Conservation Plan
for
Cold Run Watershed
Schuylkill County, Pennsylvania
February 29, 2008

Prepared for:
Schuylkill Conservation District
Craig Morgan, District Manager
1206 AG Center Drive
Pottsville, PA 17901
(570) 622-3742, ext. 5

Funding By:
Coldwater Heritage Partnership

Prepared by:
RETTEW Associates, Inc.
Natural Sciences Group
950 East Main Street, Suite 220
Schuylkill Haven, PA 17972
(570) 385-2270
(570) 385-2217 fax
RETTEW Project Number: 06-03883-005

Prepared by: _____
Aaron S. Clauser, PhD, CPESC
Senior Environmental Scientist

Reviewed by: _____
Mark A. Metzler, NICET II
Watershed Specialist

TABLE OF CONTENTS

1.0 INTRODUCTION

The Cold Run Watershed is unique in Schuylkill County as it serves as the backdrop for one of the greatest family recreation areas in southern Schuylkill County. A mix of boulder strewn stream, tall forest, open farm land, abundant access points, state game lands, and maintained paved road, make Cold Run Watershed second to none. Throughout the year, fishermen spend countless hours casting into the boulder pools and short riffles of Cold Run. Those with flies in tow find Cold Run particularly appealing in the summer months when this stream lives up to its name and continues to provide quality fishing while other streams warm and the action slows. As warm days bring warm evenings, many family outings end with a ride up Cold Run Road to Heisler's Dairy Bar and Miniature Golf with its traditional family atmosphere. Unlike most of the few high quality streams in Schuylkill County, Cold Run is situated primarily on private properties. The predominance of private parcels allows for a potentially increased susceptibility to anthropogenic change in the watershed as the Commonwealth lacks direct control over small land use changes that have potential implications for the stream.

With the above in mind, we have developed this Cold Water Conservation Plan so that the primary issues that put Cold Run at risk may be identified and hopefully avoided. By incorporating public outreach and biological assessments, this plan may serve as the foundation for conservation initiatives in the watershed.

1.1 Topography and Land Use

A "fishy" looking spot in "Devil's Hole".

Cold Run is approximately 4.8 mile long with an approximately 10 square mile drainage basin located in Blythe, Walker and East Brunswick Townships, Schuylkill County, Pennsylvania. The headwaters of Cold Run originate in a valley between Sharp Mountain and Second Mountain at approximately 1,020 ft. in elevation. The headwaters of Cold Run contain a Class A Wild Brook Trout population and are listed by the Pennsylvania Department of Environmental Protection (DEP) as a High Quality-Cold Water Fishery (HQ-CWF). Land use in this area is a combination of agriculture and single family rural residences on the valley floor with undeveloped woodlots interspersed and on the steeper slopes of Second Mountain and Sharp Mountain. Additionally, a small private dam (Lake Rosemont) is located directly on Cold Run near the most upstream bridge crossing of T-523 (Wnuk and Kaufmann, 1997). As the headwaters meet Beaver Creek, agricultural and development influences on Beaver Creek impact Cold Run. Beaver Creek is the only named tributary to Cold Run, but there are several unnamed tributaries and farm ponds in the basin. The stream turns southward below the confluence with Beaver Creek. This

section of Cold Run is referred to as "Devil's Hole" and includes a steep boulder strewn water gap through Second Mountain.

Moving downstream, Cold Run contains a Class C Wild Brook Trout population and loses its High Quality designation. While land use in this portion of the basin is primarily undeveloped woodlots and small cabin properties, the narrow valley limits the number of floodplain wetlands that could mitigate some of the effects from Beaver Creek. The Pennsylvania Game Commission owns a large amount of land along Second Mountain (State Game Lands Number 222), but only a small portion of it actually borders the stream. One of the larger unnamed tributaries to Cold Run enters the stream just as it leaves the water gap. Here, the tributary flows through a slightly more developed residential area called Hecla and flows easterly with a more gradual gradient to its confluence with the Little Schuylkill River.

1.2 Background

The Pennsylvania Fish and Boat Commission (PFBC) conducted four previous surveys of Cold Run. Donley (1946) and Bielo (1956) found that the upper portion of Cold Run, upstream from the confluence with Beaver Creek, was too small for adult trout stocking. Bielo (1956) recommended the lower portion of Cold Run (from the confluence with Beaver Creek downstream to the mouth) for pre-season and in-season stockings. Marshall et al., (1978) examined the lower portion of Cold Run in September of 1978 as part of the statewide inventory of coldwater resources. Wnuk and Kaufmann completed sampling in July of 1996 to quantify the wild trout population throughout Cold Run and to measure any changes in stream conditions in the stocked trout portion that may have occurred since the 1978 survey (1997). This survey led to the recommendation from the PFBC for the Pennsylvania Department of Environmental Protection to upgrade the Chapter 93 water quality of the headwaters of Cold Run to High Quality based on the presence of a Class A wild brook trout population.

The wild brook trout population in the lower section of Cold Run (below the mouth of Beaver Creek) has shown periodic fluctuations that are likely related to stream flow conditions and has great potential for this reach also to be upgraded to a Class A wild brook trout stream with a High Quality classification (M. Kaufmann personal communication).

In the environmental and biological fields of study, sources and causes of pollution in a watershed (leading to impairment) are typically categorized into two broadly defined categories known as Point Source Pollution or Non-point Source Pollution. The terms "point source pollution and non-point source pollution" refer not to a specific polluting substance or practice, but rather describe the means by which a pollutant is introduced.

Point source pollution is most often associated with industries or municipalities that discharge wastewater to natural waters through a pipe or ditch. Point sources of pollution can be measured and treated, therefore discharges of wastewater in the United States are regulated under the provisions of the Clean Water Act and sources must obtain permits issued under the National Pollutant Discharge Elimination System (NPDES) in order to discharge wastewater into streams. An NPDES permit requires the discharger to meet certain technology-based effluent limits and

perform effluent monitoring. Raw sewage piped to a stream could be referred to as “point source pollution”.

Unlike point sources, non-point sources of pollution occur over a wide area and are usually associated with large-scale land activities such as agriculture, livestock grazing, mining, logging and development of impervious surfaces resulting in increased amounts of potentially polluted stormwater runoff. Since there is not one specific point of discharge, non-point source pollution is difficult to measure, regulate and treat because of the nature of the activities that cause it and the large-scale area from which it is produced. Non-point source pollution can include stormwater runoff that contains harmful substances. Types of non-point source pollution common to agricultural areas include increased sedimentation and nutrient runoff from barnyard wastes and livestock loafing in waterways. The lack or the removal of vital habitat components (such as the destruction of forested riparian corridors) is also a cause of impairment.

Here, we present a conservation plan for Cold Run Watershed to address specific areas of impairment from point and non-point source pollutants. With a clear plan for conservation, we may attain the greatest value from investments in the watershed.

1.3 Land Development Concerns

The primary problem resulting from increased land development is the increase in stormwater runoff from impervious surfaces such as roofs, parking lots, roads and driveways. The increase in stormwater volumes and velocities results in accelerated erosion and sedimentation, while thermal and chemical pollution from roads and large parking lots further degrade water quality. The increased sediment can lead to other problems including alterations in the natural configuration of the channel, loss of stream meanders, decreased occurrences of pool, riffle, and run patterns and a destruction of the variety and abundance of aquatic habitat.

