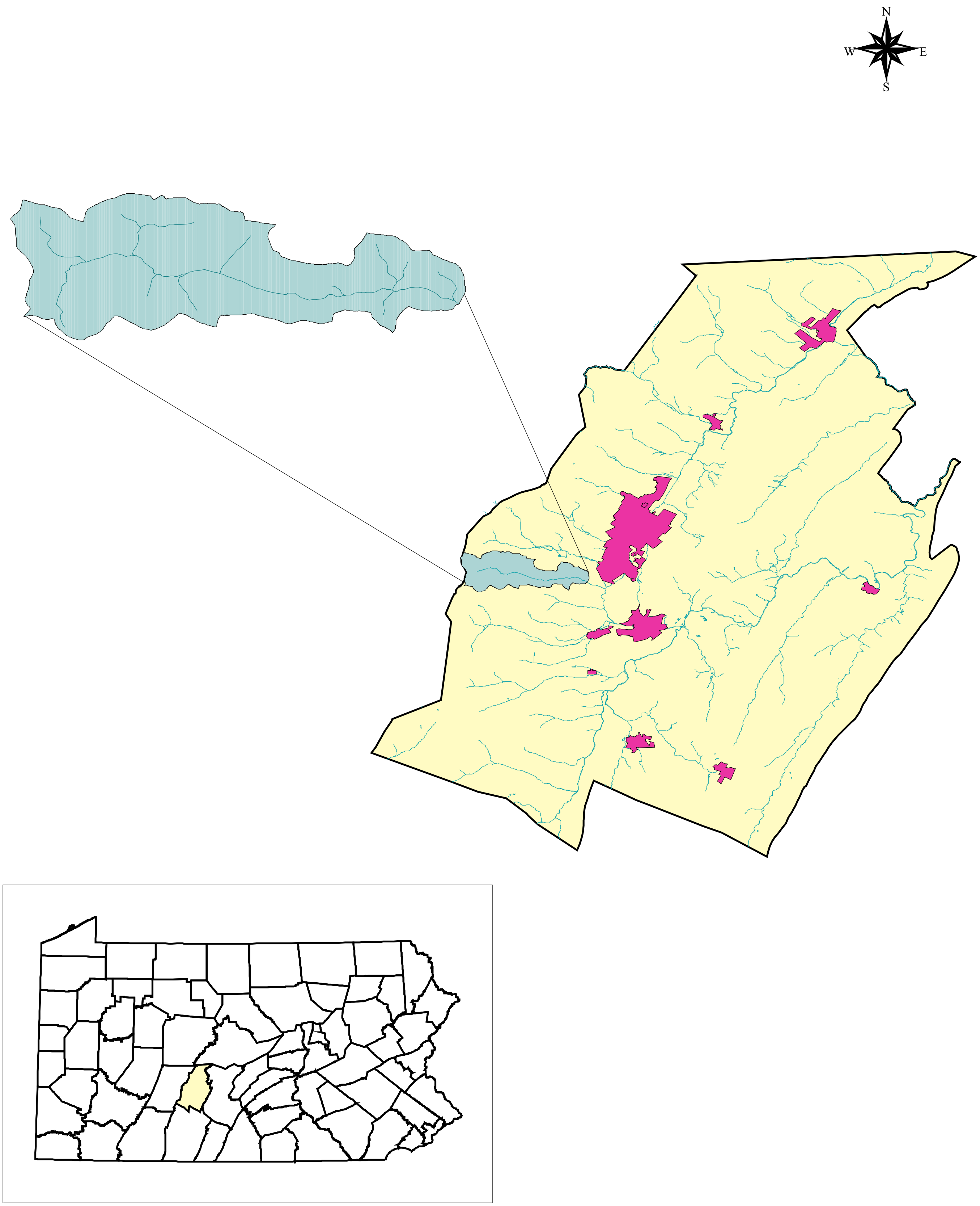
Sugar Run Watershed Assessment and Restoration Plan

Blair County
Pennsylvania

September, 2003

Sugar Run Watershed
Blair County, Pennsylvania



Developed by the
BLAIR COUNTY COMMISSIONERS
BLAIR COUNTY CONSERVATION DISTRICT

In cooperation with
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With assistance form the
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ALLEGHENY TOWNSHIP

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I.B Watershed Description

Sugar Run Watershed is predominantly a rural watershed. The watershed, although close in proximity to the City of Altoona, is relatively steep and mountainous with little areas suitable for development. The general land uses of the watershed are: 75% forested, 14% developed (primarily private residencies with a few small businesses) 10% mining (reclaimed and un-reclaimed) and 1% developed for transportation use. Sugar Run Watershed is located in the western half of Blair County on the Cambria/ Blair County line. The watershed encompasses parts of three municipalities; the two Blair County municipalities are Allegheny and Logan Townships. The third municipality, Tunnelhill Borough, is located within Blair and Cambria Counties. The majority of the watershed is located within Allegheny Township. Sugar Run watershed is also a key corridor over the Allegheny Ridge to Cambria County and other destinations west. This historical importance as a major transportation route has left the watershed forever changed.

Sugar Run has been identified on the Commonwealth of Pennsylvania's Federal Clean Water Act Section 303(d) List of Waters as impaired by Abandoned Mine Drainage (AMD). It is listed on the recently completed Final 2003 List as a medium priority with the cause of impairments as metals and pH. Of the 6.62 miles of stream 98% of Sugar Run is listed as degraded. Active mining has ceased in this 6,200 acre watershed (of which approximately 600 surface acres have been impacted by mining) and only one inactivated Subchapter F permit still remains viable within the watershed. That permit, depending on economic conditions, may never be utilized. In addition, private reclamation under previous mining permits has already begun within this watershed. With the more recent mining already being reclaimed, the next step will be to remediate the older abandoned discharges which potentially could restore this 6.46 mile stretch of stream to a cold-water fishery.

I.C General Demographic Characteristics for Blair County and Pennsylvania:

	County	Pennsylvania
Total Population	129,144	12,281,054
Unemployment (March, 2003)	6.1%	5.8%
Per Capita Money Income (1999)	$16,743	$20,880
Property Value (median) (1999)	$73,600	$97,000

Listed below is a segment from the QuickFacts table from the U.S. Census Bureau for Blair County and Pennsylvania. A complete Profile of General Demographic Characteristics: 2000 can be found in Appendix A (Appendix A.1, Blair County; Appendix A.2, Allegheny Township; Appendix A.3, Logan Township; and Appendix A.4, Tunnelhill Borough).

People QuickFacts	**Blair County**	**Pennsylvania**
Population, 2001 estimate	128,391	12,287,150
Population percent change, April 1, 2000-July 1, 2001	-0.6%	0.0%
Population, 2000	129,144	12,281,054
Population, percent change, 1990 to 2000	-1.1%	3.4%
Persons under 5 years old, percent, 2000	5.6%	5.9%
Persons under 18 years old, percent, 2000	22.7%	23.8%
Persons 65 years old and over, percent, 2000	17.4%	15.6%
Female persons, percent, 2000	52.1%	51.7%
White persons, percent, 2000 (a)	97.6%	85.4%
Black or African American persons, percent, 2000 (a)	1.2%	10.0%
American Indian and Alaska Native persons, percent, 2000 (a)	0.1%	0.1%
Asian persons, percent, 2000 (a)	0.4%	1.8%
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	Z	Z
Living in same house in 1995 and 2000, pct age 5+, 2000	66.7%	63.5%
High school graduates, percent of persons age 25+, 2000	83.8%	81.9%
Bachelor's degree or higher, pct of persons age 25+, 2000	13.9%	22.4%
Persons with a disability, age 5+, 2000	25,182	2,111,771
Housing units, 2000	55,061	5,249,750
Homeownership rate, 2000	72.9%	71.3%
Housing units in multi-unit structures, percent, 2000	19.1%	21.2%
Median value of owner-occupied housing units, 2000	$73,600	$97,000
Households, 2000	51,518	4,777,003
Persons per household, 2000	2.43	2.48
Median household money income, 1999	$32,861	$40,106
Per capita money income, 1999	$16,743	$20,880
Persons below poverty, percent, 1999	12.6%	11.0%
Private non-farm establishments, 1999	3,264	293,491
Private non-farm employment, 1999	50,331	4,986,591
Private non-farm employment, percent change 1990-1999	6.1%	8.4%
Non-employer establishments, 1999	5,927	614,594
Manufacturers shipments, 1997 ($1000)	1,592,437	172,193,216
Retail sales, 1997 ($1000)	1,331,159	109,948,462
Retail sales per capita, 1997	$10,165	$9,150
Federal funds and grants, 2001 ($1000)	745,213	79,310,064
Local government employment - full-time equivalent, 1997	3,859	365,556
Land area, 2000 (square miles)	526	44,817

Business QuickFacts	Blair County	Pennsylvania
Persons per square mile, 2000	245.6	274
Metropolitan Area	Altoona, PA MSA	

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.
NA: Not available
D: Suppressed to avoid disclosure of confidential information
X: Not applicable
S: Suppressed; does not meet publication standards
Z: Value greater than zero but less than half unit of measure shown

I.D Blair County History

Blair County was organized in 1846 with Hollidaysburg as its county seat. Blair County is situated in south central Pennsylvania and lies on the eastern side of the Allegheny Ridge. The Allegheny Ridge is the eastern continental divide between the east coast and the central plains. The Ridge also acts as the watershed boundary between the Ohio River to the west and the Susquehanna River to the east. This geological diversity has provided Blair County with numerous natural resources and opportunities. Blair County has flourished because of its' abundant resources of forest, coal and prime agricultural land. These resources became an important key to the growth of Blair County during the industrial era.

In addition to the County's wealth of natural resources, Blair County quickly became a hub for transportation. Transportation played a major role in the development of not only Blair County but in the growth of the City of Altoona. From the wagon trails of the mid-1700s, to the opening of the Pennsylvania Canal in 1832 in conjunction with the Portage Railroad in 1834, and finally with the completion of the Horseshoe Curve in 1854, Blair County became the important link between Pittsburgh and Philadelphia. According to *A Brief History of Blair County, Pennsylvania,* Altoona became one of the largest railroad repair shops ever and with this growth came supporting services and industries. Today Altoona and Hollidaysburg still maintain their strong tradition of rail car repair shops, although due to the decreased use in rail transportation production is at its lowest.

Blair County, relying on its heritage and natural resources, provides a beautiful place to live for its' 128,000 plus residents. The County provides outdoor recreation through hundreds of acres of State Game Lands and is home to Canoe Creek State Park. Today the County serves the role as a hub for transportation and is a vital connection between cities of the east to those in the west. The County provides economic opportunities through manufacturing and retail jobs and continues its' legacy of agriculture which is still Pennsylvania's largest industry. Blair County is proud of its heritage of transportation, manufacturing and mining and preserves them in the

Allegheny Portage Railroad Historic Site, the Horseshoe Curve and the Altoona Railroader's Museum. Excerpts from *A Brief History of Blair County, Pennsylvania* can be found in Appendix B.

I.E Archeological and Historical Features

Blair County has several significant archeological and historical features throughout the County. However, through literature searches, discussions with the Pennsylvania Historical and Museum Commission (PHMC) and use of all available information, no archeological or historical resources have been identified within the proposed project areas. The PHMC also made available for review Environmental Review survey reports for the Sugar Run Watershed. Those reports outline prehistoric elements of the areas such as flora and fauna.

There are however several nearby historic sites which are recognized on the National Register of Historic Places or that are deemed significant by the state. The two sites listed on the Register, in adjoining watersheds, are the Allegheny Portage Railroad National Historic Site and the Horseshoe Curve. These sites are both directly related to the long history of transportation in Blair County. One additional site not listed in any available document as an historical resource, would be the remains of several coke ovens located in the headwaters of the watershed. However these coke ovens would not need to be disturbed during any reclamation efforts.

National Register of Historic Places:

Allegheny Portage Railroad National Historic Site

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Unknown
Architectural Style:	No Style Listed
Area of Significance:	Commerce, Engineering, Transportation
Period of Significance:	1825-1849, 1850-1874
Owner:	Federal
Historic Function:	Transportation
Historic Sub-function:	Rail-Related
Current Function:	Recreation And Culture
Current Sub-function:	Museum

Horseshoe Curve

Historic Significance:	Event, Architecture/Engineering
Architect, builder, or engineer:	Pennsylvania Railroad
Area of Significance:	Engineering, Transportation
Period of Significance:	1850-1874
Owner:	Private
Historic Function:	Transportation
Historic Sub-function:	Rail-Related
Current Function:	Transportation
Current Sub-function:	Rail-Related

Areas of Significant Importance

Another source of significant historic areas is the Geographic Names Information System. In efforts to identify locations of physical and cultural geographic features located throughout the United States, the United States Geological Service has developed a mapping standardization for these sites. These sites represent an important part of the local history of Blair County. Using the data and available mapping created by the Geographic Names Information System to identify these sites, no conflicts were found within the proposed restoration areas. A listing below identifies those sites found within the Sugar Run watershed.

Feature	**Feature Class Abbreviation**
Tunnelhill	ppl
Saint Patrick's Cemetery	cemetery
Sugar Run Gap	gap
Bennington Cemetery	cemetery
Bennington/ Bennington Furnace	locale
Allegripus	locale

Feature Class Terms and Abbreviation

cemetery - a place or area for burying the dead (burial, burying ground, grave, memorial garden).

gap - low point or opening between hills or mountains or in a ridge or mountain range (notch, pass, saddle, water gap, wind gap).

locale - place at which there is or was human activity; it does not include populated places, mines, and dams (battlefield, crossroad, camp, farm, ghost town, landing, railroad siding, ranch, ruins, site, station, windmill).

ppl - (populated place) place or area with clustered or scattered buildings and a permanent human population (city, settlement, town, and village).

I.F Geological

The Story of Blair County Soils (abstract from Soil Survey of Blair County, Pennsylvania)

Physiography and Geology

The majority of the county is in the Valley and Ridge physiographic province; the western third is in the Appalachian Plateau physiographic province. The Valley and Ridge province forms a series of parallel valleys and ridges oriented northeast-southwest, while the Appalachian Plateau province has high, rounded ridges and stream-dissected valleys. The elevation in the county ranges from a high of about 3,000 feet in the southwest corner to a low of 720 feet where the Juniata River crosses into Huntington County.

Rocks of Pennsylvanian and Mississippian age are the youngest in the county and outcrop in the Appalachian Plateau province. They are composed primarily of a cyclic sequence of shale, siltstone, sandstone, and some limestone and coal. The dominant soils in this area are of the Laidig-Hazleton-Clymer association.

The oldest rocks in the county are in the Valley and Ridge province. The more resistant Ordovician and Silurian quartzites, sandstones, conglomerates, and shales form the ridges and slopes in the province. The soils of the Laidig-Hazleton-Buchanan association are dominant on the ridges.

The Tuscarora formation (quartzite sandstone) caps several prominent ridge tops in the county-the Bald Eagle, Brush, and Canoe Mountains in the north and central parts of the county and the Lock, Loop, and Dunning Mountains in the southern part. Soils of the Laidig-Hazleton-Buchanan association dominate these areas.

The Nittany Valley, the Canoe Valley, and Morrison Cove are underlain by Cambrian and Ordovician limestone and dolomite. The major soils in these areas are of the Hublersburg-Murrill-Opequon and Edom-Opequon associations. The long, narrow valley running nearly the full length of the county from Tyrone to Hollidaysburg is composed of Silurian limestone and Devonian shale. The Morrison association is dominant over limestone, and the Berks-Brinkerton-Weikert association is dominant over shale. The Basher-Monongahela-Purdy association is on flood plains and terraces in this area. Between the valley and the Allegheny Front lies a band of Devonian shale that also runs the full length of the county. The major soils in this band are in the Leck Kill-Meckesville-Albrights association and the Berks-Brinkerton-Weikert association.

Regional uplift and compression from the southeast during the Permian period caused intense folding and faulting of rocks in the Valley and Ridge province and caused only a regional northwest dip of bedding in the Appalachian Plateau province. The majority of the faulting occurred in the limestone valley near the eastern border. The structural disturbance resulted in the formation of the northeast-southwest oriented valleys and ridges. Erosion over the course of 200 million years has severely reduced the mountains to their present topography.

Mineral Resources

Deposits of limestone, sandstone, shale, clay, and coal provide most of the mineral resources in the county. All mining is done by quarrying, open-pit, or strip-mining methods.

Limestone is mined from the Cambrian and Ordovician formations in the valleys of the central and southern parts of the county. It is mainly used for aggregate and agricultural lime. Sandstone, used in the production of crushed and broken stone, is mined from Silurian quartzite in the southern part of the county. Middle Devonian sandstone is mined for construction sand and gravel in an area east of Hollidaysburg.

Deposits of clay and shale of Pennsylvanian and Devonian age are mined in the western, central, and southern parts of the county. This material is used primarily for fill, road building, and refractories.

According to the Soil Survey coal mining is limited to the western portion of the county. One strip mine in the western part of the county produces medium- to low-volatile bituminous coal. The seam is the Upper Freeport coal of Pennsylvanian age. Although coal mining has been limited in Blair County in comparison to neighboring counties such as Somerset and Cambria, other seams have been mined throughout Blair County in addition to the Upper Freeport. In general the coal seams in the western/ south-central region of Pennsylvania include the following seams listed from the top (surface) to bottom with corresponding common seam lettering structure. Within the Sugar Run watershed all seams are present and have been mined except for the Clarion seam which is not found within the watershed.

E	Upper Freeport
D	Lower Freeport
C’	Upper Kittanning
C	Middle Kittanning
B	Lower Kittanning
A’	Clarion
A	Brookville
A	Mercer

Mining has had a significant impact on the soil structure within the watershed. Corresponding surface mining in conjunction with past deep mining has literally turned the earth inside out. Mining has destroyed the soil structure that took millions of years to develop. Identified on Map Number I-4, Soils; several soils impacted by mining are now identified as a disturbed soil Udorthents/ strip mine (US). Mining has disturbed the soil profile by changing its’ limiting factors such as depth to bedrock, changed the permeability, limited its’ ability to hold nutrients and potentially created disturbed areas which could subside or collapse. In addition, reclaimed soils contain little topsoil, are generally low in moisture levels due to structure and limited organic layer, and are relatively low in pH because of the mixing of the soil with acidic overburden. These characteristics often yield highly erodable soils that are unable to establish vegetation or provide food and shelter. An example of previously reclaimed soil characteristics within the watershed can be found in Appendix E, Erosion of Previously Reclaimed Areas.

I.G Wetlands

Few wetlands have been identified through the assessment process. Historically few wetlands were found in the upper reaches of Sugar Run due to the lack of hydric soils and steep slopes. Due to excessive amounts of earth disturbance, related to previous surface mining and logging, several prime wetland locations have been destroyed. Through thorough review of the Blair County Soil Survey and the National Wetland Inventory maps no known wetlands have been identified within the project areas. Any wetlands found within the project areas would consist of manmade wetlands directly related to mine hydrology.

Few wetlands were identified on the National Wetland Inventory maps. The identified wetlands and their type down to class have been listed below.

National Wetlands Inventory - United States Department of the Interior

Hollidaysburg-April, 1977

Wetland Type	Map Symbol
Palustrine-Forested	PFOlA
Palustrine-Open Water	POWZ

Cresson-April, 1977

Wetland Type	Map Symbol
Palustrine-Forested	PFOlY
Palustrine-Forested	PFOlA
Palustrine-Open Water	POWZ
Palustrine-Emergent	PEMY
Palustrine-Open Water	POWZ

I.H Biological

Macroinvertebrate Study and Habitat Assessment

A bio-survey/ macroinvertebrate study in addition to a stream habitat assessment was conducted on Sugar Run in the spring of 2003. Volunteers from the Blair Senior Services Center through the Blair County Senior Environment Corps/ Environmental Alliance for Senior Involvement (EASI) conducted the surveys along with conservation district staff. The EASI group has been trained in collection and identification procedures and bi-annually conducts these studies as part of their monitoring program. Two volunteers along with the project coordinator participated in the survey.

