COLDWATER CONSERVATION PLAN

Furnace Run and Segloch Run
2004

Prepared for:

Furnace Run / Segloch Run Watershed Alliance

Prepared by:

Rettew Associates, Inc.

A Coldwater Heritage Partnership Funded Project

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"A wild brown trout fingerling from Furnace Run"

INTRODUCTION

Purpose of Study

In the year 2000, the Furnace Run/Seglock Run Watershed Alliance was formed by local landowners in response to a proposal by Heidelberg Township, Lebanon County, Pennsylvania to construct a sewage treatment plant and discharge effluent to Furnace Run.

At that time, locals were concerned the discharge would spell the beginning of the end for Furnace Run and its aquatic life. Given the volume of proposed discharge, landowners living along the stream feared the majority of flow during seasonal low flow conditions would be mainly comprised of sewage effluent. Landowners also feared for their private wells considering the hydraulic connection between the stream, groundwater levels and the depth of their drilled wells and springs. Their persistent vigilance and questioning paid off when the Pennsylvania Department of Environmental Protection (PADEP) upgraded Furnace Run's water quality classification to its current "High Quality – Cold Water Fishes (HQ-CWF)" status; effectively removing the stream as a potential discharge location.

Segloch Run, sometimes spelled "Seglock", is a tributary to Furnace Run and is deemed "Exceptional Value (EV)" as per PADEP water quality standards. The Segloch is a rare treasure indeed for Lancaster County, being only one of two streams in the entire county pristine enough to receive this classification.

Present day, the Furnace Run/Seglock Run Watershed Alliance continues its effort of protecting and enhancing its namesake through public awareness and education and partnering with other environmental based interest groups. The Alliance recently received a grant from PADEP to conduct two open houses to inform the general public of Alliance activity and a grant from the Lancaster County Foundation to assist establishing Hopeland Farm as an environmental education center for both teachers and students.

The Stroud Water Research Center and the Chesapeake Bay Foundation are currently involved in an on-going riparian buffer study project on Hopeland Farm owned by Douglas Weidman. Additionally, the Donegal Chapter of Trout Unlimited recently completed a natural stream design restoration project on the Gary Landis Farm located on Furnace Run and the Lancaster County Youth Conservation School continues its "Adopt-A-Stream" project with the Pennsylvania Fish and Boat Commission on Segloch Run within Pennsylvania State Gamelands #46-70.

Most recently, the Alliance has received a grant from The Cold Water Heritage Partnership to complete a **Coldwater Conservation Plan**. The Cold Water Heritage Partnership is comprised of Pennsylvania Trout, Trout Unlimited, the Western Pennsylvania Watershed Program, the Pennsylvania Department of Conservation of Natural Resources and the Pennsylvania Fish and Boat Commission.

The focus of the Coldwater Conservation Plan, as the name suggests, is the coldwater fishery and the conservation of the aquatic resource through proper planning, implementation and education. This very writing (report) is to serve as the Coldwater Conservation Plan and includes

background information, a current description of the Furnace Run and Segloch Run Watersheds, biological study information, and problems and solutions.

Sport Fishing History

When considering the development of a Coldwater Conservation Plan for Furnace and Segloch Runs, one must certainly take into account the role of trout fishing for sport. Segloch more so than Furnace Run, has an interesting, local history of sport fishing.

Prior to 1983, the Pennsylvania Fish and Boat Commission stocked Segloch Run annually with both Brook trout (Salvelinus fontinalis) and Brown trout (Salmo trutta). These fish were mainly stocked in the month of March between Hopeland Road and Fox Road. Assess for both stocking and fishing was mainly via Seglock Road which runs more or less parallel with the stream.

In the 1970's and early 80's, the first day of trout season brought about an onslaught of anglers both vying for a parking spot along Seglock Road and a fishing spot along Segloch Run. At that time, the creel limit was 8 trout per day as compared to the now reduced limit of 5. By far, the most popular fishing hole on Segloch Run was immediately below and under the old stone bridge on Seglock Road. At that time, the bridge consisted of undermined footings and crumbling rock walls; perfect habitat for hiding fish. Since that time, the bridge has undergone repair and no longer offers the unique fish habitat of its former day.

"The bridge on Seglock Road – Once a very popular fishing hole!"

In fact, the entire reach of Segloch Run along Seglock Road was riddled with man-made fish habitat improvement structures. Jack dams, log deflectors, rock weirs and log slat cribbing structures where quite numerous in the 70's though they did show signs of aging and a need for maintenance. Most of the structures had been installed in the 1960's apparently by a local

sportsmen's club. Interestingly, this same sort of generous structure installation took place in neighboring trout streams as well. Specifically Shearers Creek north of Manheim underwent the same in-stream habitat metamorphosis during the same time period as did the upper reaches of Hammer Creek above the old pumping station north of Rte. 322.

The combination of these numerous "fish houses" coupled with the annual stockings made for some very exciting trout fishing – that was until the stocked trout were all caught out in the first week or two of the season. Once the stocked trout seemed gone, the population of fisherman reduced and the stream would return to its normal, unmolested self by the month of May.

Segloch Run, as did many other trout streams during that time period, largely served a group of fisherman with a put and take perspective. The practice of catch and release was not at all a common practice. Rather the mindset of "I have to get my limit of 8 fish" seemed to be the norm.

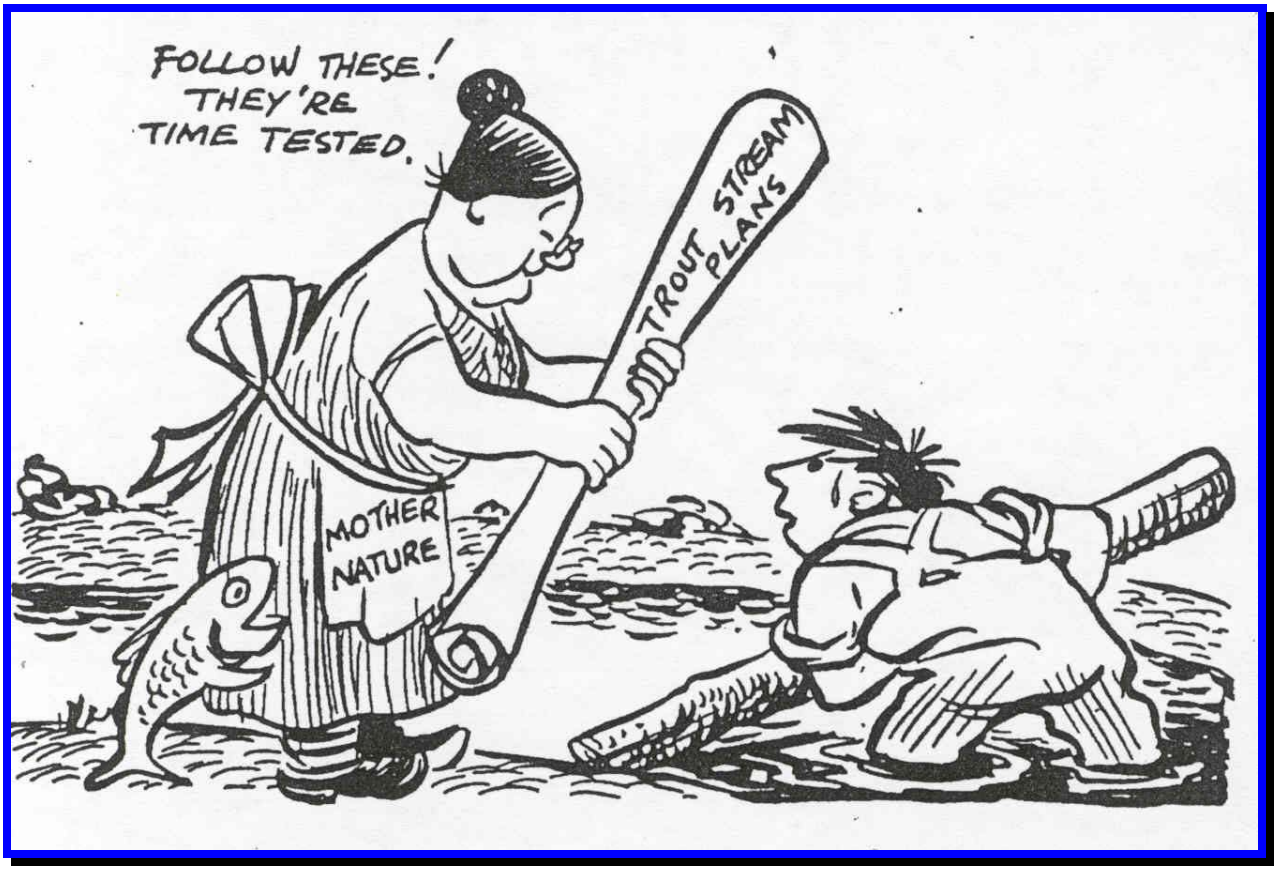
"On a sad note, I recall the time I was fishing Segloch Run and an angler next to me caught a wild, beautifully colored, native brook trout that might have measured all of 5-inches. The angler ripped his 5 cent hook from the trout's throat and threw it up on the bank as he put it "food for the 'coons" and proceeded to exclaim how the fish commission was ripping he and other anglers off by stocking such small trout that didn't even make the minimum legal size. Obviously this angler was in dire need of some fisheries education and a lesson in outdoor ethics." – Mark Metzler

During those years of put and take trout fishing, the Segloch's wild trout population was certainly placed in jeopardy – this fact being recognized by the Pennsylvania Fish and Boat Commission on a state wide level. So in 1983, as per the Commission's new management strategy resulting from its "Operation FUTURE" program, the Segloch was taking off the state's stocking list. From that point on, the Segloch because of its wild trout population would be managed as a "Class A Wild Brook Trout Fishery".