The increase in impervious surfaces within the watershed would also reduce infiltration and groundwater recharge. Ground water that supports the base flow of Cold Run and the hydrology to riparian wetlands in the watershed also could be affected with an increase in impervious surfaces.

New developments in the watershed will undergo regulatory review for stormwater rate, volume and water quality. Most of the existing residences pre-date existing stormwater volume and rate control regulations. Best Management Practices (BMPs) such as rain gardens, rain barrels, and appropriate maintenance of riparian buffers should be encouraged to mitigate the effects of the residential areas in the watershed. Educational programs that target private landowners where potential projects are likely to occur would certainly be a wise course of action.

At the municipal level, subdivision and zoning ordinances that are sensitive to the natural resources of Cold Run should be periodically reviewed for consistency with state regulations so that land development projects will protect the existing ground water recharge and preserve and enhance surface water quality.

1.4 Agricultural Concerns

Agriculture nutrients such as phosphorus, nitrogen, and potassium, in the form of commercial fertilizers, manure, sludge, irrigation water, legumes, and crop residues, can create nutrient related pollution. When these nutrients are applied to enhance production in excess of plant needs, they can wash into aquatic ecosystems where they can cause excessive plant growth, by which recreation opportunities decrease, drinking water becomes contaminated, and aquatic life can be killed. Farmers can implement nutrient management plans, which help maintain high yields and save money on the use of fertilizers while reducing non-point source pollution. Overgrazing and unrestricted cattle access to streams exposes soils, increases soil erosion and sedimentation, encourages invasion by undesirable plants and destroys fish habitat. The farming community in the Cold Run Watershed implements many of the desired conservation BMPs, but additional education and assistance with implementation are an ongoing necessity.

2.0 METHODOLOGY

2.1 Stream Walk

To determine areas of concern within Cold Run Watershed, Schuylkill Conservation District representatives and a RETTEW scientist conducted a stream walk on August 2, 2007. Photographs, field notes, and GPS locations were collected at areas identified as areas of concern within the watershed. Within the headwaters, impacted areas of the watershed were identified by conducting windshield surveys from roadways and reviewing aerial photography. Sources of impairment were identified at the landowner level.

RETTEW located the sample points and other features within the watershed using Trimble Pro XH and Trimble GeoXT, Global Positioning System (GPS) receivers during the site visits. The instrument settings used were: a) Elevation Mask of 15 degrees to limit lowest angle of satellite acceptance to 15 degrees, b) Signal Noise Ratio Mask 6 to minimize weak signal strength, c) PDOP Mask 6 to control the geometry of satellite constellations, and d) Mode Setting Overdetermined 3D which requires a minimum of five satellites for acceptable readings. Logging interval was set at 1 second with typically a minimum of 60 readings collected at each point (Trimble Navigation 1994). Data collected in the field were downloaded to a personal computer for differential correction using GPS Pathfinder Office software (Version 3.1). Correction files were obtained from a dedicated base station located in West Chester, PA. Mission planning, parameter settings, and post processing typically allow an accuracy of less than (<) 1 meter. The precision of GPS collected data is subject to variation caused by canopy cover, atmospheric interference, time of day, and satellite geometry. GPS collected data should not be used in situations involving high property values, controversial projects, or in situations where legal questions may arise (Hook et al., 1995).

2.2 Stakeholder Survey

A survey was mailed to all property owners with property adjoining Cold Run. The survey was mailed to 14 households. Eight surveys were completed and returned.

2.3 Fish Sampling

To determine the trout population and fish community diversity of Cold Run, electro-fishing was conducted. Electro-fishing occurred along a 300 meter section of stream on October 29, 2007. The site was the same stream reach as PFBC station 0201 that was sampled by Wnuk and Kaufmann in 1997 and Marshall et al. in 1978.

3.0 RESULTS

3.1 Stakeholder Survey Data

The stakeholder survey revealed that watershed residents are most concerned about littering, high levels of nutrients from agriculture, flooding, and stormwater control as problems facing Cold Run. Half of respondents said their family spends time enjoying Cold Run at least weekly. Seven of eight respondents fish cold run, with the same number considering themselves conservationists.

3.2 Electrofishing Data

Electro-fishing data revealed the diversity of fish species found within the study reach (Table 1, Appendix D). While this study found a greater diversity of fish species than the two previous studies, direct comparison should be cautioned as the previous studies were conducted in different months of the year and seasonal fish migration might have influenced the findings. The previous studies utilized a mark-recapture methodology, while this study relied upon a single sampling effort. Of note is the presence of the coolwater smallmouth bass and warmwater largemouth bass that were more common during this sampling. The presence of these predatory fish is a possible concern for the trout population as they may compete for food. As the largemouth bass were of similar small size (approximately 5 cm), they were likely of the same year class. Summer low flow conditions may have encouraged these fish to move upstream from the river or they may have been washed from upstream dams during spring floods.

Table 1: Electro-fishing Subjective Abundance Index*

Scientific name	Common name	Year		
		2007	1996	1978
Salmo trutta	Brown trout	R	P	P
Salvelinus fontinalis	Brook trout	P	C	R
Oncorhynchus mykiss	Rainbow trout	R		
Notemigonus crysoleucas	Golden shiner			X
Luxilus cornutus	Common shiner	R		
Notropis atherinoides	Emerald shiner	C		
Rhinichthys atratulus	Blacknose dace	C	A	X
Rhinichthys cataractae	Longnose dace	P	R	
Semotilus atromaculatus	Creek chub	P	P	X
Semotilus corporalis	Fallfish		P	
Catostomus commersoni	White sucker		C	X
Hypentelium nigricans	Northern hog sucker	P		X
Lepomis cyanellus	Green sunfish		R	
Lepomis gibbosus	Pumpkinseed		P	R
Lepomis macrochirus	Blue gill	P		
Micropterus dolomieu	Smallmouth bass	P		
Micropterus salmoides	Largemouth bass	P		R
Etheostoma olmstedi	Tessellated darter		P	
Total species		12	10	9

Subjective Abundance Index (based on a 300 m long station):
A = Abundant (> 100); C = Common (26 - 100); P = Present (3 - 25); R = Rare (< 3); X = Species was captured at the station but not assigned an abundance rating.

*Table adapted from Wnuk and Kaufmann 1997 with data for PFBC Station 0201 from 10/29/2007 (RETTEW), 7/2/2006 (Wnuk and Kaufmann 1997) and 9/26/1978 (Marshall et al., 1978).

3.3 Watershed Problems and Solutions

This section focuses on the sources and causes of impairment within Cold Run Watershed and the potential restoration work and best management practices that could be implemented to address the impacts for high and medium priority areas. Each impacted segment identification number can be cross-referenced with its approximate location on the map of Appendix A. Low priority restoration projects are included in Appendix B and are mapped in Appendix A.