The bio-survey/ macroinvertebrate study was conducted using EASI's Rocky Bottom Stream procedure adapted from the *Volunteer Stream Monitoring: A Methods Manual, United States Environmental Protection Agency, Office of Water, November 1997*. The study procedure outlines the use of a 1-meter collection net, magnifying glass, collection trays and tweezers. The protocol also outlines sampling to be conducted in a defined 30-meter stream section with 3 samples taken in riffle areas. The macroinvertebrates (down to order) are identified as either sensitive (Group 1), somewhat sensitive (Group II), or tolerant (Group III) and are labeled according to abundance, Rare (<9), Common (10-99) and Dominant (>100).

The stream habitat assessment study was also conducted using EASI's Rocky Bottom Stream. This habitat assessment identifies the condition of the stream by using a visual criteria scale of optimal, sub-optimal, marginal or poor. The assessment consists of the following 10 parameters; attachment sites for macroinvertebrates, embeddedness, shelter for fish and macroinvertebrates, channel alteration, sediment deposition, stream velocity and depth combinations, channel flow status, bank vegetative protection, condition of banks and riparian vegetative zone width. For additional information regarding EASI monitoring procedures consult the Volunteer Water Quality Monitoring Field Manual compiled by: The Schuylkill Center for Environmental Education and the Environmental Alliance for Senior Involvement.

A total of four monitoring sites were identified throughout the watershed to provide a representation of the overall health of Sugar Run and to identify the impacts of abandoned mine drainage. Those four sites are: starting at the mouth, SRSS10; SRSS25; directly above the confluence of Sugar Run and RT-6; and at the Keystone site. These sites were chosen to isolate points of interest and change. SRSS10 is the closest monitoring point to the mouth of Sugar Run and historically maintains good water quality. SRSS25 is upstream of SRSS10 and is impacted by both Gumtree Run and the Kittanning discharge, these two influences makeup the majority of mine drainage pollution within the watershed (see Chart Number I-4, Pollutant Loading on Sugar Run by Gumtree Run and the Kittanning Discharge). The RT-6 site located above the confluence of RT-6 and Sugar Run, reflects the impacts of the Kittanning discharge while isolating the impacts of Gumtree Run. Finally the Keystone site removes almost all mine drainage impacts.

The Macroinvertebrate Study and Habitat Assessment on June 20, 2003 produced the following results.

Precipitation in the past 24 hours:
None
Currently:
Overcast

I.H.1 Macroinvertebrate Study

Water Quality Score for Sites Studied

Poor (<20), Fair (20-40), Good (>40)

	SRSS10	SRSS25	RT-6	Keystone
Total Score	**Good (110.5)**	**Poor (12.4)**	**Poor (15.2)**	**Poor/Fair (19.2)**

SRSS10 **Water Quality Score:** Good (110.5)

Species found	Number found	Group	Abundance
Hellgrammites	1	Sensitive	Rare
Crayfish	5	Somewhat Sensitive	Rare
Aquatic Worms	6	Tolerant	Rare
Stonefly Nymphs	9	Sensitive	Rare
Net spinning Caddisfly Larve	8	Somewhat Sensitive	Rare

SRSS25 **Water Quality Score:** Poor (12.4)

Species found	Number found	Group	Abundance
Net Spinning Caddisfly Larvae	2	Somewhat Sensitive	Rare
Aquatic Worms	2	Tolerant	Rare

RT-6 **Water Quality Score:** Poor (15.2)

Species found	Number found	Group	Abundance
Sowbugs	4	Somewhat Sensitive	Rare
Aquatic Worms	2	Tolerant	Rare

Keystone **Water Quality Score:** Poor/ Fair (19.2)

Species found	Number found	Group	Abundance
Crayfish	4	Somewhat Sensitive	Rare
Dragonfly Nymphs	1	Somewhat Sensitive	Rare
Net Spinning Caddisfly Larvae	1	Somewhat Sensitive	Rare

I.H.2 Habitat Assessment

Total Habitat Ranking for Sites Studied

Poor (0-50), Marginal (51-100), Suboptimal (101-150), Optimal (151-200)

	SRSS10	SRSS25	RT-6	Keystone
Total Score	Suboptimal (149)	Optimal (187)	Optimal (193)	Marginal (99)

Habitat Assessment Scores for Sites Studied

On a scale of Poor (0) – Optimal (20)

	SRSS10	SRSS25	RT-6	Keystone
Attachment Sites for Macroinvertebrates	17	15	18	11
Embeddedness	15	15	18	10
Shelter for Fish and Macroinvertebrates	10	15	19	12
Channel Alterations	18	16	20	8
Sediment Deposition	16	18	20	6
Stream Velocity Status	17	19	19	11
Channel Flow Status	19	19	19	15

On a scale of Poor (0) – Optimal (10)

	SRSS10	SRSS25	RT-6	Keystone
Bank Vegetation Protection	Left Bank: 9 Right Bank: 9	Left Bank: 10 Right Bank:10	Left Bank: 10 Right Bank:10	Left Bank: 5 Right Bank: 3
Condition of Bank	Left Bank: 7 Right Bank: 9	Left Bank: 10 Right Bank:10	Left Bank: 10 Right Bank:10	Left Bank: 4 Right Bank: 4
Riparian Vegetative Zone Width	Left Bank: 1 Right Bank: 2	Left Bank: 10 Right Bank:10	Left Bank: 10 Right Bank:10	Left Bank: 5 Right Bank: 5

The habitat assessment of Sugar Run quantified the stream habitat quality, found throughout the watershed as marginal/ sub-optimal to optimal. In most cases the areas impacted by development were limited to single family homes, which often maintained some riparian areas. The remaining areas can be grouped by those directly adjacent to the road, which could be considered poor and those areas remaining in meadow or forest. The study areas primarily provided good flow over the entire channel, provided good shelter and attachment sites for macroinvertebrates and had marginal to sub-optimal vegetative riparian areas. Those sites adjacent to the road or that had been disturbed, such as Keystone, suffered from increased sediment load, unstable banks, and extensive channel alterations.

The macroinvertebrate study of Sugar Run yielded slightly different results than the habitat assessment. Although the habitat assessment was favorable for large sections of the stream the macroinvertebrate population and diversity where in most cases poor with improving density near the mouth of the watershed. Segments of the stream between the Kittanning discharge inlet and SRSS15 (incorporating sites RT-6 and SRSS25) ranged from no species to just a few with little diversity. Those prominent species found were in the tolerant or somewhat sensitive groups. Although impacted slightly by mine drainage the poor/ borderline fair results for the Keystone site were the direct result of marginal/sub-optimal habitat. The RT-6 and SRSS25 sites were highly impacted by mine drainage and produced a total of 10 macroinvertebrates found and was dominated by species in the somewhat sensitive and tolerant groups.

Recommendations made within the plan with respect to stream bank/ channel restoration projects, such as the Keystone Project and remediation of the abandoned mine discharges that feed Gumtree Run and the Kittanning discharge would significantly improve the quality of habitat and species diversity within Sugar Run while reaching the streams designated use as a cold water fishery. Improvements in species quantity and diversity similar to those observed at site SRSS10 could be found throughout the watershed with diversity numbers increasing exponentially as longer connected sections of the stream were improved.

I.H.3 Pennsylvania Natural Diversity Inventory

The Pennsylvania Natural Diversity Inventory identifies several flora species of concern in or adjacent to several potential project areas throughout the watershed. Those found include:

Common Name	Scientific Name	Status
Bushy Bluestem	Andropogon Glomeratus	TU-PR
Torrey's Rush	Juncus Torreyi	PT-PE
A Clubmoss	Lycopodiella Margueritae	N-PE

(Status Codes: PE=Pennsylvania Endangered; PT=Pennsylvania Threatened; PR=Pennsylvania Rare; TU=Tentatively Undetermined; N no current data; FE=Federally Endangered)

II. Problem Identification

The Sugar Run watershed is negatively impacted by several factors. The leading factors are listed below as significant problems. Additional factors impacting the Sugar Run watershed are malfunctioning sewage systems and continued loss of habitat. This degradation has also left the stream aesthetically unpleasing and perceived as a liability by the community.

Sugar Run Watershed has been impacted by human influences over the past several hundred years creating four major problem areas.

1. Abandoned mine drainage from past coal mining activities throughout the watershed has left 6.46 miles of Sugar Run degraded (see Chart Number I-7, Concentrations of Iron, Aluminum & Manganese in Sugar Run). These activities have negatively impacted the water quality and destroyed aquatic habitat through increased concentrations of metals, significant decreases in pH and sediment pollution from disturbed unreclaimed areas.

2. Another impact on the Sugar Run watershed is transportation. The importance of passage over the Allegheny Ridge to areas west has left Sugar Run with little room to become a stable and diverse stream. In an already narrow and steep corridor; encroachment from county and state roads, manipulation of the streams natural corridor and excess stormwater from roadways has significantly changed the dynamics of the stream.

3. Increased streambank degradation and erosion due to earthmoving activities and encroachment within and adjacent to the stream channel. Streambank degradation and erosion is a direct result of roadway encroachment, increased stormwater and channel manipulation including several private road crossings that include bridges and fords. Additional earthmoving activities include construction of single dwelling family homes and logging.

4. Potential for human health and safety hazards from unreclaimed highwalls, abandoned deep mine shafts, and illegal dumps.

II.A Impaired Water Quality

Sugar Run is severely encroached upon by U.S. Route 22 and Sugar Run Road and through the years has been moved and manipulated to its' current channel. Through the construction of the railroad, Sugar Run Road and the new construction of U.S. Route 22 the watershed has been bisected into parcels with only culverts restoring some of the original drainage patterns. Three areas of environmental concern associated with transportation are the use of road deicing materials, increased stormwater run-off, and potential for accidental spills of hazardous materials.

The use of de-icing materials on roadways (specifically salts) has been a concern over the past few years due to the potential for salts to concentrate within the stream in levels lethal to macroinvertebrates. Through this study calcium, sodium and chloride were sampled in order to potentially identify excess salts entering the stream. Unfortunately, due to the high levels found of the above sampled contaminants within the mine discharges, no direct correlation can be made between the use of de-icing materials on adjacent roadways and observed stream levels. It is recommended that an additional study be conducted after remediation efforts are completed of the identified abandoned mine drainage projects.

Stormwater run-off is an ever increasing concern primarily due to continued development within the communities of Pennsylvania. Although Sugar Run is fortunate to have minimal development to date (considering the 75% forested landuse) it is impacted by stormwater. In most cases encroachment from development has been more detrimental to the stream than stormwater. In completion of U.S. Route 22 several sections of Sugar Run had been altered. Changes ranged from stream relocation, stream stabilization, relocation of the Kittanning discharge, relocation of sections of the Sugar Run Road and an extensive system of culverts. These necessary changes were significant and have permanently impacted Sugar Run. Stormwater, despite the potential for thermal pollution to a stream classified as a Cold Water Fishery, is primarily being controlled by well protected outlets and channel improvements. However increased downstream degradation of the channel and banks can be directly attributed to increased flow within the stream channel.

Along with any transportation corridor there is always the potential for accidental spills from railroad or automobile accidents. As is in most cases the transportation corridors are adjacent to the stream corridor, this co-location allows for quick contamination of the nearby stream. Fortunately to the benefit of remediation efforts this co-location also provides for good access to both the road and the stream for emergency services and equipment. The surrounding communities in addition to PennDOT and Norfolk Southern are well trained and equipped to handle potential hazardous spills through emergency services located within and near Sugar Run watershed.

Although quite often these modifications are permanent, care should be taken for any further development of the watershed and best management practices should be considered for continued and future protection. Some example best management practices may include increased riparian areas, proper stabilization of streambanks using bioengineering techniques, installation of stormwater management devices, limitation in the use of herbicides, and care in the use of roadway salts and those greases and oils used by the railroad.

The watershed through years of disturbance also has significant streambank erosion issues in the headwaters. Although no quantification of annual soil loss was determined for the stream channel, a few areas have been identified for restoration efforts through natural stream design and bioengineering techniques. Another source of impairment found in several stream samples throughout the watershed, is elevated levels of fecal coliforms. Some increased levels of coliforms could be related to animal waste, but consistently high levels are often associated with a specific point source such as a malfunctioning on-lot septic system. The residential area near the mouth of the watershed is primarily serviced by a municipal sewer service. However homes further upstream use private on-lot septic systems. Education, with reference to maintenance of on-lot septic systems and if necessary enforcement are the only resources available to address this source of pollution.

Due to Sugar Run's historic land uses extensive habitat degradation has taken place. Fortunately a large piece of land abused by past mining practices has now been obtained by the Pennsylvania Game Commission. This land will be added to the state game lands and will be used for hunting and outdoor recreational purposes. As the new land managers the PA-Game Commission is proposing to develop access, stabilize highly eroded areas and enhance wildlife habitat through the planting of beneficial grass species used by wildlife.

Additional factors impacting the watershed, such as land and floodplain development, are constantly changing through updated municipal ordinances and state regulations. Currently several of the municipalities and planning entities within the watershed are in the process of updating their ordinances and township comprehensive plans. Identified issues concerning human health and safety factors are directly related to the mining industry and are addressed under the land reclamation projects.

II.B Water Sampling

Through this study water samples were taken over a one year period to accurately assess the negative impacts of abandoned mine drainage. A water sampling protocol was developed to identify specific pollutants and to systematically cover the entire watershed. The watershed was divided into sub-watersheds and samples were taken periodically throughout the main stem and at each tributary. Additional samples were taken monthly at specified priority areas to characterize mine discharges or sections of the watershed in order to develop a sound restoration plan.

Two types of water samples were collected to accurately describe the watershed. Those two types were Stream samples and AMD samples. All water samples were taken by representatives of the Blair County Conservation District and/ or the U.S.D.A. Natural Resources Conservation Service.

II.B.1 Water Sample Analysis

All water samples were analyzed by:
Fairway Laboratories Inc. 2019 Ninth Avenue, P.O. Box 1925, Altoona, PA 16603

History:
Fairway Laboratories Inc. has been providing quality environmental laboratory services for over twenty years. Incorporated on July 12, 1977 to fill the need for a local,

affordable wet chemistry laboratory, Fairway Laboratories quickly established a standard of reliability and accuracy within the industry.

Fairway Laboratories, Inc.
Our Quality Mission:

Fairway Laboratories, Inc. currently holds Drinking Water Certification for Pennsylvania and Maryland. We continually strive to enhance our quality systems and processes without compromising the health or safety of our employees. Using EPA, PA DEP, NELAC and OSHA guidelines, we continually adopt new procedures that improve the quality of our data and the safety of our staff.

Our Quality Mission is company wide. Each scientist, technician and support staff member is dedicated to providing quality data and service. Our objectives are fundamental to Environmental Data.

- To produce legally defensible data of known origin and documented quality
- To report precise, accurate, reproducible, complete, comparable and representative data.
- To generate data according to recognized professional standards
- To minimize random and systemic errors
- To maintain a company wide safety program to ensure employee health and safety
- To adopt guidelines set forth by the National Environmental Laboratory Accreditation Program in our daily practices and procedures.

*taken from material provided by Fairway Laboratories

II.B.2 Water Sampling Quality and Control

Due to inclement weather and/ or safety factors, there were several times when all samples were not able to be taken at once. All efforts were made to collect the samples on the same day under similar circumstances. If any significant environmental factors had occurred, they were noted on the water sampling data entry spreadsheet. In addition, quality assurance and quality control measures were taken by the participating laboratory. For information concerning their Quality Assurance & Quality Control please contact Fairway Laboratories.

II.B.3 Main Stem Sampling Points:

The stream samples included all tributaries to Sugar Run and periodic stream samples of Sugar Run's main stem. Stream samples were taken twice a year to reflect annual high and low flows. The high flows were taken in May, 2002 and the low flows were taken in September, 2002. A total of nine (9) main stem sampling points were identified and a total of thirteen (13) tributary sampling points were identified.

All stream sampling points were sampled for the following parameters:

Sampling Point	Units
Conductivity	US/CM
pH	SCALE
Alkalinity	MG/L
Acidity	MG/L
Total Iron	MG/L
Total Aluminum	MG/L
Total Manganese	MG/L
Total Calcium	MG/L
Sulfate	MG/L
Total Dissolved Solids	MG/L
Chloride	MG/L
Phosphorous	MG/L
Sodium	MG/L
Ammonia	MG/L
Fecal Coliforms	CFU/100ml

Stream Sampling Points:

Stream Sampling points were identified by significant changes in water chemistry or landuse. Stream samples were identified by starting at the mouth of Sugar Run (with sample SRSS10) looking upstream (see Map Number I-5, Stream Sampling Points). For the complete water chemistry see Appendix F, Stream Sampling Point Water Chemistry.

Example name: SRSS10 = Sugar Run Stream Sample number 10

	pH	Iron (mg/l)	Aluminum (mg/l)
SRSS10	5.6	0.58	0.91
SRSS15	5.3	1.00	1.23
SRSS20	5.1	0.72	1.35
SRSS25	4.6	1.22	2.77
SRSS30	4.2	2.03	4.84
SRSS35	3.9	3.66	5.23
SRSS40	3.5	5.02	6.08
SRSS45	5.9	*	*
SRSS50	6.5	0.36	0.16

* Not detectible within test limits

The stream samples show that between sites SRSS40 and SRSS45 there is a significant change in water chemistry. SRSS40 has elevated levels of Iron, Aluminum and Manganese (well above 1.0 mg/l) with a significant decrease in pH (see Chart Number I-6, Concentrations of Acidity and Alkalinity with pH in Sugar Run and Chart Number I-5, Acidity and Alkalinity Loading with pH in Sugar Run). This decrease in water quality can be directly tied to the negative influences of SRRT-6 (Gumtree Run), SRRT-7 and the Kittanning discharge on Sugar Run (see Chart Number I-4, Pollutant Loading on Sugar Run by Gumtree Run and the Kittanning Discharge).

The tributaries not impacted by mine drainage near the mouth of the stream are often able to buffer these upstream impacts. Those tributaries are net alkaline, averaging about 10 mg/l of alkalinity, contain less than 0.1mg/l of Aluminum and Manganese and contain less than 0.5 mg/l of Iron. In most cases the trend seems to be, as additional non-polluted tributaries enter Sugar Run, that the metals are precipitating and that the stream pH is increasing to normal levels for a forested watershed.

Stream samples also show an increased level of Fecal Coliforms in the headwaters of the watershed and another increase toward the mouth of the watershed that is heavily developed with private residences. Elevated levels of fecal coliform may have also been found in some of the remaining stream samples, but due to poor water quality from mine drainage pollution no positive samples were found (see Chart Number I-8, Acidity, Alkalinity and Coliform Count in Sugar Run).

Samples also showed substantial increases in Calcium, Sodium and Chloride. These increases may be directly related to the proximity of Sugar Run to Sugar Run Road, the lack of riparian or forested buffers to act as a natural filter and the use of winter salts used by the state and municipalities for winter maintenance (see Chart Number I-9, Calcium, Sodium and Chloride Concentrations in Sugar Run). Finally no increases in Phosphorous or Ammonia were found in any segment of stream samples. This would lead to the conclusion that excess nutrients should not be considered as a source of pollution within the Sugar Run Watershed.

II.B.4 Tributary Sampling Points:

Tributaries were identified by their sub-watershed starting at the mouth of Sugar Run looking upstream. Often tributaries had been altered due to human impact through sprawl and transportation needs. All tributary monitoring spots were identified as close to the main stem as possible.

