Pennsylvania Fish and Boat Commission

Hatchery Cost Savings Work Group Report

August 31, 2011

Pennsylvania Fish and Boat Commission

Governor's Office of Administration
Office of Strategic Services

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Introduction

Taking into consideration a recommendation made in a September 2010 performance report of the Pennsylvania Fish and Boat Commission (PFBC) by the Legislative Budget and Finance Committee (LB&FC), the PFBC incorporated a goal into its strategic plan of identifying cost savings strategies for hatchery operations by September 2011. The LB&FC also recommended that the results be formally presented to the House and Senate Game and Fisheries Committees.

A PFBC work group examined cost savings opportunities through assessing hatchery consolidation opportunities, varying fish production options, and various cost savings and revenue generating opportunities. The assessment was guided by the following operating assumptions that were confirmed with the PFBC Executive Director.

1. Current fish production practices are expected to be assessed by the workgroup with alternatives presented as options.
2. Production options cannot result in a net loss in the number of stocked trout.
3. Cost savings ideas can impact angler services.
4. NPDES effluent permit requirements must be met.

Process

In September 2010, the PFBC formed an 11-member work group with representatives from the Bureau of Fisheries, the Bureau of Law Enforcement, and the Bureau of Engineering and Property Services. Two staff from the Office of Administration, Office of Strategic Services (OSS), served as staff to the work group and facilitated the process.

A total of eight meetings was held between September 2010 and July 2011 to identify, research, and develop cost savings strategies. This work also included examining fiscal trends within the Division of Fish Production over the past five years.

Work group members reached out to other PFBC staff when necessary to gather needed information and perspectives. Hatchery production options, both consolidation and varying production, were examined in detail from the perspective of trout and warm/cool water species. Through a brainstorming exercise, the work group identified 41 possible cost savings and revenue generating ideas for consideration. Of the 13 priority topics identified for development by work group members, each one was examined for its need, current cost, potential barriers, potential savings, angler services impact, evaluation method for follow-up, internal and external partners for implementation, and an initial work plan and timetable.

Results

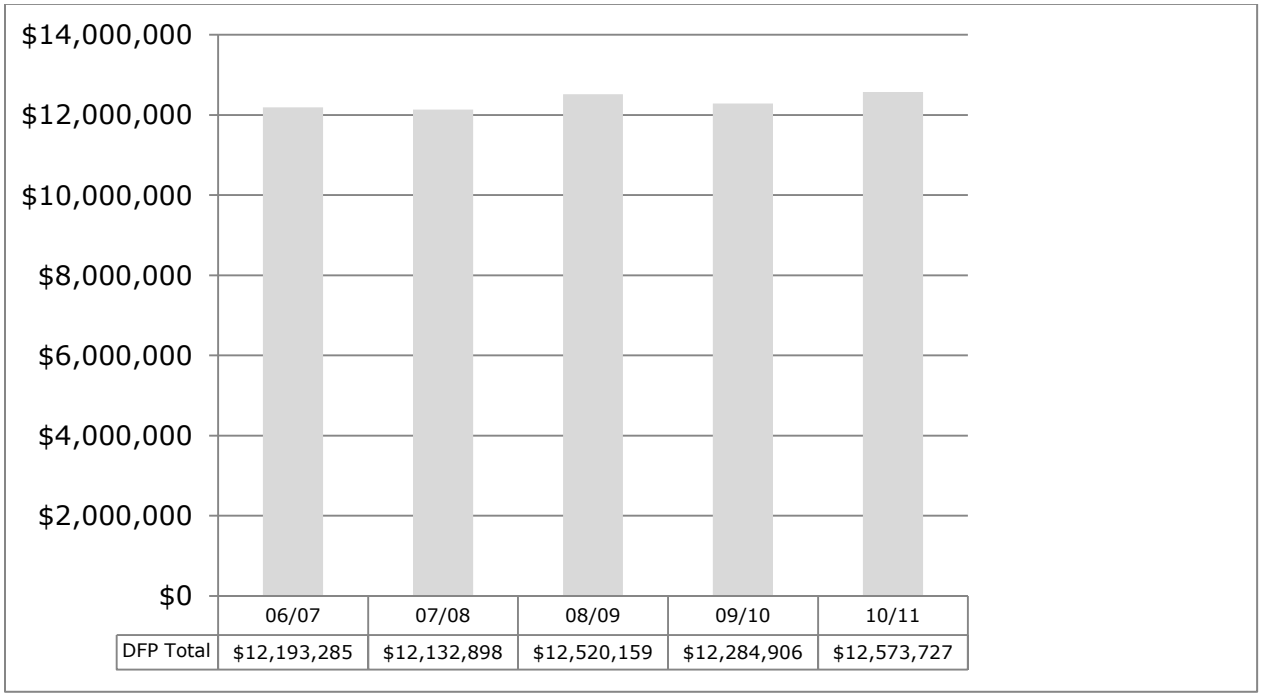
Estimated savings and revenue generated range from $343,000 to $795,000 through implementing options to change fish production, cut costs, and gain revenue. By area, the options assessed by the work group include the following estimated impacts:

Reducing costs by varying production: $88,000 to $480,000
Other cost savings: $75,000 to $130,000
Increased revenue: $180,000 to $185,000
Implementation costs: $55,000

Division of Fish Production Trends

Over the past five fiscal years, the PFBC has been holding the line on hatchery costs. The work group gathered fiscal, personnel, and comparative cost information and noted the following observations:

1. DFP expenditures have been stable the past five fiscal years.



	06/07	07/08	08/09	09/10	10/11
DFP Total	$12,193,285	$12,132,898	$12,520,159	$12,284,906	$12,573,727

Note: Based on expenditures for personnel and operating expenses. Fixed assets and grants are excluded.

2. Staff levels within fish production, particularly Fish Culturists and Maintenance Repairmen, have dropped by 32 positions (20%) since 1990 (Figure 6).

3. The reduction of hatchery staff since 2000 has resulted in current (FY 10-11) personnel costs being lower than FY 06-07 (Figures 6 and 7).
4. Improved feed specifications and bid practices have allowed DFP to keep costs relatively level for the past five fiscal years (Figure 8).
5. Trout distribution costs have been stable the past five fiscal years (Figure 9).
6. PFBC costs to raise trout are comparable to private industry (Figure 10).

Hatchery Consolidation

Hatchery consolidation was examined within the context of trout and warm/cool water hatcheries to determine the potential to leverage production that could result in the need for fewer hatcheries. Details can be found beginning on pages 25 and 36. The challenges to consolidation include protection of aquatic resources receiving hatchery effluent, effluent treatment technology, the need to fund projects to address effluent issues and production capacity expansions, and increasing the vulnerability to aquatic invasive species pathogens. If fish production goals (size and number of fish) do not change, consolidation would not be feasible without new effluent treatment technology and infrastructure upgrades.

Hatchery consolidation could be accomplished if program changes take place that reduce the size of stocked trout from 11" to 10" without increasing or decreasing the number of adult trout stocked. It's also possible if production could be expanded at the Huntsdale State Fish Hatchery in the old B-series raceways but several obstacles would need to be resolved first and substantial funding would be needed to build new systems. New effluent treatment technologies are being investigated that may allow for increased production at one of the larger facilities but this must be tested on a pilot scale first. Given these three options, reducing the size of stocked adult trout can be implemented with minimal cost compared to the anticipated high cost of infrastructure improvements in the other options.

The work group concludes any hatchery consolidation decisions should wait until the new warm/cool water species plans are implemented, new effluent treatment systems have been evaluated, and/or the Division of Fisheries Management changes the requested size/numbers of stocked trout. When these items are accomplished, a workgroup focused on the new production goals should be formed to decide on the best method to achieve consolidation, reach production goals and minimize costs.

Varying Production

Three options were identified by the work group that would lead to savings. Details of these can be found beginning on pages 31 and 37.

1. Decrease brook trout size at stocking
2. Decrease trout size for all species
3. Decrease trout size but increase the number of trout

The estimated savings realized by the options range from approximately $88,000 to $480,000 depending on the mix of options pursued. Three trout sizes are shown in Table 1 for comparison purposes.

The opportunity for savings by varying the production of warm/cool species is limited. Production costs are low in comparison to trout. Fry are placed in fertilized ponds and harvested in about 45 days or reared in a hatch house until fingerling size. Some minimal savings can be realized by the Division of Fish Management evaluating the need for some of the lower priority species and the effectiveness of the channel catfish and paddlefish programs. Most labor and water use savings would be shifted to another higher priority species program.

Cost Savings and Revenue Generating Options

The work group identified 13 ideas that would either lead to cost savings or generate revenue. Details on the options can be found on page 37 and in the appendices. One idea, pursuing algae abatement options, was dropped because the preferred method, a natural cover using water hyacinth, is a non-native species and not recommended for use by biologists within the Division of Environmental Services. Other species are under evaluation. Another option, reducing cooperative nursery site visits, is not recommended because of the importance of contact with cooperative nursery volunteers and the minimal potential savings of approximately $4,000 a year.

The following are the 11 options being recommended for cost savings and new revenue.

1. Bird predation reduction through netting
2. Improve stocking practices to maximize logistics and adjust for use
    a. Eliminate early season trout stocked waters program and combine fall, winter, and later winter stockings on those waters
    b. Adjust stocking assignments based on PSU Distribution Report (Strategic Route Planning for Fish Stocking) and/or residency concerns
    c. Eliminate fall stockings on some waters with minimal use and remove spring trout stocked waters with extremely low use
3. Establish year-round season for stocked trout
4. Create budget line item for pre-maintenance of hatcheries
5. Maximize put-grow-take production
6. Purchase eggs or fish
7. Reduce Fish Culturist overtime
8. Gain timber revenue from hatchery property
9. Prioritize production by species to guide future reductions in programs
10. Advertise on PFBC stocking trucks
11. Install fish food vending machines at hatcheries

None of the options negatively impact NPDES permits or trout numbers. Improved stocking practices and establishing a year-round season for stocked trout might have a negative or positive impact on the angler's experience. The greatest potential comes from revenue options, with the majority coming from advertising on stocking trucks. Revenue estimates range around

$180,000 to $185,000. For those options where cost savings could be estimated, total savings of between $75,000 and $130,000 can be realized.

Implementation costs are estimated for the budget line item for pre-maintenance expenses ($50,000) and a pilot study to determine if purchasing eggs or fish would lead to savings ($5,000). Bird netting is recommended but only when a cost/benefit analysis shows the feasibility in terms of cost and improved fish culture (fish health and biosecurity).

Next Steps

The most important step in containing the cost of hatchery operations is for the Division of Fisheries Management (DFM) to continue to define the requests for fish to be produced by the Division of Fish Production. DFM requests drive the entire fish production system and provide each hatchery with goals pertaining to fish species, size and numbers. DFM must determine the number of trout and warm/cool water fish needed to create the desired fisheries around the Commonwealth. Stockings that do not produce the desired results should be modified or eliminated.

DFM will be evaluating these alternatives within the current PFBC strategic plan. Species include musky, tiger musky, walleye, catfish, striped bass, hybrid striped bass, and fingerling trout. Species specific management plans designed to improve angling opportunities throughout the Commonwealth while ensuring wise use of hatchery reared fish are well underway. The draft *A Plan for the Management of Pennsylvania's Inland Walleye Fisheries* has been completed and is currently posted on the agency web site and undergoing the public comment with an anticipated completion date of September 30, 2011. Draft species management plans for channel catfish and muskellunge (musky) have been written are in various stages of internal review. The public comment periods for both the channel catfish and muskellunge management plans are scheduled to begin October 1, 2011 with a completion date in early winter 2012. The striped bass management plan is anticipated to be completed by the end of the 2012 calendar year. Once final, Area Fisheries Managers will begin the implementation of these plans and requests for hatchery reared fish will be in accordance with the plans. Evaluation of individual waters will occur over a period of years and changes in the annual request for individual species are expected to vary. The evaluation of the fingering trout program is currently underway with the evaluation of all current fingerling trout waters scheduled to be completed by December, 2014. Additional waters are being evaluated for their ability to support recreational angling opportunities through the use of fingerling trout. Evaluation of these new waters will extend beyond 2014.

Several of the strategies proposed within this report may be accomplished in a relatively short time frame while others will require more long term planning and input by Commissioners and anglers.

Short Term Implementation

Strategies that may be undertaken almost immediately include those that are initiated within the Division of Fish Production.

1. Bird Netting: This will be added to the hatcheries where there is the greatest cost/benefit ratio in order to increase fish survival, decrease feed cost and decrease effluent waste. Additional netting will need to be budgeted.
2. Purchase Eggs/Fish & Maximize Trades: Staff will continue to seek trades with other states for species that are costly for the PFBC to rear. Pilot studies will be initiated on rainbow trout egg and channel catfish fingerling purchases. A cost/benefit analysis will be conducted in conjunction with the pilot studies.
3. Reduce overtime assignments for fish culturists: Hatchery Managers will implement the strategies recommended within Appendix G of this report.
4. Fish feed vending machines: Machines will be purchased and a pilot study initiated at a few of the high visitation hatcheries to determine the degree of revenue generation and visitor reactions.
5. Timber Revenue: A Memorandum of Understanding has been developed with the Pennsylvania Game Commission to allow them to provide a timber management plan for hatchery properties with revenue potential.
6. Continue to refine previous cost savings strategies in respect to personnel, feed, utilities and fish distribution.

Long Term Implementation

1. Stocking Options: As stated above, DFM requests drive fish production operations. DFM should undertake discussions with Commissioners and anglers to determine what changes in stocking options will have the greatest benefit or least negative impact on angler services. These options include:
    - Eliminate early season trout stocked waters program and combine fall, winter, and later winter stockings on those waters
    - Initiate feasible adjustments to stocking assignments based on PSU Distribution Report and/or stocked trout residency concerns
    - Eliminate fall stockings on some waters with minimal use and remove spring trout stocked waters with extremely low use
2. Maximize Put-Grow-Take: DFM will continue to evaluate fingerling trout stockings in relation to cost and providing a successful fishery.
3. Program Prioritization: As DFM refines the requests for stocked fish, DFP will eliminate lower priority programs that are not cost effective or do not provide sufficient services to anglers.
4. Advertising on hatchery trucks: DFP will work with communications staff to develop bids for advertising services for the sides of stocking trucks.
5. Trout Production Options: If the PFBC determines trout production should decrease, public meetings should be held to determine if smaller trout or less trout would be acceptable to anglers. Several variations of reducing trout size or varying numbers exist and a comprehensive cost analysis needs to be undertaken to determine the most cost effective way

to institute a major program change. If production changes are determined, a workgroup should be formed to determine hatchery consolidation strategies.

Introduction

Background

The Legislative Budget and Finance Committee (LB&FC), in its September 2010 report, *A Performance Audit of the Pennsylvania Fish and Boat Commission*, recommended that the Pennsylvania Fish and Boat Commission (PFBC) create a broad-based working-group with the primary responsibility to identify strategies for promoting cost savings (including hatchery consolidation strategies) in the operation of the state fish hatcheries with the least adverse effects on services to the angling public. The results of the working group's efforts are to be released via a written report within one year and formally presented to the House and Senate Game and Fisheries Committees. The LB&FC also suggested that the PFBC may want to engage the services of the Office of Strategic Services (OSS), to assist with this effort.

The PFBC, taking into consideration the recommendation of the LB&FC, incorporated the hatchery cost study into its *Strategic Plan for July 2010 – June 2015*. Strategic Plan goal 6D is:

> By September 2011, conduct a full hatchery review to identify strategies for promoting cost savings in operation of the state fish hatcheries with the least adverse effects on services to the angling public.

Workgroup Membership

The Division of Fish Production (DFP) formed a workgroup with representation across PFBC and asked the Office of Strategic Services (OSS) for assistance providing analysis, facilitating the workgroup sessions, and assisting with the preparation of work products including an implementation plan.

A wide ranging team from within the PFBC was assembled for this effort, including representation from the Bureaus' of Fisheries, Engineering and Property Services, and Law Enforcement.

1. Director of Fish Production chaired the effort (Brian Wisner)
2. Director of the Bureau of Fisheries (Leroy Young)
3. Director of the Bureau of Engineering and Property Services (Dan Leonard)
4. North Central Region Law Enforcement Director (Gerry Barton)
5. Northern Hatcheries Production Manager (Larry Hines)
6. Southern Hatcheries Production Manager (Tom Cochran)
7. Anadromous Fish Restoration Unit Leader (Mike Hendricks)
8. Corry/Union City State Fish Hatchery Manager (Dan Donato)
9. Fisheries Administrative Officer (Liz Ebeling)
10. Fisheries Management Chief (Dave Miko)
11. Engineering Chief (Jack Rokavec)

Workgroup Process

The PFBC was charged by the LB&FC to create a broad-based working group to identify strategies for promoting cost savings (including hatchery consolidation strategies) in the operation of the state fish hatcheries with the least adverse effects on services to the angling public. To meet this requirement, a total of eight meetings were held that addressed the issues in three phases – idea identification and development, idea refinement, and final report preparation. Figure 1 outlines the work conducted t each meeting. After the July 8 meeting, OSS coordinated the efforts to address the report action plan items and complete the draft report.

Initial meetings consisted of brainstorming ideas, voting on priority items to pursue, and assigning lead responsibilities for each area, either cost savings ideas or possible revenue measures. Each area was developed to flesh out key considerations such as potential barriers, potential savings (or revenue) impact, effect on angler services, and implementation considerations. Idea identification and development was completed during meetings held in September, October, and November.

Another key task accomplished during the initial phase was the establishment of operating assumptions to guide the work of the group. A draft was vetted with the Executive Director which yielded the final results:

1. Fish production practices are expected to be assessed by the workgroup with alternatives presented as options.
2. Production options cannot result in a net loss in the number of stocked trout.
3. Cost savings ideas can impact angler services.
4. NPDES permit requirements must be met.

Meetings held during January through May consisted of refining cost savings topics and gathering additional information on hatchery operations for the final report. One cost savings idea, algae abatement, was dropped from consideration. Due to concerns with the proposed use of water hyacinth, a non-native species, other species will be evaluated. The Executive Director was briefed on the work group's progress. The Director of the Division of Fish Production briefed the PFBC Fisheries Committee on the progress of the work group on June 22, 2011.

The May meeting represented the transition to the final report preparation phase through completion in August. Assignments were made and OSS staff coordinated the assembly of the information into a draft report reviewed at the July meeting.

Figure 1: Hatchery Cost Savings Workgroup Meeting Summary

Meeting Date	Meeting Content
September 23, 2010	Kick off meeting – operating assumptions considered, background on hatchery topics (personnel, budget, vehicles, trout cost study, feed, distribution study, stocking procedures, hatchery maintenance, effluent issues, recent cost savings measures), initial brainstorming.
October 27, 2010	Refinement – revisited operating assumptions, refinement of brainstorming list (clarification, potential additions, combination opportunities), voting on priorities (11

Meeting Date	Meeting Content
	topics), the addition of low vote recipient topics with quick implementation potential (3 topics), and the assignment of topics to workgroup members.
November 22, 2010	Discussion on topics – feedback from Executive Director on operating assumptions, updates on leads from initial gathering of information on topics, presentation of tracking method for topics.
January 13, 2011	Review of initial topic drafts – topic drafts were presented and review, to do list developed for each topic.
February 24, 2011	Sub-group meeting on varying fish production.
March 17, 2011	Topic review and adjustments – breaking stocking options into four individual topics, gas/oil/timber topic to just timber (since they are being addressed by a separate PFBC initiative), and project timeline planning.
May 26, 2011	Final topic review and final report assignments – final review of each topic, discussion of possible smaller fish option, review of final report outline, assignment of final report sections.
July 8, 2011	Review of draft report – review of draft report, identification of final information needs, and action plan for report finalization.

Division of Fish Production

Under the Division of Fish Production, the PFBC operates 14 state fish hatcheries which culture over 5 million trout (adult and fingerlings) and 40 million warm/cool water fish for stocking into Pennsylvania waters in accord with its mandate to propagate and distribute fish (30 Pa. C.S. §2301). The earliest hatchery operation dates to the 1870's at Marietta, which was known as the Eastern Station. In the 1880's the Eastern Station was moved to a location in Emmaus and Corry began operations. The evolution of hatcheries continued from the early 1900's through the establishment of the Tylersville State Fish Hatchery in 1984, through a lease from the U.S. Fish and Wildlife Service. The PFBC took ownership of Tylersville in 2007. The most recent hatchery to cease production was Big Spring in 2001, due to pollution concerns.

The division was created in 2005 as part of a re-organization of the Fisheries Bureau. Reasons for creating this division were to consolidate all fish production related areas into one division to share expertise and provide a common direction in relation to staffing, budgeting, production, permits and setting priorities. This new structure consists of a Director, two Hatchery Regions and Fish Production Services (FPS). The two hatchery regions (Northern and Southern) are each led by a Regional Fish Production Manager who oversees 6-7 hatcheries, personnel, budgets and production goals. Fish Production Services is managed by a Chief who manages the Water Quality, Fish Health, Aquaculture Technology, Anadromous Fish Restoration and Cooperative Nursery Units. The annual budget for the DFP is approximately $12 million and at full staffing consists of 150 employees (full time and wage) who produce and stock approximately 45 million fish of up to 25 species annually for the Commonwealth of Pennsylvania.

Historically, the Division of Fisheries Management (DFM) makes requests to the DFP based on what the hatcheries are capable of rearing. This is especially true for trout species. When hatcheries have lowered their production (mostly due to hatchery effluent and stream protection issues), the DFM requests less trout and divides them into waters according to the management criteria. Many of the warm/cool water species requests are also based on the availability of the hatcheries to culture the numbers in the ponds and hatch houses. Requests for fish are the driving force that determines the production at the hatcheries. The DFM has been working on

species management plans that contain a focus on monitoring the success of stocking programs. As DFM and DFP work together to improve stocking and fisheries, emphasis will be placed on stocking fish with high success rates that improve fisheries and meet the goals of the Area Fisheries Managers.

