlier in the late spring and early summer in the 18-county region than in the rest of the state.

Early Season Trout-Stocked Waters Program

The Early Season Trout-Stocked Waters Program was implemented in 1995 to extend trout angling opportunities through the month of March on a group of trout stocked lakes and two tailwater areas. Most trout stocked waters are closed during the period of March 1 until the opening day of trout season in mid April. Under the Early Season Trout-Stocked Waters option, a portion of the annual trout allocation is stocked during January or February. During the month of March, the season remains open on these waters under extended season regulations that permit the harvest of three trout per day. The season closes at midnight March 31 to allow these waters to be stocked again between April 1 and opening day.

Stocking Frequency

In 2007 the inseason stocking frequency was reduced on waters that traditionally received multiple inseason stockings. This change was implemented to increase angler use following stocking and allow the PFBC to save on distribution costs by reducing the number of stocking trips required to distribute these fish. The idea was to consolidate shipments into fewer plantings and stock more fish earlier in the inseason distribution period at a time when more anglers participate in trout fishing.

Brood Trout Allocation Strategy

The brood trout allocation strategy was revised in 2004 to coincide with the reduced number of brood fish available due to reduced production. In addition, revisions were made to include the addition of new stocking categories (High Yield Metro and Optimum Yield II Metro). As with past practice, approximately 70% of these trout are shipped during the preseason distribution period, and 30% are stocked during inseason stockings.

Refuge Areas

Refuge areas were initially established in the 1960s. These areas are intended to reduce angler concentration immediately after stocking and to prolong the contribution of each stocking over a greater period of time. Refuge areas are primarily designed for small stocked trout streams and are not widely used across the state. Statewide angling regulations are applied to stream sections managed under this option. However, refuge areas (approximately 100 meters in length) are subjected to no entry and no fishing from March 1 through June 15. Following this time period the refuge areas are open to angling under statewide angling regulations.

5. Develop appropriate regulations and operational strategies to replace policies that are not compatible with management through resource classification.

Special Regulation Programs

Besides the wild brook trout special regulation program mentioned in section 3 above, additional changes were made to special regulations programs in the time period between the end of the 2004 and beginning of the 2006 seasons. The purpose of these changes was to standardize and simplify the special regulations options. These changes included, consolidating similar special regulations into one regulation, the removal of some special regulations programs, and the addition of some new special regulations programs.

As a result of these changes, four special regulations programs were removed (Delayed Harvest Fly-Fishing Only, Heritage Trout Angling, Selective Harvest, and All Tackle Selective Harvest), two new programs were added (Catch-and-Release Fly-Fishing Only and Catch-and-Release All Tackle), two waters were removed from Miscellaneous Special Regulations and placed under a formal special regulations option, and the barbless hook requirement was removed from special regulations programs where it formerly applied.

Prior to the beginning of the 2005 season, the Selective Harvest and All Tackle Selective Harvest programs were dissolved. Waters formerly managed under these programs were placed into other existing regulations options. For example, five waters were placed under the Catch-and-Release (Artificial Lures Only) program, two waters were placed under

Wild Brook Trout Enhancement regulations, two waters were placed under Trophy Trout (Artificial Lures Only) regulations, and one water was returned to statewide regulations at the request of the landowners. (Table 8).

Table 8. Summary of Changes to Special Regulations Programs from 2004 through 2006.

<u>2004 Special Regulations Program</u>	<u>2006 Special Regulations Program</u>
Wild Brook Trout Enhancement Selective Harvest (Lyman Rn) All Tackle Selective Harvest (Camp Rn)	Wild Brook Trout Enhancement
Delayed Harvest Artificial Lures Only	Delayed Harvest Artificial Lures Only
Heritage Trout Angling Delayed Harvest Fly-Fishing Only	Catch-and-Release Fly-Fishing Only
Catch-and-Release (Artificial Lures Only) Selective Harvest (Grays Run and Young Woman's Ck) All-Tackle Selective Harvest (Rauchtown Ck, Cherry Rn, Hunts Rn)	Catch-and-Release (Artificial Lures Only)
Miscellaneous Regulations (Spring Ck and Valley Ck) All Tackle Trophy Trout (Clarion River and Little Juniata River)	Catch and Release All Tackle
All Tackle Trophy Trout (Penns Ck and Youghiogheny River)	All Tackle Trophy Trout
Trophy Trout Artificial Lures Only Selective Harvest (Codorus Ck and Saucon Ck)	Trophy Trout Artificial Lures Only

Beginning with the 2006 season, the Delayed Harvest Fly-Fishing Only and Heritage Trout Angling programs were combined to form the new Catch-and-Release Fly-Fishing Only program. Under these regulations angling is permitted on a year-round basis, no trout may be harvested at any time, and gear is restricted to the use of artificial flies and streamers.

For the 2006 season, two waters formerly managed under All Tackle Trophy Trout regulations and two waters managed under Miscellaneous Special Regulations were placed into the new Catch-and-Release All Tackle program. Under these regulations angling is permitted on a year-round basis with no tackle restrictions, and no trout may be harvested at anytime.