Example name: SRLT-1 = Sugar Run Left Tributary number 1

	PH	Iron (mg/l)	Aluminum (mg/l)
SRLT1	6.7	0.44	0.11
SRLT2	6.2	0.54	0.16
SRLT3	6.3	0.34	0.10
SRLT4 *.*	n/a	n/a	n/a
SRLT5	6.1	*	*
SRRT1	6.9	.041	*
SRRT2	6.1	0.19	*
SRRT3 *.*	n/a	n/a	n/a
SRRT4 *.*	n/a	n/a	n/a

	PH	Iron (mg/l)	Aluminum (mg/l)
SRRT5	6.5	0.04	*
SRRT6	3.3	4.0	3.2
SRRT7	6.7	3.48	1.1
SRRT8	4.7	*	2.8

* not detectible within test limits
. flow from the defined watershed disappeared into the ground before reaching the stream (no sample was taken)

II.B.5 Abandoned Mine Drainage/ Discharge Sampling Points:

The AMD/ discharge sampling points included discharge sites from previous mine openings, seeps from coal outcrops, boreholes, flows running through spoil areas and stream samples directly below areas with mining influence. Thirteen (13) sites were identified in the initial review as possible places for future restoration or treatment (see Map Number I-6, AMD Sampling Points). The AMD/ discharge sampling points were monitored on varying schedules beginning in May of 2002.

All AMD/ discharge sampling points were sampled for the following parameters:

Sampling Point	Units
Conductivity	US/CM
pH	SCALE
Alkalinity	MG/L
Acidity	MG/L
Total Iron	MG/L
Ferrous Iron	MG/L
Total Aluminum	MG/L
Total Manganese	MG/L
Total Calcium	MG/L
Sulfate	MG/L
Total Dissolved Solids	MG/L

Sugar Run AMD Sampling Points:

Average sampling data including maximum and minimum concentrations and loading can be found in Appendix C, Characteristics of AMD Sites. For the complete water chemistry see Appendix G, AMD Sampling Point Water Chemistry. As a comparison of the discharges within the watershed see Chart Number I-1, Mine Drainage Discharge Pollutant Concentrations, Chart Number I-2 Mine Drainage Discharge Pollutant Loading and Chart Number I-3, Acidity, Alkalinity and pH at Mine Discharge Points.

III. Expectations

Expectations concerning watershed management and restoration efforts in the Juniata watershed have been identified over the past few years through several different avenues. Expectations specific to Sugar Run were identified at the public meeting held in June of 2003. Community expectations were also identified in the Juniata Clean Water Partnership's Watershed Management Plan which included three rounds of public meetings over a two year period between 1999-2000. Finally, expectations were developed from agency mission statements and goals, such as those of the Blair Conservation District, the Pennsylvania Department of Environmental Protection and the Pennsylvania Game Commission.

Expectations differ from each group slightly, although the outcomes are similar. Several residents and landowners would like to see the stream returned to a pristine condition with no discoloring or noxious smell. Others would like the stream to meet its' designated use as a cold water fishery and as a source for recreation. Those involved in resource restoration and preservation would also like to see the stream returned to its' designated use, maintain habitat, and become a resource of clean water as opposed to a liability with its' current polluted condition.

The realization of these goals is primarily limited to the interest of the community stakeholders and the agencies that provide support. All expectations can be realized in time with interested participation by those who would benefit the most. A continued commitment from the community is needed to become successful. Secondly, funding is a necessary component of success. Although Pennsylvania has made a large commitment to the environment through the Growing Greener program, the money available is competitive and is not given without commitment from the sponsor to maintain all best management practices installed on the ground. Finally, the greatest hurdle is the limitation of current technologies available with respect to limitations of landuse, space for construction and by limitations inherent to passive systems. These limitations would need to be overcome through the planning process.

IV. Specific Problems

IV.A Abandoned Mine Lands

There are several areas throughout the watershed that in the past have either not been reclaimed at all, primarily due to limited regulations prior to the 1970's, or that have been poorly reclaimed within the past 30 years. In completing the Sugar Run Watershed Assessment it has been found that due to sheet, rill and gully erosion a significant amount of sediment pollution is being added to Sugar Run annually. This extensive erosion is second only to the discharges of abandoned mine drainage as a significant source of non-point source pollution. Several of these areas would benefit from the installation of best management practices such as grassed waterways, rock channels, diversions and the reestablishment of grasses through additional fertilization and increased alkalinity.

In addition to reducing erosion through the implementation of best management practices, these reclamation efforts would serve to add alkalinity into the headwaters of the watershed for years to come. This alkaline addition will increase the streams buffering capacity while eliminating one of the current sources producing acidity (erosion of acidic soils).

Keystone Stream Restoration

The Keystone site is located in the headwaters of the watershed. Due to past mining and reclamation processes a section of Sugar Run has been encroached upon and in some areas filled in. This filling of the original channel has forced the stream to take an alternate route. Unfortunately, this alternate path is through a more highly erodable area and has caused excessive amounts of erosion and an unstable channel. In addition, another section of stream just below the Keystone site (approximately 600 foot in total length) has also been encroached upon by Sugar Run Road and is in need of some streambank restoration work. These areas combined will be referred to throughout the rest of the report as the Keystone Stream Restoration project.

Turkey Run Land Treatment

The Turkey Run Land Treatment project area would include the area above and adjacent to Site 26. The area is sparsely vegetated with little run-off protection. Culverts have been destroyed, waterways have eroded, and diversions have been compromised or destroyed. The project area also includes an abandoned sedimentation basin.

Gob Pile

One of the most visible remnants of past coal mining is an approximately 1 acre gob pile located in the headwaters of the Sugar Run Watershed. This gob pile is directly adjacent to a tributary to Sugar Run and in some areas spoil is falling into the small tributary.

Highwall Waterway

This site is also found in the headwaters. The highwall ends at the proposed project site with a small flow discharging into a created wetland. This discharge is representative of a forested stream with a pH between 6 and 7.

26A Land Reclamation

The 26A Land Reclamation project area would include the area above and adjacent to Site 26A. The area is sparsely vegetated with little run-off protection. Several areas contain highly acidic soils, culverts that have been destroyed, waterways that have eroded, and diversions that have been compromised or destroyed. A study on the extent of erosion and of the amount of acidity loading generated is found in Appendix E, Erosion of Previously Reclaimed Areas.

IV.B Abandoned Mine Discharges

Several sites have been identified to be point source discharges of abandoned mine drainage. These discharge sites are often found near mine outcrops and/ or mine shaft openings. The discharge sites often produce water in low pHs with substantial amounts of concentrated metals such as Iron, Aluminum and Manganese. These sites are usually the main source of impairment to nearby streams and waterways. Although not all metals are toxic in concentrated forms, their presence coats the stream bottom suffocating macroinvertebrate species, destroying habitat and often consuming large quantities of available oxygen through chemical reactions.

The site specific information, including landowner, location and average water chemistry, for the list below can be found in Appendix C, Characteristics of AMD Sites.

Site 26

Site 26 is one of three existing sites with some sort of passive treatment technologies in place. Site 26 originally had been treated by caustic drip and at times with soda ash briquettes. These chemical additions were used to increase the pH which would then precipitate the metals into the remaining ponds/ wetlands. These practices took place in the late 1980's through the early 90's. After active mining concluded the land had been partially reclaimed and active treatment processes had been abandoned, leaving mine discharges. Currently the site consists of one weir collecting the majority of seepage, two interconnecting ponds with raceways connecting each one to the other, an additional pond connects to the second pond with all ponds flowing into an approximately 4 acre wetland. The wetland then discharges into Gumtree Run. The constructed ponds on site are at best in poor condition. The primary spillway is being by-passed due to a clogged perforated pipe, and the system has little or no current value due to the lack in ability to add alkalinity.

Site 26A

This site is the second site with existing passive treatment technologies in place. This site is similar to site 26 in that it also is the remains of past active treatment measures. This site involves several initial smaller ponds, several upslope diversions and sediment basins, a wetland and a final settling basin. This system is also in poor shape and the ponds are not connected. The reasons for failure would be similar to those at site 26. Site 26A has high concentrations of metals and acidity.

Site 26B (Paradise)

Paradise is the third site with existing passive treatment technologies in place. Similar to the other two sites this system is no longer functioning properly and is no longer producing clean water. This site also contains the highest concentrations of acidity and metals found in any site in the Sugar Run watershed. However, this site is not the largest polluter of the watershed due to its' low average flow. For sampling efforts some improvements were made to this site in order to capture the flow and take measurements. The remaining settling ponds below have been compromised and currently serve little purpose.

Bennington

This discharge is located directly adjacent to the railroad right of way and received its' name due to the proximity to Bennington Cemetery. Although this site has suitable water chemistry which is treatable with current passive treatment technologies, this discharge will be difficult to address due to topographic limitations. The site is located in between a steep slope and the elevated railroad bed. Currently the water runs out of the discharge along the railroad grade through a culvert. Research of mine maps show that this discharge lays along an identified Lower Kittanning coal seam outcrop.

Switchbox

This discharge site is located within the railroad bed directly across from the Bennington site. The discharge lies right along the Brookville coal seam outcrop as identified on mining maps. This outcrop is located within the elevated railroad bed and has now been covered by railroad ballast.

Kittanning

The Kittanning discharge is a deep mine opening that had been moved from its original location to accommodate the new construction of U.S. Route 22. This site is located between Sugar Run Road and U.S. Route 22. The discharge surfaces approximately 100 feet from a culvert that discharges directly into the stream. This site is the largest discharge by average observed flow. The Kittanning site is a major contributor to the pollution load within the Sugar Run watershed and may be a potential future threat to the adjacent U.S. Route 22 due to its proximity and potential to increase erosion of the highway's toe. The average flow is about 600 gallons per minute.

GT-Aluminum

This site is located at the base of the railroad fill just above the confluence of Gumtree Run and Sugar Run. This discharge is milky white in appearance and is composed primarily of Aluminum. The site is located adjacent to the stream channel and is very steep.

Orange Falls

Although this discharge is located adjacent to GT-Aluminum, there is a significant difference in elevation between the two sites. There is approximately a thirty foot change in elevation and a significant difference in water chemistry. The Orange Falls discharge is bright orange and is primarily composed of Iron. This discharge lies along the Mercer coal seam outcrop.

White Discharge

This site is found directly along Sugar Run Road. A small discharge is evident during wet periods and is distinctively white. This discharge during flow shows high concentrations of Aluminum with average concentrations above 35 mg/l.

26 Borehole

This site is adjacent to Site 26. The borehole is located within a stormwater run-off basin which also receives flow from the base of an upslope highwall. This site is heavily influenced by stormwater run-off.

IV.C Illegal Dumping

Sugar Run Watershed is fortunate considering its' rural characteristic and convenient access in the headwaters of the watershed that few illegal dumps have formed over the years. Four isolated areas have been identified for possible clean-up locations. All the sites listed below would be considered relatively small in size. Each site is limited to an area of a few hundred feet or less and is primarily composed of old garbage.

Those four sites are:

1. GT-Aluminum dump site – composed primarily of old appliances and scrap metal
2. Reservoir road site – composed primarily of old appliances, bagged garbage and mattresses
3. Sugar Run road site – composed of scrap metal, old appliances and bagged garbage
4. Keystone dump site – composed of old appliances, chairs, carpet, and bagged garbage

Locations:

1. GT-Aluminum site is directly adjacent to the GT-Aluminum discharge site at the confluence of Gumtree Run and Sugar Run. (40N 28' 50.5" – 78W 30'59.1")
2. The Reservoir Road site is located on the first dirt road on the right traveling west directly after stream sampling point SRSS25. (40N 28' 20.0" – 78W 28' 45.1")
3. The Sugar Run Road Site is directly adjacent to the pull-off at the stream sampling point SRSS25. (40N 28' 30.3" – 78W 30' 41.9")
4. The Keystone dump site is located directly adjacent to the Keystone project area along Sugar Run road. (40N 28' 31.0" – 78W 31.0 57.0")

IV.D Fecal Coliform

Elevated levels of fecal coliform were found in several stream samples throughout the watershed. Due to limited sampling of coliform levels and with significant differences with respect to the results, no specific problem area was identified. Elevated levels of fecal coliform are often related to animal waste or malfunctioning septic systems. Due to no upstream agricultural activity, these levels are most likely related to sewage problems.

IV.E Safety Hazards

There are several sites that could be considered health and safety hazards. Those sites that would be considered health issues are identified under fecal coliform and illegal dumping. However, several additional sites could be considered safety hazards. Those sites include highwalls, abandoned ponds and sedimentation basins, abandoned storage tanks and a deep mine shaft opening.

There are two highwall areas identified through this study. The first site is adjacent to Site 26. This highwall is approximately 50 feet high, but over the years has become vegetated and slumped due to the weathering of the exposed bedrock. The second highwall ends at the Highwall Waterway project area described under the Abandoned Mine Lands projects. This highwall at times is vertical and contains several rock outcrops.

There are two remaining storage tanks left on-site from previous mining activities. These tanks are believed to contain caustic material used for increasing the pH as a type of active mine drainage treatment. This assumption is based on the fact that the tanks have small rubber hoses running out of them, which would suggest their use as storage for an alkaline chemical such as caustic as opposed to fuel. These tanks are in average condition but could become a hazard if someone were to try to gain access to the tanks or if they would begin to leak.

Several abandoned sedimentation and settling basins still exists throughout the old mining areas. Although these sites have often been compromised and drained, several ponds still remain and could be considered a hazard by the game commission to unsuspecting sportsman. The ponds on-site were often poorly constructed and have steep banks. None of the sites are identified or posted.

Finally an abandoned deep mine shaft has been identified in the headwaters of the watershed. Although, the entrance to the shaft is currently closed, it could be exposed through continued collapse of the original opening. This shaft, when exposed, could entice explorers or children to enter the deteriorating mine.

V. Objectives

The overall objective of the Sugar Run Watershed Assessment and Restoration Plan is to restore and protect the water quality of Sugar Run while restoring the stream to its' designated use as a Cold Water Fishery.

Specific Objectives

The below listed specific objectives have not been weighted and are all equally important to meeting the overall objective.

1. To reduce metal concentrations to non-toxic levels within the stream
2. To increase the pH to natural conditions
3. Restore/ preserve aquatic and terrestrial habitat
4. Limit use of potentially degrading deicing materials
5. Reclaim abandoned or highly eroded areas

6. Restore/ preserve riparian areas
7. Eliminate illegal dumping opportunities
8. Restore eroded streambanks
9. Eliminate safety hazards
10. Reduce elevated levels of fecal coliform
11. Eliminate stream encroachment opportunities

Criteria for measuring/ meeting the above objectives:

1. Sample the stream to determine the concentration of metals. All metal concentrations should be less than 1 mg/l
2. Sample the stream to determine the pH. The pH should be between 6 and 7 for a forested watershed.
3. Increase habitat areas through the creation of wetlands, riparian areas, reclamation of barren areas and preservation/ protection of open areas.
4. Use educational opportunities (brochures, mailing, and meetings) to inform the state and municipalities of the dangers of continued use of specific deicing materials while providing them with sound alternatives.
5. Reclaim highly eroded areas. These areas could be measured by acres restored.
6. Restore degraded riparian areas along Sugar Run. Restoration could be measured by miles of riparian area restored and through continued habitat assessments.
7. Illegal dumping opportunities are made less enticing without the availability of truck pull off and turnaround areas. Eliminate these areas or block their access. Restore current areas through dump clean-ups.
8. Restore eroded streambank areas through natural stream design and bio-engineering techniques. Measure these areas by miles of streambank restored.
9. Several safety issues of concern are often found around abandoned mining areas. Eliminate these issues through the removal of old tanks and equipment, closing of abandoned mine shafts, and grading of highwalls and abandoned ponds.
10. Identify specific point sources of elevated fecal coliform levels and promote education on the necessary maintenance and proper operation of on-lot septic systems.
11. Use educational opportunities (brochures, mailing, and meetings) to inform municipalities and landowners of the importance of preserving floodplain and riparian areas.

VI. Restoration Alternatives

Through the developmental process of formulating restoration opportunities to the above listed specific problems several alternatives were considered. Implementation through the construction of active treatment systems, passive treatment systems, remining and the possibility of no action were all considered.

The installation of physical/ chemical treatment plants (commonly referred to as active treatment systems) would be unrealistic considering the location of the project areas and the level of available resources. Active treatment technologies operate through the consumption of several resources. Those resources may be chemicals (such as alkaline materials, emulsifiers or flocculants), electricity, operator time, available space and require an available annual budget. Active treatment technologies use industry standards to precipitate the impurities and then discharge clean water similar to a waster water treatment plant. Although these systems usually require less space than passive treatment systems, they require constant maintenance and input of chemicals and electricity. Active treatment systems are efficient at producing clean water but, due to the high initial capitol cost in addition to the constant need for consumable resources, the alternative is not feasible.

The recommendation of using passive treatment technologies produced numerous treatment scenarios at each site. Through monthly water sampling at the discharge sites the quantity and quality of the water needing treatment was determined. The consideration of viable alternatives centered on the evaluation of methodologies for capturing the acid mine water, treatment and preventing clean surface water from entering the passive treatment system.

Treatment alternatives were evaluated at each discharge location. The treatments were assessed in relation to available space for project construction and the effectiveness of available technologies considering the observed chemistry and flow rate. The environmental impacts of each alternative were also considered. The treatment methodologies and components that were evaluated at each discharge include: Vertical Flow Systems (VFS), Anoxic Limestone Drains (ALD), aerobic wetlands, settling ponds, limestone drains, alkaline addition, and seeding.

Vertical Flow Systems (VFS) are ponds that contain limestone rock that, through chemical and biological processes, would react with and neutralize the acid in the mine water. An organic layer is placed over the rock to convert all iron in the discharge water into a ferrous state of Iron, by removing any present oxygen. This will minimize armoring, the process of iron precipitate coating the limestone, which will allow the acid to readily react with the limestone.

Three to five feet of water is maintained above the compost to provide head pressure to move the water through the compost and limestone into outlet pipes located below the limestone. Once the water travels through the VFS it contains increased alkalinity and pH that allows the iron and aluminum to precipitate. Observed outcomes using the VFS technology in other applications have shown that acidity will be completely neutralized and net alkalinities will be produced. Iron and aluminum levels will be reduced to 1 mg/l or less and manganese levels will be reduced by 1/3.

Anoxic Limestone Drains (ALD) are similar to VFS except the limestone is placed underground and the mine water flows through a limestone bed. They have somewhat limited application because water with high levels of ferric iron and aluminum will tend to clog the beds, coat the rock with precipitate and make them less effective. Water with ferrous iron and low aluminum levels can be effectively treated with ALD technology. When the above water quality conditions can be met, the water quality improvement potentials for ALDs are similar to VFS.

Aerobic wetlands can only fully treat water that is net alkaline. This does not preclude their use in systems that incorporate other treatment components to generate alkalinity to treat acid water. Their use in Sugar Run will be to enhance the effectiveness of other treatment measures. Wetlands will promote oxidation, precipitation and settling of iron and aluminum. They accomplish these tasks by generating alkalinity, especially in summer months, filtering the water flowing through them, and by slowing the flow of water. Water quality improvements achieved by aerobic wetlands are variable. They do enhance the function of other treatment components by acting as a filter for precipitates. Aerobic wetlands can also add some alkalinity through sulfate reduction.

Settling ponds differ from wetlands in that there is a loss of those biological processes that aid in the polishing of treated water but, do provide a much larger capacity for collecting and storing precipitates. Most often, settling ponds are placed to collect the flow from VFS or ALDS where precipitation is most likely to occur. These ponds are developed to hold a significant amount of precipitated metals with a designed life span of about 25 years. Removal of these metals is a vital component to stream habitat and water quality restoration.

