

Operational Guidelines for the Management of Trout Fisheries in Pennsylvania Waters

Bureau of Fisheries
Pennsylvania Fish and Boat Commission
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1.0 INTRODUCTION

Pennsylvania's angling history spans a period of over two centuries. This extends from a time predating the Pennsylvania Fish and Boat Commission (PFBC), when angling opportunity was solely dependant upon native stocks and where laws and regulations were virtually absent to present day management, which includes angling regulations and law enforcement, water quality protection, habitat enhancement, management directed at protecting naturally reproducing stocks, and the use of cultured fish to provide recreational angling opportunities. Over this time period a variety of changes have occurred that coincided with the evolution of angling methods and management practices. These changes are discussed in "The History of Trout Management in Pennsylvania" (Weber et al. 2008).

Beginning in 1983, the Pennsylvania Fish and Boat Commission adopted a "Resource First" philosophy into the management of the Commonwealth's coldwater resources. Under this concept, statewide management was implemented and decisions were made on individual waters based on resource classification. Resource classification took into consideration key biological, physical, and social factors when assigning waters to an appropriate resource category.

As part of the change to resource classification based management, the presence and abundance of wild trout were recognized. Trout population abundance criteria were developed to identify and categorize wild trout waters and provide the framework for the formal management of wild trout populations with no stocking. For lakes and streams that required the stocking of adult trout to provide angling opportunities, a set of biological, physical, and social factors were used to assign waters to an appropriate resource based stocking category. Waters with similar attributes were assigned to the same stocking category.

The "Resource First" philosophy was a striking change from past practice. Formerly, trout management was based on allocating trout on the basis of a county quota system where license sales were the primary basis for determining the number of hatchery trout assigned to a county regardless of the water resources available in the county. Wild trout management was limited to very remote streams under this system.

In the time period since the publication of the “Management of Trout Fisheries in Pennsylvania Waters, Third Edition” (PFBC, 1997), a number of evaluations have been conducted to enable staff to refine trout management in the waters of the Commonwealth. These evaluations have included the following: a statewide angler use and harvest assessment of trout stocked lakes in 2000 and 2001; a Trout Summit involving PFBC staff and invited members of the angling public in 2002; a statewide angler use and harvest and economic assessment of wild trout streams in 2004; a statewide angler use and harvest and economic assessment of stocked trout streams in 2005; assessments of opening weekend angler use and cost-benefit of stocking on trout stocked streams in 2006, 2007, 2008 and 2009; statewide assessments of stocked trout residency in streams prior to the opening day of trout season in 2006, 2007, 2008 and 2009; a statewide Trout Angler Telephone Survey to assess angler attitudes and opinions in 2008; annual stream and lake examination inventories; evaluations of existing trout management program options; and a comprehensive economic analysis of the costs to produce hatchery trout for put-grow-and-take fisheries, cooperative nurseries, and put-and-take adult trout fisheries. The *Operational Guidelines for the Management of Trout Fisheries in Pennsylvania Waters* is a revision of the Management of Trout Fisheries in Pennsylvania Waters, Third Edition, and incorporates the information collected from these evaluations to outline the current management programs and strategies that are in effect to manage Pennsylvania trout fisheries at the operational level. This document should not be confused with the *Strategic Plan for Management of Trout Fisheries in Pennsylvania 2010-2014* (PFBC, 2009). Although both documents share common policies, goals, and objectives, the purpose of the strategic plan is to address 24 specific priority issues that have been identified pertaining to trout management in Pennsylvania over the next five years. Many of the trout program elements outlined in this document will be evaluated to address priority issues in the strategic plan. Based on the results from these evaluations the criteria and objectives outlined in the operational guidelines may need to be modified. Should the need for revisions arise, the criteria and objectives outlined in this document will be modified accordingly, as the Pennsylvania Fish and Boat Commission moves forward to meet the challenges of the new millennium.

1.1 POLICY FOR THE CONSERVATION AND MANAGEMENT OF PENNSYLVANIA'S FISHERY RESOURCES

The Policy for the Conservation and Management of Fishery Resources was unanimously approved by the Commissioners at the January 5, 1981, meeting of the Pennsylvania Fish Commission. The policy statement formally declared a shift in the philosophy and mission of the Pennsylvania Fish Commission from "recreation first" to "resource first." The policy established a broad goal of protecting our resources and providing continued and varied angling opportunity.

The conservation and management policy outlines five activities necessary to achieve policy objectives. This set of activities constitutes a strategic initiative and provides the basis for resource-based conservation and the management of Pennsylvania trout fisheries. To successfully achieve the objectives of the policy requires the involvement and cooperation of all Commission organizational units. This all encompassing involvement of and commitment by various activities and disciplines within the agency and through cooperative efforts from partners such as, sportsman's groups, watershed associations, universities, and other state and federal agencies will continue to largely determine the future of fishing in Pennsylvania.

The policy, which was codified at 58 Pa. Code §57.1, is stated as follows: "It will be the policy of the Fish and Boat Commission to protect, conserve, and enhance the quality and diversity of the fishery resource 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 objectives 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.

In April 2008 the Commissioners approved a new “Resource First” policy that stated, “Resource First is a philosophy that describes the first priority of the PFBC’s mission and that of the Fish and Boat Code as well as the PFBC’s fundamental role in fulfilling and supporting the provisions of Article 1, Section 27 (Natural Resources and Public Estate) of the Constitution of the Commonwealth of Pennsylvania.

It represents:

1. The commissioners’ belief that the Commonwealth’s aquatic resources are the valuable collateral that secures all fishing and boating activities.
2. The notion that protecting, conserving, and enhancing the Commonwealth’s aquatic resources is the agency’s first management priority.
3. The commissioners’ expectation that the agency’s activities, regulations, and methods of work will be evaluated and practiced within the context of this priority.

This philosophy is expected to:

1. Provide the basis for scientifically managing and protecting the Commonwealth’s aquatic resources and maximizing fishing and boating opportunities.
2. Lead to different ways of allocating the agency’s limited financial resources.
3. Support new, scientifically-based approaches to distributing and raising expensive, stocked fish.
4. Provide the basis for protecting and enhancing viable wild fisheries and other resources under the agency’s jurisdiction.

The “Resource First” philosophy further establishes the ethical principle that the agency’s primary role is that of a conservation organization. Accordingly, its responsibility extends beyond merely providing fishing and boating opportunities to the public. Rather, it establishes a

commitment to optimizing those opportunities through the application of good science throughout the Commonwealth. It also establishes the firm expectation that the agency will:

1. Not engage in or support activities or regulations that may bring undue harm to its aquatic resources.
2. Constantly strive to develop and improve upon its ability to make scientifically-informed decisions on the impact of various regulations and practices on the aquatic resources it is charged to protect.

Should doubt or confusion arise regarding this priority, the agency will:

1. Opt for the more conservative position of protecting, conserving, and enhancing the water, the habitat within its attendant watershed, and the life within it.
2. Develop all of its activities in a scientifically supportable manner that is consistent with this philosophy and the most currently available research.
3. Implement changes, whenever feasible, in its regulations and practices to eliminate such doubt or confusion.

1.2 DESCRIPTION OF THE RESOURCE AND RESOURCE USERS

Description of the Resource

Pennsylvania is fortunate to have a vast flowing water resource comprised of 86,000 miles of flowing water (Pa. DEP 2006). To date the PFBC has surveyed 3,175 streams comprising 21,654 miles. Of this total, there have been 1,709 streams (9,372 miles) in which wild trout have been documented by PFBC staff. There are another 1,702 streams, comprising 3,452 miles, that by PFBC policy are classified as wild trout streams by virtue of the fact they lie upstream of documented wild trout waters (58 Pa. Code §57.11; Figure 1). This results in a total of 3,411 designated wild trout streams comprising 12,824 miles. Including stocked streams, there are currently 15,118 miles of streams managed to provide trout fishing in Pennsylvania.

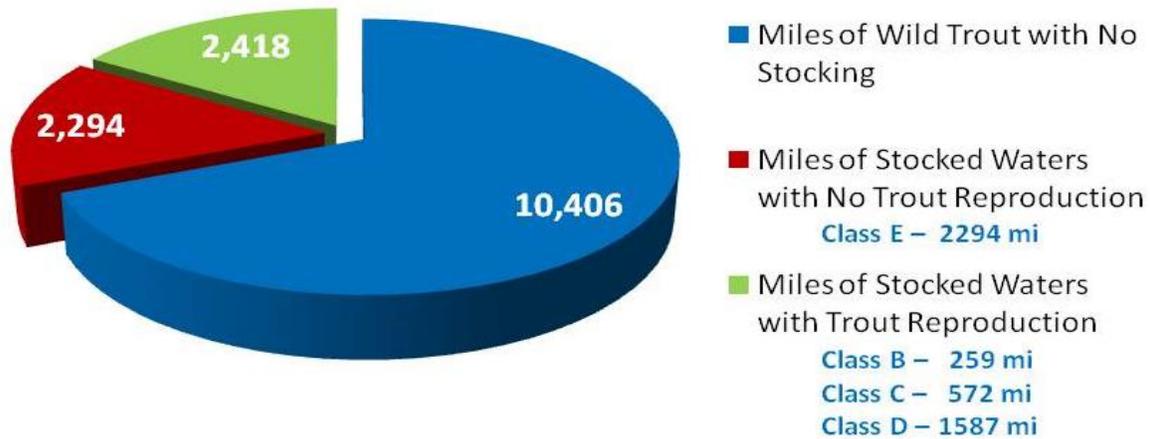


Figure 1. Miles of stream managed for trout in Pennsylvania

Pennsylvania's diverse coldwater resources range from small, infertile, mountain streams to larger valley limestone streams. Reproducing populations of brook trout, brown trout, and to a lesser extent rainbow trout have been documented in these waters. Brook trout are the only salmonid species native to Pennsylvania's streams and are Pennsylvania's official state fish. Despite the numerous changes that have occurred to Pennsylvania's landscape since the pre-colonial era, brook trout continue to be broadly distributed in waters across the state. Based on stream examination data collected by PFBC staff since 1976, wild brook trout populations have been documented in 1,524 stream sections covering a total of 5,044 stream miles (PFBC 2007).

Brown trout were introduced to Pennsylvania waters during the late 1800s. Brown trout have adapted well to Pennsylvania streams and naturalized populations of wild brown trout have been documented in 1,276 stream sections covering a total of 4,917 stream miles. Rainbow trout were also introduced to Pennsylvania waters during the late 1800s. Although this species has been regularly used as part of the statewide stocking program since the 1920s, wild rainbow trout populations have been documented in only 30 stream sections covering 83 stream miles. It should be noted that these figures provide a conservative estimate of the miles of stream inhabited by wild trout in Pennsylvania, as it includes only those waters where wild trout have been confirmed by way of Pennsylvania Fish & Boat Commission stream surveys (PFBC 2007). An evaluation of the economic contribution to the Commonwealth resulting from angling activities that occur on wild trout streams was conducted in 2004. It was estimated that these activities resulted in a total

economic contribution of 7.16 million dollars to the Commonwealth's economy from the opening day of trout season through Labor Day (Greene et al. 2005).

Trout stocked waters that do not support natural reproduction provide a significant amount of additional cold water angling opportunities in Pennsylvania. Currently the PFBC stocks adult trout in a total of 1,087 stream sections covering 4,712 miles of stream. A total of 530 stream sections covering 2,294 miles of stream do not support natural reproduction. These waters comprise nearly half of the stream sections and miles of stream stocked with adult trout on an annual basis. Another 16 stream sections, totaling 168.7 miles, are stocked exclusively with fingerlings to provide put-grow-take fisheries. An evaluation of the economic contribution to the Commonwealth resulting from angling activities that occur on streams stocked with adult trout was conducted in 2005. It was estimated that these activities resulted in a total economic contribution of 65.70 million dollars to the Commonwealth's economy from the opening day of trout season through mid-June (Greene et al. 2006).

Excluding Lake Erie, the PFBC manages 386 publicly accessible natural lakes and artificial impoundments for fishing opportunities. Currently 1,103 stream sections, comprising 4,881 miles of flowing water, and 132 natural lakes and artificial impoundments, comprising 30,916 acres, are managed for salmonids through adult, fingerling or a combination of adult and fingerling trout stocking programs.

Of the 386 inland natural lakes and impoundments that provide free public access for fishing 132 are managed to provide recreational angling opportunities for trout through adult trout stocking, fingerling trout stocking or a combination of the two (Figure 2). These waters include both one-story and two-story lakes. One-story lakes are characterized by an epilimnion that extends to the lake bottom or a hypolimnion that does not contain enough dissolved oxygen to support trout throughout the summer when thermal stratification occurs. As a result, one-story lakes are only capable of supporting trout on a seasonal basis. Two-story lakes are those with a hypolimnion that is extensive enough to provide adequate temperatures and dissolved oxygen levels to sustain year-round survival and angling opportunities for trout. This type of habitat is uncommon in Pennsylvania; there are currently 12 two-story lakes managed for trout in the state.

The PFBC manages 125 lakes with the stocking of adult trout. These lakes range in size from small ponds of less than 2 acres to large impoundments exceeding 1,250 acres. Adult trout stocking in lakes primarily occurs during the peak period of angling activity in the spring. However, some lakes are stocked during the fall and winter periods to extend angling opportunities over a greater portion of the year. Five of the adult trout stocked waters are two-story lakes. However, the majority (120 lakes) are one-story lakes that do not provide adequate water temperatures and dissolved oxygen content to support trout on a year-round basis.



Figure 2. Statewide distribution of lakes managed for trout fishing in Pennsylvania

Description of Pennsylvania's Trout Anglers

Trout angling generates a considerable amount of angler interest and represents a major component of the total fishery available in the Commonwealth. According to a 1991 Trout Angler Telephone Survey, 80% of Pennsylvania's licensed anglers fished for trout at some time during the season (Hummon 1992). During 2008 the PFBC sold 484,797 trout and salmon stamps. This figure represents the minimum number of anglers that fish for trout in Pennsylvania, as trout and salmon stamp sales do not take into account lifetime license holders who are not required to purchase a

stamp annually nor does it take into consideration anglers under 16 years of age who are not required to purchase a license.

Information from trout angler telephone surveys conducted in 1991 and 2008 indicated that trout angling is a male-dominated activity as 91% of trout anglers were males in 2008, and 90% of the trout anglers were males in 1991 (Duda et al. 2008, Hummon 1992). Pennsylvania trout anglers are an aging group; the median age of anglers was 39 in 1991 and 46 in 2008. Several trends in angler behavior have been observed from 1991 to 2008. For example, anglers are releasing a greater portion of their catch. Seventy-five per cent of the anglers reported they released at least half of their catch in 1991, compared to 88% in 2008. In addition, based on the results from statewide angler use and harvest surveys conducted on wild trout streams in 2004 and stocked trout streams in 2005, anglers released over 92% and 63% of the trout caught, respectively (Greene et al. 2005; Greene et al. 2006). A substantial majority of Pennsylvania's trout anglers prefer to fish streams as compared to lakes. In 1991, 74% of the anglers preferred to fish for trout in streams, 13% preferred lakes and 13% had no preference between streams and lakes (Hummon 1992). Similarly, in 2008, 81% of Pennsylvania trout anglers preferred to fish streams, 10% preferred lakes and nine percent had no preference between lakes or streams (Duda et al. 2008).

In Pennsylvania trout angling opportunities are provided in a variety of habitats ranging from coldwater streams where angling opportunities are provided by wild trout, to transitional streams, warmwater streams, and lakes where seasonal trout angling is provided through stocking. Stream trout fisheries are managed for wild trout or through the planting of adult trout, fingerling trout, or a combination of both adult and fingerling trout. Trout angling opportunities in lakes are provided through the planting of adult trout, fingerling trout, or a combination of both adult and fingerlings. Species of trout include brook, brown, and rainbow trout. To manage these fisheries, it is necessary to define a set of general strategic guidelines.

1.3 GENERAL STRATEGIC GUIDELINES

1. All trout streams will be designated for management as "wild trout water" or a "hatchery supported water" and managed accordingly. Hatchery supported streams include some

streams that support wild trout populations but are not designated for management under the Class A Wild Trout Waters Program or the Wilderness Trout Streams Program.

2. All streams or lakes managed for and designated as hatchery supported will be further classified into resource based stocking categories.
3. Releases of hatchery fish will not be made into streams or stream sections designated for management under the Class A Wild Trout Waters Program or the Wilderness Trout Streams Program.
4. Hatchery trout will be stocked only in those waters open to free public access for the purpose of fishing.
5. Management subprograms will be designed to provide a diversity of angling experiences including those based on wild trout only, wild trout in combination with hatchery trout, and hatchery trout only. Differing combinations of regulations will be used to provide high quality fishing experiences on selected waters.
6. Regulations will be developed to achieve a variety of objectives, both biological and social, and may include seasonal restrictions, length limits, creel limits, and gear restrictions.
7. Biological objectives will receive priority over social objectives when applying regulations for the management of wild trout fisheries.
8. Hatchery trout will not be stocked in waters where flow, size, water temperature, water quality or access for the general angling public do not meet accepted standards.
9. Data collection will be ongoing and management strategies will reflect the most current information.

2.0 TROUT FISHERIES MANAGEMENT

The Pennsylvania Fish and Boat Commission manages a diverse assortment of habitats in an effort to provide a variety of trout fisheries. Wild trout populations in these habitats range from very low to substantial standing stocks of trout. Management needs for trout fisheries reflect this diversity of habitats and resident trout populations. Resource categories have been developed as a mechanism for adequately recognizing this diversity while maintaining a uniform approach and logical organization in the statewide management of trout fisheries.

Resource categories are defined by objectively determined biological, chemical, physical, and social criteria. The biological, chemical, physical, and social information collected from stream and lake examinations conducted by PFBC staff is stored in the agency's Resource Database. This includes water specific information that has been collected on lakes and flowing water sections since 1976. Information stored in the database includes but is not limited to; fish species occurrence, fish species abundance, water chemistry data, the surface area of lakes and stream sections, the length and mean width of stream sections, riparian ownership in terms of the amount of public and private ownership and the amount that is open or closed to public angling, the proximity of a stream section to a public road, the amount of public parking spaces available, and human population density information.

The overall plan for the management of trout fisheries consists of subprograms and management options designed to achieve the general objectives of the Commission's Policy for the Conservation and Management of Fishery Resources. Operational subprograms and management options are based on meeting differing fishery management objectives associated with specific resource categories. Subprograms are designed in response to general needs identified in an effort to achieve major policy objectives. Management options, within subprograms, are intended to provide specific responses to clearly defined needs related to managing a single component of the overall trout fishery.

2.1 CURRENT OPERATIONAL PLAN ELEMENTS

The current operational plan for trout management is divided into distinct areas of emphasis (subprograms), and then options within each subprogram.

The elements are as follows:

- I. WILD TROUT FISHERIES IN STREAMS
- II. HATCHERY TROUT FISHERIES IN STREAMS
- III. HATCHERY TROUT FISHERIES IN LAKES

2.2 WILD TROUT FISHERIES MANAGEMENT IN STREAMS

Analysis of statewide inventory data provided the basis for development of criteria for establishment of wild trout fisheries. These criteria were established to classify trout populations based on wild trout population biomass. Classifications range from waters that support a high biomass of wild trout (biomass Class A) to waters that support sparse populations of wild trout (biomass Class D). Biomass standards have management and regulatory water quality protection implications. The classification of stream sections as biomass Class A, B, C, or D has significance in how waters are managed for Fisheries Management purposes, and how waters are designated under the 25 PA Code Chapter 93 water quality standards designations administered by the Pennsylvania Department of Environmental Protection.

2.2.1 Water Quality Protection Significance

All Commonwealth waters have a designated use, which determines the protection standards that the Pennsylvania Department of Environmental Protection (DEP) uses to permit development activities in watersheds. Wild trout streams should be protected at a minimum under the Cold Water Fishes (CWF) designation in 25 Pa. Code Chapter 93 because of their ability to support or maintain a population of wild trout. The PFBC notifies DEP whenever the agency designates new wild trout streams. DEP independently confirms that streams are wild trout waters by reviewing and verifying the PFBC's data. Wetlands located in or along the floodplain of wild trout streams are protected as

Exceptional Value Wetlands in 25 Pa. Code Chapter 105. This is the Commonwealth's highest level of wetland protection. Stream and wetland encroachment permits in these watersheds often include a seasonal restriction (no work from October 1 to December 31) to minimize impacts with trout spawning.

In addition, sub-groups of wild trout streams receive additional protection under the Commonwealth's special protection waters program (Pa. DEP 2003) and are designated either High Quality-Cold Water Fishes (HQ-CWF) or Exceptional Value (EV) based upon other characteristics, which can include wild trout biomass.

2.2.2 COMMISSION POLICY: LISTING OF WILD TROUT STREAMS

Under 58 Pa. Code §57.11, it is the policy of the PFBC to accurately identify and classify streams supporting naturally reproducing populations of trout as wild trout streams. The PFBC's Bureau of Fisheries, Fisheries Management Division maintains the list of wild trout streams.

The Commission Policy for the listing of Wild Trout Streams is stated as follows:

- a. *Maintenance of list* – It is the policy of the Commission to accurately identify and classify streams supporting naturally reproducing populations of trout as wild trout streams. The Fisheries Management Division will maintain the list of wild trout streams. The Executive Director, with the approval of the Commission, will from time-to-time publish the list of wild trout streams in the *Pennsylvania Bulletin* and on the World Wide Web. Persons with comments, objections or suggestions about the classification of streams listed may submit them to the Commission for review.
- b. *Criteria for classifying wild trout streams.* – The classification of a stream as a wild trout stream means that the trout found there have resulted from natural reproduction and that the habitat supports wild trout. Identification of streams for the presence of wild trout typically involves:
 1. *Location and habitat.* – Classifications of wild trout streams will involve examination of one or more sites, which may vary in size, within the stream. The exercise of judgment by the investigator is essential in describing the extent of the stream continuum to which

- the examination applies. The investigator should find that the habitat is such as would support natural reproduction of trout.
2. *Exclusion of stocked trout.* – In classifying a wild trout stream, the investigator should find trout resulting from natural reproduction in the stream section or upstream and downstream areas and their tributaries. In making this finding, the investigator will specifically exclude trout stocked as fingerlings or adults and trout that escape from a hatchery. The exercise of judgment is required in examining the trout for physical appearance such as coloration, fin condition and body conformation as indicators of the source of the trout. Direct evidence of natural reproduction of trout is a factor in making this classification, but it is not required if other elements are present.
 3. *Biological criteria.* – In identifying a wild trout stream, the investigator should find one or more of the following:
 - i. Young of the year trout less than 150 mm occur at some time in the stream section.
 - ii. Two or more ages of wild trout occur at some time within the stream section.
 4. *Tributary linkages.* – Tributaries to wild trout streams are classified as wild trout streams for their function as habitat for segments of wild trout populations, including nurseries and refuges, and in sustaining water quality necessary for wild trout.
- c. *Existing list.* – The streams identified as wild trout streams on or before January 1, 2002, and listed as such by the Fisheries Management Division will continue to be considered as wild trout streams by the Commission.
 - d. *Requests for evaluation or reevaluation of streams.* – The Commission staff will evaluate or reevaluate the classification of streams as wild trout streams at the request of the Department of Environmental Protection (DEP) in connection with permitting decisions. Requests for evaluation or reevaluation from persons or parties other than DEP will be considered for a review consistent with available staff and resources and prioritized based on the status of DEP permitting decisions related to the sites. Requests that the Commission staff evaluate or reevaluate stream sections for inclusion on or removal from the list of streams supporting naturally reproducing populations of trout may be addressed to the Bureau of Fisheries, Pennsylvania Fish and Boat Commission, 450 Robinson Lane, Bellefonte, Pennsylvania 16823-9620. In

evaluating requests to remove streams from the list of wild trout streams, the Commission will take into account circumstances where human intervention or manmade changes have diminished the capacity of a stream to meet the criteria set forth in this section. Streams will not be removed from the list of wild trout streams in circumstances where the investigator finds evidence that their characteristics and trout populations have been changed solely or principally as a result of human intervention.

