STONY RUN WATERSHED

Coldwater Conservation Plan

Prepared for:

Green Valleys Association
Pottsown, Pennsylvania

Prepared by:

Blazosky Associates, Inc.
Royersford, Pennsylvania

Prepared for Green Valleys Association

January 2010

This Coldwater Conservation Plan was funded in part by grants from:

The Coldwater Heritage Partnership
The Pennsylvania Department of Conservation and Natural Resources

Green Valleys Association (GVA) is the only watershed association in Northern Chester County devoted to the protection of water quality and quantity. Our stewardship area encompasses 155 square miles of watershed ground that contains the five watersheds of Stony Run, and Valley, Pickering, French, and Pigeon Creeks. The tributaries of these five watersheds run through some of the most productive fish and wildlife habitat in the Northern Chester County.

Since its inception in 1964, GVA has been dedicated to protecting, maintaining, and restoring the ecological integrity of watershed systems, while meeting the balance of environmental, social, and economic needs. The original founders of Green Valleys Association were landowners who came together to protect the French Creek Watershed from a plan to dam the Creek and turn the village of Pughtown into a giant reservoir to serve as a water supply for Philadelphia. The local landowners then formed a group called the French Creek Watershed Association. From the house of Welkinweir, now the headquarters of Green Valleys Association, the landowners met and marshaled a sufficiently formidable defense. That same spirit and commitment is what makes GVA today.

Cover Photo: Stony Run Creek, Summer 2009, John Hoekstra

STONY RUN WATERSHED
CHESTER COUNTY, PENNSYLVANIA

COLDWATER CONSERVATION PLAN- 2010

Table of Contents

General Recommendations

This watershed assessment has been completed for the Stony Run Watershed to yield field-based quantifiable data to add to previous studies and to bring earlier recommendations in line with more recent data regarding overall stream health of the Stony Run. Although additional research could be performed to further refine conditions within the stream, specific activities should be initiated now. Particularly in the headwaters which although represent the greatest "contact area" due to high density of first order streams, this report finds that it is precisely these areas of the Stony Run that are in need of the most improvement.

Specific recommendations from this report include:

1. Preserve open space in targeted headwater areas.
2. Formal delineation of wetlands should be performed in headwaters areas.
3. Initiate riparian buffer projects particularly in critical areas designated on Figure 6.
4. Improve storm water management/buffer ordinances.
5. Perform annual fecal coliform sampling.
6. Perform macro invertebrate sampling at five year intervals to track progress.
7. Interact with local high school and universities to encourage students to participate in water quality studies.
8. Formally organize a "Friends of the Stony Run" to develop grassroots support and identify property owners willing to implement riparian buffer projects.
9. Dam Removal
    a. Of the several obstructions on the stream, two existing dams should be considered for removal.

I. Introduction

This study developed out of long-standing and continued concerns regarding development pressures from urbanization of the Stony Run Watershed. In addition, new concerns have been raised due to recent designation by the Pennsylvania Department of Environmental Protection (PADEP) that the Stony Run is not attaining its designated water quality status. Both factors indicate that despite some overall improvement of the watershed in recent decades, there are still some very real threats to the stream system that warrant further study and ultimately protection/restoration.

Funded by a Coldwater Heritage Grant from the Coldwater Heritage Partnership as well as additional funding from the Pennsylvania Department of Conservation and Natural Resources (DCNR), BAI has performed a Watershed Assessment on the Stony Run Creek on behalf of Green Valleys Association (GVA). The purpose of this project was to assess the health of the Stony Run Watershed and identify potential problems and opportunities for conservation and restoration within the watershed. From this work, specific recommendations for protection/restoration as well as suggestions for more detailed watershed studies were developed. Specifically, the Coldwater Heritage Grant is meant to:

- Gather existing data about the coldwater ecosystem;
- Identify potential impacts, threats, problems and opportunities to our coldwater streams;
- Formulate a plan of action for proposed conservation and protection strategies; and
- Build community awareness and support for the conservation of our coldwater streams.

When compared to other local watersheds, the Stony Run is smaller in size (5.6 square miles), however it serves as a good model for larger watersheds as to the affects of negative impacts from insufficient forested buffers in headwaters, increase in impervious cover, increased storm water runoff etc. Furthermore, the issues facing the Stony Run are typical of many watersheds that have undergone urbanization and the small drainage size allows a manageable and quantitative examination of how land use changes impact surface water quality over time.

Water quality in all of our streams and rivers, begins with protection and restoration of its headwaters/first order streams down to its confluence. Work by Alexander et al. (2007) found that 70% of the mean annual water flow to second order streams is provided by first-order headwaters and Meyer et al. (2007) documented USGS models that show fourth and higher order streams receive 55% of their mean annual flow from headwater streams. In another study of watersheds in the northeastern United States, wetlands associated with first-order streams are responsible for 90% of phosphorus removal (Meyer et al., 2007).

II. Background

This project is built on work completed in several previous studies including:

- Schuylkill Project, Stroud Water Research Center (1996-2007)

- A Rivers Conservation Plan For Sustainable Watershed Management: A Model Program to Balance Water Resources and Land Development in the Pigeon Creek and Stony Run Watersheds, Chester County, PA" (June 2003)
- Stony Run Watershed Action Plan December 2002
- Schuylkill Rapid Watershed Assessment (2007)

Together these reports and plans have identified and discussed numerous pressures to the Stony Run from increased land development pressures. As watersheds move from agriculture to urbanization, problems such as increased impervious areas result in lower infiltration and generate large storm water runoff, nutrient loading to the groundwater/surface water system, thermal pollution as well as changes in water balance resulting from uncoupling of public water and public sewer infrastructures.

Building on this previous work, a watershed assessment was performed through field surveys utilizing the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Rapid Watershed Assessment methodology. This approach allows a quick and inexpensive method to collect field-based, empirical, quantitative and qualitative information for setting priorities and taking action.

III. Stony Run Watershed

a. Study Area

Located in Northern Chester County, Pennsylvania and covering 5.6 square acres, the watershed of the Stony Run Creek extends across three townships (refer to Figure 1). Beginning in East Coventry (5% of the watershed), the creek flows easterly through East Vincent Township (60% of the watershed) in East Pikeland Township (35% of the watershed) before emptying into the Schuylkill River just north of Phoenixville, Pennsylvania.

As can be seen on Figure 2, of the 10.2 stream miles of the Stony Run, 53% are first order streams which drain 59% of the watershed (Chester County Water Resources Authority et al., 2002). This is an important consideration as first order headwaters (being the "roots" of the watershed) provide 70% of the mean annual water volume and 65% of the nitrogen flux observed in second order streams (Alexander et al., 2007).

b. Bedrock and Topography

Bedrock beneath the watershed consists of sedimentary rocks which are part of the Mesozoic Basin located within the Gettysburg-Newark Basin of the Piedmont Physiographic Province. Primarily, the underlying formations include the Brunswick and Lockatong, which dip to the northwest at approximately 10 to 15 degrees. Red and gray silty mudstones and shales comprise the Brunswick while the Lockatong is abundant in think, finely laminated, fossiliferous black shales (Shultz, 1999).

The topography consists of rolling lowlands, shallow valleys and isolated hills with low to moderate relief (Pennsylvania Geologic Survey, 2000). The Stony Run rises in the eastern portion of East Coventry Township, just northwest of Heistand at an elevation of 350 to 400 feet above mean sea level and ranges down to less than 100 feet above mean sea level at the confluence with the Schuylkill River. The drainage pattern of the watershed is dendritic and trellis developed from long-term fluvial erosion of rocks with variable resistance (Pennsylvania Geologic Survey, 2007).

c. Soils

Soils within the Watershed are predominantly of the Penn and Readington Soil Series developed on the Mesozoic sedimentary bedrock. As noted by GVA (2003), much of the soils in the watershed are classified as Group C Hydrologic Group. When wet, these soils have a slow infiltration rate generally due to a restrictive layer within the soil horizon. Consistently, there are significant areas of hydric soils mapped in the watershed including Croton, Bowmansville, Wehadkee soil series (refer to Figure 3).

d. Hydrology

Located within a Modified Humid Climate, several studies including Sloto (1994), Cahill (2003), and Reese & Riser (2010) have precipitation values ranging from 44" per year to 47" per year with approximately 55% percent lost to evapotranspiration and according to Reese and Risser (2010), 20 – 25% of constitutes groundwater recharge.

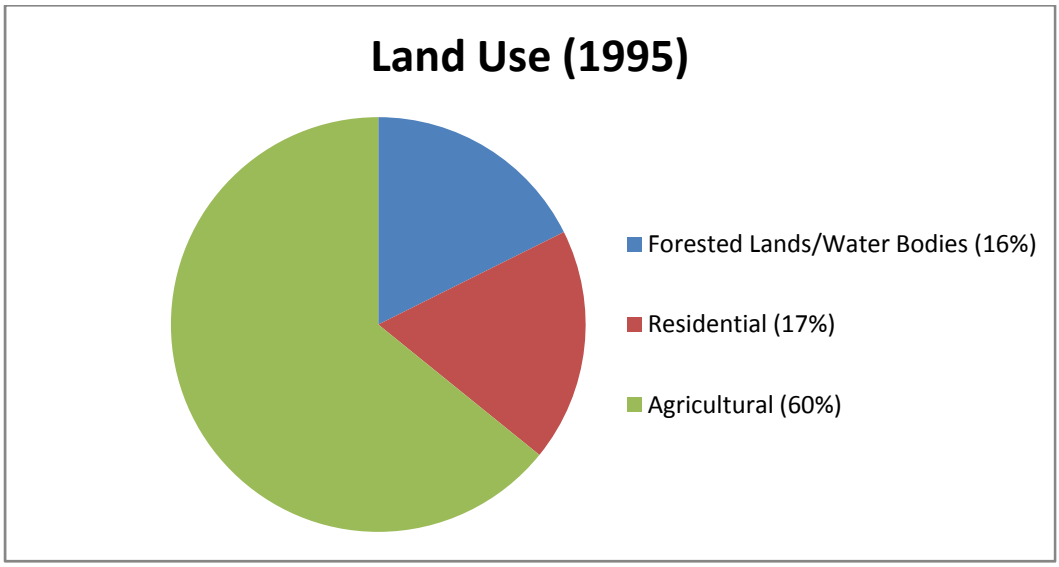
The watershed experiences warm summers and mild winters with precipitation evenly distributed throughout the year. Mean seasonal snowfall is 28 inches with ground covered approximately one-third of the winter (Shultz, 1999).

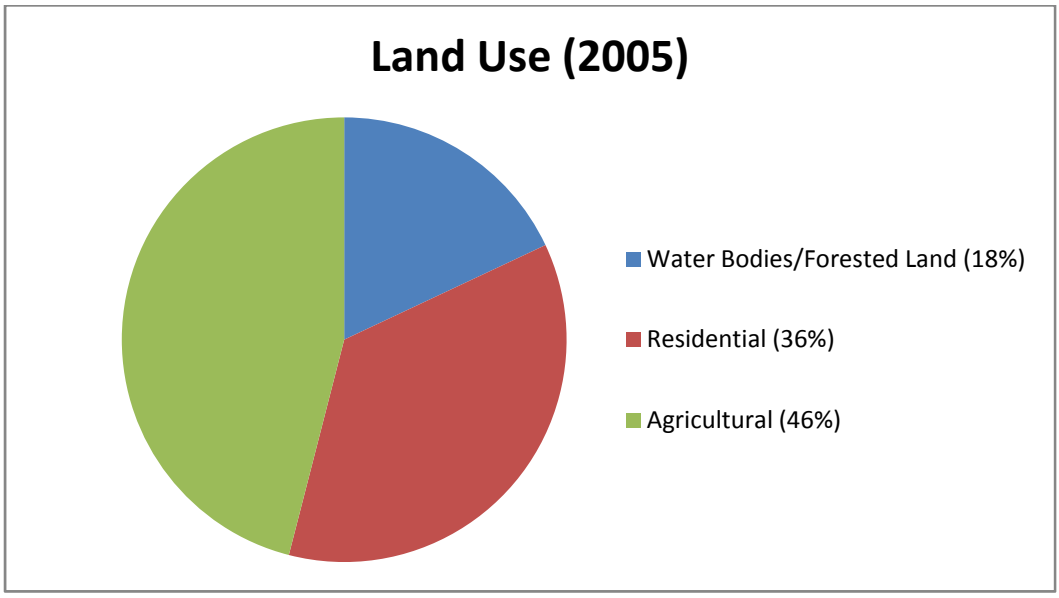
Field measurements in August of 2009 found the stream channel near the mouth to be 13 to 20 feet with a measured discharge of approximately 9 cubic feet per second. According to the USGS, the base flow for the Stony Run is an unusually low 22 gallons per acre per day.

e. Land Use

Based on information provided by the Chester County GIS Department, within the watershed, land use as of 2005 was 46% agricultural and 36% residential and other developed uses with 18% consisting of forested lands and water bodies. In comparison, during much of the early 20th Century, land use was nearly all agricultural until the 1950s when some residential development began to occur. A second larger wave of residential development occurred in the 1980s and 1990s that has transformed over one-third of the land use patterns within the watershed (GVA, 2003).