3.3.1 High Priority Projects

Impacted Stream Segment #3:
This section of stream includes an on-line dam. Fish passage is likely blocked by the dam breast in all but the largest floods. During a previous flooding event, water flow over an earthen section of the dam breast partially eroded a section of the dam breast. The material that was washed out of the breast has caused sedimentation in the stream below the dam.

Solution:

The landowner is likely aware of the situation as caution tape and construction fence surrounded the eroded area. Coordination of the inspection and repair of the dam with landowner is recommended as the dam likely contains a large volume of sediment that would have potentially devastating effects on the downstream macroinvertebrate community. In coordination with the repair, a retrofit providing fish passage should be evaluated as the dam likely blocks the natural migration of fish in the stream.

Impacted Stream Segment #14:

This section of stream has experienced streambank erosion during high flow events. The eroded banks extend approximately 150 feet upstream of the Cold Run Road bridge. Downstream of the bridge, several heavily eroded areas exist in the hemlock forest area. Property owners in this area are concerned about the effects of flooding on their properties.

Solution:

Streambank stabilization projects in this area should focus on restoring the natural streambank geometry and native vegetation. The use of in-stream structures should be limited to those necessary to establish new vegetation as the existing streambed has a nice mixture of cobble and boulders.

Impacted Stream Segment #18:

Cattle have unrestricted access to this unnamed tributary of Cold Run. Cattle in the stream account for nutrient and sediment loading to the stream system.

Solution:

The first priority for this area is to install streambank fencing with stable stream crossings. This would promote herd health and minimize impacts to the stream. A native stream buffer should be planted. Stabilized watering areas should be incorporated into the design so the stream may aid in watering the cattle with minimal adverse effects to the stream.

3.3.2 Medium Priority Projects:

Impacted Stream Segment #1:
A dirt crossing for agricultural equipment is located at this point. Sediment from the farm lane enters the stream. The stream buffer is about 20 feet on either side of the stream.

Solution:
This area would benefit from erosion and sediment control Best Management Practices (BMPs). At a minimum, the stream approaches could be stoned to stabilize the area immediately adjacent to the stream. Looking up-hill, waterbars could be installed to divert runoff from the farm lane rather than having it travel the entire length of the lane and enter directly into the stream. Waterbars are simple grade breaks that run perpendicular to the road slope and function to direct runoff to stable filter strip areas. Another option is to install conveyor belt diversions that would function in a similar manner as the waterbars, but with potentially less long-term maintenance. While the existing buffer is of great benefit to the stream, additional buffer width would be desirable. Programs such as CREP should target this area.

Impacted Stream Segment #2:
The lawn at this location is mowed right to the top of the streambank. A palustrine emergent wetland is also intermittently mowed in this immediate area.

Solution:
This area should be targeted for riparian buffer enhancement. A combination of shading of the stream and decreased nutrient input from lawn chemicals would be of benefit.

Impacted Stream Segment #13:
Invasive species including multi-flora rose and Japanese knotweed are present at this location.

Solution:
Invasive species may be removed with selective herbicide applications and replanted with native stream buffer plantings. Maintenance of plantings through establishment is essential. Invasive species removal should occur as soon as possible considering extensive invasion of the watershed has not yet occurred.

4.0 RESTORATION SOLUTION DETAILS

As was discussed in the previous section of this report, there are many opportunities for improvement. This chapter discusses specific concerns and conditions related to those improvement activities and best management practices (BMPs).

4.1 Habitat Restoration and Improvement

Streambank Stabilization & Restoration: Streambank stabilization is the most basic step in restoring a degraded stream. Eroded vertical walls or undercut banks are often present where erosion has gone unchecked over time in agricultural areas. Traditional streambank stabilization involves re-grading localized laterally eroded streambanks by grading the banks back to a more stable slope (3:1 horizontal to vertical), stabilizing the slopes with erosion control matting and vegetation and possibly adding in-stream structures or bioengineering techniques on the banks. Traditional in-stream structures may include the use of toe-rip rap and log or rock deflectors. Bioengineering methods that may be incorporated in bank stabilization could include the use of fascines, branch packing, brush mattresses, live cribwalls, tree revetments and live staking.

If a stream has been channelized or lacks stream bend meanders, and space and funds are available, a natural stream channel design (Fluvial Geomorphology) may be appropriate for stream restoration. Natural stream design uses a stable natural channel ("reference reach") as a template for the design on the impacted reach. The reference reach provides the pattern, dimension and profile for the design of the restored stream to transport flows and sediment as it dissipates energy through its particular geometry and in-stream structures. Natural stream design and restoration involves stabilization of an entrenched stream channel in place using in-stream structures and bioengineering. Typical in-stream structures for bank stability include rock cross vanes, J-hook vanes, half rock vanes, single and double wing deflectors, and root wads that divert the thalweg

from the streambank and/or absorb water energy. Bioengineering techniques and erosion control matting are often combined and recommended in the implementation of stream restoration designs.

4.2 Riparian Buffers and Landscaping

Forested riparian buffers have long been recognized as a vital component of stream health in eco-regions where they should be naturally occurring; Cold Run being no exception. Forest buffers provide shade, helping moderate diurnal stream temperatures during both winter and summer months. Water temperature can increase during summer and decrease in winter by removal of shade trees in riparian areas.

Forest buffers act as filters of stormwater runoff during storm events. For this reason, forest buffers are especially valuable in urban watersheds when stormwater can be discharged into a buffer rather than discharged directly into a stream. A wide variety of pollutants such as suspended solids (sediment), nutrients (nitrogen and phosphorus), heavy metals, toxic organic pollutants, and petroleum compounds can be successfully filtered and trapped by the physical structure of the vegetation itself and/or in the case of nitrogen and phosphorus, as well as some heavy metals and toxic organics, be taken up through the root systems and stored in the tree and shrub's biomass (wood).

Sample photograph of a three-year-old forest buffer planting.

Forested riparian buffers serve to stabilize streambanks via the root systems of trees and shrubs which provide deep penetrating structural integrity to the soil. Buffers also reduce the erosive force of stormwater runoff and flood events because the above-ground, physical structure of trees and shrubs slow water velocity via friction. Long-term loss of riparian vegetation can result in accelerated streambank erosion and channel widening, increasing the width/depth ratio.

Riparian trees and shrubs provide terrestrial wildlife habitat. Riparian buffer strips often act as travel corridors for wildlife traveling from one area to another. Additionally, riparian forests serve to provide food, shelter, and nesting areas. Riparian forests provide a vital function in aquatic ecosystems. Leaf detritus is the main force supporting many lotic (flowing water) aquatic food webs. Large woody debris plays an important role, providing fish and insect cover and spawning locations. Establishing a successful forested riparian buffer takes careful planning, planting, and maintenance.

The following tree and shrub species are recommended for forested riparian buffer plantings. All species are native and readily available at native tree nurseries.