Limestone channels/ drains are used to provide oxygen to the water and add small amounts of alkalinity to the water. As the water flows down a limestone drain, the velocity of water causes riffles that bring about increases in the dissolved oxygen content in the water. The water flow over the limestone also causes dissolution of calcium from the rock, which results in increased alkalinity in the water. The increased oxygen and alkalinity levels promote the precipitation of the metals in the water. Limestone channels/ drains provide variable treatment results depending on the velocity of the water flow. Experience has shown that limestone channels/ drains can remove 25% of aluminum levels and reduce acidity if the water is flowing at eight feet per second or faster.

Alkaline addition is used to neutralize acid producing rocks and minerals associated with some seams of coal. Alkaline addition projects often vary by site and the material used. These projects often include the addition of ground limestone which would be added to those areas in quantities sufficient to bring the pH of the material to seven or higher. These levels of alkaline addition will stop the production of acid, promote the growth of vegetation in barren areas and add alkalinity to runoff water. Alkaline addition into the watershed will increase the buffering capacity of Sugar Run, which will offer additional protection throughout the year during periods of fluctuating flow and high concentrations of acid and metals.

Another alternative would be the potential remining of previously mined areas. Often these areas would be available for remining through the use of improved mining techniques, use of technologically advanced equipment and a better understanding of mine hydrology. The primary hurdle in developing this type of remediation is in finding an operator interested in remining while meeting the expectations of the landowner. Unfortunately, this alternative does come at some expense, first an operator would need to incur the expense of exploratory drilling, determine whether the current market warrants this development and propose that the coal could be removed without further degrading the present water quality. This process is both time consuming, expensive and potentially may yield little to no improvement in water quality. According to discussions with Pennsylvania Department of Environmental Protection mining inspectors, all available coal within the Sugar Run watershed had been permitted and in most cases already removed. However there are two sites identified within the watershed that may benefit from remining. The Kittanning discharge is a prime candidate for remining considering that the majority of the upfront cost have already been expended. Currently there is a sub-chapter F permit being held by a local operator adjacent to the discharge. The Kittanning discharge, in fact, is an identified monitoring point for that permit. Although remining is not always completely successful in abating the discharges, there is the potential for a reduction in flow and/or change in water chemistry through proper and updated land reclamation and remining techniques. However, in the case of the Kittanning discharge, the sub-chapter F permit is currently limited to mining upper seams and if no additional initiative was taken by the operator, a limited positive affect on the discharge could be expected. The second potential site for remining would be Site 26 B or Paradise. According to conversations with mining inspectors approximately half of the permitted coal available at Paradise was never mined due to changes in operators. Both of these sites could potentially benefit from remining techniques and technologies, and it would be recommended in this report to inform those landowners of the potential for remining.

If the alternative of no action was elected, the present conditions would be maintained for the next hundred years with the potential for only limited, if any improvements over time. This decision would also differ from the recommended actions with respect to streambank restoration, reclamation of disturbed land and increased habitat. Although the no action alternative is feasible, no improvements would be made within the watershed and neither the land nor the stream would be meeting their designated uses.

Finally additional opportunities through combinations of passive and active treatment technologies could be beneficial on a case by case basis. Those opportunities could include the addition of alkaline material through a dosing system such as a diversion well or water powered doser. These technologies, although effective in increasing pH are not able to remove the precipitated metals. Therefore the precipitated metals are deposited within the stream bed. The benefit of this process is that the deposition is moved up much closer to the discharge allowing for more of the stream to be restored.

An experimental possibility, which is becoming more popular, is the use of resource recovery techniques. Resource Recovery is the removal of metals from the discharge that are held as a commodity. Metals such as iron, aluminum, and traces of metals such as gold, cobalt and silver are being recovered from the discharges and sold.

One of the most popular uses of iron is as iron oxide which is used in the pigment industry. However, resource recovery is only beneficial with the proper economics. This technology often uses chemicals (similar to active treatment), involves increased operation and maintenance, and is only successful if there is market for the produced goods. Recovery technologies are constantly changing with no recommended single technology appropriate for all discharge characteristics or locations. It is suggested that an additional study or a Request For Proposal would identify potential technologies appropriate for treating those difficult sites.

Finally another promising technology is insitu treatment. This technology is based on the treatment of the mine water within the mine opening/ shaft using several possible alkaline materials. This treatment technique, when successful, will discharge clean water into the watershed and precipitate the majority of the concentrated metals within the mine shaft. This process is often successful in conjunction with remining.

VII. Recommendations

- For a complete breakdown of the proposed restoration components along with associated cost, see Appendix D, Resource Inventory Report.
- Also see Map Number I-7, Restoration Sites

VII.A Proposed Projects/ Recommendations: Abandoned Mine Lands

Turkey Run Land Treatment:

The project would consists of three phases. The first component would be the installation of over 1,500 feet of rock channel to stabilize existing waterways. The second component would be the land liming of approximately 28 acres. The third component would be the restoration of an abandoned sedimentation pond that would be converted into a wetland. These projects will not only stabilize the area, but will also add alkalinity that will enhance the stream's water chemistry. Increased alkalinity within the watershed will continually aid in buffering the downstream discharges while playing a key role in off setting lethal concentrations or spikes of acidity and metals. The proposed wetland, will also provide a pristine habitat and encourage species diversity for migrating and nesting waterfowl.

Highwall Waterway:

A 450 foot waterway is to be installed at the outlet of the highwall to add additional alkalinity to water coming off of the pit floor. Although this water has been tested and is maintaining a pH of 6, it will provide an excellent opportunity to add alkalinity into the headwaters and positively impact the stream's water chemistry. Increased alkalinity will improve the water quality raising species diversity and density.

Gob Pile:

This site is refuse from previous deep mining operations. The recommended method of clean up is removal to a Co-Gen Plant as a beneficial use. If this is not economically feasible due to potentially low BTU quality, the area is to be graded and seeded. Although it is difficult to measure the impacts of runoff from this site because of the intermittent frequency of flows from the site, refuse piles typically produce very high acidities when water flows from them. The location of this pile within the headwaters of the watershed and the potential for adverse impacts on the stream are high. Removal or simple restoration of this site would eliminate any negative impacts currently felt on the adjacent tributary.

Keystone Stream Restoration:

It is recommended that these sections of channel be restored using bioengineering techniques including, regrading of banks, planting of vegetation, the installation of rock or fiber coir logs for toe protection and the possible installation of a few rock structures to assist with the changes in elevation. In the situation of the upper restoration site this recommendation is preferred over the restoration of the original channel due to the fact that the original channel has been filled with reclaimed overburden. Restoration of these sites will add needed riparian area, aid in the filtration of non-point sources of pollution, potentially reduce the streams temperature through increased cover, provide essential habitat and reduce accelerated erosion through the protection of exposed and degraded streambanks.

26A-Land Reclamation:

Similar to the Turkey Run Land Treatment site, the area above site 26A has in the past been poorly reclaimed. Several areas are void of vegetation or have only limited growth. Other sections due to poorly placed and/ or constructed diversions, suffer from extensive gully erosion. Several gullies extend for over 800 feet and are 7 feet wide and 6 feet deep. A total of 835 tons/yr of soil has eroded through sheet and rill erosion while an additional 5,127 tons of soil has been lost through extensive gully erosion (see Appendix E, Erosion of Previously Reclaimed Areas).

The project consists of installing over 4,500 feet of grass lined diversions (to reduce slope length and repair or eliminate those diversions that are no longer functional) and over 1,400 feet of rock waterway (to effectively convey run-off, minimize erosion and add alkalinity). In addition to run-off control approximately 29 acres will be limed (at 40 Tons of lime per acre), using both a coarse aggregate lime and the traditional agricultural lime. Finally, all areas disturbed in addition to those areas of sparse cover will be reseeded.

VII.B Proposed Projects/ Recommendations: Abandoned Mine Discharges

Site 26

Reclamation to the site would involve the construction of a vertical flow pond, settling basin and wetland. Water would be captured at the mine outcrop, if necessary a bentonite slurry trench would need to be installed in order to force all water to the surface were it could be captured and treated. Due to successive mining events, there is potential that several layers of poorly reclaimed mine spoil may be polluting the nearby tributary to Sugar Run. It is the intent of the slurry trench to force this water to the surface in order to treat this source of pollution while providing some additional protection downslope to the constructed ponds. The mine drainage would be treated by a vertical flow system composed of mushroom compost and limestone as the primary source of treatment. This system will increase the mine drainage's pH while removing any oxygen present. The effluent will then flow into the settling basin and then into the wetland for final polishing before it is discharged into Gumtree Run (tributary to Sugar Run). It is anticipated that 48.43 lbs/d (or about 9 tons annually) of Iron, 99.92 lbs/d (or about 18 tons annually) of Acidity and 4.4 lbs/d (or about 1,600 lbs annually) of Aluminum could be removed from the watershed through treatment of the Site 26 discharge.

Since the initial proposal for restoration, this site has been improved through the bond forfeiture appeals process. Currently this site is under construction to utilize some of the existing ponds with increased alkalinity being generated through an anoxic limestone drain. Construction was not completed at the time of printing of this report.

Site 26A

Due to high acidity and iron concentration levels, a multiple pond treatment system would be necessary. Current passive treatment technologies within vertical flow systems are limited to producing about 250 mg/l of alkalinity per system. This would not produce the desired treatment considering the average water chemistry data observed. The potential system will therefore include a vertical flow system, settling basin, another vertical flow system, settling basin and finally a wetland. The final pond will then outlet into Gumtree Run. It is anticipated that 4.16 lbs/d (or about 1,500 lbs annually) of Iron, 15.68 lbs/d (or about 3 tons annually) of Acidity and 0.5 lbs/d (or about 190 lbs annually) of Aluminum could be removed from the watershed through treatment of the Site 26A discharge.

Since the initial proposal for restoration, this site has been improved through the bond forfeiture appeals process. Currently this site is under construction to utilize some of the existing ponds while increased alkalinity is being generated through a vertical flow system. Construction was not completed at the time of printing of this report.

Site 26B (Paradise)

Improvements to this site would include a treatment system similar to 26A. Due to high concentrations a combination of ponds would be necessary to produce clean water. The system would be designed to include a settling basin, vertical flow system, settling basin, vertical flow system, settling basin and wetland. It is anticipated that 16.51

lbs/d (or about 3 tons annually) of Iron, 92.79 lbs/d (or about 17 tons annually) of Acidity and 4.98 lbs/d (or about 1,800 lbs annually) of Aluminum could be removed from the watershed through treatment of the 26B discharge. Although this site was also included in the bond forfeiture appeals process, no improvements are currently proposed.

Bennington

Due to limitations, the best possible solution would be to construct a rock channel with smaller settling basins parallel to the railroad bed and outlet through the existing culvert. This will add alkalinity into the flow and provide for some precipitation in the smaller settling basins. Although the project area is narrow, there is the potential for the final survey to show enough area available for a passive treatment system such as a vertical flow system. Restoration of this site, because of the limited work area, will also be heavily dependent upon landowner cooperation. Considering the proposed recommendation, based on available space, limited metals removal is likely. If the space limitations could be resolved or detention time increased, all metals concentrations could be reduced to less than 1 mg/l yielding a net reduction in 708 lbs/yr of Iron, 11.68 lbs/d (or about 2 tons annually) of Acidity and about 320 lbs/yr of Aluminum could be removed from the watershed through treatment of the Bennington discharge.

Switchbox

The Switchbox discharge appears within the elevated railroad bed and would be difficult to treat unless the flow could be captured and piped to a more appropriate location. Due to the location and proximity to the railroad, little treatment is proposed. Similar to the Bennington discharge a rock channel could be constructed to add additional alkalinity to the discharge and protect the surrounding area from any additional increased erosion. This channel could then be connected to the channel from the Bennington discharge.

Kittanning

Due to topography, space limitations and flow, there are limited possibilities for restoration using passive treatment technologies. Those possibilities available could include the addition of alkaline material through a dosing system such as a diversion well or water powered doser or the use of resource recovery techniques. Additionally, it is recommended that a hydrogeologic study be completed on the Kittanning Run discharge. The intent of the study would be to identify possible mine pool recharge areas, possible alternative discharge location, and to consider alternate treatment possibilities such as insitu treatment.

GT-Aluminum

See recommendations for Orange Falls below

Orange Falls

Proposed restoration would include the transport and treatment of the Orange Falls discharge, due to lack of useable space near the site, several hundred feet down in the stream valley. This would allow for treatment through a vertical flow system and settling pond. In addition the GT-Aluminum discharge would also be transported from its' discharge site and would then be added to the effluent of the treated Orange Falls site. The GT-Aluminum discharge being composed primarily of aluminum would be discharged into the settling basin just below the Orange Falls vertical flow system and mix with the treated water from Orange Falls aiding in the precipitation of aluminum. These two discharges would then enter a final basin and discharge into the main stem of Sugar Run. It is anticipated that 53.9 lbs/d (or about 10 tons annually) of Iron, 72.29 lbs/d (or about 13 tons annually) of Acidity and 12.58 lbs/d (or about 2.3 tons annually) of Aluminum could be removed from the watershed through treatment of these two systems.

Upper Sugar Run

This restoration project would include construction of two separate alkaline addition beds which would add alkalinity in the upper reach of the watershed. These beds would mix with the main stem flow through stream intake and outlet structures. This treatment would enhance stream chemistry and promote macroinvertebrate diversity and density.

White Discharge

No restoration projects have been identified for this site due to low flows, difficulty in separating the flow from storm runoff and the insignificant amount of pollution created versus cost associated with the respective clean-up.

26 Borehole

This site is heavily influenced by stormwater run-off. The run-off would need to be redirected through a stable rock channel and the base flow from the borehole would then be piped to Site 26, were it would be mixed with the effluent from the proposed treatment system. This small project could potentially bring back a small tributary to Gumtree Run, identified in this study as Turkey Run. This tributary offers several areas of excellent habitat; through developed pools and riffles, forested riparian areas and low average temperatures; and it is fed from a small spring with additional surface run-off from the Turkey Run land reclamation project area. Although iron concentrations are relatively low from this discharge the small but significant concentration of Aluminum greater that 1 mg/l is toxic to most macroinvertebrate life.

VII.C Proposed Projects/ Recommendations: Illegal Dumping

Illegal dumping is a state wide issue with thousands of tons of trash being picked up annually by volunteers. In most circumstances if a clean-up is organized and successful and side pull-off areas are blocked or removed, the site will remain trash free. The four sites identified through the study will be added to the Blair County PA CleanWays database. Blair County PA CleanWays has been successful in promoting the education of illegal dumping and the associated health hazards. PA CleanWyas has also been successful in organizing the reclamation of existing dumps sites and have been able to work with the municipalities to maintain those sites from future dumping.

VII.D Proposed Projects/ Recommendations: Fecal Coliform

In efforts to promote the successful restoration and future preservation of the watershed and promote continued community support, no specific sites have been identified as potential sources of pollution. The recommendation in this report is to continue with a smaller study of Sugar Run with respect to elevated levels of fecal coliform. It may be necessary to temporarily delay this study until complete or partial AMD restoration is concluded due to the mortality of the coliforms in highly polluted sections of the stream. When feasible the new study should increase the frequency of sampling in order to potentially identify sources. This work should be done in conjunction with the County Sewage Enforcement Officer and the local municipality.

VII.E Proposed Projects/ Recommendations: Safety Hazards

Several areas have been identified through this study as potential safety hazards. It is recommended that each individual site be addressed by the landowner to determine their level of risk and interest in removing those safety hazards.

Hazards:

1. Highwalls - Two highwall sites have been identified. Several sections of the two remaining highwalls are now degraded steep slopes. These areas are often no steeper than road embankments and have become vegetated and stable. These specific areas are of less of a risk then those areas with vertical walls. In those areas were vertical banks do exist they should be temporarily identified, with signage or vegetative cuts, marking the hazard and reclaimed when funds become available.

2. Storage Tanks - It is recommended that the content of the two tanks be identified and that they are removed and disposed of properly.

3. Abandoned Ponds/ Basins - It is recommended that the existing ponds, in efforts to eliminate possible future failure, should either be enhanced as wetlands for habitat or regraded and closed.

4. Abandoned Deep Mine Shaft - It is recommended that the shaft entrance be excavated back to solid ground and that stone be backfilled in place of the entrance.

VII.F Proposed Projects/ Recommendations: Aerial Photography for Topographic Map Production

Production of aerial photography is a vital component of the restoration planning process. Aerial photography is reasonably priced and extremely beneficial in the design. This photography will be used in future abandoned mine lands projects in addition to providing the necessary elevation and topography that will be used in the designing of passive treatment systems for several other known abandoned discharges within the Sugar Run Watershed. Approximate cost is determined considering 5 areas to be flown with each area representing a section no larger than 20 acres at an approximate cost of $50.00/ acre. This associated cost provides the aerial photography at 2 foot interval topographic maps with horizontal and vertical ground controls. Specifications for the photographs are available from the Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation, Cambria Office. Similar photography had been used in designing previous passive systems within the Glenwhite Run Watershed.

VIII. Plan Implementation

VIII.A Schedule

Through careful consideration and prioritization based on funding availability, pollution abated, landowner cooperation and access availability, and probability of success the following sites have been prioritized. Those ranked with highest priority of (1) are first with the remaining sites listed in descending order. Through the prioritization process several projects ranked equally within their respective groups. These projects should be considered comparable. The prioritizations made below are recommended with respect to the above criteria, any changes made to the schedule due to outside interest, overwhelming landowner support, etc. should be considered with no adverse consequences expected.

The sequence listed below involves a holistic approach to the restoration of the Sugar Run Watershed. Projects listed below involve the restoration of abandoned mine discharges (which would improve water quality), restoration of barren and dead areas (which would reduce accelerated erosion and increase habitat) and the restoration of riparian areas and eroded streambanks (decreasing stream instability, reducing average stream temperatures, decreasing polluted run-off from reaching the stream and increasing habitat.)

1. 26 A Land Reclamation Project
   Kittanning (hydrogeologic study with restoration recommendations)
   Keystone Stream Restoration
   Production of Aerial Photography

2. Highwall Waterway
   Turkey Run Land Treatment

3. Gob Pile
   Site 26
   Site 26 B
   Orange Falls/ GT-Aluminum
   Upper Sugar Run

4. Bennington

5. 26 A

6. Switchbox

VIII.B Permits and Compliance

The individual sponsor of each project will acquire all necessary permits to comply with local, state, and federal regulations. All permits must be approved prior to any earthmoving or construction activities. It is recommended that the project sponsor meet with the appropriate agency personnel on site early in the design process to help identify potential permitting issues.

VIII.C Land Rights and Relocation

The individual sponsor of each project will be responsible for acquiring the land rights, water rights, and rights-of-way necessary to install, operate or maintain the implemented improvements. The sponsor will also be responsible for the satisfactory relocation or modification of all utilities disturbed as a result of the project.

VIII.D Solid and Hazardous Waste

The individual sponsor of each project will assure that any solid or potentially hazardous wastes at the project sites are identified and disposed of in accordance with applicable federal, state and local rules and regulations.

VIII.E Cultural Resources

A preliminary archaeological review has been conducted of the Sugar Run watershed and no historic archeological resources are documented in any of the project areas. If cultural resources are discovered throughout any part of the restoration process the sponsor will cease activity and contact the Pennsylvania Museum and Historical Commission for further guidance on identification/ mitigation/ preservation actions.

VIII.F Funding

Funding opportunities are available through private non-profit entities, corporations and businesses, and state, federal and local grant programs. All funding avenues should be utilized (including combinations of these sources) to leverage the necessary monies to implement the above recommendations. Additionally local support through potential cash and/or in-kind contributions for the projects from landowners, municipalities, and community members could also be another source of support. As noted within the recommendations of the Gob Pile project, possible restoration may be done at no cost to the landowner if the pile could be reclaimed as a beneficial resource.