- e. *Appeals.* – A person aggrieved by the classification of a stream section as a wild trout stream section may appeal the agency action by filing a notice of appeal with the Executive Director, Pennsylvania Fish and Boat Commission, Post Office Box 67000, Harrisburg, Pennsylvania 17106-7000 within 15 days after publication of the notice that the stream section had been so classified in the *Pennsylvania Bulletin*. Nothing in this subsection will be construed to enlarge or diminish the appeal rights of persons or parties in connection with permitting decisions or other actions of DEP.

2.2.3 CLASSIFICATION OF WILD TROUT STREAMS (A, B, C, and D)

The Commission has developed specific biomass criteria for classifying Wild Trout streams (Table 1). The biomass criteria vary based on the species composition of the fishery. Class A Wild Trout Waters are a sub-group of wild trout streams meeting higher biomass thresholds. Under 58 Pa. Code §57.8a, it is the policy of the Commission to manage self-sustaining Class A wild trout populations as a renewable natural resource to conserve that resource and the angling it provides. Class A wild trout populations represent the best of this Commonwealth's naturally reproducing trout populations. The Commission's Bureau of Fisheries, Division of Fisheries Management maintains a list of these waters.

Wild trout management is applied to all Class A streams and some stream sections classified with lower biomass criteria (Class B, C, or D). The wild trout program emphasizes the provision of a wild trout angling experience of varying levels of stock density or harvest. Stream sections managed under this option may range from small headwater streams to large lowland streams. Management plans should address limiting factors and possible strategies to improve water quality, instream habitat, and the trout fishery, especially for biomass Class B, C, and D streams.

Table 1. Criteria used to determine the classification of biomass Class A, B, C, D and E.

Class	Criteria
A (Brook Trout)	<ul style="list-style-type: none"> a. Total wild brook trout biomass of at least 30 kg/ha (26.7 lbs/acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs/acre) c. Wild brook trout biomass must comprise at least 75% of the total wild trout biomass
A (Brown Trout)	<ul style="list-style-type: none"> a. Total wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs/acre). c. Wild brown trout biomass must comprise at least 75% of the total wild trout biomass
A (Mixed Brown and Brook)	<ul style="list-style-type: none"> a. Combined wild brook and wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs/acre). c. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs/acre). d. Wild brook trout biomass comprises less than 75% of total trout biomass e. Wild brown trout biomass comprises less than 75% of total trout biomass
A (Rainbow Trout)	Total biomass of wild rainbow trout less than 15 cm (5.9 inches) in total length of at least 2.0 kg/ha (1.78 lbs/acre).
B	<ul style="list-style-type: none"> 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/ acre). b. Total wild brown trout or wild brook and wild brown trout combined biomass of at least 20 kg/ha (17.8 lbs/ acre) and less than 40 kg/ha (35.6 lbs/acre).
C	Total wild trout biomass of at least 10 kg/ha (8.9 lbs/ acre) and less than 20 kg/ha (17.8 lbs/acre).
D	Total wild trout biomass greater than 0 kg/ha and less than 10 kg/ha (8.9 lbs/ acre).
E	Total wild trout biomass of 0 kg/ha.

Prior to the development of this version of the operational plan, Class D waters included stream sections that were stocked with trout but did not support any wild trout. Within this version, a new biomass Class E category has been developed. Class E waters are not wild trout waters. They are defined as stream sections that do not support any wild trout but are managed for trout fishing through stocking.

2.2.4 Water Quality and Quantity Protection Significance of PFBC Biomass Classes

Class A Wild Trout Waters are provided with special regulatory protection by DEP. Since these waters are the “best of the best” trout waters, they are protected by DEP with a 25 Pa. Code Chapter 93 designation of High Quality-Cold Water Fishes (HQ-CWF). They receive special protection afforded by the antidegradation provisions of the federal Clean Water Act. This means that any activity that proposes to discharge to a Class A stream must comply with more stringent standards than those applied to other non-special protection waters. Stream and wetland encroachment permits in these watersheds often include a seasonal restriction (no work from October 1 to December 31) to minimize impacts with trout spawning.

The classification of stream sections as biomass Class A, B, C, or D has further significance in how streams are managed with respect to instream flow protection. For example, the Susquehanna River Basin Commission recognizes the PFBC’s biomass criteria as the basis for establishing varying levels of habitat impact criteria in their water withdrawal policy (SRBC Policy No. 2003-01). DEP generally follows these same criteria in their water allocation permit reviews (Table 2).

Table 2. Effect of PFBC trout biomass classification system on SRBC water withdrawal permitting.

Category	Habitat Loss Criteria
Exceptional Value in 25 PA Code Chapter 93	Less than 5% (de minimus)
High Quality-Cold Water Fishes or Class A	Less than 5% (7.5% with social and economic justification)
Cold Water Fishes; Class B	Less than 10%
Cold Water Fishes; Class C and D	Less than 15%

2.2.5 COMMISSION POLICY: CLASS A WILD TROUT STREAMS

Trout biomass criteria were established to provide minimum qualifying guidelines for Class A wild trout management in 1983 (PFC 1986). These criteria were formally adopted by the Commissioners as a Statement of Commission Policy during the January 21, 1996, Pennsylvania Fish and Boat Commission Meeting. Waters designated by the Commission as Class A Wild Trout Waters are managed for wild trout with no stocking. The Commission Policy, which establishes the biomass

criteria shown in Table 1, can be found at 58 Pa. Code §57.8a. Along with the biomass criteria, this section states: “It is the policy of the Commission to manage self-sustaining Class A wild trout populations as a renewable natural resource to conserve that resource and the angling it provides. Class A wild trout populations represent the best of this Commonwealth’s naturally reproducing trout fisheries. These stream sections are managed solely for the perpetuation of the wild trout fishery with no stocking.”

The policy further states, “For a water to be removed from the Class A Wild Trout Streams designation, total trout biomass shall be documented below set criteria for two consecutive stream examinations.”

2.2.6 WILD TROUT MANAGEMENT OPTIONS

Management options under the Class A, B, C, and D wild trout subprograms include both species-specific and habitat-specific approaches and attempt to provide diverse angling experiences through the utilization of a variety of regulations ranging from Commonwealth Inland Waters regulations to stringent gear restrictions, including complete prohibition of harvest. Management alternatives for these wild trout fisheries are as follow:

2.2.6.1 WILD TROUT WATERS – COMMONWEALTH INLAND WATERS REGULATIONS

Class A Wild Trout Waters

Rationale. The Class A wild trout waters option is designed to provide anglers with an opportunity to catch and harvest (if desired) wild trout from a population totally sustained by natural reproduction. This option is proposed for stream sections that support populations of brook trout, brown trout, mixed brook-brown trout, and rainbow trout capable of sustaining a trout fishery without stocking. Some of these waters may be judged to have a low potential to produce a biological response to the application of highly restrictive regulations. There are currently 486 stream sections and 1,432.6 miles of stream managed as Commission approved Class A wild trout waters.

Class A wild trout waters have a wide distribution across the Commonwealth. While the majority of the Class A sections are located in the northcentral and northeastern regions of Pennsylvania, 49 of the 67 counties in the state contain at least one Class A wild trout stream section (Figure 3).

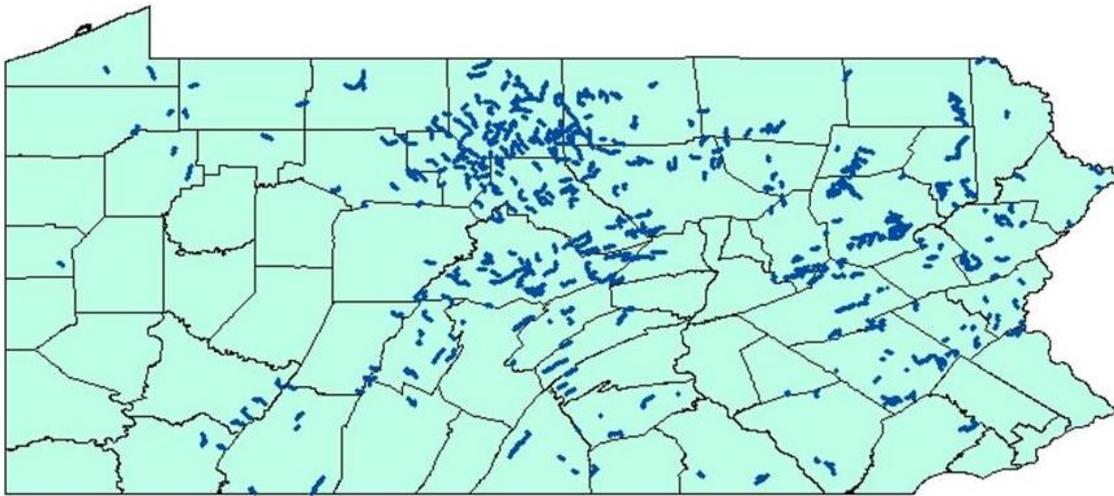


Figure 3. Statewide distribution of Class A Wild Trout Streams

Goal. To provide recreational trout angling opportunities in waters where wild trout populations are capable of supporting a trout fishery without stocking.

Objectives

1. To protect exceptional wild trout populations from possible harmful effects of stocking due to interactions with hatchery trout.
2. To minimize the potential of over harvest of wild trout due to attraction of anglers through stocking.
3. To maintain standing stocks of wild trout at a Class A biomass density. An increase in the population of age 3 or older trout by a factor of two (after cessation of stocking) is desirable. The amount of habitat, the full force of fishing mortality, and natural variation in response to climatic events may limit this response in older fish and should not be considered a rigid measure of program success.
4. To protect habitat and water quality through public education and by seeking the highest DEP water quality standards applicable.

5. To disseminate information to other Commonwealth regulatory agencies.

Regulations

Minimum length limit:	7 inches
Creel limit:	5 trout per day
Season:	Opening day to Labor Day. Extended season with a 3 fish daily creel limit applies only where a stocked stream section exists upstream from a section managed as a Class A wild trout stream.
Gear/lure restriction:	No special regulations, Commonwealth Inland Waters regulations apply.

Results from evaluations conducted on Class A Wild Trout Waters

Between the time when the first Class A wild trout waters were designated in 1983 and the development of the Third Edition of the Management of Trout Fisheries in Pennsylvania Waters in 1997, a total of 71 of the original 138 Class A wild trout stream sections were assessed. The waters evaluated were categorized into three general areas: stream sections managed under statewide regulations that were stocked prior to 1983, sections managed under statewide regulations that were unstocked prior to 1983 and stream sections managed under special regulations.

The results of these evaluations indicated that a clear majority of 82% (58 of 71) of the stream sections continued to support Class A wild trout population densities after 1983. Both the waters stocked prior to 1983 (77%) and unstocked prior to 1983 (79%) had a similar rate of maintaining Class A wild trout population densities. The waters managed under special regulations had a higher percentage of stream sections (94%) that continued to support Class A wild trout fisheries (Greene and Weber 1995a). This may have been due to either the implementation of special regulations or a bias in selecting waters with some of the better trout populations for management under special regulations.

Within these dynamic systems, some natural variation in the trout populations is expected to occur. Environmental factors such as acid precipitation, climatic events (drought and floods) and habitat degradation may lead to changes within the population structure of wild trout fisheries.

Furthermore, for waters that were stocked prior to 1983, the baseline surveys (1976-1983) did not record hatchery trout separate from wild trout. Therefore, when comparisons were made between pre- and post-Class A wild trout management on these waters, it should be noted that some of the baseline estimates (pre-1983) were inflated due to the presence of hatchery trout.

During the 2004 season, a statewide angler use and harvest study was conducted from opening day through Labor Day on a set of 200 wild trout stream sections. These stream segments supported trout populations that ranged from low (biomass Class D) to substantial standing stocks of wild trout (biomass Class A). As part of this evaluation, electrofishing surveys were conducted on 76 stream segments to examine the trout populations. Based on the results of these inventories wild trout stream sections averaged 221 legal size (≥ 7 inch) trout per mile (Greene et al. 2005). A total of 35 Class A stream sections were examined as part of this evaluation. In comparison with previous examinations conducted on these streams, the number of legal size trout on Class A stream sections increased by 34%, from 229 legal size trout per mile to 307 legal size trout per mile.

Results from the angler use and harvest study indicated that angler use was low on wild trout streams, averaging 82 angler hours/mile over the course of the regular trout season (mid-April through Labor Day). In comparison, angler use averaged 1,168 angler hours per mile over the first eight weeks of season on stocked trout streams (Greene et al. 2005, Greene et al. 2006). Anglers released over 92% of their catch on wild trout streams. Anglers harvested a very small number (9/mile) of the legal size (≥ 7 inches) wild trout available on wild trout streams (221/mile). In 2004 wild trout stream angling contributed over 7.16 million dollars to Pennsylvania's economy. The economic impact of wild trout stream angling, or the contribution that was uniquely the result of wild trout angling and would not have otherwise contributed to the state's economy by way of other recreational alternatives, was estimated at over 2.61 million dollars (Greene et al. 2005).

As a result of these evaluations qualifying stream sections will continue to be managed as Class A wild trout waters. As outlined in the strategic plan, stream sections likely to support Class A wild trout populations will be identified and examined by staff. Based on the results of these evaluations, the appropriate designation will be applied to these waters.

Class B, C, & D Wild Trout Waters

Rationale. Wild trout management is also applied to stream sections that do not meet the biomass criteria set for Class A wild trout management and, for a variety of reasons, do not qualify for the planting of adult trout. This option represents streams classified as biomass Class B, C, or D wild trout waters. This program emphasizes the provision of a wild trout angling experience without the promotion of a high stock density. Stream sections managed under this option may range from small headwater streams to large lowland streams supporting good to low densities of wild trout (Class B, C, or D). Management plans should address limiting factors and strategies to improve wild trout populations.

Biomass classes have been established for waters that support a lower biomass (Class B, C, and D) of wild trout. The criteria are species-specific for Class B waters but Class C and D waters are classified based on total wild trout biomass. Similar to Class A waters, to be designated as Class B, C, or D, a stream must be surveyed by PFBC biologists using approved protocols, and must meet the specific biomass criteria for each classification (Table 1). However, Commission action is not needed for classification as Class B, C, or D wild trout waters.

A total of 1,772 stream sections have been documented to support Class B, C, or D wild trout populations (Figure 4). Of these, 1,215 sections are managed for wild trout with no stocking, and 557 stream sections are stocked with hatchery trout (Table 3). The majority of the stocked stream sections (86%) are biomass Class C or D waters that support only low to moderate densities of wild trout (< 20 kg/ha).

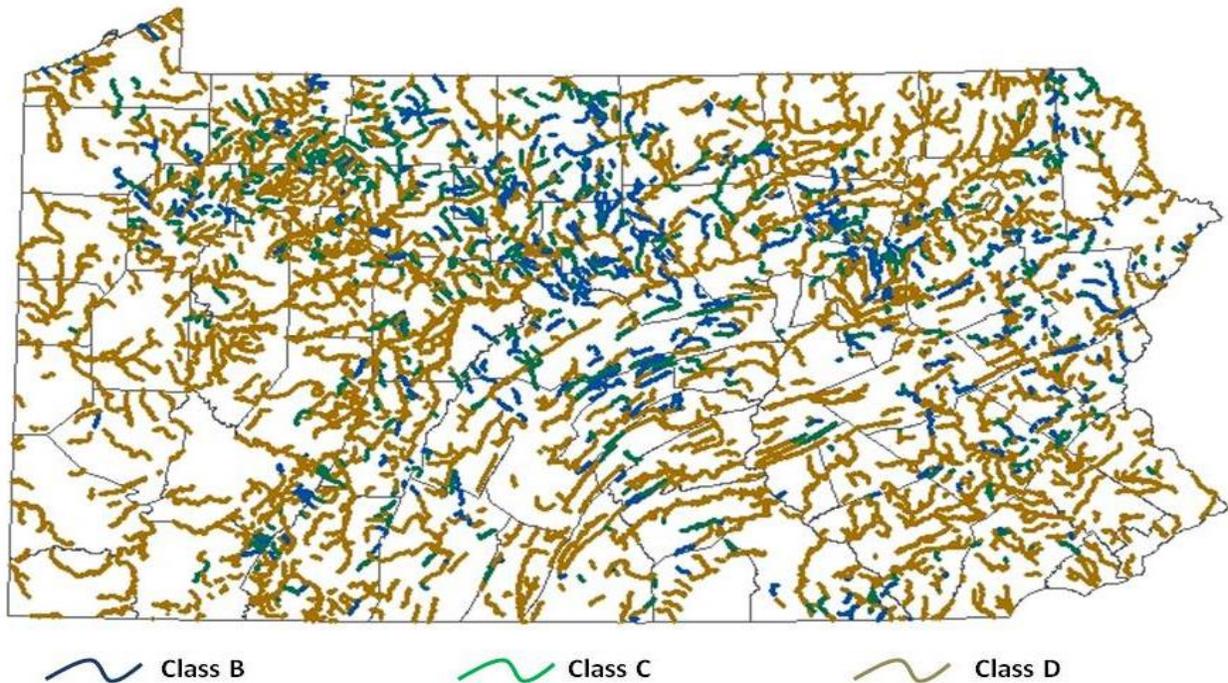


Figure 4. Statewide distribution of biomass Class B, C, and D streams

Table 3. Frequency of Class B, C, and D stream sections managed as stocked or wild trout waters

Biomass Class	# Sections Stocked	# Sections Unstocked
B	80	347
C	139	347
D	338	521
Totals	557	1,215

Objectives

1. To protect wild trout populations from possible harmful effects of stocking due to interactions with hatchery trout.
2. To minimize the potential of over harvest of wild trout due to attraction of anglers through stocking.
3. To protect habitat and water quality through public education and by seeking the highest DEP water quality standards applicable.
4. To disseminate information to other Commonwealth regulatory agencies.

Regulations

Minimum length limit:	7 inches
Creel limit:	5 trout per day
Season:	Opening day to Labor Day. Extended season with a 3 fish daily creel limit applies only where a stocked stream section exists upstream from a section managed as a Class B, C, or D wild trout stream.
Gear/lure restriction:	No special regulations, Commonwealth Inland Waters regulations apply.

Evaluation Strategy for Class B, C, and D wild trout waters

Aside from the statewide angler use and harvest survey conducted on wild trout streams in 2004, no statewide assessment has been conducted on Class B, C, and D wild trout streams. Future evaluations should outline the limiting factors to these wild trout populations and strategies should be developed to improve wild trout populations in biomass Class B, C, and D wild trout waters. As outlined in the strategic plan, habitat enhancement will be conducted on stream sections where habitat has been identified as the primary limiting factor to the expansion of wild trout populations. Time series population monitoring should be conducted on select stream sections (pre- and post-treatment) to evaluate the strategies employed to improve these wild trout populations.

2.2.6.2 WILD TROUT SPECIAL REGULATION OPTIONS AND POLICY

As stated at 58 Pa. Code §57.5 “It is the policy of the Commission to utilize regulations differing from those in application on a Statewide basis when deemed necessary or desirable to protect, conserve or enhance the quality, quantity and diversity of this Commonwealth’s fisheries, to maintain public access or to provide for the safety of the users of the resource. It is the intention of the Commission to use the minimum necessary regulation to maintain the philosophy of its conservation policy and to minimize variations in regulations on similar waters having like management objectives.”

The following summarizes the special regulation options that are currently in place for the management of wild trout fisheries in Pennsylvania waters.

Catch-and-Release

Rationale. Catch-and-release regulations for wild trout fisheries are intended to provide anglers with the opportunity to fish over an essentially natural population of fish where hatchery fish and fishing mortality are not major factors in determining population structure. Catch-and-release or no-kill management is designed to permit trout populations to attain pristine densities and age/size composition. This option is directed primarily at wild brown trout; however, it may also be extended to enhance wild brook and/or wild rainbow trout fisheries. Waters were added to this program when the former Selective Harvest and All Tackle Selective Harvest programs were dissolved prior to the 2005 season.

Catch-and-Release regulations also apply to waters that are managed with the planting of hatchery trout. Catch-and-Release management on stocked waters is intended to provide anglers the opportunity to fish a trout population that is similar in density to that of a Class A water, and where harvest and hooking mortality are not major factors in determining population structure. There are currently 12 wild trout and three stocked waters in this program (Table 4).

Objectives

1. To minimize fishing mortality.
2. To maintain high trout population densities to provide for high catch-and-release rates (greater than or equal to 1.0/hr) of trout.
3. Waters managed for wild trout should maintain populations at or above standing stocks found at the time of the qualifying survey. An increase in the proportion of age 3 or older fish (≥ 9 inches in length) in the population by a factor of two is desirable. The amount of regulated habitat, the full force of fishing mortality prior to regulations, and natural variation in response to climatic events may limit this response in older fish and should not be considered a rigid measure of program success.

4. Stocked trout waters should provide an amount of angler use greater than or equal to 550-angler hours/acre during the spring (March through mid-June).

Regulations

Minimum length limit:	None, no harvest is permitted.
Creel limit:	Zero, no fish may be killed or had in possession.
Season:	Open year around.
Gear/lure restriction:	Artificial lures, flies, or streamers.