TREE SPECIES	HEIGHT (Feet)	WILDLIFE VALUE	SHADE TOLERANCE	SPACING (Feet)
Red maple (Acer rubrum)	75-100	Food source – fruits and young shoots	Tolerant	12-15
Silver maple (Acer saccharinum)	75-100	Food source – seeds and young twigs. Good cavity tree.	Intermediate	12-15
Shagbark hickory (Carya ovata)	75-100	Food source – twigs and nuts	Intermediate	12-15
Persimmon (Diospyros virginiana)	50-75	Food source – fruit	Intolerant	10-13
Hackberry (Celtis occidentalis)	75-100	Food source – fruits and twigs	Intermediate	12-15
White ash (Fraxinus americana)	75-100	Food source – fruit	Tolerant	12-15
Red ash (Fraxinus pennsylvanica)	50-75	Food source – fruit	Intolerant	10-13
Eastern white pine (Pinus strobus)	75-100	High value food source – needles and seeds. Good cover and nesting tree.	Intermediate	12-15
Sycamore (Platanus occidentalis)	75-100	Moderate value for cover and food source – fruits	Intermediate	12-15
White oak (Quercus alba)	75-100	Food source – acorns and twigs	Intermediate	12-15
Red oak (Quercus rubra)	75-100	Medium value for nesting. Food source.	Intermediate	12-15
Pin oak (Quercus palustris)	75-100	Food source – acorns and twigs	Intolerant	12-15
Black willow (Salix nigra)	35-50	Food source – buds, fruit and twigs	Very intolerant	10-13
Sassafras (Sassafras albidum)	35-50	Food source – twigs and fruits	Intolerant	10-13
Slippery elm (Ulmus rubra)	50-80	Food source – seeds and twigs	Tolerant	10-13

SHRUB SPECIES	HEIGHT (Feet)	WILDLIFE VALUE	SHADE TOLERANCE	SPACING (Feet)
White flowering dogwood (Cornus florida)	35-50	Food source – fruit	Intermediate	10-13
Redbud (Cercis Canadensis)	20-35	Minimal food source – seeds	Tolerant	10-13
Sandbar willow (Salix exigua)	15-20	Food source – fruits and twigs	Very tolerant	8-10
Smooth alder (Alnus serrulata)	12-20	Food source – fruit	Very intolerant	8-10
Serviceberry (Amelanchier Canadensis)	5-25	Food source – fruit, twigs and leaves	Very tolerant	8-10
Buttonbush (Cephalanthus occidentalis)	6-12	Food source – fruit	Very intolerant	8-10
Silky dogwood (Cornus amomum)	6-12	Food source – fruits	Intolerant	6-8
Grey dogwood (Cornus racemosa)	6-12	Food source – fruits	Tolerant	6-8
Red-osier dogwood (Cornus sericea)	6-12	Food source – fruits, buds and twigs	Very intolerant	6-8
Winterberry (Ilex verticillata)	6-12	Intermediate wildlife value	Intermediate	6-8
Staghorn sumac (Rhus typhina)	35-50	Food source – fruits	Very tolerant	8-10
Highbush blueberry (Vaccinium corymbosum)	6-12	Food source – fruit	Tolerant	6-8
Northern arrowwood (Viburnum regonitum)	6-12	Food source – fruit	Tolerant	6-8

Fortunately, Cold Run Watershed has been less affected by invasive plant species than many of the other watersheds in Schuylkill County. As such, it should be aggressively protected from invasion by removing any new colonies of invasive species. If left unmanaged, invasive species tend to out-compete desired native species for space and nutrients. The correct natural progression and succession of the desired native plant community can be stalled for years, and in turn negatively impact the rest of the food web.

It is very important to maintain newly planted forest buffers by removing unwanted, invasive species. Mowing, string trimming, and physically pulling out invasive species can be effective ways of dealing with these unwanted “weeds”, but many times enough root mass remains and the

plant returns. Also, mowing and such other physical removal means are labor intensive and many times not cost effective. Herbicide, when properly applied, can be a safe, efficient means of dealing with invasives.

4.3 Agricultural Improvements

Streambank Fencing: Streambank fencing protects streambanks, promotes re-vegetation, enables forest buffer plantings, protects in-stream habitat and eliminates cattle from entering and loafing in the stream channel. The installation of a two-wire, high-tensile electric fence (powered by AC chargers or solar/battery chargers) is preferred. For construction, eight-foot long locust or pressure treated wooden fence posts should be pounded into the ground on 50-foot centers. Corners should be braced and constructed of 8-foot posts. Temporary poly wire electric fencing can be erected around planted riparian buffers until permanent fencing can be installed.

Cattle Crossing: To direct cattle from barn to pasture or from one pasture to another, cattle crossings can be incorporated as needed into the streambank fence design to allow cattle to cross the stream at selected locations without damaging the integrity of the stream. Cattle crossings should be installed perpendicular across the stream and equipped with electric fence and droppers to deter cattle from entering the stream and wandering upstream or downstream of the crossing. Crossings can be constructed of rock (R-4 rock base covered with 2B stone) or through the use of concrete hog slats set at an 8:1 horizontal to vertical slope cut into streambanks. The center of the crossing should be set at the stream bottom's invert elevation.

Crop Residue Management – (Conservation Tillage): This BMP involves leaving crop residue (plant materials from past harvests) on the soil surface to reduce runoff and soil erosion, conserve soil moisture, keep nutrients and pesticides on the field, and improve soil, water, and air quality.

Cover Crop: Cover crops can either be crops grown between cash crop cycles, or intercropped with the cash crops to cover the bare ground, such as in orchards, groves, and other long-term sites. Used appropriately, cover crops can improve soil structure and fertility, decrease soil erosion, provide foliage and animal feed, and suppress crop pests such as weeds, insects, nematodes, and plant pathogens including fungi. Residues from cover crops can be incorporated for use as green manure to supply nutrients and improve fertility for the next crop. Using cover crops can increase on-farm crop diversity, may enhance some beneficial organisms, and possibly even contribute to carbon sequestration.

Grazing Land Management: The management of lands for livestock grazing includes the manipulation of the soil-plant-animal complex of the grazing land in pursuit of a desired result. This BMP develops a sound plan that minimizes the water quality impacts of grazing and browsing activities on pastured lands along streams and involves rotational grazing. To reduce the impacts of grazing on water quality, farmers and ranchers can adjust grazing intensity, keep livestock out of sensitive areas, provide alternative sources of water and shade, and allow pastures to recover between grazings.

Nutrient Management: Nutrient management is a plan for managing the amount, source, placement, form and timing of the application of animal manure, chemical fertilizer, biosolids (sewage sludge) or other plant nutrients used in the production of agricultural products to prevent pollution, maintain soil productivity and achieve realistic yield goals. Nutrient management minimizes agricultural non-point source pollution of surface and ground water resources. Manure management facilities provide the opportunity to apply manure when soil conditions are suitable and crop nutrient needs are high. Manure storage facilities eliminate the need to haul and apply manure daily. Properly designed storage facilities are based on herd size, the area draining to the storage, wastewater and the nutrient management plan for the farm.

Strip Cropping/Contour Farming: This BMP is used to control both wind and water erosion. Contour strip cropping involves a planned layout in which the crops follow a definite rotational sequence, and tillage is held closely to the exact contour of the field. If the strips are planted along the contour, damage from water runoff can be minimized.