With the stoppage of stocking, fewer anglers frequented the stream and still fewer showed any interest in giving time for any sort of habitat improvement work. The fish habitat creators of the past disappeared along with the stocked trout.

Present day, the Segloch receives only light fishing pressure with most of the anglers being fly fisherman practicing catch and release, though bait fishing and a creel limit of 5 trout measuring 7-inches or longer is permitted.

Once again, there is an interest in improving the in-stream habitat for trout. The Lancaster County Youth Conservation School is currently working closely with Karl Lutz, Area Habitat Manager for the Pennsylvania Fish and Boat Commission in a Commission program known as "Adopt-A-Stream". Likewise, the founding of the Furnace Run / Seglock Run Watershed Alliance and their interest in completing this very Coldwater Conservation Plan will play a vital role in the future sport fishery potential in both the Furnace and Segloch Run Watersheds.



CURRENT FISHING REGULATIONS

Segloch Run
Managed as "Class A Wild Trout Waters"
Angler must have current PA Fishing License and Trout/Salmon Permit (if over 16-years of age) to fish
Minimum length limit: 7-inches
Creel limit: 5
Season: Normal opening day (mid-April) to Labor Day

Furnace Run
Managed as normal inland water – not an approved trout stream
Angler must have current PA Fishing License to fish and Trout/Salmon Permit (if over 16-years of age) if keeping trout
Minimum length limit: 7-inches
Creel limit: 5
Season: Open year round

WATERSHED CHARACTERISTCS

Location

Both Furnace and Segloch Runs are located within the Lower Susquehanna River Sub-basin (state water plan sub-subbasin 7J) within Lancaster and Lebanon Counties, Pennsylvania.

More specifically, Furnace Run originates from a collection of springs within Heidelburg Township, Lebanon County more or less on the west side of Rte. 501 approximately 0.85-miles north of the Lancaster/Lebanon County line. Furnace Run flows in a southeast direction before intersecting with its main tributary Segloch Run on Hopeland Farm located in Elizabeth Township, Lancaster County. From there, Furnace Run continues in a general southeast direction and forms the political boundary between Clay and Elizabeth Townships, Lancaster County before emptying into Middle Creek just northwest of the Village of Clay and Rte. 322. In total, the length of Furnace Run is some 7.9-miles.

Segloch Run also originates from a collection of springs and ponds in Heidelburg Township, Lebanon County near the Village of Dogtown within 0.30-miles of the Lancaster/Lebanon County line. Segloch flows some 3.1-miles in a southerly direction mainly through Pennsylvania State Gamelands #46-70 before entering Furnace Run as noted above. For the most part, Segloch Run forms the political boundary between Clay and Elizabeth Townships, Lancaster County.

"Headwaters of Segloch Run near the Village of Dogtown, Lebanon Co., PA"

Sub-watersheds

Segloch Run is a first order, freestone stream with a drainage area of approximately 3.4-square miles. Segloch Run does not have any tributaries of a significant size worth noting separately, however there are a few important wetlands and springs which contribute significantly. One

such wetland is located on the west side of Seglock Road (T-596) between the Seglock Road bridge and Fox Road (T-548). This little wetland is less than 1/8th-acre in size but is known to play a key role in the local salamander and tree frog population. Locally, this wetland has never been known to go completely dry and plays a vital role in delivering a year round cold water discharge into the Segloch.

A second wooded wetland, approximately 2.5-acres in size exists just north of the Pennsylvania Turnpike on the west side of the stream. A portion of this wetland is easily viewed from the turnpike road shoulder. This wetland complex is located on lands owned by the Pennsylvania Game Commission – Gamelands #46-70.

For purposes of biological assessment, the Pennsylvania Fish and Boat Commission has subdivided the Segloch into three sections. Section #2 extends from Fox Road downstream to Hopeland Road (SR-1026) and measures 2.2-miles in length. Section #2 has been surveyed the past five years as part of a five year Federal Aid project to assess Class A wild trout fisheries. The 2002 survey, which is reviewed in the biological studies chapter of this report, represents the fifth year of the five-year project. The Commission also monitored the potential affects of stream sedimentation and low flow on wild trout abundance over this same time period.

Furnace Run is a first and second order freestone stream draining approximately 8.1-square miles. Furnace Run's main tributary is the previously mentioned Segloch Run; the confluence being located on Hopeland Farm at 40º 13' 43" latitude and 76º 16' 40" longitude. Furnace Run also has two other perennial tributaries. The most upstream intersecting the main stem more or less at the northeast corner of the intersection of Rte. 501 and Fox Road. This unnamed tributary flows in an east to west direction paralleling the north side of Fox Road. The other unnamed tributary is located on the north side of the Pennsylvania Turnpike and the west and east sides of Rte. 501. It flows from west to east, crosses under Rte. 501 via a culvert into Gamelands #46-70 and enters Furnace Run just before Furnace Run flows south under the Pennsylvania Turnpike.

Furnace Run has several significant springs and wetlands worth noting. A large wetland complex exists on the north side of Fox Road and east side of Rte. 501 more or less opposite the Pretzel Hut Resturant in the vicinity of Lake Drive. A major spring exists near the old swimming pool at Spring Lake (intersection of Fox Road and Rte. 501). A second major spring exists on the Coleman Farm and feeds a large farm pond west of the farm buildings and a third set of major springs exist west and south of the recently created wetlands (by the USFWS in 1996) on Hopeland Farm. Once below the Segloch confluence, the Blough property contains a large pond on the south side of Furnace Run which is fed by several springs and a major wetland complex exists on the north side of Furnace Run on the Landis Farm just west of Yummerdall Road.

Geology and Soils

The Furnace Run and Segloch Run drainage basins are underlain with Precambrian grantic and hornblende gneiss. Both rock types are metamorphic and of low permeability typically making for high runoff rates.

The following soil types are found within the riparian zone of Furnace Run (see enclosed soils mapping):

Rd – Rowland silt loam (Considered "Prime Farmland" soil type)
Bo – Bowmansville silt loam
Ln – Lindside silt loam (Considered "Prime Farmland" soil type)
UbD – Ungers extremely stony loam (8-25% slopes)

The following soil types are found within the riparian zone of Segloch Run (see enclosed mapping):

UbD – Ungers extremely stony loam (8-25% slopes)
UbE– Ungers extremely stony loam (25-50% slopes)

Rowland, Lindside and Ungers soils are formed in alluvium and residuum weathered from reddish sandstone and siltstone while Bowmansville soils are formed in mixed alluvial material deposited by streams.

One obvious shortcoming for the Rowland, Lindside and Ungers soils are the fact they are formed from sandstone making for sandy soils prone to fluvial erosion. This reddish, sandy sediment dominates the substrate of Segloch Run and is a limiting factor in regards to trout habitat and spawning gravel availability. Furnace Run's substrate is also laden with this same sand but not as extremely as the Segloch.

Ownership

(See enclosed map)

BIOLOGICAL STUDIES

Pennsylvania Fish and Boat Commission Studies

This article is the second in a series of articles on the major topics of concern in the Commission's theme, "Conserve 2000." This feature explains the global, regional and local aspects of the topic of fish habitat with the state fish, the brook trout, as the focal point. Because the brook trout is a Pennsylvania native, we can readily see the effects of human activity on this species and its habitat over several hundred years.

Habitat and the Brook Trout

by Walt Dietz

Have you ever caught a wild brook trout? If you have, you were probably awed by its orange belly, red spots and the green markings on its back. It's one of Pennsylvania's most colorful fish. But you probably didn't catch it just anywhere. Wild brook trout need the coldest and cleanest water, like that which flows in a small stream beneath a shady forest. Today, most of these shaded streams can be found only in the forested mountains. That's because much of our landscape has been opened up to agriculture and development. Can you imagine what the state might have been like 400 years ago? Pennsylvania was entirely forested then and nearly every stream had a wild brook trout in it.

Before the 1600s, wild brook trout were widely distributed throughout the state. They could be found in just about every watershed, including the Ohio, Allegheny, Susquehanna and Delaware. Pennsylvania provided the perfect habitat for the native brook trout because of the forests.