Results from evaluations conducted on Catch-and-Release Waters

Seven Class A wild trout waters (Bushkill Creek; Cross Fork, Hickory Run, Penns Creek, Roaring Brook, Toms Creek, and West Branch Caldwell Creek) have been examined to evaluate this regulation. Results of pre- and post- Catch-and-Release management inventories have indicated that wild brown trout populations on four waters (Bushkill Creek, Hickory Run, Toms Creek, and West Branch Caldwell Creek) met the program objective of maintaining populations at or above the standing stocks found at the time of the qualifying survey. The abundance of age 3 or older wild brown trout increased on Bushkill Creek, Hickory Run, Toms Creek, and West Branch Caldwell Creek. The abundance of age 3 or older brown trout increased by a factor of two on Bushkill Creek, Hickory Run, and Toms Creek. The wild brown trout populations in Cross Fork, Penns Creek, and Roaring Brook failed to meet the program objectives. Overall, this regulation provides a management tool that is beneficial to protect, conserve, and enhance wild trout populations.

As a result of these evaluations most of these stream sections should continue to be managed under Catch-and-Release regulations. As outlined in the strategic plan, a sampling strategy will be developed to determine if waters currently managed under special regulations have met a specific set of biological and social criteria required to remain in a special regulations program.

Catch-and-Release Fly-Fishing Only

Rationale. This program is intended to reflect the traditional involvement of fly-fishing in the Commonwealth by including waters long associated with fly-fishing only regulations. The

program was designed in 2006 to consolidate two very similar former programs, Heritage Trout Angling and Delayed Harvest Fly-Fishing Only, into one special regulations program. Stream sections considered eligible for this management option will be limited to waters that have had a long-standing membership under a formal fly-fishing only option and have played a significant role in the historic development of fly-fishing under special regulations in Pennsylvania. Therefore, membership to this option is essentially closed. Stream sections managed under this option for wild trout with no stocking include the former Heritage Trout Angling waters. Stream sections managed under this option that are stocked with hatchery trout include the former Delayed Harvest Fly-Fishing Only waters. There are currently seven wild trout and 26 stocked trout waters in this program (Table 4).

Objectives

1. To minimize fishing mortality.
2. To maintain high trout population densities to provide for high catch-and-release rates (greater than or equal to 1.0/hr) of trout.
3. Waters managed for wild trout should maintain populations at or above standing stocks found at the time of the qualifying survey. An increase in the proportion of age 3 or older fish (≥ 9 inches in length) in the population by a factor of two is desirable. The amount of regulated habitat, the full force of fishing mortality prior to regulations and natural variation in response to climatic events may limit this response in older fish and should not be considered a rigid measure of program success.
4. Stocked trout waters should provide an amount of angler use greater than or equal to 550-angler hours/acre during the spring (March through mid-June).
5. To recognize the social significance that fly-fishing has had in Pennsylvania's angling tradition.

Regulations

Minimum length limit:	None, no harvest is permitted.
Creel limit:	Zero, no fish may be killed or had in possession.
Season:	Open year around.
Gear/lure restriction:	Artificial flies or streamers.

Results from evaluations conducted on Catch-and-Release Fly-Fishing Only Waters

Five waters (Big Spring Creek, Falling Spring Branch, Francis Branch, Letort Spring Run, and Slate Run) have been inventoried to evaluate the Catch-and-Release Fly-Fishing Only program. Although the name of this program changed in 2006 from the Heritage Trout Angling Program to Catch-and-Release Fly-Fishing Only, the regulations have remained the same. Results from examinations conducted before and after Catch-and-Release Fly-Fishing Only management went into effect have indicated that the wild rainbow trout population on Falling Spring Branch, the wild brown trout population on Letort Spring Run, and the wild brook trout population on Francis Branch met the program objective of maintaining populations at or above the standing stocks found at the time of the qualifying survey. The abundance of age 3 and older rainbow trout increased on Falling Spring Branch and the abundance of age 3 and older brook trout increased on Francis Branch. The abundance of age 3 and older trout did not increase by a factor of two on any of these waters. The wild trout populations in Big Spring Creek and Slate Run did not meet the program objectives.

The majority of the stream sections managed under Catch-and-Release Fly-Fishing Only regulations are hatchery supported waters. However, as outlined in the strategic plan, a sampling strategy will be developed to determine if waters currently managed under special regulations have met a specific set of biological and social criteria to remain in a special regulations program.

Catch-and-Release All Tackle

Rationale. Originally developed for the 2006 season, the Catch-and-Release All Tackle program was designed for sections of Spring Creek and Valley Creek (including Little Valley Creek) that were managed under a Miscellaneous Waters Special regulations option where catch and release angling was permitted with the use of artificial lures, flies, and bait. Sections of two waters formerly managed under All Tackle Trophy Trout regulations (Clarion River and Little Juniata River) were also added to this program in 2006. This option is applied to waters that support either Class A wild trout populations or trout fisheries supplemented with the planting of fingerling brown trout due to low levels of natural reproduction. Thurow and Schill (1994) reported that as more wild trout waters are closed to bait angling, displaced anglers might be compelled to contest restrictive

regulations. The Catch-and-Release All-Tackle option allows the use of bait to continue on waters that have traditionally been managed under special regulations with no tackle restrictions and broadens the potential user base on these waters. There are currently three wild trout and two stocked trout waters in this program (Table 4).

Objectives

1. To minimize fishing mortality.
2. To maintain high trout population densities to provide for high catch-and-release rates (greater than or equal to 1.0/hr) of trout.
3. To maintain populations at or above standing stocks found at the time of the qualifying survey. An increase in the proportion of age 3 or older fish (≥ 9 inches in length) in the population by a factor of two is desirable. The amount of regulated habitat, the full force of fishing mortality prior to regulations and natural variation in response to climatic events may limit this response in older fish and should not be considered a rigid measure of program success.

Regulations

Minimum length limit:	None, no harvest is permitted.
Creel limit:	Zero, no fish may be killed or had in possession.
Season:	Open year around.
Gear/lure restriction:	None.

Results from evaluation of a Catch-and-Release All Tackle Water

One water (Spring Creek) has been examined to evaluate the Catch-and-Release All Tackle program. Although this program was implemented in 2006, regulations (catch and release all tackle) have remained the same since the water was placed under Miscellaneous Special Regulations in 1982. The results from examinations conducted before and after catch and release all tackle regulations went into effect have indicated that the wild brown trout population has met the program objective for maintaining the population at or above the standing stock found at the time of the

qualifying survey. In addition, the abundance of age 3 and older wild brown trout has increased by a factor of two.

As outlined in the strategic plan, a sampling strategy will be developed to determine if waters currently managed under special regulations have met a specific set of biological and social criteria in order to remain in a special regulations program. This will include a study to evaluate the use of bait and tackle restrictions (artificial lures and flies) on special regulations areas.

Trophy Trout Management

Rationale. The trophy trout option is intended to provide anglers with the opportunity to fish for trophy wild or resident trout longer than 14 inches, with a high catch-and-release rate of 9 to 14-inch trout. Trophy trout management will be considered as a mechanism to achieve high densities of wild or resident trout in streams where 5% or more of the adult trout population (trout greater than or equal to 9 inches in length) is composed of trout 14 inches or greater in length, or in those streams judged by the Area Fisheries Manager as having a high potential for supporting a trophy-size fishery. This management option is directed primarily at brown trout.

Two variations of this option are offered: Trophy Trout (Artificial Lures Only) and an All-Tackle Trophy Trout option. The Trophy Trout (Artificial Lures Only) option applies to small and moderate size waters managed solely as Class A wild trout waters. The All-Tackle Trophy Trout option is applied to include some larger waters (1S or 1L Rivers) that support either Class A wild trout populations or trout fisheries supplemented with the planting of fingerling trout due to low levels of natural reproduction. Initially adopted in January 1995, the All-Tackle option was designed to broaden the potential user base and to allow more waters to enter the program by permitting the use of bait. There are currently eight wild trout waters in the Trophy Trout program, and one wild trout and one trout-stocked water in the All Tackle Trophy Trout program (Table 4).

Objectives

1. To maintain wild or resident trout populations at or above the levels found at the time of the qualifying survey.

2. To maintain high trout population densities to provide for high catch-and-release rates (greater than or equal to 1.0/hr) of trout.
3. To stockpile older (age 3+) and larger trout by a factor of two in the time period since the qualifying survey. The amount of regulated habitat, the full force of fishing mortality prior to regulations, and natural variation in response to climatic events may limit this response in older fish and should not be considered a rigid measure of program success.
4. To protect multiple-aged spawning stocks.
5. To allow anglers to fish over and harvest (if desired) trout significantly larger than the average 11-inch hatchery trout.
6. For All-Tackle Trophy Trout waters: to allow the use of bait angling to broaden the potential user base and allow more waters to enter the program.

Regulations

Minimum length limit:	14 inches.
Creel limit:	2 trout per day.
Season:	Open year around, except no harvest between the day after Labor Day and the opening day of trout season.
Gear/lure restriction:	Artificial lures, flies or streamers, or no gear/lure restriction.

Results from evaluations conducted on Trophy Trout and All Tackle Trophy Trout Waters

Six wild trout waters (Cedar Run, East Branch Tunungwant Creek, Fishing Creek, Lackawanna River, Lick Run, and Monocacy Creek) have been monitored to evaluate Trophy Trout regulations and one water (Penns Creek) has been examined to evaluate All Tackle Trophy Trout regulations. The results from pre- and post- Trophy Trout and All Tackle Trophy Trout management inventories have indicated that the wild brown trout populations on six waters (Cedar Run, Fishing Creek, Lackawanna River, Lick Run, Monocacy Creek and Penns Creek) have met the program objective of maintaining populations at or above the standing stocks found at the time of the qualifying survey. The abundance of age 3 or older wild brown trout increased on the same six waters. In addition, the abundance of age 3 or older brown trout increased by a factor of two on

Fishing Creek. The wild brown trout population on East Branch Tunungwant Creek did not meet these program objectives.

Trout greater than or equal to 14 inches in length comprised at least 5% of the adult trout population on six of the waters examined (Cedar Run, East Branch Tunungwant Creek, Fishing Creek, Lackawanna River, Lick Run, and Penns Creek).

The results of the pre- post- Trophy Trout management assessments have documented that most Class A wild trout populations have demonstrated a positive biological response to this regulation (Greene and Weber 1993a). Trophy Trout regulations have provided a management tool that is beneficial to protect, conserve, and enhance exceptional wild brown trout populations.

As a result of these evaluations most of these stream sections should continue to be managed under Trophy Trout regulations. As outlined in the strategic plan, a sampling strategy will be developed to determine if waters currently managed under special regulations have met a specific set of biological and social criteria in order to remain in a special regulations program. This will include a study to evaluate the use of bait and tackle restrictions (artificial lures and flies) on special regulations areas.

Wild Brook Trout Enhancement Program

Rationale. The Wild Brook Trout Enhancement Program was developed in 2004. The intent of this program was to improve the size and abundance of wild brook trout by protecting wild brook trout from angler harvest. Waters selected for the program primarily support wild brook trout populations. These regulations apply to the main stem water and all tributary streams within the designated limits of the main stem water.

There are currently nine main stem waters in this program (Table 4). This include, the upper Kettle Creek drainage basin (including all tributaries within this reach) that were placed in the Wild Brook Trout Enhancement Program in 2004, and eight waters (including all tributary streams) that were added to the program in 2005.

Objectives

1. To increase the abundance of wild brook trout (≥ 7 inches in length) by a factor of two between the time Wild Brook Trout Enhancement regulations were implemented and 2010.
2. To maintain wild brook trout population densities to provide for high catch-and-release rates (greater than or equal to 1.0/hr) of trout.
3. To increase the total abundance of the wild brook trout population by at least 25% between the time Wild Brook Trout Enhancement regulations were implemented and 2010.
4. To increase the abundance of older and larger wild brook trout. Wild brook trout ≥ 9 inches in length should be present in all streams managed under Wild Brook Trout Enhancement regulations by 2010.

Regulations

Minimum length limit:	No harvest of brook trout is permitted at any time, 7 inches for all other trout species.
Creel limit:	No harvest of brook trout is permitted at any time, 5 trout per day for all other trout species.
Season:	Open year around, except no harvest between the day after Labor Day and the opening day of trout season.
Gear/lure restriction:	No gear/lure restriction.

Evaluation Strategy for Wild Brook Trout Enhancement Waters

The evaluation of these regulations is currently in progress. Initially, trout populations were examined on each of the streams the year before Wild Brook Trout Enhancement regulations went into effect to provide a baseline for comparison of the trout populations before and after the implementation of special regulations. To evaluate the response of brook trout populations to these regulations, the evaluation period will allow time for at least one cohort to move through the population. Based on age and growth of wild brook trout in Pennsylvania waters, the evaluation period should extend for at least five years. For comparative purposes, sampling will also be conducted on a set of waters that support wild brook trout populations managed under Commonwealth Inland Waters regulations. These will serve as control waters to aid in evaluating

the response of wild brook trout populations to Wild Brook Trout Enhancement regulations. The control waters will be monitored at the same time as waters managed under the special regulations.

To assess angler use and catch related factors, angler surveys will be conducted on two of the nine waters included in the Wild Brook Trout Enhancement Program and two control waters during the 2011 season. Based on information collected from angler surveys on wild trout streams in 2004, 80% of the spring-summer angler use on wild trout streams occurred between mid-April and the end of June. Therefore, angler surveys on the treatment and control waters will be conducted from the opening day of regular trout season (in mid-April) through the end of June. Survey procedures will follow methods similar to those used for the Angler Use, Harvest, and Economic Assessment on Wild Trout Streams in Pennsylvania during the 2004 season (Greene et al. 2005). A complete assessment of the Wild Brook Trout Enhancement Program to determine if the program should be continued, modified, or eliminated should be completed by January 2012.

Table 4. Special Regulations Programs – Number and miles of water managed for wild trout and stocked trout.

Special Regulation Program	Total Number of Waters	Total Number of Miles	Number of Wild Trout Waters	Miles of Wild Trout Waters	Number of Stocked Waters	Miles of Stocked Waters
Catch-and-Release	15	42.5	12	32.6	3	9.9
Catch-and-Release Fly Fishing Only	33	61.6	7	15.8	26	45.8
Catch-and-Release All Tackle	5	53.6	3	31.3	2	22.3
Trophy Trout	8	26.2	8	26.2	0	0
All Tackle Trophy Trout	2	16.0	1	7.0	1	9.0
Wild Brook Trout Enhancement	9	62.4	9	62.4	0	0
Delayed Harvest Artificial Lures Only	59	95.2	0	0	59	95.2
Total	131	357.5	40	175.3	91	182.2

2.2.7. WILDERNESS TROUT STREAMS

Wilderness Trout Streams are a sub-group of wild trout streams; some Wilderness Trout Streams also have a Class A designation based on meeting a minimum biomass threshold. Under 58 Pa. Code §57.4, it is the Commission’s policy to manage wilderness trout streams where stream remoteness and populations of wild trout combine to offer sport-fishing opportunities for anglers in a wilderness setting.

2.2.7.1 Water Quality Protection Significance

Wilderness Trout Streams receive the highest level of water quality protection under the Commonwealth’s 25 Pa. Code Chapter 93 Water Quality Standards Program. Wilderness Trout

Streams are afforded protection in Chapter 93 as Exceptional Value (EV). Thus, although some Wilderness Trout Streams are also designated Class A, the Chapter 93 water quality protection provided to Wilderness Trout Streams can be greater than that afforded to Commission designated Class A Wild Trout Streams. DEP does not permit discharges that degrade existing water quality to Exceptional Value waters and closely regulates land disturbances in these watersheds.

2.2.7.2 COMMISSION POLICY: WILDERNESS TROUT STREAMS

As stated in 58 Pa. Code §57.4, “It is the policy of the Commission to maintain the Wilderness Trout Streams program where stream remoteness and populations of naturally reproducing trout combine to offer sport fishing opportunity for the recreation of anglers in a wilderness setting away from roads or vehicular access. It is the Commission’s intent to advocate proper watershed management to maintain the wilderness setting and to advance and seek the highest water quality standards through the Department of Environmental Protection.”

Rationale. The Wilderness Trout Streams program is a habitat-based option on streams supporting wild trout. However, not all stream sections in the program meet the biomass criteria for "Class A" wild trout management, as more emphasis is placed on aesthetics rather than the density of the wild trout fishery. Wilderness trout stream management is based upon the provision of a wild trout fishing experience in a remote, natural and unspoiled environment where man's disruptive activities are minimized. Established in 1969, this option was designed to protect and promote native (brook trout) fisheries, the ecological requirements necessary for natural reproduction of trout, and wilderness aesthetics. The superior quality of these watersheds is considered an important part of the overall angling experience on wilderness trout streams. Therefore, all stream sections included in this program qualify for the Exceptional Value (EV) special protected water use classification, which represents the highest protection status provided by the Department of Environmental Protection (DEP). There are currently 101 wild trout waters managed in this program.

Objectives

1. To protect wild trout fisheries, regardless of biomass classification, in areas remote from the impact of human development, including industrial development, road construction, impoundments, and introductions of non-resident fish species.
2. To maintain a "wilderness experience" for those anglers seeking this recreational experience and for those who benefit from the knowledge such an experience is ensured even though they may not personally experience it.

Regulations

Minimum length limit:	7 inches.
Creel limit:	5 trout per day.
Season:	Opening day through Labor Day. No extended harvest season.
Gear/lure restriction:	No special regulations, Commonwealth Inland Waters regulations apply.

Criteria

1. Streams or stream sections approved for this program should not be accessible to motorized vehicles at more than one point every two miles or can be limited to at most one point every two miles.
2. Wilderness Trout Streams or sections so designated shall be at least two miles in length or one mile from the nearest access.
3. Natural reproduction of trout in these streams must be sufficient to sustain a sport fishery. Wilderness Trout Streams support wild trout populations that range from Class A to biomass Class D. Areas supporting wild brook trout populations will be protected from the introduction of brown and rainbow trout, as the stocking of hatchery trout is prohibited in all wilderness trout streams.
4. Streams or stream sections approved for this program must be open to the general angling public.

To date, no statewide evaluation has been conducted to assess wild trout populations managed under the Wilderness Trout Streams Program. As outlined in the strategic plan, habitat enhancement should be conducted on stream sections where habitat has been identified as the primary limiting factor to the expansion of wild trout populations. However, considering the remote location of these streams, intensive habitat management may not be feasible on some of these waters.

2.3 HATCHERY TROUT SUBPROGRAM

Annually the PFBC raises and distributes cultured hatchery trout (adult and fingerling trout) to Pennsylvania waters (lakes and streams) open to public fishing. The purpose of the hatchery trout program is to provide recreational trout angling opportunities over a much broader area of the Commonwealth than could be provided by the wild trout resource.

Adult trout averaging 11 inches in length are allocated to lakes and streams based on resource classification that places waters into resource based stocking categories defined by objectively determined biological, physical, and social criteria. Under this system, waters with similar attributes are managed under the same guidelines regardless of their location. For the 2008 season, a total of 3,466,600 adult trout were allocated to 127 lakes covering 8,513 acres of water and 1,091 stream sections covering 4,725 miles of flowing water statewide (Figure 5). The majority of adult trout distributed to Pennsylvania waters (3,275,900 trout - 94.5%) were stocked during the spring to coincide with the period of peak angler demand for trout fishing. The remainder of stocking (190,700 trout – 5.5%) occurred during the fall and winter periods extending from October through February. Fingerling trout are allocated to lakes and stream sections based on stocking requests determined by the Area Fisheries Managers. Fingerling trout stocked during the spring months typically range from two to four inches in length at the time of stocking. In 2008 a total of 1,434,300 fingerling trout were allocated to nine lakes covering 20,331 acres and 32 stream sections covering 257 miles of flowing water in the Commonwealth.

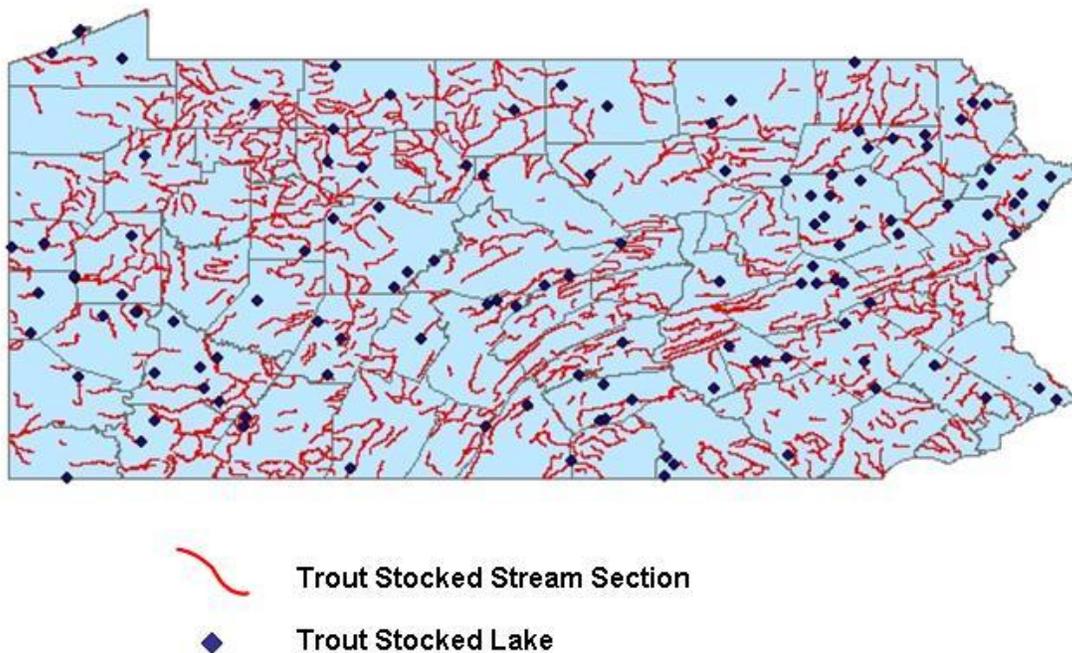


Figure 5. Waters stocked with adult trout – Approved Trout Waters

2.3.1 Water Quality Protection Significance

Water quality protection of stocked trout streams ranges from Trout Stocking (TSF) to Exceptional Value (EV). DEP protects PFBC Approved Trout Waters (i.e., those approved by the Division of Fisheries Management for stocking) by applying water quality criteria that are designed to protect all of the stream's coldwater aquatic life uses. Stream and wetland encroachment permits in these watersheds often include a seasonal restriction (no work from March 1 to June 15) to minimize conflicts with trout fishing. If some wild trout occur in a stocked stream, it is usually classified as Cold Water Fishes (CWF) by DEP. If a stocked stream is classified by DEP as High Quality-Cold Water Fishes (HQ-CWF) or Exceptional Value (EV), it is typically on the basis of such things as the presence of high quality macroinvertebrate communities rather than on the presence of wild trout (Pa. DEP 2003).