Terraces and Diversions: Diversions and terraces are designed to intercept water flowing down a slope and direct it across the slope to a stable outlet such as a grassed waterway or underground outlet. Vegetative barriers established above the diversion and terrace channels increase their longevity by promoting sediment deposition above the diversions and channels. Barriers established on top of terraces may provide additional stability; however, barrier vegetation should not be allowed to become established within the terrace channel area.

Watering Trough: A watering trough or tank to provide drinking water for livestock is a great alternative to keeping horses and cows out of the stream. This practice allows for the desired protection from streambanks and riparian vegetation while still providing livestock with water at strategic locations in pastureland.

4.4 Stormwater Water Volume and Quality Improvement

Potential storm water volume and quality improvement projects associated with Cold Run should include a combination of existing facility retrofits and innovative applications during new construction. The PADEP BMP manual should be consulted for design ideas and requirements. Stormwater volume may be controlled by either infiltrating the stormwater into the groundwater, capturing the stormwater for use, or evapotranspirating the water back into the atmosphere.

Infiltration trenches and drywells function to return stormwater directly to the groundwater. By collecting rooftop water that should contain minimal pollutants, it may be infiltrated to the groundwater with minimal risk of contamination. During construction of infiltration devices, the main consideration is minimizing compaction of the soil surface that underlies the stone bed. By utilizing an excavator and scooping the soil back and then placing the stone from above, compaction may be minimized. If built in combination with underground detention facilities, the bulk of the water from a new development can sometimes be infiltrated with minimal impact to the buildable area of a site.

Stormwater capture for use in Cold Run should be encouraged through educational programs. With the environmentally conscious populace of today, the use of rain barrels and cisterns could become commonplace with proper promotion.

Evapotranspiration is another option for stormwater volume management and is best combined with water quality improvements. The use of rain garden bioretention areas to allow for wetland type plants to filter pollutants and minimize runoff should not be overlooked.

5.0 OBTAINING SUPPORT AND MONITORING PROGRESS

Sample photograph of an underground detention facility

Education and cooperation of landowners within the watershed to implement BMPs and stream restoration solutions is the key to improving and preserving the natural resources and water quality of the Cold Run Watershed. Educating landowners as to why proposed improvements and changes should occur on their property is extremely important and takes tact, courtesy, respect and sometimes, persistence. Oftentimes if they are clearly shown what is in it for them and helped to visualize the project's goals through actual examples (photographs) of completed projects, they

are more likely to want to be a partner in a project. Furthermore, if you are able to communicate what the benefits of sound land management practices could mean to help improve the bottom line of partner farms and businesses, then they will be even more interested. Increases in crop production through preservation of topsoil and a decrease in veterinary bills for treating water borne and transmitted diseases such as mastitis (a painful udder infection that occurs in dairy cows) have a positive monetary effect. The Schuylkill Conservation District's presence in the community should facilitate landowner partnerships.

6.0 LITERATURE CITED

Bielo, R. 1956. *Cold Run stream survey report*. PFBC files, Bellefonte, PA.

Donley, B.F. 1946. *Cold Run stream survey report*. PFBC files, Bellefonte, PA.

Hook, D.D., B. Davis, J. Scott, and J. Strubble. 1995. *Locating Delineated Wetland Boundaries in Coastal South Carolina Using Global Positioning Systems*. Wetlands 15(1):31-36.

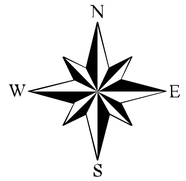
Marshall, R.,C. Emery, and Colmer. 1978. *Cold Run stream examination report*. PFBC files, Bellefonte, PA.

Wnuk, R., and M. Kaufmann. 1997. *Cold Run (603a) fisheries management report.* PFBC files, Bellefonte, PA.

APPENDIX A
CONSERVATION PLAN MAP

Cold Run Watershed

Conservation Plan Map



0 750 1,500 3,000 Feet

Legend

- GPS Survey Point
- High Priority Project
- Medium Priority Project
- Low Priority Project
- Cold Run Watershed
- Adjacent Watersheds
- Cold Run
- Unnamed Tributaries to Cold Run
- Pond or Lake
- Parcel
- Municipal Boundary

Project Partners

RETTEW SM

Schuylkill County Conservation District

Coldwater Heritage Partnership

Projection: SPCS PA South NAD83 (Feet)
Data Sources: Environmental Resource Research Institute, PA DEP, PA DCNR, PENNDOT, Schuylkill County GIS, & USGS

N:\06\06-03883-005\GIS\06-03883-005-Priorities.mxd

APPENDIX B
GPS POINT DESCRIPTIONS AND ACTION ITEMS

GPS Point Description and Action Items

Point #	Description	Action Item	Key Partners	Conservation Priority	Comments
1	A dirt ford for agricultural equipment crossing is located at this point. The stream buffer is about 20 feet on either side of the stream.	Conveyor belt diversions could be installed upslope and the stream approaches could be stoned.	Landowner, Conservation District E&S staff	Medium Priority	
2	Lawn at this location is mowed to the top of bank for the stream.	Riparian buffer enhancement	Landowner	Medium Priority	
3	An online pond is located at this point. Fish passage is likely blocked by the dam breast. The dam breast is partially eroded and sediment has washed into the stream below.	Retrofit fish passage structure evaluation. Coordinate dam inspection and possible repair with landowner.	Landowner, agencies, American Rivers	High Priority	
4	A mowed lawn area is immediately adjacent to the north side of the stream at this point.	Educate landowner on options to limit or eliminate lawn fertilizers and chemicals. Riparian buffer enhancement.	Landowner	Low Priority	
5	A cabin and small lawn area are adjacent the stream in this area with approximately a five foot wide buffer along stream.	Educate landowner on options to limit or eliminate lawn fertilizers and chemicals. Riparian Buffer Enhancement	Landowner	Low Priority	
6	Downstream edge of open grate bridge just above the confluence with Beaver Creek.	N/A	N/A	N/A	
7	A washed out bridge with some bank encroachment on both sides of the stream is in this location. "No Fishing" signs post the area.	Discuss public access for fishing with the landowner.	Landowner, PFBC	Low Priority	
8	Game Lands bridge limits fish passage and has some downstream scour behind wingwall.	Retrofit fish passage. Rip-rap at wingwall.	PGC, agencies	Low Priority	

GPS Point Description and Action Items

Point #	Description	Action Item	Key Partners	Conservation Priority	Comments
9	The floodplain upstream of this point and just past the game lands bridge has been impacted with a berm being placed along the eastern stream edge. The berm is stable and forested and removal would potentially impact the stream more than leaving it in place.	N/A	N/A	N/A	
10	Rip-rap is located on the east bank of the stream in this area to stabilize the roadway.	N/A	N/A	N/A	
11	Litter is scattered about the campsite in this area.	Small litter clean-up	Boy Scouts, SKIP, Conservation District interns	Low Priority	Several garbage bags worth of litter are present.
12	Occasional use campsites are common in this area of the watershed.	N/A	N/A	N/A	
13	Invasive species surround the stream in this location including multi-flora rose and Japanese knotweed.	Invasive species removal	Landowner	Medium Priority	
14	Eroded banks extend approximately 150 feet upstream of the bridge with several areas of streambank erosion downstream of the bridge in this location.	Bank stabilization	Landowner, agencies	High Priority	Landowners are interested in any assistance the Conservation District may provide regarding this area.
15	Mowed lawn within 10 feet of the streambank.	Riparian buffer enhancement	Landowner	Low Priority	
16	Approximately 75 feet of retaining wall is located along the northern bank of the stream in this area.	N/A	N/A	N/A	A floodplain restoration is impractical at this time for this location as the structure was likely constructed to assist in flood mitigation for a residence.
17	At this point, the upstream stream buffer on the east side of the stream ends and the stream buffer on the west side of the stream is approximately 10 feet wide moving downstream.	Riparian buffer enhancement	Landowner	Low Priority	
18	Several cattle have unrestricted access to the stream in this area.	Streambank fencing, stabilized cattle crossing.	Landowner, NRCS	High Priority	