The area that became Pennsylvania includes nearly 29 million acres. Very few clearings could be found before the 1600s, except for those made by natural events or Native Americans. No wonder it was named Pennsylvania. "Penn," for William Penn, the Quaker leader who purchased the land from the Indians, and sylvania, which is Latin for "woods."

This blanket of forest was important to the health of streams and rivers. Tall hemlocks, white pine and a variety of deciduous trees shaded the valleys. Shade kept the water temperatures cold. Trees protected the banks from erosion. Gravel stream bottoms were clean and unsilted. There was plenty of food and shelter among the submerged tree roots. The conditions were perfect for brook trout survival and reproduction.

Changing landscape

The landscape changed when European settlers arrived and began to cut the forests in the 1600s and 1700s. This activity changed the habitat of the native brook trout. There seemed to be an endless supply of trees at that time. There were so many trees that the first settlers looked at the

forests as a hindrance. They cut timber for fuel, homes, furniture and tools. Still, the early settlers hardly had an effect on the state's endless forest.

Large amounts of timber were not really cut until the early 1700s. Europeans had already overexploited their own resources. They sought to develop the New World and use its abundant resources. Pennsylvania timber became a valuable commodity. It fed a growing country and a global economy, but not without consequences to our local forests and waters.

Shipbuilding was the first industry to take advantage of the state's trees. England needed timber to build ships, so the White Pine Act of 1722 was created. It reserved all the white pines for the British Navy. Lumber was used to make hulls. "Spars," long white pine logs, were used for masts. Can you imagine the size of a tree needed for the main ship mast? The minimum size was 96 feet tall and 15 inches in diameter at the top. A spar's size made it hard to transport. That's why the first trees to be cut were those closest to major riverbanks-not good for the health of aquatic habitats. The banks of eastern rivers like the Delaware and the Susquehanna became the first targets. Trees were felled by hand and the logs were pulled to the water by oxen. Logs were then floated to Baltimore and Philadelphia. Lumber and spars were shipped back to England and made into ships. Those ships were later used against America during the revolutionary war and for exploration of new frontiers. Imagine the importance that Pennsylvania trees had in the world's economy and history

Industrial heritage

The new country's population was growing in the early 1800s. And forest resources were needed to meet its demands. This is when large-scale timbering began. Wood became an important part of America's industrial heritage. The iron, tanning and lumber industries all relied on forests.

In the early 1800s, Pennsylvania became an important source of iron. Making iron required wood for charcoal. It was the fuel used to melt iron ore. Most of the forests had already been cut near the river valleys for the shipbuilding industry. So the mountainsides of central Pennsylvania became the next focus. Iron ore was present and trees were abundant. Iron furnaces were established and entire communities would be built up around them.

By 1860, there were 150 iron furnaces in Pennsylvania. They required over 1.5 million acres of trees per year. That's a lot of trees cut down to produce a lot of iron. This iron fed a growing nation and a growing world. That's right: Pennsylvania iron was an important part of the global economy. Take the small town of Axemann in Centre County, for example. It once produced iron ax heads that were shipped all over the world.

The landscape around iron furnaces was eventually stripped bare of trees. Only open clear cuts were left.

The tanning industry also relied heavily on the use of trees. Tree bark provided the tannin that was used to "tan" animal hides. The best source for tannin was the bark of eastern hemlocks. The best place to find plenty of hemlocks was northeast Pennsylvania. Counties like Monroe and Pike became the location of several important tanneries. Buffalo hides were brought from the West to these tanneries. By the mid-1800s, the Pocono region became the second largest leather producer in America. That's how places like Tannersville, in Monroe County, got its name.

Eventually the areas around the tanneries also ran out of trees. By the 1800s, much of the landscape in northeastern Pennsylvania was deforested.

The lumber industry took advantage of the central portion of the state. This area was still heavily forested. But transporting large logs from these remote areas was a problem. The solution was splash dams. They were built on small mountain streams to impound and stop the flow of water. Trees were pulled to the empty streambed, the dam was opened and water pushed the trees to the next dam. Can you imagine the effect that splash dams had on brook trout habitat? The trees could be transported from remote areas to major rivers, like the Susquehanna and Allegheny.

Booms were constructed on the rivers to catch and hold the logs. Logs were then formed into huge "rafts" and floated downriver to Williamsport, Philadelphia, Harrisburg and even as far away as New Orleans.

Pennsylvania's lumber industry also had an important place in history. Take, for instance, Williamsport, which had many sawmills. It became the world's largest lumber producer by 1880.

Stream and river habitats

By the late 1800 to early 1900s, almost all areas of Pennsylvania had been cut at least once. Forest cutting up to this time was not really managed with sustainability in mind. Environmental effects were not considered. The effect of logging on streams and rivers was not even considered. Loggers would move on to a new area once the trees were cut. The result was that our stream and river habitats were degraded. So was the water quality. Without trees for shade, water temperatures rose. The higher temperatures became too stressful for brook trout. There was no vegetation to hold the soil. Erosion washed silt into prime spawning habitat. The silt covered the gravel and made it impossible for brook trout to reproduce. The aquatic insects that brook trout feed on could not survive. Shelter in the form of tree roots was lost. The result was that native brook trout populations were depleted from much of their original range.

Depleted fish populations brought about concern. The aristocracy of the New World enjoyed sport fishing, but there were no fish! Their solution to the problem was to stock new fish. There was little thought about restoring or improving habitat. They believed that stocking fish would bring back good populations. It also gave them an opportunity to duplicate the species that they once caught in their homeland -- Europe. So they brought in carp during the mid-1800s. Smallmouth bass were introduced from the Potomac River. They were released into the Delaware and Susquehanna rivers during the 1870s. Brown trout from Europe were introduced in the late 1800s.

Rainbow trout were eventually transferred from western North America to the East Coast. Brown, rainbow and brook trout were raised in hatcheries and then released into the wild.

Little did they know that they were providing a source of competition for the native brook trout. When they co-exist in the same habitat, brown trout compete with brook trout for resources.

Lessons from the past

Today things are much different. We have learned many lessons from the past. The way we go about managing and protecting Penn-sylvania's forests and waters has improved. Forestry practices have changed and many important habitat management methods have been learned over the years. Landscape ecology is evaluated before cutting forests. In most cases, forests are no longer clear-cut. Cutting rotations are ecologically based and managed more carefully. Timbered areas are replanted after trees are removed. Some mature trees are left standing to act as a seed stock for new trees. Vegetation buffers are left along streambanks and roads. Buffers minimize the effects of logging operations. These techniques result in healthier forests. They also result in better water quality.

The way in which we manage fisheries in Pennsylvania has also changed. The Fish & Boat Commission follows a plan for streams and rivers that are cold enough to hold trout. Waters are grouped as "wild" or "hatchery-supported." There are several criteria that fisheries biologist use. A wild trout fishery must also be able to sustain a naturally reproducing population of wild trout. It must provide adequate habitat. These waters are labeled "Class A Wild Trout Waters" and are not stocked. In this way, wild brook trout are managed more like a renewable natural resource.

Streams that cannot support wild trout are stocked with hatchery-raised trout. Stocking provides the opportunity for anglers to catch a trout, in a stream that would normally not allow them to reproduce on their own. Chances are there is a hatchery-supported trout stream only minutes from your home.

Riparian buffers

Habitat protection and enhancement play an important support role in fisheries management. A focal point for protecting and enhancing aquatic habitats is riparian buffers. A riparian buffer is a zone of trees and vegetation between water and an upland area. Riparian buffers are important to the health of a stream. They shade the water, stabilize banks and intercept surface runoff. Studies show that water temperature is 10 degrees cooler in streams that are lined with buffers. They purify runoff by trapping sediment, fertilizers and pollution. They even provide food in the form of leaf litter for aquatic insects. The insects in turn are food for forage fish and trout. Ultimately, we can improve fish populations if we protect and enhance riparian buffers.

The Commission, along with other agencies, also protects habitat through laws and regulations. People who want to alter a stream or river in any way must apply for a special permit. The request is reviewed to make sure that the habitat will not be degraded. The Commission enforces habitat protection laws that are broken.

The Commission is also involved with many stream and river enhancement projects through its Adopt-a-Stream Program. This program is one of the ways in which individuals and organizations can help. It's a cooperative effort that improves and protects aquatic and riparian habitats. The program provides assistance for those willing to donate time and effort toward waterway protection and enhancement. Projects might include fish habitat restoration, stream corridor management and stabilization projects.

Environmental conditions in Pennsylvania are much improved. Our forests and waters have rebounded thanks to the efforts of many agencies, organizations and individuals. Hardwood forests now cover nearly 60 percent of the Commonwealth. These forests protect more than 25,000 miles of streams and provide clean water for aquatic animals. Around 13,000 miles of streams are clear and cold enough to support trout. Wild brook trout populations have also improved. Their numbers and dispersal in watersheds isn't what it was before the 1600s. Nevertheless, they can once again be found over much of the terrain they once inhabited.