This change in land use pattern is reflected in benthic macro invertebrate data collected from the Stony Run by the United States Geological Survey (USGS) as well as the Stroud Water Research Center. The most recent land use data is shown on Figure 4.





As depicted in the above comparison of land use between 1995 and 2005, the continued urbanization of the watershed is shown in the decrease of agriculture from 60% to 46% and the increase in residential and other developed land uses from 17% to over 36% of the watershed. While some improvements are noted from this change including an increase in forested riparian buffer and better soil conservation and erosion control practices, urbanization brings a new set of problems including increased impervious surfaces, changes in storm water infiltration and flow, on-lot septic systems, lawn maintenance practices, among others. Changes in storm water flow to the watershed now exist due to the presence of at least 11 separate storm water detention/retention basins (mostly related to residential subdivisions) which affect storm water flow within approximately 8% of the watershed. These structures which have only been built during the last 10 to 20 years represent a likely change in the amount of storm water runoff that is now directed away from the aquifer and to the surface stream.

IV. Regulatory

Based on information obtained from PADEP's eFACTS website (http://www.ahs2.dep.state.pa.us/eFactsWeb/default.aspx, accessed on May 7, 2010) a number of permitted features exist in the watershed. Close to the mouth of Stony Run there a multiple permitted discharges related to the Cromby Power Point water pollution control facilities. Although there are no permitted surface water withdrawals from the Stony Run, at least four permitted uses of groundwater are located in the watershed as well as two solid waste permits for land application two farming operations. Also two sites with impacted soils exist but may have been cleaned up at this time.

During the 2009, field assessment, several of these outfalls were observed but none had active discharges at the time. In addition, a number of (apparently) unpermitted discharge pipes were found at various locations along the creek. These were all observed to be dry and many (if not most) likely carry rainwater from residential properties.

V. Stream Health

In 1976, PADEP deemed the Stony Run Watershed to be part of a larger conservation area. As a result of this process, the stream was then designated as a high quality special protection stream in 1979. Currently, the Stony Run is listed under PADEP Chapter 93 as a high quality – trout stocking stream (HQ-TSF). This designation is now its "designated use". With this classification and with PADEP's goal of preventing degradation of water quality and maintaining this level of classification, the stream is assessed periodically to determine if it is meeting its designated use. PADEP uses four different categories of assessments: Aquatic Life Use, Fish Consumption, Potable Water and Recreation.

An assessment of the Stony Run was completed by PADEP in 1999 but only for Aquatic Life Use and Recreation: it was not assessed for Fish Consumption or Potable Water. At that time, it was deemed attaining of its designated uses. However, in 2009, it was re-assessed and determined to be impaired for Recreation due to detections of high fecal coliform in water samples collected by Green Valleys Association. The fecal coliform sampling and results are discussed in detail below.

Additional understanding of the health of the stream comes from benthic macro invertebrate data. Macro invertebrates are aquatic organisms that live in streams and serve as good indicators of watershed health because they spend most or all of their life cycle in the water, differ in their tolerance to pollution, have limited mobility and are relatively easy to collect.

The USGS has sampled invertebrate population data from two locations on the Stony Run annually since 1970. In 2007, the Stroud Water Research Center also performed a macro invertebrate study on the same locations as part of its "Schuylkill Project", which is an effort to describe the stream water quality throughout the Schuylkill River Basin.

USGS's larger data set enables a review of macro invertebrate population over time and was previously analyzed using Brillouin's Index (Moore, 1987). Later assessments use Hilsenhoff's Biotic Index (HBI) which was originally developed at the University of Wisconsin in 1979 for assessing streams with low dissolved oxygen content due to organic loading. A summary of the HBI scoring system is provided here:

HBI Score	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic pollution

Contrastingly to the USGS Stony Run data set, Stroud's data for the Stony offers a single snapshot in time and allows an interesting comparison against the USGS data set since it was evaluated using a different index called the Macroinvertebrate Aggregated Index for Streams (MAIS) which was created for streams in the Mid-Atlantic region. The MAIS considers 10

metrics (including the HBI used by the USGS) rather than relying on a single metric and develops an MAIS scoring system as follows:

MAIS Score	Water Quality
13.1 – 20	Good
6.1 - 13	Fair
0 - 6	Poor

The USGS data as reported (http://pa.water.usgs.gov/chesco/monitoring/bio_chemical.php, accessed January 11, 2009) indicates that although there has been some improvement over time, that trend has leveled off and the Stony Run is considered "slightly impacted" which typically indicate that water quality and habitat are having an effect on the benthic macro invertebrate community. HBI scores range from 4.56 to 5.59. According to the USGS, slightly impacted sites commonly are receiving some wastewater inputs and/or agricultural/urban runoff.

Stroud's 2007 data from both the Cromby Road and Pikeland Avenue sampling locations on the Stony Run produced a score of 3.6 and 4.8 which falls into the "poor" category. A summary of the various benthic macroinvertebrate data indices for the Stony Run are provided below:

Benthic Macroinvertebrate Data Summary			
Diversity Measure	**Stony Run Watershed**	**Time Period**	**Comments**
Brillouin's Index	0.79 – 3.59	1970 – 1980	Values show improvement from "severely stressed" to "unstressed"
Taxa Richness	34	1981 – 1997	Nonimpacted
EPT Taxa Richness	16	1981 – 1997	Nonimpacted
HBI	4.66	1981 – 1997	Nonimpacted to slightly impacted
MAIS	3.6 to 4.8	2007	Water quality considered "poor"

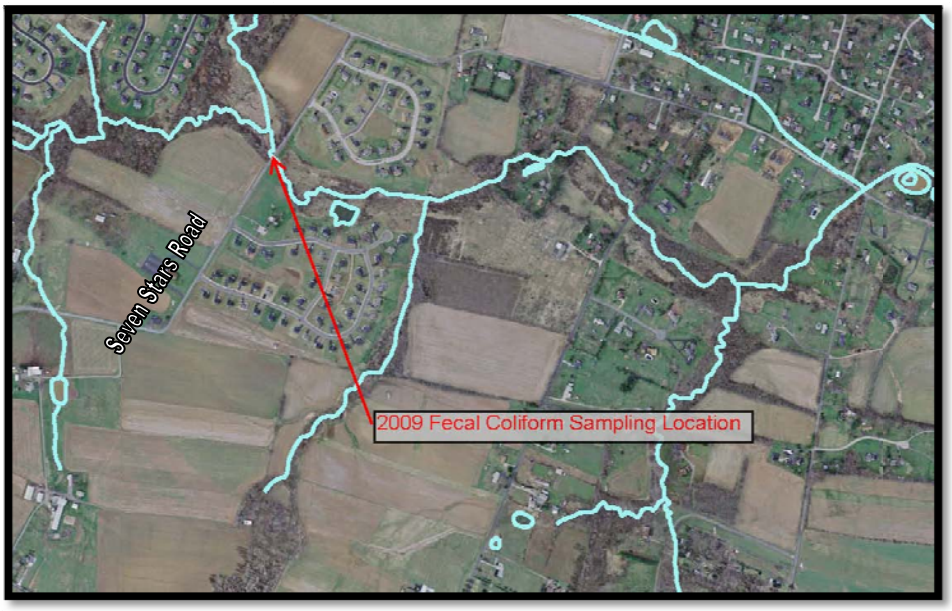
Much research has been done regarding the connection between urbanization of watersheds and their impact on aquatic life. As noted by Cuffney et al. (2010) urbanization negatively affects water quality and benthic macro invertebrate communities and that these negative changes begin at very low levels of urbanization. Furthermore, this trend only continues as urban intensity (a measure of urbanization) increases.

Water chemistry data from several sources including Stroud's 2007 monitoring event, the 2009 Field Assessment (discussed in below) as well as GVA and USGS show nitrate and phosphorus levels of 2.6 mg/L and 0.035 mg/L, which while not high, do indicate continued agricultural and waste water runoff.

More data on the degraded quality of water in the Stony Run has been provided by recent sampling by GVA. Between July 18, 2009 and September 8, 2009, GVA (in cooperation with

PADEP and the Pottstown Borough Authority – Wastewater Treatment Plant) collected ten samples from the Seven Stars Road crossing over the Stony Run and analyzed them for fecal coliform bacteria. Fecal coliform bacteria is an indicator parameter for the potential presence of pathogenic organisms. Results from these samples ranged from 200 to 1,294 colonies per 100 milliliters (col/ml) with a geometric mean of 708 col/ml.

This mean value exceeds the PADEP "swimming season" criteria of 200 col/100 ml although does not exceed the 2,000 col/100 ml criterion established by PADEP for the remainder of the year. Research by the USGS in the Brandywine Creek Basin in central Chester County found elevated levels of fecal coliform in surface water was likely attributable to several sources including agriculture runoff, groundwater contamination from residential septic systems, urban/residential activities and local wildlife (Town, 2001). Interestingly, this study also found an improvement in fecal coliform levels during the 1970s and 1980s that corresponded with a decrease in agricultural land usage. This finding is consistent with the improvement noted in the Stony Run macroinvertebrate data during the same time period.



2009 Fecal Coliform Sampling			
Date	Colonies per 100/mL	Date	Colonies per 100/mL
7/18/2009	715	8/13/2009	1100
7/15/2009	460	8/19/2009	1294
7/22/2009	650	8/25/2009	210
7/29/2009	960	9/1/2009	144
8/5/2009	200	9/8/2009	481
Geometric Mean	578	Geometric Mean	460
PADEP "Swimming" Criteria	200	PADEP "Non-Swimming" Criteria	2,000

The improvement noted in the macroinvertebrate data set corresponds with the changing land use of the watershed from over 70% agricultural to less than 50% as well as an increase in forested riparian buffer from less than 10% of stream miles in the 1930s to now over an estimated 40%. This trend has been noted by others including Hardy et al. (1995) and Sloto (1987). It is likely that less agricultural runoff and soil erosion have had positive effects on water quality. However, continued nutrient loading from increasing numbers of residential on-lot septic systems, lawn fertilization and large sections of first order headwater streams that remain unforested as well as the recent fecal coliform results indicates that that the Stony Run continues to be negatively affected.

VI. Field Assessment

In the summer of 2009, field assessments were performed in the Stony Run using the Rapid Watershed Assessment Methodology developed by the NCRS. This provided field-based, quantitative and qualitative data regarding stream conditions. Over the course of three days, BAI field personnel walked the watershed recording stream conditions on the Rapid Watershed Visual Assessment and assigning a score value for a variety of parameters including riparian buffer, water quality, channel condition, bank stability, fish barriers, canopy cover, riffles, pools among others. Dimensions of the stream channel were also recorded at several locations as well measurements of pH, temperature, conductivity, dissolved oxygen.

Assessment scores were then totaled for habitat and stability and then compiled into a total score for each assessed stream segment and ranked as either “Excellent”, “Good”, “Fair” or “Poor”. Field forms are included in Appendix A.

During the field assessments a variety of conditions were observed including:

- significant sections of little to no riparian buffer and/or tree canopy
- abandoned mill dams and resultant “legacy” sediments
- stream channel alteration
- channel downcutting
- embeddedness of substrate
- algal growth
- trash/debris
- unknown pipes allowing possible discharges
- invasive plants- including purple loosestrife, autumn olive, multi-flora rose, Japanese stiltgrass

In general, water appearance was satisfactory along with measured dissolved oxygen levels. Much of the lower watershed has a well established forested buffer however, approximately two-thirds of the upper reaches of the watershed remain unforested.