If streams are stocked, they typically are not classified in Chapter 93 as Warm Water Fishes (WWF). However, if this does occur, the PFBC brings such streams to DEP's attention and recommends a change in designation to Trout Stocking (TSF). Stocking trout in streams that were

designated as Warm Water Fishes (WWF) and subsequently designated as Trout Stocking (TSF) provides additional water quality protection to the aquatic communities of those streams since lower temperature criteria apply for the period from February 15 through July 31 and higher dissolved oxygen criteria apply for the period from May 16 through August 15.

2.3.2 COMMISSION POLICY: ALLOCATION AND STOCKING OF TROUT

The Commission formally adopted a statement of policy for the allocation and stocking of adult trout at the November 8, 1985, meeting. The policy was revised at the July 19, 2005, meeting. The policy, codified at 58 Pa. Code §57.2, is stated as follows:

- a. The Commission will allocate trout, except fingerlings, to individual waters with the rate and frequency to be determined by the assignment of each water area to a resource category.
- b. The Commission will assign water areas to resource categories based on the appropriately weighted biological and social factors, including the status of the wild trout populations, stream width or lake area and recreational use potential as indicated by public access, parking spaces, ownership, proximity to roads, proximity to urban areas and activities of resource adoption organizations.
- c. The Division of Fisheries Management will maintain a current list of resource categories, trout allocation processes and trout allocations.
- d. This section supersedes all other Commission policies or operating procedures to the extent inconsistent with this section.

Objective

To use adult hatchery trout (averaging 11 inches in length) to provide recreational angling opportunities in the waters of the Commonwealth open to fishing for the general angling public.

Tactical Approach

All trout stocked are allocated to individual water areas with no consideration of county lines. The rates and frequencies of stocking are determined by assignment of each water area to an appropriate resource-based stocking category.

Assignment of water areas to stocking categories is based on consideration and rating of biological, physical and social factors including: status of wild trout population, stream width, lake size, recreational use potential as indicated by public access, parking spaces, ownership, and proximity to urban areas.

2.3.3 ADULT HATCHERY TROUT IN STREAMS SUBPROGRAM GUIDELINES

The following general guidelines have been developed for the adult hatchery trout in streams subprogram:

1. The suitability of a stream section for trout stocking must be determined through a field survey conducted by the Area Fisheries Manager. No water shall be approved for stocking prior to this survey.
2. Stream sections classified as Commission approved "Class A - Wild Trout Waters" and "Wilderness Trout Streams" will not be stocked with hatchery trout. Stream sections classified as "Class B" (greater than or equal to 20 kg/ha, 17.8 lbs/acre) and not stocked prior to 1983 will not be considered for stocking with hatchery trout.
3. For addition to the stocking program, stream sections must be at least 3.2 kilometers (2 miles) in length. Smaller tributaries or stream sections, which are contiguous with larger approved stream sections are eligible for stocking if all other standards are satisfied.
4. The average width for pre-season stocking and at any time before June 15 for in-season stocking must be greater than or equal to 4.0 meters (13.2 feet) in the upstream one-third of the section, or less than or equal to 40.0 meters (132 feet) average width in the downstream one-third of the section. Stream sections with a mean width less than or equal to 4.0 meters or greater than or equal to 20.0 meters (66 feet) and not stocked prior to 1983 will receive the

lowest priority for consideration. Recommendations will be based upon the occurrence of wild trout and availability of other stocked waters in the area.

5. For new waters added to the adult trout program, water temperature shall not exceed 24C (75F) at any time prior to June 1.
6. The minimum values for pH at the time of stocking shall not be less than 6.0 for brook trout and brown trout, and not less than 6.5 for rainbow trout. In cases where acid precipitation is believed to be the cause of low pH and alkalinity values, aluminum concentrations should be determined. Any stocking canceled due to poor water quality will not be rescheduled. The same criteria will be applied in the consideration for adding new waters to the adult trout-stocking program.
7. No stream section shall be stocked if pollutants are known to be present at concentrations exceeding public health protection levels established by the Pennsylvania Department of Health.
8. Stream sections subject to periodic pollution incidents potentially harmful to aquatic life and resulting in fish and/or habitat loss will be managed as low intensity, seasonal-stocked fisheries for one year if no additional incidents occur. The stream section will be removed from stocking if an existing problem is not corrected or if pollution becomes chronic. Trout lost to a pollution incident will not be replaced.
9. Access for the general angling public must be available to at least 75% of the stream section and the accessible area must be at least 1.6 km (1 mile) in length to be approved for stocking.
10. A stream section may be approved for stocking without angler use and harvest data. However, a subsequent evaluation by the Area Fisheries Manager to assess early season stocked trout residency on the stream section should be conducted to assess continuation of stocking.
11. Choice of species to be stocked will be determined by the Area Fisheries Manager. Consideration will be given to habitat characteristics, angling vulnerability and popularity. Multispecies management is preferable, due to the seasonal differences in catchability between species as documented by Pennsylvania Fish and Boat Commission angler use and harvest surveys (Greene and Weber 1993b).
12. Stream sections with vehicular access limited to <20% within 500 meters (1,650 feet) of a road and not stocked prior to 1997, will not be considered as an addition to the adult trout stocking program.

13. A minimum number of 300 adult trout will be necessary to constitute an individual stocking.
14. Stocking rates outlined represent the maximum stocking rates and frequency according to classification. In response to various biological, chemical, physical and/or social factors, Area Fisheries Managers have the latitude to adjust stocking rates downward from the maximum stocking rate. These special case situations should be addressed individually on a case-by-case basis, as the Area Fisheries Managers deem necessary.

Stream Resource Categories

Criteria for establishing resource categories for management with hatchery trout include trout abundance, stream width, recreational use potential, and human population density. Ratings for these criteria are combined to determine the appropriate management option for each stream section included in the hatchery trout subprogram.

Angler use and harvest work conducted between 1988 and 1991 on a cross-section of waters representing the stream resource categories served as a basis for adjustments to the allocation strategy for these categories in 1994. Adjustments in stocking rates were made to provide for more recreation (angler trips) and a better utilization (total catch) of hatchery trout based upon angler use and harvest information in conjunction with information obtained from the 1991 Trout Angler Telephone Survey (Hummon 1992).

Further adjustments in the allocation strategy were required for the 2002 season, as annual statewide production of adult trout was reduced from 5.2 million to 3.8 million trout. These reductions resulted from the closure of the Big Spring hatchery and statewide hatchery production reductions to remain in compliance with more stringent effluent discharge standards as permitted by the Pennsylvania Department of Environmental Protection. Subsequently, a biomass limitation of 1.9 million pounds of trout produced was placed on Pennsylvania Fish and Boat Commission hatcheries. Through hatchery infrastructure improvements and some production adjustments made at Pennsylvania Fish and Boat Commission hatcheries, the addition of a purchase contract with a commercial hatchery, and a cooperative agreement with the United States Fish and Wildlife Service to raise adult trout at one of their hatcheries, the number of adult trout available for statewide distribution increased to 4.2 million for the 2004 season. Beginning with the 2007 season, the

Commission decided to increase the average size of adult trout produced for stocking to 11 inches. To accomplish this some trade-off was required in the number of trout that could be produced of this size at Pennsylvania Fish and Boat Commission hatcheries. By increasing the average size of adult trout from 10.25 inches to 11 inches in length, there was a corresponding 30 percent increase in the weight of these fish. Therefore, to compensate for raising trout that were 30% larger in weight, the number of trout produced was reduced by 20% to remain in compliance with the biomass restriction of 1.9 million pounds of trout produced at Pennsylvania Fish and Boat Commission hatcheries. Subsequently, stocking rates applied across all resource-based stocking categories were reduced by 20% beginning with the 2007 season. Accounting for this revision, the number of adult trout available for annual statewide distribution was 3.4 million trout. In February 2009 the contract with the commercial hatchery expired. Due to a significant cost increase from the previous contract (from \$1.23 per fish to \$3.38 per fish) the PFBC decided to discontinue this program. Subsequently, the current number of adult trout available for statewide distribution stands at approximately 3.2 million trout.

Trout Population/Biomass Classification

Criteria to determine biomass classification for individual resource related factors are applied in the following manner:

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

Stream sections are classified as A (excellent standing stock of wild trout), B (good standing stock of wild trout), C (fair standing stock of wild trout), D (few wild trout), and E (no wild trout).

The abundance of wild trout is generally considered inversely proportional to the management intensity required to provide a trout angling experience through stocking. It is assumed that hatchery trout will contribute more to the amount of trout angling available when stocking is emphasized in stream sections containing few wild trout.

Stream Section Width Classification

Relative stream size is established by determining the average width of the stream section with standardized methods.

Class	Subclass	Criteria
1	1L	Average width greater than 30 meters (99 ft.).
	1S	Average width greater than 20 meters (66 ft.) but less than or equal to 30 meters (99 ft.).
2		Average width of at least 10 meters (33 ft.) but less than or equal to 20 meters (66 ft.).
3		Average width of at least 4 meters (13.2 ft.) but less than 10 meters (33 ft.).
4		Average width less than 4 meters (13.2 ft.).

Differences in stocking rates and frequencies have been established between width class 1 and 4 and width class 2 and 3 sections. Statewide angler use and harvest surveys conducted from 1988 through 1990 recorded a lower rate of angler use on (1S and 1L) stream sections (186 angler hours/acre) as compared to width class 2 and 3 stream sections (380 angler hours/acre) (Greene and Weber 1993b). Results from statewide angler use and harvest surveys conducted on stocked trout streams in 2005 also recorded a lower amount of angler use on width class 1 stream sections (218 angler hours/acre) in comparison with width class 2 and 3 stream sections (368 angler hours/acre) (Greene et al. 2006). In addition, these large streams have the potential to absorb a large portion of hatchery production, thereby reducing the statewide availability of recreational angling opportunity. Therefore, width class 1 waters are managed at less intensive stocking rates. Due to their small size, width class 4 stream sections are also managed less intensively to avoid overcrowding of fish and anglers on these very small streams.

Recreational Use Potential Classification

Subclass: Access Rating

	PARKING SPACES/KILOMETER			
PERCENT PROXIMITY TO A ROAD	≥100	≥50 but <100	≥10 but <50	<10
% within 100 m ≥75	High	High	High	Moderate
% within 100 m <75 but ≥75% within 300 m	High	High	Moderate	Moderate
% within 300 m <75 but >0	Moderate	Moderate	Low	Low
% within 300 m = 0	Low	Low	Inaccessible	Inaccessible

Subclasses: High, Good, Low, Closed to Public

	ACCESS RATING			
OWNERSHIP	High	Moderate	Low	Inaccessible
100% Public: Open	High	High	High	Good
Mixed Public/Private: 100% open and ≥50% public	High	High	Good	Good
Mixed Public/Private: 100% open and <50% public or 100% private and ≥85% open	Good	Good	Good	Low
Mixed Public/Private: >15% closed to public	Low	Low	Low	Low
100% Private and 100% Closed	Closed	Closed	Closed	Closed

Social factors, which define recreational use potential include, proximity of the stream section to roads open to public travel, automobile parking capacity located along any portion of the stream section, and riparian ownership. Recreational use potential is classified as high, good, low, or closed to fishing.

Remarks:

1. If posting $\leq 5\%$, then posting = 0.
2. If the percent proximity to a road within 500 m = 0, then regardless of parking or ownership, Recreational Use Potential = Low.
3. Percent proximity to a road relates to motorized vehicular access and not walk-in or bicycle access via road or trail.

Stream sections located near dense population centers flowing through public land and closely paralleled by public roads with a “High” recreational use potential classification will receive the maximum allowable allocation. Such sections provide the access characteristics to attract and accommodate large numbers of anglers generated by heavy and frequent stockings. Stocking rates and frequencies decrease proportionately as the percentage of private ownership and difficulty of access increases. This regulated approach is intended to minimize angler-landowner conflicts generated by a common property approach.

Upgrading Recreational Use Potential

Providing that access rating criteria qualify (stream section to road proximity and available parking), stream sections may be eligible for an upgrading in recreational use potential from good to a high rating. Elevating recreational use potential can be accomplished by landowners entering into landowner agreements with the PFBC. The standard PFC-60 form will be utilized to acknowledge an agreement between the PFBC and individual landowners willing to allow stream access to the general angling public.

Under these agreements, the “High” recreational use potential rating will be applied to stream sections with at least a moderate access rating providing that 100% of the total section length is accounted for under PFBC landowner agreements or a combination of landowner agreements and existing public ownership open to the general angling public.

All landowner agreements should be in the form of the standard PFC-60 agreement that is in accordance with the program administered by the Pennsylvania Fish and Boat Commission (Division of Property Services).

Posting Criteria

Recreational trout angling opportunity is provided on many stream sections that have riparian land ownership within the private sector. Some of these sections have portions closed to the general angling public due to landowner posting. Continued high intensity stocking on waters with existing posting problems may lead to additional posting and the eventual total closure of these waters. Furthermore, due to the potential for trout to move into posted areas, the maintenance of high intensity stocking on these waters is not in the best interest of the general angling public. If possible, areas closed to the general angling public should be sectioned out (or removed) from the stocking limits. However, posting often occurs in a checkerboard fashion and resectioning is not a viable option. Therefore, in order to account for the amount of closure and continue to provide recreational angling opportunity within the portions of stream open to the general angling public, the following criteria have been developed:

Criteria

1. For stream sections with less than or equal to 5% posted (closed to angling), the amount of posting will be considered incidental and these waters will be stocked at the classification rate according to program guidelines. No reduction will be made to the annual allocation.
2. For stream sections with greater than 5% to less than or equal to 15% posted (closed to angling), a reduction in the annual allocation will be applied equal to the percentage of the stream section that is closed to the general angling public.
3. Stream sections with greater than 15% to less than or equal to 25% posted (closed to angling), will be downgraded to low recreational use potential. They will still qualify for stocking; however, stocking will be conducted on a preseason or inseason only basis at the prescribed rates for low recreational use potential waters according to program guidelines.
4. Stream sections greater than 25% posted (closed to angling), where resectioning is not possible, will be removed from the adult trout-stocking program.

Human Population Density Classification

Human population density is determined from the Pennsylvania Industrial Census Series for the township(s) and municipalities in which the stream section is located.

Class	Criteria
Metropolitan	Greater than or equal to 300 persons per square kilometer
Urban	Greater than or equal to 125 persons per square kilometer but less than 300 persons per square kilometer
Suburban	Greater than or equal to 40 persons per square kilometer but less than 125 persons per square kilometer
Rural	Less than 40 persons per square kilometer

Human population density criteria apply to determining stocking rates on width class 2 and 3 stream sections and 1S and 1L stream sections with a recreational use potential rating of either high or good. For these waters, stocking rates and frequencies are adjusted upward in a structured fashion to even distribution of recreational trout fishing opportunities in populated areas. Angler use data collected between 1988 and 1990 on good recreational use potential stream sections confirmed that on average, the most intensive amount of angler use was observed on urban (409 hrs/acre) and suburban stream sections (410 hrs/acre). Within this group, rural stream sections comprise the largest group of waters stocked; however, they provided the lowest (224 hrs/acre) amount of angler use (Greene and Weber 1993b). Angler use data collected in 2005 on good recreational use potential stream sections indicated that the most intensive amount of angler use occurred on metropolitan stream sections (844 hrs/acre), followed by urban stream sections (580 hrs/acre). However, in contrast to the data collected between 1988 and 1990, angler use on rural stream sections (281 hrs/acre) exceeded the amount of angler use recorded on suburban stream sections (194 hrs/acre) in 2005 (Greene et al. 2006).

These criteria are particularly targeted to the "leisure time" anglers in populated areas who are willing to drive short distances more frequently than making trips that involve more travel time than actual fishing time for a single day. This was supported by the information obtained from the 1991

Trout Angler Telephone Survey, as between 63 and 70 percent of all trout angling trips take place within one hour of the anglers home (Hummon 1992). This was also supported by information collected from the 2008 Pennsylvania Trout Fishing Survey, where 49 percent of all trout angling trips resulted in a travel distance of no more than 15 miles (one way) to fish for trout in Pennsylvania (Duda et al 2008).

Management Options

The hatchery trout subprogram is divided into a number of management options with different allocations and rates for the stocking of hatchery trout based on resource categories. Within these options there are alternatives for adding diversity and variety to hatchery trout supported fisheries. A summary of the allocation strategy and distribution options for stream sections is presented in Table 5. Original stocking rates applied to resource based stocking categories from 1983 through 1993 are provided in Appendix 1.

Table 5. Summary of allocation and distribution options for streams

Biomass	Recreational Use Potential	Width	Population	Stocking Intensity (trout/acre/year)
High Yield Membership				
C	High	2 or 3	M	380
D	High	2 or 3	M	380
E	High	2 or 3	M	380
C	High	2 or 3	U, S or R	340
D	High	2 or 3	U, S or R	340
E	High	2 or 3	U, S or R	340

Optimum Yield Membership				
B	High	2 or 3	M, U, S, or R	155
	Good	2 or 3	M	340
		2 or 3	U	300
		2 or 3	S	200
		2 or 3	R	100
	High	4	M, U, S, or R	60
Good	4	M, U, S, or R	60	
C	Good	2 or 3	M	340
		2 or 3	U	300
		2 or 3	S	200
		2 or 3	R	100
	High	4	M, U, S, or R	60
	Good	4	M, U, S, or R	60
D	Good	2 or 3	M	340
		2 or 3	U	300
		2 or 3	S	200
		2 or 3	R	100
	High	4	M, U, S, or R	60
	Good	4	M, U, S, or R	60
E	Good	2 or 3	M	340
		2 or 3	U	300
		2 or 3	S	200
		2 or 3	R	100
	High	4	M, U, S, or R	60
	Good	4	M, U, S, or R	60
Low Yield Membership				
B	Low	2, 3 or 4	M, U, S, or R	60
C	Low	2, 3 or 4	M, U, S, or R	60
D	Low	2, 3 or 4	M, U, S, or R	60
E	Low	2, 3 or 4	M, U, S, or R	60

Width	Recreational Use Potential	Population	Stocking Intensity (trout/acre/year)
River Membership			
1S	High	U	144
		S	128
		R	116
	Good	U	88
		S	68
		R	60
	Low	U, S or R	36
1L	High	U	96
		S	76
		R	64
	Good	U	56
		S	52
		R	40
	Low	U, S or R	32

High Yield Metro

Rationale. Prior to the 2004 season, the High Yield category was revised to recognize waters with a metropolitan (metro) human population density separate from those with urban, suburban, or rural human population densities. The intent was to provide more intensive stocking in high access public owned waters located in proximity to dense human population centers. These sections receive the greatest emphasis for catchable trout stocking in flowing water. High Yield Metro stream sections provide a combination of characteristics that identify these waters as best suited for high density stocking to encourage heavy angler use. These factors include: low to moderate density wild trout populations, moderate stream size, accessibility, a high percentage of public ownership, and their location near dense population centers.

Goal. To provide recreational trout angling opportunities and minimize angler-landowner conflicts through the use of high stocking rates and frequencies to concentrate angler use on areas under public ownership located near dense human population centers with high angler use potential and low to fair resident trout populations.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 800-angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round trout angling by the use of a fall stocking.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Fair to poor	High	From 4 meters to 20 meters	Metro
C-D-E	High	2-3	Metro

Stocking rates and frequencies for High Yield Metro waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
200	180	2	380

Criteria

1. Two inseason plantings are required for a section to qualify for the maximum inseason stocking rate of 180-trout/acre. Should less than two inseason plantings be desired, the inseason allocation should be reduced accordingly with a maximum of 100-trout/acre for a single inseason stocking.
2. Fall stocking may be conducted at a stocking rate not to exceed 50-trout/acre. Trout stocked during the fall will be included as part of a waters total annual allocation which will not exceed 380 trout/acre/year.

High Yield

Rationale. Results from the statewide angler use and harvest surveys conducted from 1988 through 1990 confirmed that High Yield stream sections attracted the greatest amount of angler use (610 hrs/acre) for flowing water areas managed with the planting of adult trout (Greene and Weber 1993b). Based on angler use information from the 2005 angler survey, angler use on High Yield Stream sections averaged 592 hours/acre and was second only to the effort recorded on an Optimum Yield 2 Metro stream section (Greene et al. 2006). Stream sections in this category and the Optimum Yield 2 Metro category receive the second greatest emphasis for adult trout stocking in flowing water. High Yield stream sections provide a combination of characteristics that identify these waters as well suited for high density stocking to encourage heavy angler use. These factors include: low to moderate density wild trout populations, moderate stream size, accessibility and a high percentage of public ownership. No distinction is made in the allocation strategy between urban, suburban or rural, all sections qualify for intensive management.

In general, catchable trout stocking in flowing water areas has traditionally been completed by Memorial Day. In order to provide more and varied angling opportunities, the stocking program on this group of waters may be extended (where possible) to include non-traditional periods. For example, angler use and harvest work conducted following an October stocking on a High Yield water indicated that angler use after the fall stocking (136 hrs/acre) was comparable to that of a late spring stocking (102 hrs/acre). Therefore, the fall stocking option may be extended to suitable High Yield stream sections.

Goal. To provide recreational trout angling opportunities and minimize angler-landowner conflicts through the use of high stocking rates and frequencies to concentrate angler use on areas under public ownership with high angler use potential and low to fair resident trout populations.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 550 angler hours/acre during the spring angling period (April through mid-June).

2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round trout angling by the use of a fall stocking.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Fair to poor	High	From 4 meters to 20 meters	Urban, Suburban or Rural
C-D-E	High	2-3	U, S, or R

Stocking rates and frequencies for High Yield waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
160	180	2	340

Criteria

1. Two inseason plantings are required for a section to qualify for the maximum inseason stocking rate of 180-trout/acre. Should less than two inseason plantings be desired, the inseason allocation should be reduced accordingly with a maximum of 100-trout/acre for a single inseason stocking.
2. Fall stocking should be conducted at a stocking rate not to exceed 50-trout/acre. Trout stocked during the fall will be included as part of a waters total annual allocation which will not exceed 340-trout/acre/year.

Optimum Yield

Rationale. These comprise the majority of stocked trout waters. The optimum yield category has been subdivided into seven possible alternatives depending on varying combinations of trout populations, stream size, access, and ownership.

Goal. To provide recreational trout angling opportunities using the management techniques that include stocking rates and frequencies (a maximum of two inseason) which reflect the abundance of wild trout, public ownership or private ownership with public access, human population density, and stream size.