The above article by Walt Dietz provides good background information on what landuse conditions must have been like in the Furnace and Segloch Run Watersheds. It is interesting to note the article states that by 1860 there were 150 iron furnaces in Pennsylvania requiring 1.5 million acres of trees per year! Local names like Cannon Hill, Forge Hill and Furnace Run certainly attest to this past history in the subject watersheds.

Current day, the Pennsylvania Fish and Boat Commission has conducted several biological surveys within both Furnace and Segloch Runs. As previously mentioned, Segloch Run is currently managed as a Class "A" Wild Brook Trout Fishery. Furnace Run is not technically recognized as an "approved trout stream" or "special regulated trout water" by the Pennsylvania Fish and Boat Commission, but the Commission and the Pennsylvania Department of Environmental Protection are aware there is a wild trout population persisting in Furnace Run.

Most recently, Segloch Run was surveyed as part of a five-year Federal Aid project to assess Class A wild trout fisheries. During the five-year study period (1998-2002), Section #2 located between Fox Road (T-548) and Hopeland Road (SR-1026) supported an average wild trout biomass in excess of 46 kg/ha (41 lbs/acre) of which Brook trout (*Salvelinus fontinalis*) represented 82% of the population while Brown trout (*Salmo trutta*) comprised the balance of 18%.

The average number of trout ≥ 175 mm (6.9-inches) estimated per mile was 124 trout of which 90 were Brook trout and 34 were Brown trout. Interestingly, the loss of adult trout habitat apparently due to drought and sedimentation in 2000 and 2002 resulted in fewer legal and larger length trout as compared to 1998.

The Fish and Boat Commission has several recommendations as a result of their five-year study. They are as follows (as published in their August 6th, 2003 report Segloch Run report):

1. The Pennsylvania Fish and Boat Commission should continue to manage the Class A wild brook trout fishery in Section 02 of Segloch Run under conventional, statewide angling regulations with no stocking.

2. The Pennsylvania Fish and Boat Commission should continue to sample the wild trout populations to monitor the effects of stream sedimentation and low flow on trout abundance, and to learn more about natural variations in brook trout abundance.

3. Corrective measured should be taken to reduce man-related sources of sedimentation in the drainage basin. Stream sedimentation conditions have clearly worsened during the study period. The naturally sandy soil in the drainage basin is highly erodible.

4. Efforts by townships to address problems associated with runoff and erosion from roads adjacent to the stream through the Department of Environmental Protection's Dirt and Gravel Road Program should be pursued.

The Pennsylvania Fish and Boat Commission latest study of Furnace Run occurred in the Fall of 2000 in response to concerns raised by Heidelberg Township's proposed sewage treatment plant and discharge.

In short, the Commission only found trout in Furnace Run upstream of Hopeland Road, though no monitoring was conducted between Hopeland Road and Yummerdall Road. However the Commission findings and list of encountered species mirror findings of Rettew in the Fall of 2003.

Pennsylvania Department of Environmental Protection Study

During the time Heidelberg Township, Lebanon County was proposing the construction of a sewage treatment plant and discharge within the Furnace Run Watershed, the Department of Environmental Protection completed a study to reevaluate its classification of the stream. This reevaluation was prompted by concerns raised by area residents opposed to the treatment plant and discharge, the Furnace Run/Segloch Run Watershed Alliance, the Donegal Chapter of Trout Unlimited, the Lebanon School District, the Conestoga Valley School District and the Lancaster County Conservation District.

The study was completed on October 30, 2000 and found Furnace Run did not meet the requirements for being classified as a high quality stream – a classification that would have jeopardized the construction of the sewage treatment plant. The Department however did recognize the existence of wild trout and determined the stream should be protected as a coldwater fishery generally upstream of the PA Turnpike. This decision was based on electrofishing results conducted by the Pennsylvania Fish and Boat Commission.

In a stunning upset, the Department's decision was overturned a year later by the Environmental Hearing Board who were greatly persuaded and convinced otherwise by stream health documentation provided mainly by a very persistent Conestoga Valley High School.
Furnace Run is now classified and protected as a cold water fishery and a high quality stream.

Lebanon High School Study

In February of 2002, a group of Lebanon High School Honors Biology students, under the supervision of their teacher Ralph Heister, completed a draft report of their water quality

assessment of the Furnace Run Watershed. The report is very comprehensive in its look at water chemistry and macroinvertebrates.

The study complements studies performed by the Pennsylvania Fish and Boat Commission and Rettew. In general, findings from the Lebanon High School study indicate Segloch Run is indeed an exceptional value stream in terms of water quality while Furnace Run is also healthy but not as pristine as the Segloch. The study does mention agricultural and residential landuses within the Furnace Run to likely be sources of impairment. The study indicates the numerous ponds in the headwaters of Furnace Run and the presence of on-lot septic systems to be a possible explanation for elevated nitrogen and phosphorous levels upstream of the PA Turnpike.

Rettew Associates, Inc. Findings

In October of 2003, Rettew conducted a survey of the fish community within Furnace Run and to a lesser degree Segloch Run (because of already known data collected by the Pennsylvania Fish and Boat Commission.

A native brook trout captured at the confluence of Segloch Run and Furnace Run.

The following tables summarize fish assemblages found by Rettew and the Pennsylvania Fish and Boat Commission.

FURNACE RUN DOWNSTREAM OF YUMMERDALL ROAD TO ITS CONFLUENCE WITH MIDDLE CREEK

SPECIES	RETTEW	PA FISH & BOAT
Brook trout, *Salvelinus fontinalis*	Absent	Absent
Brown trout, *Salmo trutta*	Rare – (1)	Absent
Cutlips minnow, *Exoglossum maxillingua*	Present	Present

Common shiner, *Notropis cornutus*,	Common	Abundant
Spottail shiner, *Notropis hudsonius*	Absent	Rare
Blacknose dace, *Rhinichythys atratulus*	Abundant	Abundant
Longnose dace, *Rhinichythys cataractae*	Common	Common
Fallfish, *Semotilus corporalis*	Common	Abundant
White sucker, *Catastomus commersoni*	Abundant	Abundant
Northern hog sucker, *Hypentelium nigricans*	Common	Present
Margined madtom, *Noturus insignis*	Rare	Present
Rock bass, *Ambloplites rupestris*	Rare	Rare
Tessellated darter, *Etheostoma olmstedi*	Common	Common
Creek chub, *Semotilus atromaculatus*	Abundant	Common
Green sunfish, *Lepomis cyanellus*	Rare	Present
Bluegill, *Lepomis macrochirus*	Absent	Present
Swallowtail shiner, *Notropis procne*	Absent	Rare
Golden shiner, *Notemigonus crysoleucas*	Absent	Absent
Pumpkinseed, *Lepomis gibbosus*	Absent	Present
Banded killifish, *Fundulus diaphanous*	Absent	Present
Bluntnose minnow, *Pimephales notatus*	Common	Abundant
Gizzard Shad, *Dorosoma cepedianum*	Rare	Absent
Spotfin shiner, *Cyprinella spiloptera*	Present	Absent

FURNACE RUN DOWNSTREAM OF PA TURNPIKE

SPECIES	RETTEW	PA FISH & BOAT
Brook trout, *Salvelinus fontinalis*	Present	Rare
Brown trout, *Salmo trutta*	Present	Absent
Cutlips minnow, *Exoglossum maxillingua*	Present	Present
Common shiner, *Notropis cornutus*,	Common	Common
Spottail shiner, *Notropis hudsonius*	Absent	Absent
Blacknose dace, *Rhinichythys atratulus*	Abundant	Abundant
Longnose dace, *Rhinichythys cataractae*	Common	Common

Fallfish, *Semotilus corporalis*	Common	Absent
White sucker, *Catastomus commersoni*	Abundant	Present
Northern hog sucker, *Hypentelium nigricans*	Common	Present
Margined madtom, *Noturus insignis*	Rare	Absent
Rock bass, *Ambloplites rupestris*	Rare	Absent
Tessellated darter, *Etheostoma olmstedi*	Common	Common
Creek chub, *Semotilus atromaculatus*	Common	Absent
Green sunfish, *Lepomis cyanellus*	Absent	Rare
Bluegill, *Lepomis macrochirus*	Absent	Present
Swallowtail shiner, *Notropis procne*	Absent	Absent
Golden shiner, *Notemigonus crysoleucas*	Absent	Absent
Pumpkinseed, *Lepomis gibbosus*	Absent	Rare
Banded killifish, *Fundulus diaphanous*	Absent	Absent
Bluntnose minnow, *Pimephales notatus*	Common	Absent
Spotfin shiner, *Cyprinella spiloptera*	Present	Absent
Redbreast sunfish, *Lepomis auritus*	Rare	Absent