Finally it is important to organize the restoration projects with the involvement of all the potential stakeholders in order to make the most efficient use of resources. Below is a list of funding sources that had been successfully utilized in the past.

Funding Sources:

- Blair County Conservation District: Watershed Restoration Fund
- DEP- Bureau of Abandoned Mine Reclamation - 10% Set Aside
- Growing Greener: Environmental Stewardship and Watershed Protection Grant
- Growing Greener: Funding directly to the Dep - Bureau of Abandoned Mine Reclamation
- Office of Surface Mining - Appalachian Clean Streams Initiative
- Watershed Protection and Flood Prevention Act: PL 83-566
- Section 319 (U. S. Environmental Protection Agency)

Note: not all sources were available directly to a landowner or citizen group. Some of the funding sources listed are available only to specific agencies.

VIII.G Resource Plan for Operation and Maintenance

Within the past year state and federal agencies are beginning to recognize the necessity to not only provide funding for the initial capitol cost involved with the treatment of abandoned mine drainage but the additional need for future support through funding for operation and maintenance. Operation and maintenance has always been a stumbling block for project success and perpetuity. Continued operation cost are expensive and time consuming, those systems deemed "passive" just 10 years ago are now becoming burdensome. In the future; operation, maintenance and replacement issues need to be one of the primary concerns when developing restoration projects. Development and a better understanding of the responsibilities of the sponsor need to be understood well in advance in the planning process. In the end, the best solution will be to promote local involvement and help empower local sponsors with a vested interest in the project to assume responsibility. Those local sponsors could be the landowner, stakeholders who would benefit from the restoration efforts, local government or others interested in seeing environmental improvements to the community.

A specific operation and maintenance plan was not developed for each of the proposed restoration projects, as part of this report. Often there is variability between an initial resource inventory and a completed design considering future technologies and materials. The listing of operation and maintenance components below shall serve as a guide to ideas that should be considered.

Consider who will take the time to provide the general maintenance such as:

- Routine Flushing
- Addition of alkaline material (used in a dosing or diversion well system)
- Debris removal from clogged pipes and weirs
- Routine water sampling
- Annual structural inspections
- Quarterly operational inspections of equipment

Consider who will cover the associated cost:

- Purchase alkaline material
- Cost of water sample analysis
- General Repairs due to aged materials
- Repairs due to significant storm events
- Repairs due to vandalism
- Cost associated with sludge removal and disposal

Ethical and Environmental Concerns:

- What will happen to the site if the Sponsoring group folds?
- Who will maintain the high level of water quality in the future?
- How long will the initial system last?
- Have other alternatives been considered, such as eliminating mine pool recharge areas and insitu site treatment?

All of the above issues should be considered when planning for restoration projects. Operation, maintenance and replacement are issues that not only should be addressed by the sponsors, but will be required by most funding entities.

VIV. Participation from Watershed Stakeholders

VIV.A Public Meeting

Public input is a necessary part of a successful watershed restoration plan. Community involvement can aid in the identification process of potential sources of pollution and in establishing future landowner relationships. However, the stakeholder's most valuable rule is the continuation of protection and preservation of the watershed far past the development and implementation of restoration projects. They provide the local support and have a vested interest in the restoration of the community in which they live.

A public meeting was held on Thursday, June 12, 2003 at the Canan Station Fire Hall. The meeting was scheduled from 6:30 p.m. till 7:30 p.m. but continued till 8:00 p.m. due to interest and discussion. This fire hall site was chosen because of its prominent location within the watershed and ease of access and parking. The meeting was publicized through flyers (see Appendix I, Public Meeting Flyer) at local restaurants and shopping centers, at all municipal offices within the watershed and at the Conservation District Office. Additionally a public notice in the legal section of the Altoona Mirror was run on Wednesday, June 11, 2003 (see Appendix J, Public Meeting Legal Notice). The meeting was also posted on the Blair County Conservation District web-page for the week prior to the meeting. Several community members showed up for the informational meeting as well as representatives from the Natural Resources Conservation Service, PA Department of Environmental Protection, PA Trout Unlimited-Blair County Chapter, and the Juniata Valley Audubon Society.

The agenda began with introductions by the Conservation District Manager and the Watershed Specialist followed by a fifteen minute presentation describing the assessment process, watershed characteristics and general recommendations for future restoration. Following the presentation questions were answered including several specific questions about restoration techniques, associated cost and general state of the watershed issues. Finally a few additional questions were asked by the facilitators to determine any missing elements necessary to the assessment.

Those specific questions asked were:

- What are the perceived issues/ problems within the watershed ?
- What are the assets that need protected within the watershed ?
- Are their any specific sites that we should look more closely at ?

In response to the above listed questions, the attendees made several comments on concerns they had. Those comments are listed below.

- Concerns about logging
- Concerns about potential contamination of private wells from bacteria and metals
- Possibility of complete restoration in conjunction with the possibility of future stream stocking
- Expressed fears/concerns of future development
- Concerns of floodplain development/ encroachment and of municipal ordinances governing those developments
- Concerns of stormwater and road salt pollution issues from U.S. Route 22 and Sugar Run Road
- Informational comment regarding the drilling of a municipal well by Gallitzin Borough

In conclusion the residents and represented groups felt that the meeting was quite informational and were optimistic about potential future restoration projects.

VIV.B Organizational Groups and Agency Partners

On September 19th, 2002 a letter was sent out soliciting information on the Sugar Run watershed to several resource conservation orientated organizations and governmental agencies. The groups were ask to provide any information that they felt could be beneficial to this assessment. They were also to ask to identify any areas of special concern or provide information on current projects within the Sugar Run watershed (see Appendix H, Example Letter Soliciting Information from State, Federal and Private Organizations Concerning the Sugar Run Watershed Assessment). Those agencies and groups responding identified no specific areas of concern and provided no additional information on current or future projects. All information received supported information already provided through the assessment process.

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CHARTS

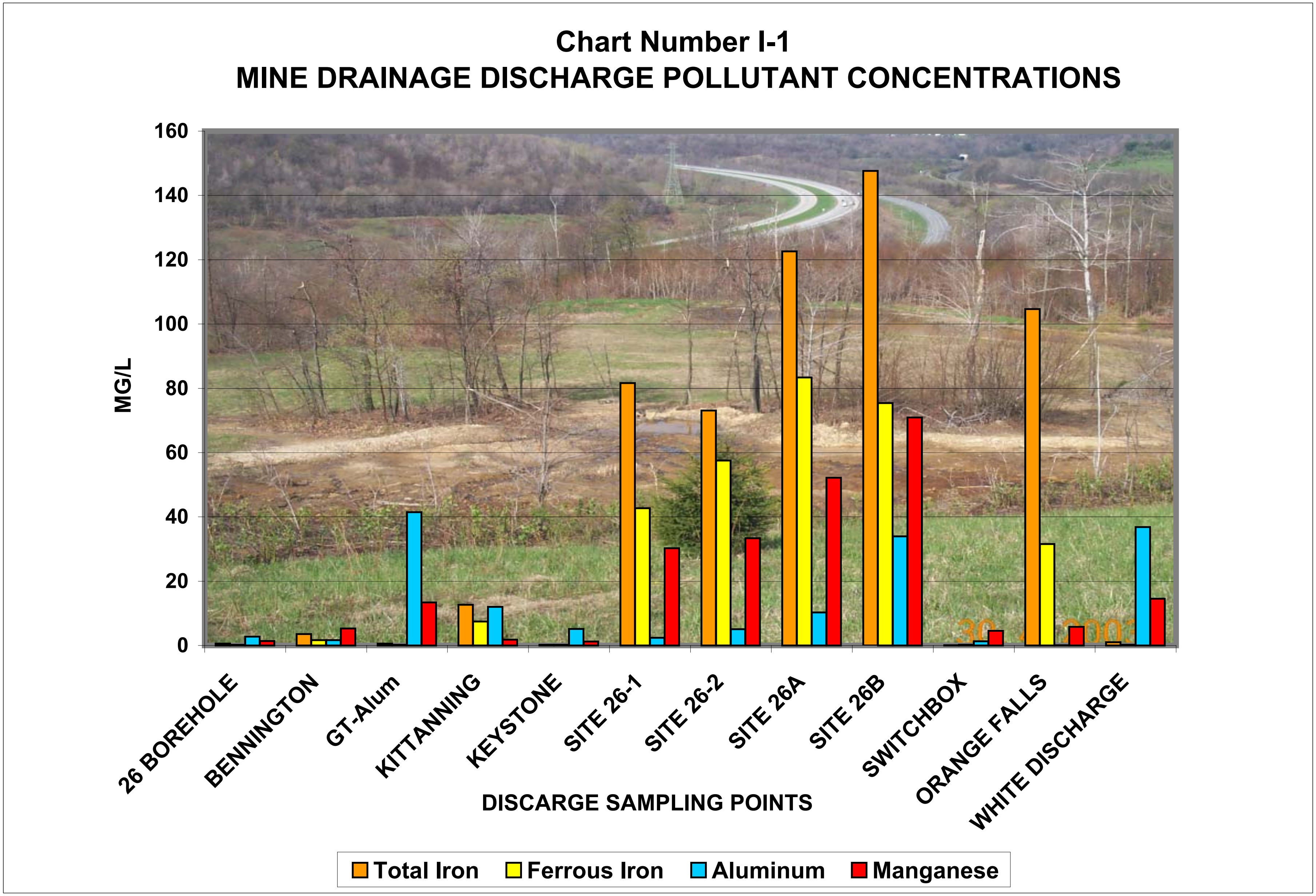


Chart Number I-1
MINE DRAINAGE DISCHARGE POLLUTANT CONCENTRATIONS
MG/L
160
140
120
100
80
60
40
20
0
26 BOREHOLE
BENNINGTON
GT-Alum
KITTANNING
KEYSTONE
SITE 26-1
SITE 26-2
SITE 26A
SITE 26B
SWITCHBOX
ORANGE FALLS
WHITE DISCHARGE
DISCHARGE SAMPLING POINTS
Total Iron
Ferrous Iron
Aluminum
Manganese

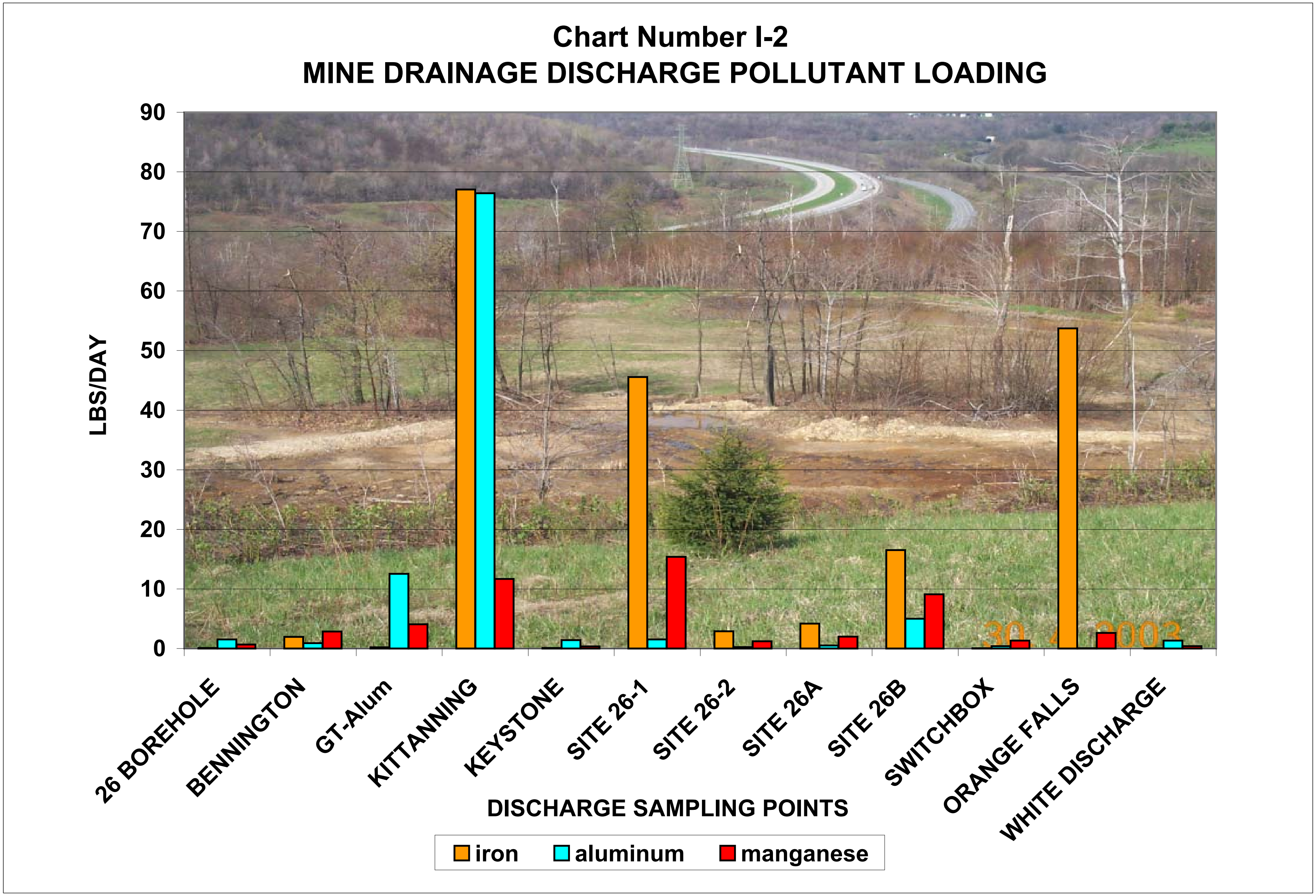


Chart Number I-2
MINE DRAINAGE DISCHARGE POLLUTANT LOADING
90
80
70
60
50
40
30
20
10
0
LBS/DAY
26 BOREHOLE
BENNINGTON
GT-Alum
KITTANNING
KEYSTONE
SITE 26-1
SITE 26-2
SITE 26A
SITE 26B
SWITCHBOX
ORANGE FALLS
WHITE DISCHARGE
DISCHARGE SAMPLING POINTS
iron
aluminum
manganese

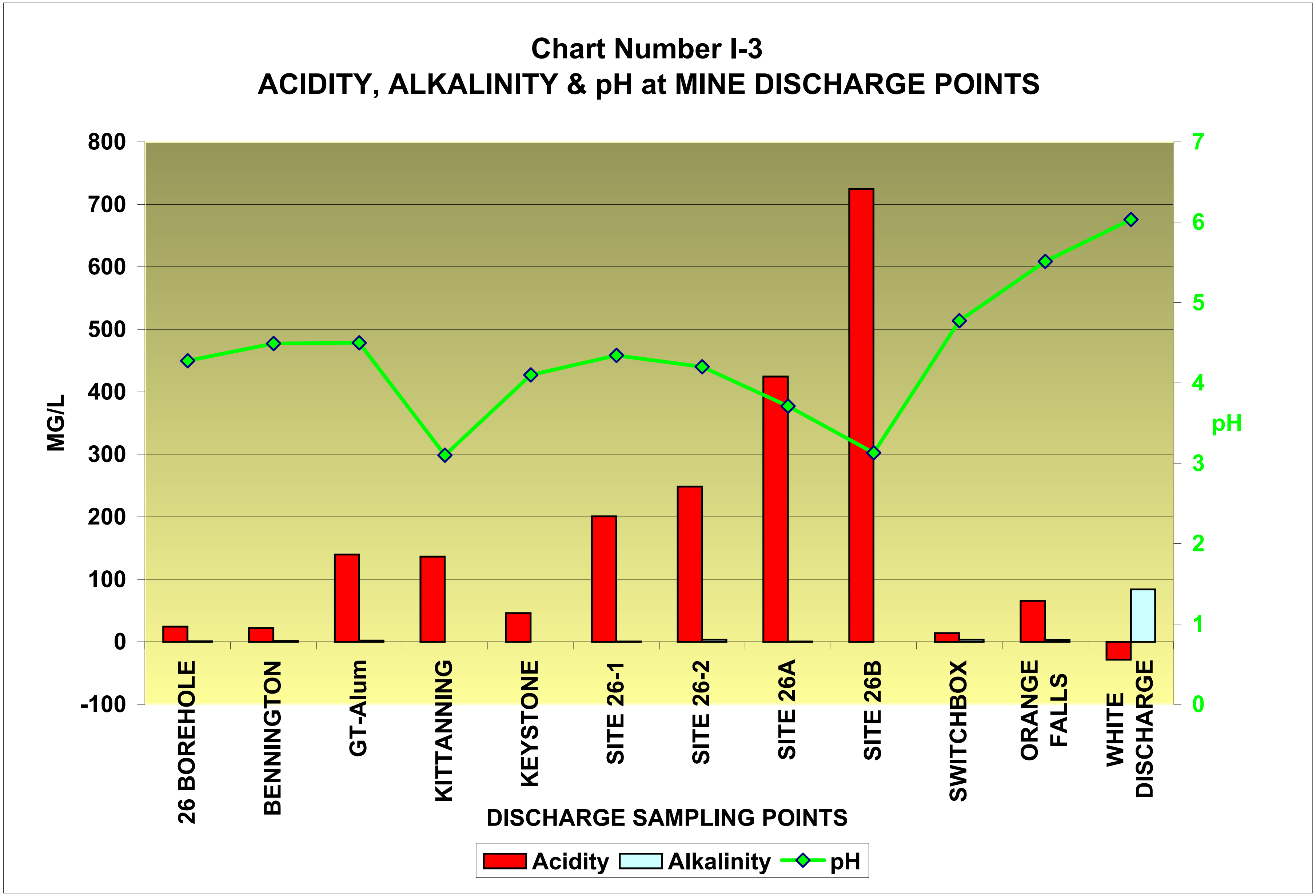


Chart Number I-3
ACIDITY, ALKALINITY & pH at MINE DISCHARGE POINTS
MG/L
800
700
600
500
400
300
200
100
0
-100
7
6
5
4
3
2
1
0
pH
26 BOREHOLE
BENNINGTON
GT-Alum
KITTANNING
KEYSTONE
SITE 26-1
SITE 26-2
SITE 26A
SITE 26B
SWITCHBOX
ORANGE FALLS
WHITE DISCHARGE
DISCHARGE SAMPLING POINTS
Acidity
Alkalinity
pH