The Pennsylvania Fish and Boat Commission rears, collects, trades for, and purchases fish to support numerous program goals. Adult trout are reared and stocked to create immediate angling opportunities for these coldwater fish. These fish are largely placed into rivers, streams and lakes during the spring, fall and winter months when water temperatures are conducive to trout survival. The majority of these waters become too warm throughout the summer months to support trout on a year-round basis. Other programmatic needs for hatchery fish include maintenance stockings of warm and cool water fish species that are unable to naturally reproduce in sufficient numbers to provide a high quality fishing experience or to rebuild fish populations following a pollution event or the dewatering and subsequent refilling of a lake. Fingerling fish are typically used for these purposes. Figure 2 lists the 14 hatcheries, the species they raise, and some details about the hatcheries. Finally, there are cooperative nurseries located throughout the Commonwealth that provide a service to Pennsylvania's anglers by raising and stocking additional numbers of fish, primarily adult trout, into waters that are open to public fishing. The PFBC provides these cooperative nurseries with fingerling fish for them to raise and stock on behalf of Pennsylvania's anglers.

Fish Production Services serves the division by providing fish production expertise in specific areas. This is also the research branch for fish production. The Water Quality Unit analyzes samples for the hatchery National Pollution Discharge Elimination Systems (NPDES) effluent permits, tracks permits and applications and corresponds with the Department of Environmental Protection (DEP) on permit issues. The Fish Health Unit performs diagnosis services and recommends treatments for diseased fish. They also track all aquaculture drug use and work with other labs in performing specialized diagnostic services. The Anadromous Fish Restoration Unit concentrates on rearing and stocking American Shad, otolith marking/assessment and hydroelectric dam re-licensing issues as they pertain to migratory fisheries. The Cooperative Nursery Unit provides technical guidance and grant over sight to about 165 cooperative nurseries around the state that are operated by volunteer organizations. These cooperative nurseries stock approximately one million adult trout, 100,000 steelhead smolts and numerous warm/cool species annually for the anglers of Pennsylvania. The Aquaculture Technology Unit performs research for the hatchery system and provides technical guidance to improve efficiency and help the hatcheries meet effluent permit requirements. Recent studies have focused on feed types, egg disinfection techniques and effluent management equipment and efficiency.

Figure 2: PFBC Hatcheries and Species Information

Hatchery	Species	Details
1. Bellefonte	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 570,000 adult trout and 149,000 fingerling trout annually for stocking in Commonwealth waters.
2. Benner Spring	Brook Trout, Brown Trout, Rainbow Trout, Golden Rainbow Trout, and Walleye	• Raises 575,000 adult trout and 157,000 fingerling trout for stocking in Commonwealth waters. • Raises 170,000 fingerling trout for Cooperative Nursery program.

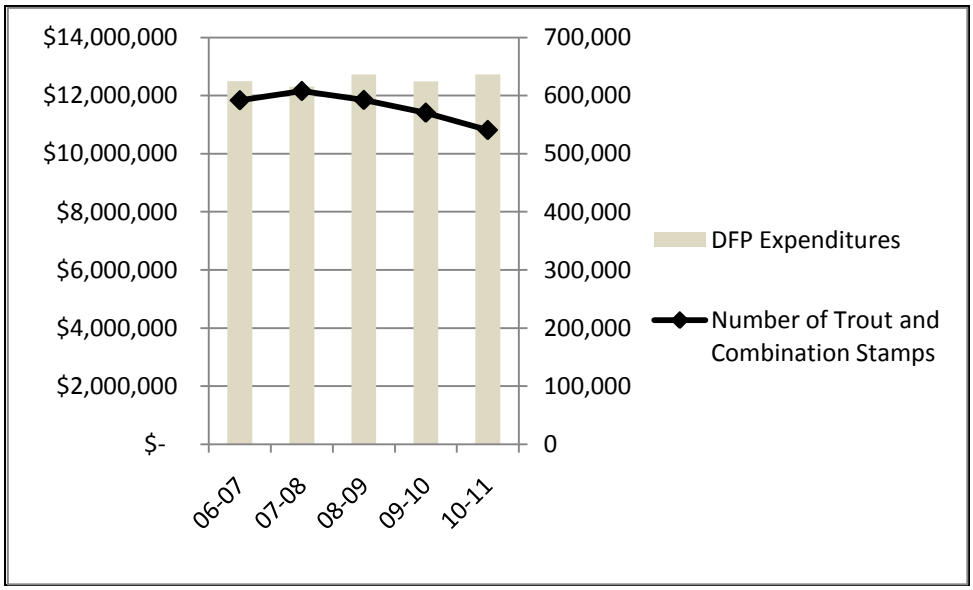
Hatchery	Species	Details
		• Provides golden rainbow trout fingerlings to 6 other hatcheries. • Provides light controlled trout eggs to other hatcheries. • Raises walleye at the Upper Spring Creek facility.
3. Corry	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 325,000 adult trout and 264,000 fingerling trout for stocking in Commonwealth waters. • Raises 61,000 fingerling trout for Cooperative Nursery program.
4. Fairview	Steelhead	• Raises 300,000 steelhead fingerlings. • All collecting, inoculating and spawning of steelhead adults occurs here. • Bio-security concerns involve steelhead spawning which must be done within the Lake Erie watershed and only Fairview has facilities capable of holding and culturing fish.
5. Huntsdale	Brook Trout, Brown Trout, Rainbow Trout, Golden Rainbow Trout and various warm/cool water species depending on need.	• Raises 403,000 adult trout and 140,000 fingerling trout for stocking in Commonwealth waters. • Raises 243,000 fingerling trout for Cooperative Nursery program. • Warm/cool water production currently suspended due to effluent treatment system construction and a need for pond repairs. Historically raised walleye, channel catfish and hybrid striped bass.
6. Linesville	Bluegill, Brown Trout for Lake Erie, Channel Catfish, Largemouth Bass, Musky, Paddlefish, Walleye, Yellow Perch	• Only facility capable of raising brown trout for the Lake Erie program. • Spawns 95% of walleye for PFBC program. • Spawns 85% of musky for PFBC program. • Spawns 100% of channel catfish for PFBC yearling program. • Cultures 100% of paddlefish.
7. Oswayo	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 244,000 adult trout and 18,000 fingerling trout for stocking in Commonwealth waters. • Raises 319,000 fingerling trout for Cooperative Nursery program.
8. Pleasant Gap	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 418,000 adult trout and 195,000 fingerling trout for stocking in Commonwealth waters.
9. Pleasant Mount	Black Crappie, Channel Catfish, Golden Shiner, Lake Trout, Largemouth Bass, Musky, Tiger Musky, Walleye, White Crappie, Yellow Perch	• Only w/c hatchery on eastern side of Pennsylvania. • Spawns late walleye eggs for pond fingerling production. • Cultures 100% of Lake Trout. • Cultures 100% of golden shiner.
10. Reynoldsdale	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 198,000 adult trout and 146,000 fingerling trout for stocking in Commonwealth waters. • Raises 330,000 fingerling trout for Cooperative Nursery program. • Provides light controlled trout eggs to other hatcheries.
11. Tionesta	Steelhead, Musky, Tiger Musky, Walleye	• Raises 700,000 steelhead fingerlings.
12. Tylersville	Brook Trout, Brown Trout, Rainbow Trout, and Golden Rainbow Trout	• Raises 466,000 adult trout for stocking in Commonwealth waters. • Provides light controlled trout eggs to other hatcheries. • Although temporarily suspended in 2011 due to personnel constraints, also raises striped bass at the U.S. Fish and Wildlife Service (USFWS) facility in Lamar.
13. Union City	Channel Catfish, Northern Pike, Tiger Musky, Musky, Walleye	• Spawns 100% of northern pike. • Spawns 100% of tiger musky.
14. Van Dyke	American and Hickory Shad	• Hatches, rears and stocks shad for restoration purposes. Part of the Anadromous Fish Restoration Unit of FPS.

Note: Non-trout species production is highly variable due to wild fish spawning and pond production. Specific numbers are not included in the table.

Fiscal Overview

As shown in Figure 3, the DFP expenditures have been steady between $12.1 million and $12.5 million over the last five fiscal years. While the bars show the expenditures for the Division of Fish Production which cultures both trout and warm/cool water fish, the line shows the number of Trout and Combination Stamp sales. Lake Erie Stamp sales are not included. This time period was chosen because Fiscal Year 06-07 was when the "bigger and better" trout stocking started and production goals shifted from earlier years. Most of the cost containment was from personnel costs but it's important to note that hatchery staff has controlled their costs in other areas, such as fish feed and fish distribution, to show and maintain this type of stability. Further minor savings may be realized by changes in operations but any significant savings will likely come from program changes. Any program changes will need to be analyzed by the PFBC to determine how they may affect the services provided to anglers.

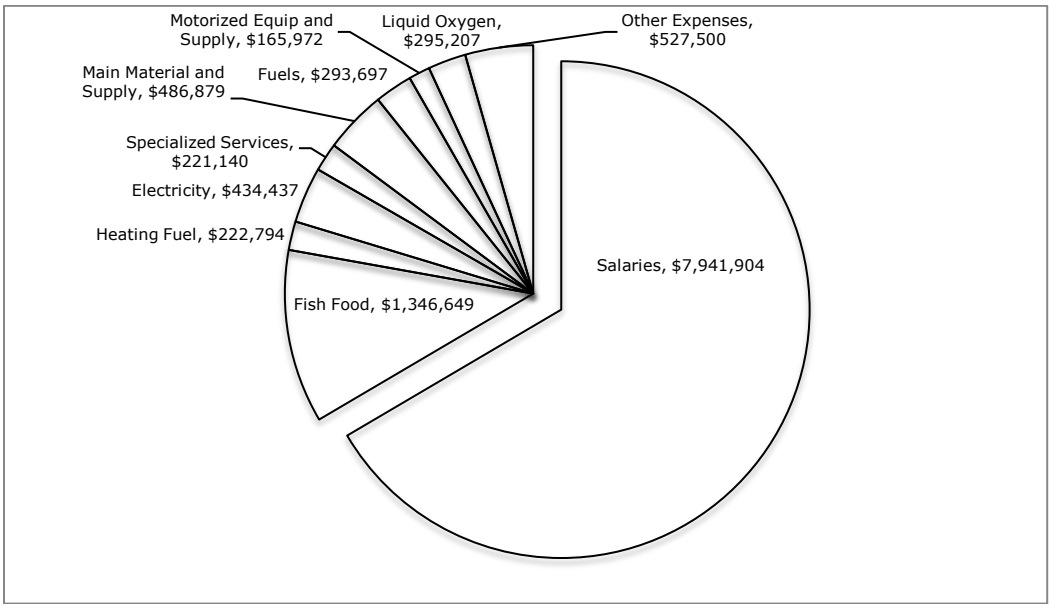
Figure 3: Total Division of Fish Production Expenditures – FY 06-07 to 10-11 and Trout and Combination Erie/Trout Stamp Sales



Note: This includes all personnel and operation costs for the Division. Fixed assets and grants are excluded.

As with other bureaus and divisions, personnel costs are by far the largest single item in the budget. Approximately 67% of all expenditures are in the personnel area. The DFP has held down personnel, feed and total expenditures by seeking efficiencies in production and promoting cost savings among staff at all levels. Most expenditures are tied to direct costs to raise fish with little discretionary spending. Details for FY 10-11 are shown in Figure 4.

Figure 4: Division of Fish Production FY 10-11 Expense Category Breakdown



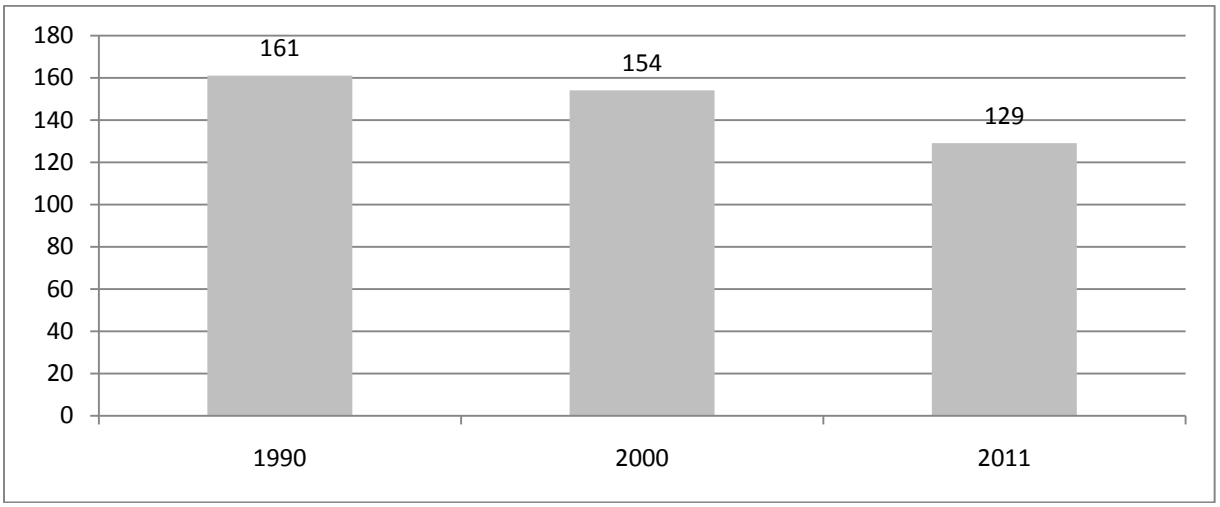
Fish feed, liquid oxygen, fuels and utilities are all direct costs tied to the amount of fish being reared and the size of the facility. These costs total approximately 22% of annual production expenditures. Combined with personnel costs, these expenses account for approximately 89% of annual expenditures. The remaining 11% is allocated to an additional 40 to 50 smaller categories which are described in Appendix A. In the next section, various DFP cost savings measures employed over the past several years are described.

Recent Cost Savings Efforts

Personnel

The number of permanent staff employed in the PFBC Division of Fish Production has been reduced by 20% since 1990 with the majority of the reductions occurring in the last 11 years (Figure 5). For the purpose of this analysis, permanent staff was defined as all Clerk Typists, full-time Fish Culturists (FC), Maintenance Repairmen, Hatchery Managers, Foreman, Fisheries Biologists, and Fisheries Technicians within the DFP. Seasonal Fish Culturists, Fisheries Biologist Aides and other non-permanent positions were not included. For a breakdown of the number of permanent staff in each work unit in 1990, 2000, and 2011, see Appendix B.

Figure 5: Division of Fish Production Permanent Staff Levels from 1990 - 2011



Of the overall 20% reduction in staff (32 positions), eleven were from the closure of the Big Spring State Fish Hatchery in November of 2001. At the closure, one person retired, one resigned, one transferred to engineering and eight positions were reassigned to other hatcheries and later eliminated through attrition. Following the closure of the "B" series of raceways at the Huntsdale SFH, staffing levels were reduced through attrition and reclassification to non-permanent wage positions.

In 2007, DFP staff, in cooperation with PFBC Human Resources, performed a staffing analysis of the hatcheries to determine the number of Fish Culturists and Maintenance Repairmen (rank and file staff) needed to accomplish tasks at the hatcheries. It's important to review this periodically because of program changes and shifting production among various facilities. Hatchery Managers and Regional Production Managers looked at the specific duties at each hatchery and assigned Full Time Equivalent (FTE) values to each major job duty. In addition, these FTE's were broken down into months due to the seasonal nature of hatchery work. Using this approach, managerial staff determined the minimum FTE required at each hatchery for each month of the year. As retirements took place at the hatcheries, staffing levels were adjusted so that some full time FC positions were not filled and others were shifted to non-permanent wage positions. As a result of this FTE analysis, permanent rank and file positions were reduced to the current levels.

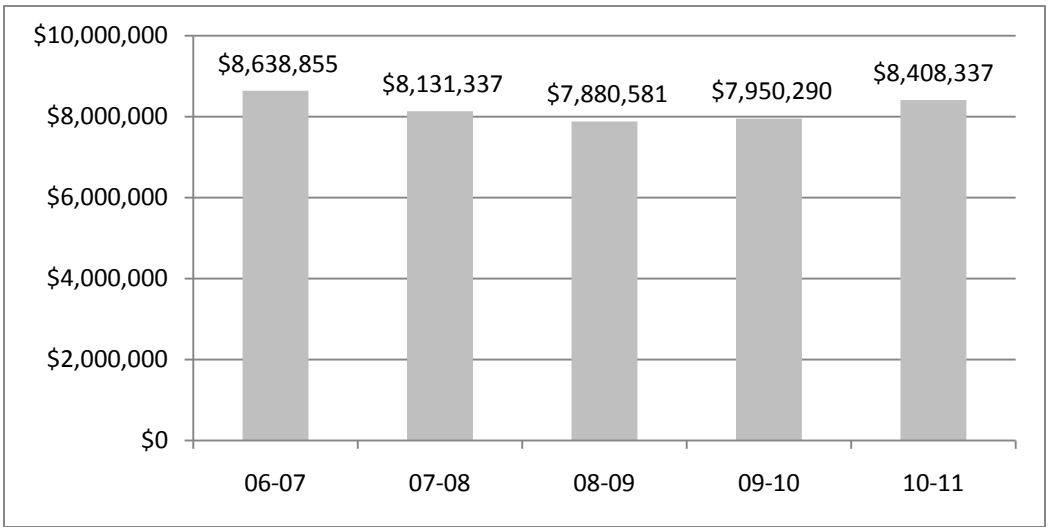
Other steps taken to reduce personnel costs were the combining of specific Hatchery Manager positions, combining clerical positions and limiting other clerical staff to wage positions. Four of our smaller northern hatcheries are now managed by two Hatchery Managers and each is in charge of two facilities. In some cases, two hatcheries share a Clerk Typist position. Since the Benner Spring State Fish Hatchery and the Cooperative Nursery Unit are located at the same facility, a Clerk Typist position is shared between the hatchery and the Cooperative Nursery Unit. As previous full-time Clerk Typists retired, their positions were evaluated and either reclassified as a permanent wage position or the duties were shared with another hatchery. There may be

further opportunities to consolidate administrative functions at multiple hatcheries in close proximity to each other.

Over the course of the last two years (2009-2010), most hatcheries were at or below the minimum FC staffing levels. Hatcheries were often below the minimum level due to retirements and the state government hiring freeze/waiver process needed to fill the positions. One of the consequences of reducing FC staff and the current hiring freeze/waiver process is that many normal maintenance activities must be deferred to accomplish the core mission of staff safety, complying with effluent permits, and rearing fish.

Figure 6 shows that total DFP personnel costs have remained between $7.9 and $8.6 million since the FTE analysis in 2007. This includes all Northern Hatcheries, Southern Hatcheries, Fish Production Services and Administration.

Figure 6: Division of Fish Production Personnel Costs

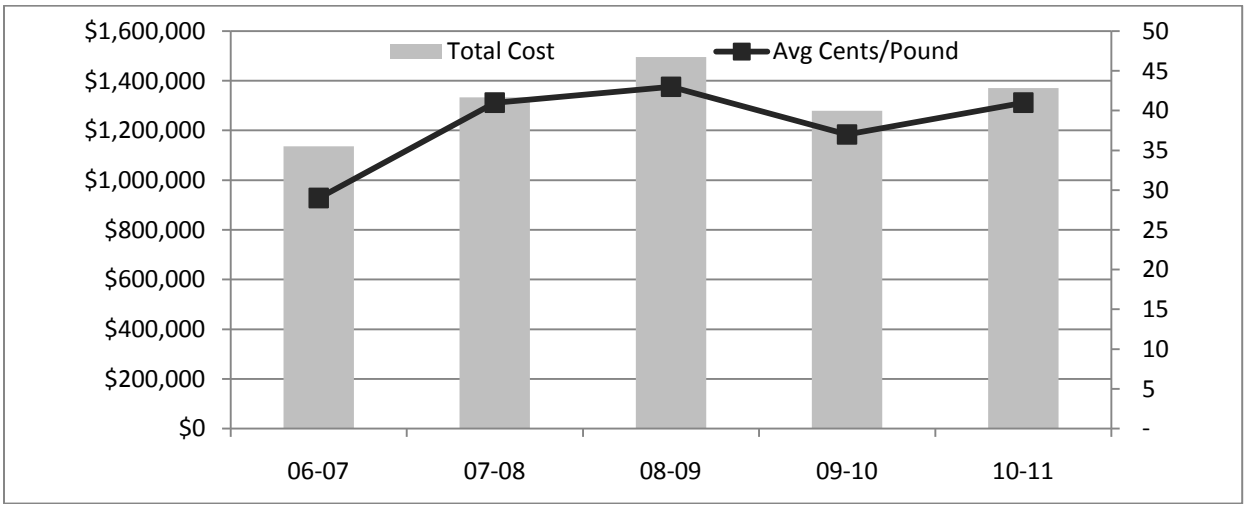


Note: Includes all hatcheries, FPS, and administrative costs within the Division of Fish Production.

Feed

Fish feed is the largest operational expense for the DFP and averages about $1.2 to $1.4 million per year as illustrated in Figure 7. Average annual feed purchases for the Division of Fish Production were 3.2 million pounds (range 3.1-3.3 million pounds). Feed is procured through the state bidding process and the way DFP bids the feed has been adjusted over the years to obtain the lowest price possible. The feed specifications used allow for a good production diet for trout that produces good growth and feed conversion at a moderate cost. We have recently conducted feed studies to determine if the higher quality (and higher priced) feed may lead to better growth and feed conversion thus off-setting the higher price. Under current bid procedures and quantities available from certain vendors this approach is not cost effective at this time.