APPENDIX C
STAKEHOLDER SURVEYS

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? Not Sure (Yes) No

How long have you lived in the watershed? 34 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? Yes (No)

How often does your family spend time enjoying Cold Run? Daily (Weekly) Monthly Rarely

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?
We enjoy the drive - Serenity & Beauty of Such a long Stretch of unoccupied forrest Land, seeing the water, snow, animals. Areas like this are fast fleeting.

What kind of fish do you think live in Cold Run? *(Please List)*
Trout, Suckers, Minnows

Any specific problems we should know about?

As a landowner, I would be interested in learning more about help with the following improvements:

(In-stream habitat for fish) (Litter clean-up) (Streambank stabilization) (Tree planting)

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	(4)	3	2	1
Sediment, soil loss from Ag operations	5	4	(3)	2	1
Dirt & gravel roads causing sediment	5	4	(3)	2	1
Chemical runoff from Ag operations	5	4	(3)	2	1
Too much manure, nutrients from Ag	5	(4)	3	2	1
Failing septic systems	5	(4)	3	2	1
Lack of groundwater recharge	5	4	(3)	2	1
Flooding	5	4	(3)	2	1
Stormwater control	5	4	(3)	2	1
Streambank erosion	5	4	(3)	2	1
Livestock access to stream	5	4	3	(2)	1
Land clearing, lack of forest buffers	5	(4)	3	2	1
Lack of in-stream habitat for fish	5	4	(3)	2	1
Too much recreational use destroying habitat	5	4	(3)	2	1
Quadrunners, 4 wheelers, motorcycles	5	4	3	(2)	1
Graffiti	5	4	3	2	(1)
Urban sprawl	5	(4)	3	2	1
Roadway runoff	5	4	(3)	2	1

Additional comments?

_____

_____

Name Gloria + Wayne Bensinger

Address 1002 Shady Lane

TAMAQUA, PA. 18252

Phone (570) 277-6147

E-mail _____

THANK YOU!!!

PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? (Not Sure) Yes No

How long have you lived in the watershed? 23+ years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? Yes (No)

How often does your family spend time enjoying Cold Run? Daily (Weekly) Monthly Rarely

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?

WALKING ALONG STREAM

What kind of fish do you think live in Cold Run? *(Please List)*

NO IDEA

Any specific problems we should know about?

NOT AT THIS TIME

As a landowner, I would be interested in learning more about help with the following improvements:

In-stream habitat for fish Litter clean-up (Streambank stabilization) (Tree planting)

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	4	3	2	1
Sediment, soil loss from Ag operations	5	4	3	2	1
Dirt & gravel roads causing sediment	5	4	3	2	1
Chemical runoff from Ag operations	5	4	3	2	1
Too much manure, nutrients from Ag	5	4	3	2	1
Failing septic systems	5	4	3	2	1
Lack of groundwater recharge	5	4	3	2	1
Flooding	5	4	3	2	1
Stormwater control	5	4	3	2	1
Streambank erosion	5	4	3	2	1
Livestock access to stream	5	4	3	2	1
Land clearing, lack of forest buffers	5	4	3	2	1
Lack of in-stream habitat for fish	5	4	3	2	1
Too much recreational use destroying habitat	5	4	3	2	1
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	1
Graffiti	5	4	3	2	1
Urban sprawl	5	4	3	2	1
Roadway runoff	5	4	3	2	1

Additional comments?

_____

_____

Name _____

Address _____

_____

_____

Phone ( )_____

E-mail _____

THANK YOU!!!

PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? Not Sure (Yes) No

How long have you lived in the watershed? 62 years

Do you consider yourself a conservationist? Yes (No)

Do you fish in Cold Run? (Yes) No

How often does your family spend time enjoying Cold Run? Daily Weekly Monthly (Rarely)

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?

What kind of fish do you think live in Cold Run? *(Please List)*

trout

Any specific problems we should know about?

As a landowner, I would be interested in learning more about help with the following improvements:

(In-stream habitat for fish) Litter clean-up Streambank stabilization Tree planting

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	4	(3)	2	1
Sediment, soil loss from Ag operations	5	4	3	2	(1)
Dirt & gravel roads causing sediment	5	4	3	2	(1)
Chemical runoff from Ag operations	5	4	3	2	(1)
Too much manure, nutrients from Ag	5	4	3	2	(1)
Failing septic systems	5	4	3	2	(1)
Lack of groundwater recharge	5	4	3	2	(1)
Flooding	5	4	(3)	2	(1)
Stormwater control	5	4	3	2	(1)
Streambank erosion	5	4	3	2	(1)
Livestock access to stream	5	4	3	2	(1)
Land clearing, lack of forest buffers	5	4	3	2	(1)
Lack of in-stream habitat for fish	5	4	(3)	2	1
Too much recreational use destroying habitat	5	4	3	2	(1)
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	(1)
Graffiti	5	4	3	2	(1)
Urban sprawl	5	4	3	2	(1)
Roadway runoff	5	4	3	2	(1)

Additional comments?

Name Robert Conrad

Address

Phone (570) 943-2242

E-mail

THANK YOU!!!

PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? Not Sure (Yes) No

How long have you lived in the watershed? 30 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? (Yes) No

How often does your family spend time enjoying Cold Run? (Daily) Weekly Monthly Rarely

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?

Enjoy the wildlife

What kind of fish do you think live in Cold Run? *(Please List)*

Native Brook Trout
Stocked Trout
Suckers
Chubs, minnows, catfish

Any specific problems we should know about?

As a landowner, I would be interested in learning more about help with the following improvements:

In-stream habitat for fish Litter clean-up Streambank stabilization Tree planting

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	4	3	2	1
Sediment, soil loss from Ag operations	5	4	3	2	1
Dirt & gravel roads causing sediment	5	4	3	2	1
Chemical runoff from Ag operations	5	4	3	2	1
Too much manure, nutrients from Ag	5	4	3	2	1
Failing septic systems	5	4	3	2	1
Lack of groundwater recharge	5	4	3	2	1
Flooding	5	4	3	2	1
Stormwater control	5	4	3	2	1
Streambank erosion	5	4	3	2	1
Livestock access to stream	5	4	3	2	1
Land clearing, lack of forest buffers	5	4	3	2	1
Lack of in-stream habitat for fish	5	4	3	2	1
Too much recreational use destroying habitat	5	4	3	2	1
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	1
Graffiti	5	4	3	2	1
Urban sprawl	5	4	3	2	1
Roadway runoff	5	4	3	2	1

Additional comments?