Optimum Yield I

Rationale. Results from statewide angler use and harvest surveys from 1988 through 1990 recorded a moderate amount of angler use (296 hours/acre) from stream sections within this category of waters (Greene and Weber 1993b). Low angler use was recorded (32 hours/acre) from one stream section sampled within this category in 2005 (Greene et al. 2006). These stream sections provide essentially the same physical and social characteristics as High Yield waters. The major difference is that Optimum Yield 1 sections support good biomass Class B wild trout populations. To provide some protection to these wild trout fisheries, stocking rates and frequencies are reduced, and stocking is limited to the spring with a maximum of two plantings (one preseason and one inseason). No distinction is made in the stocking rate between human population density classifications.

Due to the presence of good wild trout populations, these waters should receive a priority for reinventory to document the status of the wild trout fishery. Should these trout populations change upon reinventory, appropriate management actions will be made on a case-by-case basis according to program guidelines.

Objectives. The fishery is dependent on the rate and frequency of stocking and the contribution of good densities of wild trout. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 150 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good	High	From 4 meters to 20 meters	Not a factor
B	High	2-3	Not a factor

Stocking rates and frequency for Optimum Yield 1 waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
80	75	1	155

Criteria. In order to provide some protection to the existing wild trout fisheries, a practice of less intensive stocking rates and frequencies should be followed. Currently most stream sections in this category receive one stocking on a preseason or inseason only basis. In cases where a preseason and inseason stocking strategy is used, these waters will receive only one inseason planting rather than multiple inseason stockings. This planting should occur prior to Memorial Day.

Optimum Yield II

The proximity to population centers becomes an important social consideration in adjusting stocking rates upward in heavily populated areas to take advantage of the fact that more leisure time is available for angling trips closer to the angler's residency. Therefore, this category has been subdivided into four options based upon human population density (Metropolitan, Urban, Suburban, and Rural).

Two factors are of importance to waters in this category.

1. **Recreational Use Potential:** For this group, all waters qualify for a rating of "Good" recreational use potential. The factors that can downgrade this rating include: access, ownership, posting and/or parking problems.

2. Human population density: If the stream section has a "Metropolitan" human population density classification, it will be stocked at a high rate. If the stream section has an "Urban" human population density classification, a less intensive stocking rate will be applied. Stocking rates on stream sections with a "Suburban" human population density classification will be less than those with an "Urban" human population density classification and stocking rates on "Rural" stream sections will be stepped down from "Suburban."

Optimum Yield II - Metro

Rationale. Prior to the 2004 season, the Optimum Yield II category was revised to recognize waters with a metropolitan (metro) human population density separate from those with urban, suburban, or rural human population densities. The idea was to provide more intensive stocking in stream sections open to public angling located in proximity to dense human population centers. Waters in this category and the High Yield category receive the second greatest emphasis for adult trout stocking in flowing water. Optimum Yield II Metro stream sections provide a combination of characteristics that identify these waters as well suited for high density stocking to encourage heavy angler use. These factors include: low to moderate density wild trout populations, moderate stream size, accessibility, and their location near dense population centers.

One stream section from this category was examined as part of the statewide angler survey on stocked trout stream sections in 2005. Results from this survey recorded a very high amount of angler use on this water (844 hours/acre) during the spring angling period (Greene et al. 2006). Due to intense early season use, these sections should receive one of their inseason stockings during the opening week of season. This would serve to maintain the high rate of angler use that has been recorded on these waters in the early spring.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 800 angler hours/ acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

- Where conditions permit provide more year-round angling opportunity by the use of a fall stocking.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor	Good	From 4 meters to 20 meters	Metro
B-C-D-E	Good	2-3	Metro

Stocking rates and frequencies for Optimum Yield II - Metro waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
200	140	2	340

Criteria

- A minimum of two inseason stockings are required for a section to qualify for the maximum inseason stocking rate of 140-trout/acre. Should only one inseason planting be desired, the inseason allocation will be reduced to a maximum of 100-trout/acre.
- Fall stocking may be conducted at a stocking rate not to exceed 50-trout/acre. Trout stocked during the fall period will be included as part of the waters total annual allocation which will not exceed 340 trout/acre/year.

Optimum Yield II – Urban

Rationale. The results from the statewide angler use and harvest surveys from 1988 through 1990 indicated that these stream sections attracted a high amount of angler use (409 hours/acre), second only to the use observed on High Yield sections for flowing water areas (Greene and Weber 1993b). A high amount of angler use (580 hours/acre) was recorded from one stream section sampled from this category in 2005 (Greene et al. 2006). Located near human population centers within the Commonwealth, these stream sections provide valuable trout angling opportunities in

areas where recreational fisheries are at a premium. These sections can be characterized as moderate size streams with a recreational use potential rating of Good. Biomass density can range from good to low (Class B, C, D or E). However, most of these sections support only low density populations of wild trout.

Due to intense early season use, these sections should receive one of their inseason stockings during the opening week of season. This would serve to maintain the high rate of angler use that has been recorded on these waters in the early spring. Unfortunately, on many of these waters, angler use declines as stream conditions become less favorable to support trout in the late spring (late May-June). However, favorable conditions may exist to support a trout fishery on some of these waters during the fall. Therefore, a fall stocking option may be extended to suitable stream sections within this category.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 500 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit provide more year-round angling opportunity by the use of a fall stocking.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor	Good	From 4 meters to 20 meters	Urban
B-C-D-E	Good	2-3	Urban

Stocking rates and frequencies for Optimum Yield II - Urban waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
160	140	2 or 3	300

Criteria

1. Two inseason stockings are required for a section to qualify for the maximum inseason stocking rate of 140-trout/acre. Should only one inseason planting be desired, the inseason allocation will be reduced to a maximum of 100-trout/acre.
2. Fall stocking may be conducted at a stocking rate not to exceed 50-trout/acre. Trout stocked during the fall period will be included as part of the water's total annual allocation which will not exceed 300-trout/acre.

Optimum Yield II – Suburban

Rationale. The results from the statewide angler use and harvest surveys conducted from 1988 through 1990 recorded a high amount of angler use for waters within this category (410 hours/acre) in comparison to other flowing water areas (Greene and Weber 1993b). Based on angler use information from the 2005 angler survey, angler effort on Optimum Yield II Suburban stream sections averaged 194 hours/acre (Greene et al. 2006).

This group of stream sections represents areas with moderate concentrations of human population density. These sections can be characterized as moderate size streams with Good recreational use potential. Again, biomass density can range from good to low and most of the sections support only low density wild trout populations. To provide more seasonal trout angling opportunity, the fall stocking option may be used on some of these streams, especially in areas where other fall trout angling opportunities are limited.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 300 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round angling opportunity by the use of a fall stocking.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor	Good	From 4 meters to 20 meters	Suburban
B-C-D-E	Good	2-3	Suburban

Stocking rates and frequencies for Optimum Yield II - Suburban waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason frequency	Total (trout/acre)
100	100	1	200

Criteria

1. One inseason planting at a maximum stocking rate of 100-trout/acre will be used to compose the spring inseason stocking program.
2. Fall plantings may be conducted at a stocking rate not to exceed 50-trout/acre. Trout stocked during the fall period will be included as part of a waters total annual allocation which will not exceed 200-trout/acre.

Optimum Yield II – Rural

Rationale. The results from the 1988 through 1990 statewide angler use and harvest surveys recorded a moderate amount of angler use from this category of waters (224 hours/acre). However, due to the large number of waters in this category, some variability in angler use was noted within

this category (Greene and Weber 1993b). Based on angler use information from the 2005 angler survey, angler use on Optimum Yield II Rural stream sections averaged over 280 angler hours/acre (Greene et al. 2006).

This category represents the largest resource category comprising over 40% of the stocked stream sections in Pennsylvania. Located in sparsely populated areas of the Commonwealth, these stream sections can be characterized as moderate size waters with Good recreational use potential. Biomass density can range from good to low. However, over 78% of these sections are classified as biomass Class D or E waters. To maximize the potential of these waters, this category was divided into two options (a standard option and a Destination Waters option) beginning with the 1994 season. The standard option has been applied to most waters. The Destination Waters option has been applied to waters within this category that have a greater potential to provide more angler use.

Objectives. The fishery is dependent on the rate and frequency of stocking and, in some cases, the contribution of good to fair densities of wild trout. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 250 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor	Good	From 4 meters to 20 meters	Rural
B-C-D-E	Good	2-3	Rural

Stocking rates and frequencies for Optimum Yield II - Rural waters managed under the Standard Option are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
60	40	1	100

Criteria

1. One inseason planting at a maximum stocking rate of 40-trout/acre will be used to compose the spring inseason stocking program.

Destination Waters Option

Rationale. The Destination Waters option was developed to recognize stream sections within the Optimum Yield II - Rural category that provide the best potential for additional angler use. These sections were selected based upon the Area Fisheries Manager's best professional judgment. Selection criteria were developed to identify some stream sections located in close proximity to population centers (cities, boroughs, etc.); however, by definition, human population density remains Rural (less than 40 persons per square kilometer). These criteria also included provisions for some stream sections with a considerable amount of public ownership, but for lack of a qualifying percentage of public ownership (less than 50%) these remain under the Good rather than High recreational use potential classification.

The intent of this option was to provide more flexibility in the stocking program by allowing for elevated stocking rates in rural areas of the state where such opportunities were desired to enhance angler use. Should social problems arise with the intensified program on any of these sections, operational procedures will be followed to reclassify the section into the appropriate stocking category according to program guidelines.

Objectives. The fishery is dependent on the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 275 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Fair-Poor	Good	From 4 meters to 20 meters	Rural
C-D-E	Good	2-3	Rural

Stocking rates and frequencies for Optimum Yield II - Rural Destination waters are:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason frequency	Total (trout/acre)
80	60	1	140

Criteria

1. Identify candidate waters on the basis of location, either in proximity to population centers and/or areas of public ownership. Although these waters by definition are rural in human population density and provide Good recreational use potential, they provide the best candidates for increased angler use within the Optimum Yield II - Rural category.
2. Priority for membership will be placed on width class 2 sections (greater than or equal to 33 ft. but less than or equal to 66 ft. in mean width). These larger sections will represent many of the sections with more of an historic angler following. Width class 3 waters (greater than or equal to 13 ft. but less than 33 ft. in mean width) may be included if width class 2 waters are not available in an area.

3. Waters supporting viable biomass Class B wild trout fisheries will not be eligible for the more intensive stocking rates prescribed by this option.
4. A maximum of two - Optimum Yield II - Rural stream sections may be designated under the Destination Waters Option within any individual sub-sub basin.
5. Program membership will not exceed 10% (by number) of the Optimum Yield 2 – Rural category.

Optimum Yield III

Rationale. Waters included under this category represent a small group of extremely small stream sections (less than 13.2 ft. in width) that have historically been managed with the planting of adult trout. These sections support good to low density wild trout populations and are located on public or private land open to public angling. As with the Optimum Yield 1 category, no distinction is made in the allocation strategy based on human population density.

Results from the statewide angler use and harvest surveys conducted between 1988 and 1990 recorded a low amount of angler use (211 hours/acre) on this group of waters (Greene and Weber 1993b). Furthermore, the small physical size of these waters precludes consideration for intensive management. Therefore, multiple high density stockings will be avoided to prevent overcrowding of fish and anglers on these small streams.

Objectives. The fishery is dependent on the rate of stocking and, in some cases, the contribution of good to fair densities of wild trout. The objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 175 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor	High	Less than 4 meters	Not a factor
B-C-D-E	High	4	Not a factor

Stocking rate and frequency for Optimum Yield III waters is as follows:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
60 or	40	0 or 1	40-60

Criteria

1. These waters will receive one annual planting. The Area Fisheries Manager will have the option to choose between a preseason stocking or an inseason stocking. One preseason stocking at a maximum rate of 60-trout/acre, or one inseason stocking at a maximum rate of 40-trout/acre will be used to compose the stocking program on this category of waters.

Low Yield

Rationale. Stream sections represented by this category are those that, for a variety of reasons, should not be stocked at a high rate with multiple frequencies. Reasons for membership in the Low Yield category may include: posting problems, elevated late spring and summer water temperatures, good wild trout populations, low recreational use potential or a combination of these factors which diminish their suitability as an adult trout stocked water.

Goal. To provide a spring recreational trout angling experience on stream sections that, for a variety of reasons, are not well suited for intensive adult trout stocking.

Objectives. The fishery is dependent on the rate of stocking and, in some cases, the contribution of good to fair densities of wild trout. The objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 175 angler hours/acre during the spring angling period (April through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Good-Fair-Poor-None	Low	From less than 4 meters to 20 meters	Not a factor
B-C-D-E	Low	2, 3, 4	Not a factor

Stocking rate and frequency for Low Yield waters is as follows:

Preseason (trout/acre)	Inseason (trout/acre)	Inseason Frequency	Total (trout/acre)
60 or	40	0 or 1	40-60

Criteria

1. These waters will receive one annual planting. The Area Fisheries Manager will have the option to choose between a preseason stocking or an inseason stocking. One preseason stocking at a maximum rate of 60-trout/acre, or one inseason stocking at a maximum rate of 40-trout/acre will be used to compose the stocking program on this category of waters.

Rivers

Rationale. Width class 1 stream sections or rivers (1S or 1L) represent the group of stream sections, which by virtue of their large size are quite different from the average Pennsylvania trout stream. Most of these are marginal trout waters limited by seasonal elevations in water temperature.

Since the allocation of trout is based upon the product of the stocking rate by the total acres of the section, width class 1 sections have the potential to absorb a substantial portion of hatchery production if they are stocked at a high rate per acre. Therefore, in order to provide a recreational trout fishery and balance supply with demand, low to moderate stocking rates are applied to these large waters.

This category has been subdivided based on width classification into two groups: 1S Rivers (greater than 20 meters but less than or equal to 30 meters in mean width) and 1L Rivers (greater than 30 meters in mean width). Results from the statewide angler use and harvest surveys conducted from 1988 through 1990 confirmed that on average, the smaller 1S sections provide a greater amount of angler use (240 hrs/acre) in comparison with the larger 1L sections (125 hrs/acre). However, the amount of angler use documented on both 1S and 1L sections, was low in comparison with most of the other stocking categories (Greene and Weber 1993b). A moderate amount of angler use (218 hours/acre) was recorded from one stream section sampled from the 1S Rivers category in 2005 (Greene et al. 2006).

A combination of stream size based on width classification, recreational use potential and human population density will be used to determine the stocking rate on these sections. Unlike other flowing water stocking categories, width class 1S and 1L sections are assigned a total stocking rate or block allocation rate for the year. The distribution of the total between preseason and inseason plantings and the inseason stocking frequency is based on the recommendation of the Area Fisheries Manager. Stocking rates range from 32 to 144 trout/acre depending upon the classification of the river section.

Goal. To provide a recreational trout angling experience on waters with low to non-existent resident trout populations using the management strategy of low to moderate stocking rates with inseason frequencies adjusted to provide better use of stocked trout.

Objectives. The fishery is largely dependent upon the rate and frequency of stocking. Objectives for these waters are as follows:

1. To provide an amount of angler use greater than or equal to 200 angler hours/acre during the spring angling period (April through mid-June).

- To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Allocation Strategy

Trout Biomass	Recreational Use Potential	Width	Human Population Density
Fair-Poor-None	High-Good-Low	Greater than 20 meters	Urban Suburban Rural
C-D-E	High-Good-Low	1S 1L	Urban Suburban Rural

Stocking rates for 1S and 1L Rivers are as follows:

Width Class	Rec. Use Potential	Human Pop. Density	Stocking Rate
1S	High	U	144 trout/acre
		S	128 trout/acre
		R	116 trout/acre
	Good	U	88 trout/acre
		S	68 trout/acre
		R	60 trout/acre
	Low	U, S or R	36 trout/acre
1L	High	U	96 trout/acre
		S	76 trout/acre
		R	64 trout/acre
	Good	U	56 trout/acre
		S	52 trout/acre
		R	40 trout/acre
	Low	U, S or R	32 trout/acre

Criteria

- Inseason stocking frequency is based on the recommendation of the Area Fisheries Manager; either one or two inseason plantings are made.
- In areas where other suitable stream sections are lacking, the fall stocking option may be extended to width class 1 stream sections. The stocking rate will be determined by the Area

Fisheries Manager. Trout stocked during the fall will be included as part of the waters total annual allocation, which will not exceed the stocking rate determined by classification according to program guidelines.

Results from evaluations of the Adult Trout Stocking Program in Flowing Water

Statewide angler use and harvest surveys were conducted between 1988 and 1990 to assess angler demand and yield on selected sections representative of the individual stream resource categories. These surveys provided information for program refinements in 1994. For example, stocking rates and frequencies were elevated on high use stocking categories (High Yield and Optimum Yield II Urban), and stocking rates were reduced on a low use stocking category (Optimum Yield II Rural).

A statewide angler use and harvest study was completed on a group of 28 randomly selected trout stocked stream sections managed under Commonwealth Inland Waters regulations in 2005. The study was conducted over the opening eight weeks of the regular trout season (mid-April through early June). Results from the study indicated that angler use on these waters averaged 363 hours/acre (range 23.12 – 843.74 hours/acre), and trips per trout stocked averaged 0.63 trips/trout (range 0.07 – 2.76 trips/trout). Angler use was high on stocked trout streams, averaging 1,168 angler hours/mile over the first eight weeks of season, in comparison with wild trout streams where angler use averaged only 82 angler hours/mile over the regular trout season in 2004 (Greene et al. 2005, Greene et al. 2006). On stocked trout streams, peak angler use occurred during the first two weeks of season. Opening weekend angler use accounted for 29.4% of the angler use (angler hours) and 21.3% of the angler trips observed over the study period, and daily angler use was much greater during the opening weekend of season (171.9 angler hours/mile/day) in comparison with the remainder of the study period (16.8 angler hours/mile/day). Anglers released over 63% of their catch on stocked trout streams. In 2005 stocked trout stream angling contributed over 65.7 million dollars to Pennsylvania's economy. The economic impact of stocked trout stream angling, or the contribution that was uniquely the result of stocked trout stream angling and would not have otherwise contributed to the state's economy by way of other recreational alternatives, was estimated at over 25.5 million dollars (Greene et al. 2006).

In 2006, 2007, and 2008 a statewide study was conducted to assess stocked trout residency in streams between the time of preseason stocking and the opening day of trout season. The study was done to follow-up on staff and angler reports of low numbers of trout remaining in some stream sections by opening day. For evaluation purposes, electrofishing surveys were conducted at two 300 meter sample sites per stream that coincided with known stocking point locations. Sampling was completed 10 to 20 days after stocking but prior to the opening day of trout season. The 10 to 20 day post stocking sample period was selected based on previous PFBC survey work that used radio telemetry to track the movement of stocked trout on streams with early season stocked trout movement problems. The results from that study confirmed movement of brook, brown, and rainbow trout from the stocking point locations occurred within ten days after stocking (Wnuk 2005). Results from the 2006 study recorded mean recapture rates of less than 40% on 30 of 135 stream sections, or 22% of the sections examined (Pierce et al. 2007). In 2007 sampling was repeated at 24 of the stream sections examined in 2006 with recapture rates averaging less than 40%. Sampling was also conducted at four additional sections where poor or very poor recapture rates were recorded at one of the two sample sites. Results from the 2007 examinations indicated that recapture rates improved to greater than 40% on 10 stream sections, remained similar on 10 sections, and declined on eight stream sections. It was recommended that Area Fisheries Managers should modify preseason stocking programs in stream sections where the trout residency rating was poor or very poor in both study years. Alternatives included stocking stream sections closer to opening day, revising species composition for stocking, or terminating preseason stocking (Wnuk et al. 2008). Sampling was also conducted to assess early season stocked trout residency on 31 stream sections in 2008. Results from these examinations were very similar to the results recorded in 2006, as mean recapture rates of greater than 40% were recorded on 24 of the 31 stream sections, or 77% of the sections examined (Wnuk et al. 2009).

In 2007 a cost-benefit analysis was conducted on 76 trout stocked stream sections to compare the revenue generated by angler trip and fishing license expenditures based on opening weekend angler use with the production costs to raise and distribute the preseason allocation of trout. Results from comparing production costs with angler trip expenditures, fishing license expenditures, and a combination of both expenditures, indicated that 19.7% of the trout stocked sections had negative cost-benefit values for one or more of the expenditures. In 2008 a cost-benefit analysis was conducted on 32 trout stocked stream sections using the same methods that were used in 2007. In

contrast to the 2007 results, only one of the 32 trout stocked sections (3.1%) had negative cost-benefit values for one or more of the expenditures. On stream sections with negative opening weekend cost-benefit values, it was recommended that the preseason trout stocking should either be eliminated, or reduced to a level that coincides with a positive cost-benefit value (Greene and Weber 2007, Greene and Weber 2008).

Based on the results from the angler use and harvest evaluations stocking rates and frequencies have been adjusted to provide for more efficient utilization of hatchery trout. Water specific adjustments in stocking rates, the timing of stocking, and the species used for stocking have also been made based on the results from the stocked trout residency study and the cost-benefit analysis. As outlined in the strategic plan, stocking should be reduced or eliminated on streams that receive lower angler use.

Regional Opening Days of Trout Season

Rationale: Beginning with the 2007 season, a regional earlier opening day of trout season applied to waters within an 18 county region located in southeastern and southcentral Pennsylvania. The traditional time period for opening day (first Saturday after April 11) remained in place for waters in other regions of the state. The rationale for the regional opening day of trout season was based upon long-term weather patterns that indicated air temperatures in the 18 county-region tended to be warmer earlier in the spring compared to other regions of the state. These warmer temperatures provide conditions more conducive to angling earlier in the spring. The warmer temperatures can also lead to water temperatures too warm for trout earlier in the year, as compared to the northern and western regions of the state. The combination of an opening day in mid-April and the potential for these waters to become too warm for trout by mid-spring reduces the amount of time that trout angling opportunities can be provided on many stocked trout waters in this region. Therefore, the implementation of a regional opening day was designed to take advantage of conditions that provide for optimum trout angling in this region of the state.

Results from an evaluation of Regional Opening Days of Trout Season

Angler interviews were conducted on a total of 76 stocked trout stream sections during the two opening days of trout season in 2007 to collect angler opinion information on the two regional opening days of trout season. Interviews were conducted on 22 stream sections managed under the regional opening day (March 31, 2007), and 54 stream sections managed under the traditional opening day of trout season (April 14, 2007). To assess angler opinions, anglers were asked if they agreed, disagreed, or were neutral to the concept of having two opening days of trout season in Pennsylvania. Based on the results from 582 angler interviews on stream sections where the regional opening day applied (March 31, 2007), 73% of the anglers interviewed agreed, 10% disagreed, and 17% were neutral on the concept of two opening days of trout season in Pennsylvania. Results from 1,174 angler interviews on stream sections where the traditional opening day of trout season applied (April 14, 2007), indicated that 56% of the anglers interviewed agreed, 7% disagreed, and 37% were neutral on the concept of two opening days of trout season in Pennsylvania. Some concerns were expressed that two opening days would lead to a large influx of anglers from outside the region to the streams where the earlier regional opening day applied. This did not occur, as 95% of the anglers interviewed on stream sections where the regional opening day applied (March 31, 2007), were residents of the 18 county-region (Greene and Weber 2007). Based on the results from this evaluation the Regional Opening Day was supported by the majority of anglers interviewed and has been maintained.