Figure 7: Division of Fish Production Fish Feed Costs – FY 06-07 to FY 10-11



The DFP also accepts feed bids on a quarterly basis rather than a yearly bid. This is done to help the feed vendors place an accurate bid based on the price of their commodity ingredients (fish meal, corn, soy, etc.) and fuel. The Director of Fish Production has met with our primary vendors to discuss methods that may lower their bids and their response has been that the PFBC gets the best price of any state agency due to our quarterly bidding process. During an extremely variable feed price period, the PFBC set up monthly bids for bagged feed but this was discontinued when prices stabilized because the DFP did not see a savings over the quarterly bid structure. Other state natural resource agencies that have yearly or multi-year contracts get higher bids from vendors because the feed manufacturer must anticipate higher ingredient and fuel prices and then pad their bids for the future. The PFBC also benefits from lower prices because we have two major fish feed vendors located within our state. Another advantage of the bidding process is vendors placing bids based on the county to which they are delivering the feed. Hatcheries closer to the vendors receive feed at a slightly lower price than more distant hatcheries. Most of the Commission's hatcheries are located within a couple of hours driving distance of the vendors.

Prior to 2007, feed bids were divided into two categories: bulk and bagged. Upon reviewing the bids, it became apparent that the Commission could get better prices by separating the bagged feed into types of feed. Feed for the smallest fish is typically most expensive and used in the least quantity; while feed for adults is the least expensive. Currently, the PFBC accepts bids for fry, fingerling, adult and brood feed. This has allowed the vendors to give the Commission accurate bids specific to the type of feed purchased and saved the PFBC substantial dollars in feed cost.

The DFP has also instituted a method to track feed use and fish growth using an Excel spreadsheet format. This Raceway Tracking program allows Hatchery Managers to adjust feed

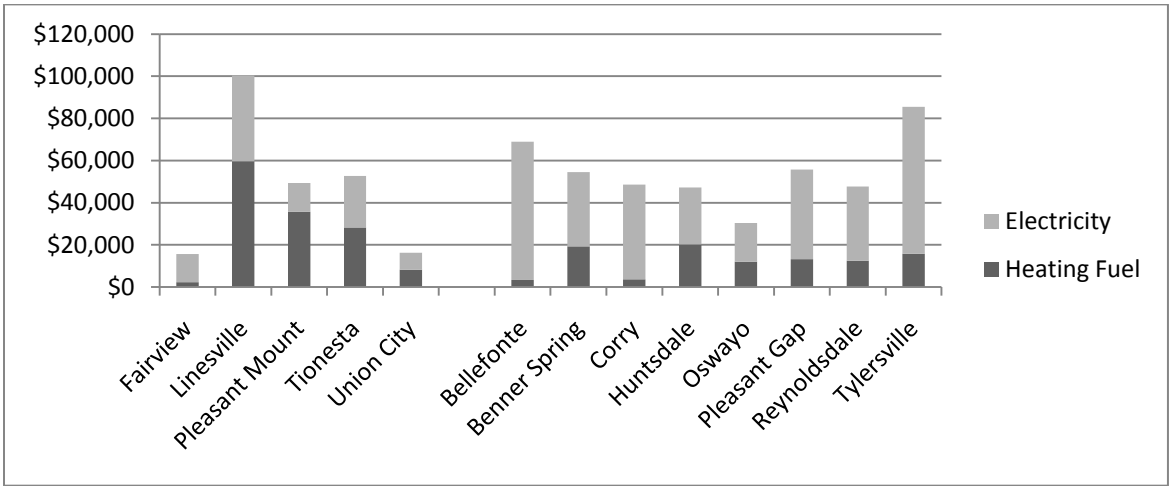
rates weekly rather than monthly as previously done. This program also assists Hatchery Managers in adjusting feed amounts so trout reach the target sizes at the proper time.

Even with the procedures the PFBC has in place, fish feed prices are volatile and react to fuel and commodity prices with high degrees of variability. Increases in fuel prices are one of the most significant contributors to increased feed price due to the rise in transportation costs and the effect on commodity prices used in preparing bio-fuels. These commodities are also used in the manufacture of feed and the competition drives up the price.

Utilities

The cost of utilities is also a major expense for the hatcheries. Several improvements are being made in this area but new effluent treatment equipment is also being installed to assist the PFBC in compliance with DEP effluent permits. This new treatment equipment has increased overall utility usage. One area that has helped substantially is replacement of worn, inefficient pumps with systems that work off of the demand for pumping capacity. Rather than run full bore, the new pumps and variable drive controls allow staff to adjust the volume of water needing to be pumped and decrease the amount of electricity required to run the pumps. This is an on-going process and takes place when pumps or controls need to be replaced or sooner if there is a short return on investment. Some of the Commission's hatcheries are actively replacing old light fixtures with newer, greener fixtures that use less electricity. These are small improvements, but when added to other facilities, the long term savings will accumulate. As budgets permit, hatcheries are installing programmable thermostats to reduce heating costs. The agency has also recently accepted bids from various energy companies around the state which will provide our facilities with the least cost source of electricity. The figure below (Figure 8) shows the utility costs of each of the State Fish Hatcheries.

Figure 8: State Fish Hatchery Utility Expenditures FY 10-11



Note: Huntsdale SFH electricity is estimated from FY 09-10. Updated data for FY 10-11 was not yet available for this hatchery.

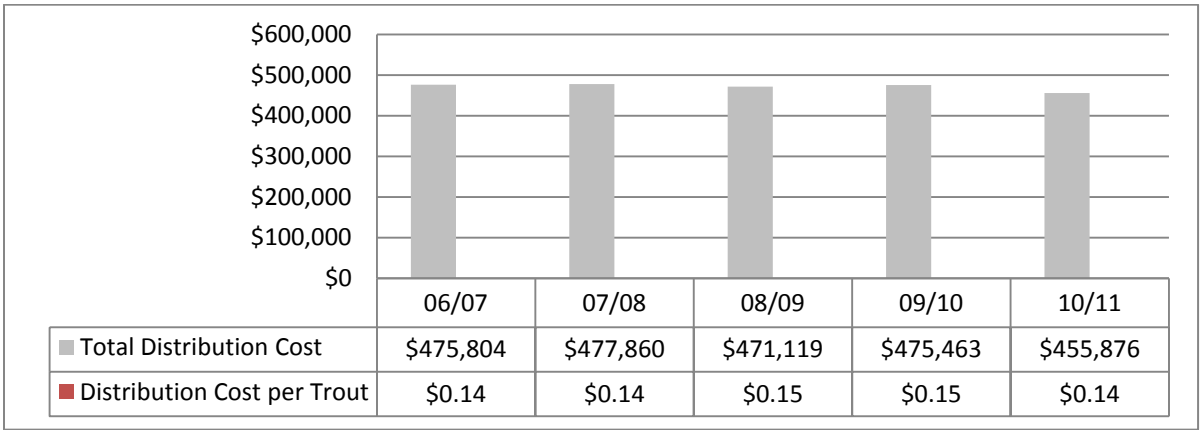
There is a large degree of variability in utility costs based on the type of buildings, numbers and types of pumps and amount of heated water for hatch house production. Linesville SFH has the greatest overall utility cost. They also have a large administrative building with a big visitor center to heat. All of the water used at Linesville is pumped from either wells or a lake. Many of the species they raise in the hatch house require some degree of water heating to keep the water in the proper range for fish culture. When lake water quality is poor, some well water is heated to culture the musky and to maintain growth. Tylersville and Bellefonte have higher electrical costs because they must pump a large volume of the water used at those facilities. Pumps are used to lift the water for oxygenation purposes and to lift the water in the effluent management process. Most of the pumps at these two facilities already have variable drive controls. Hatcheries with the highest utility cost have the highest priority for upgrades and improvements as described in the above text.

Fish Distribution

Fish stocking expenditures consist of driver wages, travel expenses, and truck mileage costs. These costs are tabulated at each hatchery throughout the year and the data are entered into a statewide standardized database. The PFBC stocking coordinator is responsible for maintaining the database that contains cost and other stocking data.

Although, stocking costs are a substantial part of Fish Production's overall expenses, the DFP has managed to contain these costs over the last several years due to small operational improvements. Using larger transportation tanks has allowed for the reduction of stocking trips. Figure 9 depicts the costs associated with stocking adult trout over the last five years. These costs include salaries, overtime and vehicle use. The average cost of distributing an adult trout to our waterways has remained at approximately $0.14 -0.15 per trout despite increased fuel costs.

Figure 9: Trout Distribution Costs – Total and Per Trout – FY 06-07 – FY 10-11



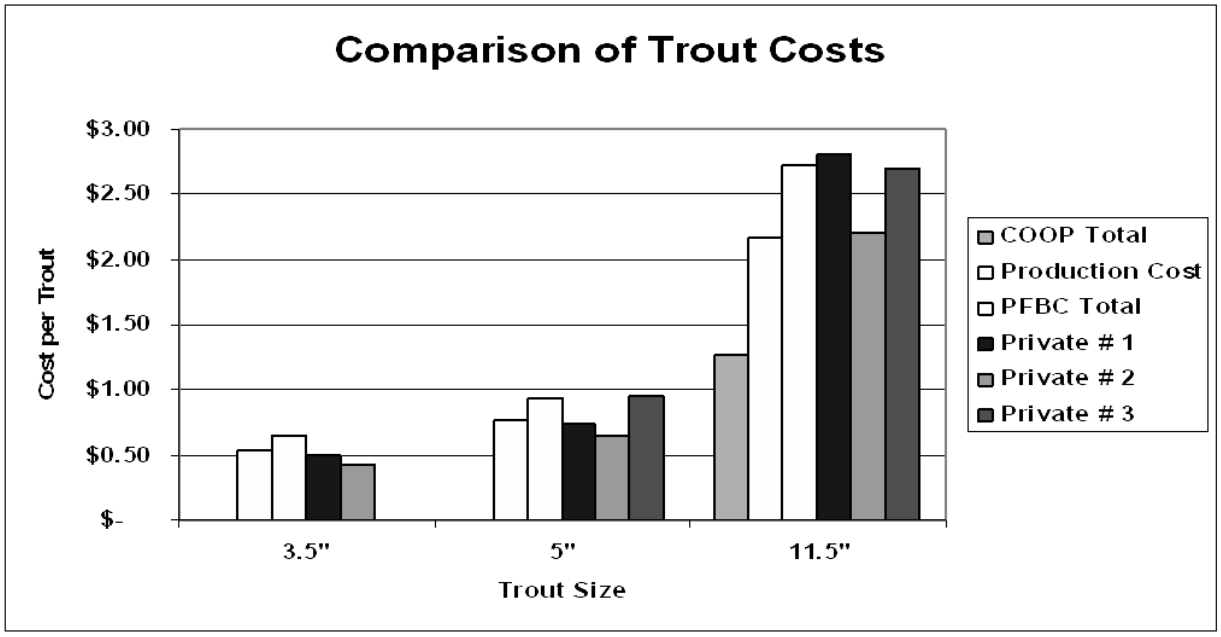
	06/07	07/08	08/09	09/10	10/11
Total Distribution Cost	$475,804	$477,860	$471,119	$475,463	$455,876
Distribution Cost per Trout	$0.14	$0.14	$0.15	$0.15	$0.14

Source: Annual Stocking Reports

Stocked Trout Cost Study

During 2008 and 2009, the DFP completed a study on the cost to rear trout at the state fish hatcheries and also to determine the total cost of the stocked trout program for the entire agency. This total cost involved the expenditures and time beyond fish production and included law enforcement, management, habitat, permitting, engineering, administration and other indirect costs. The final report indicated that the PFBC cost to raise trout was comparable to private industry within Pennsylvania as shown in Figure 10. This demonstrates that the agency is doing very well at keeping production costs down considering the constraints placed on the hatcheries with the vast majority of production (adult trout) due in the spring, species varieties, state salaries and benefits, and permit compliance issues. See Appendix R for the executive summary of the referenced report.

Figure 10: Comparison of PFBC Trout Cost and Pennsylvania Commercial Hatcheries



Note: This graph is Figure 10 in the report - Stocked Trout Program: Cost Report, March 2009.

Factors Affecting Rising Costs

Stream Protection and National Pollution Discharge Elimination System Compliance

Each hatchery has a National Pollution Discharge Elimination System (NPDES) permit in order to be in compliance with DEP and maintain the quality of the hatchery effluent. Some trout hatcheries are discharging to waters which are listed as impaired by the Pennsylvania Department of Environmental Protection. In these cases, DEP required infrastructure

improvements in the effluent management systems as part of the permits in order to protect the quality of the receiving streams. The PFBC utilized Growing Greener II funds to design and build microscreen effluent systems at those hatcheries and has reduced the total suspended solids leaving those facilities by 44 to 70 percent. A side effect of the new microscreen systems is the added costs due to electricity for pumps and filters, additional maintenance and parts, and more labor to maintain and clean the filters. The DEP is now preparing to address the amount of nutrients (nitrogen and phosphorus) in the hatchery effluent at PFBC hatcheries within the Chesapeake Bay Basin to meet new federal Environmental Protection Agency standards. To reduce nutrients, the hatcheries will need to reduce the pounds of fish raised, use a more expensive low phosphorus feed, build costly infrastructure to remove the nutrients, or some combination of these items.

Economy of Scale

One factor affecting fish rearing cost is the economy of scale and the maximum number of fish produced at a single facility by the least number of people. The warm/cool water hatcheries are able to utilize this concept as evidenced by the vast number of walleye fry being produced for an extremely low cost. High numbers of fingerlings also contribute to keeping costs minimized. The most expensive warm/cool water fish to produce are those that are highly cannibalistic, reared at relatively low densities and cultured to a large fingerling size. In order to profit from an economy of scale for the warm/cool water facilities, as many fish as possible should be reared throughout the spring, summer and fall months. Production is dependent on the requests of the DFM. Ponds and other rearing units which are not currently in production should be renovated (if done in a cost effective manner) and put into production to maximize efficiency. Typical pond culture requires very little labor except when setting up and harvesting the pond. A minimal amount of system input tends to yield a substantial benefit to the overall production of the facility.

An issue of concern with the trout hatcheries has been a diminishing economy of scale. This is not due to the management of the facilities but to the PFBC's increased efforts to protect receiving waters and improve the hatcheries' effluent water quality. Our NPDES permits limit the concentration levels of ammonia, total suspended solids and other parameters that exist in the effluent in order to protect the aquatic resources. Permits have also placed biomass (total pounds of fish) restrictions on the number of pounds that may be reared at certain facilities. Future permits will likely include conditions to reduce the amount of nutrients in the hatchery effluent. This is especially true for hatcheries located within the Chesapeake Bay Watershed where nutrient reductions are an ongoing concern. Nutrient reductions are being managed by the U.S. Environmental Protection Agency and state agencies in an effort to restore the health of the Chesapeake Bay. Typically, effluent quality is driven by the pounds of feed going into the hatchery system and the pounds of feed are dictated by the amount of fish. The PFBC trout hatcheries are currently at their carrying capacities and are not capable of rearing more total fish biomass (trout) without exceeding the existing permit conditions. It is likely that as natural resource agencies such as the PFBC and DEP take additional measures to improve the quality of our streams and rivers, some of the trout hatcheries may have effluent permits in the future which will require either reducing the pounds of fish produced or adding costly infrastructure improvements in order to meet the new goals.

Hatchery Production Factors

Hatchery Consolidation

The PFBC operates 14 state fish hatcheries which culture over 5 million trout (about 3 million adults and 2 million fingerlings) and approximately 40 million warm/cool water fish (fry and fingerling) for stocking into the Commonwealth of Pennsylvania. While undergoing the exercise of developing strategies to reduce the cost of operations, one of the obvious approaches would be to consolidate fish production into fewer hatcheries and reap the benefits of economy of scale. While this seems like a simple solution, there are several obstacles and reasons that reduce the feasibility of this approach at the present time.

Considerations for hatchery consolidation:

- Carrying capacity of the hatchery: the number of pounds of fish that can be produced at the hatchery while at the same time managing effluent quality to levels not harmful to receiving streams
- Size and number of fish requested by the Division of Fisheries Management
- Biosecurity and aquatic invasive species

Trout Hatcheries

Eight trout hatcheries produce the fingerlings and adult trout used in the stocked trout and cooperative nursery programs. These hatcheries are located in Centre (3), Clinton, Bedford, Cumberland, Potter and Erie (one each) Counties.

Pennsylvania has an abundant supply of water but there is a limited amount of high quality water available for trout culture. The best sources of water for trout culture are of a fairly constant cold temperature, free of fish and fish diseases and free-flowing without the aid of pumping and its associated high costs. Large volume springs are the most feasible source of water for fish culture and the majority of these are already in use in Pennsylvania. Since these types of undeveloped springs are such a valuable resource they need to be protected.

Since quality water resources are limited, the PFBC could invest in more recirculation technology or pumping of ground water for hatcheries to increase flows but this in turn drives up annual operation costs and defeats the purpose of cost reduction. A recent analysis was done on comparing a high volume partial recirculation (80%) hatchery versus a limited recirculation flow-through raceway system and while the construction costs were similar, the flow-through system was chosen because of lower annual operating costs and cost per fish produced.

If the water supply of some of our larger (trout) hatcheries could be increased to rear more fish, we would still need to meet the current and future effluent discharge permits as defined in our NPDES permits. These permits are hatchery specific and are based on the effluents affects on the receiving streams and minimizing those impacts. The amount of feed fed to the fish and the water flow are the driving factors that produce effluent waste in a fish hatchery. For hatchery

consolidation, increasing the amount of feed would be necessary if more fish were raised at a hatchery and that would have an impact on the permit parameters such as ammonia, nutrients, oxygen demand and others. As mentioned in the Economy of Scale section, the trout hatcheries are at their carrying capacities and any substantial increase in production would cause the PFBC to potentially violate some of the permit parameters. The ammonia level is a difficult parameter to meet and hatchery staff must adjust and reduce their feeding amounts just to stay in compliance with the permit. If more fish are reared at these facilities, more feed is needed which is not compatible with the permits or our goals of improving effluent water quality.

Goals to reduce nutrients to the Chesapeake Bay mean that hatcheries in that watershed will be decreasing the average amount of nutrients in the effluent. These limits are based on historic averages discharged by the hatcheries and staff must investigate methods to decrease the current amount of nutrients discharged. Any large increase in production would elevate the difficulty of this task. A large infusion of capital may be needed to build new water treatment systems which could lower the nutrients.

One option would be to take the production from one of our Centre County hatcheries and redistribute that to all of the remaining trout hatcheries so that each facility increased its' annual production by a small percentage without changing their flow. This would create a very difficult situation in relation to the NPDES permits and hatchery carrying capacity. Under this scenario, as the hatcheries exceeded their carrying capacity, they would also likely exceed the effluent ammonia and nutrient limits as they reached peak annual production. This shift in production could occur only if the PFBC built effluent management systems capable of removing the additional solids and nutrients. This type of infrastructure is not presently utilized in the aquaculture industry to reduce nutrient loads. The PFBC is currently evaluating various options used in the waste water industry and their associated costs. Engineering and waste water specialists would need to be consulted to develop this option and determine the cost-benefit ratio.

Some of our trout hatcheries currently have biomass (pounds of fish) limits written into their NPDES permits. This includes two facilities (Tylersville, Huntsdale) with very large quantities of spring water available for fish culture. If more fish were reared with the amount of water available, the protection limits built into the effluent levels would be surpassed. While these biomass limits may be lifted in the future, there is a functional amount of fish a facility can rear in order to protect the receiving stream. Biomass restrictions are also written into several permits as a penalty for exceeding the NPDES parameters. If the specific PFBC state fish hatchery exceeds annual total suspended solid permit limits, biomass restrictions are put into place which limit the production until corrections have taken place.

Three of the smallest trout hatcheries (Oswayo, Corry and Reynoldsdale) are located in strategic areas of Pennsylvania where the majority of their fish are stocked within a regional area. This decreases the need for staff from the larger trout hatcheries located in the central portions of the state to travel to the far extremes of the Commonwealth to distribute trout for stocking. Each year, stocking trucks travel about 350,000 miles and this number (along with associated overtime) would be much higher if these smaller hatcheries did not exist in the regions where they are now located. A cost of travel and overtime analysis has not been completed to compare fish distribution costs with hatchery production costs at these facilities. If a decision to

consolidate hatcheries is made, a study should be done to determine the cost/benefit of each hatchery in relation to distribution costs.

There are three options which would allow consolidation to take place in the near future. Option one is the reduction of the size of trout stocked. Carrying capacity is based on the total pounds of fish and not size. If the PFBC reduces the size goal of trout stocked from 11" to 10", the total pounds of adult trout reared (numbers stay the same) would decrease approximately 450,000 pounds. All of our hatcheries stock less than that amount of adult trout. If sizes were reduced and trout numbers stayed the same, a hatchery could be closed. Currently, DFM requests large trout (11") so this change needs to be initiated from the Director of the Bureau of Fisheries, after consultation with the Executive Director.

The second option involves renovations at Huntsdale SFH. If the biomass limitation were removed at the Huntsdale SFH, the water supply is available to increase production by approximately 200,000 pounds of trout in the old B-series area which was taken out of production in the past. Unfortunately, the B-series area was associated with PCB issues and that was the main reason for halting production. If the PCB issues can be resolved, above-ground tanks are an option that can be explored. A cost analysis should be undertaken by the Bureau of Engineering and Property Services and the Division of Fish Production to determine the feasibility of this consolidation approach and to determine the most appropriate types of rearing systems. A study is needed to determine if the current effluent management system could treat the hatchery effluent sufficiently to protect the receiving stream or if more treatment were necessary. A hatchery with less than 200,000 pounds of adult trout production could be consolidated into the Huntsdale SFH with this approach.