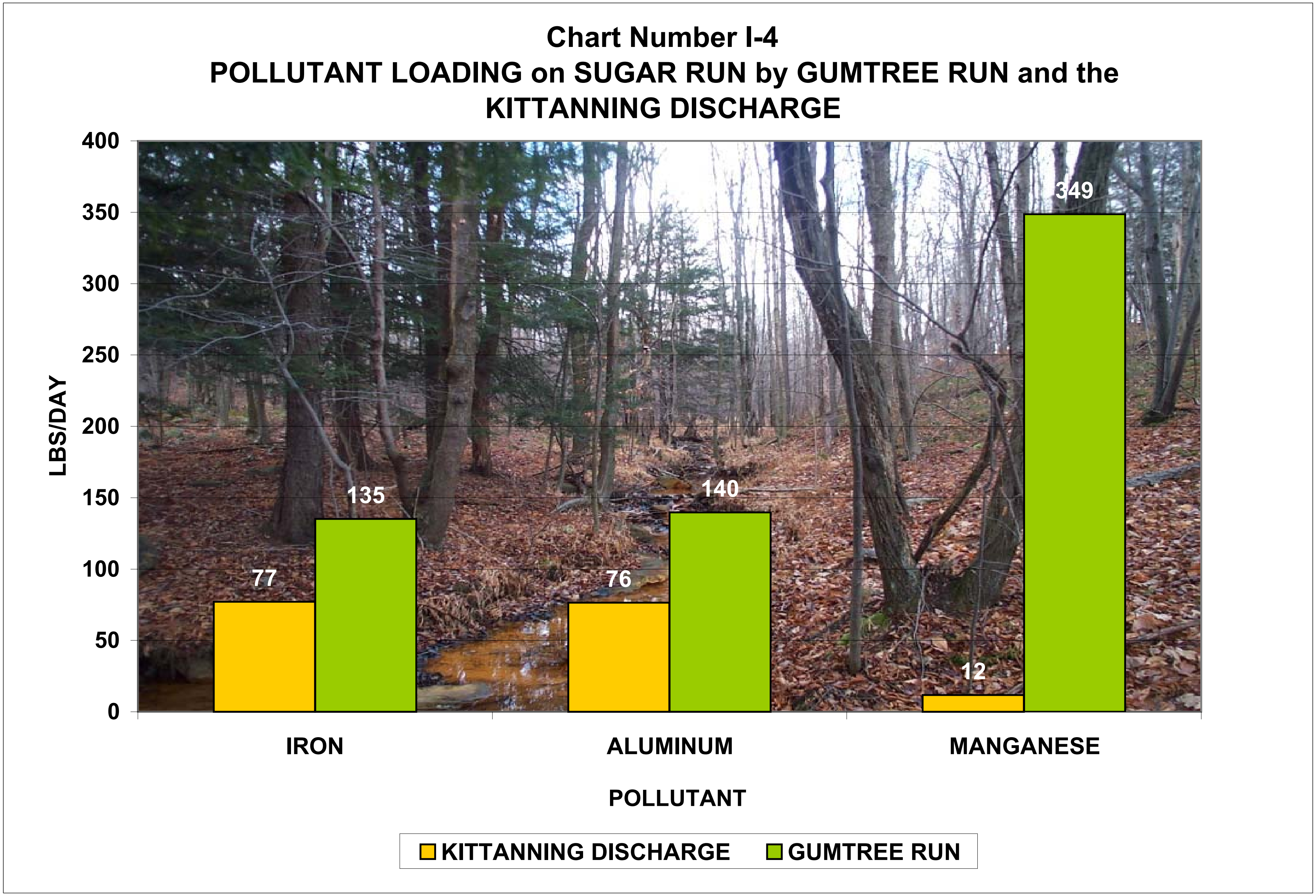


Chart Number I-4
POLLUTANT LOADING on SUGAR RUN by GUMTREE RUN and the KITTANNING DISCHARGE
LBS/DAY
400
350
300
250
200
150
100
50
0
77
135
76
140
12
349
IRON
ALUMINUM
MANGANESE
POLLUTANT
KITTANNING DISCHARGE
GUMTREE RUN

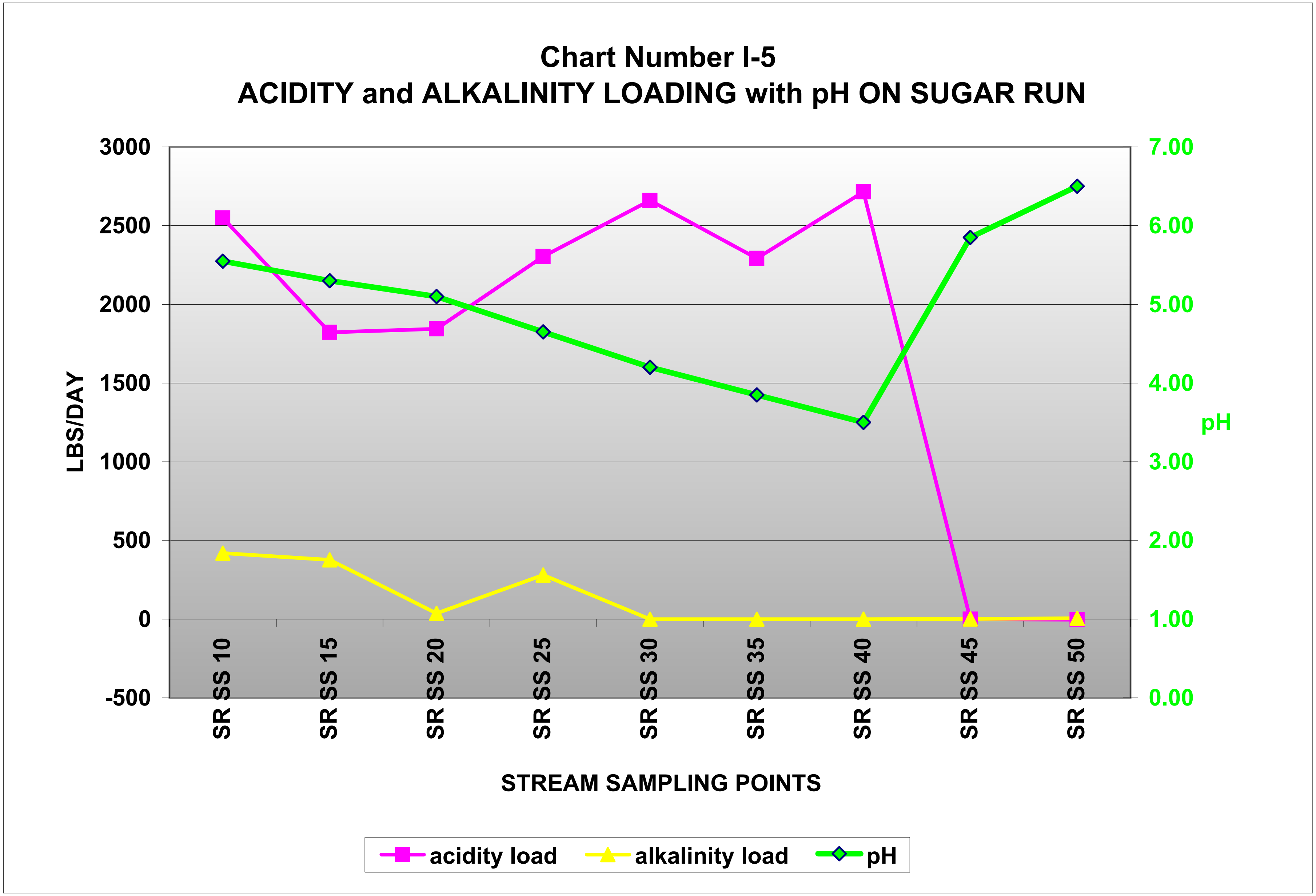


Chart Number I-5
ACIDITY and ALKALINITY LOADING with pH ON SUGAR RUN
LBS/DAY
3000
2500
2000
1500
1000
500
0
-500
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
pH
SR SS 10
SR SS 15
SR SS 20
SR SS 25
SR SS 30
SR SS 35
SR SS 40
SR SS 45
SR SS 50
STREAM SAMPLING POINTS
acidity load
alkalinity load
pH

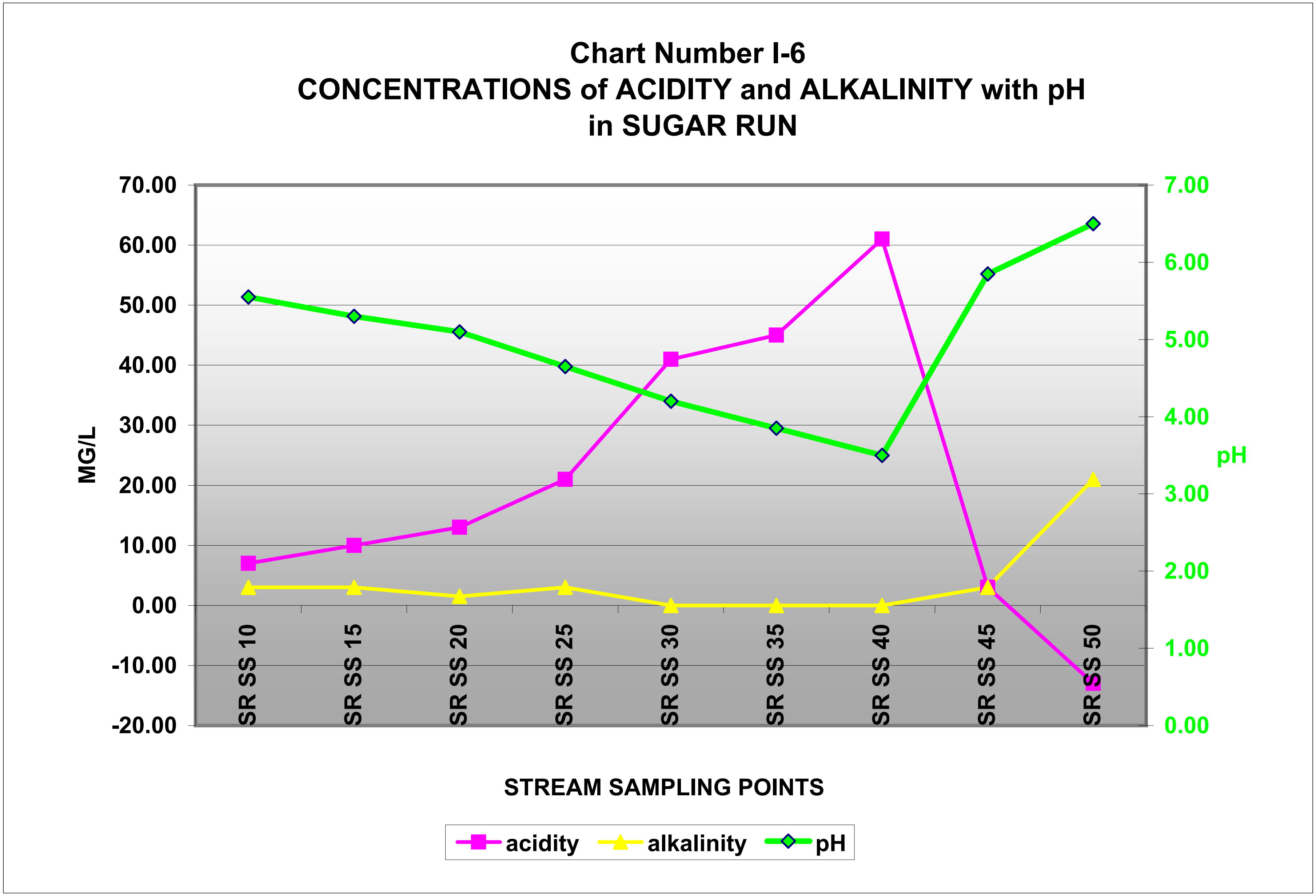


Chart Number I-6
CONCENTRATIONS of ACIDITY and ALKALINITY with pH
in SUGAR RUN
MG/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
pH
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
SR SS 10
SR SS 15
SR SS 20
SR SS 25
SR SS 30
SR SS 35
SR SS 40
SR SS 45
SR SS 50
STREAM SAMPLING POINTS
acidity
alkalinity
pH

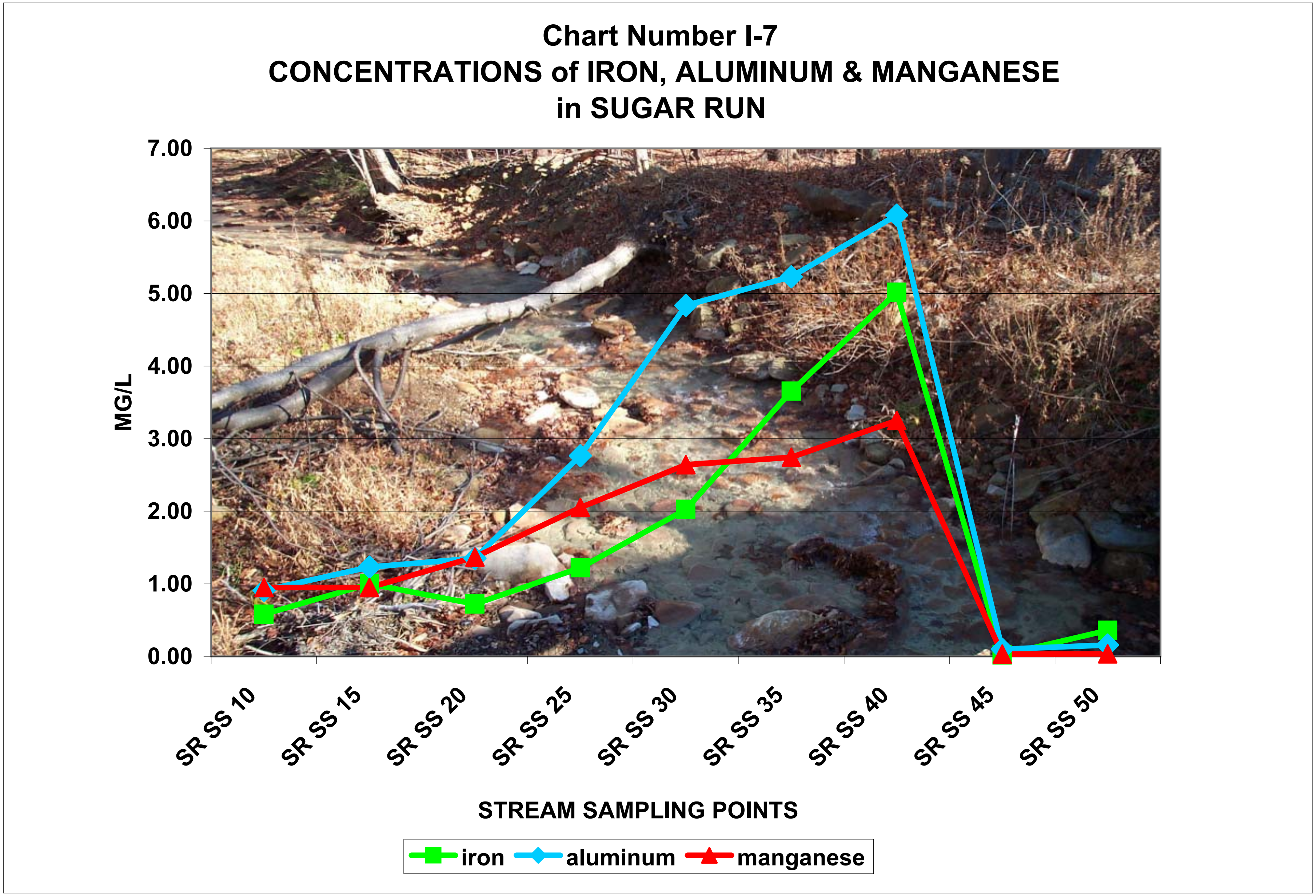


Chart Number I-7
CONCENTRATIONS of IRON, ALUMINUM & MANGANESE
in SUGAR RUN
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
MG/L
SR SS 10
SR SS 15
SR SS 20
SR SS 25
SR SS 30
SR SS 35
SR SS 40
SR SS 45
SR SS 50
STREAM SAMPLING POINTS
iron
aluminum
manganese

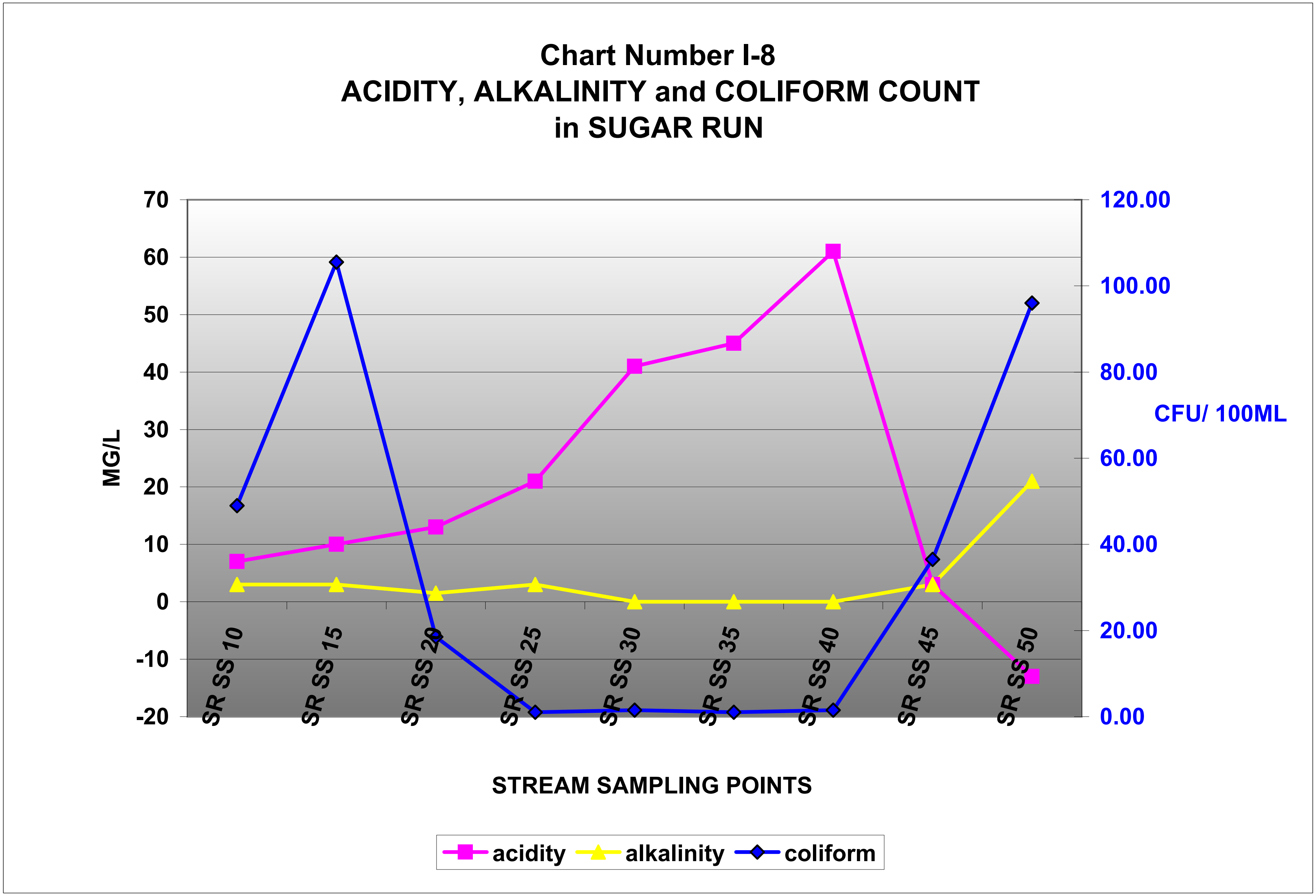


Chart Number I-8
ACIDITY, ALKALINITY and COLIFORM COUNT
in SUGAR RUN
70
60
50
40
30
20
10
0
-10
-20
MG/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
CFU/ 100ML
SR SS 10
SR SS 15
SR SS 20
SR SS 25
SR SS 30
SR SS 35
SR SS 40
SR SS 45
SR SS 50
STREAM SAMPLING POINTS
acidity
alkalinity
coliform