FURNACE RUN DOWNSTREAM OF FOX ROAD

SPECIES	RETTEW	PA FISH & BOAT
Brook trout, *Salvelinus fontinalis*	Present	Present
Brown trout, *Salmo trutta*	Present	Absent
Cutlips minnow, *Exoglossum maxillingua*	Present	Absent
Blacknose dace, *Rhinichythys atratulus*	Abundant	Abundant
Longnose dace, *Rhinichythys cataractae*	Present	Absent
White sucker, *Catastomus commersoni*	Common	Present
Northern hog sucker, *Hypentelium nigricans*	Present	Absent
Tessellated darter, *Etheostoma olmstedi*	Common	Absent
Creek chub, *Semotilus atromaculatus*	Common	Abundant
Pumpkinseed, *Lepomis gibbosus*	Absent	Present
Bluntnose minnow, *Pimephales notatus*	Present	Absent

SEGLOCH RUN DOWNSTREAM OF PA TURNPIKE

SPECIES	RETTEW	PA FISH & BOAT
Brook trout, *Salvelinus fontinalis*	Abundant	Common
Brown trout, *Salmo trutta*	Present	Present
Cutlips minnow, *Exoglossum maxillingua*	Common	Not reported
Blacknose dace, *Rhinichythys atratulus*	Abundant	Not reported
Longnose dace, *Rhinichythys cataractae*	Present	Not reported
White sucker, *Catastomus commersoni*	Present	Not reported
Tessellated darter, *Etheostoma olmstedi*	Present	Not reported
Creek chub, *Semotilus atromaculatus*	Present	Not reported
Bluntnose minnow, *Pimephales notatus*	Rare	Not reported

SEGLOCH RUN UPSTREAM OF PA TURNPIKE

SPECIES	RETTEW	PA FISH & BOAT
Brook trout, *Salvelinus fontinalis*	Abundant	Abundant
Brown trout, *Salmo trutta*	Present	Present
Cutlips minnow, *Exoglossum maxillingua*	Present	Not reported
Blacknose dace, *Rhinichythys atratulus*	Abundant	Not reported
Longnose dace, *Rhinichythys cataractae*	Present	Not reported
White sucker, *Catastomus commersoni*	Present	Not reported
Tessellated darter, *Etheostoma olmstedi*	Present	Not reported
Creek chub, *Semotilus atromaculatus*	Present	Not reported
Bluntnose minnow, *Pimephales notatus*	Rare	Not reported

STAKEHOLDER SURVEY

In April of 2003, the Furnace Run/Segloch Run Watershed Alliance conducted a stakeholder survey with the goal of better understanding stakeholder concerns and desires. A total of 18 questionnaires were returned to the Alliance for evaluation.

Some conclusions that can be drawn from the survey include:

- 16 of the 18 stakeholders previously were aware of the Furnace Run/Segloch Run Watershed Alliance
- The majority of stakeholders thought Segloch Run was “healthy”, but were not sure about Furnace Run
- The average stakeholder lived in the watershed 25-years
- 15 of the 18 stakeholders considered themselves conservationists

- The majority (17 of the 18 stakeholders) do not fish in either Furnace Run or Segloch Run
- The majority of stakeholders believed trout lived in both Furnace Run and Segloch Run

Following is a copy of the cover letter and survey sent to the stakeholders. The final tallies are also listed on the copy of the survey.

THE TOP TEN RECOMMENDATIONS

1. Work with the Pennsylvania Game Commission to control pull-off areas along Seglock Road from becoming littering sites and sources of sedimentation

2. Maintenance of the Horseshoe Trail (waterbars, blockades for vehicular traffic)

3. Riparian buffer improvements along Furnace Run upstream of Camp Mack to Tract 11

4. Educate landowners in the Dogtown area about the vital role they play in protecting the headwaters of Segloch Run

5. In-stream habitat improvements downstream of Fox Road to the confluence with Furnace Run (Assist the Lancaster County Youth Conservation School implement their "Adopt-A-Stream" project)

6. In-stream habitat improvements on Furnace Run on Tracts 51, 54, 56

7. Remove dam on Tract 51 immediately above the PA Turnpike

8. Riparian buffer and in-stream habitat improvements on Tract 63

9. Re-direct the majority of the spring flow directly into Furnace Run instead of the created wetlands on Tract 59

10. Remove irrigation dam on Tract 64

CURRENT CONDITIONS AND RECOMMENDATIONS

Aerial and Ground Photographs ***Problems and Recommendations***

FURNACE RUN

Photos #1 and #2

Furnace Run begins at this farm pond located on Tract #1.

The pond shows signs of eutrophication, and serves as a means of artificially warming the water in Furnace Run.

Improvements in the way of installing a bottom discharge to draw the cold bottom water from the pond would greatly aid in maintaining Furnace Run as a coldwater fishery as would the planting of a forest riparian buffer around the pond and the stream channel.

The second, smaller pond is fairly well shaded and less of a priority in regards to installing a forest buffer.

Photos #3 and #4

The same small pond as previously pictured in photo #2.

A third pond on Tract #1.

Photos #5 and #6

A closer view of the third pond on Tract #1. The pond is rip-rapped and is off line with the stream.

Furnace Run can be seen to the right of the pond. A lawn condition is maintained right up to the top of the stream bank in this backyard setting.

It is suspected the pond is chemically treated with possibly "Aqua-shade" given its unnaturally blue color as viewed from the air. The "Aqua-shade" product is not necessary harmful to Furnace Run, but other chemicals such as copper sulfate commonly used to control algae blooms could be damaging to the aquatic community in Furnace Run because of its possible disruption to the food chain beginning with in-stream plant materials (including necessary algae).

Tract #11 and its two farm ponds. As was the case with the ponds on Tract #1, these ponds and stream channel could be improved with forest buffer plantings and bottom discharges in the ponds.

Photos #7 and #8

Photo #7 was taken from the driveway crossing looking upstream at Furnace Run. Tract #11's larger farm pond can be seen on the right side of the photo.

Photo #8 is an aerial view looking at the second, smaller pond on Tract #11.

A well planned and planted forest buffer would be a beneficial "best management practice" to install along the stream channel as seen in this photo. This landowner could greatly benefit from the CREP program.

Photos #9 and #10

Gas pipeline exposed here

Aerial view of Tract #14. Fairly well shaded stream channel in this section.

Photo #10 is an aerial view of an active pasture on Tract #21 where livestock have free access to the stream channel. Stream bank fencing and a forested buffer would be beneficial. The stream bank erosion that was evident would likely heal by itself if livestock access was denied. A stone ford cattle crossing could be used to provide access to both sides of the stream and also serve as a watering location. This landowner could greatly benefit from the **CREP** program.

Photos #11 and #12

Aerial views of Tracts #24 and #31. Limited potential for installing a forest buffer.

Aerial view of the large pond at the J. Edward Mack Boy Scout Reservation. Obviously the pond is a source of thermal pollution; a situation that could be improved upon with a bottom discharge. The pond is off line with the stream channel and is believed to be spring fed. Rettew did not find any intake pipe feeding the pond from the stream. It is unlikely the camp would ever want to do away with this manmade pond, considering its value for water related activity – However if opportunity would ever avail itself, the pond could be returned to its likely, former wetland state. It appears the stream channel was realigned to accommodate the pond and Rte. 501.

Photos #13 and #14

The entrance to the J. Edward Mack Boy Scout Reservation (Camp Mack) off of Rte. 501.

The Alliance should consider approaching the boy scouts and inviting them to participate in stream restoration activities. Because of their active location within the watershed and their close proximity to a number of projects well within their "hands on" capabilities, the boy scouts could prove to be an invaluable asset.

Photo #14 shows an aerial view of Furnace Run where it crosses to the other side of Rte. 501 near the Camp Mack entrance.

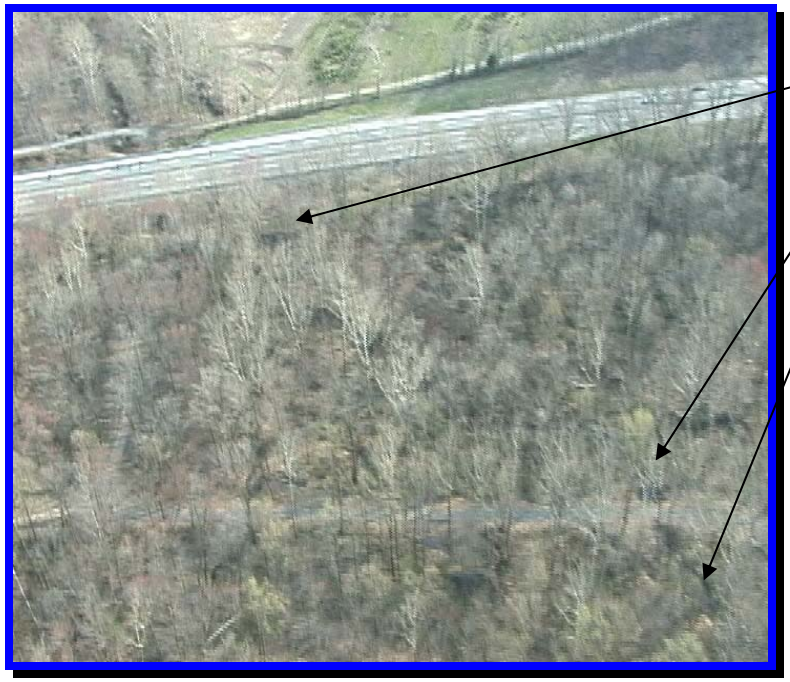
Photos #15 and #16

Aerial view of Tract #46 and Spring Lake. Just upstream of the lake, there is a palustrine wetland which gives hint to the way the area looked prior to the construction of the lake.