Although no significant trout populations were noted during the field assessments, a few specimens of pan fish were observed in isolated pools and local residents did offer anecdotal

stories of fishing frequently in Stony Run several decades ago. Other residents pointed out sections that had been re-routed or channelized to allow residential development.

Field sheet scores were prepared for each section or "stream reach". Stream reaches were determined in the field based upon similarity of conditions including riparian/forested buffer, proximal land use and channel conditions. Scores were broken down into the following categories:

Rapid Visual Assessment Scoring Criteria

< 6.0	= Poor
6.1 – 7.4	= Fair
7.5 – 8.9	= Good
> 9.0	= Excellent

As shown on Figure 5, scores were generally in the "Poor" to "Fair" categories and decreased upstream with the lowest scores in the headwaters. Many sections showed significant man-made alteration, channelization and areas where the channel has become disconnected from its floodplain due to downcutting. However, many of these same areas (mostly in the lower sections) have become largely stabilized with well established forested buffers (it should be noted however, that a stream channel in such a condition is not healthy for aquatic communities.)

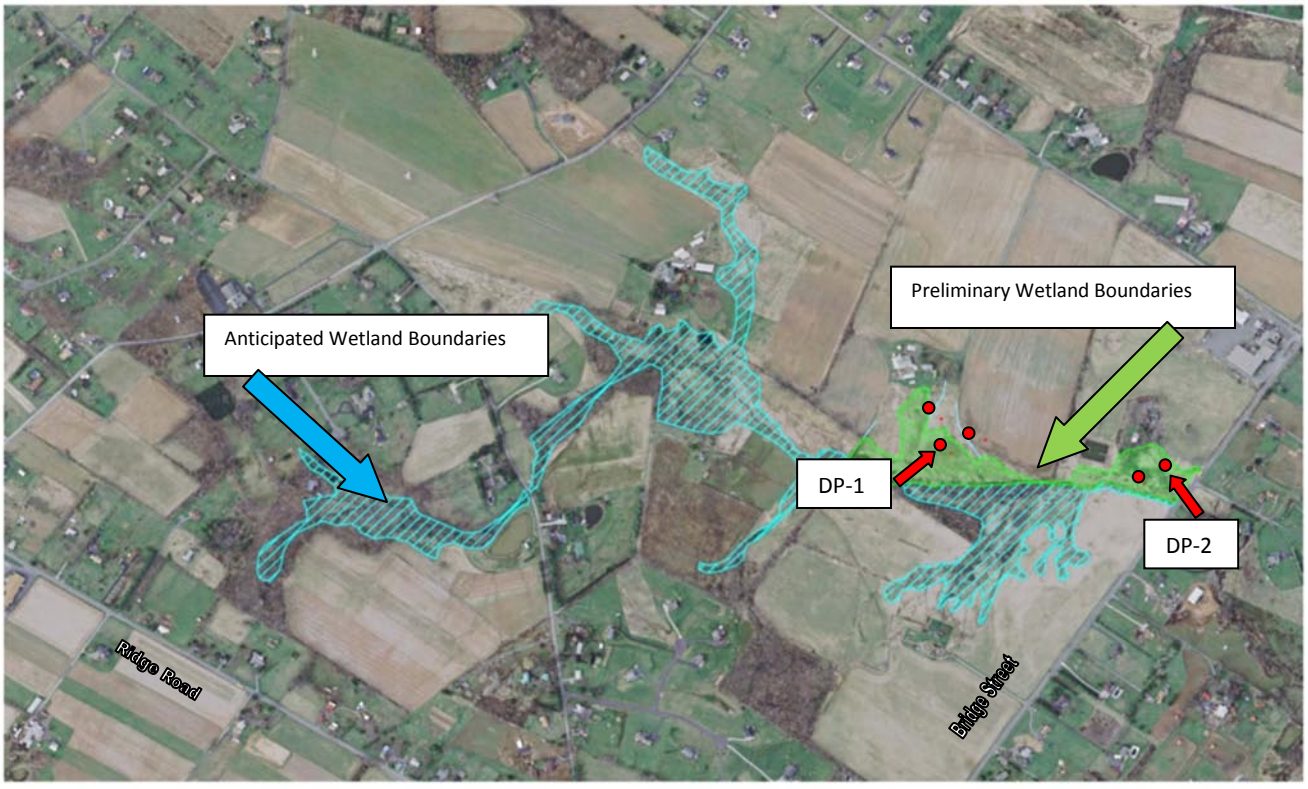
Contrastingly, in upstream areas with absent riparian buffers much of the land use is agricultural and residential. Heavy siltation from eroding banks and algal growth on substrates are evidence that without a wetland or forest buffers, nutrient-laden surface runoff represents a continued threat to the Stony Run. Figure 6 shows areas without significant riparian buffer.

Photo 1 – View of unnamed tributary (UNT-14) with no riparian buffer.

VII. Wetlands

Despite not appearing on the U.S. Fish and Wildlife National Wetlands Inventory, many sections along the Stony Run have mapped hydric soils where suspect wetlands had been observed. To identify potential wetland areas (particularly in the headwaters where development pressures are the greatest) a targeted preliminary field assessment was performed in an area just west of Bridge Street. On April 30, 2010, BAI along with WHM, Inc. evaluated soils, hydrology and plant life in an effort to identify "preliminary wetland boundaries". These boundaries were field marked via global positioning system (GPS) and are shown on Map 1. Additional areas which were observed in the field but not formally delineated, due to access restrictions, were cross-checked against aerial photography and are shown as "anticipated wetland areas".

While many of these wetlands show evidence of infilling, re-grading, draining and invasive plant impacts, they are still considered functional and are critical to improving the quality of storm water runoff to the Stony Run. Therefore, these wetlands warrant additional protection/restoration to improve this section of the headwaters.



VIII. 2002 Watershed Action Plan

In December 2002, a Watershed Action Plan (Action Plan) for the Stony Run was prepared by the Chester County Water Resources Authority, the Chester County Planning Commission, Camp Dresser & McKee, Inc. and Gaadt Perspectives, LLC. Based on Chester County's *Watersheds* Plan, the Action Plan developed specific "Priority Management Actions" to identify the most pressing needs for improvement of stream health. A summary of these actions and their current status:

Recommended Priority Management Actions (from the 2002 Stony Run Watershed Action Plan)	
Action	**Status**
Storm water management ordinance	100' riparian buffer existing. Wetlands buffer not established.
NPDES Phase II	Implemented
Stream bank fencing and riparian corridor in 15% of agricultural and first order stream miles	Not complete
Soil and water conservation plans	Not complete
Manure management plans	Not complete
Residential pollutant runoff reduction programs	Not complete
Riparian buffer ordinance	Established
Integrated Water Resources Plans	Not complete
Provide ground water balance information to municipalities	Not complete

At the time these recommendations were developed, the Stony Run was viewed as a high quality watershed that had not degraded. As discussed above, the identification of fecal coliform in 2009 in water samples collected from the Stony Run precipitated PADEP's designation that the stream is not meeting its Chapter 93 designated use.

Although some effort has been made, many of the recommended actions have yet to be to finished or started. Therefore, based on the status of this list, combined with a fresh look at recent water quality data and macro invertebrate results, this action list has been "reset" to respond to current critical needs and a new prioritization schedule.

2010 Recommended Priority Management Actions	
Action	**Strategy**
Preserve open space in headwaters	Work through property owners and municipalities.
Formal delineation of wetlands in headwaters	Work through property owners and municipalities.
Establish riparian buffer in "severe" areas	Identify specific sections, property owners and funding to implement
Storm water management/buffer ordinances	Advance through direct presentations
Annual fecal coliform sampling	Executed through GVA
Five-year macro invertebrate sampling	Executed through GVA and partners
Solicit high schools/universities for additional research	Advance through direct contact
Organize Friends of the Stony Run	Executed through GVA
Dam removal projects	Indentify owners and possible partners

Findings

This study has combined previous work from multiple studies as well as new work to develop the most recent assessment of the Stony Run Watershed to date. In summary, the watershed has undergone significant changes from original forestland, to predominantly agricultural and then most recently increasing urbanization during the last several decades. In particular, the urbanization process has brought some improvements to water quality including decreased agricultural runoff and increasing forested riparian buffer. This trend is supported by some improvement in water quality and benthic macro invertebrate communities over the last several decades. However, this positive trend has appeared to level off with several indicators denoting stressed aquatic communities. Similarly, field watershed assessments found most of the upstream reaches had an overall health score of "poor". Further evidence of the stalled improvement for the Stony Run Watershed is shown through the recent listing of the creek as "impaired" by PADEP due to the presence of fecal coliform in the water. This combined with the condition of the benthic communities, nitrate/phosphorus levels, current land use combined with insufficient vegetative buffers, algal substrate growth indicates agricultural and/or wastewater nonpoint pollution continues to negatively the Stony Run. The increase in residential development communities with storm water detention basins has created an imbalance between infiltration of precipitation versus runoff.

The findings of this assessment indicate that this situation has much to due with the condition of the headwaters of the watershed. As discussed by Alexander et al. (2007), first order headwaters typically have increased surface area and therefore greater contact. It is these "roots" of the watershed that require the most protection. In contrast, the headwaters of the Stony Run are an area that has seen the least improvement in riparian buffer over the last fifty years – a critical component for improving the water quality.

The report recommends in addition to aforementioned priority management actions that following strategies be implemented to allow routine monitoring of the Stony Run to measure the success level of the management actions.

Success Monitoring Strategies		
Issue	**Strategy**	**Timeframe**
Preserve open space	Evaluation through land use data	Every 5 years
Riparian Buffer	Field assessments/aerial photography	Every 5 years
Water Quality	Fecal coliform sampling	Annual
Water Quality	Macro invertebrate sampling	Every 5 years
Storm water/buffer ordinances	Review of township ordinances	Every 5 years

References

Alexander, Richard B., Boyer, Elizabeth W., Smith, Richard A., Schwarz, Gregory E. and Moore, Richard B., (2007), The Role of Headwater Streams in Downstream Water Quality. Journal of the American Water Resources Association.

Cahill Associates (2003) A Rivers Conservation Plan for Sustainable Watershed Management: A Model Program to Balance Water Resources and Land Development in the Pigeon Creek and Stony Run Watersheds of Chester County, PA.

Chester County Water Resources Authority, Chester County Planning Commission, Camp Dresser and McKee, Gaadt Perspectives, LLC, December 2002, Stony Run Watershed Action Plan (prepared as a component of the Chester County, Pennsylvania Water Resources Compendium.

Green Valleys Association (2003) Sustainable Watershed Management for Northern Chester County Watersheds, A Model Program to Balance Water Resources and Land development in the Schuylkill River Tributary Watersheds: French Creek, Pickering Creek, Pigeon Creek, Stony Run and Direct Schuylkill Drainage.

Hardy, Mark A., Wetzel, Kim L., and Moore, Craig R., 1995, Land Use, Organochlorine Compound Concentrations, and Trends in Benthic-Invertebrate Communities in Selected Stream Basins in Chester County, Pennsylvania. United States Geological Survey Water-Resources Investigations Report 94-4060.

Jackson, John K., 2009, Understanding Stream Conditions: Lessons from an 11 Year Macroinvertebrate in Eastern Pennsylvania's Schuylkill River Watershed with a Focus on Exceptional Value and High Quality Streams. Stroud Water Research Center.

Meyer, Judy L., Kaplan, Louis A., Newbold, Denis, Strayer, David L., Woltemade, Christopher J., Zedler, Joy B., Beilfuss, Richard, Carpenter, Quentin, Semlitsch, Ray, Watzin, Mary C., Zedler, Paul H., (2007), Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands. American Rivers and The Sierra Club.

Moore, Craig R., 1987, Determination of Benthic-Invertebrate Indices and Water-Quality Trends of Selected Streams in Chester County, Pennsylvania, 1969-1980. United States Geological Survey Water-Resources Investigations Report 85-4177.

Pennsylvania Bureau of Topographic and Geologic Survey (2000)

Pennsylvania Bureau of Topographic and Geologic Survey (2007), Map 13 – Physiographic Provinces of Pennsylvania, Pennsylvania Department of Conservation and Natural Resources.