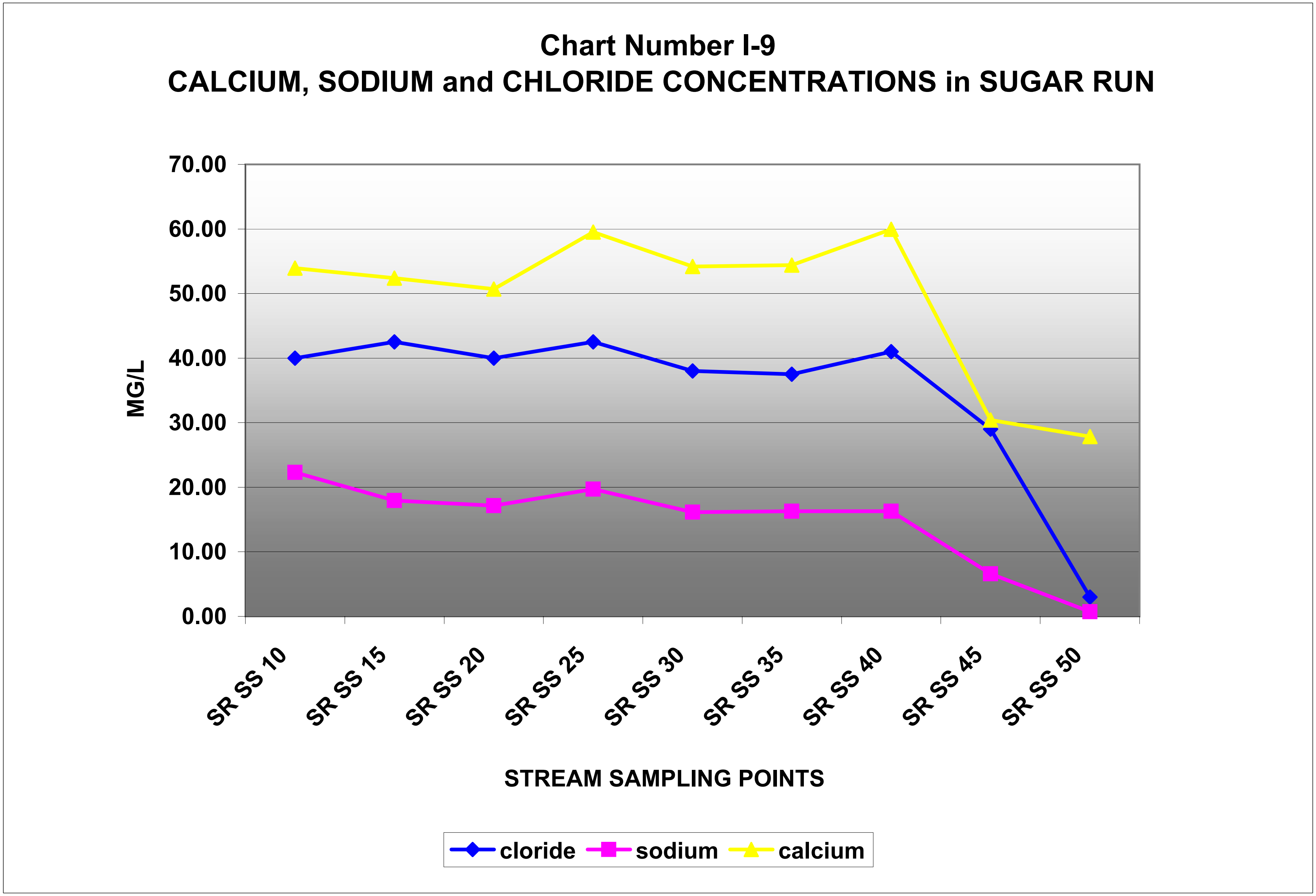
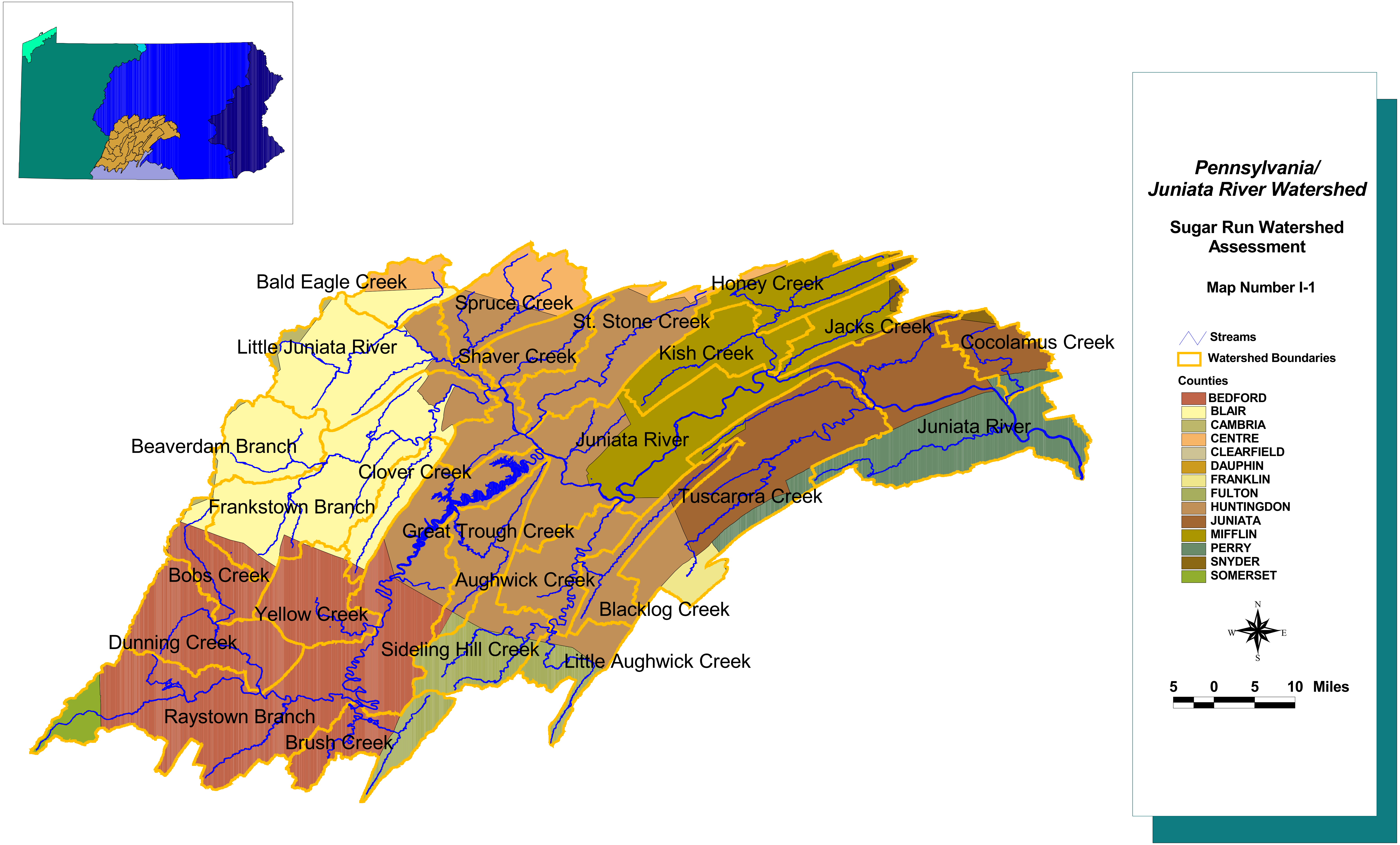
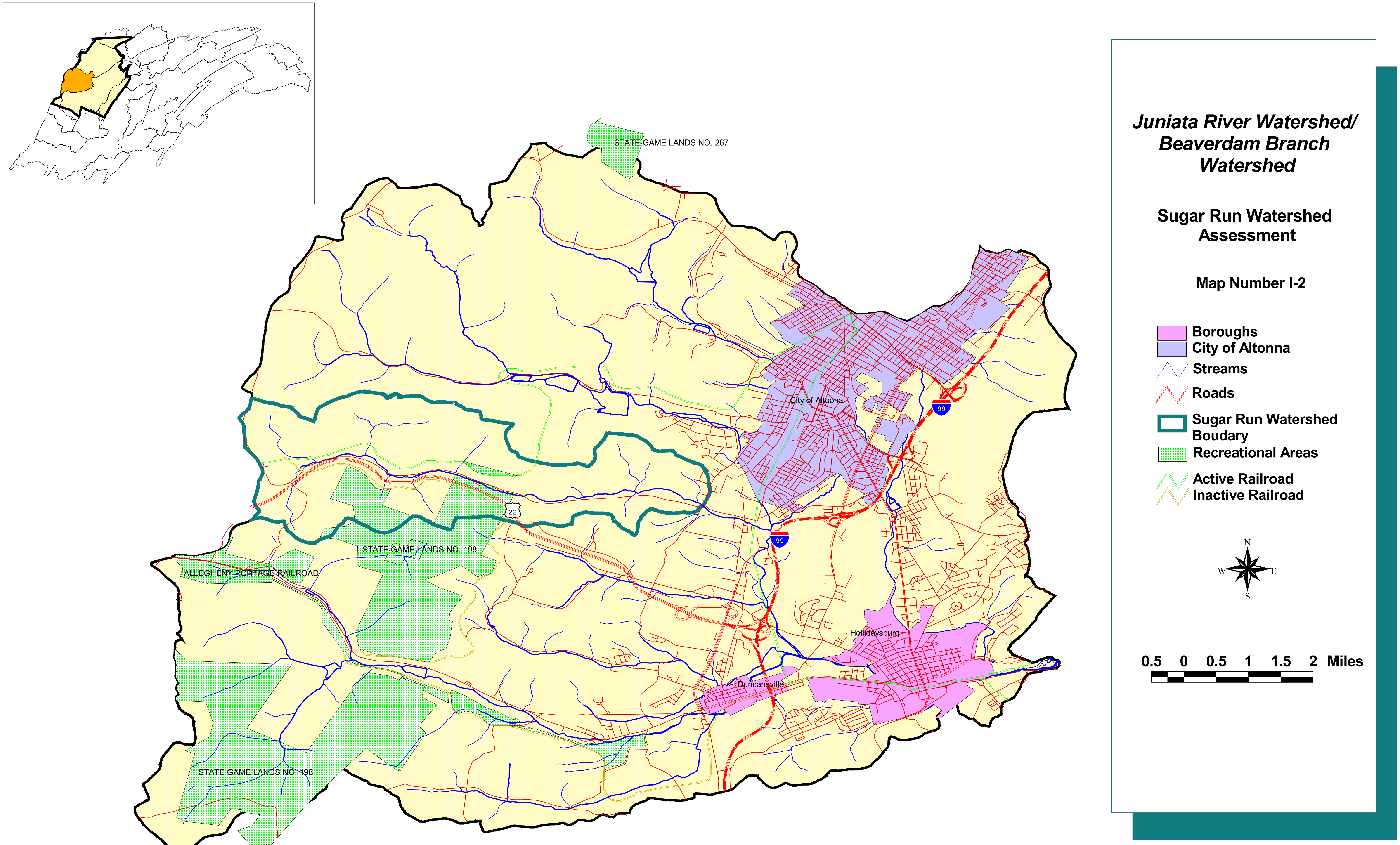


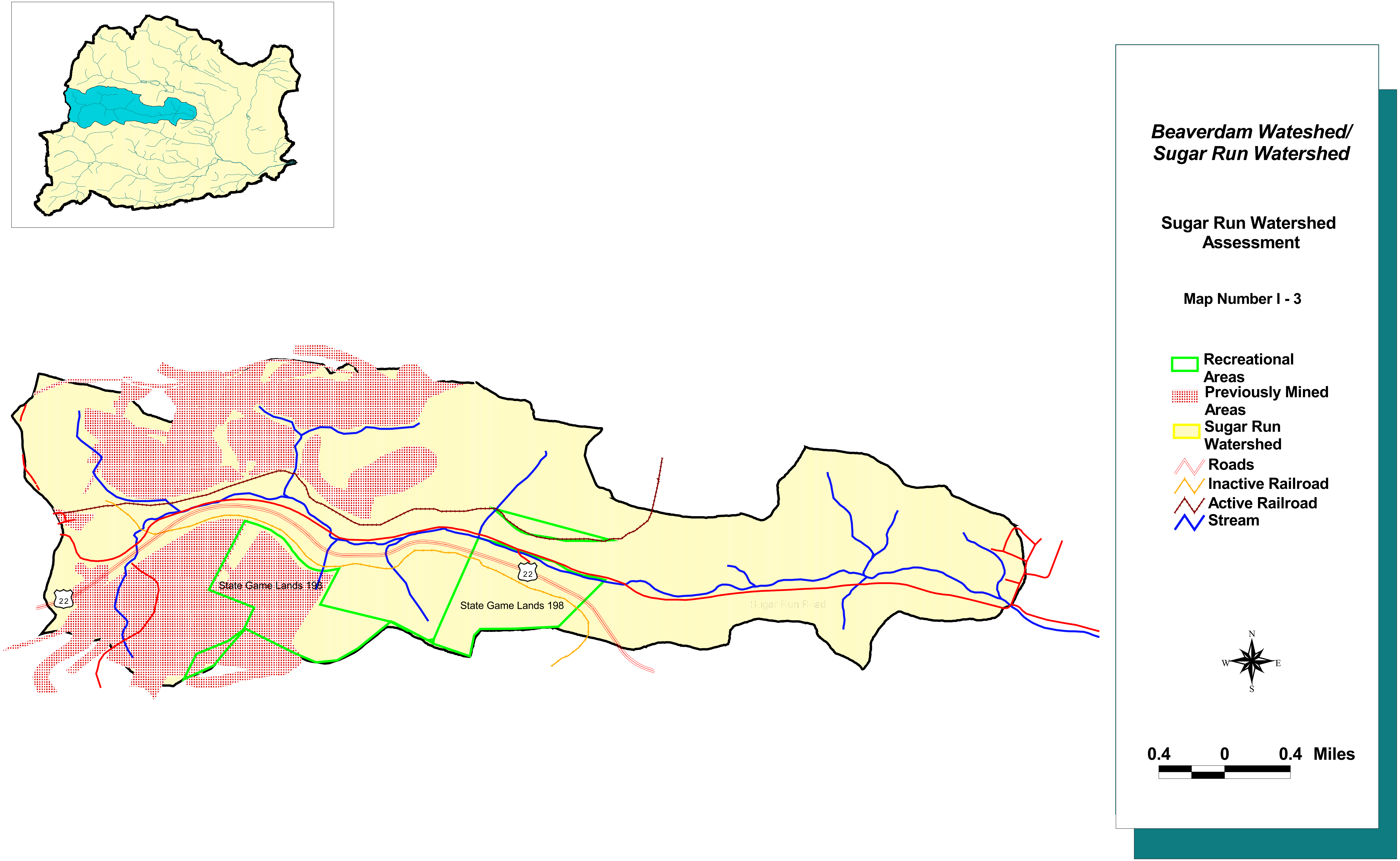
Chart Number I-9
CALCIUM, SODIUM and CHLORIDE CONCENTRATIONS in SUGAR RUN
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
MG/L
SR SS 10
SR SS 15
SR SS 20
SR SS 25
SR SS 30
SR SS 35
SR SS 40
SR SS 45
SR SS 50
STREAM SAMPLING POINTS
cloride
sodium
calcium

MAPS



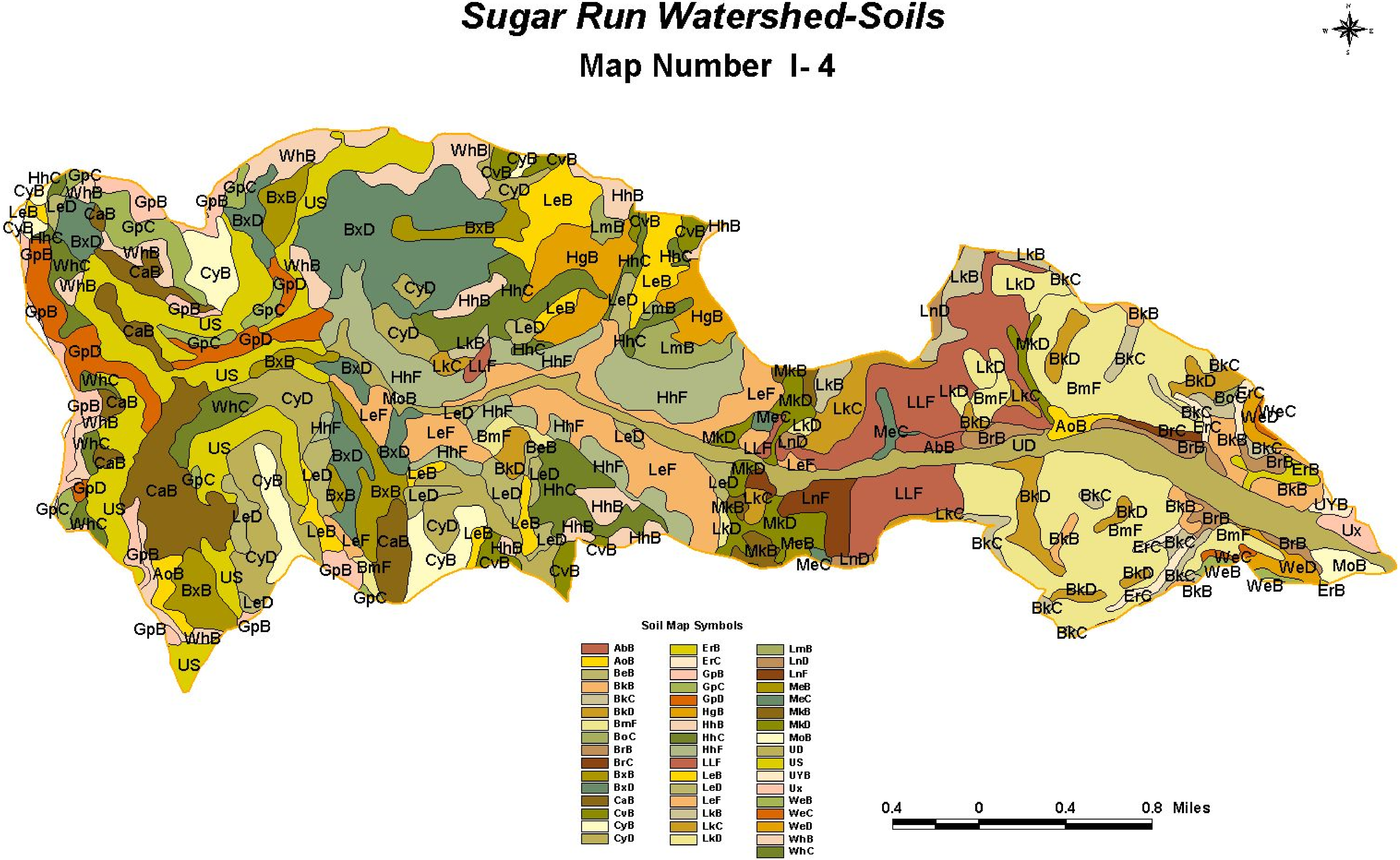
Pennsylvania/
Juniata River Watershed
Sugar Run Watershed
Assessment
Map Number I-1
Streams
Watershed Boundaries
Counties
BEDFORD
BLAIR
CAMBRIA
CENTRE
CLEARFIELD
DAUPHIN
FRANKLIN
FULTON
HUNTINGDON
JUNIATA
MIFFLIN
PERRY
SNYDER
SOMERSET
N
W
E
S
5 0 5 10 Miles
Bald Eagle Creek
Spruce Creek
Honey Creek
St. Stone Creek
Little Juniata River
Shaver Creek
Kish Creek
Jacks Creek
Cocolamus Creek
Beaverdam Branch
Juniata River
Clover Creek
Frankstown Branch
Tuscarora Creek
Great Trough Creek
Bobs Creek
Aughwick Creek
Yellow Creek
Blacklog Creek
Dunning Creek
Sideling Hill Creek
Little Aughwick Creek
Raystown Branch
Brush Creek