The wetland does filter stormwater generated from Rte. 501.

Spring Lake is yet another obvious thermal pollution source which could be improved upon with the addition of a bottom discharge.

A ground view of the wetland with Spring Lake in the background.



Photos #17 and #18

Closer view of the bottom end of Spring Lake and the old public swimming pool no longer in use.

Immediately below the lake, an unnamed tributary enters Furnace Run from the northeast. This unnamed tributary more or less flows parallel to Fox Road and originates at a pond on Tract #19.

Furnace Run below the lake could be improved with a forest buffer planting.

Aerial photo #19 shows Furnace Run in a forest setting just north of the PA Turnpike on Tract #51. Obviously the forest buffer is intact but instream habitat improvements could boost the carrying capacity of the stream for trout.

Photos #19 and #20

Ground photo #19 shows a rock dam on the north side of the PA Turnpike on Tract #51. The dam should be removed so as to provide fish migration. The dam also backfloods the stream channel and creates a localized sedimentation problem.

Photo #20 shows the downstream (southside) end of the PA Turnpike underpass culvert through which both the stream and farm vehicles pass. This culvert also creates somewhat of a migration block in that the substrate is forced to be wide and shallow.

Photos #21 and #22

Aerial photos #21 and #22 show Furnace Run on the south side of the PA Turnpike on Tract #54. The stream is well surrounded by a forest buffer, though much of the understory is dominated by multiflora rose. The limiting factor in regards to trout habitat is the availability of instream habitat. Trout (mainly native Brook trout) are present above and below the PA Turnpike but are limited to a few suitable runs and pools. The numbers and especially the size of the trout could be enhanced with the addition of instream fish enhancement structures such as log deflectors, cribbing and the like.

Photos #23 and #24

This old bridge within Tract #56 at one time was part of Hopeland Road prior to the construction of the PA Turnpike. It now serves as a crossing for farm equipment. Farily good trout habitat exists immediately below the bridge though again the forest understory is dominated by multiflora rose.

This farm lane on Tract #56 could be improved with various erosion and sedimentation measures so as to avoid sedimentation during rain events. Devises such as broad base dips could divert sediment laden runoff into grass and forest lands for filtering. Grass swales along the lane coupled with culverts could keep upslope water clean and diverted rather than having it enter onto the farm lane.

Photos #25 and #26

Aerial photo #25 and #26 show Furnace Run as it continues in a southwest direction.

Hopeland Road

This little wooded patch south of Hopeland Road harbored both wild Brown trout and native Brook trout.

Habitat through this section of Furnace Run needs little improvement.

Above – A view of the larger impoundment which serves as a thermal pollution source to Furnace Run.

Photos #27 and #28

Aerial photo #27 shows two man made wetlands on Hopeland Farm (Tract #59).

In the creation of the two wetlands, a spring was diverted from Furnace Run to the larger pictured impoundment. The larger impoundment then flows into the smaller triangular shape impoundment which then flows into Furnace Run.

The trade off of diverting the spring from Furnace Run into the created wetlands is questionable and certainly something that would not have been done in the interest of maintaining a coldwater fishery in Furnace Run. RETTEW suggests diverting the majority of spring flow back into Furnace Run and letting the wetlands become more of a palustrine wetland type rather than the open water condition now so prevalent throughout much of the created wetland area.

Photos #29 and #30

The new wooden bridge at Elser Hill Road installed by Elizabeth Township with financial assistance from Hopeland Farm and the Commonwealth's Dirt and Gravel Road maintenance program was a much better alternative than the originally planned pipe culvert crossing. The wooden bridge spans the stream channel and allows for a natural substrate underneath the bridge as compared to the metal surface of the inside of a pipe.

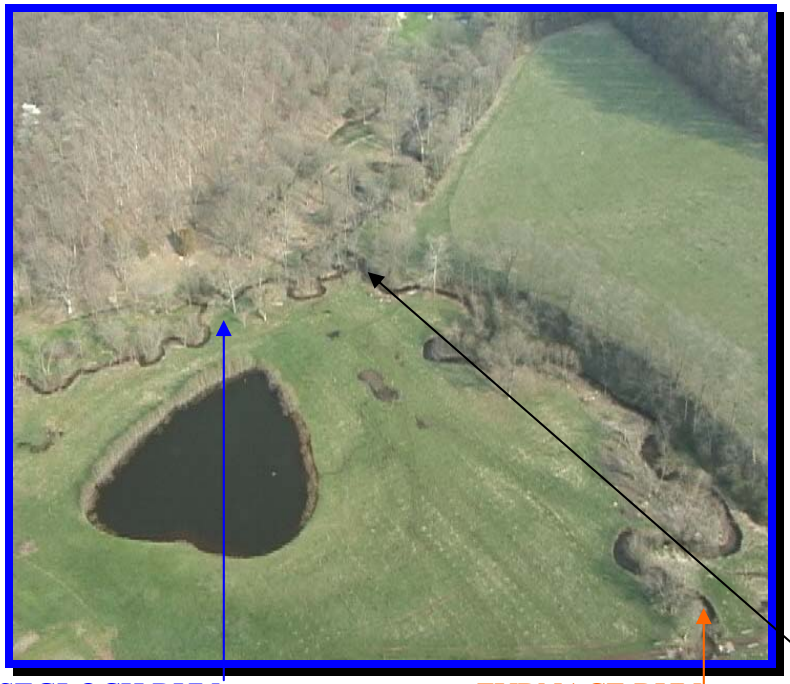
Below – This snapping turtle was found crossing Elser Hill Road and stop briefly to have his picture taken.

Photos #31 and #32

Although the aerial photo doesn't show it, this section of Furnace Run flowing through Hopeland Farm is part of a huge forest buffer planting and streambank fencing project made possible through the cooperative efforts of Hopeland Farm, the Chesapeake Bay Foundation, the Stroud Water Research Center and the Commonwealth's CREP program. Only time and maintenance of the installed best management practices is all that will be necessary to improve this reach of Furnace Run.

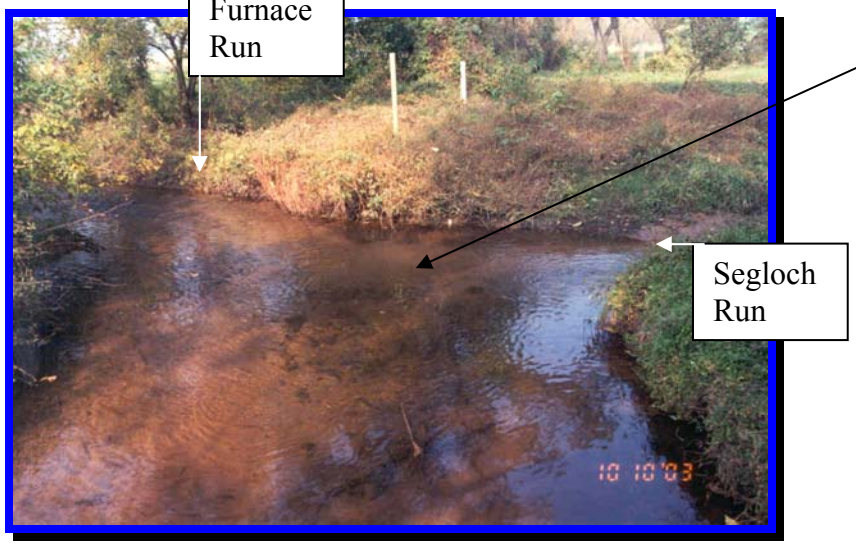
Elser Hill Road

Some of the tree tubes east of Elser Hill Road



SEGLOCH RUN

FURNACE RUN



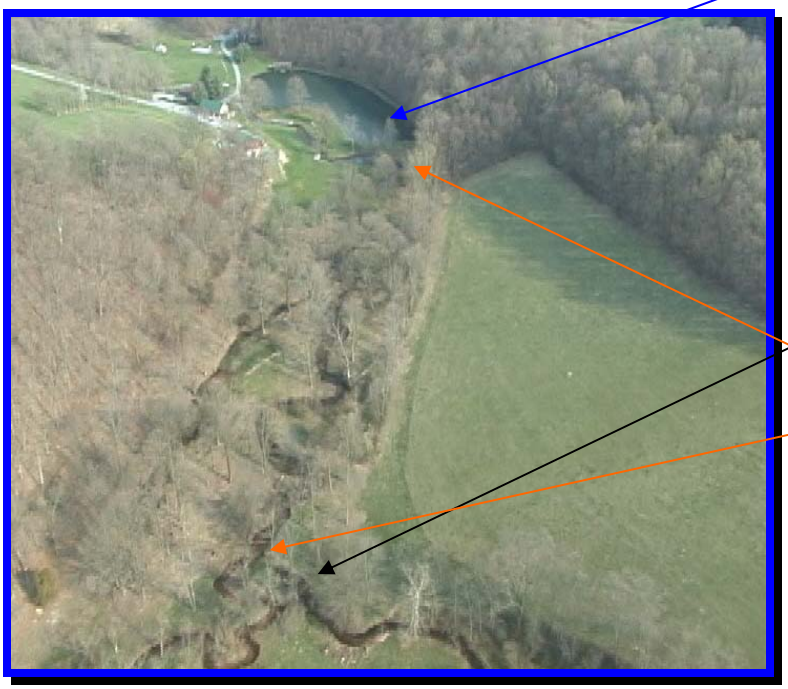
Photos #33 and #34

This heart shaped pond on Hopeland farm also serves as a thermal pollution source to Segloch and Furnace Runs.