Shultz, Charles H. ed. (1999) The Geology of Pennsylvania, Pennsylvania Geological Survey/ Pittsburgh Geological Society.

Reif, Andrew G., 2002, Assessment of Stream Quality Using Biological Indices at Selected Sites in the Schuylkill River Basin, Chester County, Pennsylvania, 1981-97. United States Geological Survey Fact Sheet FS-114-02.

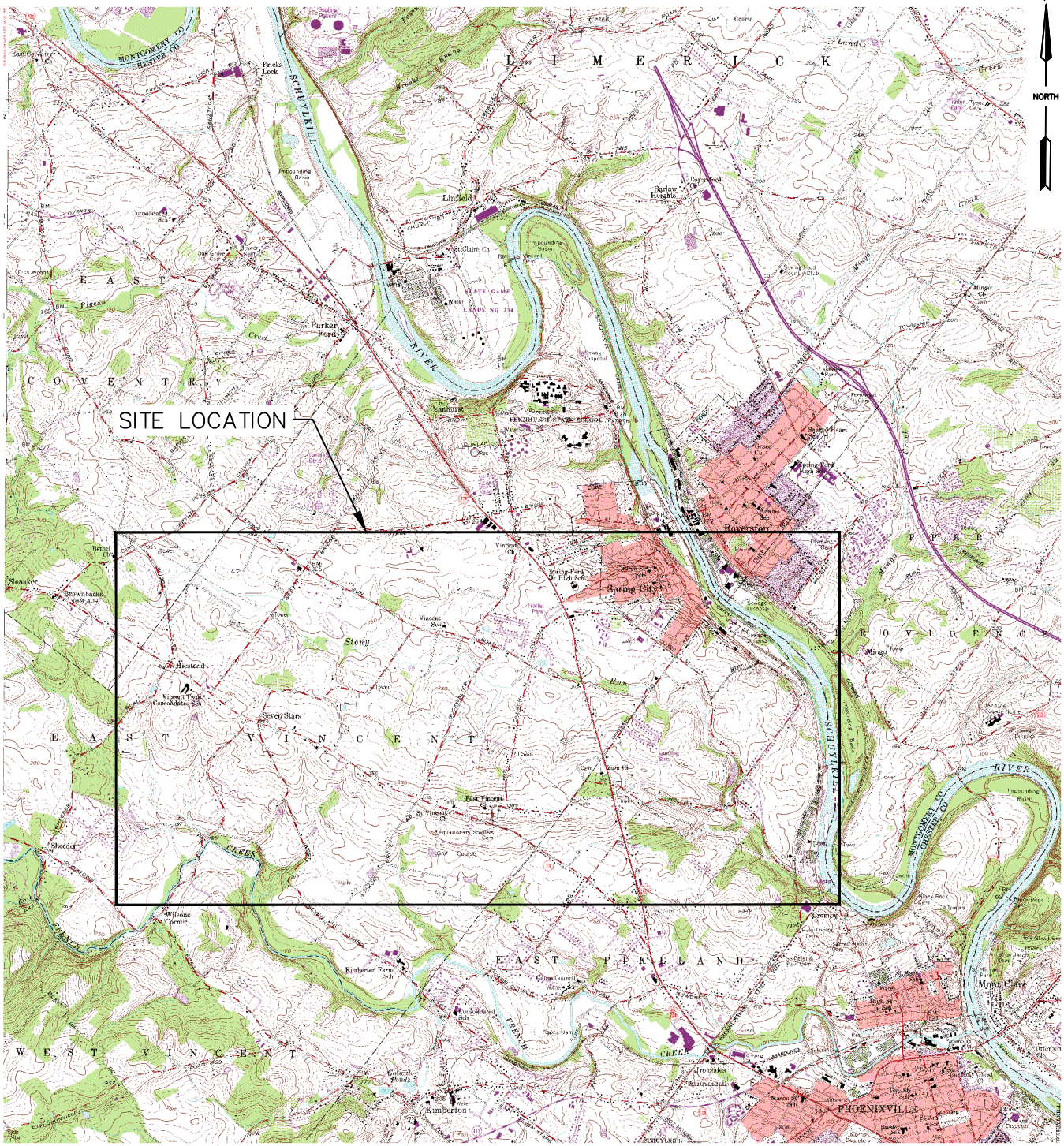
Reese, Stuart O., and Risser, Dennis W., (2010) Summary of Groundwater Recharge Estimates for Pennsylvania, Water Resources Report 70 Pennsylvania Geological Survey/United States Geological Survey.

Sloto, R.A. Effect of Urbanization on the Water Resources of eastern Chester County, Pennsylvania, 1987. United States Geological Survey Water-Resources Investigations Report 87-4098.

Town, Debra A., 2001, Historical Trends and Concentrations of Fecal Coliform Bacteria in the Brandywine Creek Basin, Chester County, Pennsylvania. United States Geological Survey Water-Resources Investigations Report 01-4026.

GVA–001A001

07/01/10



MAP TAKEN FROM U.S.G.S. 7.5 MINUTE, PHOENIXVILLE QUADRANGLE.

BLAZOSKY Associates INC. Balanced Environmental Solutions

GREEN VALLEYS ASSOCIATION

STONY RUN CONSERVATION PLAN

CHESTER COUNTY PENNSYLVANIA

SITE LOCATION MAP

BALANCED ENVIRONMENTAL SOLUTIONS
State College, PA. Telephone: (814) 238–2060; Royersford, PA. Telephone: (610) 495–5585

FIGURE 1

Stony Run Watershed

Coldwater Conservation Plan

Legend

Stream

Stony Run Watershed Boundary

0 0.1 0.2 0.4 0.6 0.8

Miles

BLAZOSKY Associates • inc.

N

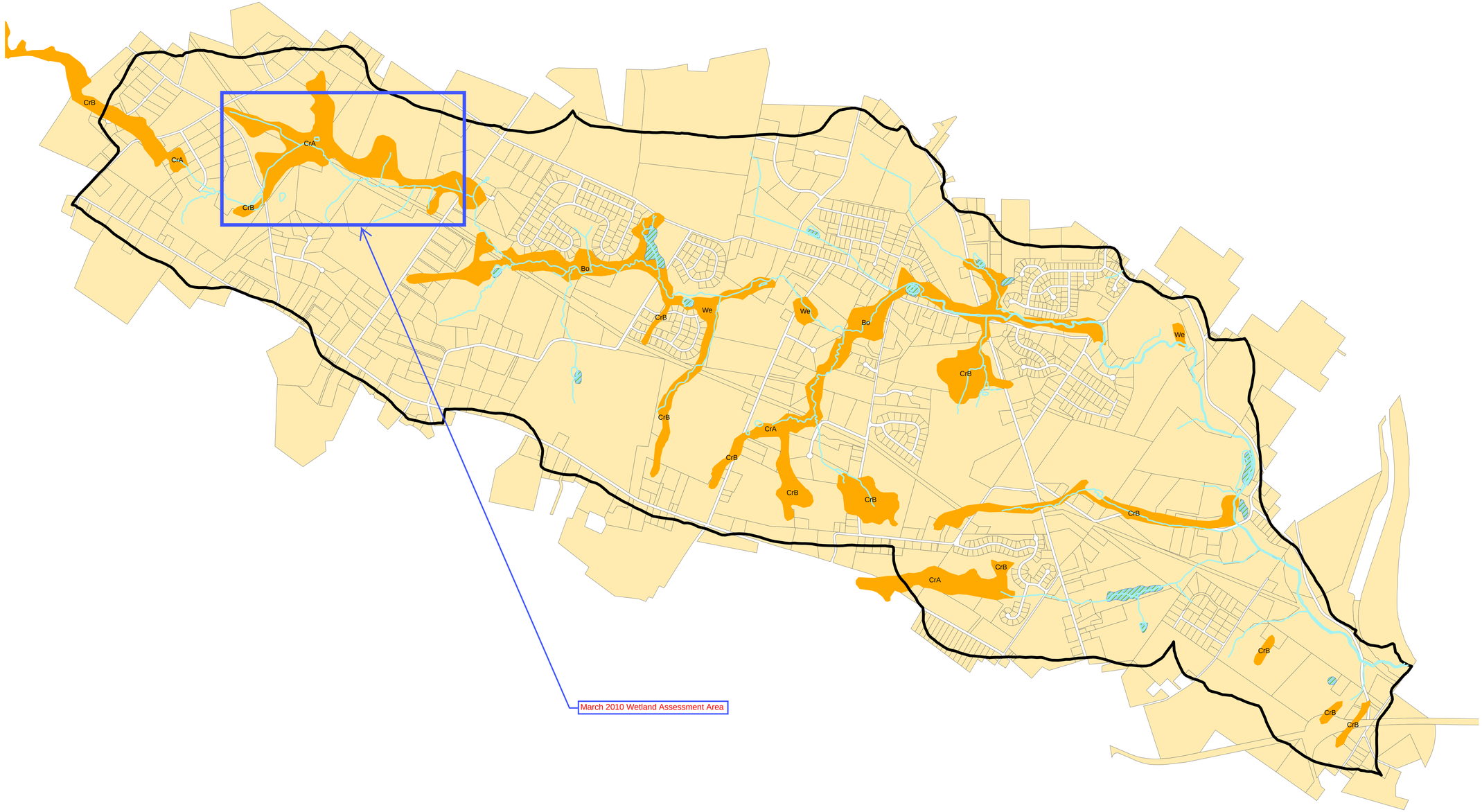
Figure 2 - Stony Run Watershed

Drawn By: JCR

Checked by: EJL

Date: 1/22/10

Source: Chester County GIS Department, September 2006



Hydric Soils Mapping

Stony Run Watershed - Coldwater Conservation Plan

Legend

- Stream
- Stony Run Watershed Boundary
- Wetlands
- Hydric Soils
- Property Boundary

0 0.1 0.2 0.4 0.6 0.8 Miles

BLAZOSKY Associates • Inc.