_____

_____

Name [redacted]
Address

Phone (570) 668-6038
E-mail _____

THANK YOU!!!
PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? (Not Sure) Yes No

How long have you lived in the watershed? 3 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? (Yes) No

How often does your family spend time enjoying Cold Run? (Daily) Weekly Monthly Rarely

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?
THE BEAUTY OF THIS MOUNTAIN STREAM AND OBSERVING THE FISH, INSECTS, AND WILDLIFE.

What kind of fish do you think live in Cold Run? *(Please List)*
BROOK, BROWN AND RAINBOW TROUT, CHUBS

Any specific problems we should know about?
EXTREMELY HEAVY VOLUME OF DEBRIS AND STREAM BANK EROSION DURING THE NOVEMBER RAIN EVENT.

As a landowner, I would be interested in learning more about help with the following improvements:

(In-stream habitat for fish) Litter clean-up (Streambank stabilization) (Tree planting)

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM	
Littering, roadside dumping	5	4	(3)	2	1	
Sediment, soil loss from Ag operations	5	4	3	2	(1)	
Dirt & gravel roads causing sediment	5	4	3	(2)	1	
Chemical runoff from Ag operations	5	4	3	2	1	DON'T KNOW
Too much manure, nutrients from Ag	5	4	3	2	1	"
Failing septic systems	5	4	3	2	1	"
Lack of groundwater recharge	5	4	3	2	1	"
Flooding	(5)	4	3	2	1	
Stormwater control	(5)	4	3	2	1	
Streambank erosion	(5)	4	3	2	1	
Livestock access to stream	5	4	3	2	(1)	
Land clearing, lack of forest buffers	5	4	3	(2)	1	
Lack of in-stream habitat for fish	5	4	3	(2)	1	
Too much recreational use destroying habitat	5	4	3	2	(1)	
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	(1)	
Graffiti	5	4	3	2	(1)	
Urban sprawl	5	4	3	2	(1)	
Roadway runoff	5	4	3	2	1	DON'T KNOW

Additional comments?

_____

_____

Name WALTER KEELY

Address 39 OLD COUNTRY LANE
NEW RINGGOLD PA 17960

Phone (570) 943-2173

E-mail WPKJR @ COMCAST.NET

THANK YOU!!!

PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? Not Sure (Yes) No

How long have you lived in the watershed? 63 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? Yes (No)

How often does your family spend time enjoying Cold Run? Daily Weekly Monthly (Rarely)

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?

What kind of fish do you think live in Cold Run? *(Please List)*

trout

Any specific problems we should know about?

No

As a landowner, I would be interested in learning more about help with the following improvements:

In-stream habitat for fish Litter clean-up Streambank stabilization Tree planting

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	4	3	2	1
Sediment, soil loss from Ag operations	5	4	3	2	1
Dirt & gravel roads causing sediment	5	4	3	2	1
Chemical runoff from Ag operations	5	4	3	2	1
Too much manure, nutrients from Ag	5	4	3	2	1
Failing septic systems	5	4	3	2	1
Lack of groundwater recharge	5	4	3	2	1
Flooding	5	4	3	2	1
Stormwater control	5	4	3	2	1
Streambank erosion	5	4	3	2	1
Livestock access to stream	5	4	3	2	1
Land clearing, lack of forest buffers	5	4	3	2	1
Lack of in-stream habitat for fish	5	4	3	2	1
Too much recreational use destroying habitat	5	4	3	2	1
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	1
Graffiti	5	4	3	2	1
Urban sprawl	5	4	3	2	1
Roadway runoff	5	4	3	2	1

Additional comments?

Name PAUL W. WAGNER
Address 1108 SHADY LANE
TAMAQUA PA 18252

Phone (570) 668 1399
E-mail

THANK YOU!!!
PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? (Yes) No

Do you consider the water quality in Cold Run to be "healthy"? Not Sure (Yes) No

How long have you lived in the watershed? 24 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? Yes (No)

How often does your family spend time enjoying Cold Run? Daily Weekly Monthly (Rarely)

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?
Hearing, seeing, feeling the water. Knowing that its there running through our property enhances the experience.

What kind of fish do you think live in Cold Run? *(Please List)*
Whatever they stock

Any specific problems we should know about?
Nothing major at this time.

As a landowner, I would be interested in learning more about help with the following improvements:

In-stream habitat for fish Litter clean-up Streambank stabilization Tree planting

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	4	3	2	1
Sediment, soil loss from Ag operations	5	4	3	2	1
Dirt & gravel roads causing sediment	5	4	3	2	1
Chemical runoff from Ag operations	5	4	3	2	1
Too much manure, nutrients from Ag	5	4	3	2	1
Failing septic systems	5	4	3	2	1
Lack of groundwater recharge	5	4	3	2	1
Flooding	5	4	3	2	1
Stormwater control	5	4	3	2	1
Streambank erosion	5	4	3	2	1
Livestock access to stream	5	4	3	2	1
Land clearing, lack of forest buffers	5	4	3	2	1
Lack of in-stream habitat for fish	5	4	3	2	1
Too much recreational use destroying habitat	5	4	3	2	1
Quadrunners, 4 wheelers, motorcycles	5	4	3	2	1
Graffiti	5	4	3	2	1
Urban sprawl	5	4	3	2	1
Roadway runoff	5	4	3	2	1

Additional comments?
No major problems now. There is future potential so please keep on top of this.

Name David Kunkel
Address 1314 Shady Lane
Tamaqua Pa 18252

Phone (570) 668 0714
E-mail

THANK YOU!!!
PLEASE RETURN IN PROVIDED ENVELOPE

COLD RUN

COLDWATER CONSERVATION PLAN

STAKEHOLDER SURVEY

Were you previously aware that you live in the Cold Run Watershed? Yes (No)

Do you consider the water quality in Cold Run to be "healthy"? (Not Sure) Yes No

How long have you lived in the watershed? 37 years

Do you consider yourself a conservationist? (Yes) No

Do you fish in Cold Run? (Yes) No

How often does your family spend time enjoying Cold Run? Daily Weekly Monthly (Rarely)

How do you enjoy Cold Run (just hearing the water, relaxing by the stream, etc.)?
Watching Malard ducks that come sometimes also a great gray crane.

What kind of fish do you think live in Cold Run? *(Please List)*
Trout
Suckers
Maybe Seamus?

Any specific problems we should know about?
Severe bank erosion when flooding occurs

As a landowner, I would be interested in learning more about help with the following improvements:

In-stream habitat for fish Litter clean-up (Streambank stabilization) Tree planting

OVER

Please rate the following concerns as related to stream health and water quality in Cold Run.