TROPHY GOLDEN RAINBOW TROUT AND BROOD TROUT ALLOCATION STRATEGY

Rationale. There is considerable angler interest and support for stocking trout larger than the average size (11 inch) adult trout. Therefore, strategies for distributing older (age 2 and older) and larger brook, brown, rainbow, and golden rainbow trout have been incorporated into the adult trout program since 1991. The distribution of some larger trout adds variety to the stocking program and the anticipation of catching a larger than average size trout is viewed as a positive part of the adult trout stocking program.

Beginning with the 1991 season, strategies were implemented for the stocking of trophy golden rainbow trout and brood trout (brook, brown and rainbow). These strategies were designed to provide for a systematic statewide distribution of these trout to stream sections and lakes stocked with adult trout in Pennsylvania. Since the majority of angler use directed toward stocked trout waters occurs during the spring angling season (April through mid-June), these fish will be allocated during the spring distribution periods (preseason and spring inseason) to coincide with the period of peak angler demand. Two separate allocation strategies have been developed: one for the allocation of trophy golden rainbow trout and one for the distribution of brood trout (brook, brown and rainbow) produced at PFBC hatcheries. The goal has been to equitably distribute these trout to a broad geographic region of the Commonwealth.

Trophy Golden Rainbow Trout Allocation Strategy

Objective. To produce approximately 9,000 trophy golden rainbow trout, averaging 18 inches in length, on an annual basis for distribution to stream sections and lakes during the preseason stocking period.

Allocation Strategy for Trophy Golden Rainbow Trout

Class	Number/Mile	Block Allocation
High Yield Metro & High Yield	5	
Optimum Yield 2		
Width Class 2	5	
Width Class 3	2	
1S Rivers	5	
1L Rivers	2	
Class 1 LK ($\geq 6A$)		15
Class 2 LK		30
Class 3 LK		40
Class 4 LK		15
Tailwaters		15

Criteria

1. Stocking categories and stocking rates are based on resource category assignments according to program guidelines and stream section length or lake area.
2. Trophy golden rainbow trout should be released only during the preseason stocking period into stream sections and lakes, which qualify to receive rainbow trout during preseason stockings.
3. Trophy golden rainbow trout will be released only into those stream sections and lakes, which the Area Fisheries Manager has determined to be suitable.
4. Trophy golden rainbow trout will be allocated on the basis of a number per mile for individual stream sections. Lakes and tailwater sections will receive allocations based on a fixed number per class. All stocking rates are maximum rates and may be reduced based on the availability of golden rainbow trout or eliminated if overriding biological or social factors become evident.
5. Unless a stream section is contiguous with other stocked sections, stream sections should be at least 3 kilometers (2 miles) in length and lakes should be a minimum of 2.4 hectares (6 acres) to be eligible to receive trophy golden rainbow trout.
6. Due to biological, physical and/or social considerations, the following stocking categories/strategies have not been allocated trophy golden rainbow trout.

The following Stocking Categories and special case waters do not receive Trophy Golden Rainbow Trout.

Class 1 Lakes (<2.4 ha or <6.0 acres)	Preseason Only Waters
Optimum Yield 1 (Class B waters)	Inseason Only Waters
Optimum Yield 3	Delayed Harvest
Low Yield	Catch-and-Release (ALO and FFO)

Brood Trout Allocation Strategy

Objective. To produce approximately 20,000 trophy size brook, brown, and rainbow trout combined, on an annual basis for distribution in stream sections and lakes (based upon the numbers available from hatchery production). Since the majority of angler use directed toward stocked trout waters occurs during the spring angling season (April through mid-June), these fish will be allocated

during the spring distribution periods (preseason and spring inseason). Approximately 70% of these trout will be stocked during the preseason distribution period and 30% will be stocked during the spring inseason distribution period.

Allocation Strategy for Brood Trout

Class	Number/Mile	Block Allocation
High Yield Metro & High Yield	8	
Optimum Yield 2 Metro	8	
Optimum Yield 2 Urban	8	
Optimum Yield 1 (Class B)	5	
Optimum Yield 2 WC-2	5	
Optimum Yield 2 WC-3	3	
1S River	4	
1L River	3	
Class 1 LK (≥ 6 Acres)		20
Class 1 LK (< 6 Acres)		5
Class 2 LK		30
Class 3 LK		30
Class 4 LK		20
Tailwater		20
Delayed Harvest (≥ 2 mi.)		10
Delayed Harvest (< 2 mi.)		5
Catch and Release (≥ 2 mi.)		10
Catch and Release (< 2 mi.)		5
Preseason Only		5
Inseason Only		5

Criteria:

1. Stocking categories and stocking rates are based on resource category assignments according to program guidelines and stream section length or lake area.
2. Approximately 70% of the brood trout will be stocked during the preseason stocking period, the remaining 30% will be planted during the spring inseason period. No brood trout will be allocated during the fall, winter, or late-winter stocking periods.

3. Brood trout will be allocated on the basis of a number per mile for individual stream sections. Lakes, tailwaters, special regulation, and special case waters will receive allocations based on a fixed number per class. All stocking rates are maximum rates and may be reduced based on the availability of brood trout or eliminated if overriding biological or social factors become evident.
4. Number and choice of species will depend upon availability and species requirements for individual waters specified by the Area Fisheries Manager.
5. Due to physical and/or social considerations that include small stream size or a high amount of landowner posting, the Low Yield and Optimum Yield 3 stocking categories will not be allocated brood trout:

Spring Inseason Stocking Frequency

Rationale: Based on a reduction in the numbers of adult trout produced from 5.25 million in 2001 to 3.4 million in 2007, and additional information gathered through angler surveys and feedback from staff, the guidelines for inseason stocking frequencies were restructured for the spring 2007 inseason stocking period. In general, spring inseason stocking frequencies were reduced over most stocking categories. This was done to provide for a more efficient use of adult trout stockings by consolidating stockings to concentrate on periods of better angler use. This strategy served to reduce the number of plants that occurred during periods of lower angler use, and to reduce distribution costs through the elimination of a number of distribution trips and the amount of labor required for stocking.

Altering the frequency and timing of stocking has been demonstrated to be an effective tool to improve the performance of a catchable trout fishery (PFC 1987). Therefore, in an effort to maintain higher levels of angler use during the spring, it is important to provide timely inseason stockings. For example, on waters that generate a high amount of angler use, it is important to provide an inseason stocking during the week following opening weekend. This typically applies to stream sections and lakes located near dense population centers and on waters located in proximity to publicly owned parks. Many of these waters receive two spring inseason stockings. The first of these stockings is typically scheduled during the week following the opening weekend of trout season. The second stocking is usually completed by early to mid-May. Some waters located near

public parks also generate a high amount of angler use during the Memorial Day Holiday weekend. Most of these public park waters receive two spring inseason stockings. In these cases, the second inseason stocking should be scheduled to occur during the week prior to Memorial Day. On some waters seasonal water temperature elevations dictate that all inseason stocking must be completed early in the spring.

To provide for more efficient timing of stocking, the cases described above are handled through special remark stocking instructions provided by the Area Fisheries Manager. Fall and winter inseason stocking will be addressed in separate sections pertaining to stream sections and lakes.

Stocking frequency for the Stocking Categories are as follows:

Revised Spring Inseason Stocking Frequency by Stocking Category

Stocking Category	Previous Inseason Stocking Frequency	2007 Inseason Stocking Frequency
High Yield Metro	3	2
High Yield	3	2
Optimum Yield 1	1	1
Optimum Yield 2 Metro	2	2
Optimum Yield 2 Urban	2	2
Optimum Yield 2 Suburban	2	1
Optimum Yield 2 Rural Destination Waters	2	1
Optimum Yield 2 Rural	1	1
1S River	One or more	One or Two
1L River	One or more	One or Two
1L River Tailwaters	Two or more	Two or more
Delayed Harvest Areas	1	1
Catch and Release Areas	1	1
Class 1 Lakes	One or more	One or Two
Class 2 Lakes	One or more	One or Two
Class 3 Lakes	One or more	One or Two
Class 4 Lakes	One or more	One or Two
Class 5 Lakes	1	1

Management Options: Special Case Subprogram

This subprogram enables response to localized concerns or problems to increase the opportunities and diversity of the angling experience. Special case management options include: preseason only, inseason only, tailwater trout fisheries, fall stocking, fingerling trout, Refuge Areas, special regulations options, and Delayed Harvest Artificial Lures Only.

Preseason Only

Rationale. Preseason only stocking is designed to provide early season angling opportunities in stream sections where a combination of factors may preclude the water from consideration for inseason stocking. Considerations for preseason only stocking include but are not limited to stream sections that support good biomass Class B wild trout populations, sections where more intensive stocking may lead to landowner-angler conflicts that could result in posting, sections with seasonal elevations in water temperature, or sections that have chronic low flows and poor holding conditions for trout later in the spring. Preseason only stocking may be applied to any stocking subprogram.

Inseason Only

Rationale. Inseason only stocking is designed to provide seasonal trout angling opportunities in stream sections where a combination of factors may preclude the water from consideration for preseason stocking. Considerations for inseason only stocking include but are not limited to stream sections with early season stocked trout residency problems, sections where a decline in water quality occurs due to acid precipitation and/or snow melt from spring runoff, sections where private landowner(s) object to large opening day crowds associated with a preseason stocking, or sections where poor early season road conditions preclude the consideration for a preseason stocking. Inseason only stocking may be applied to any stocking subprogram.

Tailwater Trout Fisheries

Rationale. This option is provided for the few short tailrace sections (less than or equal to 3.2 km or 2 miles in length) that are located directly downstream of the outflow of major reservoirs where thermal conditions are favorable to support trout and offer angling opportunities on a year-round basis. For adult trout management, the tailwater option will be limited to a few short stream sections located directly below a coldwater outflow of a major reservoir where no other adult trout stocked sections occur on the main stem waterway. Due to the potential for year-round recreation, stocking rates will be intensive and extended frequency plantings will be utilized to provide a year-round trout fishery.

Results from a 1990 angler use and harvest survey conducted on the tailwater section of the Shenango River indicated that angler use was greatest during the early season (272 hrs/acre) and declined by the late spring to 58 hrs/acre (Greene and Weber 1993b).

Tailwater trout fisheries will be assigned a total stocking allocation based on their recreational use potential. The distribution of the total number of catchable trout between the preseason and inseason stockings and the inseason stocking frequency will be based on the recommendation of the Area Fisheries Manager.

Goal. To provide a trout fishery in tailwater sections where environmental conditions are suitable for the maintenance of a year-round trout fishery.

Objectives. The fishery is dependent on the rate and frequency of stocking. Objectives for tailwater trout fisheries are as follows:

1. To provide an amount of annual angler use greater than or equal to 300 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per adult trout stocked.
3. To provide more year-round trout angling opportunity by the use of extended frequency inseason plantings (four or more). Where conditions permit, stocking may occur during summer and the use of fall and late winter plantings will be encouraged.

4. To provide rationale and information to encourage a water release pattern that will maintain thermal conditions suitable for trout survival on a year-round basis.

Allocation Strategy

Stocking rates and frequencies for Tailwater Trout Fisheries are:

Recreational Use Potential Frequency	Inseason Frequency	Total (trout/acre)
High	4 or more	280
Good	4 or more	260

Criteria

1. This option will be limited to those few short tailwater sections (less than or equal to 3.2 km or 2 miles in length) where no other adult trout stocked sections occur on the mainstem waterway. For tailwater sections that have additional adult trout stocked sections located on the mainstem waterway, the stocking rate and frequency will be determined by classification according to program guidelines.
2. To provide more year-round trout angling opportunity, sections qualifying for the Tailwater Trout Fisheries option should be included in the fall and late winter stocking program.

Fall Stocking Option - Flowing Water

Rationale. Traditionally, the fall adult trout stocking program was reserved solely for lakes and reservoirs. In order to expand angling opportunity, a pilot program was developed during the fall of 1989 to evaluate the potential for fall stocking on streams. Two High Yield stream sections located in urban areas of southeastern Pennsylvania (Wissahickon Creek and Ridley Creek) were included in the fall stocking program. Following the fall 1991 stocking, an angler use and harvest survey was conducted on Wissahickon Creek. Results from the survey indicated that angler use (136 hrs/acre and 0.93 trips/trout stocked) was similar to the use observed following a late spring (May) inseason stocking (102 hrs/acre and 0.95 trips/trout stocked). Angler use from a survey conducted on an urban stream section of Pine Creek (Allegheny County) during the fall of 2000 was recorded at 125 hours/acre and 1.32 trips/trout stocked.

Beginning with the 1994 season, the fall stocking option was extended to include more stream sections. The intent of the program was to provide regional coverage to select stream sections on a statewide basis. Emphasis was placed on using High Yield, Optimum Yield II-Urban, and Delayed Harvest special regulations areas for this option. However, sections from some of the other resource based stocking categories (primarily Optimum Yield II-Suburban and River categories) were included to provide more regional coverage.

Due to statewide reductions in adult trout production beginning in 2002, several waters were removed from the fall stocking option. This was done to maintain the spring allocations of trout closer to the traditional plant size on these waters, as spring represents the period of peak angler demand for trout angling on most waters in Pennsylvania.

Goal. To provide recreational trout angling opportunities during the fall through the planting of adult trout on select stream sections.

Objectives. The fishery will be dependent upon the provision of a fall stocking. Objectives for the fall stocking option are as follows:

1. To provide an amount of angler use greater than or equal to 150 angler hours/acre during the fall (October through November).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Criteria

1. Plant adult trout at relatively low stocking rates during the fall. One October planting will constitute the fall option.
2. Trout stocked during the fall will be included as part of a water's total annual allocation, which will not exceed the stocking rate determined by classification according to program guidelines.

As outlined in the strategic plan, the cost-benefit of the fall stocking program should be evaluated. Adjustments should be made to reduce or eliminate fall stocking on streams where stocking at this time of year is not cost effective.

Fingerling Trout Management in Flowing Water

Rationale. This management option is intended for those waters that provide most of the general life requirements of trout and will support trout on a year-round basis. Generally, the growth potential of trout in these waters is excellent. However, a number of factors including: siltation, lack of adequate spawning substrate, and fluctuations in water levels due to reservoir release regimes, may preclude the development of a wild trout fishery. In cases where fingerling trout stocking efforts are successful they can provide a cost effective method to provide a trout fishery. Fingerling trout that survive to the adult life stage essentially provide a naturalized fishery that is similar to a wild trout fishery. Anglers may find this type of fishery more attractive than fisheries supported through the stocking of adult trout.

Goal. To provide recreational trout angling opportunities through the planting of fingerling trout in stream sections capable of supporting a substantial standing stock of resident trout but where lack of spawning success or other factors prevent the development of a wild trout fishery.

Objectives.

1. To provide a total catch (by weight) that exceeds the original total weight of the fingerling planting.
2. A total of 25% of the original number of fingerling trout planted should survive to a size of at least 10 inches.
3. Trout populations resulting from fingerling stockings should provide catch rates greater than or equal to 0.5 trout/hr.
4. Fingerling trout stockings should maintain trout populations comprised of two or more age groups of Age I and older trout.
5. Trout population density provided through fingerling stocking should be at least 20 kg/ha.

Criteria

1. Stream sections considered for fingerling trout stocking should provide a minimum total alkalinity of 10 mg/l.
2. The number of fingerling trout stocked will depend upon a combination of management choices and will be determined by the Area Fisheries Manager. Generally, 2-4" spring fingerling trout will be utilized for stocking from April through June.

As outlined in the strategic plan, a sampling strategy will be developed to evaluate all fingerling trout stocking efforts and provide recommendations on the continuation and possible expansion, or reduction of these programs.

Refuge Areas

Rationale. The use of Refuge Areas for stocking is a management option intended to reduce angler concentration immediately after stocking and to prolong the contribution of each stocking by extending the harvest over a greater period of time. Refuge Areas (or Wired Areas) are designated areas of stream approximately 100 meters in length that are closed to angling and public entry from March 1 through June 14. On June 15 these areas are open to angling under Commonwealth Inland Waters regulations. Some of the trout allocated to these stream sections are stocked within the Refuge Areas each time the stream is stocked. Trout stocked within Refuge Areas are protected from harvest immediately after stocking and may move from these areas over time into portions of the stream that are open to angling. This serves to extend angling opportunity over a longer period of time. This option is designed primarily for small (Width Class 3), accessible, low alkalinity stream sections of at least 3 km (2 miles) in length.

Goal. To extend the duration of adult trout stocked fisheries.

Objectives

1. To reduce instantaneous angling mortality of adult stocked trout.

2. To prolong the contribution of each stocking to the fishery by reducing the availability of freshly stocked trout to immediate harvest.

Regulations. Commonwealth Inland Waters regulations are applied to stream sections managed under this option. However, the areas of stream (approximately 100 meters in length) managed under Refuge Area regulations are subjected to no public entry and no fishing regulations from March 1 to June 14. On June 15 these areas are open to angling under Commonwealth Inland Waters regulations.

Results from Evaluations conducted on Refuge Areas

The use of Refuge Areas as a tool for extending the period of time that a stocking contributes to angling has been documented by studies completed on streams similar to those in the width class 3 category (Weirich 1974). More recent follow-up examinations were conducted on two stream sections with Refuge Areas during the 2009 field season. Results from these surveys recorded a low amount of angler use during 8:00 am angler counts conducted on Monday, June 15, 2009, (0.9 to 2.1 anglers/mile) and Saturday, June 20, 2009 (0 to 1.1 anglers/mile). Follow up electrofishing surveys conducted within four Refuge Areas (two per water) six to seven days after stocking recorded stocked trout residency rates ranging from 18 to 67% (average 43.3%). Electrofishing surveys conducted within the same four sites on June 12, 2009, (between 21 and 24 days after stocking) recorded low stocked trout residency rates ranging from 10 to 27% (average 19.3%).

Based on these examinations and input from staff, Refuge Areas will be removed from streams where they are no longer being maintained and from streams that are no longer stocked with trout. Refuge Areas will remain on stocked streams where these areas are being maintained and sponsored by an angling group.

Hatchery Supported Waters Special Regulation Options

The Commission's Special Regulations Policy (58 PA Code §57.5), also applies to special regulations options designed for hatchery supported waters. These include Catch-and-Release, Catch-and-Release Fly Fishing Only, Catch-and-Release All-Tackle, and Trophy Trout All Tackle.

These regulations were described earlier under Section 2.2.6.2. One special regulation program applies only to stocked waters, the Delayed Harvest Artificial Lures Only program.

Delayed Harvest Artificial Lures Only

Rationale. This option is designed to maintain a recreational trout fishery through stocking. Delayed Harvest management provides for an extended period of catch and release angling, then, as angler interest for trout fishing declines and stream conditions become less favorable for survival (due to decreased flows and elevated water temperatures), harvest is allowed utilizing a low creel limit so that emphasis remains on the angling experience rather than harvest. The harvest season has been set to allow for some harvest before hatchery trout are lost to natural mortality.

In general, Delayed Harvest management has been applied to Width Class 2, 3 or 1S River sections (these range from greater than 13.2 feet to less than or equal to 99 feet in mean width). Due to their large size and tendency for elevated late spring water temperatures most 1L River sections are not well suited for this option. Conversely, due to their small size and the potential for the overcrowding of fish and anglers, Width Class 4 stream sections should not be considered for this option.

Prior to the beginning of the 2006 season, the Delayed Harvest program offered two options, an Artificial Lures Only option and a Fly Fishing Only option. Subsequently, the Delayed Harvest Fly-Fishing Only option was merged with the Heritage Trout Angling Program to form the Catch-and-Release Fly-Fishing Only Program in 2006. There are currently 59 stocked trout waters managed under the Delayed Harvest Artificial Lures Only program (Table 4).

Goal. To utilize the planting of hatchery trout to provide an angling experience that provides for an extended period of high stocked trout abundance by emphasizing catch-and-release angling rather than harvest.

Objectives

1. To provide angler use greater than or equal to 550 angler hours/acre during the spring (March through mid-June).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. To provide a high catch rate (greater than or equal to 1.0/hr.) based on a high density of stocked trout.
4. To provide for limited harvest between June 15 and Labor Day.

Allocation Strategy

Stocking rates and frequencies for Delayed Harvest Areas are:

Width Class	Inseason Frequency	Total (trout/acre)
2 or 3	1 or 2 (if stocked in Fall)	200
1S or 1L	1 or 2 (if stocked in Fall)	140

Regulations

Minimum Length Limit:	9 inches (when harvest is permitted).
Creel Limit:	3 from June 15 through Labor Day, and 0 from the day after Labor Day through June 14.
Season:	Open year-round, no harvest is permitted from the day after Labor Day through June 14.
Gear/Lure Restrictions:	Artificial Lures Only (includes flies and streamers).

Criteria

1. Water temperatures should not exceed 21C (70F) for prolonged periods (48 hours) prior to June 15.
2. Fall stocking should be conducted at relatively light stocking rates (25-50 trout/acre). However, in the case of some of the smaller stream sections (less than 6 surface acres) fall stocking rates may need to be increased to attain the minimum plant size of 300 trout. Trout stocked during the fall will be included as part of a waters total annual allocation. Stocking

rates will not exceed 140 trout/acre/year for 1S and 1L River sections and 200 trout/acre/year for Width Class 2 and 3 stream sections.

3. All waters considered for Delayed Harvest management should provide a surface area of at least 1.6 ha (4.0 acres).

Results from evaluations conducted on Delayed Harvest Artificial Lures Only waters

On average, the angler use and harvest work conducted on five Delayed Harvest Artificial Lures Only waters in 1993 documented high catch rates (1.03 trout/hour) and a good amount of angler use (756 angler hours/acre) throughout the spring (early March through mid-June). The majority of the anglers using these waters were fly anglers (69%) followed by anglers that used artificial lures (27%). Interestingly, during the opening nine days of the harvest season (June 15-23, 1993) anglers continued to voluntarily release the majority (91%) of their catch (Greene and Weber 1995b). Based on angler use information from the 2005 angler survey, angler effort on two Delayed Harvest stream sections averaged 229 hrs/acre during an eight-week period from April 16 – June 12, 2005 (Greene et al 2006).