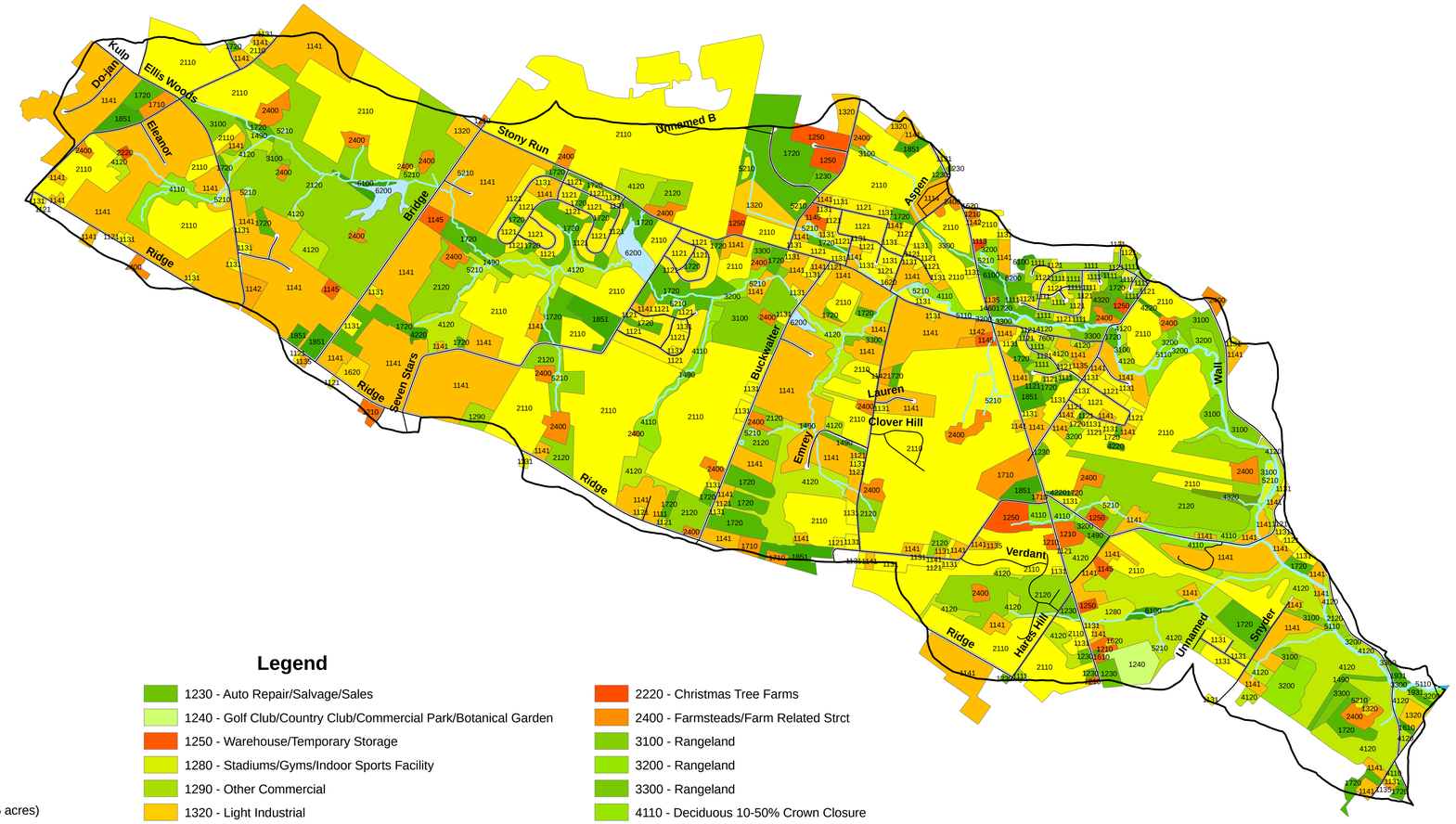
N

Figure 3 - Hydric Soils Mapping

Drawn By: JCR

Checked by: EJL

Date: 1/22/10



Legend

- Roads
- Streams
- Stony Run Boundary

Landuse - 2005

- 1111 - Single Family Detached (0.00 to 0.25 acres)
- 1113 - Multi Family Apartment/Townhouse (0.00 to 0.25 acres)
- 1114 - Mobile Home Park (0.00 to 0.25 acres)
- 1115 - Mobile Home (0.00 to 0.25 acres)
- 1121 - Single Family Detached (0.26 to 0.50 acres)
- 1131 - Single Family Detached (0.51 to 1.00 acres)
- 1135 - Mobile Home (0.51 to 1.00 acres)
- 1141 - Single Family Detached (> 1 acre)
- 1142 - Two Family Residential (> 1 acre)
- 1145 - Mobile Home (> 1 acre)
- 1210 - Commercial Sales/Services
- 1230 - Auto Repair/Salvage/Sales
- 1240 - Golf Club/Country Club/Commercial Park/Botanical Garden
- 1250 - Warehouse/Temporary Storage
- 1280 - Stadiums/Gyms/Indoor Sports Facility
- 1290 - Other Commercial
- 1320 - Light Industrial
- 1460 - Water Supply
- 1490 - Energy Utilities
- 1610 - Commercial/Residential
- 1620 - Residential/Commercial
- 1710 - Cemeteries
- 1720 - Vacant Urban or Suburban Land
- 1851 - Places of Worship
- 1931 - County Parks
- 2110 - Cropland (Row Crops)
- 2120 - Pasture/Hay
- 2220 - Christmas Tree Farms
- 2400 - Farmsteads/Farm Related Strct
- 3100 - Rangeland
- 3200 - Rangeland
- 3300 - Rangeland
- 4110 - Deciduous 10-50% Crown Closure
- 4120 - Deciduous > 50% Crown Closure
- 4220 - Coniferous > 50% Crown Closure
- 4320 - Mixed > 50% Deciduous
- 5110 - Rivers/Streams/Creeks
- 5210 - Freshwater Lakes and Ponds
- 6100 - Forested Wetlands
- 6200 - Non-Forested Wetlands
- 7600 - Transitional (under construction)

Stony Run Watershed

Coldwater Conservation Plan

0 0.15 0.3 0.6 0.9 1.2 Miles

BLAZOSKY Associates • Inc.

N

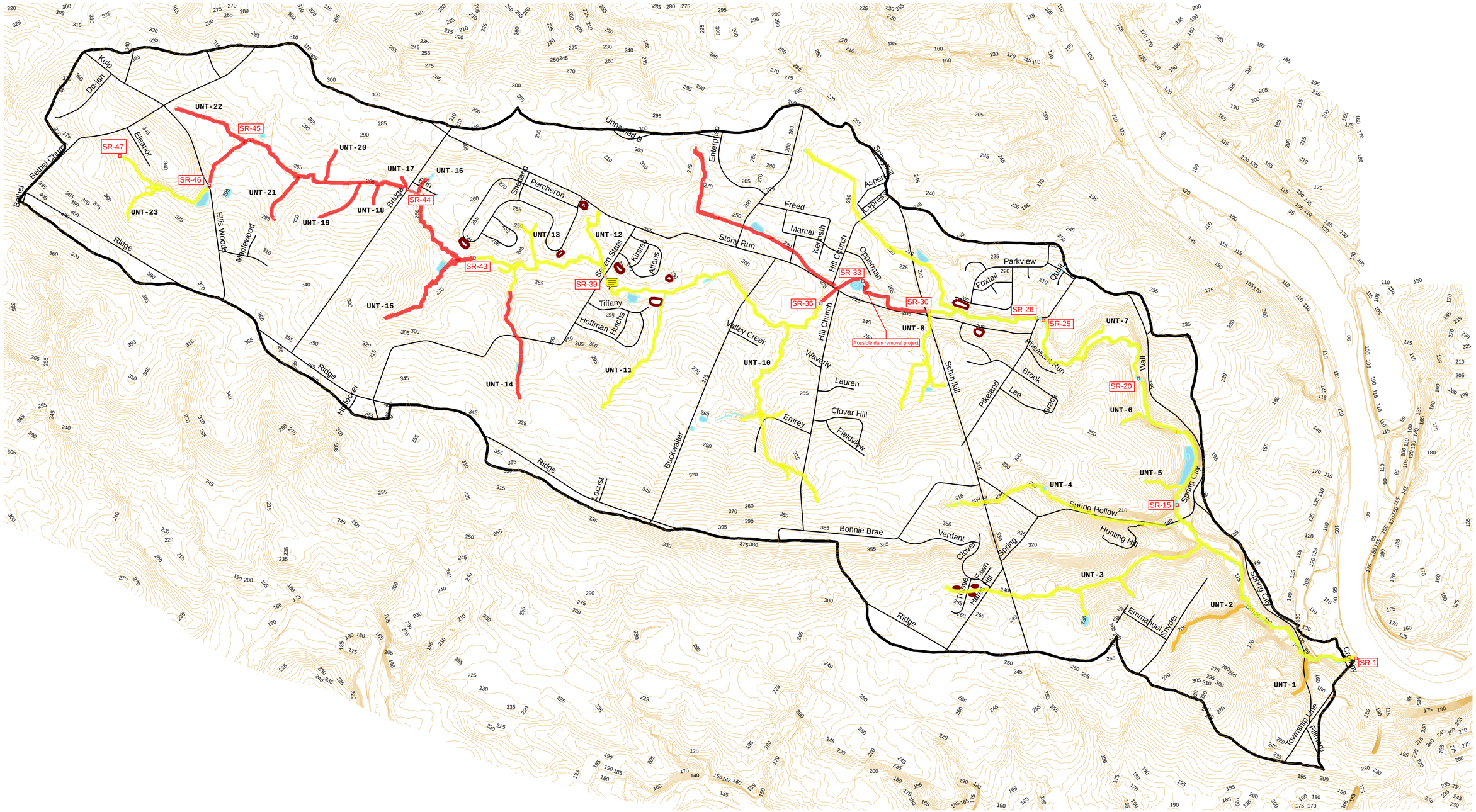
Figure 4 - Land Use Map

Drawn By: JCR

Checked by: EJL

Date: 1/22/10

Source: Chester County GIS Department



Watershed Assessment Scoring Summary

Stony Run Watershed - Coldwater Conservation Plan

Legend

- Streams
- Roads
- Ponds & Lakes
- Topography (C.I.=5')
- Stony Run Watershed Boundary

Watershed Assessment Score Ranking

- Poor
- Fair
- Good
- Excellent

Stormwater Detention/Retention Basin Locations

0 600 1,200 2,400 3,600 4,800 Feet

BLAZOSKY Associates • INC.

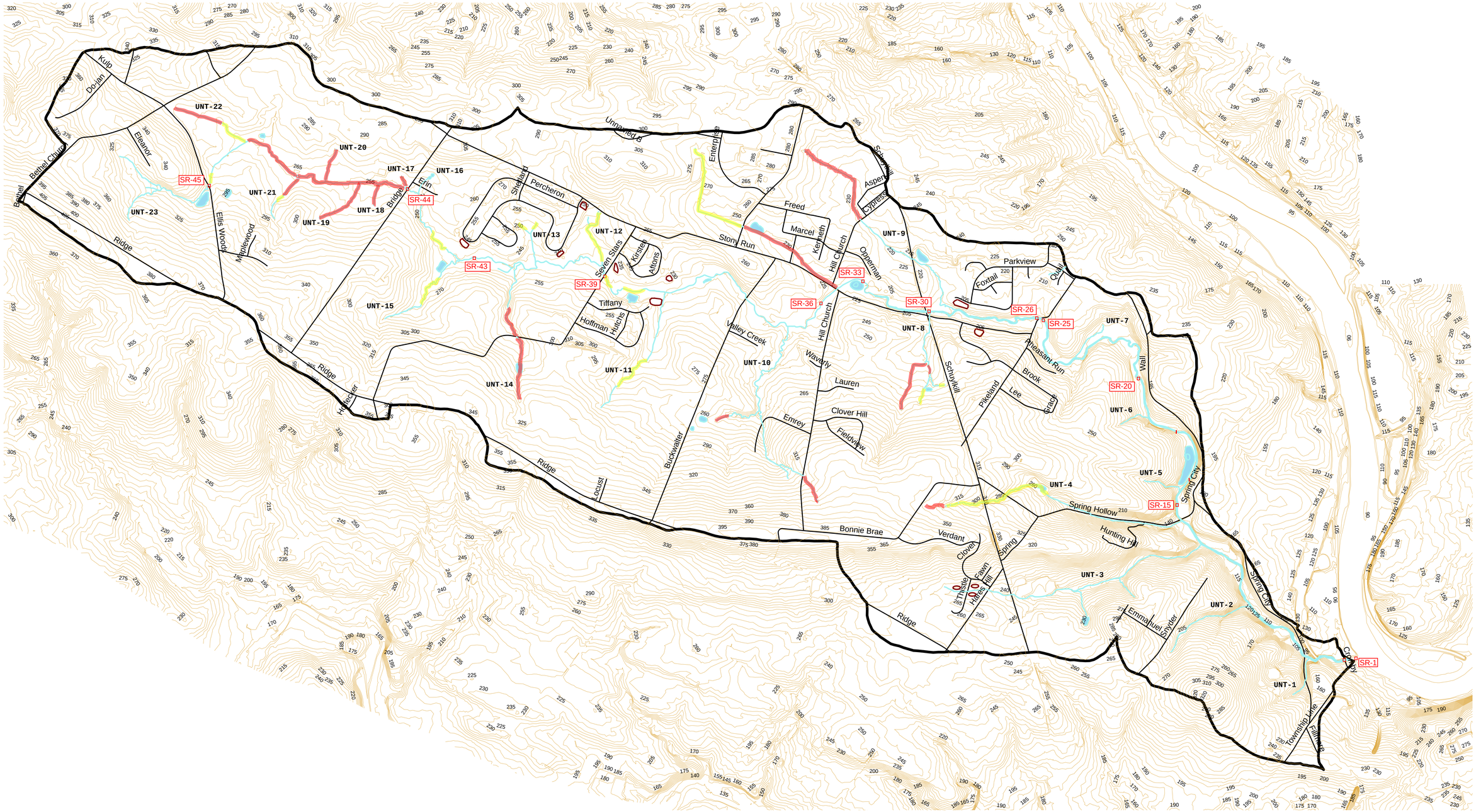
N

Figure 5 - Watershed Assessment Scoring Summary

Drawn By: JCR

Checked by: EJL

Date: 08-04-2009



Stony Run Watershed

Coldwater Conservation Plan

Legend

- Streams
- Roads
- Ponds & Lakes
- Topography (C.I.=5')
- Stony Run Watershed Boundary

Riparian Buffer Condition

- Severe
- Minimal

0 600 1,200 2,400 3,600 4,800 Feet

BLAZOSKY Associates • INC.