PROBLEM	VERY SERIOUS PROBLEM	SERIOUS PROBLEM	MODERATE PROBLEM	MINOR PROBLEM	NOT A PROBLEM
Littering, roadside dumping	5	(4)	3	2	1
Sediment, soil loss from Ag operations	5	4	3	(2)	1
Dirt & gravel roads causing sediment	5	4	3	(2)	1
Chemical runoff from Ag operations	5	4	3	2	(1)
Too much manure, nutrients from Ag	(5)	4	3	2	1
Failing septic systems	5	4	3	2	(1)
Lack of groundwater recharge	5	4	3	2	1
Flooding	5	(4)	3	2	1
Stormwater control	5	4	3	2	1
Streambank erosion	(5)	4	3	2	1
Livestock access to stream	5	4	3	2	(1)
Land clearing, lack of forest buffers	5	4	3	2	1
Lack of in-stream habitat for fish	5	4	3	2	(1)
Too much recreational use destroying habitat	5	4	3	2	(1)
Quadrunners, 4 wheelers, motorcycles	(5)	4	3	2	1
Graffiti	5	4	3	2	(1)
Urban sprawl	5	4	3	2	(1)
Roadway runoff	5	4	(3)	2	1

Additional comments?

Name Jimmy & Linda Ritchie
Address 277 Cold Run Road
New Ringgold PA
17960
Phone (570) 385-9048 ext 3019 - Linda's Job
E-mail None

THANK YOU!!!
PLEASE RETURN IN PROVIDED ENVELOPE

APPENDIX D
ELECTROFISHING DATA

Cold Run Electrofishing Data (10/29/2007)

Scientific Name	Common Name	Number
Micropterus dolomieu	Smallmouth bass	3
Hypentelium nigricans	Northern hog sucker	13
Rhinichthys atratulus	Blacknose dace	31
Luxilus cornutus	Common shiner	2
Semotilus atromaculatus	Creek chub	4
Notropis atherinoides	Emerald shiner	80
Lepomis macrochirus	Blue gill	7
Rhinichthys cataractae	Longnose dace	17
Micropterus salmoides	Largemouth bass	14
Oncorhynchus mykiss	Rainbow trout	1
Salvelinus fontinalis	Brook trout	22
Salmo trutta	Brown trout	2
N/A	Misc. trout (not netted)	7

Cold Run Trout Data (10/29/2007)

Trout	Length (cm)
Brook	15
Brook	11
Brook	16
Brook	10
Brook	18
Brook	20
Brook	17
Brook	24
Brook	17
Brook	21
Brook	16
Brook	21
Brook	20
Brook	21
Brook	10
Brook	20
Brook	18
Brook	18
Brook	15
Brook	19
Brook	10
Brook	10
Brown	19
Brown	22
Rainbow	25

APPENDIX E
PROFESSIONAL QUALIFICATIONS

Aaron S. Clauser, Ph.D., CPESC - Dr. Clauser has his bachelor's degree in Biology and Environmental Studies from East Stroudsburg University of Pennsylvania and a doctorate in Environmental Science from Lehigh University. Dr. Clauser is a Certified Professional in Erosion and Sediment Control. He has experience as an environmental regulator with the Berks and Schuylkill Conservation Districts where he has served at both the technician and managerial levels. Dr. Clauser has given oral presentations at conferences held by the Ecological Society of America, American Society of Limnology and Oceanography, Pocono Comparative Lakes Program and Schuylkill and Berks Conservation Districts and has collaborated on an article published about Pacific Northwest amphibians in a peer-reviewed journal. Dr. Clauser has completed numerous training courses including DEP sponsored NPDES, Chapter 102 and 105 technical seminars, Applied Fluvial Geomorphology for Engineers (FGE) by Wildland Hydrology, Inc., and Environmentally Sensitive Maintenance of Dirt and Gravel Roads Training. He is familiar with the 1987 *Corps of Engineers Wetland Delineation Manual*. Dr. Clauser has both conducted and been accepted as an expert witness regarding wetland delineations. Dr. Clauser served in the PA Air National Guard where he attained the rank of Staff Sergeant. His doctoral dissertation entitled "Zooplankton to Amphibians: Sensitivity to UVR in Temporary Pools" includes quantitative optical and organismal level models that are extended to landscape level variations in pool optical properties and population level sensitivity to UVR.

Mark A. Metzler, NICET II – Mr. Metzler has an associate's degree in Wildlife Technology from the Pennsylvania State University and is certified by the National Institute for Certification in Engineering Technologies in Land Management and Water Control/Erosion and Sediment Control. Mr. Metzler has ten years experience working in the environmental regulatory community (Lancaster County Conservation District) and seven years of private consulting experience. He received training in both the 1987 Corps of Engineers Wetland Delineation Manual and the 1989 Federal Manual from both the PA Dept. of Environmental Protection and the US Corps of Engineers. In addition, he received soil mechanics training from the US Dept. of Agriculture – Natural Resources Conservation Service. As an environmental regulator, Mr. Metzler reviewed, permitted, and inspected over 2,000 various plans and project sites many of which involved impacts to Waters of the Commonwealth (wetlands, rivers, lakes). Mr. Metzler has prepared three TMDL implementation plans for the Commonwealth of Pennsylvania and US EPA, as well as numerous watershed assessment and river restoration plans. He is also experienced in dam removal design, the issue of legacy sediment and has overseen dam removal and fish migration projects within Pennsylvania, Maryland and Virginia.

Jonathan P. Kasitz – Mr. Kasitz has a bachelor's degree in Biology/Ecology from Millersville University. He has used the 1987 *Corps of Engineers Wetland Delineation Manual* for numerous field delineations in PA, MD and NY. He has completed the U.S. Army Corp of Engineers' Wetland Delineation Course. He has also been trained in several different stream assessment protocols, both in the eastern U. S. as well as in the Rocky Mountain region. Mr. Kasitz participated in internships with the PA Department of Environmental Protection in their Water Quality division and with the PA Department of Military and Veteran Affairs as a Biology Tech at Fort Indiantown Gap. He has worked with various government agencies including the National Park Service at Yellowstone NP and the US Forest Service in Colorado. He has performed biological surveys for many different threatened and endangered species across the country. He

also completed honors research on the effects of ponds on stream nitrate levels in Lancaster County while at Millersville University.

Joel M. Esh – Mr. Esh has an Associate in Specialized Technology Degree in Computer Aided Drafting and Design from York Technical Institute and 6 years of experience at RETTEW. He is responsible for the technical workload of the Natural Sciences department, including computer-aided drafting and design (CADD), global positioning systems (GPS), and geographic information systems (GIS). He has created and been involved with the design of stream restoration plans, dam removal plans, pond restoration plans, wetland mitigation plans, and wetland delineation plans. Additional training has included Introduction to Stream Processes and Ecology by Canaan Valley Institute and West Virginia University. When working in the field, he has assisted with data collection and surveying for stream design and wetland delineations in PA, NY, and DE using the 1987 *Corps of Engineers Wetland Delineation Manual*. Utilizing GIS information, he has obtained and analyzed information for watershed assessments and created maps for grant applications and other uses. He has also been involved with cultural resources by performing site visits for documentation of buildings and bridges and creating plans for historic survey forms. In his first four years at RETTEW, he worked in the Transportation Engineering department, where he has directed data collection, prepared traffic engineering analysis, and completed PENNDOT plans involving right-of-way, traffic signals and highway occupancy permits utilizing PENNDOT resources.