Option three involves the use of improved infrastructure technology to reduce total suspended solids, ammonia and nutrients in the hatchery effluent. The PFBC is currently evaluating technologies used in the waste water treatment industry to determine if this is applicable to our fish hatchery systems. There are substantial differences in how effluent is treated between hatcheries and sewage treatment plants. Sewage treatment plants have high concentrations of solids at relatively low flows while hatcheries have low concentrations and high water flows. These evaluations will provide the PFBC with information to help determine the feasibility and cost-benefits of installing such systems. If the treatment systems clean hatchery effluent adequately to protect receiving streams in a cost effective manner, a smaller hatchery could be consolidated into one of our larger hatcheries with enough flow to handle the additional production. More raceways and/or tanks would be necessary to handle the additional trout and provide sufficient rearing space.

Summary of trout hatchery consolidation obstacles:

- Corry, Oswayo and Reynoldsdale should be maintained
    - To efficiently stock fish regionally
    - Corry discharges part of their effluent directly to a sewage treatment plant (less impact on local streams)
    - Reynoldsdale discharges effluent to a warm water stream that is less sensitive to effluent than cold water streams
- Increasing production at most trout hatcheries would lead to stream protection violations

- Huntsdale and Tylersville have biomass limits
- Bellefonte, Oswayo and Corry struggle to meet current ammonia limits
- Pleasant Gap and Benner Spring must minimize water usage to meet total suspended solids limits
- Any additional feeding at hatcheries would increase nutrients in effluents
- Future expectations include lowering biomass (pounds) at hatcheries in order to meet future measures to improve effluent water quality
- The following conditions would be required in order to increase production at individual hatcheries:
  - Huntsdale: biomass restriction lifted, PCB issues finalized
  - Tylersville: biomass restriction lifted, total suspended solids maintained below permit levels
  - Bellefonte: reduce ammonia levels before increasing production
  - Reynoldsdale: new raceways built with higher rearing densities
  - Oswayo: may increase densities if new well water system provides sufficient flow
  - Corry: may increase densities if new well/pipeline provide sufficient flow

Summary of trout hatchery consolidation possibilities:

- Decreasing adult trout stocking size (11" to 10") would allow a hatchery with production less than 450,000 pounds to be consolidated into other facilities.
- If certain conditions are met at Huntsdale SFH, production can be expanded by approximately 200,000 pounds but studies must be done first to ensure stream protection.
- If new treatment processes can remove more total suspended solids and nutrients in a cost effective manner, one of the smaller hatcheries could be consolidated into a larger one with additional rearing units being built.
- Multiple consolidation options exist depending on the size of fish requested, the availability of new rearing areas at current hatcheries and effective treatment processes. If all three of these factors are feasible, more than one site may be consolidated into other facilities.

Warm/Cool Water Hatcheries

Warm/Cool (W/C) hatcheries are defined as those raising species other than trout. Production includes salmonid fingerlings for Lake Erie stocking. Most of the production is fry and fingerlings stocked into lakes and large rivers. The vast majority of fish are spawned and raised by the PFBC but some are imported from other agencies/vendors.

Up to 25 species of fish are produced at our warm/cool water fish hatcheries located in Crawford, Erie, Forest and Wayne counties. These species include walleye, musky, steelhead trout, channel catfish, paddlefish, tiger musky, bass and others. Consolidation of warm/cool water hatcheries would be easier than trout facilities because warm/cool water sources do not have the same requirements that occur in trout culture and wider variety of source waters are acceptable. Well water and surface water may be and are used at our facilities. Linesville and Pleasant Mount produce most of our typical warm/cool species while Union City production focuses on musky and tiger musky (also walleye and catfish). Union City is in the best location for producing the tiger musky which is a hybrid of northern pike and musky. Fairview and Tionesta primarily produce

steelhead trout for Lake Erie. Figure 11 describes the major species, where they are cultured and some of the intricacies involved.

Maintaining separate and distinct warm/cool water facilities is important because of disease and aquatic invasive species (AIS) considerations. AIS have become more numerous in Pennsylvania and must be kept out of hatcheries otherwise, the stocking process could rapidly spread them throughout the state. If a detrimental AIS or pathogen were to infect a warm/cool water hatchery, the most likely scenario would be to depopulate the hatchery, disinfect the facility and allow it to lie fallow for a time before fish are reintroduced. The steelhead program utilizes Fairview and Tionesta SFH's. Spawning takes place at Fairview under strict biosecurity measures to minimize the risk of spreading Viral Hemorrhagic Septicemia (VHS) virus from Lake Erie to other waterways. Disinfected eggs are sent to Tionesta for incubation and then Fairview and Tionesta raise the fingerlings for stocking. If VHS were found at one of the hatcheries, those fish would be destroyed and the hatchery would likely be depopulated, disinfected and allowed to dry out. By utilizing multiple facilities, if VHS were to be discovered in fish at one hatchery, the steelhead program can be maintained by the other facilities. Also, none of the hatcheries has a large enough water supply to rear all one million fingerling steelhead for stocking into Lake Erie tributaries each year. Another important component of the warm/cool water hatcheries is the fact they each follow biosecurity procedures to spawn fish, ship eggs to one another, rear fish and then stock regionally.

Consolidation of any W/C hatcheries while still maintaining current W/C production would be difficult without major renovations and additions to ponds/hatch houses at the remaining facilities. No single hatchery can increase their production without affecting the other species being cultured there. Issues of water and space come into play. Also, having different regional hatcheries culturing the same species reduces stocking costs. Reducing the number of W/C hatcheries also increases the risk level of AIS pathogens (such as VHS) and organisms (such as zebra mussel). If a facility must be shut down due to AIS issues, it would have a negative effect on angler services through reduced W/C stocking. If Union City production was shifted to Pleasant Mount and Linesville, additional ponds or pond renovations would be needed at those facilities to accommodate the increased production and major changes would be needed for the tiger musky program.

Since Union City SFH is the smallest of the W/C hatcheries, it would be the simplest to consolidate into the larger facilities but Union City also has brood lakes containing AIS species. Union City SFH is also the source of all tiger musky which are shipped to other hatcheries for rearing and stocking. Union City staff are utilized in programs at other hatcheries during the busiest times of production and stocking. If Union City production were consolidated into Linesville and Pleasant Mount, the following items would need to be addressed:

- Finding a new source of northern pike brood stock for tiger musky spawning
- Some staff would need to be assigned to other facilities to assist with the additional production and to continue with assistance in other areas as is currently done
- Pond renovations are needed at Linesville and Pleasant Mount to increase production capabilities
- Hatch House renovations/additions would be needed at W/C hatcheries or musky and tiger musky production would need to decrease
- Engineering designs and cost estimates are needed to conduct a full cost/benefit analysis

- The hatchery budget is approximately $400,000 and 75% of that is personnel so very little operational savings would be realized

Figure 11: Warm/Cool Water Species Program Overview

Species	Hatchery/Average Production	Details
Steelhead	Tionesta: 700,000 Fairview: 300,000	• Due to space and water constraints neither hatchery is capable of raising the others' allotment. • Adults must be kept in the Erie watershed due to concerns of the Viral Hemorrhagic Septicemia virus.
Walleye	Fingerlings: Linesville: 523,000 Pleasant Mount: 321,000 Tionesta: 158,000 Union City: 142,000 Upper Spring Creek and Benner Spring: variable Fry: Linesville: 20,000,000 Tionesta: 4,000,000	• Currently at full capacity with existing ponds. • Average annual requests are about 1.1 million phase-1 fingerlings. • DFM desires more fingerlings to increase stockings. • Pond renovations or construction is required to meet increased production requests. • Production at Upper Spring Creek and Benner Spring ponds has been variable due to pond leakage issues and available staffing to focus on pond production. Emphasis needs to be placed on staff training and pond repairs.
Tiger Musky	Union City – spawn only Pleasant Mount: 40,000 Tionesta: 37,000	• Tiger musky are a hybrid cross between northern pike and musky. • Only Union City has both species readily available. Union City sends tiger musky eggs to Pleasant Mount and Tionesta where production occurs. This also provides a site on each side of state for efficient distribution. • Even though Union City spawns tigers, they are not currently raised there. Union City tiger production was moved to Tionesta and Tionesta's musky production was moved to Union City. Tionesta has cooler water and tigers grow well there but muskies do not.
Musky	Linesville: 27,000 Pleasant Mount: 60,000 Tionesta: 27,000 Union City: 24,000	• Musky are trapnetted from the Pymatuning Sanctuary and Pymatuning Lake (Linesville). • Eggs are distributed to Tionesta, Pleasant Mount and Union City. If conditions are good, Union City will spawn their own musky eggs. • No facility can increase production without cutbacks to other species production or increasing tank space at the facility.
Channel Catfish	Fingerlings: Linesville: 43,000 Pleasant Mount: 100,000 Yearling: Linesville: 37,000	• In the past, DFM requested a 10-inch fall fingerling for stocking. Growing conditions do not allow the fish to reach that size in a single growing season. Requests were adjusted to a fall fingerling for some waters and a fall yearling for other waters. • New Jersey supplies Pleasant Mount with around 100,000 newly hatched catfish which are raised in ponds and stocked at 3-4 inches as fall fingerlings. • Linesville will spawn, hatch and over-winter fingerlings until the next fall to produce yearling catfish that are 8-10 inches when stocked.
Lake Trout	Pleasant Mount: 103,000	• Eggs are received from Vermont to establish a brood stock. • Vermont will provide eggs for next 5 years that are free of the epizootic epitheliotropic disease virus.
Brown Trout (for	Linesville: 40,000	• Linesville receives 100,000 specific pathogen free,

Species	Hatchery/Average Production	Details
Lake Erie program)	fingerlings	furunculosis resistant, brown trout eggs from New York about mid-October of each year. • By April, 40,000 fingerlings are transferred to cooperative nurseries near Lake Erie. The fish will be raised to about 7 inches in length and stocked at the mouths of Lake Erie tributaries. • Linesville also stocks approximately 40,000 fingerlings.
Northern Pike	Union City: 6,530 fingerlings	• This is the only hatchery rearing northern pike.
Paddlefish	Linesville: 10,000	• A total of 150,000 Ohio River strain eggs are received from Kentucky in the spring of each year. • On average, 10,000 14-inch fall fingerlings are stocked in the Ohio River each year.
Striped Bass	None - out of state surplus fish and occasional purchases. Fingerling: 420,000 Fry: 6,000,000	• There is no in-state production of striped bass. • Out-of-state surplus fish are obtained from Virginia and Maryland. • Fry are purchased when necessary to meet stocking goals.
Hybrid Striped Bass	None - out of state surplus fish and purchases. Fingerling: 118,000	• There is no in-state production of hybrid striped bass. • Out-of-state surplus fish are obtained. • Due to the popularity of this program, additional hybrid striped bass are purchased each year at a cost of $10,000 to provide a minimum stocking for the best waters. • Depending on current pricing, 40-50,000 hybrid striped bass are purchased annually.
Largemouth Bass	Linesville and Pleasant Mount: Total production is 40,000 fry	• Largemouth bass fry are collected from the Pymatuning Sanctuary Lake each spring. • Fry are cultured extensively in ponds to about 2 inches in length.
Black and White Crappie	Pleasant Mount: 150,000	• Produced at two off-site ponds stocked with adults. • A few weeks after spawning the ponds are drained to harvest the fish.
Golden Shiner	Pleasant Mount: Fingerling: 12,000 Adult: 85,000	
Yellow Perch	Pleasant Mount and Linesville: Total production is 520,000 fry	
Bluegill	Pleasant Mount and Linesville Total production is 2,600 fingerlings	• The closest facility to the assigned lake will get the request.

Effects of Varying Production

One of the options the workgroup was asked to evaluate was the effect on costs of varying production. The DFM needs to have the resources and time to determine what number of stocked fish would achieve the level of angler satisfaction that is required to have an acceptable positive fishery. Responsive Management performed an angler survey in 2007 (Pennsylvania Trout Fishing Survey) and determined that "The overwhelming majority of Pennsylvania trout anglers (84%)

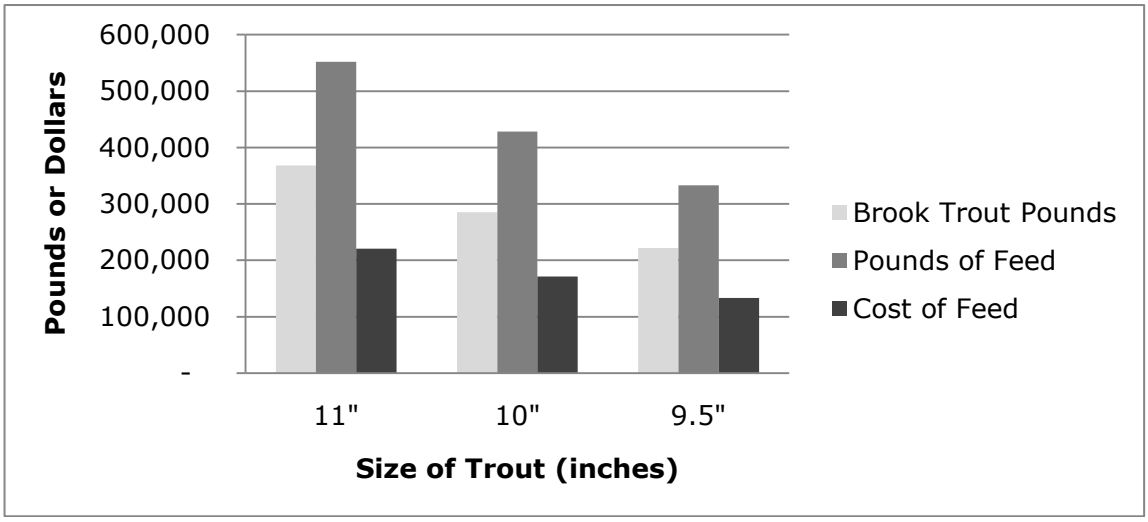
were satisfied with their trout fishing in Pennsylvania in 2007, about evenly divided between *very* and *somewhat* satisfied."

Increasing trout production is difficult due to the fact that hatcheries are at a carrying capacity that protects the receiving bodies of water. Water supplies are currently being increased at the Corry and Oswayo hatcheries by additional well water supplies and associated pipelines. These hatcheries are also outside the Chesapeake Bay Watershed and may not have annual nutrient limits in their NPDES permits as the southern hatcheries may soon have. The increased water supply is designed to help staff meet current NPDES permits but the possibility exists to increase production slightly at these two facilities and still comply with protective effluent measures. The only significant increases in costs for this to take place include additional feed and oxygen use for the added fish. While costs would increase, the economy of scale would be beneficial because the cost per fish would decrease, no additional labor or infrastructure would be required to slightly increase the density of trout at these hatcheries. Since the water supply systems are not yet fully functional, it is not possible to determine the exact amount of production increases that may take place without decreasing effluent quality or negating the benefits gained from the additional water. The primary reason for increasing current water flows was to improve effluent quality, protect receiving streams and reduce recirculation which is at high levels and detrimental to fish health. Pilot studies would need to be done to determine exact densities. If both Corry and Oswayo could increase production by 5% (additional 30,500 adult trout), estimated feed and oxygen costs would increase approximately $11,000 annually.

Reducing trout stocking without adversely affecting angler services is something that needs to be defined by DFM. The current goal is approximately 3.2 million adult trout totaling 1.9 million pounds. Three potential methods of reducing production are presented: decreasing brook trout size at stocking, decreasing all trout species sizes and decreasing size while increasing numbers.

Brook trout are fall spawners and difficult to rear to the desired 11" size goal. They are typically stocked in smaller headwater streams where a smaller fish would be expected to be caught. The DFM has suggested reducing the size goal of brook trout for stocking. This would enable fish production to reach the size goals more easily and have the benefit of lowering the overall fish feed expenditures each year. Some 634,293 adult brook trout were stocked in 2009 – 2010 with a total weight of 371,413 pounds and averaging 0.58 pounds each. These fish consumed approximately 552,000 pounds of feed at a cost of approximately $221,000. Figure 12 shows that if the size goal of brook trout were reduced to 9.5", the estimated feed cost would be reduced to $133,000. The 9.5" size was chosen because this is feasible with the spawning period of brook trout and their growth rate in the hatcheries. This translates to an annual savings of $88,000. Rainbow and brown trout would continue to be reared to the larger 11" size range and provide the "bigger and better" angling opportunity. Another advantage of reducing brook trout size would be less waste created in fish production due to lower feed use which would help with effluent management and NPDES compliance.

Figure 12: Estimated Feed Use and Cost by Reducing Brook Trout Stocking Size



Decreasing the size of stocked trout is contrary to findings from the Trout Summit in 2002 where it was determined some anglers would prefer fewer and larger trout over smaller, more numerous trout stocked. Angler feedback since the initiation of this program has generally been very positive. Even so, by reducing the average adult trout size from 11" to 10" or 9.5", a substantial savings in feed can be realized. Two size reductions are used here to show the range of savings available depending on the size of trout stocked. If the number of trout stayed the same (3.2 million adults), total production would decrease from 1.9 million (11") to 1.5 million (10") or 1.1 million (9.5") pounds. This leads to a feed savings of approximately $270,000 to $480,000 a year. Another cost-benefit would be reduced trout distribution costs due to more fish being held on trucks per trip. This may have a negative effect on angler services and not be readily accepted by the angling community after the PFBC promoted "Bigger and Better" trout several years ago.

A possible compromise would be to decrease the size of the trout but increase the numbers stocked. We could still see a decrease in total pounds of fish produced but also have the benefit of increasing the number of trout stocked. Table 1 illustrates some possible variations of this theme with the italic bolded cells showing increases in the number of fish over current levels but keeping pounds the same. Increasing the number of trout in the non-central, state fish hatcheries (Oswayo - Potter, Corry - Erie, Reynoldsdale - Bedford and Huntsdale - Cumberland Counties) while decreasing the pounds in Centre and Clinton County (Benner Spring, Bellefonte, Pleasant Gap and Tylersville) would benefit meeting the NPDES permits and reduce overall transportation costs during stocking. Smaller trout also have better feed conversions than larger trout which would decrease the quantity of feed required. Feed savings could approach $150,000 – $280,000 per year at the current feed prices. This would also improve DFP's ability to meet the newer nutrient requirements being placed in NPDES permits for hatcheries located within the Chesapeake Bay Watershed.

Table 1: Variations of Trout Size and Numbers to Save Costs

Hatchery	Adult Trout Production					
	11" number	11" pounds	10" number	10" pounds	9.5" number	9.5" pounds
Bellefonte	588,569	344,910	588,569	264,856	588,569	205,999
Benner Spring	597,934	345,251	597,934	269,070	597,934	209,277
Corry	324,995	203,121	***451,380***	***203,121***	***580,346***	***203,121***
Huntsdale	415,500	242,928	***539,840***	***242,928***	***694,080***	***242,928***
Oswayo	244,100	151,097	***335,771***	***151,097***	***431,706***	***151,097***
Pleasant Gap	424,855	247,934	424,855	191,185	424,855	148,699
Reynoldsdale	205,575	129,752	***288,338***	***129,752***	***370,720***	***129,752***
Tylersville	465,895	260,238	465,895	209,653	465,895	163,063
TOTALS	**3,267,423**	**1,925,231**	**3,692,582**	**1,661,662**	**4,154,104**	**1,453,937**
Estimated Feed Use (pounds)		2,887,847		2,492,493		2,180,905
Feed Cost ($.40/lb)		$ 1,155,139		$ 996,997		$ 872,362
Feed Savings		0		$ 158,141		$ 282,777

Note: Italic bolded cells are increases in the number of fish over current levels but keeping pounds the same.

Warm/Cool hatchery production increases are possible with renovations of existing but old, non-functional ponds. Most of these ponds could be renovated by repairing leaks, grading and fixing catch basins. Approximately 17 ponds totaling 16.4 acres are currently non-productive within the state hatchery system. An additional 21 ponds comprising 17 acres need repairs to maximize their productivity. Many of these ponds have fallen into disrepair due to budget and manpower issues. PFBC resources have been focused on NPDES issues and infrastructure at the trout hatcheries for the last decade. While repairing all of these ponds would be expensive, a priority list should be developed to determine which are the most cost effective to renovate. Pond culture is very cost effective for fingerling production of walleye which is one of the species in demand for stocking. DFM has recently completed a draft Walleye Management Plan which calls for a significant number of walleye fingerlings and pond renovations would assist in meeting these requests.

Decreasing warm/cool water production would have a limited effect on cost savings for most of the species produced. Fry are inexpensive to produce and pond culture of fingerlings is also extremely cost effective. To decrease production within warm/cool hatcheries, the most expensive fish should be evaluated. Some of these species include musky, tiger musky, paddlefish and channel catfish. Musky and tiger musky are high priority species required by DFM. Channel catfish are stocked throughout the state but have a lower priority. Channel catfish

culture within the PFBC is much more expensive than in other areas of the country with longer growing seasons. Purchase of fingerlings should be evaluated against in-state culture for this species. Paddlefish are used in a restoration stocking program. Paddlefish stockings will soon be evaluated to determine the success of this program and may be discontinued. There are also some species which are cultured in low numbers and stocked in small quantities. Staff within DFM should carefully weigh the need for these low number species in relation to the cost to grow and transport them.

Hatchery Production Summary

In summary, trout hatchery consolidation would lead to cost savings in labor and facility cost but several factors will impact the feasibility of this option. Trout hatcheries are at carrying capacity to protect the receiving streams' water quality. Increases in fish and feed would make effluent water quality more difficult to manage. If this happens, any production gains that were shifted to other facilities would likely be lost to improve the effluent quality and the original hatchery that was closed would have to be re-commissioned if it was still functional. Maintaining the current number of facilities will increase the flexibility of the PFBC to improve effluent quality, protect the aquatic environment and maintain appropriate production levels. Consolidation of trout hatcheries is possible if program changes take place such as stocking smaller trout but the same number as the PFBC currently does. This would have the benefit of reduced expenditures and increasing effluent water quality. Without lowering the pounds of trout produced, major infrastructure and effluent treatment changes would need to take place.