N

Figure 6 - Riparian Buffer Status

Drawn By: JCR

Checked by: EJL

Date: 08-04-2009

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/5/2009

Sub-Watershed _____ **Stream Section Name** SR-1 to SR-2

Stream Name Stony Run **Reference Section** Mouth to Bridge

Weather Conditions Today dry, warm (82°), clear sky **Past 2-5 Days** T-storms on 8/2/2009 (1.7 inches of rain)

Active Channel Width: 38 feet (at confluence)

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder	0	**Cobble**	20	**Gravel**	50	**Silt**	20	**Mud**	10
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

Cromby Road crossing. Industrial buildings, coal-fired power plant, heavy wooded riparian buffer on both sides of stream.

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-1		Confluence with Schuylkill River	7.73	32
		Turbidity – nm, Dissolved Oxygen – 7.80, Temperature – 70° F		
SR-2		Cromby Road Bridge		
		Flow below bridge = 0.5 feet per second (fps)	7.91	33
		Turbidity – 5, Dissolved Oxygen – 8.86, Temperature – 70° F		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2
Date: 8/5/2009

Invasive plants present: Yes / No ❒ Japanese Knotweed ❒ Garlic mustard ■ Purple loosestrife ■ Other

Trash / Litter: (Yes) / No empty 55-gallon drum, metal debris

Floodplain wetlands: Yes (No) **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes (No) (Wetland or other) _____

Any of the following?

AMD: no

Sewage Impacts: none observed

Erosion Sites: none observed

Stream Encroachments/Bank Erosion: bank erosion, down-cut channel

SW Management Facilities/Issues: storm water facilities not observed

Wetlands: significant wetlands not observed

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2
Date: 8/5/2009

Parameter	Score	Explanation of Score Given
Channel condition	5	Downcutting with stream disconnected from floodplain
Riparian zone	9	
Bank stability	5	High banks, eroding surface areas are generally protected by roots down to baseflow elevation
Water appearance	8	Generally clear
Nutrient enrichment	6	Algal growth on substrates
Fish barriers	9	
In-stream fish cover	5	Logs, deep pools, cobbles, riffles
Embeddedness	7	
Invertebrate habitat	6	Fine woody debris, submerged logs, cobbles
Canopy Cover	6	Shaded in reach but poorly shaded upstream
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	6.6	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2
Date: 8/5/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 (5) 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 (9)	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7 6 (5) 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2
Date: 8/5/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 (8)	**7 6 5 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 (9)	**8 7 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 6**	**(5) 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2

Date: 8/5/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-1 to SR-2

Date: 8/5/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/5/2009

Sub-Watershed _____ **Stream Section Name** SR-2 to SR-15

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today dry, warm (82°), clear sky **Past 2-5 Days** T-storms on 8/2/2009 (1.7 inches of rain)

Active Channel Width: 14 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder	5	**Cobble**	30	**Gravel**	10	**Silt**	5	**Mud**	10
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

Wooded riparian corridor, surrounding lands are mixed (industrial, commercial, agricultural, residential)

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-2		Above Cromby Road Bridge		
		Algal growth		
SR-3		Relic concrete pad pad encroaching into stream bed accelerating		
		erosion of bank, undercut roots, deep pool		
SR-4		Flow below bridge = 1.5 to 2 feet per second (fps)		
		Power line crossing, concrete debris in stream bed		
SR-5		RR Bridge – deeper water, fish (smallmouth bass, suckers) significant		
		sediment accumulations on downstream side of railroad culvert		
SR-6		RR Bridge (upstream) – deep pool (smallmouth bass), undercut banks		
SR-7		Under cut banks, poor bank stability, old mill, dump, fallen trees		
SR-8		Above mill		
		Turbidity – 6, Dissolved Oxygen – 8.79, Temp. – 71° F, Flow=0.7 fps	8.06	29
SR-9		Flat dispersion area, undercut banks, downcutting, mill dam legacy		
		sediments		
SR-10		Natural gas pipeline crossing, "all-terrain-vehicle" (ATV) crossing,		
		Minnows observed		
SR-11		Power lines, significant sediment accumulation, Kingfisher observed		
		Flow = 1.5 fps, Channel = 0.7' deep		
SR-12		Skipped		
SR-13		Walking bridge crossing, underwater bridge to summer vacation home on		
		Island in river, PVC outfall from home to creek.		
SR-14		Confluence with UNT. ATV trails, shed, old boat		
		Tributary Turbidity = 7, cond. = 44, pH = 8.22, D.O.= 8.69 temp. =		
		Main stem (upstream of trib) Turbidity = 12, cond. = 28, pH = 7.96, D.O.= 8.87 temp. = 70.5		
		Great blue heron		
SR-15		Spring Hollow Road Crossing, confluence with UNT		
		4" PVC pipe outfall (drain from garage?). Home in floodplain, trash		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Invasive plants present: (Yes) / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: (Yes) / No metal waste, plastic tubing, shoeos, steel debris, boxes etc.

Floodplain wetlands: Yes / (No) **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) refer to a map

Any of the following?

AMD: no

Sewage Impacts: none observed

Erosion Sites: SR-9: undercut banks

Stream Encroachments/Bank Erosion: bank erosion, altered channel by SR-6

SW Management Facilities/Issues: storm water facilities not observed

Wetlands: significant wetlands not observed, refer to Map ---

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects: SR-7, historical mill dam

Notes: significant numbers of dead adult crayfish (~23)

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Parameter	Score	Explanation of Score Given
Channel condition	5	Active downcutting
Riparian zone	8	
Bank stability	8	
Water appearance	7	Generally clear
Nutrient enrichment	7	Algal growth on substrates
Fish barriers	9	
In-stream fish cover	4	
Embeddedness	8	
Invertebrate habitat	6	
Canopy Cover	7	Shaded in reach but poorly shaded upstream
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	6.9	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Water Appearance									
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.			Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.				Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.		Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment									
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.			Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.				Greenish water along entire reach; **abundant algal growth**, especially during warmer months.		Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers									
No barriers.		Seasonal water withdrawals inhibit movement within the reach.			Drop structures, culverts, dams or diversions (<1ft drop) within the reach.		Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.		Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover									
>7 cover types available		6 to 7 cover types available			4 to 5 cover types available		2 to 3 cover types available		None to 1 cover type available
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-2 to SR-15
Date: 8/5/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/5/2009

Sub-Watershed ______ **Stream Section Name** SR-16 to SR-20

Stream Name Stony Run **Reference Section** ______

Weather Conditions Today dry, warm (82°), clear sky **Past 2-5 Days** T-storms on 8/2/2009 (1.7 inches of rain)

Active Channel Width: 7 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder	5	**Cobble**	20	**Gravel**	30	**Silt**	10	**Mud**	
Bedrock	30								

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:
Farm/pasture with some wooded areas, residential homes

GPS POINTS / PHOTOS:				
Waypoint	Photo	Description	pH	Cond.
SR-16		Walking bridge		
		Increased turbidity, lethargic sunfish		
SR-17		Underwater bridge		
SR-18		Old farm, open plains, little to no riparian buffer		
SR-19		Stream crossing (for trucks)		
SR-20		Home, septic system in proximal to stream, eroded banks		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20
Date: 8/5/2009

Invasive plants present: (Yes)/ No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: (Yes)/ No steel/rubber, styrofoam, household litter.

Floodplain wetlands: Yes / (No) **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) refer to a map

Any of the following?

AMD: no

Sewage Impacts: none observed

Erosion Sites:

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues: storm water facilities not observed

Wetlands: significant wetlands not observed, refer to Map ---

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes: significant numbers of dead adult crayfish (~10)

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20
Date: 8/5/2009

Parameter	Score	Explanation of Score Given
Channel condition	8	Active downcutting
Riparian zone	8	
Bank stability	8	
Water appearance	7	Generally clear
Nutrient enrichment	7	Algal growth on substrates
Fish barriers	9	
In-stream fish cover	4	
Embeddedness	8	
Invertebrate habitat	6	
Canopy Cover	7	Shaded in reach but poorly shaded upstream
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	——	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20
Date: 8/5/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 5 4**	**3**	**2** **1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5** **4**	**3** **2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7** **6 5 4**	**3** **2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20
Date: 8/5/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 (9)	**8 7 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 (6)**	**5 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20
Date: 8/5/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3** **2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-16 to SR-20

Date: 8/5/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/5/2009

Sub-Watershed _____ **Stream Section Name** SR-20 to SR-25

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today dry, warm (82°), clear sky **Past 2-5 Days** T-storms on 8/2/2009 (1.7 inches of rain)

Active Channel Width: 14 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder	5	**Cobble**	20	**Gravel**	30	**Silt**	10	**Mud**	
Bedrock	30								

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

Farm/pasture with some wooded areas, residential homes

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-21		Flow = 0.9 fps	7.68	38
		Turb = 13, D.O. = 8.23, Temp = 70.3		
		Increased Embeddedness, increase in algal growth in pools		
		Evidence of infilling and channel alteration		
SR-22		orange seep, truck crossing		
SR-23		Channelized flow		
SR-24		Gas line crossing. Pipe is exposed in streambed.		
SR-25		Old road/concrete debris. Pikeland Road Bridge	7.56	28
		Turb – 8, D.O. = 8.66, Temp = 71		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Invasive plants present: (Yes) / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: (Yes) / No railroad ties, household liter

Floodplain wetlands: Yes / (No) **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) refer to a map

Any of the following?

AMD: no

Sewage Impacts: none observed

Erosion Sites:

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues: storm water facilities not observed

Wetlands: significant wetlands not observed, refer to Map ---

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes: dead adult crayfish

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Parameter	Score	Explanation of Score Given
Channel condition	6	
Riparian zone	6	
Bank stability	8	
Water appearance	7	
Nutrient enrichment	7	
Fish barriers	9	
In-stream fish cover	6	
Embeddedness	8	
Invertebrate habitat	7	
Canopy Cover	4	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	6.8	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Water Appearance									
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.			Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.				Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.		Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment									
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.			Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.				Greenish water along entire reach; **abundant algal growth**, especially during warmer months.		Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers									
No barriers.		Seasonal water withdrawals inhibit movement within the reach.			Drop structures, culverts, dams or diversions (<1ft drop) within the reach.		Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.		Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover									
>7 cover types available		6 to 7 cover types available			4 to 5 cover types available		2 to 3 cover types available		None to 1 cover type available
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9 8 7 6	**5 4**	**3 2**	**1**	

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-20 to SR-25
Date: 8/5/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/5/2009

Sub-Watershed _____ **Stream Section Name** SR-26 to SR-30

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today dry, warm (82°), clear sky **Past 2-5 Days** T-storms on 8/2/2009 (1.7 inches of rain)

Active Channel Width: 18 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	15	**Gravel**	40	**Silt**	30	**Mud**	10
Bedrock	5								

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

Farm/pasture with some wooded areas, residential homes

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-26		Pikeland Road Bridge		
		Turb = 15, D.O. = 7.54, Temp = 69.1	7.97	255
SR-27		Residential homes on right, power lines on left, eroded banks		
SR-28		Orange seep/ clay infilling		
SR-29		Deep pool, eroded banks, snapping turtle		
SR-30		Rt. 724 bridge, 2 outfalls, manhole, altered channel (road obstruction)		
		Turb = 4, D.O. = 8.44, Temp = 69.1		
SR-25		Old road/concrete debris. Pikeland Road Bridge	7.56	28
		Turb – 8, D.O. = 8.66, Temp = 69.1		
		Increased embeddedness		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Invasive plants present: (Yes) / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: (Yes) / No railroad ties, household liter

Floodplain wetlands: Yes / (No) **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) refer to a map

Any of the following?