In addition to use, harvest, and gear preference data, angler opinion data were also collected on these waters in 1993. The consensus of angler opinions rated the overall angling experience on Delayed Harvest waters above average. Anglers also expressed their support for an extension of the no harvest period on Delayed Harvest waters (Greene and Weber 1995b). As a result of support from the angler opinion information, the harvest season was revised on Delayed Harvest waters for the 1995 season. This revision reduced the harvest season from June 15 through the end of February to June 15 through Labor Day. In conjunction with the revised season, fall stocking was implemented on most of the Delayed Harvest areas in 1995. The addition of fall stocking was designed to enhance angler interest and to provide more year-round angling opportunity on Delayed Harvest waters.

As a result of these evaluations most of these stream sections should continue to be managed under Delayed harvest Artificial Lures Only regulations. As outlined in the strategic plan, a sampling strategy will be developed to determine if waters currently managed under special

regulations have met a specific set of biological and social criteria required to remain in a special regulations program.

2.3.4 ADULT HATCHERY TROUT IN LAKES SUBPROGRAM GUIDELINES

The following general guidelines have been developed for the adult hatchery trout in lakes subprogram:

1. The suitability of a lake for trout stocking must be determined through a field survey conducted by the Area Fisheries Manager. No lake shall be approved for stocking prior to survey.
2. Ponds less than 1.6 hectares (4 acres) and lakes greater than or equal to 516.2 hectares (1,275 acres) which are not presently managed with adult trout will not be considered for adult trout management in the future. Lakes and reservoirs greater than 81 hectares (200 acres) and less than 516.2 hectares (1,275 acres) will be a low priority for addition to the adult trout stocking program.
3. Public ownership is a requirement for selecting lakes for adult trout management. Exceptions may be made for privately owned lakes according to the following guidelines:
 - a. Lakes with greater than 50% of the shoreline posted against public access will not be considered.
 - b. Lakes with 25 to 50% of the shoreline posted against public access may be considered if the lake is an urban or suburban classified sub-subbasin, and public boat access with developed parking is available.
 - c. Lakes with less than 25% of the shoreline posted may be considered if no other lakes are stocked with trout in the sub-subbasin, or lake(s) currently stocked are not centrally located in the sub-subbasin, and trout angling opportunities are limited.
4. A minimum of 1.0 meter (3.3 ft.) of water column with temperatures of 21C (70F) or lower and 5 mg/l or greater of dissolved oxygen should be present to May 1 for preseason stocking and to June 1 for inseason stocking.
5. The minimum values for pH at the time of stocking shall not be less than 6.0 for brook trout and brown trout, and not less than 6.5 for rainbow trout. In cases where acid precipitation is believed to be the cause of low pH and alkalinity values, aluminum concentrations should be

determined. Any stocking canceled due to poor water quality will not be rescheduled. The same criteria will be applied in the consideration for adding new waters to the adult trout-stocking program.

6. No lake shall be stocked if pollutants are known to be present at concentrations exceeding the public health protection levels established by the Pennsylvania Department of Health.
7. Lakes subject to periodic pollution incidents resulting in fish and/or habitat loss will be managed at its classification's lowest stocking rate for one year if no additional incidents occur. The water will be removed from stocking if an existing problem is not corrected or if pollution becomes chronic. Trout lost to a pollution incident will not be replaced.
8. Due to the fact that lake size has a bearing on total catch and return to the creel, guidelines for total catch and/or return to the creel will be addressed on an individual category basis. Although a lake may be approved for stocking without angler use and harvest data, a subsequent evaluation by the Area Fisheries Manager of the lake or a similar lake considered representative of the resource category will be used to assess the continuation of stocking.
9. Choice of species to be stocked will be determined by the Area Fisheries Manager. Consideration will be given to habitat characteristics, angling vulnerability and popularity.
10. In situations where adult trout may conflict with directed warmwater/coolwater management initiatives, the Area Fisheries Manager and the Warmwater Unit may recommend that the lake not be stocked with adult trout. The policy objective to manage self-sustaining fish populations as a renewable natural resource to conserve that resource and the angling it provides should take precedence over trout stocking.
11. A minimum number of 300 adult trout will be necessary to constitute an individual stocking.
12. Stocking rates outlined represent the optimum and alternate stocking rates according to classification. In response to a variety of biological, chemical, physical and/or social factors, the Area Fisheries Managers have the latitude to adjust stocking rates downward from these rates. These special case situations should be addressed individually on a case-by-case basis as the Area Fisheries Managers deem necessary.

Lake Resource Categories

Lake Size

The attribute of lake size bears a relationship to management intensity, angler use and creel returns. Evaluations of tag return studies indicated that as lakes increase in size, creel returns tended to decline (Selcher 1972). In large lakes or reservoirs returns of stocked trout are generally low (Curtis 1951). On larger lakes angling can essentially be keyed to boat anglers. Larger lakes and reservoirs have the potential to absorb a considerable portion of hatchery production even if they are stocked at relatively moderate rates and, therefore, reduce the statewide availability of recreation. Conversely, small lakes can be intensively managed for excellent returns. However, due to their small size the potential for overcrowding exists which may foster unsportsmanlike behavior. Therefore, stocking rates for lakes were developed to reflect trends in diminishing angler use and creel returns with increased lake size. Lake classes are determined by surface area as described in Table 6.

Table 6. Lake classification as determined by surface area

Class	Criteria	
	Hectares	Acres
1	≤ 8	Less than or equal to 20
2	>8 but ≤ 20	>20 but ≤ 50
3	>20 but ≤ 40	>50 but ≤ 100
4	>40 but ≤ 81	>100 but ≤ 200
5	>81	>200

Human Population Density

Potential angler effort is related to human population concentrations. Fishing for trout in lakes is generally more acceptable to urban than rural anglers in Pennsylvania. According to the 1991 Trout Angler Telephone Survey, 75-80% of trout fishing in lakes occurs within one hour of the angler's residence (Hummon 1992). Therefore, the provision of catchable trout angling opportunities in waters closer to home is of particular importance to the "leisure time" angler residing in populated areas, especially when angling options are limited. The problems and opportunities for public access on lakes are more clearly defined than with streams. For lakes,

stocking rates have been adjusted upward to more evenly distribute recreational trout fishing opportunities in populated areas.

The human population density ranking for lakes is based on the number of persons per square kilometer in the immediate area of the lake in combination with the surrounding sub-sub basin (Table 7).

Table 7. Human Population Density Ranking Classification for Trout Stocked Lakes

Human Population Density Rank	Lake Rank	Sub-sub basin Rank
1	U	U
	U	S
2	U	R
	S	U
	S	S
3	S	R
	R	U
	R	S
4	R	R

Lake rank: Human population density is determined from the Pennsylvania Industrial Census Series for the townships and municipalities in which the lake is located.

Human Population Density Classification (Lake Rank):

Class	Criteria
Urban	Greater than or equal to 125 persons/km ²
Suburban	Greater than or equal to 40 persons/km ² but less than 125 persons/km ² .
Rural	Less than 40 persons/km ² .

Sub-sub basin rank: Using inventory information for human population density, a median population density was determined for each sub-sub basin. The median was chosen as a measure of central tendency since the mean may not be typical due to extreme scores or small sample sizes. Sub-sub basin rankings were established by percentile rank at the 33rd and 66th percentiles and defined as Urban (U), Suburban (S) or Rural (R). These rankings have been updated in accordance

Table 8. Sub-sub basin classification of human population density

SSB	Class	SSB	Class	SSB	Class	SSB	Class
01A	R	04E	R	09A	R	16G	R
01B	R	04F	R	09B	R	17A	R
01C	R	04G	S	09C	U	17B	R
01D	S	05A	U	10A	R	17C	S
01E	S	05B	U	10B	S	17D	R
01F	S	05C	S	10C	S	17E	S
02A	S	05D	S	10D	S	18A	U
02B	S	05E	S	11A	U	18B	R
02C	U	06A	S	11B	R	18C	S
02D	S	06B	S	11C	R	18D	U
02E	U	06C	S	11D	R	18E	U
02F	U	07A	R	12A	S	18F	R
03A	S	07B	U	12B	R	19A	U
03B	S	07C	U	12C	R	19B	S
03C	U	07D	U	13A	R	19C	U
03D	U	07E	U	13B	R	19D	U
03E	U	07F	U	13C	U	19E	R
03F	U	07G	U	13D	S	19F	R
03G	U	07H	U	14A	R	19G	R
03H	U	07I	S	15A	U	20A	U
03I	R	07J	U	16A	S	20B	S
03J	U	07K	U	16B	S	20C	U
04A	R	08A	R	16C	S	20D	S
04B	R	08B	S	16D	S	20E	R
04C	R	08C	S	16E	S	20F	U
04D	R	08D	R	16F	R	20G	U

Additional Criteria

Each of the lake size groups offers unique management problems and opportunities. Other factors, which could influence the manner of management, are ownership, posting against public ingress, boating opportunity, access, and non-trout community structure. Depending upon the lake type, these factors may have varying degrees of influence on management potential. For example,

boating opportunity is not critical to adult trout management on a 4 hectare (10 acre) pond. However, it is on a 75 hectare (185 acre) impoundment. Factors other than lake size and population density will, therefore, be considered for individual stocking sub-subprograms as their importance to management is warranted.

Management Options

The hatchery trout subprogram is divided into a number of management options with different allocations and rates for the stocking of hatchery trout based on resource categories. Within these options there are alternatives for adding diversity and variety to hatchery trout supported fisheries. A summary of the allocation strategy and distribution options for lakes is presented in Table 9.

Table 9. Summary of allocation and distribution options for lakes

Lake Class	Human Population Rank	Stocking Intensity (trout/acre/year)
1	1	520
	2	500
	3	460
	4	440
2	1	320
	2	300
	3	260
	4	240
3	1	180
	2	160
	3	140
	4	100
4	1	120
	2	100
	3	80
	4	60

Class 1 Lakes

Rationale. This category represents small lakes and ponds of 8 hectares (20 acres) or less. Some of these are impoundments with upstream and/or downstream flowing water sections managed with adult trout. Most of these waters are completely open to the general angling public regardless of ownership and provide good public access and parking areas. The major limiting factors include elevated summer water temperatures and the number of anglers that can be accommodated without overcrowding.

On these waters adult trout management offers an opportunity to manage small lakes for intensive angler use and excellent returns to the creel. Results from an angler use and harvest survey conducted on Twin Lakes in 1989 recorded angler effort at 903 angler hours per acre (Greene and Weber 1993b). Based on angler use information collected on stocked trout lakes from 2000 through 2001, angler use on Class 1 lakes averaged 1,016 hours/acre over the first seven weeks of season, and 163 hours/acre during the late winter period (February and March).

Goal. To provide recreational trout angling opportunities on Class 1 lakes (less than or equal to 8 hectares or less than 20 acres) through the planting of adult trout.

Objectives. The trout fishery is dependent upon the rate and frequency of stocking. Stocking rates will be adjusted to reflect differences in access and human population density. Objectives for Class 1 lakes are as follows:

1. To provide an amount of annual angler use greater than or equal to 1,000 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round angling opportunity by the use of fall/winter or late winter stockings.

Allocation Strategy

Human Pop. Rank	Stocking Rate (trout/acre/year)	
	Optimum	Alternate
1	520	240
2	500	220
3	460	200
4	440	160

Criteria

1. Lakes should be at least 1.6 hectares (4 acres) in total surface area to be considered as an addition to the adult trout program.
2. Class 1 lakes included in the fall and/or winter options should be at least 2.4 hectares (6 acres) in total surface area. Trout stocked during the fall and/or winter will be included as part of a waters total annual allocation which will not exceed the maximum stocking rate according to classification.

Additional Criteria. Optimum stocking rates may be applied to all waters in this class except for the following conditions when the alternate rates will be applied.

1. The lake has only one public access road, which is gated at a point 500 m or farther from the lake.
2. The lake has only one public access road, which is classified by the USGS as unimproved dirt.
3. The lake owner has no desire for intensive management or both a preseason and inseason stocking combination.
4. Other biological, chemical or social factors limit the suitability for intensive management to preseason-only or inseason-only stocking frequency.

Class 2 Lakes

Rationale. This category represents the group of impoundments that range in size from greater than 8 hectares (20 acres) to and including 20 hectares (50 acres). Most of these lakes are public owned and allow boating with some type of developed boating access and parking available. Adult trout stocking offers an opportunity to increase angling diversity on these waters. The major limiting factors to management include elevated summer water temperatures and boating restrictions on some waters.

Angler use and creel returns would be expected to be relatively high on this group of waters. Results from angler survey work conducted on Briar Creek Lake in 1993 recorded 372 hours/acre of angler use during the spring and summer (Copeland and Moase 1996). Based on angler use information from the 2000 and 2001 seasons, angler use on Class 2 lakes averaged 483 hours/acre for the first seven weeks of season, and 161 hours/acre during the late winter period.

Goal. To enhance angling diversity by providing recreational trout angling opportunities on Class 2 lakes (greater than 8 hectares and less than or equal to 20 hectares or greater than 20 acres and less than or equal to 50 acres) through the planting of adult trout.

Objectives. The trout fishery is dependent upon the rate and frequency of stocking. Stocking rates will be adjusted to reflect differences in access, human population density, posting, and boat angling opportunity. Objectives for Class 2 lakes are as follows:

1. To provide an amount of annual angler use greater than or equal to 650 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round angling opportunity by the use of fall/winter and or late winter stockings.

Allocation Strategy

Human Pop. Rank	Stocking Rate (trout/acre/year)		
	Optimum with Boating Permitted	Optimum with No Boating	Alternate
1	320	200	108
2	300	180	88
3	260	160	68
4	240	140	48

Criteria

1. Trout stocked during the fall and/or winter will be included as part of a waters total annual allocation which will not exceed the maximum stocking rate according to classification.

Additional Criteria. Optimum stocking rates may be applied to all waters in this class except for the following conditions when the alternate rates will be applied.

1. The lake has only one public access road, which is gated, at a point 500 m or farther from the lake.
2. The lake has only one public access road, which is classified by the USGS as unimproved dirt.
3. Greater than or equal to 50% of the shoreline is posted (closed to the general angling public).
4. The lake owner has no desire for intensive management or both a preseason and inseason stocking combination.
5. Other biological, chemical or social factors limit the suitability for intensive management to preseason-only or inseason-only stocking frequency.

Class 3 Lakes

Rationale. Lakes represented by this group range in size from greater than 20 hectares (50 acres) to less than or equal to 40 hectares (100 acres). Most of these lakes are public owned with good to excellent access. Generally, boating is permitted and public parking is readily available. The major limiting factors include elevated summer water temperatures and the larger size of these waters.

On Class 3 lakes, adult trout stocking offers the opportunity to provide a more diverse angling experience with reasonable expectations of good angler use. Angler use on this group of waters would be expected to be lower in comparison to smaller impoundments. The size of these waters coupled with any shoreline access limitation will likely affect angler use. Based on angler use information from the 2000 and 2001 seasons, angler use on Class 3 lakes averaged 386 hours/acre for the first seven weeks of season and 81 hours/acre during the late winter period.

Goal. To enhance angling diversity by providing recreational trout angling opportunities on Class 3 lakes (greater than 20 hectares and less than or equal to 40 hectares or greater than 50 acres and less than or equal to 100 acres) through the planting of adult trout.

Objectives. The trout fishery is dependent upon the rate and frequency of stocking. Stocking rates will be adjusted to reflect differences in access, human population density, posting, and boat angling opportunity. Objectives for Class 3 lakes are as follows:

1. To provide an amount of annual angler use greater than or equal to 450 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round angling opportunity by the use of fall/winter and or late winter stockings.

Allocation Strategy

Human Pop. Rank	Stocking Rate (trout/acre/year)	
	Optimum	Alternate
1	180	88
2	160	68
3	140	48
4	100	28

Criteria

1. Trout stocked during the fall and/or winter will be included as part of a waters total annual allocation which will not exceed the maximum stocking rate according to classification.

Additional Criteria. Optimum stocking rates may be applied to all waters in this class except for the following conditions when the alternate rates will be applied.

1. Greater than or equal to 50% of the shoreline is posted (closed to the general angling public).
2. Boating is not permitted.
3. The lake owner has no desire for intensive management or both a preseason and inseason stocking combination.
4. Other biological, chemical or social factors limit the suitability for intensive management to preseason-only or inseason-only stocking frequency.

Class 4 Lakes

Rationale. This group of lakes range in size from 40 hectares (100 acres) to and including 81 hectares (200 acres). Generally, these lakes can be characterized as providing well developed access, parking and boat launch facilities. Most of these are public owned waters, which offer a multi-species fishery where trout comprise a major component of the sport fishery. Some Class 4 lakes provide suitable water temperatures and dissolved oxygen concentrations to support trout throughout

the year. The major limiting factors to management include the size of these impoundments, limited shoreline access and in some cases elevated summer water temperatures.

Adult trout management provides an opportunity to add diversity to the multi-species fisheries supported by most Class 4 lakes. Due to their large size, these lakes have the potential to absorb a considerable portion of adult trout production if stocked at a high rate. Therefore, management will not be as intensive as with other subprograms representing smaller adult trout stocked lakes. Based on angler use information from the 2000 and 2001 seasons, angler effort on Class 4 lakes averaged 164 hours/acre for the first seven weeks of season and 18 hours/acre during the late winter period.

Goal. To enhance angling diversity by providing recreational trout angling opportunities on Class 4 lakes (greater than 40 hectares and less than or equal to 81 hectares or greater than 100 acres and less than or equal to 200 acres) through the planting of adult trout.

Objectives. The trout fishery is dependent upon the rate and frequency of stocking. Stocking rates will be adjusted to reflect differences in access, human population density, posting and boat angling opportunity. Objectives for Class 4 lakes are as follows:

1. To provide an amount of annual angler use greater than or equal to 200 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.
3. Where conditions permit, provide more year-round angling opportunity by the use of fall/winter and or late winter stockings.

Allocation Strategy

Human Pop. Rank	Stocking Rate (trout/acre/year)	
	Optimum	Alternate
1	120	48
2	100	40
3	80	32
4	60	16

Criteria

1. Trout stocked during the fall and/or winter will be included as part of a waters total annual allocation which will not exceed the maximum stocking rate according to classification.

Additional Criteria. Optimum stocking rates may be applied to all waters in this class except for the following conditions when the alternate rates will be applied.

1. Greater than or equal to 50% of the shoreline is posted (closed to the general angling public).
2. Boating is not permitted.
3. The lake owner has no desire for intensive management or both a preseason and inseason stocking combination.
4. Other biological, chemical or social factors limit the suitability for intensive management to preseason-only or inseason-only stocking frequency.

Class 5 Lakes

Rationale. This category represents a small group of large lakes greater than 81 hectares (200 acres) that are managed with the planting of adult trout. These lakes are typically dominated by relatively complex fish communities. In an effort to provide a satisfactory fishery with a reasonable amount of angler use, this group offers the least potential for adult trout management. The primary limiting factor is the size of these waters. A few waters in this group can absorb a large portion of hatchery production, even at modest stocking rates. Angler surveys have documented low angler use on these waters. For example, angler effort from an angler survey conducted on Lake Carey during the spring of 1989 was recorded at 21 hours/acre (Greene and Weber 1993b). Similarly, angler effort was recorded at 21 hours/acre from an angler survey conducted on Harvey's Lake during the spring and summer of 2002.

To meet the criteria established for adult trout stocking, Class 5 lakes should be capable of supporting trout on a year-round basis. Two-story potential should be provided where a minimum of 1.0 meter of the water column maintains water temperatures less than or equal to 21C (70F) and 5 mg/l of dissolved oxygen throughout the late spring and summer. These criteria are based on

previous research conducted on trout survival in lakes. For example, the maximum weekly average temperature for growth and the short-term maximum for survival of adult rainbow trout during summer months is 19C (66F) and 24C (75F), respectively (U.S. Environmental Protection Agency 1976). Work on rainbow trout depth distribution in California reservoirs found fish to be near the surface when water temperatures were below 21C (70F), but moved downward when the surface temperatures exceeded 21C and concentrated at a temperature range between 16C (60F) and 21C (McAfee 1966). In Minnesota waters, rainbow trout have survived summer conditions with as little as two feet of oxygenated water and temperatures up to 21C with no detectable losses (Johnson 1978).

To qualify for adult trout stocking Class 5 lakes should also meet some access requirements. These include the provision of public boat launching facilities, developed public parking areas, and shoreline angler access. Class 5 lakes without suitable thermal and chemical characteristics should be managed for species other than trout.

Adult trout stocking offers the opportunity to add diversity to the angling experience on Class 5 lakes. Trout planted may provide for an immediate fishery, however, with the two-story potential of these waters, some fish will be expected to survive to provide a trophy element on these waters. Class 5 lakes that demonstrate good potential to provide a trophy fishery may be considered for special regulations management to enhance the trophy fishery.

Goal. To enhance angling diversity and provide recreational trout angling opportunities on Class 5 lakes (greater than 81 hectares or greater than 200 acres) through the planting of adult trout.

Objectives. The trout fishery is dependent upon the stocking of adult trout. Objectives for Class 5 lakes are as follows:

1. To provide an amount of annual angler use greater than or equal to 35 angler hours/acre.
2. To provide an amount of angler use equivalent to one angler trip generated per catchable trout stocked.

Allocation Strategy

For Class 5 lakes allocation strategies have been developed for waters managed under either statewide trout angling regulations or a special trout angling regulations option.

Statewide Regulations. Class 5 lakes that qualify for adult trout stocking under Commonwealth Inland regulations will receive one low density spring stocking. The stocking should occur sometime during the early inseason period (mid-late April). This strategy will avoid a period of closure, which would limit angling opportunity for other fish species. Under this option, catchable trout stocking will be conducted at a low rate (maximum annual allocation of 4 trout/acre) and the total allocation should not exceed the hauling capacity of one distribution unit.

Special Regulations. Class 5 lakes that are managed under special regulations (reduced creel limits and elevated minimum size limits) may be stocked during the preseason, inseason and/or fall distribution periods. This strategy will focus on the provision of a year-round season, with only a short period of closure (April 1 - opening day) to avoid limiting angling opportunity directed toward the multi-species fishery for an extended period of time. Under this option, adult trout stocking will be conducted at a low rate (maximum annual allocation of 8 trout/acre) and the maximum stocking frequency should not exceed three plantings.

Criteria. To qualify for adult trout stocking, Class 5 lakes should satisfy the following criteria:

1. The lake should provide the potential for a two-story fishery where a minimum of 1.0 meter of the water column maintains water temperatures less than or equal to 21C and greater than or equal to 5 mg/l of dissolved oxygen throughout late spring and summer.
2. Facilities at the lake should include provisions for: developed public parking areas, public boat launching, and shoreline angler access.
3. The adult trout option may apply to lakes that range in size from greater than 81 hectares (200 acres) to and including 516.2 hectares (1,275 acres).