Consolidation of W/C hatcheries increases the risk of AIS substantially, considering that brood fish are captured from the wild. Separation of facilities and disease testing before transferring fish between hatcheries has helped the PFBC maintain production and work around disease issues. The smallest W/C hatchery has an annual budget of approximately $400,000. If that facility were consolidated into the larger W/C hatcheries, some of the staff (current personnel cost $300,000) would likely move to the other facilities and pond/hatch house renovations would be required to rear the additional fish. A detailed cost/benefit analysis would be required which includes engineering designs, FTE analysis and cost for renovations.

Cost savings can be realized by decreasing the size of stocked trout. There are many options within this proposal; from reducing size of one species at one hatchery to reducing sizes of all trout species at all hatcheries. This option would lead to cost savings at specific hatcheries and also assist with improving effluent water quality at hatcheries that need additional stream protection.

Cost Savings Strategies

Overview

As considered by the work group, cost savings options available to the PFBC include hatchery consolidation, varying fish production, and implementing select cost savings and revenue enhancement practices. Guiding these options are the following assumptions the work group operated under:

1. Fish production practices are expected to be assessed by the workgroup with alternatives presented as options.
2. Production options can not result in a net loss in the number of stocked trout.
3. Cost savings ideas can impact angler services.
4. NPDES permit requirements must be met.

For reasons outlined below, the work group concluded hatchery consolidation is not a viable option at this time but is feasible if program changes are implemented.

Varying fish production can realize savings between $88,000 and $480,000. Other cost savings options can generate an additional $75,000 to $130,000 in savings. Revenue options can bring the Commission approximately $180,000 annually. These options represent a minimum estimate of savings since combining options can result in greater savings than each of items addressed individually. It is difficult to evaluate all of the possible combinations of options and their interactions within the scope of this document.

Hatchery Consolidation

The consideration of hatchery consolidation was examined within the context of trout and warm/cool hatcheries to determine the potential to leverage production that could result in the need for fewer hatcheries. The challenges to consolidation include stream protection issues, the need to fund projects to address effluent issues and production capacity expansions, changes in fish production goals and increasing the vulnerability to aquatic invasive species pathogens. Given these challenges, the work group concludes that any hatchery consolidation should wait until the new warm/cool water species plans are implemented, new effluent treatment systems have been evaluated, and/or the Division of Fisheries Management changes the requested size/numbers of stocked trout. When these items are accomplished, a workgroup focused on the new production goals should be formed to decide on the best method to achieve consolidation (if cost effective), reach production goals and minimize costs. With these goals, a group can evaluate wages, distribution costs, infrastructure needs and combinations of consolidation possibilities.

Trout Hatcheries

In examining the trout hatcheries, the major issues for consolidation include current stream protection and effluent permits and the need to fund projects to reduce nutrients in the effluent

as shown in Figure 13. In addition, Corry, Oswayo, and Reynoldsdale should be maintained to meet regional stocking needs. They also have less sensitive receiving streams than other trout hatcheries and less infrastructure required to treat their effluent water. As described above in the Hatchery Production Factors section, consolidation could be accomplished if the request for eleven inch adult trout were reduced to ten inches. At that point, an evaluation of the most effective means of consolidating hatcheries should be undertaken.

Figure 13: Trout Hatchery NPDES Permit Issues and Effluent Infrastructure Needs

Stream Protection Issues	Effluent Infrastructure Project Needs for Possible Consolidation
• Huntsdale and Tylersville have biomass limits • Bellefonte, Oswayo and Corry currently have challenging ammonia limits • Pleasant Gap and Benner Spring must reduce water usage to minimize total suspended solids. Tylersville may need to reduce water usage as well depending on future permit conditions • Any additional feeding at hatcheries would increase nutrients in effluents • Future expectations include lowering biomass at hatcheries in order to further meet stream protection needs	• Huntsdale: biomass restriction lifted, PCB issues finalized, build new rearing units in old B-series • Tylersville: biomass restriction lifted, TSS maintained below permit levels • Bellefonte: need to decrease ammonia concentration in the effluent • Reynoldsdale: new raceways built with higher rearing densities • Oswayo: may increase densities if new well water system provides sufficient flow • Corry: may increase densities if new well/pipeline provide sufficient flow • Pleasant Gap and Benner Spring: do not recommend higher production due to keeping TSS levels low and the need to minimize flows

Warm/Cool Hatcheries

Consolidation of any W/C hatcheries while still maintaining current W/C production would only be possible with major renovations to ponds/hatch houses at the remaining facilities. Currently, 17 ponds (16.4 acres) are non-productive and 21 ponds (17 acres) need repairs to maximize their productivity. Consolidation of the smallest W/C hatchery may not have a substantial effect due to its' limited operations budget.

Reducing the number of W/C hatcheries also increases the risk level of AIS pathogens (such as VHS) and organisms (such as zebra mussel). If a facility must be shut down due to AIS issues, there would be reduced W/C stocking. Biosecurity is a major factor for successful fish production.

Varying Fish Production

Three options were identified by the work group that would lead to savings. These are shown in Table 2. The estimated savings realized by the options range from approximately $88,000 to $480,000 depending on the mix of options pursued.

Table 2: Savings Estimates from Varying Fish Production

Option	Action/Notes	Savings Estimates	Angler Impact
1. Decreasing brook trout size at stocking	Reducing the size of brook trout to 9.5" to reduce feed consumption. Another benefit is less waste created in their production which would help effluent management and meeting NPDES standards.	$88,000	Some trout will be smaller
2. Decrease all trout size	Reduce the average size of trout from 11" to 9.5". Assuming the number of trout stayed the same at 3.2 million adults, total production decreases from 1.9 million to 1.1 million pounds.	Up to $480,000	Smaller trout available for anglers
3. Decrease trout size but increase the number of trout	Reduce size of trout to 10" or 9.5", but increase numbers to address possible angler dissatisfaction with smaller trout (see Table 1).	$150,000 to $280,000	Smaller trout More trout for anglers

The opportunity for savings by varying the production of warm/cool species is limited. Production costs are low compared to trout production costs. Some minimal savings can be realized by the Division of Fish Management evaluating the need for some of the lower priority species and the effectiveness of the channel catfish and paddlefish programs (see Table 9 in Appendix L).

Cost Savings and Revenue Options

The work group identified 13 ideas that would either lead to cost savings or generate revenue. One, pursuing algae abatement options, was dropped because the preferred method, a natural cover using water hyacinth, is a non-native species. Another option, reducing cooperative nursery site visits, is not recommended because of the importance of contact with cooperative nursery volunteers and the minimal potential savings. Details on each area can be found in the referenced appendix. Details on algae abatement are included in Appendix P.

None of the options negatively impact NPDES permits or trout numbers. Improved stocking practices and establishing a year-round season for stocked trout might have a negative or positive impact on the angler's experience. Table 3 summarizes the 12 options and their possible impact where it could be estimated.

The greatest potential comes from revenue options, with the majority coming from advertising on stocking trucks. Revenue estimates range around $180,000 to $185,000. For those options where cost savings could be estimated, total savings of between $75,000 and $130,000 can be realized.

Costs are estimated for the budget line item for pre-maintenance expenses ($50,000 - item 3 in the table) and a pilot study to determine if purchasing eggs or fish would lead to savings ($5,000 - item 5 in the table). Bird netting is recommended but only when a cost/benefit analysis shows the feasibility and savings.

Table 3: Work Group Cost Savings and Revenue Options

Idea (Appendix Reference)	Costs	Savings Estimate	Revenue Estimate	Notes
1. Bird predation reduction through netting (D)	No qualified bids received	$15,000 to $20,000 in feed cost		Feed savings, less brood, eggs and fingerlings needed to reach adult goals. Additional benefits to achieving and maintaining biosecurity.
2. Improve stocking practices to maximize logistics and adjust for use (E)	None	$60,000 to $80,000		Substantial staff time needed to evaluate changes in stocking assignments and schedules.
3. Establish year-round season for stocked trout (F)	None	Not determined		Will improve fish culture efficiency but angler impact needs to be determined.
4. Create budget line item for pre-maintenance (G)	$50,000	Not determined		It is estimated $50,000 a year for the special projects and programs line item would provide program efficiencies. Savings would come from better planning and budgeting of maintenance projects rather than emergency repairs which must be done quickly without seeking most cost effective solution.
5. Maximize put-grow-take production (H)	None	Not determined		Concept needs to be tested using targeted streams to study the survival rate of fingerlings.
6. Purchase eggs or fish (I)	Estimate $5,000 for a pilot study	Nearly equal to costs		Cost studies have shown a one to one ratio – for every dollar spent on eggs, there is a dollar saved in labor, feed, and chemicals. Other benefits include additional rearing space, improved effluent, and labor available for other jobs. Pilot study is recommended for the fall of 2012 for Corry and Oswayo.
7. Reduce Fish Culturist overtime (J)	None	Zero to $30,000		Some savings would be realized from careful planning and scheduling. The majority of overtime costs are non-negotiable as long as the PFBC continues to stock fish throughout Pennsylvania.
8. Gain timber revenue from hatchery property (K)	None		$36,000	Average for past 10 years. Includes spike of $242,461 in FY 01-02. Better timber management can result in higher annual revenue.
9. Prioritize production by species to guide future reductions (L)	None	Variable by species.		Channel catfish and paddlefish cost information from 2009 are $77,219 and $34,691 respectively.
10. Advertise on PFBC stocking trucks (M)	None		$130,000	Likely a high estimate based on the seasonality of stocking truck use.
11. Use fish food vending machines at hatcheries (N)	Minimal to purchase equipment		$15,000 to $20,000	May improve interaction of visitors at the hatcheries.
12. Reduce Co-Op Nursery site visits (O)	None	$3,900		*Savings do not justify loss of contact with coop nurseries.*
Totals	$55,000+	$75,000 to $130,000	$180,000 to $185,000	

Note: Savings impact excludes number 12, reduce co-op nursery site visits.

Other Strategies

The work group identified 25 other ideas that can be used as the basis for further cost savings potential. Those receiving votes are shown in parenthesis in Table 4.

Table 4: Other Strategies for Cost Savings

Prior/Current Efforts	New Ideas
1. Variable speed pumps (3) 2. Increase efficiency of Low Head Oxygenation systems (1) 3. Full time equivalent analysis (2) 4. Surplus vehicles (BLE, utility versus trucks, cutting fleet) 5. Zoned heating/lighting (2) 6. Lower egg takes (1) 7. Need based purchasing 8. Contract out for maintenance jobs 9. Flow management through hatcheries (1)	1. Reduce excessive vehicle idling 2. Guaranteed Energy Savings Act utility projects (1) 3. Conduct energy audits (1) 4. Geothermal energy using fish culture water (1) 5. Stock brood when done spawning (2) 6. Hatchery work prioritization and frequency (1) 7. Reduce complement of hatchery managers (for those close in proximity) 8. Solar and wind energy 9. Co-op workers at hatcheries 10. Complete pond projects 11. Selling live product to the public 12. Natural gas wells for heating supply at hatcheries (4) 13. Sale of fish production by-products 14. Heat recovery systems 15. FERC related mitigation funds for American shad restoration 16. Evaluate efficient utilization of warm/cool stockings

Next Steps

The most important step in containing the cost of hatchery operations is for the Division of Fisheries Management to continue to refine the requests for fish from the Division of Fish Production. The DFM requests drive the entire fish production system and provide each hatchery with goals pertaining to fish species, size and numbers. The DFM must determine the number of trout and warm/cool water fish needed to create the desired fisheries around the Commonwealth. Stockings that do not produce the desired results should be modified or eliminated. The DFM must have the time and resources needed to evaluate stocked fisheries for success. The DFM is in the process of addressing these stocking programs consistent with the agency strategic plan. In 2009 the agency completed a statewide trout plan which is currently being implemented. Also under development are statewide walleye, musky, and catfish plans. A striped bass/white bass plan will follow.

Several of the strategies proposed within this report may be accomplished in a relatively short time frame while others will require more long term planning and input by Commissioners and anglers.

Short Term Implementation

Strategies that may be undertaken almost immediately include those that are initiated within the Division of Fish Production.

1. Bird Netting: This will be added to the hatcheries where there is the greatest cost/benefit ratio in order to increase fish survival, decrease feed cost and decrease effluent waste. Additional netting will need to be budgeted.
2. Purchase Eggs/Fish & Maximize Trades: Staff will continue to seek trades with other states for species that are costly for the PFBC to rear. Pilot studies will be initiated on rainbow trout egg and channel catfish fingerling purchases. A cost/benefit analysis will be conducted in conjunction with the pilot studies.
3. Reduce overtime assignments for fish culturists: Hatchery Managers will implement the strategies recommended within Appendix G of this report.
4. Fish feed vending machines: Machines will be purchased and a pilot study initiated at a few of the high visitation hatcheries to determine the degree of revenue generation and visitors positive or negative reaction.
5. Timber Revenue: A Memorandum of Understanding has been developed with the Pennsylvania Game Commission to allow them to provide a timber management plan for hatchery properties with revenue potential.
6. Continue to refine previous cost savings strategies in respect to personnel, feed, utilities and fish distribution.

Long Term Implementation

1. Stocking Options: As stated above, DFM requests drive fish production operations. The DFM should undertake discussions with Commissioners and anglers to determine what changes in stocking options will have the greatest benefit or least negative impact on angler services. These options include:
    - Eliminate early season trout stocked waters program and combine fall, winter, and later winter stockings on those waters
    - Initiate feasible adjustments to stocking assignments based on PSU Distribution Report and/or stocked trout residency concerns
    - Eliminate fall stockings on some waters with minimal use and remove spring trout stocked waters with extremely low use
2. Maximize Put-Grow-Take: The DFM will continue to evaluate fingerling trout stockings in relation to cost and providing a successful fishery.
3. Program Prioritization: As the DFM refines the requests for stocked fish, DFP will eliminate or minimize lower priority programs that are not cost effective or providing sufficient services to anglers.
4. Advertising on hatchery trucks: The DFP will work with communications staff to develop bids for advertising services for the sides of stocking trucks.
5. Trout Production Options: If the PFBC determines trout production should decrease, public meetings should be held to determine if smaller trout or less trout would be acceptable to anglers. Several variations of reducing trout numbers and/or trout size exist and a comprehensive cost analysis needs to be undertaken. If production changes are determined, a workgroup should be formed to determine hatchery consolidation strategies.

Appendix A: DFP Budget and Expenditure Details – FY 10-11

This table includes the most recently available fiscal detail information for the Division of Fish Production including administration, Northern, Southern Hatcheries and Production Services. *Additional expenditure information has yet to be posted for the fiscal year.*

Category	Commitment Item	Current Budget	Actual Expends
Personnel Services	Salaries-RegHour	$5,249,197.00	$4,589,118.83
	Salaries-ShiftDiff	$1,000.00	$392.88
	Salaries-HghClassPay	$0.00	$8,111.17
	GenPayInc-CashPymt	$0.00	$20,351.00
	Repay Sal Overpay	$0.00	$ (677.60)
	Wages-RegHour	$639,378.00	$395,336.52
	OTHourStrTimeRate	$262,914.00	$286,103.43
	HospIns-SS	$678,600.00	$602,560.51
	SocSecurityCont-SS	$381,457.00	$322,028.53
	Medicare-SS	$89,213.00	$75,313.09
	RetCont-SS	$231,896.00	$218,342.40
	StatWrkmnInsPremPymt	$120,963.00	$103,649.10
	EmpGrpLifeIns-SS	$14,588.00	$11,548.05
	HealthBenefits-SS	$1,357,200.00	$1,167,457.03
	UnempComp-SS	$0.00	$43,163.80
	Leave Payout Assmt	$110,745.00	$99,105.03
		$9,137,151.00	**$7,941,903.77**
Operational Expenses	Travel	$53,900.00	$27,415.96
	Training	$28,300.00	$7,662.00
	Telecomm-Rec	$94,000.00	$70,836.34
	Telecomm-NR	$1,000.00	$9,779.05
	Telephone/Equipment	$0.00	$754.00
	Heating Fuel	$244,500.00	$222,794.33
	Water and Sewerage	$24,800.00	$27,518.22
	Electricity	$440,700.00	$434,437.33
	Legal Services/Fees	$0.00	$0.00
	Specialized Services	$336,904.00	$12,888.82
	Other Specialized Se	$0.00	$208,250.55

Category	Commitment Item	Current Budget	Actual Expends
	ContEDPSvc-VndProv	$1,800.00	
	ContNon-EDPSvc	$0.00	$328.25
	ContMaintSv-EDP	$1,500.00	
	ContMaint-Non-EDP	$62,200.00	$62,561.44
	ContRepairs-Non-EDP	$47,000.00	$39,221.30
	ContRepairs-MotEq	$30,600.00	$21,461.99
	RealEstate	$500.00	$570.61
	Vehicles	$1,400.00	$10,630.34
	Other Rentals/Leases	$2,600.00	$5,098.80
	OfficeSupplies	$27,900.00	$32,475.58
	HousekeepingSupplies	$12,100.00	$9,258.23
	EducationalSupplies	$1,700.00	$188.00
	Miscellaneous	$398,646.00	$486,878.79
	MedicalSupplies	$400.00	$1,496.12
	LaboratorySupplies	$43,500.00	$33,533.83
	Drugs	$59,200.00	$74,390.99
	EDPSoftware	$0.00	$12,204.45
	OthComputerEq	$0.00	$1,342.09
	Furniture/Fixtures	$0.00	$1,407.41
	OthEquipment	$0.00	$5,596.94
	Materials and Suppli	$0.00	$3,008.39
	Fuels	$312,000.00	$293,697.33
	Aggregates and Other	$0.00	$642.29
	Motorized Equipment	$200,600.00	$165,972.30
	Miscellaneous Equipm	$0.00	$428.99
	Postage	$8,200.00	$2,490.19
	Freight	$7,200.00	$5,303.63
	Printing	$100.00	$2,696.00
	Subscriptions	$3,100.00	$2,315.73
	Membership Dues	$200.00	$77.00
	Conference Exp	$6,400.00	$947.50
	Wearing Apparel	$0.00	$34,715.32
	Food	$5,650.00	$5,492.41
	Fish Food	$1,456,500.00	$1,346,649.34

Category	Commitment Item	Current Budget	Actual Expends
	Liq Oxygen Fish Prop	$295,500.00	$295,207.20
	Insur/Sur/Fid Bonds	$32,800.00	
	IntChrg-LateVendPmts	$0.00	$4.34
	Oth Op Exp	$20,600.00	$13,645.58
		$4,264,000.00	**$3,994,275.30**
Grants	St Pymts-Gov subr-CE	$0.00	$75,000.00
	SPymtInsHEdNonSt	$0.00	$77,035.80
		$0.00	**$152,035.80**
Overall Result		**$13,401,151.00**	**$12,088,214.87**

Appendix B: Division of Fish Production Permanent Staff Level History – 1990, 2000, 2011

Location	Employees		
	1990	2000	2011
Administration	6	6	6
Fish Production Services	15	16	12
Bellefonte	11	11	11
Benner Spring	13	11	10
Big Spring	11	11	1
Corry	8	7	7
Fairview	6	6	5
Huntsdale	18	17	12
Linesville	11	10	9
Oswayo	9	7	8
Pleasant Gap	16	11	9
Pleasant Mount	11	10	9
Reynoldsdale	10	8	8
Tionesta	8	7	8
Tylersville	4	12	10
Union City	4	4	4
TOTALS	161	154	129
Decrease from 1990 - 2000		4%	
Decrease from 1990 - 2011			20%

Note: Cooperative Nursery Unit staff are currently within Fish Production Services. In 1990 and 2000, they were located in another division. For the sake of consistency, Coop Unit staff numbers are included under Fish Production Services for all years.

Appendix C: Adult Trout Distribution and Cost Statistics, FY 06-07 to FY 10-11

FY	Trout Stocked	Trips		Hours			Miles			Cost	
		#	Trout/ Trip	Total	Ave Trip	Trout Stocked per Hour	Total	Ave Trip	Trout per Mile	Total Cost	Per Trout
06/07	3,361,188	1,498	2,244	15,760	10.5	213	314,518	210	10.7	$475,804	$0.14
07/08	3,422,449	1,545	2,215	15,560	10.1	220	325,388	211	10.5	$477,860	$0.14
08/09	3,237,142	1,434	2,257	14,606	10.2	222	302,103	211	10.7	$471,119	$0.15
09/10	3,267,423	1,447	2,258	14,637	10.1	223	304,217	210	10.7	$475,463	$0.15
10/11	3,238,396	1,418	2,284	14,137	10.0	229	296,781	209	10.9	$462,049	$0.14

Appendix D: Bird Predation (Larry Hines)

Assessment

Rationale for Initiative: Avian predation on hatchery fish has long been a problem. Hatchery losses can measure in the thousands of dollars depending on numbers and size of fish lost. Birds also carry parasites and disease and cause stress on remaining fish. Developing methods to decrease/eliminate bird predation is necessary for the long term economic production of fish by the PFBC. Many of the hatcheries already have some sort of bird netting to prevent excessive predation. Three trout hatcheries without netting suffer from significant bird predation on fish.

Current Cost Information: Covering hatcheries with netting is expensive and time consuming. Cost per square foot range from $0.25 to greater than one dollar depending on design and type of materials used.

Potential Barriers: The main barrier to covering hatcheries with netting is cost. Due to the size of hatchery areas needing to be covered, costs will be thousands of dollars per hatchery (previous estimates of greater than $100,000 for some facilities). A more economical solution is lethal harvest. The Wildlife Services Division of the USDA can help develop a plan to remove nuisance birds through whatever means necessary for no cost. However, this option is limited by concerns over liability issues and public reaction to bird harvesting by the PFBC.

Background/Analysis Work: Currently three PFBC trout hatcheries, Reynoldsdale, Bellefonte and Tylersville, remain uncovered by bird netting. Other trout hatcheries are covered to varying extents. The fish losses to birds and other predators at these three facilities far exceed losses at any other facility so covering them seems like the logical thing to do. A reduction in the loss of smaller fish (3 inches) has already taken place, but reducing the loss of larger fish must occur. However, covering these hatcheries with netting will be costly and it must be determined if there is a sufficient cost-benefit ratio to invest in bird netting or other structures. Reducing bird predation is also part of the biosecurity plans for hatcheries.