The pond could be improved through the installation of a bottom discharge. The pond itself could be improved through dredging, structure installation and aeration to improve it as likely a warm water fishery.

The confluence of Furnace and Segloch Runs on Hopeland Farm.

In general, the substrate of Segloch Run was found to be more sediment laden than Furnace Run.



Photos #35 and #36

A ground photo of the planted forest buffer along Furnace Run just upstream of the confluence with Segloch Run.

Upstream end of Tract #63 and the large pond on that property.

Aerial photo #36 shows Furnace Run just downstream of its confluence with Segloch Run.

Segloch Run/Furnace Run confluence

Trout were present but limited in number throughout this reach – Both Brown and Brook trout present.

Photos #37 and #38

Photos #37 and #38 show the downstream end of Hopeland Farm (Tract #61) before entering Tract #63.

Both Brown and Brook trout were present but the numbers of fish were somewhat disappointing. Only three (3) trout were captured from the stream sections pictured in these photographs.

Instream habitat structures could surely boost trout numbers.

One 11-inch Brown trout was captured and released from under this overhanging tree.

Photos #39 and #40

An aerial view of Tract #63. The property is well manicured with a lawn condition being maintained right to the stream channel thus the need for a riparian forest buffer. It would be possible to incorporate a scenic yet environmentally practical forest buffer in the estate setting. Well placed species such as White-flowering dogwood, Silky dogwood and White pine could provide both an aesthetic and biological function.

Portions of the channel are rip-rapped to prevent erosion. This too could be improved upon through natural stream design practices that both stabilize the stream channel and provide fish habitat. Structures such as j hooks and cross-vanes would be suitable.

The pond discharges via a surface spillway – Again a bottom discharge would be an improvement.

A portion of the well manicured pond.

Photos #41 and #42

More photos of Tract #63.

Notice the streambank erosion and lack of forest buffer.

A large section of Furnace Run on Tract #63 has been rip-rapped as can be seen in this photo and photo #43 on the next page. This section of stream was dominated by warm water species including Fallfish.

Photos #43 and #44

Another view of the rip-rap on Tract #63.

No trout were captured on Tract #63 except for one lone Brown trout at the very upper end of the property. This is mainly due to unsuitable riparian habitat, thermal pollution and inadequate instream cover.

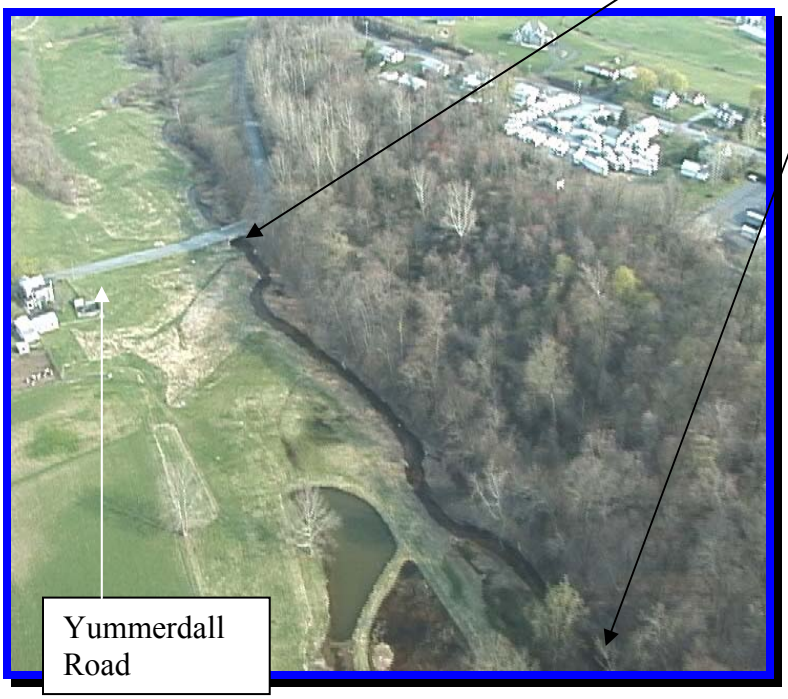
The downstream limits of Tract #63 along Furnace Run. Notice the mowed condition right up to the stream channel. What a great opportunity to put in a well planned forest buffer and instream habitat structures.

Photos #45 and #46

Aerial photo #45 depicts the forested condition surrounding Furnace Run on Tracts #62 and #64 downstream of the previous Tract #63.

Tracts #62 and #64 contained a small population of both Brook and Brown trout – though Fallfish continued to be the dominate species followed closely by White sucker.

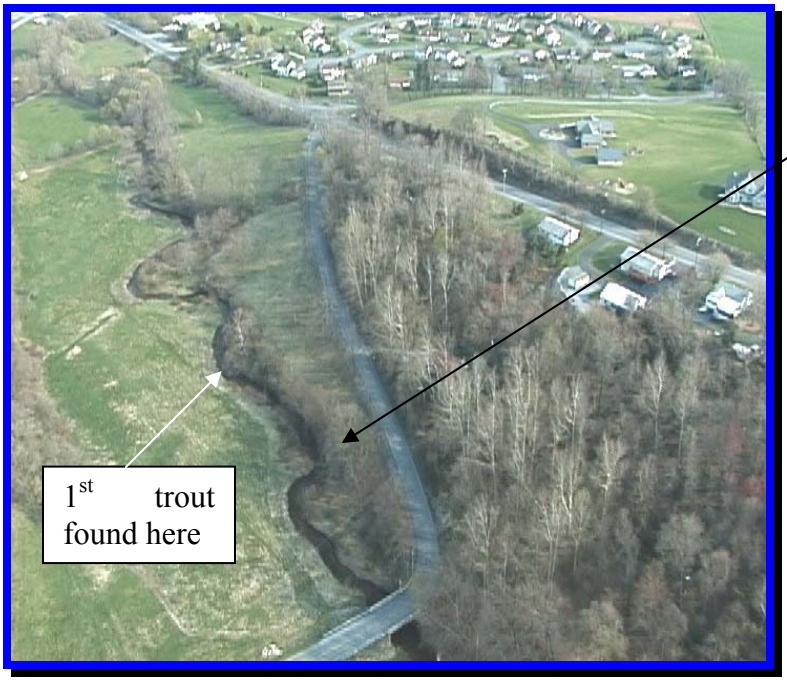
There is little that can be improved upon within these two tracts other than the removal of a small irrigation dam at the downstream end of Tract #64. Instream habitat is as good if not better than that found in Segloch Run, however the thermal pollution impacts from Tract #63 currently limit the carrying capacity of downstream Tracts #62 and #64.



Photos #47 and #48

A view of the small irrigation dam previously mentioned on Tract #64. However it is worth mentioning two (2) native Brook trout were captured within the scour of this small dam.

An aerial view of Tract #79 and site of a previous 1999/2000 stream restoration project by the owner, Donegal Trout Unlimited and LandStudies. The restoration project includes streambank fencing, stone ford watering locations, riparian plantings, wetland creation, instream cross-vanes, j-hooks and channel realignment. This reach of Furnace Run will improve with time. One Brown trout was captured in this reach of stream.



Photos #49 and #50

A view of Tract #78 downstream of Yummerdall Road. Here Furnace Run flows through an active cattle pasture but fortunately has been fenced to keep livestock out of the stream channel.

Furnace Run throughout Tract #79 could be improved with the addition of instream habitat structures and tree planting where the streambank fencing will allow. The stream in this reach tends to be wide and shallow with few pools or deep runs as is common in streams that have been subject to cattle wading and trampling of the banks. Now that the stream has been fenced, nature will begin to improve upon the stream channel configuration in regards to fish habitat, but this process could be accelerated with the addition of well planned practices such as log deflectors, cross-vanes, mud sills, etc.

RETTEW began electrofishing at the confluence of Middle Creek and Furnace Run. The first encountered trout was a wild Brown trout on Tract #79 and was the only trout found in the entire reach below Yummerdall Road.