AMD: no

Sewage Impacts: none observed

Erosion Sites:

Stream Encroachments/Bank Erosion: bank erosion

SW Management Facilities/Issues: storm water facilities not observed

Wetlands: significant wetlands not observed, refer to Map ---

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Parameter	Score	Explanation of Score Given
Channel condition	7	
Riparian zone	7	
Bank stability	5	
Water appearance	8	
Nutrient enrichment	6	
Fish barriers	10	
In-stream fish cover	6	
Embeddedness	6	
Invertebrate habitat	6	
Canopy Cover	5	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	6.6	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7** **6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8** **7** **6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7** **6** **5** **4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 (8)	**7 6 5 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
(10) 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 (6)**	**5 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-26 to SR-30
Date: 8/5/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed _____ **Stream Section Name** SR-30 to SR-33

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today Sunny, warm **Past 2-5 Days** _____

Active Channel Width: 10 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	**10**	**Gravel**	**40**	**Silt/Sand**	**40**	**Mud**	**10**
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-30		Above SR-30 (Bridge) highly channelized along Stony Run Road.		
		Evidence of filling.		
SR-31		Construction backfill into stream (concrete blocks, etc.)		
		House septic close to stream.		
SR-32		Tributary sediment settling in confluence causing stream diversion.	8.05	.255
		Turb.-12.5, DO-8.6, Temp-20.4,		
		0.6' Deep, 0.55 fps		
SR-33		Concrete dam (28' wide) pond adjacent to dam on left.		
		4" diameter pipes above dam (to pond?)		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Invasive plants present: (Yes)/ No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ❒ Other

Trash / Litter: (Yes)/ No _____

Floodplain wetlands: (Yes)/ No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts:

Erosion Sites: Many eroded banks

Stream Encroachments/Bank Erosion: Stony Run Road

SW Management Facilities/Issues:

Wetlands:

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	**3**	
Riparian zone	**5**	
Bank stability	**6**	
Water appearance	**7**	
Nutrient enrichment	**5**	
Fish barriers	**3**	
In-stream fish cover	**6**	
Embeddedness	**6**	
Invertebrate habitat	**7**	
Canopy Cover	**5**	
AMD (if applicable)		
Sewage (if applicable)		
Manure presence (if applicable)		
TOTAL SCORE (Add all scores and divide by number of scores given)	**5.3**	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 5 4**	**3** **2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5** **4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7** **6** **5 4**	**3** **2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Water Appearance									
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.			Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.				Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.		Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment									
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.			Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.				Greenish water along entire reach; **abundant algal growth**, especially during warmer months.		Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers									
No barriers.			Seasonal water withdrawals inhibit movement within the reach.			Drop structures, culverts, dams or diversions (<1ft drop) within the reach.		Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10	**9**	**8**	**7**	**6**		**5**	**4**	**3**	**2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover									
>7 cover types available			6 to 7 cover types available			4 to 5 cover types available		2 to 3 cover types available	None to 1 cover type available
10	**9**	**8**	**7**	**6**		**5**	**4**	**3**	**2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-30 to SR-33
Date: 8/20/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed _____ **Stream Section Name** SR-33 to SR-36

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today _____ **Past 2-5 Days** _____

Active Channel Width: 18 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	**5**	**Gravel**	**40**	**Silt/Sand**	**45**	**Mud**	**10**
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
		Above SR-33 – long, deep pool w/ sediment.		
		Had to walk on land due to mud/silt.		
SR-34		Bridge at Stony Run Road/ Hill Chapel Road		
		Road construction on Hill Church Road		
		Deep pool continues		
SR-35		Deep pool continues above dam. High silt/embeddedness	8.27	.252
		4" diameter pipe from residence		
		Turb.-2.7, DO-8.8, ORP-20, Temp-20.4,		
		2' deep, 0.6 fps		
SR-36		End pool from dam		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-33 to SR-36
Date: 8/20/2009

Invasive plants present: (Yes)/ No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ❒ Other

Trash / Litter: (Yes)/ No ___Residence litter _____

Floodplain wetlands: Yes / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts: Outfall at residence?

Erosion Sites: Banks

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues:

Wetlands:

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-33 to SR-36
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	**6**	
Riparian zone	**5**	
Bank stability	**6**	
Water appearance	**7**	
Nutrient enrichment	**6**	
Fish barriers	**10**	
In-stream fish cover	**5**	
Embeddedness	**3**	
Invertebrate habitat	**5**	
Canopy Cover	**6**	
AMD (if applicable)		
Sewage (if applicable)		
Manure presence (if applicable)		
TOTAL SCORE (Add all scores and divide by number of scores given)	**5.9**	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-33 to SR-36
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-33 to SR-36
Date: 8/20/2009

Water Appearance									
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.			Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.				Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.		Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment									
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.			Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.				Greenish water along entire reach; **abundant algal growth**, especially during warmer months.		Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers									
No barriers.			Seasonal water withdrawals inhibit movement within the reach.			Drop structures, culverts, dams or diversions (<1ft drop) within the reach.		Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10	**9**	**8**	**7**	**6**		**5**	**4**	**3**	**2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover									
>7 cover types available			6 to 7 cover types available			4 to 5 cover types available		2 to 3 cover types available	None to 1 cover type available
10	**9**	**8**	**7**	**6**		**5**	**4**	**3**	**2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-33 to SR-36
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed _____ **Stream Section Name** SR-36 to SR-42

Stream Name Stony Run **Reference Section** _____

Weather Conditions Today _____ **Past 2-5 Days** _____

Active Channel Width: 17 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	**30**	**Gravel**	**30**	**Silt/Sand**	**30**	**Mud**	
Bedrock	**10**								

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-37		Tributary confluence, seeps present along bank. Adjacent to wetland?		
		Temp-19.8, DO-8.83, ORP-32, Turb-3, TDS-0.2,	8.21	.257
		Depth-0.45', width- 17 ft, velocity 0.13 fps		
SR-38		Concrete bridge and tributary confluence		
		Temp-21, DO-7.72, ORP-35, Turb-5.2, TDS-0.2	8.18	.244
		Velocity 0.13, width-17 ft, depth- 1.2 ft		
		Metal debris		
SR-39		Seven stars Road bridge		
		Temp-21.4, DO-8.13, ORP-14, Turb-4	8.23	.258
		Velocity-0.13, depth-0.91 ft, width-10 ft		
SR-40		Old Ag fields, minnows, up stream, less canopy		
SR-41		Iron? Seep – next to wetland – watersnake		
SR-42		Inc. cover – cobbles	8.04	.256
		Turb-6, DO-8.44, ORP-55, Temp- 21.64		
		Width-13', depth-1.0'		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-36 to SR-42
Date: 8/20/2009

Invasive plants present: (Yes)/ No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ❒ Other

Trash / Litter: (Yes)/ No ___metal, tires, appliances, litter

Floodplain wetlands: Yes / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts: Residential pipe – sewer?

Erosion Sites:

Stream Encroachments/Bank Erosion: Banks

SW Management Facilities/Issues:

Wetlands:

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-36 to SR-42
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	**8**	
Riparian zone	**7**	
Bank stability	**6**	
Water appearance	**7**	
Nutrient enrichment	**7**	
Fish barriers	**5**	
In-stream fish cover	**7**	
Embeddedness	**6**	
Invertebrate habitat	**5**	
Canopy Cover	**7**	
AMD (if applicable)		
Sewage (if applicable)		
Manure presence (if applicable)		
TOTAL SCORE (Add all scores and divide by number of scores given)	**6.5**	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-36 to SR-42
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 (8) 7 6 5 4 3 2 1			

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 (7) 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-36 to SR-42
Date: 8/20/2009

Water Appearance									
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.			Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.				Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.		Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment									
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.			Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.				Greenish water along entire reach; **abundant algal growth**, especially during warmer months.		Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers									
No barriers.		Seasonal water withdrawals inhibit movement within the reach.			Drop structures, culverts, dams or diversions (<1ft drop) within the reach.		Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.		Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover									
>7 cover types available		6 to 7 cover types available			4 to 5 cover types available		2 to 3 cover types available		None to 1 cover type available
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-36 to SR-42
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed ____________ **Stream Section Name** SR-43 to SR-44

Stream Name Stony Run **Reference Section** ____________

Weather Conditions Today ____________ **Past 2-5 Days** ____________

Active Channel Width: 7 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	10	**Gravel**	35	**Silt/Sand**	40	**Mud**	15
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR-43		Power lines, Ag pasture, less cover – dense brush		
		- Unable to walk stream		
		- Inc. turbidity - very cloudy		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44
Date: 8/20/2009

Invasive plants present: Yes / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: Yes / No _____

Floodplain wetlands: Yes / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts:

Erosion Sites:

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues:

Wetlands:

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	8	
Riparian zone	6	
Bank stability	8	
Water appearance	5	
Nutrient enrichment	4	
Fish barriers	5	
In-stream fish cover	6	
Embeddedness	5	
Invertebrate habitat	5	
Canopy Cover	3	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	5.5	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 (8)	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 (6)**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 (8)	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44
Date: 8/20/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-43 to SR-44

Date: 8/20/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Ed Layton, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed ________ **Stream Section Name** SR-44 to SR-45

Stream Name Stony Run **Reference Section** ________

Weather Conditions Today ________ **Past 2-5 Days** ________

Active Channel Width: 7 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	10	**Gravel**	35	**Silt/Sand**	40	**Mud**	15
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:				
Waypoint	Photo	Description	pH	Cond.
SR-44		Bridge Street Bridge - Deep pool - 2' channel	8.4	.250
		- Minnows		
		Turb - 7, DO - 7.9, Temp - 22.25, ORP - 43		
		- Only small section of stream below bridge walkable		
		- Upstream - stream covered by veg/brush		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45
Date: 8/20/2009

Invasive plants present: Yes / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: Yes / No _____

Floodplain wetlands: (Yes) / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts:

Erosion Sites:

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues:
Impounding/treatment basin related to former Parmalot West Dairies facility

Wetlands:
Significant wetlands are present

Sites of Interest for History or Conservation:
Considerable existing farmland

Possible Watershed Improvement Projects:
Riparian buffer improvement, takes measures to protect existing wetlands

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	7	
Riparian zone	4	
Bank stability	7	
Water appearance	4	
Nutrient enrichment	4	
Fish barriers	5	
In-stream fish cover	5	
Embeddedness	4	
Invertebrate habitat	5	
Canopy Cover	3	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	4.8	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	**7** 6 5 4	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	**7** 6 5 4	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45
Date: 8/20/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	**7 6 5 (4)**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 6 5 (4)**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 9	**8 7 6**	**(5) 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 6**	**(5) 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 (4)**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 (5) 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**(3) 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-44 to SR-45

Date: 8/20/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.	Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.		Visible pipe with effluent, heavy odor.
	5 **4**	**3**	**2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.	Occasional manure in stream or waste storage structure located on the flood plain.		Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5 **4**	**3**	**2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Jamey Dotts,, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed ______ **Stream Section Name** SR-45 to SR-46

Stream Name Stony Run **Reference Section** ______

Weather Conditions Today Sunny, warm **Past 2-5 Days** ______

Active Channel Width: 7 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**	10	**Gravel**	35	**Silt/Sand**	40	**Mud**	15
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:

Waypoint	Photo	Description	pH	Cond.
SR – 45		Below headwaters – pond at Ellis Woods Road	8.03	.276
		Turb - 11.9, DO - 9.22, ORP - 3, Temp - 20.54		
		-Personal property above bridge		
		- Below – unable to walk- dense over growth		
		- Channel – 2' wide		
		Unnamed tributary (UNT-22) has been channelized and shows complete		
		absence f riparian buffer and receives significant sediment input		

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46
Date: 8/20/2009

Invasive plants present: Yes / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: Yes / No _____

Floodplain wetlands: (Yes) / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: (Yes) / No (Wetland or other) UNT-22

Any of the following?

AMD:

Sewage Impacts:

Erosion Sites:
Unnamed tributaries receive significant erosion from farm fields

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues:

Wetlands:
Possible wetlands

Sites of Interest for History or Conservation:
Areas of significant farmland

Possible Watershed Improvement Projects:
Improvement of riparian buffer. Particularly UNT-22.