Netting has been successful at reducing bird predation at PFBC hatcheries. Other methods such as laser lights and harassment techniques have shown promise, but birds become accustomed to the noises and labor is required to enact these methods. Netting and lethal harvest have proven the most successful. Bird predation has increased dramatically in the hatcheries without netting and the number of large bird predators (primarily great blue herons) staying throughout the winter and nesting near hatcheries has been on the rise. Reynoldsdale State Fish Hatchery has a heron rookery located within site of the trout ponds that contains over 80 nests.

Impact

Savings Estimate: It will be difficult to measure an actual cost savings on bird exclusion from hatcheries due to the complexities and interaction of various costs. The most obvious savings that can be measured is feed. Less fish need to be spawned and raised to make up for fish eaten by birds and this leads to a small direct feed savings. Less brood are required and less space in

hatch houses is needed. Labor would not be reduced because the majority of labor is needed to take care of the rearing facilities. The Northern Production Manager estimated conservative feed savings of $15,000 to $20,000 per year by covering the remaining three trout hatcheries.

Early in 2011, requests for bids were sent out to cover the trout rearing areas at Reynoldsdale. Unfortunately, no bids were submitted. However, a quote from an unqualified vendor (missed the deadline) was submitted to the PFBC purchasing department and the bid was almost $100,000 over the estimated amount of $44,000. With the lack of interest in commercial vendors to provide bird netting at Reynoldsdale the staff decided to construct bird exclusion devices in-house. That work is ongoing and effectiveness will not be measurable until the summer of 2012.

Showing the benefit of bird exclusion in dollars will not be easy and may not reflect the entire benefit to the hatchery. Savings would occur in manpower, chemical treatments and feed. However, except for feed where data is available, it is very difficult to measure how manpower and drug treatments could be reduced.

The fish loss estimates for the hatcheries are by size of fish (Table 5).

Feed conversion factors were used to estimate the approximate pounds of feed saved by not having to feed the "lost" fish. Feed cost for fish eaten by birds varies by hatchery but is estimated between a few thousand to twenty thousand dollars per hatchery per year. A netting structure should be able to pay for itself before the end of the useful life of the structure. Netting typically lasts five to 10 years and support structures have a useful life of 20 or more years.

Table 5: 2009 PFBC Trout Hatchery Fish Bird Predation Loss Estimates

Hatchery	Five Inch Fish	Eleven Inch Fish
Bellefonte	25,000	5,000
Benner spring	36,846	0
Corry	8,000	10,000
Huntsdale	15,000	3,000
Oswayo	1,000	1,000
Pleasant gap	3,500	2,000
Reynoldsdale	113,000	10,000
Tionesta	8,000	0
Tylersville	23,000	0
Totals	233,346	31,000

The high cost of commercial netting structures provides a lower cost-benefit ratio than structures constructed by staff. Therefore, less expensive but practical solutions need to be implemented. As an example, Pleasant Gap has constructed a simple "pup tent" design that excludes large birds and implemented this at a very low cost. Reynoldsdale staff are in the process of installing seasonal netting over their ponds to protect them in the spring through fall and dismantle it in the winter. Costs increase substantially for netting that is structurally capable of handling snow and ice. This system will reap benefits for most of the year.

Other benefits are more qualitative at the hatcheries. Uncovered fish hatchery raceways and ponds attract large numbers of predatory birds looking for an easy meal. Birds are a host for parasites and diseases and when their waste enters the hatchery water they not only spread disease but also reduce water quality. With their presence also comes increased stress on fish which can cause diseases to increase. When hatcheries are netted there will be less stress on fish and reduced treatments for these parasites and diseases. Less treatments means less drugs used resulting in a cost savings and better water quality.

Another benefit is when predation is high hatcheries must raise higher numbers of extra fish to meet stocking quotas. These extra fish serve as a "buffer" to feed predators while allowing enough fish to survive to meet hatchery quotas. When fish hatcheries no longer have to produce "buffer" fish, hatchery effluent discharges benefit from reduced feed fed and less fish waste. It should result in less waste management and lower ammonia outputs which will reduce the chance of an NPDES violation and improve water quality.

Indirect losses to predation will also decline. When predator numbers are high many of the daily mortalities picked up by culturists are the result of contact with a predator. Fish that are pinched or pierced by birds but not eaten will show up as mortalities a few days later. It is beneficial in terms of feed savings, lower inventories, reduced chemical usage and improved effluent management when fish are protected from birds.

Angler Services Impact: Depending on species, anglers could see more fish stocked (especially for W/C species).

Evaluation Method for Follow-Up: Reduction in feed usage and cost. Reduction in eggs and fingerlings needed to set up ponds for production. Before and after visual counts of predatory birds in action.

Implementation

Internal PFBC/Other Coordination/Assistance: Netting projects are part of the Special Projects list within the PFBC budget process and must compete with other agency projects. Getting the required budgetary funding is required for implementation. Assistance with netting installation from the Bureau of Engineering and Property Services (BEPS) would be less expensive than contracting the work out. However, BEPS has not been able to assist with as many hatchery projects recently due to other priority projects.

Work Plan and Timetable: Netting projects and bird depredation plans must keep moving forward. In 2011, Reynoldsdale SFH will cover many of their ponds with low cost netting during spring – fall to reduce heron predation on trout. Installing the netting seasonally is less costly than permanent structures. After hatchery renovations are completed, a more permanent system can be installed. A new prototype system was installed at Bellefonte SFH and will be reviewed for its effectiveness and ability to withstand winters during 2011-2012. Tylersville SFH is temporarily covering select raceways with netting but needs more netting to prevent adult mortality from birds. Managers and staff will work on finding economic systems that work for each facility.

Appendix E: Stocking Options (Thomas Cochran and Gerald Barton)

This topic evolved into three options that, if implemented together or separately, could result in cost savings or at the least, better trout stocking efficiency.

- Eliminate early season trout stocked waters program and combine fall, winter, and later winter stockings on those waters
- Adjust stocking assignments based on PSU Distribution Report (Strategic Route Planning for Fish Stocking) and/or residency concerns
- Eliminate fall stockings on some waters with minimal use and remove spring trout stocked waters with extremely low use

PSU Distribution Report

The PFBC contracted with The Pennsylvania State University Department of Supply Chain and Information Systems to model the logistics of our spring adult trout stocking schedule based on our operations assumptions and the restrictions placed on our stocking schedule. The result was the Strategic Route Planning for Fish Stocking – Final Report, June 2011. The following is the Executive Summary of this report:

> *This report outlines the development of a system to optimize deliveries of fish for the Pennsylvania Fish and Boat Commission (PFBC). This system determines the best assignment of hatcheries to waterways conservation districts (WCD) and stocking points to meet a set of operational constraints and to minimize the number of miles traveled in delivering fish.*
>
> *We have used this system to compare the assignments with the existing manual PFBC process for the 2010 stocking schedule. Additionally, we examine the effect of changing some of the operational policies of the PFBC. These include the restriction that each WCD receive fish from only one hatchery. We also consider the option of having the system determine the best mix of fish species to cultivate at each hatchery, given an overall hatchery capacity limit. For both cases, we find an opportunity for savings by relaxing these restrictions.*
>
> *Overall, we recommend that the PFBC allow each WCD to receive fish from up to three hatcheries. Additionally, we recommend slight realignments of the proportions of trout hatchery capacities to each of the three primary species (brook, brown and rainbow).*

The author (T.P. Harrison) of the report suggests that a 10-15% savings may be seen over current distribution costs if the PFBC relaxes the restrictions outlined in the text above.

Assessment

Rationale for Initiative: To minimize stocking expenditures, improve fish distribution efficiency, improve utilization of stocked trout, and address opening day stocked trout availability in areas with trout residency concerns.

Current Cost Information: Annual fish distribution costs have been about $500,000 per year over the past 5 years.

Potential Barriers: Acceptance of recommended regulation changes; acceptance of elimination of stocking or a reduction in stocking frequency; scheduling of stockings from multiple hatcheries to individual Waterways Conservation Officer districts.

Background/Analysis Work: Analyzed historical distribution cost data; calculated reduction in number of stocking trips if winter and late winter stockings are combined; collected angler interview data from early season stocked trout lakes in support of a year round season; assessed availability of adult stocking trips for use in residency concern areas if early season trout stocked waters program was eliminated; conducted opening day angler counts on trout residency waters and determined a cost-benefit ratio based on angler use and known angler expenditures for trout fishing based on angler use and harvest surveys completed in 2005.

Impact

Potential cost savings estimates are listed by number to correspond with the three options listed above.

Savings Estimate:

- Estimated $8,000 - $10,000 savings by combining winter and late winter stockings of adult trout. Having 30 to 40 truck trips available for stocking streams with residency concerns closer to opening day with the elimination of the early season trout stocked waters program. This would provide better use of our stocked trout to anglers fishing in residency problem waters.
- According to the PSU Distribution Report, distribution costs could decrease by 10% to 15% compared to current levels. This could mean a decrease in overall adult trout distribution costs of $50,000 to $75,000 per year or at the least, minimizing future cost increases due to fuel prices and other uncontrollable variables.
- Elimination of stockings on waters with minimal use will result in fewer trips which will decrease distribution costs. An estimate of savings will not be available until waters are identified.

Angler Services Impact: Improve utilization of adult trout by stocking more waters with residency problems closer to opening day; increased angling opportunities on waters currently managed under the early season trout stocked waters program; increased number of adult trout available in November\December with decreased numbers available in February; perception of no

opening day on early season trout stocked waters. Elimination of traditional, adult stocked trout water may negatively impact an individual angler's trout fishing experience.

Evaluation Method for Follow-Up: Track fish distribution costs; angler use surveys on waters removed from early season trout stocked waters program; evaluate changes in trout residency and angler use in waters with residency concerns. No formal follow up evaluation is planned. Public comment will likely reflect negative comments of those most impacted.

Implementation

Internal PFBC/Other Coordination/Assistance: Complete evaluation of the PSU Distribution Report; PFBC DFM, DFP, and BLE staff.

Work Plan and Timetable:

- Stocking assignment changes to be implemented upon evaluation of PSU Distribution Report (2013 at the earliest).
    - Hatchery Managers will prepare 2012 stocking schedules as normal and based on the PSU Distribution Report as given by the Southern Production Manager.
    - Southern Production Manager and Stocking Coordinator will compare scheduled assignments to look for errors, omissions and inconsistencies. Data will be compared to determine if mileage is reduced by the computer model and to what degree.
    - If savings are realized, hatcheries will stock per standard PFBC schedules for 2012 but will start to adjust production numbers for new assignments in 2013 (staff need time to adjust production of species and numbers)
- Elimination of early season trout stocked waters program (requires Commission approval, 2013 at the earliest).
- Elimination of fall stockings on waters with low use to begin in 2012.
- Elimination of waters with low use to begin in 2012 and continue as more information becomes available through additional angler counts.

Appendix F: Establish Year-Round Season for Stocked Trout (Thomas Cochran, Gerald Barton, David Miko)

Assessment

Rationale for Initiative:

1. Optimize adult trout production at PFBC hatcheries
2. Maximize adult trout distribution efficiency by not having to wait until a specific date to distribute fish
3. Provide more enforcement time for WCOs during current stocking period

Current Cost Information: Current expenditures could be reduced by being able to stock fish as soon as they reach desired size and remove spent brood stock from hatcheries at the end of spawning season as opposed to waiting several months until the traditional spring opening day period. While this approach would allow for more flexibility within the production and delivery cycle, the majority of stocked trout would still be required to be stocked in a few months beginning in early spring and ending in early summer (typically adult trout stocking is completed by June 15). This is necessary to meet Pennsylvania anglers' trout fishing habits as well as the environmental conditions necessary to support stocked trout. The vast majority of targeted stocked trout fishing occurs between March and June. While important and in some instances cost effective, relatively few anglers take advantage of the fall, winter and late winter stocked trout programs. While some adult trout stocking should continue to occur during these time periods, it should be limited to only those instances where the benefit of stocking have proven to outweigh the associated costs. The fall, winter and late winter program was identified under Issue 15 of the Strategic Plan for the Management of Trout Fisheries in Pennsylvania as a program where cost savings may be realized. Adjustments to the stocking strategies within this program are currently underway and will continue through 2014 as Area Fisheries Managers evaluate the performance of individual waters managed within this program.

Potential Barriers: Acceptance by Commissioners and the public. There would be no closed season for stocked trout, thus conversely, no opening day. Although establishing a year-round season for stocked trout would allow anglers to fish year-round and theoretically providing anglers with more opportunities to fish, the fact remains that Pennsylvania's anglers continue to have a very positive attitude toward opening day. This was demonstrated by the results of the 2008 Pennsylvania Trout Fishing Survey (Responsive Management 2008) which documented that 74% of Pennsylvania's trout anglers feel that the opening day of trout is important. One of the largest unknowns associated with eliminating the opening day of trout season is the impact on fishing license and trout stamp sales. It has always been assumed that there would be a substantial reduction in the number of fishing license and trout stamp sales. Responsive Management attempted to address this concern by asking trout anglers if they would still purchase a license if the opening day of trout season was eliminated. An overwhelming majority (93%) of respondents indicated that they would continue to purchase a fishing license.

The 2011 fishing license sale patterns provide support for the results of the Responsive Management survey. During the 2011 season, weather patterns and high stream flows during both the southeast regional opening day and the traditional opening day made for extremely poor fishing conditions throughout much of the Commonwealth. As an apparent result of the poor fishing conditions during the spring of 2011, fishing license sales were 15% behind the 2010 sales over the same time period. This could provide some insight into the importance of opening day. However, as respondents indicated during the Responsive Management survey, many anglers still purchased a fishing license as sales recovered and were less than 4% behind the 2010 sales through July.

Background/Analysis Work: The ability to stock (i.e. remove from PFBC care) these fish as soon as they reach target size will result in less manpower, less feed, and less liquid oxygen being used. The DFM is currently looking at either eliminating some fall stockings or increasing the numbers allocated to some water to encourage more use in the fall.

Impact

Savings Estimate: Some savings is presumed due to having fish on-site at PFBC hatcheries for a shorter period of time prior to stocking. However, a specific dollar amount is not available at this time. Similar numbers of fish and stockings would occur so most of the impact would be increases in efficiency at the hatcheries by moving the fish through the system faster and scheduling stockings in ways to reduce overtime. The size of the stocking truck fleet could be reduced slightly but savings would be small. Reducing the fleet by 2-3 trucks would reduce overall fixed asset costs by $5,000-10,000 per year.

Angler Services Impact: No closed season on stocked trout waters would provide more potential angling days for those wishing to fish for trout. Under the current opening day system, anglers assume that due to traditional PFBC stocking practices there are sufficient numbers of stocked trout available on opening day. If the PFBC moved to a year-round trout season anglers would need to take the initiative to gather PFBC adult trout stocking data if they wanted to insure that they were fishing over a dense population of freshly stocked fish to increase their chances of success. With or without an opening day of trout season, anglers will continue to be advised of trout stocking areas and dates.

Beyond angler service impacts there is another impact that needs to be considered before the elimination of opening day is considered in favor of a year-round season for stocked trout. That is the positive economic influence on many rural communities that often rely on the influx of anglers into their regions to fish on the opening day of trout. An attempt to estimate the regional economic impact that this would have is beyond the scope of this report but it is an important consideration that should be made prior to implementing this initiative.

Evaluation Method for Follow-Up: Track cost/stocked trout and license sales over time.

Implementation

Internal PFBC/Other Coordination/Assistance: Commissioners, PFBC Executive Office, DFM, DFP, and BLE staff

Work Plan and Timetable: Implementation of this initiative requires careful consideration as the opening day of trout is a very traditional event. In forming a workgroup(s) to address this issue, the following topics, at a minimum, need to be considered:

- economic impact
- license sales
- angler attitudes
- rulemaking implications

This would also require numerous meetings to be held around the Commonwealth to gather public input. Due to the initiatives in the current PFBC strategic plan, this cannot be initiated prior to 2014.

Appendix G: Budgeting Line Item for Pre-Maintenance (Elizabeth Ebeling)

Assessment

Rationale for Initiative: The goal is to provide annual funding within the PFBC budget for maintenance projects and equipment replacement/upgrades at the hatcheries. This funding would be set and management staff could use it to prioritize within the Division the items that need done each year. Maintenance of hatchery facilities is vital for not only the fish life support systems (pumps, oxygen, filters, etc.) but also to keep the buildings and grounds in good working order and a safe environment for staff and visitors. Unfortunately, maintenance is usually put on the bottom of the list during slim budget times. Small maintenance projects can be done within the hatchery budgets but med-large projects must be placed on the Special Projects List which is line approved during the budget process. Inevitably, these routine maintenance items must compete against high priority projects and new initiatives on the Special Projects List and the lower priority maintenance items are postponed year after year until it becomes an emergency situation that must be dealt with to protect the fish or a safety concern.

Current Cost Information: Each year, the DFP spends approximately $400-500,000 dollars within the miscellaneous category. Many of these items are maintenance projects that Hatchery Managers are trying to do within their budgets. They can only accomplish small projects (< $5,000) that fall below the Special Projects category. The main cost of not addressing the large maintenance items is that deferred maintenance costs more in the long run due to the extra cost of replacing something that could have been repaired at an earlier time if funding was available.

Potential Barriers: Even though this money is spent during emergency repairs, it must be approved in advance as part of the hatchery budget. Tough budget times mean that some other division or bureau must make a sacrifice to provide this necessary funding.

Background/Analysis Work: Each year, numerous contingency requests are submitted for emergency work on wells and pumps. In a typical year, 1-3 emergency well repairs are needed with an average cost of around $20,000. Some of the hatcheries have buildings and grounds where the deferred maintenance has become apparent and much work is needed.

Impact

Savings Estimate: The savings is not so much in dollars but in planned maintenance activities so that fewer emergencies take place and projects can be planned in advance. In this way, the engineering division and private contractors can be consulted about the best ways to maintain equipment and facilities rather than the agency needing to make a quick reaction to an emergency situation.

Angler Services Impact: Budgeting for maintenance would lead to less risk for fish. Also, hatchery buildings and grounds would be in better condition for visitors to the facilities.

Evaluation Method for Follow-Up: Track the number of contingency requests and fish mortalities due to equipment malfunction over time.

Implementation

Internal PFBC/Other Coordination/Assistance: Bureau of Fisheries, Bureau of Engineering and Property Services, Administration, Executive Director would need to approve.

Work Plan and Timetable: Present a plan for including Hatchery Maintenance dollars into the FY 13-14 budget prep cycle. This should be prepared in January 2013.

Appendix H: Maximize Put-Grow-Take Production (David Miko)

Assessment

Rationale for Initiative: Production costs associated with raising trout increase as the size of the trout increases. These costs are attributed to increased food costs, oxygen injection, treatments to combat disease and increased waste and effluent management. For the vast majority of waters stocked with trout in Pennsylvania, the only option is to utilize adult fish due to the waters' inability to support trout year-round. In instances where water quality and instream habitat is sufficient to support year-round survival of trout but other influences prohibit adequate reproduction to support a wild population, the use of stocked fingerling trout may be an option to provide a high quality fishery at a reduced cost.

Current Cost Information: Total program cost for a stocked adult trout averaging 11 inches long is $2.73. The cost to raise a fingerling trout is $0.65 (Stocked Trout Program: Cost Report, March 2009). This is an approximate 4:1 ratio, which means that 4 times the number of fingerling trout can be raised and stocked for the same cost as stocking 11-inch adult trout.

Potential Barriers: The greatest potential barrier to success of this program is the highly variable survival rate of fingerling stocked trout from stream to stream. Based on past attempts to create fishable trout populations utilizing fingerling stocked trout, it is unlikely that major cost savings will be realized with this approach. For example, if a stream was receiving 1,000 adult trout to create a fishery and the adult program was replaced with a fingerling program at the same cost, 4,000 fingerlings would be stocked. Because it takes two years for a fingerling trout to reach 11 inches, 25% of the stocked fingerlings would need to survive through two winters to result in the same number of 11-inch fish in the stream being available to the anglers.

Background/Analysis Work: Based on previous PFBC research, fingerling survival to adult size has typically been low (0-5%) on many waters from spring to fall *of the same year* (Table 6). On three of 15 streams examined, survival has been documented to exceed 10% but on none was survival over 17%. A survival rate of 25% over two winters is required to provide a fishing experience similar to what is provided by stocking adults.

Table 6: Fingerling Survival to Adult Size

Water	SSB	Section	Survival Rate	Year examined
Lackawannock Creek	20A	01	0	2010
Gardner Creek	04G	02	1.3%	2006
Pocono Creek	01E	06	0.7%	2010
Schuylkill River	03A	01	2.4%	2009
Tulpehocken Creek	03C	05	17.0%	2009
Big Spring Creek	07B	02	0	2007
Big Spring Creek	07B	03	0	2007

Water	SSB	Section	Survival Rate	Year examined
Little Juniata River	11A	05	1.9%	2010
Little Juniata River	11A	06	0.6%	2010
Bens Creek	18E	01	4.0%	2009
Blacklegs Creek	18C	02	1.0%	2008
Hannas Run	18C	02	4.6%	2009
Mill Creek	18C	01	11.1%	2009
Stonycreek River	18E	03	1.3%	2007
Stonycreek River	18E	04	10.9%	2007

Impact

Savings Estimate: No measurable savings on production costs are expected as ongoing research appears to indicate that fingerling survival rates are far less than the 25% through two winters. However, fewer adults would need to be cultured if fingerlings were used, and this would be advantageous to hatchery effluent quality.