Results from evaluations conducted on Adult Trout Stocked Lakes

A total of fifteen trout stocked lakes were examined via angler surveys during a seven- week period in the spring during the 2000 and 2001 seasons. Angler use on these waters averaged 592 hours/acre (range 116.3 – 1,098.6 hours/acre), trips per trout stocked averaged 0.68 trips/trout (range 0.41 – 1.1 trips/trout), and catch rates averaged 0.9/hour (range 0.41 – 2.11/hour). An extended survey (April through August) was conducted on one large two-story lake (Harvey's Lake) in 2002. Angler use on this water was recorded at 21 hours/acre, with 0.99 trips/trout, and a catch rate of 0.18/hour.

Based on the results from the angler use and harvest evaluations stocking rates and frequencies have been adjusted to provide for more efficient utilization of hatchery trout. As outlined in the strategic plan, stocking efforts on lakes should be concentrated on those waters that receive better angler use and should be reduced or eliminated on lakes that receive lower angler use. By 2014, angler surveys should be conducted to provide a statewide assessment of angler use, catch, angler opinions, and an economic contribution of trout angling on trout stocked lakes.

Management Options: Special Case Subprogram

The purpose of this subprogram is to enable Area Fisheries Managers to increase the diversity of the angling experience. Management options include: Fall-Winter, Early Season Trout-Stocked Waters, and fingerling trout.

Fall-Winter Stocking Program

Rationale. Under the current regular/extended season strategy for approved trout waters, angling opportunity is available year around except for the period between March 1 and the opening day of trout season. The peak fishing period for Pennsylvania anglers seeking trout occurs in the spring. Fall and winter trout fishing is popular within some segments of the angling public. However, it does not generate the same level of angler use that occurs during the spring. For example, spring angler use averaged 592 hours/acre over a cross section of 15 trout stocked lakes examined via angler surveys between 2000 and 2001. In contrast, fall/winter angler use averaged

only 46 hours/acre on three of these trout stocked lakes sampled in 2001 and 2002. Stocking adult trout during the fall and winter adds variety to the Commission's trout management program by providing more year-round angling opportunity. Due to the fact that the fall-winter program does not stimulate the same intensity of angling pressure as compared with the spring program, stocking will be maintained at lower rates and program success will be defined at a reasonably acceptable level.

For the winter period, ice fishermen will be the primary beneficiary, but this option is by no means limited to ice fishing. Ice formation to a suitable depth that permits recreational activity has not been nor should it be a criteria for this option. Since the first priority for allocating adult trout will continue to be spring stocking, operational guidelines are necessary so that the fall-winter option does not exceed its intended purpose.

Goal. To provide recreational trout angling opportunities on select trout stocked lakes during the fall and/or winter through the planting of adult trout.

Objectives. The fishery is largely dependent upon the provision of fall and/or winter stockings. Objectives for waters included in the Fall-Winter program are as follows:

1. To provide an amount of angler use greater than or equal to 75 angler hours/acre during the fall and winter (October through December).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Criteria

1. Plant adult trout at relatively low stocking rates during the fall or winter. Frequency will be designated as fall or winter. One October stocking will constitute the fall option. One planting during either November or December will constitute the winter option. Considering rising distribution costs and the fact that angler use is typically much lower during the fall and winter periods as compared with spring, the practice of stocking some lakes during both the fall and winter periods was discontinued in 2009. Lakes designated for stocking during the fall/winter period will receive one plant. This stocking will occur during either the fall (October) or winter (November or December) stocking period.

2. Primary categories for fall/winter stocking will be Class 2 and 3 lakes developed for public use with public maintained road access throughout the fall and winter. Class 1 lakes (greater than 2.4 hectares or 6 acres) and Class 4 lakes may be considered if the primary categories are not represented within the sub-sub basin or are unsuitable for trout stocking due to biological, chemical, or social factors. Class 5 lakes may be considered for the fall option providing that they are managed under a special regulations option.
3. Access, projected use, need and the status of the fishery will be used to evaluate the potential of new candidates for the program. As a general rule, no more than two lakes should be stocked under this option in urban or suburban sub-sub basins, and no more than one in rural sub-sub basins.
4. The stocking rates for fall and winter plantings to individual waters will be specified by the Area Fisheries Manager. Trout stocked during the fall/winter period will be included as part of a waters total annual allocation, which will not exceed the stocking rate determined by classification according to program guidelines.
5. A minimum plant size of 300 adult trout will be necessary to constitute an individual stocking.

Results from evaluations conducted on Fall/Winter Stocked Waters

Three lakes (North Park Lake, George B. Stevenson Reservoir, and Harvey's Lake) were examined via angler survey during the fall and winter periods in 2001 and 2002. Angler use on these waters averaged 46 hours/acre (range 14.57 – 85.96 hours/acre), trips per trout stocked averaged 1.04 trips/trout (range 0.84 – 1.43 trips/trout), and catch rate averaged 0.6/hour (range 0.31 – 0.80/hour).

As outlined in the strategic plan, the cost-benefit of the fall and winter trout-stocking program should be evaluated. Adjustments should be made to reduce or eliminate fall and winter stockings on lakes where stocking is not cost effective at this time of year.

Early Season Trout-Stocked Waters Program

Rationale. One of the major objectives resulting from the PFBC planning efforts for The Future of Fishing and Boating in Pennsylvania (1994) was to increase the overall number of angling

trips (PFBC 1994). Part of this strategy included increasing the amount of angler trips on lakes and reservoirs where additional angling pressure can be generated without harm to the resource or landowner.

Beginning with the 1995 season, a strategy was developed to extend trout angling opportunities through the month of March on a select group of adult trout stocked lakes and two tailwater areas. Under this option, 30% of the preseason allocation is stocked during the late winter (January or February). During the month of March, angling season remains open under extended season regulations, which permit the harvest of three-trout/day. The season closes at midnight March 31 and the remainder of the preseason allocation (70%) is stocked between April 1 and opening day. This strategy serves to provide one month of additional angling opportunity and to maintain the traditional opening day of season. The opening day of trout season continues to be a popular social tradition with Pennsylvania trout anglers, as according to the majority (72%) of the respondents to the 1991 Trout Angler Telephone Survey, opening day was considered to be an important part of their overall trout angling experience (Hummon 1992). Similarly, results from the 2008 Pennsylvania Trout Fishing Survey indicated that the majority (74%) of anglers interviewed believed it was important to have an opening day of trout season (Duda et al. 2008).

Although trout fishing is popular within some segments of the angling public during winter, it does not generate the same level of angler use that follows spring stockings. For example, spring angler use averaged 592 hours/acre over a cross section of 15 trout stocked lakes examined via angler surveys in 2000 and 2001. In contrast, winter angler use averaged only 111 hours/acre on twelve of these trout stocked lakes surveyed in February and March of 2000 and 2001. Due to the fact that the winter program does not stimulate the same intensity of angling pressure as the spring program, stocking is maintained at lower rates and program success is defined based on more moderate catch and use rates. This program is not intended for every lake that is planted with adult trout during the spring. The intent is to provide regional coverage for anglers seeking extended trout angling opportunities during the month of March.

Goal. To provide recreational trout angling opportunities from January through March on select lakes and two tailwater sections, through the planting of adult trout.

Objectives. The fishery is largely dependent upon the provision of a late winter stocking. Objectives for waters included in the Early Season Trout-Stocked Waters program are as follows:

1. To provide an amount of angler use greater than or equal to 125 angler hours/acre during the late winter period (January – March).
2. To provide an amount of angler use equivalent to one angler trip generated per trout stocked.

Criteria

1. Plant adult trout at relatively low stocking rates during late winter. One planting in either January or February constitutes the late winter option.
2. The primary categories will be two tailwater areas and Class 2 and 3 lakes developed for public use with well maintained public road access and parking throughout the winter. Class 1 and 4 lakes may be considered for the program providing no other opportunities exist for Class 2 or 3 lakes within the sub-sub basin. Class 1 lakes considered for the program should be at least 2.4 hectares (6.0 acres) in surface area.
3. Trout stocked during the late winter will be included as part of a waters total annual allocation, which will not exceed the stocking rate determined by classification according to program guidelines.
4. A minimum plant size of 300 adult trout will be necessary to constitute an individual stocking.

Results from evaluations conducted on Early Season Trout-Stocked Waters

Twelve lakes were examined via angler survey during the late winter period in 2000 and 2001. Angler use on these waters averaged 111 hours/acre (range 16.88 – 365.13 hours/acre), trips per trout stocked averaged 1.03 trips/trout (range 0.25 – 3.06 trips/trout), and catch rate averaged 0.7/hour (range 0.29 – 1.18/hour).

The advantages of this program include the provision of increased angling opportunities by extending season through the month of March, and allowing the Trout Production system to ship

some trout when hatchery density is at its peak. The disadvantage of this program is that these waters must be stocked between April 1 and opening day to maintain a traditional opening day angling experience. This requires approximately 40 truck trips to stock these waters at a time (early to mid-April) when stocking dates are needed for waters that must be stocked closer to opening day due to water quality problems and concerns with early season stocked trout residency. Prior to the implementation of the Early Season Trout-Stocked Waters program, most of the waters in this program received their preseason stocking in early March. Terminating this program and opening these waters to fishing under a year-round season would eliminate any period of closure, and make more stocking dates available for waters that require stocking closer to opening day.

To examine the concept of terminating the Early Season Trout-Stocked Waters program in favor of a year-round season, angler interviews were conducted during the opening day of regular trout season (April 18, 2009) on seven trout stocked lakes managed under the Early Season Trout-Stocked Waters program. Anglers were asked if they supported or opposed having the lake open to year-round fishing with a catch-and-release period for trout extending from March 1 to the opening day of trout season. Based on a total of 554 angler interviews, 82% of the interviewed anglers supported the concept of opening lakes managed under the Early Season Trout-Stocked Waters program to a year-round season with a catch-and-release period for trout from March 1 to the opening day of trout season (Greene and Weber, 2009). Similarly, the results from the 2008 Pennsylvania Trout Fishing Survey indicated that a majority of trout anglers (66%) agreed that trout stocked lakes with healthy populations of other fish species should be open to year-round fishing with no closed season (Duda et al. 2008).

As a result of this evaluation it is recommended that the Early Season Trout-Stocked Waters program should be terminated. Waters currently managed under the Early Season Trout-Stocked Waters program that support a multispecies fishery should be open to year-round angling. Waters included in this program that do not support a multispecies fishery should be managed as Approved Trout Waters under Commonwealth Inland Waters angling regulations.

Fingerling Trout in Lakes

Rationale. The principal goals of trout management in Pennsylvania lakes and reservoirs are to supplement an existing warmwater/coolwater fishery, and thereby enhance variety and yield, or to substitute trout as the primary species where warmwater/coolwater fishes do not presently sustain a desirable sport fishery. The use of fingerling trout stockings to maintain a fishery in two-story lakes offers a number of advantages. The substitution of a fast-growing trout species that feeds at a lower trophic level than warmwater and coolwater fishes usually results in fish of a higher quality in the creel. Other important factors are a greater food base than in lotic habitat, a year-round growing season, cost-effectiveness, and the ability to maintain trout fishing opportunities in more waters. Depending on the characteristics of the lake, brook trout, brown trout and rainbow trout may be managed singly or in combination.

Habitat Considerations. The most desirable situations are those lakes or reservoirs in which the temperature and dissolved oxygen characteristics are compatible with the physiological requirements for salmonids on a year-round basis. For management purposes, at least one meter of water column with temperatures 21C or lower and 5 mg/l or greater dissolved oxygen throughout summer is considered necessary to satisfy the maintenance of suitable trout habitat on a year-round basis.

High water temperatures may be viewed as unsuitable for fingerling management even though dissolved oxygen criteria are satisfied. The important factor to consider in this situation is the duration of high temperatures and access to deeper, cooler waters. Trout can survive for one to two days at 27C (80F), and have been observed to survive for two weeks at temperatures of 23C (73F) (Eipper 1964; Eipper and Regier 1962). High daytime temperatures may be offset by night time cooling.

Species Characteristics

1. Brook trout: Stocked as fall fingerlings, brook trout may furnish a fishery the following spring and early summer. Unless harvest is low, angling quality usually declines the first summer after stocking in smaller lakes. Brook trout are best suited for small, spring-fed

lakes and ponds, which have been reclaimed to remove all competitive fish species. In larger lakes with depressed pH and low fertility, brook trout may provide the only opportunity to provide a fishery. To date, the use of fingerling brook trout plantings in Pennsylvania has not led to the provision of a consistent and dependable sport fishery.

2. Rainbow trout: Rainbow trout usually exhibit higher survival to desirable size, support a fishery of longer duration, and provide more fish of larger size in the second and third year after stocking than brook trout. Rainbow trout are adaptable to a wide variety of conditions and efficiently use available forage for excellent growth.
3. Brown trout: The ability of brown trout to compete successfully with warmwater and coolwater fishes is an advantage over brook or rainbow trout. However, this species is considered a serious competitor of lake trout and brook trout. Brown trout do not generally furnish the high returns of either brook or rainbow trout, but do have a greater survival to larger size. Therefore, this species provides the best choice to provide a long-term fishery and to enhance the potential to manage for a trophy component.

Stocking Considerations. Water quality characteristics, the abundance and composition of the warmwater/coolwater fish community, lake productivity, mortality, growth potential, size, and time of year are important factors to consider in choosing the species, size and time of year to stock. These factors should be addressed on a case-by-case basis by the Area Fisheries Manager.

Trout less than 5 cm (2 inches) generally will not provide good survival unless the lake has been reclaimed and all predators removed. In lakes where competition or predation from other species is a serious consideration, best results are obtained with fall fingerlings of 12.5 (5 inches) to 15.0 cm (6 inches). Depending upon availability, larger plantings of smaller fish may provide similar results.

Generally, the best time of year for stocking is between April and September. This period approximately corresponds to the best period for growth. At present, the hatchery production system is requested to provide approximately 1.1 million spring fingerling trout 5-10 cm (2-4 inches) for distribution on an annual basis. In general, the use of the smaller spring fingerlings will require larger numbers of trout to produce similar results as those from plantings using fall fingerlings.

Goal. To provide recreational trout angling opportunities through the planting of fingerling trout in lakes capable of supporting trout on a year-round basis.

Objectives. The trout fishery is dependent upon stocking fingerling trout. Objectives for fingerling stocking in lakes are as follows:

1. To provide a total catch (by weight) that exceeds the original total weight of the fingerling planting.
2. A total of 25% of the original number of fingerling trout planted should survive to a size of at least 10 inches.
3. Trout populations resulting from fingerling stockings should provide catch rates greater than or equal to 0.5 trout/hr.
4. Fingerling trout stockings should maintain trout populations comprised of two or more age groups of Age I and older trout.

Criteria

1. The lake should provide the potential for a two-story fishery where a minimum of 1.0 meter of the water column maintains a temperature less than or equal to 21C with at least 5 mg/l of dissolved oxygen throughout late spring and summer.
2. The number of fingerling trout stocked will depend upon a combination of management choices and availability and will be determined by the Area Fisheries Manager. Generally, 2-4 inch spring fingerling trout will be utilized for stocking from April through June.

As outlined in the strategic plan, a sampling strategy will be developed to evaluate all fingerling trout stocking efforts and provide recommendations on the continuation and possible expansion, or reduction of these programs.

Guidelines for Determining Stocking Rates

Unless long-term studies of stocking density, growth, survivorship, and yield are undertaken on individual waters, specific guidelines can, at best, be considered approximations. This should not

be viewed as a drawback; the weight harvested will remain about the same under a wide range of stocking rates. Poor growth or low survivorship will be important indicators to either reduce the stocking rate or terminate the program. Alternately, good growth and condition could be the basis to increase the stocking rate.

The morphoedaphic index (MEI) is a gross indicator of fish production and biomass in north-temperate lakes. It changes in value only with major environmental changes. As a simple index, it offers the best management application until more refined stocking rates can be formulated. The following guidelines are adapted or derived from Engstrom-Heg (1979), Ryder (1965), Ryder et al. (1974), and Ryder and Henderson (1975).

1. To compute the MEI:

$$\text{MEI} = \text{Total Dissolved Solids/Mean Depth.}$$

Total dissolved solids (TDS mg/l) can be determined from specific conductance (SC) adjusted to 77F according to the formula: $\text{TDS} = 0.72 (\text{SC}) + 7$. Total dissolved solids may also be estimated from total alkalinity (A) as follows: $\text{TDS} = 1.56A + 30$. Mean depth is expressed as feet.

2. Determine yield (pounds/acre/year):

$$\text{Yield} = 2 \sqrt{\text{MEI}}$$

3. Adjust Yield to Standing Stock by multiplying Yield with one of the following constants (K_b):

$K_b = 3.5$ - Oligotrophic, absence of warmwater/coolwater predators, MEI less than or equal to 1.5

$K_b = 2.0$ - Mesotrophic, two-story, MEI greater than 1.5

$K_b = 1.0$ - Poor growth and condition are symptoms when $K_b = 1.0$

4. Determine the stocking rate (number/acre/year) as the quotient of standing stock divided by projected survivorship.

Length of Fish Stocked		Survival
cm	inches	(S)
less than 7.5	less than 3	0.10
7.5-10.0	3-4	0.15
10.0-15.0	4-6	0.20

5. This approach should be used as a guideline in combination with best professional judgment. Whether a stocking density is too high or low should be evident by the length, weight, condition, and abundance of individual trout collected during a lake examination.

2.3.5 TOXIC AND HAZARDOUS CONTAMINANTS - SPECIAL RESTRICTIONS ON FISHERIES IN POLLUTED ZONES

Rationale. This option is intended for those waters that have been identified to contain toxic and hazardous contaminants that approach or exceed the public health protection levels established by the Pennsylvania Department of Health. Contaminants that are responsible for fish consumption advisories in some waters of Pennsylvania include kepone, mirex, PCBs, chlordane, and mercury.

Objective. To insure the health and welfare of the angling public on those waters where competent specialists from agencies with public health responsibility and authority have determined that contaminants in fish flesh pose a risk to the health of those who consume them.

Guidelines

1. For contaminants that exceed public health protection levels, a public news release will be prepared by the Interagency Fish Consumption Technical Workgroup and coordinated with the Bureau of Policy Planning and Communication for release just prior to the opening of the statewide trout season. Recommendations will be made to DEP to establish an annual monitoring plan.
2. For contaminants that exceed public health protection levels, stocking of adult trout will be terminated within the watershed, or a portion thereof, as circumstances reasonably dictate. Existing season, size and creel limits will be replaced by regulations that are consistent with consumption advisories. All fish caught will be immediately returned to the water when levels meet or exceed those established for the Do Not Eat advisory. The occurrence and distribution of wild trout may be a factor in establishing the upstream and downstream limits of this regulation. A listing of waters, or portions thereof, under Consumption Advisories will be updated and listed annually as a section within the

Pennsylvania Summary of Fishing Regulations and Laws. Recommendations will be made to DEP to establish an annual monitoring plan and institute corrective action.

3.0 Trout Production

The management of trout fisheries in Pennsylvania requires a coordinated stocking effort to distribute hatchery trout in the numbers and species and on the schedules developed by Fisheries Management for sub-subprograms involving hatchery-supported trout fisheries. Eight hatcheries are presently involved in the production of adult trout. These are Bellefonte, Benner Spring, Corry, Huntsdale, Oswayo, Pleasant Gap, Reynoldsdale, and Tylersville.

The current annual production of adult trout for the preseason, spring inseason, fall, and winter distribution seasons is approximately 3.2 million trout. By species, annual adult trout production is composed of approximately 16% brook trout, 27% brown trout, and 57% rainbow trout. These fish are produced at Pennsylvania Fish and Boat Commission hatcheries and at the Lamar hatchery through a cooperative agreement with the United States Fish & Wildlife Service.

Trout Hatchery Program

Objectives

1. To produce approximately 3.2 million adult trout annually for distribution in the numbers and on the schedules determined by management according to classification by resource category.
2. To produce approximately 1.1 million fingerling trout annually for distribution to support the maintenance of put-and-grow trout fisheries.

Tactical Approach

Develop operational guidelines and trout production goals for each hatchery. These guidelines and goals are to be designed to meet fishery management requirements for "Hatchery Trout Subprogram" for streams and lakes.

Assignment and Allocation

The Fisheries Management Division (Coldwater Unit), the Division of Fish Production (Southern Hatcheries Fish Production Manager), Stocking Coordinator, and the Information Systems Applications and Development Support staff has cooperated to develop an electronic data processing system to make allocation rapid, consistent, and geared to fishery management sub-subprograms. Stocking requests and special stocking instructions are provided by Fisheries Management, the assignment of water areas to hatcheries and specific water-by-water stocking instructions are provided by the Division of Fish Production.

Cooperative Nurseries

This program distributes approximately 1.2 million fingerling trout and technical assistance to sportsmen sponsored and operated fish hatcheries. The Cooperative Nursery program is intended to involve sportsmen directly in providing fish to enhance the Commonwealth's trout fishing program. Fingerling trout provided by the Pennsylvania Fish and Boat Commission hatcheries are reared to adult size by the sportsmen's groups and stocked in Pennsylvania Fish and Boat Commission approved trout waters and other waters open to public angling with acceptable water quality that do not meet the requirements for the Commission's adult trout stocking program. This program should be in accordance with the PFBC adult trout stocking program and adhere to those stipulations where stocking is prohibited in waters designated as Class A Wild Trout Waters or Wilderness Trout Streams. The Cooperative Nursery program should foster a sense of cooperation and goodwill between the Commission and sportsmen's groups and help to provide a mutual understanding of the Commission's programs.

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Appendix 1. Summary of allocation and distribution options utilized for stream resource categories from 1983-1993

Biomass	Recreational Use Potential	Width	Population	Stocking Intensity (trout/acre/year)
High Yield Membership				
C	High	2 or 3	U, S or R	425
D	High	2 or 3	U, S or R	425
Optimum Yield Membership				
B	High	2 or 3	U, S or R	275
	Good	2 or 3	U	400
			S	300
			R	200
High	4	U, S or R	150	
C	Good	2 or 3	U	400
			S	300
			R	200
	High	4	U, S or R	150
D	Good	2 or 3	U	400
			S	300
			R	200
	High	4	U, S or R	150
Low Yield Membership				
B	Good	4	U, S or R	75
	Low	2, 3 or 4	U, S or R	75
C	Good	4	U, S or R	75
	Low	2, 3 or 4	U, S or R	75
D	Good	4	U, S or R	75
	Low	2, 3 or 4	U, S or R	75

Width	Recreational Use Potential	Population	Stocking Intensity (trout/acre/year)
River Membership			
1S	High	U	185
		S	165
		R	150
	Good	U	115
		S	90
		R	80
Low	U, S or R	50	
1L	High	U	125
		S	100
		R	85
	Good	U	75
		S	70
		R	55
Low	U, S or R	50	