Notes:

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	8	
Riparian zone	4	
Bank stability	8	
Water appearance	5	
Nutrient enrichment	4	
Fish barriers	7	
In-stream fish cover	7	
Embeddedness	5	
Invertebrate habitat	5	
Canopy Cover	3	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	5.6	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46
Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 (8)	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 6**	**5 (4)**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 (8)	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46
Date: 8/20/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	**7 6 (5) 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 6 5 (4)**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 9	**8 (7) 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 (7) 6**	**5 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 6 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 5 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-45 to SR-46

Date: 8/20/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Stony Run Watershed Visual Assessment

Evaluators' Names Jamey Dotts, Jordan Rajan **Date:** 8/20/2009

Sub-Watershed ____________ **Stream Section Name** SR-46 to SR-47

Stream Name Stony Run **Reference Section** ____________

Weather Conditions Today Sunny, warm **Past 2-5 Days** ____________

Active Channel Width: 2 feet

LAND USE WITHIN DRAINAGE (%):					
Grazing Pasture		Grassy Field		Row Crops	
Forest		Residential		Industrial	
Commercial		Abandoned Mine Lands		Other	

SUBSTRATE (%):									
Boulder		**Cobble**		**Gravel**		**Silt**		**Mud**	
Bedrock									

DESCRIBE THE LAND USE OF THE AREA THAT THE STREAM FLOWS THROUGH:

GPS POINTS / PHOTOS:				
Waypoint	Photo	Description	pH	Cond.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47
Date: 8/20/2009

Invasive plants present: (Yes) / No ❒ Japanese Knotweed ❒ Garlic mustard ❒ Purple loosestrife ■ Other

Trash / Litter: Yes / No _____

Floodplain wetlands: (Yes) / No **If so, approximate size:** Length ____ / Width _____ feet

Flooded areas: Yes / No (Wetland or other) _____

Any of the following?

AMD:

Sewage Impacts:

Erosion Sites:

Stream Encroachments/Bank Erosion:

SW Management Facilities/Issues:

Wetlands:
Possible wetlands

Sites of Interest for History or Conservation:

Possible Watershed Improvement Projects:

Notes:

Large farm pond

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47
Date: 8/20/2009

Parameter	Score	Explanation of Score Given
Channel condition	8	
Riparian zone	6	
Bank stability	8	
Water appearance	6	
Nutrient enrichment	6	
Fish barriers	5	
In-stream fish cover	6	
Embeddedness	6	
Invertebrate habitat	6	
Canopy Cover	5	
AMD (if applicable)		n/a
Sewage (if applicable)		n/a
Manure presence (if applicable)		n/a
TOTAL SCORE (Add all scores and divide by number of scores given)	6.2	< 6.0 = POOR 6.1 – 7.4 = FAIR 7.5 – 8.9 = GOOD > 9.0 = EXCELLENT

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47

Date: 8/20/2009

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition			
Natural channel; no structures, dikes. No evidence of down- Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 (8)	**7 6 5 4**	**3 2**	**1**

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone				
Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	**8 7 (6)**	**5 4**	**3 2**	**1**

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability			
Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 (8)	**7 6 5 4**	**3 2**	**1**

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47
Date: 8/20/2009

Water Appearance			
Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: Remember to look at the water, not the substrate. **Dip a clear glass jar in water and observe the clarity.**

Nutrient Enrichment			
Clear water along entire reach; diverse aquatic plant community **little algal growth present**.	Fairly clear or slightly greenish water along entire reach; **moderate algal growth** on stream substrates.	Greenish water along entire reach; **abundant algal growth**, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms **create thick algal mats** in stream.
10 9 8	**7 6 5 4**	**3 2**	**1**

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers				
No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 1 mile of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would **impede fish passage**.

Instream Fish Cover				
>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	**8 7 6**	**5 4**	**3 2**	**1**

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47
Date: 8/20/2009

Embeddedness				
Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	**8 7 (6)**	**5 4**	**3 2**	**1**

Keys: Embeddedness is defined as **the degree to which objects in the stream bottom are surrounded by fine sediment**. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. **Be sure that you are looking at the entire reach, not just one riffle**. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat			
At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	**7 (6) 5 4**	**3 2**	**1**

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover **Key:** This pertains to waterways **where channel is 50 feet wide or less**. Coldwater fishery			
>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	**7 6 (5) 4**	**3 2**	**1**

Abandoned Mine Drainage (if applicable)			
(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitate.	Iron precipitate visible, muddy orange appearance.	Heavy iron precipitate, noticeable kill zone. Or White/bluish-white precipitate visible, rotten egg smell.
	5 4	**3 2**	**1**

If AMD is found, complete AMD site diagram and **mark discharge point on map, and/or with GPS unit**.

Stony Run Watershed Visual Assessment **Stream Section Name:** SR-46 to SR-47

Date: 8/20/2009

Sewage (if applicable)				
(Intentionally blank)	Noticeable odor, excess plant growth and siltation.		Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5	**4**	**3** **2**	**1**

Mark discharge(s) on map and/or with GPS unit.

Manure Presence (if applicable)				
(Intentionally blank)	Evidence of livestock access to riparian zone.		Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5	**4**	**3** **2**	**1**

NOTES

Wetland Determination Data Form - Eastern Mountains and Piedmont

Project/Site: Stony Run Delineation City/County: Spring City, Chester County Sampling Date: 4/30/2010

Applicant/Owner: State: PA Sampling Point: DP-1

Investigator(s): Ryan Nelson Section,Township,Range:

Landform (hillslope,terrace,etc.): floodplain Local relief (concave, convex, none): N/A

Slope (%) 1% Latitude: 40 10' 32.91" Longitude: 75 35' 48.598" Datum: NAD 83

Soil Map unit Name: Croton Silt Loam NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of the year? Yes x No (If no, explain in Remarks)

Are Vegetation No ,Soil No ,or Hydrology No significantly disturbed? Are normal circumstances present? Yes x No

Are Vegetation No ,Soil No ,or Hydrology No naturally problematic? (If needed explian any answer in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc…

Hydrophytic Vegetation Present?	Yes	x	No		
Hydric Soil Present?	Yes	x	No	**Is the Sampled Area within a Wetland?**	**Yes** x **No**
Wetland Hydrology Present?	Yes	x	No		

Remarks: This data form represents the western portion of the delineated wetland area behind the Ruth farmhouse. The data is a summary of the findings for this portion of the wetland. Areas outside of this delineation boundary were either remnant or active cropfields

VEGETATION - Use Scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1 Multifora Rose (Rosa multiflora)	`		FACU
2 Red Maple (Acer Rubrum)			FAC
3			
4			
5			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1 Field Horsetail (Equisetum arvense)			FAC
2 Jewelweed (Impatiens capensis)			FACW
3 Reed Canary Grass(Phalaris arundinacea)□			FACW
4 Sphagnum Moss (Sphagnum L.)			NI
5 Soft Rush (Juncus effusus)			FACW
6 Red Maple (Acer Rubrum)			FAC
7 Awl Sedge (Carex stipata)			OBL
8 Goldenrod sp. (Salidago sp.)			
9			
10			
	0 = Total Cover		
Woody Vine Stratum (Plotsize: 30 ft radius)			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL,FACW or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC (A/B)

Prevalence Index worksheet:

Total % Cover of :		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is ≤ 3.0 *
- Morphological Adaptations*(provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No**

Remarks: (Include photo numbers here or on a separate sheet.) The listed plants above represent the hydrophytic community found in this portion of the wetland. This was a summary list of all plants found near this data point, greater than the 5' radius reviewed typically for the herbaceous stratum. Percentages were not evaluated.

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5"	10 YR 4/3						SiL	
5"+	10 YR 4/3	40%	10 YR 6/1	50%	D	M	SiL	
			10 YR 6/2	10%	D	M	SiL	

*Type: C= Concentration, D = Depletion,RM = Reduced Matrix, CS = Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Hisitic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulifide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N,MLRA 147,148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
- ___ Thin Dark Surface (S9) **(MLRA 147,148)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron - Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136,122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils*:**

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Piedmont Floodplain soils (F19) **(MLRA 136,147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophtic vegetation and wetland hyrdology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (Inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks: Additional Soil pits were dug in two upland positions. The Active **Farm Field** had soils with a matrix color of 7.5 YR 4/4 at 0-12"+ and was positioned on a sideslope of appx 3-5% slope on the eastern portion of the Ruth Property. The **upland soil** had a matrix color of 10 YR 4/3 throughout the profile. This upland soil was positioned in the same topographic area as the wetland, but doesn't show wetland characteristics.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indictators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ___ Yes ___ No ___ Depth (inches) ___

Water Table Present? ___ Yes ___ No ___ Depth (inches) ___

Saturation Present? (Includes capillary fringe) X Yes ___ No ___ Depth (inches) 5"+

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge,monitoring well,aerial photos,previous inspections),if available:

Remarks: Drainageways exist within the portions of the mapped hydric soils. These were created to cut off hydrology in the wet areas for agriculture years ago.

Wetland Determination Data Form - Eastern Mountains and Piedmont

Project/Site: Stony Run Delineation | City/County: Spring City, Chester County | Sampling Date: 4/30/2010

Applicant/Owner: | State: PA | Sampling Point: DP-2

Investigator(s): Ryan Nelson | Section,Township,Range:

Landform (hillslope,terrace,etc.): floodplain | Local relief (concave, convex, none): none

Slope (%) 1% | Latitude: 40 10' 31.928" | Longitude: 75 35' 33.855 W | Datum: NAD 83

Soil Map unit Name: Croton Silt Loam | NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of the year? Yes x No (If no, explain in Remarks)

Are Vegetation No ,Soil No ,or Hydrology No significantly disturbed? Are normal circumstances present? Yes x No

Are Vegetation No ,Soil No ,or Hydrology No naturally problematic? (If needed explian any answer in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc…

Hydrophytic Vegetation Present?	Yes x	No	**Is the Sampled Area within a Wetland?**	**Yes** X **No**
Hydric Soil Present?	Yes x	No		
Wetland Hydrology Present?	Yes x	No		

Remarks: This data form represents the eastern portion of the wetland near Mennonite Church road along Stony Run primarily on the Latshaw Property. The data is a summary of the findings in this area representing this area of the wetland. This area of the wetland had diverse pockets mixing from an inundated surface to saturated soil profiles. This created a diverse herbaceous community throughout the wetland.

VEGETATION - Use Scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1 Multifora Rose (Rosa multiflora)	`		FACU
2 Red Maple (*Acer Rubrum*)			FAC
3			
4			
5			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1 Field Horsetail (Equisetum arvense)			FAC
2 Jewelweed (Impatiens capensis)			FACW
3 Reed Canary Grass(Phalaris arundinacea)			FACW
4 Cattail (*Typha latifolia*)			OBL
5 Soft Rush (Juncus effusus)			FACW
6 Awl Sedge (Carex stipata)			OBL
7 Tussock Sedge (Carex stricta)			OBL
8 Autumn Olive (Elaeagnus umbellata)			NL
9 Duckweed (Lemna minor)			OBL
10 Swamp Milkweed			OBL
	0 = Total Cover		
Woody Vine Stratum (Plotsize: 30 ft radius)			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL,FACW or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:	
OBL species	x 1 =	0
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: 0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is ≤ 3.0 *
- Morphological Adaptations*(provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No**

Remarks: (Include photo numbers here or on a separate sheet.) The listed plants above represent the hydrophytic community found in this portion of the wetland. This was a summary list of all plants found near this data point, greater than the 5' radius reviewed typically for the herbaceous stratum. Percentages were not evaluated.

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8"	10 YR 4/2						SiL	
8"+	10 YR 4/2	60%			RM	M	SiL	
			10 YR 4/3	40%	C	M	SiL	

*Type: C= Concentration, D = Depletion,RM = Reduced Matrix, CS = Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Hisitic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulifide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N,MLRA 147,148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147,148)**
- ___ Thin Dark Surface (S9) **(MLRA 147,148)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron - Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136,122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils*:**

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Piedmont Floodplain soils (F19) **(MLRA 136,147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*** Indicators of hydrophtic vegetation and wetland hyrdology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (Inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: At another data point, the soils had a matrix of 10 YR 4/2 from 0-8" and 10 YR 4/2 at 8"+ with 10 YR 4/6 redox(20% of horizon) with saturation at the surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indictators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ___ Yes ___ No ___ Depth (inches) ___

Water Table Present? ___ Yes ___ No ___ Depth (inches) ___

Saturation Present? (Includes capillary fringe) X Yes ___ No ___ Depth (inches) 0"+

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge,monitoring well,aerial photos,previous inspections),if available:

Remarks: This portion of the wetland had a mix of areas with surface inundation, and saturation throughout, creating a mixed community.