Cost savings will be stream specific and not estimable until fingerling fish are stocked and their survival is determined. If the fingerling stocking rates required to provide a similar fishery that could be provided through the use of adult trout equals four times the adult stocking rate, no savings will be realized. A net loss will be realized if the fingerling stocking rate exceeds four times the adult rate.

Angler Services Impact: Probable reduction in angler use stemming from the use of fingerlings in place of adult trout. Survival rates of fingerling stockings appear to be highly variable between water areas. Conversely, a fingerling stocked trout that survives to an adult size tends to take on physical and behavioral characteristics of wild fish. They become more colorful and more difficult to catch. It can be argued that a survival rate less than 25% may be acceptable if a more "wild trout" fishing experience can be provided. There is currently no information available to suggest what this survival rate should be; but it can be safely assumed that the 0-5% survival rate that has been documented to date is insufficient to provide even a marginal angling experience.

Evaluation Method for Follow-Up: An evaluation of fingerling stocking in wadeable streams is currently in progress with details shown in Figure 14. This includes looking for new waters where fingerling stocking could be attempted. However, the potential for the addition of new waters is likely to be limited based on the results observed to date.

Figure 14: Stream Work Plan for Evaluating Fingerling Stocking

Water	SSB	Section	Year of Examination
Kinzua Creek	16B	05	2011
Brodhead Creek	01E	02	2012
Lackawaxen River	01B	04	2013
Lehigh River	02A	06	2011
Lehigh River	02A	07	2011
Martins Creek	01F	03	2011
Monocacy Creek	02C	09	2011
Pohopoco Creek	02B	04	2013
Cove Creek	11C	03	2011
Kishacoquillas Creek	12A	05	2012
Little Juniata Creek	07A	02	2011
Youghiogheny River	19E	02	2012
Youghiogheny River	19E	03	2012
Youghiogheny River	19E	04	2012
Youghiogheny River	19D	05	2012

Implementation

Internal PFBC/Other Coordination/Assistance: None.

Work Plan and Timetable: Start: 2010 field season. End: 2014 field season.

Appendix I: Purchase Eggs or Fish (Brian Wisner)

Assessment

Rationale for Initiative:

Maximize trades: Some species are difficult or costly for the PFBC hatcheries to rear but are available as surplus from other state agencies. These surplus eggs/fish are available at relatively no cost except transportation.

Purchase eggs/fish: Some species are difficult or costly for the PFBC hatcheries to rear and are not available from other agencies. In some cases, it is less expensive to purchase these from commercial sources than to grow them ourselves.

Current Cost Information: Maximizing trades is a win/win. The only costs involved are transportation. W/C water species that may be purchased from commercial producers are striped bass fry, hybrid striped bass fingerlings and large channel catfish fingerlings. The PFBC estimated costs for rearing and holding rainbow trout brood/spawning labor/incubation are greater than $70,000 annually. Rainbow trout egg costs from commercial producers are approximately 1.5-2.0 cents per egg. The cost to purchase all our rainbow trout eggs from a commercial vendor would be approximately $70,000 depending on the bids. Cost savings would be realized by reduction in chemical use during incubation. We can also acquire limited quantities of rainbow trout eggs from the USFWS for free. Efficiency improvements are likely because removing brood from raceway space makes it available for other culture operations. Reduced labor in spawning fish can be utilized in other hatchery operations.

Rainbow trout adults had been purchased through the bid process previously but it was discontinued due to rising bid cost. Very few qualified bids were received and quantities of trout that could be supplied by vendors were extremely limited. This should be re-investigated and bid parameters changed in an attempt to receive lower bids.

Potential Barriers:

Maximizing trades: VHS disease in the Great Lakes has caused some strict interstate shipping requirements to be met. Many states no longer wish to trade with Pennsylvania. Some are still willing to supply surplus fish to us but this makes planning difficult.

Purchasing eggs/fish: Must be built into our operations budgets for the Division. There may be some union issues with purchasing species that we can raise. We would be relying more on outside sources which could be a problem if supplies were cut off or down-sized. Importing some species, such as channel catfish fingerlings, may pose a risk with introduction of aquatic invasive species. Purchasing trout eggs would mean less brood which means less trophy-sized fish to stock each year.

Background/Analysis Work:

Maximizing trades: Many state agencies have had high employee turnover and the network of managers who took part in trades has diminished. We need to be more active at going to meetings and promoting the trading of our surplus fish for those species we can't efficiently produce. We can ship fish according to VHS regulations but it takes time for fish health certification to be obtained prior to shipments. This can cause problems with donor agencies who can't afford the space and time to hold fish in their facilities while waiting up to 30 days for test results to be completed. We need to improve communications with trading partners on these issues.

Purchasing eggs/fish:

We have been purchasing some striped bass fry and hybrid striped bass fingerlings at a low cost in order to have a guaranteed supply in case other agencies don't come through with surplus fish. This approach has worked well thus far so that we always have some fish to stock if not the full request.

The Division of Fisheries Management has requested large, 7-8" channel catfish for stocking but Pennsylvania growing seasons are short. It takes us at least two years to grow channel catfish to that size. Commercial producers in the Southern U.S. can supply large channel catfish fingerlings with a clean fish health certificate/delivered at about $0.32/each, which is much less than it costs us to raise that size fish. PFBC hatcheries have been producing 1-3" channel catfish at $0.30/each including surplus channel catfish from other states.

The USFWS can supply limited quantities of rainbow trout eyed eggs under a Memorandum of Agreement. This would decrease our brood needs and cut incubation time. However, they only have certain strains that are available at certain times of the year and would not be able to meet all of our needs.

Commercial trout egg sources can supply rainbow trout eyed eggs with a clean fish health certificate any week of the year at whatever quantities we order. Having the eggs available at any time is a huge advantage for fish culture. Egg shipments can be planned against stocking dates to coincide with projected growth rates to ensure adequate growth without having to push growth or hold back feed. These are high quality, all female eggs with high hatch rates. We should start with a pilot project and test these eggs and fish at several hatcheries. This could lead to a significant reduction in brood/spawning/incubation costs. We should also maintain our best rainbow trout strains for back-up, along with our brook and brown brood. This would allow us to concentrate on brook and brown trout while purchasing the rainbow trout eyed eggs. These eyed eggs from commercial hatcheries will typically hatch in 4-6 days, dramatically reducing the amount of care and chemicals needed during the incubation period.

Purchasing trout eggs will reduce the space requirements necessary to hold brood in raceways and either free up space for production fish or provide areas where fish densities may be thinned or flows trimmed back, whichever is more appropriate. Less brood could also mean less biomass and small improvements in NPDES permit compliance.

Impact

Savings Estimate:

Maximize trades: Each successful trade or surplus batch of fish would reduce the amount of fish the PFBC needed to raise or purchase. Hatcheries could concentrate on our more important cost effective species.

Purchase eggs/fish:

Although purchasing eggs and fingerlings would result in less labor needed for these activities, staff would be reassigned to other necessary hatchery duties. In the case of channel catfish fingerlings, purchasing large fingerlings would show a definite decrease in cost over producing our own.

With the purchase of trout eggs, we would see less labor involved in taking care of brood, spawning, incubation and chemical use. This reduction in chemical use would significantly help some hatcheries with their NPDES permits. Less brood also means less feed for a long period of time needed to rear and hold the brood. Less feed equates to less cost and less waste in the effluent. The reduction in labor would be a benefit for other areas because the hatcheries are understaffed, especially due to the installation of new microscreens and waste management systems which require more staff time and maintenance. Any labor savings related to fish production will benefit the overall operations of the facilities. Cost estimates show that for every dollar spent on eggs we would likely save a dollar in labor/feed/chemical use. The qualitative benefits include utilizing labor for other tasks, reduced effluent waste, reduced chemical use and increasing rearing space for other life stages of trout.

Angler Services Impact:

- Maximizing trades would benefit anglers by securing species that are more difficult for us to produce.
- Purchasing large channel catfish fingerlings would benefit anglers if survival is better than the smaller fingerlings our hatcheries typically produce.
- Purchasing trout eggs would negatively impact anglers who target trophy size rainbow trout. We would still have plenty of brood brown and brook trout but the rainbow numbers would be reduced.

Evaluation Method for Follow-Up:

Maximizing trades: Evaluate the numbers of fish received from other states versus what we send to other states. The cost of our fish shipped to other states should be less than the value of the fish we receive from other states.

Purchasing eggs/fish:

- Evaluate the cost to purchase striped bass against rearing them ourselves. This would involve a lot of estimating since we do not have a striped bass facility.
- Conduct a comparison of our costs to rear channel catfish versus purchasing fingerlings. The DFP already knows the cost to raise large fingerling catfish at PFBC hatcheries is much higher than commercial costs. The DFM would need to have the Channel Catfish Management Plan in place and determine the size fingerling which is needed for maximum benefit to the fishery.
- Purchase trout eggs: Have Hatchery Managers compare time spent on brood/spawning/incubation between in-house eggs and purchased eggs. Also, track growth and survival of commercial eggs to adults.

Implementation

Internal PFBC/Other Coordination/Assistance:

Maximizing trades:

- Trades are typically done on a handshake but do need some coordination with respect to fish health and fish management
- Fish health certificates are required for imports made by our hatcheries
- DFM should verify any AIS concerns from state of origin
- Regional Fish Production Manager needs to get health and AIS information prior to transfers

Purchasing eggs/fish:

- Need to notify the union on purchasing fish issues
- Need to work with purchasing on the bid process and contracts
- Legal/Department of General Services may need to be involved to review contract issues
- Need to plan on trout egg purchases with Hatchery Managers and regional Production Managers to adjust the current number of rainbow trout brood and egg needs – adjust production schedules
- Need to verify fish health requirements with Fish Health Unit
- Need to verify AIS concerns and protocols with DFM against biosecurity plans

Work Plan and Timetable:

Maximize trades:

- Staff attended Feb 2011 Cool Water Workshop – gave presentation on PFBC hatcheries, increased networking with other state agencies
- The DFM needs to define strategy for importing fish and AIS concerns.

Purchase eggs/fish:

- Spring/Summer 2011 – notify union of purchasing eggs/fish issues
- Fall 2012 – pilot study, purchase commercial rainbow trout eggs for Corry and Oswayo (limited quantities – not all production), perhaps Huntsdale also

- Fall 2013 – increase pilot study on rainbow trout eggs to more hatcheries and larger quantities
- Continue small scale purchase of striped bass and hybrid striped bass for stocking
- If DFM determines we need more fish – ask for a budget line item to purchase adult trout for lake stockings and to purchase large channel catfish fingerlings.

Appendix J: Reduce Fish Culturist Overtime (Elizabeth Ebeling and Daniel Donato)

Assessment

Rationale for Initiative: The line item for the overtime (OT) expenses is a significant amount in the DFP's fiscal costs. Many factors can determine the cost for overtime such as emergencies; an older, more costly work force; lack of standardization of procedures among hatcheries and predetermined obligations for the number of fish or stocking locations. The goal of this section is to identify the reasons for the assignment of overtime, improve procedures and acknowledge a certain amount of overtime is part of the cost of doing business if the PFBC continues to stock fish in streams and lakes. The alternative to overtime use is to hire more fish culturists which equates to a much higher expense (salaries, benefits, and training) than properly assigning overtime when needed.

Current Cost Information:

As shown in Table 7, overtime costs have been around $300,000 for the past five fiscal years.

Table 7: Fish Culturist Overtime – FY 06-07 to FY 10-11

Fiscal Year	Overtime Costs for DFP
2006-2007	$295,526
2007-2008	$313,838
2008-2009	$296,643
2009-2010	$336,223
2010-2011	$299,226

Potential Barriers:

Although not a barrier, attention must be paid to the Master Agreement's requirement of all overtime being equalized among same classification volunteers. "Volunteer" in this sense refers to full or part time PFBC workers who volunteer for overtime by placing their names on an availability list. This is not to be misconstrued as implying that true volunteers from the public are being paid or paid overtime to assist with stocking. This involves posting lists twice a year to call out the staff who volunteer to work overtime and a bi-weekly list of accumulated OT hours worked by the staff. Although any rank and file personnel may be assigned overtime, the majority of the OT costs are incurred by the hatcheries by Fish Culturists.

Again, not really a barrier but a factor is the seasonality of overtime work for the hatcheries. The majority of the overtime assignments are in the spring, in the southern hatcheries, while fish are being stocked March through June each year. As long as one of the PFBC's goals continues to include the stocking of fish in the streams and lakes of Pennsylvania, there will always be a

significant cost associated with overtime assignments. The amount of work that needs to be done and driving to accomplish the task of stocking fish is much more than can be done during normal working hours by staff.

Another barrier to lowering overtime costs are the mandated hourly wages of the staff who volunteer for overtime. The PFBC has seen a significant number of retirements in the last two years but there are many volunteers who elect to be paid overtime and are near the top of their steps in salary. With overtime being paid at time and a half the hourly wage, overtime quickly becomes a major line item in the Fisheries' budgets.

Background/Analysis Work:

The cost associated with overtime became an item of review for two main reasons: 1) the overtime expense could be managed to yield a potential savings, 2) notice was made of individuals' overtime pay and research was conducted as to how individual staff could earn a significant amount of overtime pay. Payroll reports can be generated to show a staff's personal overtime hours and earnings.

Two dynamics were observed during the research; 1) if a long term career Fish Culturist 2 volunteers for overtime, he/she will be eligible to earn a significant amount of overtime pay, particularly in the southern hatcheries (rank and file fish culturists have the choice to be paid for overtime or take it in compensatory time which can be taken off at a later date) and 2) it was also found in some cases, in a couple of hatcheries, overtime was not always being assigned per the Master Agreement. The procedure for assigning overtime has been addressed and confusion concerning assignments has been clarified with staff.

The SAP system allows for customized reports to be generated for spot-checking individual and division totals at any time. Reviewing periodic reports, along with checking in with the hatcheries for posted lists and totals, are some of the best and most accurate ways to track and confirm the need for the assignment of overtime, and therefore the expense.

Impact

Savings Estimate: With the assumption the PFBC wants to continue stocking fish in lakes and streams, there will always be a certain amount of overtime because of the distances and the delivery locations identified by the Division of Fisheries Management. A rough estimate of savings could be as little as zero or as much as $30,000 in any given year. Many factors determine the potential savings and change from year to year. The most effective approach to savings is to make sure all hatcheries are following the policies and procedures for evaluating if an overtime assignment is needed for the tasks and then assigning the hours correctly.

Angler Services Impact: There is no direct angler impact with the cost of overtime assignments. The savings, if any, in reducing overtime would be realized in the overall budget. The utilization of overtime assignments must be balanced between the need to perform the necessary tasks of the hatcheries to grow and stock fish and the return on investment for the agency.

Evaluation Method for Follow-Up: The Hatchery Managers and the Administrative Officer will take the lead in most of the recommendations and deadlines outlined in the recommendations for reducing the cost of overtime, where possible. Coordination and research of information will be integrated with Human Resources, hatchery managers and foremen, fish culturists and outside contractors, when appropriate. A check list with a point person (Administrative Officer) and deadline for the tasks will be the source document for follow-up. A working SOP for overtime procedures would be an end product.

Implementation

Internal PFBC/Other Coordination/Assistance: The Division of Fish Production will work with other agency staff to fulfill the implementation of the cost containment of overtime expenses. The Administrative Officer will use the SAP system to track employees' names, hours of OT worked and funds expended in the subcategories. The Human Resources office will also provide support in researching and addressing any questions concerning payroll rules and Master Agreement interpretation.

Continued, clear communication among the chiefs, managers, foremen, and the Administrative officer will insure procedures and policies are being followed. Training will be offered as new staff move into the manager's and foremen's positions and as vacancies occur because of retirements.

Work Plan and Timetable: A comprehensive meeting regarding overtime use was held with the hatchery managers, foremen and clerical staff in February 2011. Procedures were reviewed to insure that staff from all hatcheries were assigning, calculating and posting the accumulation of overtime hours uniformly. Below is a list of specific ideas and directions with the person(s) responsible for the task and timeline/deadline:

- Hatchery Managers and Northern and Southern Production Managers will continue to work closely with the Division of Fisheries Management to determine the most efficient number of stocking trips for an area. Currently the Production Managers inform Fish Management what the hatcheries can raise and Fish Management allocates the available fish accordingly.

- According to the PSU Distribution Report and input from fish culturists, whenever possible, stocking trips should not cross paths with other hatcheries.
    - *The Southern Production Manager is working with PSU to determine if stocking can be done more efficiently. The study has been completed and being evaluated for implementation.*

- Work to get and keep FTEs hired at all hatcheries.
    - *Approved positions are being filled as soon as possible. This is currently being done and is ongoing.*

- Schedules are dictated by the amount of fish to be shipped from each hatchery. Review meeting times on stocking data sheets to ensure Fish Culturists have enough, but not too much, time to make the meeting time and check the fish enroute. Allow for Fish Culturist's feedback and adjust meeting times.

- *This should be done by Fish Production Managers in coordination with Hatchery Managers and Foremen to make sure this is getting done. Completed before spring stocking in 2012.*

- Review stocking assignments to avoid stocking small amounts of fish in lakes and streams. Possibly no stocking of head count or poundage of less than a specific amount (yet to be determined)?
  - *Production Managers and or Fish Management to set minimum count of fish or poundage for 2012 spring stocking.*

- Possibly get trucks out earlier each morning. Some hatcheries have staff depart at 8:30; some are later. *Use the best methods to get stocking trucks on the road earlier.*
  - *Training at hatcheries to review with Hatchery Managers/Foremen/Fish Culturists on ways to improve loading techniques. Production Managers to review with hatchery managers and make procedures part of the SOP for 2012 stocking season.*

- Confirm Fish Culturists are driving to and from stocking locations on the most direct routes.
  - *Production Managers should instruct Managers and Foremen to review the times on the stocking sheets to confirm that the most direct route is being taken. Manager should instruct fish culturists to take the most direct route to and from stocking locations. Compare with last year's stocking sheet to see if there are questions on times. Production Managers to review with managers and make procedures part of the SOP for 2012 stocking season.*

- Improve methods of filling trucks with water. Some hatcheries have the same staff water trucks where other hatcheries rotate staff.
  - *Managers should make sure this assignment is getting done in the most efficient way possible so that overtime is reduced. Production Managers will review procedures with managers and make procedures part of the SOP for 2012 stocking season.*

- Warm /cool water fish when harvested from earthen ponds, have to be stocked immediately. Staff may have to drive large distances to stock these fish throughout the state. Overtime is assigned as needed.
  - *Currently being done and is ongoing.*

- Only assign overtime for priority work. Never assign OT for some tasks (e.g., mowing grass, building maintenance, washing trucks) except under special circumstances such as public events.
  - *Production Managers will contact Hatchery Managers and Foreman to make sure this is being done.*

- Change assigned work schedule – 2 weeks' notice, change in payroll system (example 6:00am instead of 7:30am), to minimize hours being assigned as overtime.
  - *E-mail to be sent now from Administrative Officer to Managers and Foreman to make sure this is being done.*

- Always assign overtime to non-volunteers before double time is offered.
    - *Production Managers will contact Hatchery Managers and Foreman to make sure this is being done.*

- At hatcheries with two overtime lists (driving and hatchery), decide and make uniform the tasks for both lists (watering trucks, etc).
    - *Administrative Officer to gather information from hatcheries and submit a definitive list for the spring 2012 stocking season.*

- Evaluate if the assignment of overtime to a full-time staff person is more expensive than hiring a wage person.
    - *Currently the PFBC's policy states that a Fish Culturist 1 cannot stock fish or work weekends independently while they are in a probationary status (12 months). This policy forces the assignment of overtime to a Fish Culturist 2 during the week on days that they would normally have been scheduled off, because they had worked on a weekend to stock fish. By fall 2011 the Administrative Officer is working with HR to develop a procedure to address Fish Culturist 1 so they can stock fish and work weekends independently after adequate training,.*

- Ensure overtime is being assigned and equalized correctly.
    - *Administrative Officer and Production Managers will spot check the overtime list throughout the year and the end of each 6 month cycle to make sure that overtime is being equalized correctly. Schedule rotating training for new Foremen and Managers as needed or include as part of a bureau meeting. Currently being done and is ongoing.*

- Updated/ongoing training for all hatchery staff once a year, during the manager's meeting.
    - *Administrative Officer to work in cooperation with the Production Managers to include training/review of overtime assignments methods. Schedule with the next manager's meeting.*

- Continue to be aggressive with ideas to control, reduce and contain the need for the assignment of overtime.
    - *Production Managers, Hatchery Managers, Foremen and Administrative Officer continue to discuss and document methodology to be included in an Overtime Standard Operating Procedure.*

Appendix K: Timber Revenue from Hatchery Property (Daniel Leonard)

Assessment

Rationale for Initiative: The PFBC has obtained revenue through timber sales. Through a renewed effort with assistance from the Pennsylvania Game Commission (PGC) for forestry management services, timber sales lead to a possible revenue source.

Current Cost Information: There is a cost to prepare and solicit bids. Timber prices will effect when the return on investment justifies selling timber. Past timber revenue totals $361,967 dating back to FY 2000-2001. Annual totals are shown in Table 8.

Table 8: Timber Revenue from PFBC Properties – FY 00-01 to FY 09-10.

Fiscal Year	Revenue
2000-2001	$3,198
2001-2002	$242,461
2002-2003	0
2003-2004	$55,395
2004-2005	0
2005-2006	$60,913
2006-2007	0
2007-2008	0
2008-2009	0
2009-2010	0
Total	$361,967

Potential Barriers: Staff time necessary to bid and process timber sales. Revenue will not be consistent in order to maximize the return potential based on timber prices, and the PFBC does not own vast tracts of forested land like DCNR or PGC. Revenue from this resource will be deposited into the Fish and/or Boat fund(s) for general budgeting use, and will not be earmarked for hatchery operations specifically. Other PFBC funding priorities may negate the hatcheries from receiving funds.