Angler Attitude and Opinion Measurement

Angler attitude and opinions were assessed during the 1991 Trout Angler Telephone Survey (Hummon 1992), again in 1996 as part of a survey conducted by Responsive Management to assess Pennsylvania anglers' and boaters' attitudes toward aquatic resources, fishing, and boating (Duda et al. 1996) and most recently in 2008 in a second statewide telephone survey (Duda et al. 2008). In September 2002 the PFBC hosted a Trout Summit Meeting. The focus of this meeting was to share information on trout management and culture with other states and agencies, and to solicit feedback and opinions from members of Pennsylvania angling groups. Participants at the Summit suggested that the PFBC should emphasize stocking efforts on high use areas and public owned waters, add more seasonal no-kill areas, expand the use of fingerling stocking, increase the size of stocked adult trout, explore the use of regional opening days, develop a set of special regulations for wild brook trout waters, and better define wild trout management criteria. In response to these suggestions, the PFBC has implemented a number of changes since 2002. These changes include, the addition of the High Yield Metro and Optimum Yield II Metro stocking categories to emphasize more stocking on public owned and high use areas, the addition of waters to special regulations programs where seasonal no-kill regulations apply (such as, Delayed Harvest Artificial Lures Only), the addition of fingerling stocking in more coldwater streams where natural reproduction is limited, the adoption of two regional opening days of trout season, the creation of Wild Brook Trout Enhancement regulations, and the adoption of a Commission policy to accurately identify and classify streams supporting naturally reproducing populations of trout.

Conclusion

Pennsylvania's angling history spans across two centuries and has now entered into a third. In the early days, angling in Pennsylvania was considered an important means of providing a source of food and depended entirely on native fish stocks with no regulations. In the mid to late 1880's, as the Commonwealth's natural resources were exploited and native fish stocks dwindled. The situation soon became intolerable to the citizens of the Commonwealth as opportunities to harvest fish as food were decreasing. In 1866, a convention held in Harrisburg to investigate pollution, poor conditions existing in mountain

lakes and streams, and the stopping of spring shad runs by dams resulted in Governor Andrew G. Curtin naming James Worrall Pennsylvania's first Commissioner for the Restoration of Inland Fisheries (Pennsylvania Fish and Boat Commission 2010 and Stranahan 1993). A few years later, in 1873, the Pennsylvania Fish and Commission was created and initially charged with the task of restoring fish stocks for the citizens of the Commonwealth (Stranahan 1993).

The Pennsylvania Fish and Boat Commission is one of America's oldest and most effective conservation agencies. From its humble beginning with a simple mission to protect and restore the fisheries of the Commonwealth to the current level of diverse responsibility, trout and trout angling have been key components of the overall mission. Whether it's enhancing wild trout streams with regulations, protecting high standards of water quality vital to their existence, improving trout habitat, or providing trout angling opportunities through stocking, the Pennsylvania Fish and Boat Commission is committed to staying the course, and keeping "Resource First" as its primary focus.

Literature Cited

Anonymous, 1986. Management of trout fisheries in Pennsylvania waters. 1st edition. PFBC files. 450 Robinson Lane, Bellefonte, PA.

Anonymous, 1987. Management of trout fisheries in Pennsylvania waters. 2nd edition. PFBC files. 450 Robinson Lane, Bellefonte, PA.

Anonymous. 1994. Strategic Plan – “The future of fishing & boating in Pennsylvania”. PFBC files. 450 Robinson Lane, Bellefonte, PA.

Anonymous, 1997. Management of trout fisheries in Pennsylvania waters. 3rd edition. PFBC files. 450 Robinson Lane, Bellefonte, PA.

Curtis, B. 1951. Yield of hatchery trout in California lakes. CA Fish and Game. 37:197-251.

Duda, M. D., M. Jones, T. Beppler, S.J. Bissell, A. Criscione, B. Hepler, A. Ritchie, C. L. Schilli, T. Winegord, and A. Lanier. 2008. Pennsylvania trout fishing survey. Responsive Management, Harrisonburg, VA. 167 pp.

Duda, M. D., K. C. Young, T. E. Graham, R. S. Sipes, and S. J. Bissell. 1996. Pennsylvania anglers' and boaters' attitudes toward aquatic resources, fishing and boating. Responsive Management. Harrisonburg, VA. 345 pp.

Hays, S. P. 1959. Conservation and the gospel of efficiency, 1890 – 1920. University of Pittsburgh Press, 1999. 297 pages.

Hummon, N.P. 1992. The 1991 trout angler telephone survey. University Center for Social and Urban Research, Univ. of Pittsburgh, Pittsburgh, PA. 97 pp.

Kennedy, W. and R. A. Snyder, undated An Historical review of conservation and fishing regulation initiatives. PFBC Files. 450 Robinson Lane, Bellefonte, PA.

Marcinko, M., R. Lorson, and R. Hoopes. 1986. Procedures for stream and river inventory information input. PFBC Files, 450 Robinson Lane, Bellefonte, PA.

Pennsylvania Fish and Boat Commission. 2010. PFBC Chronology, significant Commission events, 1866 to present. Available: [Http://fishandboat.com/chrono.htm](http://fishandboat.com/chrono.htm). (June 2010).

Selcher, J. W. 1972. Percentage returns of the catchable trout fisheries in Pennsylvania. PFBC Files. 450 Robinson Lane, Bellefonte, PA.

Stranahan, S.Q. 1993. Susquehanna, river of dreams. Page 251. The John Hopkins University Press. Baltimore, Maryland.