Photos #51 and #52

Looking upstream under the bridge at Yummerdall Road.

The way in which the bridge was constructed tends to make the stream wide and shallow, though fish can migrate through the structure in higher flows.

An aerial view of the confluence of Middle Creek and Furnace Run just north of the 28th Division Highway (Rte. 322).

Confluence of Middle Creek and Furnace Run.

Photos #53 and #54

A view of the downstream end of Tract #78 just prior to Tract #66. Again, one can see evidence of prior damage caused by free ranging cattle prior to the installation of the streambank fencing. This gravel bar will likely continue to grow until one half of the stream channel is closed off and the channel returns to a more suitable width.

A view of the streambank fencing and pastureland in Tract #78.

FURNACE RUN

MIDDLE CREEK

Photos #55 and #56

Significant bank erosion on Tract #66 just upstream of the confluence with Middle Creek.

This pool with overhanging tree look promising for trout however none where found.

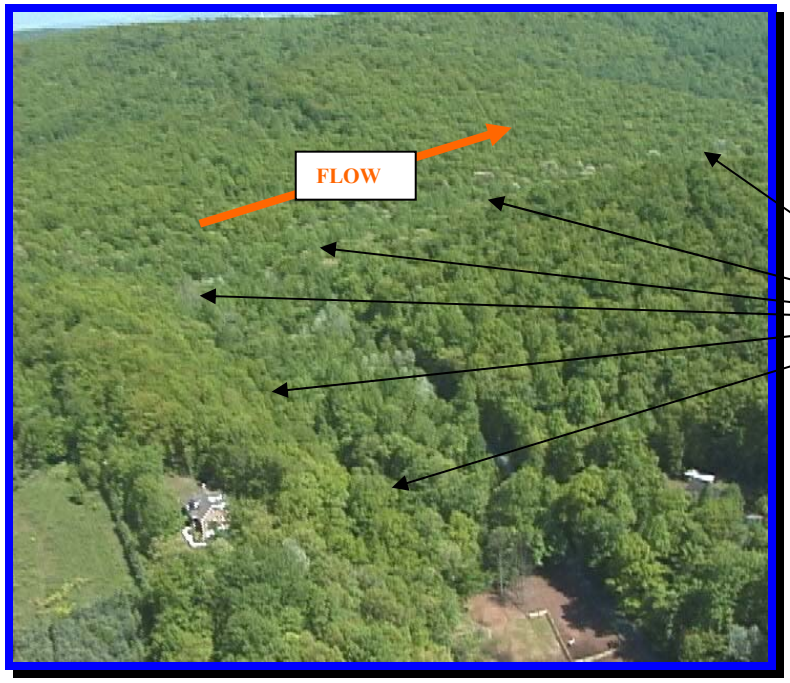
Middle Creek/Furnace Run Confluence

SEGLOCH RUN

Photos #57 and #58

These ponds in the Village of Dogtown make up a portion of the headwaters of Segloch Run. The majority of forestland seen in this aerial photo is part of Pennsylvania State Gamelands #46-70. The ponds are warmwater fisheries and reside on Tract #4 and #7.

Aerial photo #58 depicts Tract #7 and a horse pasture (the brown area). Though it would appear from quick observance the horse pasture would be a significant source of sediment to Segloch Run, a closer look revealed this is not really the case. The water from the pond does not surface flow through the horse pasture.



Photos #59 and #60

Aerial photo #59 depicts the heavily forested condition surrounding Segloch Run within Gamelands #46-70.

Segloch Run

A ground of unpaved Fox Road in the headwaters of Segloch Run at its intersection with Seglock Road.

Photos #61 and #62

Other views of Fox Road and the culvert crossing of Segloch Run.

Photo #62 shows bank erosion at the discharge end of the culvert – A problem that could be addressed with better culvert pipe alignment and bank protection such as a mud sill or log cribbing.

Photos #63 and #64

Photo #63 provides an aerial view of the forest surrounding Segloch Run within Gamelands #46-70.

A view of Seglock Road looking north towards the Fox Road intersection near the Village of Dogtown. In this location, Elizabeth Township is doing an adequate job of maintaining the dirt and gravel road.

Notice the wetland on the left side of the photograph. This particular wetland is locally known as a breeding ground for various salamander and frog species. The wetland provides a cold water source to Segloch Run and care should be taken to protect this natural resource.

Photos #65 and #66

A pull off area upstream of the bridge on Seglock Road serves as a sediment pollution source to Segloch Run and encourages littering and dumping. The Alliance should work with the Pennsylvania Game Commission to explore possible remedies for such problems.

Another aerial view of Gamelands #46-70 near the PA Turnpike.

This sloped area was purposely installed in the 1990's to serve as a stabile watering location for horses using the Horseshoe Trail – It's true value in light of it also serving as an access point for 4 wheelers is questionable.

Photos #67 and #68

The old bridge on Seglock Road within Gamelands #46-70.

The Horseshoe Trail intersects Seglock Road more or less at the bridge. Various pulloff areas that serve as parking locations double as inviting access points for motorized vehicles looking for a 4-wheeling adventure through the stream and adjoining forest. Because of this inappropriate landuse, the Horseshoe Trail an the associated pulloffs are without a doubt a significant source of sediment to Segloch Run. The pulloffs also serve as a handy location for an illegal "mid-night trash dump".

The Lancaster County Youth Conservation School had installed waterbars throughout the Horseshoe Trail in this location but they've since been ruined by 4-wheel drive vehicles.

Photos #69 and #70

Photo #69 shows the Horseshoe Trail as it intersects Seglock Road on the east side. The large boulders were placed to stop access to motorized vehicles.

This log frame deflector was installed by the Pennsylvania Fish and Boat Commission and the Lancaster County Youth Conservation School in the late 1990's.

Photos #71 and #72

This is another log frame deflector installed by the Lancaster Youth Conservation School as part of their Adopt-a-Stream project with the Pennsylvania Fish and Boat Commission.

This log framed jack dam is yet another such installed structure.

Such man-made devices can provide much needed instream habitat for Segloch Run, but they do need to be design and installed by someone familiar with their function and effect on the stream channel configuration. Misuse of such structures can lead to accelerated erosion and create localized sedimentation problems.

Photos #73 and #74

A poorly placed culvert pipe in Seglock Road. This culvert should discharge at the bottom of the bank rather than the top of the bank. Its current placement will only serve to erode the bank because of the created "waterfall effect" and the absence of any kind of rock apron or rock lined channel to dissipate energy.

Segloch Run unfortunately has a sedimentation problem as can be seen in this photograph.

Notice the submersed sand bars in this pool.

Also notice the accumulation of deposited sediment on the far bank.

Photos #75 and #76

Another example of a culvert pipe causing erosion to the Segloch streambank.

Here stormwater from Segloch Road sheds off the road shoulder and causing shhet and rill erosion.

Photos #77 and #78

A portion of Seglock Road with adequate buffer between it and the stream. In this location the road is properly graded, drained and stabilized with limestone.

The paved portion of Seglock Road between the PA Turnpike overpass and the unpaved section at Gameland #46-70.

Photos #79 and #80

This timber harvest took place on the west side of Segloch Road just north of the PA Turnpike. This particular harvest did not cause any damage to Segloch Run, however the Alliance should be alert to such timber harvesting in the future. Poorly conducted timber harvests can result in sediment loading to stream through the construction of skid trails and landing areas without good erosion and sedimentation controls.

If a problem should arise in the future, the Alliance can contact the:

Lancaster Co. Conservation District at (717) 299-5361 to report problems.

An aerial view of the Segloch just north of the PA Turnpike.

Photos #81 and #82

These two photos show the formation of a gravel bar and the splitting of the stream channel on Gamelands #46-70 midway between the PA Turnpike and the bridge of Seglock Road.

In this situation, a channel block and well place deflectors could serve to create on main channel while maintaining gravel bar formation thus providing the stream an area to discharge its sediment load during storm events.

A project such as this would need careful planning and on-site direction from someone knowledgeable in the use of such structures.

Photos #83 and #84

Views of Segloch Run immediately upstream of the PA Turnpike on Gamelands #46-70.

Notice the understory is dominated by multiflora rose which made it very difficult to travel alone this section of stream.

Trout were present in this location but were typically less than 6-inches long mainly because of the lack of deeper pools and runs. Much of the stream immediately north of the PA Turnpike tended to be wide and shallow.

Instream fish enhancement structures could provide better angling opportunity.

Photos #85 and #86

Views of the PA Turnpike in the area of Segloch Run.

The turnpike is a source of litter, thermal pollution and accelerated stormwater runoff. However the most critical threat posed by the highway is the possibility of an accident and the spillage of a substance deleterious to fish such as fuel oil, gasoline or ammonia.

Photos #87 and #88

Aerial views of Segloch Run south of the PA Turnpike and Tracts #53, 75, 76 and 57 at Hopeland Farm.

Segloch Run

Heart-shaped pond at Hopeland Farm

Furnace Run

Segloch Run

Hopeland Road