Background/Analysis Work: PFBC has recently established a Memorandum of Understanding (MOU) in 2011 with the PGC for forestry management services. Upon request from the PFBC, the PGC will provide technical guidance, resource evaluation, administrative support and management assistance in evaluating, protecting, managing, and developing timber resources on PFBC property.

Impact

Savings Estimate: The average revenue over the past 10 years has been $36,000. More active manage should allow the PFBC to exceed this amount.

Angler Services Impact: None.

Evaluation Method for Follow-Up: Continued tracking of timber revenue. Compare bid solicitation costs to realized timber revenue.

Implementation

Internal PFBC/Other Coordination/Assistance: Deputy Director, with assistance from BEPS and BOF Division of Environmental Services, as well as the Legal Office.

Work Plan and Timetable: The MOU was put into effect earlier this year.

Appendix L: Program Prioritization (Elizabeth Ebeling and Brian Wisner)

Assessment

Rationale for Initiative: Over 20 species of fish may be raised annually by the Division of Fish Production. These species have varying levels of priority and costs. When seeking methods to reduce costs, one alternative would be to cancel production of lower priority species or fish which are not cost effective to rear.

Current Cost Information: Much detail was put into providing cost information for various components of the trout stocking program. This is presented in the Stocked Trout Program: Cost Report, March 2009. Data was also available on the cost to rear each species of warm/cool water fish in 2010. Table 9 shows the direct hatchery costs to provide each of these species for fisheries management purposes.

Table 9: Division of Fisheries Management Species Priority List and Cost

Species	DFM Priority	Hatchery Cost	Comments
Adult Trout	1	$ 5,583,653	
Coop Trout	2	$ 725,150	
Steelhead	3	$ 565,480	
Walleye Fingerling	4	$ 123,541	
Walleye Fry	5	$ 160,075	Estimated fry cost
Musky	6	$ 1,003,978	
Tiger Musky	7	$ 164,764	
Fingerling Trout	8	$ 942,695	
Channel Catfish	9	$ 77,219	Some provided by other states
Striped Bass Fingerling	10a	$ 1,000	Provided by other states
Striped Bass Fry	10b	$ 5,000	Provided by other states and vendors
Lake Trout	11	$ 54,012	Some eggs provided by other states
Erie Brown Trout	12	$ 41,470	Eggs provided by other states
Hybrid Striped Bass	13	$ 10,000	Provided by vendor or other states
Largemouth Bass	14	$ 10,966	
Black Crappie	15	$ 12,429	
White Crappie	16	$ 23,381	
Blue Gill	17	$ 1,152	
Paddlefish	18	$ 34,691	Eggs provided by other states
Northern Pike	19	$ 23,168	

Species	DFM Priority	Hatchery Cost	Comments
Golden Shiner	20	$ 8,618	

Note: Trout costs are from the Stocked Trout Program: Cost Report 2009 and the other species are estimates from the Northern Production Manager hatchery time/activity reports and hatchery budgets.

Potential Barriers: If the DFP stops production of the lower priority species, they may not be available by other means (such as trades or purchases) for stocking. Biologists may not want to stop stocking species of lower priority.

Background/Analysis Work: Some species are either difficult to culture in Pennsylvania or cost prohibitive. Striped bass and hybrid striped bass are good examples. The number of fish requested does not warrant the cost involved in collecting broodstock, spawning, hatching eggs, rearing fingerlings, and all the related labor and infrastructure. The DFP has worked with other states to procure their surplus STB and HSB at no cost except our labor and transportation costs. This has worked out very well to meet our needs but in some years surpluses from other states are not available. Recently, we have started purchasing some fry and fingerling STB and HSB from commercial hatcheries to ensure we stock the highest priority lakes. This has been successful at helping us meet the stocking request while keeping the cost down.

Another species we are currently evaluating is channel catfish. The DFM requests CC each year but growth in Pennsylvania is quite slow and this creates a situation where the cost to rear CC is higher than the cost to purchase them from commercial hatcheries in the Southern US. The DFP is working on developing a pilot program to test the purchase and direct stocking of CC into Pennsylvania waters.

Impact

Savings Estimate: Very little cost savings will be seen if lower priority species culture is discontinued. We may see a small savings in reduced distribution costs for the smaller stockings (loads of few fish going to stocking points). In the overall picture, the effort put towards this lower priority or non-cost effective fish will be shifted to the higher priority programs.

Angler Services Impact: If after a stocking program is properly evaluated and determined to not be meeting program expectations, the stockings would be terminated and a cost savings realized. Due to the failure of the stocked fish to develop into a fishable population there would be minimal to no negative impact on anglers. Anglers may experience less species variety in some waters.

Evaluation Method for Follow-Up: The Division of Fisheries Management is currently developing Fisheries Management Plans for many of the highly requested and expensive-to-produce fish species. These plans will ensure that these species are managed consistently throughout the Commonwealth, that approved protocols are followed with respect to the number of fish that can be requested, an appropriate evaluation method has been developed to determine stocking success and the specific goals that must be reached in order to continue a stocking program. These plans are necessary to ensure that the Area Fisheries Managers have reasonable

opportunities to successfully develop high quality fisheries and also ensures the fish are being utilized in a cost effective manner.

Implementation

Internal PFBC/Other Coordination/Assistance:

- DFM: need to discontinue requests for low priority or non-economical stockings.
- DFP: seek alternative sources (state trades) for low priority species or those which are too costly to raise in Pennsylvania.
- Angler clubs: should meet with angler clubs who may see this as a reduction in services. Explain rationale and that stockings have not produced desired effect at reasonable cost.

Work Plan and Timetable:

- DFP and DFM meet to discuss requests and priorities – Fall 2011.
- DFM Biologists review their requests and discontinue low priority species and those that have not produced desired fisheries – Winter 2011/12.
- DFP shifts effort towards production of higher priority and/or more cost effective species – Spring 2012.
- The Division of Fisheries Management has completed a draft walleye management plan and is in the process of completing the muskellunge and catfish management plans. A striped bass and hybrid striped bass management plan is schedule for completion in 2014.

Appendix M: Advertising on PFBC Stocking Trucks (Michael Hendricks)

Assessment

Rationale for Initiative: Opportunity to increase revenue.

Current Cost Information: Minimal operating and maintenance expenses.

Potential Barriers:

- Possible negative angler perception
- Issue of how to deal with advertising by entities that are in opposition to the PFBC mission (beer ads, cigarette ads, gas drilling companies, dredging companies, etc.)
- Possible internal PFBC resistance if sign placement made it appear as an advertiser's truck

Background/Analysis Work: Beyond confirming strategy, consultation with the ad industry and a trial will need to be considered as part of the evaluation. Also, similar to metro bus ads, exposure to the public needs to be quantified. This means identifying the amount of miles traveled with general routes defined. Trucks times miles plus territorial exposure equals ad rates. Both billboards and bus ads use these as measures of exposure. While bus space can be used as an example of size, it's exposure to a higher population density, possibly at a slower pace in city traffic helps buses command a higher ad price.

Signs:

- King size – 12 feet by 2.5 feet sign on Allegheny Port Authority Bus (Pittsburgh) is $300 per month per bus
- Queen size – 9 feet by 2.5 feet is $250 per month
- Tail sign – 6 feet by 2.5 feet is $175 per month

Possible PFBC Scenario:

- Application of signs on stocking trucks need to follow existing PFBC advertisement policy.
- 43 trucks (or trailers) X 3 months X 1 king size sign on each side X $300/side = $77,400 annually.
- Queen size on the other side of the truck would be 43 X $250 X 3 months = $32,250 annually.
- Tail sign will remain as PFBC.
- Each client also pays a production cost per sign: King - $62 to $72; Queen - $51 to $61; Tail - $30 to $38. Multi-year contract will minimize production cost for client.
- Revenue accrued from space sales would be shared with the contracted company as payment, *so net projections in addition to production costs must be considered*.

Impact

Savings Estimate: New revenue up to $130,000 annually.

Angler Services Impact: Negligible

Evaluation Method for Follow-Up: Track annual profit.

Implementation

Internal PFBC/Other Coordination/Assistance: Division of Fish Production, Division of Communication, Bureau of Administration and Chief Counsel.

Work Plan and Timetable:

- Research other states to see if others have done this and gather best practice information.
- Have the Division of Communications contact outdoor advertising companies to confirm the market viability of this proposal.
- Requires Legal Office and Commission approval.
- Director of Fish Production work with Office of Chief Counsel and Bureau of Administration to develop and implement process for bidding to vendors.
- PFBC hosts a competitively bid contract award to a company who would handle solicitation and production of the billboard substrate.
- Implementation - Spring 2012.

Appendix N: Fish Food Vending Machines at Hatcheries (Michael Hendricks)

Assessment

Rationale for Initiative: Similar efforts are in place at many US Fish and Wildlife Service hatcheries and at the Queen City Co-op Nursery in Allentown.

Current Cost Information:

- Capital - 10 Hatcheries X $100 each = $1,000
- Current - none
- Operating - minimal labor

Potential Barriers:

- Potential negative angler perception
- Charging versus giving feed away

Background/Analysis Work: Researched use of bulk candy machines. The average cost of equipment is $100 each. Machines accept quarters and can be placed in high visibility areas of hatcheries..

Specifications:

- Height: 42" Width: 8" Depth: 8" Weight: 32lbs Capacity: 14 lbs candy or 400 gumballs.
- Available with bulk candy wheel or 1" gumball capsule wheel.
- All metal construction.
- All metal drop thru coin mechanism.
- Heavy duty polycarbonate globe.
- All metal cash box with secure locking system.
- .

Vender product description:

"The LYPC Tough Pro Gumball Candy Machine is the strongest machine we make. It's reliability & dependability is the finest in the industry. The new "Secure Cash Box" cuts service time in half. This machine can dispense most bulk candy, 1" gumballs, 1" capsules & 27mm bouncy balls. It comes with a 1 year warranty & 30day money back guarantee."

Impact

Savings Estimate: Potential of generating revenue of $15,000 to $25,000 annually.

Angler Services Impact: Negligible

Evaluation Method for Follow-Up: Track net income.

Implementation

Internal PFBC/Other Coordination/Assistance: Division of Fish Production, Division of Communication, Bureau of Administration and Chief Counsel.

Work Plan and Timetable:

- Several months to implement
- Need details of handling the money from the machines.
- Require approval by Commission? Consult Legal Office.
- Production Managers order vending machines
- Place machines into service. Couple with education on fish feeding, growth, etc.
- Goal of 2012 if not sooner.

Appendix O: Reducing Co-Op Nursery Visits (Michael Hendricks)

Assessment

Rationale for Initiative: Site visits to the co-op nurseries are conducted each year in the spring and fall to conduct inspections and interact with the volunteers that manage the sites. Site visits are time consuming and require overtime compensation. Reducing visits to once a year could save approximately $3,900 annually.

Current Cost Information:

FY 10-11:

- Overtime: $4,018
- Vehicle fuel cost = $4,446 (estimated)

Potential Barriers: The visits are the only time the Co-op Nursery Unit gets to interact with volunteers. Most volunteers work during the day which requires many visits to be conducted during off hours. Many volunteers do not have email. Those that do have email often do not have the software to open PFBC documents. The relationship between the Co-op Nursery Unit and volunteers may suffer. Volunteers may interpret a reduction of visits as lack of interest on the part of PFBC.

Background/Analysis Work: The PFBC invests approximately $924,000 per year in fingerling deliveries to the co-op nurseries who in turn stock around one million adult trout per year valued at $2,730,000. The goal is to visit each of the 165 co-ops twice a year, but there are not enough staff resources and time to do so. During FY 10-11 a total of 291 co-op site visits were conducted.

Inspection information for FY 2010-11 is shown in Table 10. Fuel costs for the period noted above is based on an average trip of 100 miles, 18 miles per gallon, $3.75 per gallon, and applied to 291 trips. The Hatchery Manager does not receive overtime compensation.

Overnight travel is necessary around 12 nights a year.

Table 10: Co-Op Nursery Site Visits and Overtime Costs – FY 10-11

Position	Number of Site Visits	Overtime Hours	Overtime Costs
Hatchery Manager	91	62.0	0
Fisheries Tech 2	107	44.0	$1,723.79
Fisheries Tech 2	93	58.5	$2,294.10
	291	164.5	$4,017.90

Impact

Savings Estimate: Cutting back inspections to once per year could save approximately 50 percent in overtime costs, or $2,009 based on FY 10-11 costs. This is estimated with the idea that a greater reduction in overtime can be made and still accommodate visiting the 165 co-ops during the year. Additional fuel savings of approximately $1,900 would occur with a reduction of 126 trips based on FY 10-11 site visits and an average of $15 in fuel per trip.

Angler Services Impact: Negligible for anglers but could have a negative impact on production of cooperative nurseries who rely on contact with staff.

Evaluation Method for Follow-Up: Track overtime hours and compare to FY 10-11.

Implementation

Internal PFBC/Other Coordination/Assistance: Co-op Nursery Unit implementation

Work Plan and Timetable:

- Reach out to the co-ops to ask them about the frequency of visits as a cost savings initiative.
- Determine if the feedback from the co-ops warrants pursuing the reduction in visits.
- If recommended as a strategy, could begin reduction in the fall of 2011 to 165 site visits.

Appendix P: Algae Abatement (Jack Rokavec)

Assessment

Rationale for Initiative: Algae is prevalent in the Commission's hatchery ponds. It adversely affects the performance of the Commission new Hydrotech Disc Filters (Microscreens), their required maintenance, and effluent water quality.

Current Cost Information: Costs were developed in 2010 to implement this concept at the Pleasant Gap SFH's settling pond. The annual costs totaled $16,000; or, $0.90 per 6" plant to obtain 25% initial settling pond cover before plant reproduction increased surface area.

Potential Barriers: Non-native species concerns, budgeting and labor issues.

Background/Analysis Work: The following observations have been made:

- Hatchery effluent contains high levels of oxygen, nitrogen and phosphorus compounds. Hatchery ponds are exposed to direct sunlight. All of these factors significantly contribute to the growth of algae in the Commission hatchery ponds and in receiving streams.
- On the effluent side of the house, the Commissions' pre-treatment screens [upstream of the Microscreens] readily clog. In several locations these screens are cleaned daily, or are removed.
- Algae and/or biofouling are observed on and around automated valve seats and pump cavities associated with the Microscreens.
- Algae and/or biofouling are observed within the Microscreens. This algae also plugs the Microscreen's backwash trough.
- At times, the Commission struggles to meet regulated TSS effluent water quality standards even with the Microscreens in place.

The algae that are in the Commission hatchery ponds create the following issues:

- Algae have the potential to significantly increase both the TSS and the CBOD5 of the Commission effluent waters.
- Many types of algae will pass directly through the 20um Microscreens.

There are several ways to abate algae in the Commission hatchery ponds and in the Commission effluent waters:

- Mechanical Mixing - The turbidity of suspended solids is sufficient to minimize algal growth. Mixing will also reduce the carbon dioxide from the pond thereby limiting growth during a portion of the algae's diurnal cycle. Unfortunately, mixing will increase TSS that the microscreens may not be able to remove. Electrical consumption and costs will noticeably increase.
- Chemical Addition

  - Chlorination / Dechlorination - Chlorination will kill algae. Dechlorination would be required prior to discharge of the effluent waters. This type of chemical treatment would be less expensive than mechanical mixing.
  - Copper Sulfate – Copper sulfate will kill algae; however, from an aquaculture standpoint this option is not viable for the Commission purposes as this chemical is highly toxic to trout and could adversely affect receiving waters.
  - Water Soluble Dyes - Certain non-toxic, organic, water soluble dyes that block out the specific light rays utilized in photosynthesis can be used to kill algae. Some of these commercially available dyes color the water a natural teal blue. The economics of this option should be slightly less than that of chlorination / dechlorination.
- Covers – Eliminating or reducing the available sunlight on the Commission ponds will significantly reduce algal growth.
  - Artificial Cover – Floating fabrics come in a variety of materials (e.g., polyester). Artificial covers can be expensive and may approach the life cycle cost of mechanical mixing. Synthetic covers are susceptible to damage by vermin, difficult to maintain, and have a replacement life of approximately 10 years.
  - Natural Covers - Natural cover can be provided by surface-growing plants such as water hyacinths which are very effective toward reducing algae in ponds. Floating grids or additional floating baffle curtains could be placed across the ponds that would work cooperatively with existing floating baffle curtains to ensure surface coverage. The water hyacinth can also be kept away from the effluent by floating or surface baffles in front of the effluent weir. Duckweed, water fern, slavonia, water lettuce, neptunia, parrot's feather, water lilly, cattails, and etc. are other types of natural covers considered, however they are discouraged due to the size of plant, price, and embedding issues.

The recommendation to plant a natural cover, such as water hyacinths, as an experiment and at the appropriate hatchery (e.g., Pleasant Gap, Bellefonte, etc.) is made with the presumption that the Commission's goals are to:

- Increase the Commission's hatcheries effluent water quality, and not contribute to receiving stream algal blooms.
- Increase the Commission's ability to meet current regulatory TSS and CBOD5 effluent water quality criteria.
- Increase the performance of the Microscreens.
- Reduce the current maintenance issues associated with the Microscreens.
- Mitigate electrical cost increases.

Impact

Savings Estimate: Savings will be in the form of reduced annual O&M costs.

Angler Services Impact: None.

Evaluation Method for Follow-Up: Continue to evaluate various native plant types: availability and cost.

Implementation

Internal PFBC/Other Coordination/Assistance: Coordination with Hatchery and Water Quality staff.

Work Plan and Timetable: As this is an experimental and unbudgeted initiative, the goal was to place surface growing plants on, at least, one hatchery pond in 2011. The planting of these plants was anticipated to occur in Spring/Summer 2011, until budgetary constraints placed a hold on this initiative. There were also concerns about escapement of water hyacinth into the receiving waters.

Appendix Q: Cost Savings Ideas List with Voting

The results the brainstorming of ideas was split between current and past efforts considered to be valid and new ideas. Votes are shown in parenthesis. Strikeout text represents changes done at the time of voting to consolidate ideas.

The items below that did not receive enough votes to be top priority items are not discussed in the body of the report. This does not exclude further consideration of the items in the future. In fact, many of them are activities that we are already part of the ongoing cost reductions at hatcheries.

Prior/Current Efforts

1. Variable speed pumps (3)
2. Increase efficiency of LHO systems (1)
3. Full time equivalent analysis (2)
4. Bird predation (8)
5. Surplus vehicles (BLE, utility versus trucks, cutting fleet)
6. Zoned heating/lighting (2)
7. Lower egg takes (1)
8. Improved/adjust stocking procedures to include the PSU logistics study (7)

~~9. PSU logistics study~~ (incorporated into number 8 above)
~~10. Adjust stocking schedule~~ (incorporated into number 8 above)

11. Need based purchasing
12. Contract out maintenance jobs
13. Purchase eggs or fish (4)
14. Maximize put/grow/take – decrease adult (5)
15. Flow management through hatcheries (1)
16. Budgeting/line item for pre-maintenance (6)

New Ideas

1. Sponsored stockings
2. Reduce excessive vehicle idling
3. GESA utility projects (1)
4. Conduct energy audits (1)
5. Advertise on stocking trucks
6. Geothermal energy using fish culture water (1)
7. Stock brood when done spawning (2)
8. Hatchery work prioritization and frequency (1)
9. Program prioritization (5)
10. Reduce complement of hatchery managers (for those close in proximity)
11. Solar and wind energy
12. Stock fish year round (7)
13. Co-op workers at hatcheries
14. Complete pond projects

15. Reduce Fish Culturist overtime (6)
16. Selling live product to the public
17. Natural gas wells for supply at hatcheries (4)
18. Sale of fish production by-products
19. Algae abatement (5)
20. Decrease inspection schedules at co-ops
21. Heat recovery systems
22. FERC related mitigation funding for American shad
23. Install fish food machines at hatcheries (1)
24. Evaluate efficient utilization of warm/cool stockings
25. Gas/oil/timber money directly back to hatcheries (5)

Appendix R: Stocked Trout Cost Study – 2009 – Executive Summary

Each year, the Pennsylvania Fish and Boat Commission (PFBC) expends funding in support of the Stocked Trout Program. The Stocked Trout Program includes all trout production, stocking, infrastructure, fixed assets, management, permitting, habitat work and administrative duties required to provide a high quality stocked trout fishery and high degree of service to the anglers of the Commonwealth.

Average annual expenditures during fiscal years 06-07 and 07-08 for the program totaled approximately $12.4 million. Over $8.2 million was incurred by the Division of Fish production to produce and stock the trout. Approximately 6% of the annual expenditures were allocated to hatchery effluent renovations being funded by Growing Greener II and not PFBC revenues. The remaining 28% of costs were from other Fisheries Divisions, the Bureaus of Law Enforcement and Engineering and Property Services, indirect costs and fixed asset/capital expenses. The cost of the Stocked Trout Program represents approximately 36% of the PFBC Fish Fund average annual expenditures.

The total cost of individual trout produced by the PFBC compared to private live trout prices by Pennsylvania trout farms is similar. The average PFBC *production cost* (does not include management or indirect cost) during fiscal years 06/07 and 07/08 to produce put-grow-take fingerlings, cooperative nursery fingerlings and adult trout was $0.53, $0.77 and $2.17 per trout, respectively. The *total program cost* to the PFBC to produce and manage these fish was $0.65, $0.94 and $2.73. The average price of similar size live trout from three Pennsylvania commercial trout farms was $0.47, $0.78 and $2.57. These commercial values are farm gate prices and do not include any delivery, stocking or other management activities that are included in the PFBC program totals.

The total PFBC funds expended to support the adult trout, put-grow-take fingerling and cooperative nursery programs were determined. Approximately $9.3 million (77%) of the total costs are spent on the adult trout portion of the program. The remaining $1.5 million (12%) and $1.6 million (13%) are utilized in the put-grow-take program and cooperative nursery program, respectively.