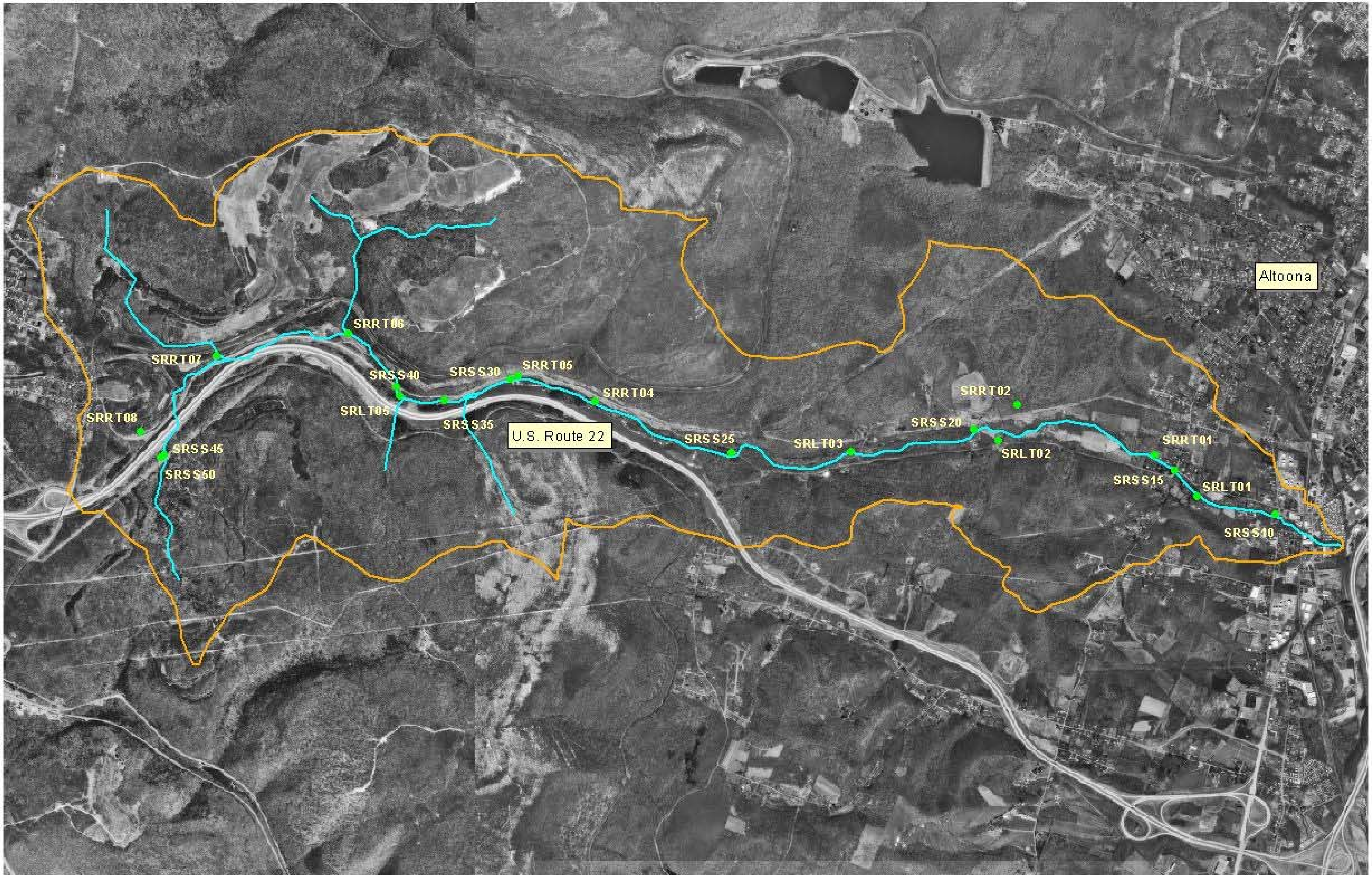

Juniata River Watershed/
Beaverdam Branch
Watershed
Sugar Run Watershed
Assessment
Map Number I-2
Boroughs
City of Altonna
Streams
Roads
Sugar Run Watershed
Boudary
Recreational Areas
Active Railroad
Inactive Railroad
N
W
E
S
0.5 0 0.5 1 1.5 2 Miles
STATE GAME LANDS NO. 267
City of Altoona
99
22
STATE GAME LANDS NO. 198
ALLEGHENY PORTAGE RAILROAD
Hollidaysburg
Duncansville
STATE GAME LANDS NO. 198


Beaverdam Wateshed/
Sugar Run Watershed
Sugar Run Watershed
Assessment
Map Number I - 3
Recreational Areas
Previously Mined Areas
Sugar Run Watershed
Roads
Inactive Railroad
Active Railroad
Stream
N
W
E
S
0.4
0
0.4
Miles
State Game Lands 198
State Game Lands 198
22
22
Sugar Run Road

Sugar Run Watershed-Soils

Map Number I- 4





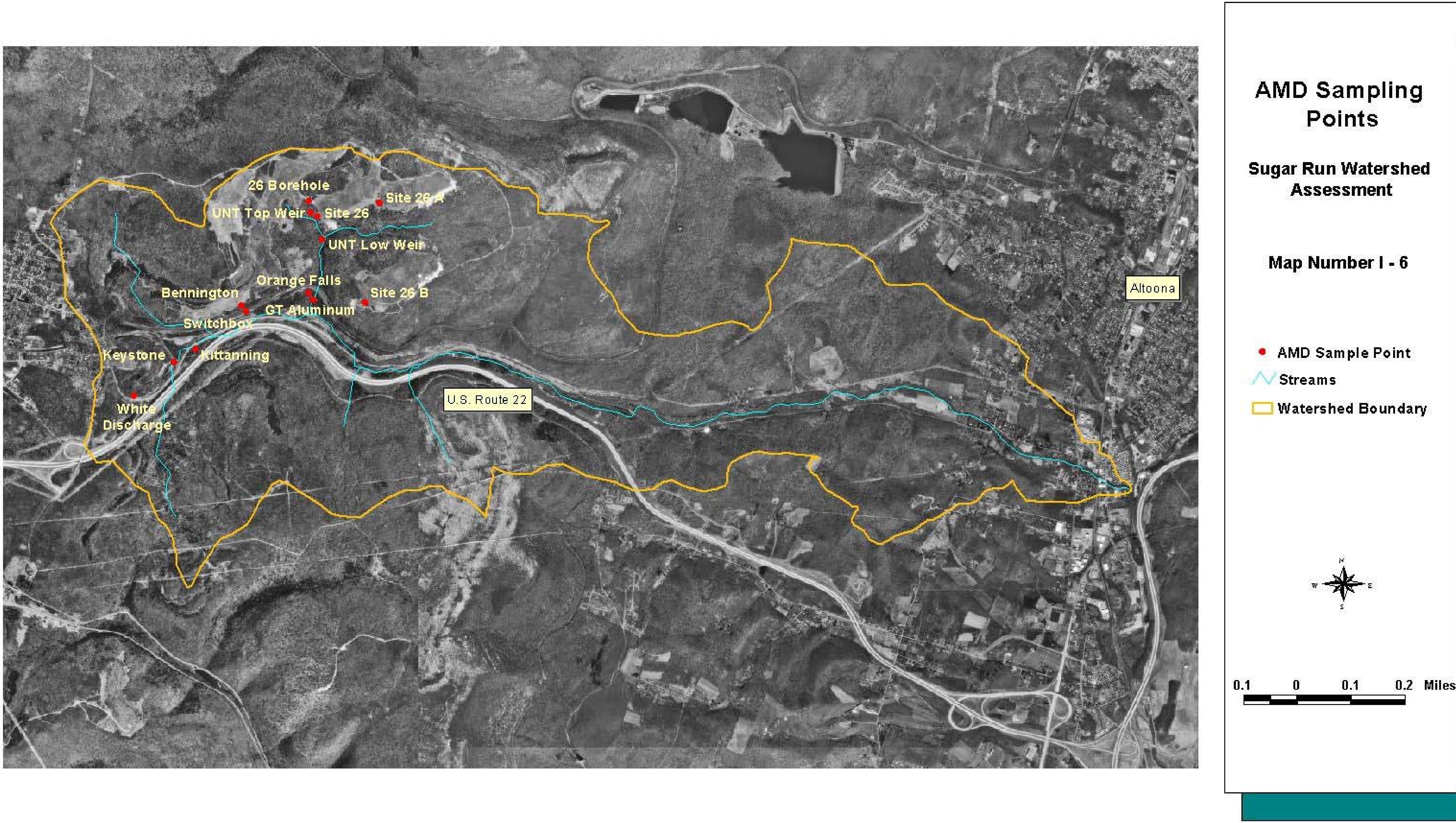
Stream Sampling Points

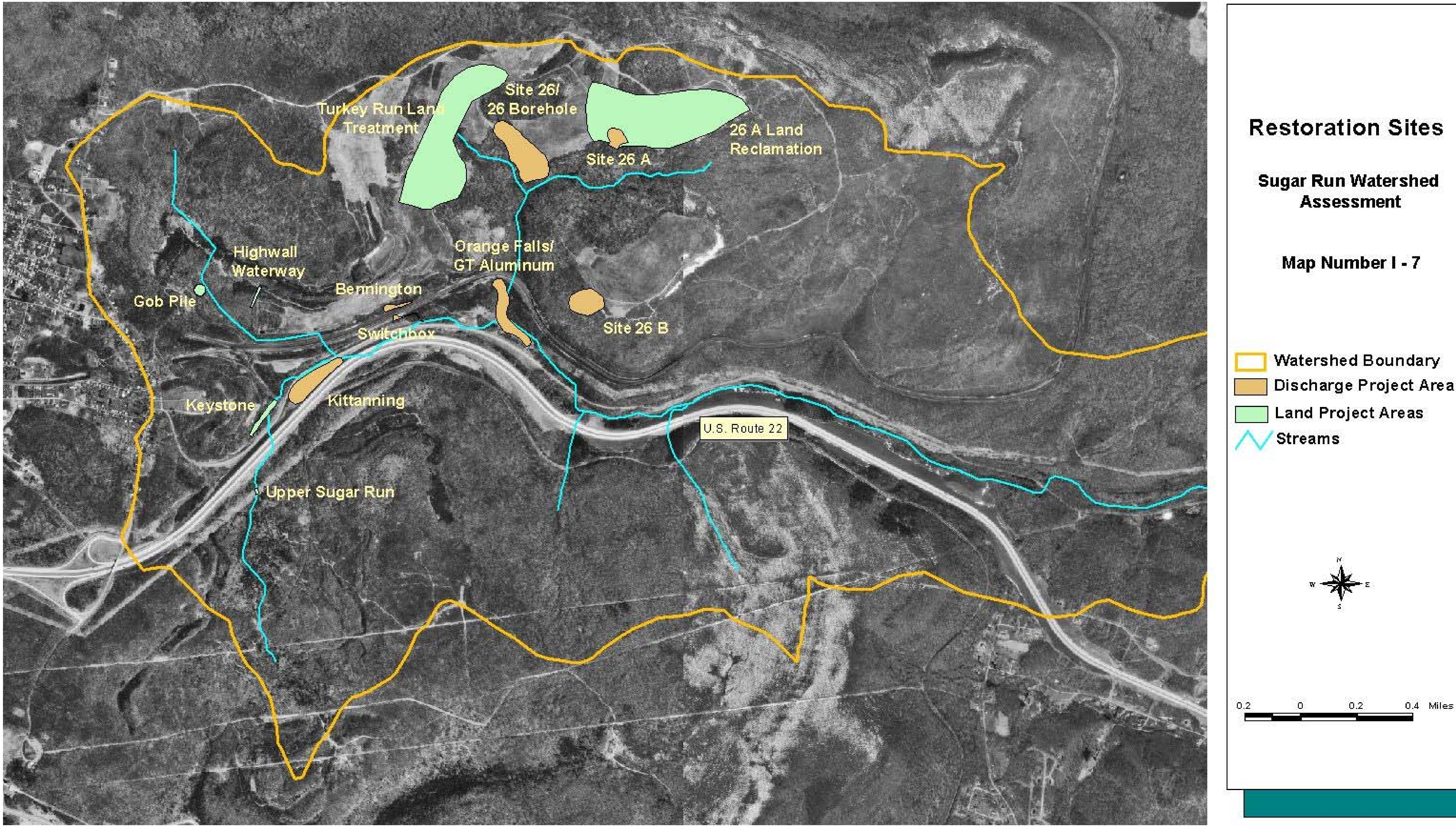
Sugar Run Watershed Assessment

Map Number I - 5

Stream Samples Point
Watershed Boundary
Stream

0.1 0 0.1 0.2 Miles


26 Borehole
Site 26 A
UNT Top Weir
Site 26
UNT Low Weir
Orange Falls
Bennington
Site 26 B
GT Aluminum
Switchbox
Keystone
Kittanning
White
Discharge
U.S. Route 22
Altoona
AMD Sampling
Points
Sugar Run Watershed
Assessment
Map Number I - 6
AMD Sample Point
Streams
Watershed Boundary
0.1
0
0.1
0.2
Miles


Restoration Sites
Sugar Run Watershed Assessment
Map Number I - 7
Watershed Boundary
Discharge Project Areas
Land Project Areas
Streams
0.2 0 0.2 0.4 Miles
Site 26/ 26 Borehole
Turkey Run Land Treatment
26 A Land Reclamation
Site 26 A
Highwall Waterway
Orange Falls/ GT Aluminum
Bennington
Gob Pile
Site 26 B
Switchbox
Keystone
Kittanning
U.S. Route 22
Upper Sugar Run

APPENDIX

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Blair County, Pennsylvania

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**129,144**	**100.0**
SEX AND AGE		
Male	61,917	47.9
Female	67,227	52.1
Under 5 years	7,257	5.6
5 to 9 years	8,134	6.3
10 to 14 years	8,518	6.6
15 to 19 years	9,595	7.4
20 to 24 years	7,306	5.7
25 to 34 years	15,459	12.0
35 to 44 years	19,424	15.0
45 to 54 years	18,416	14.3
55 to 59 years	6,820	5.3
60 to 64 years	5,759	4.5
65 to 74 years	11,127	8.6
75 to 84 years	8,479	6.6
85 years and over	2,850	2.2
Median age (years)	39.5	(X)
18 years and over	99,862	77.3
Male	46,880	36.3
Female	52,982	41.0
21 years and over	93,748	72.6
62 years and over	25,845	20.0
65 years and over	22,456	17.4
Male	8,777	6.8
Female	13,679	10.6
RACE		
One race	128,365	99.4
White	126,059	97.6
Black or African American	1,535	1.2
American Indian and Alaska Native	109	0.1
Asian	463	0.4
Asian Indian	145	0.1
Chinese	89	0.1
Filipino	49	-
Japanese	36	-
Korean	78	0.1
Vietnamese	23	-
Other Asian [1]	43	-
Native Hawaiian and Other Pacific Islander	19	-
Native Hawaiian	10	-
Guamanian or Chamorro	6	-
Samoan	1	-
Other Pacific Islander [2]	2	-
Some other race	180	0.1
Two or more races	779	0.6
Race alone or in combination with one or more other races: [3]		
White	126,795	98.2
Black or African American	1,861	1.4
American Indian and Alaska Native	384	0.3
Asian	611	0.5
Native Hawaiian and Other Pacific Islander	43	-
Some other race	294	0.2

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**129,144**	**100.0**
Hispanic or Latino (of any race)	662	0.5
Mexican	161	0.1
Puerto Rican	186	0.1
Cuban	13	-
Other Hispanic or Latino	302	0.2
Not Hispanic or Latino	128,482	99.5
White alone	125,641	97.3
RELATIONSHIP		
Total population	**129,144**	**100.0**
In households	125,037	96.8
Householder	51,518	39.9
Spouse	27,080	21.0
Child	36,690	28.4
Own child under 18 years	26,862	20.8
Other relatives	4,456	3.5
Under 18 years	1,768	1.4
Nonrelatives	5,293	4.1
Unmarried partner	2,535	2.0
In group quarters	4,107	3.2
Institutionalized population	2,480	1.9
Noninstitutionalized population	1,627	1.3
HOUSEHOLD BY TYPE		
Total households	**51,518**	**100.0**
Family households (families)	34,895	67.7
With own children under 18 years	15,078	29.3
Married-couple family	27,080	52.6
With own children under 18 years	10,836	21.0
Female householder, no husband present	5,769	11.2
With own children under 18 years	3,112	6.0
Nonfamily households	16,623	32.3
Householder living alone	14,344	27.8
Householder 65 years and over	6,832	13.3
Households with individuals under 18 years	16,414	31.9
Households with individuals 65 years and over	15,184	29.5
Average household size	2.43	(X)
Average family size	2.96	(X)
HOUSING OCCUPANCY		
Total housing units	**55,061**	**100.0**
Occupied housing units	51,518	93.6
Vacant housing units	3,543	6.4
For seasonal, recreational, or occasional use	322	0.6
Homeowner vacancy rate (percent)	1.2	(X)
Rental vacancy rate (percent)	7.5	(X)
HOUSING TENURE		
Occupied housing units	**51,518**	**100.0**
Owner-occupied housing units	37,554	72.9
Renter-occupied housing units	13,964	27.1
Average household size of owner-occupied units	2.55	(X)
Average household size of renter-occupied units	2.09	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**29,585**	**100.0**
Nursery school, preschool	1,965	6.6
Kindergarten	1,642	5.6
Elementary school (grades 1-8)	13,632	46.1
High school (grades 9-12)	7,095	24.0
College or graduate school	5,251	17.7
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**88,366**	**100.0**
Less than 9th grade	4,228	4.8
9th to 12th grade, no diploma	10,124	11.5
High school graduate (includes equivalency)	44,107	49.9
Some college, no degree	12,509	14.2
Associate degree	5,130	5.8
Bachelor's degree	8,115	9.2
Graduate or professional degree	4,153	4.7
Percent high school graduate or higher	83.8	(X)
Percent bachelor's degree or higher	13.9	(X)
MARITAL STATUS		
Population 15 years and over	**105,162**	**100.0**
Never married	26,092	24.8
Now married, except separated	57,346	54.5
Separated	2,324	2.2
Widowed	10,101	9.6
Female	8,472	8.1
Divorced	9,299	8.8
Female	5,266	5.0
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**2,006**	**100.0**
Grandparent responsible for grandchildren	1,042	51.9
VETERAN STATUS		
Civilian population 18 years and over	**99,782**	**100.0**
Civilian veterans	15,901	15.9
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**27,874**	**100.0**
With a disability	2,459	8.8
Population 21 to 64 years	**71,046**	**100.0**
With a disability	14,404	20.3
Percent employed	55.5	(X)
No disability	56,642	79.7
Percent employed	77.8	(X)
Population 65 years and over	**20,359**	**100.0**
With a disability	8,319	40.9
RESIDENCE IN 1995		
Population 5 years and over	**121,866**	**100.0**
Same house in 1995	81,255	66.7
Different house in the U.S. in 1995	40,217	33.0
Same county	29,234	24.0
Different county	10,983	9.0
Same state	6,759	5.5
Different state	4,224	3.5
Elsewhere in 1995	394	0.3
NATIVITY AND PLACE OF BIRTH		
Total population	**129,144**	**100.0**
Native	127,834	99.0
Born in United States	127,399	98.6
State of residence	115,832	89.7
Different state	11,567	9.0
Born outside United States	435	0.3
Foreign born	1,310	1.0
Entered 1990 to March 2000	357	0.3
Naturalized citizen	918	0.7
Not a citizen	392	0.3
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**1,310**	**100.0**
Europe	567	43.3
Asia	433	33.1
Africa	45	3.4
Oceania	-	-
Latin America	152	11.6
Northern America	113	8.6
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**121,866**	**100.0**
English only	118,116	96.9
Language other than English	3,750	3.1
Speak English less than "very well"	1,080	0.9
Spanish	1,049	0.9
Speak English less than "very well"	321	0.3
Other Indo-European languages	2,233	1.8
Speak English less than "very well"	639	0.5
Asian and Pacific Island languages	363	0.3
Speak English less than "very well"	111	0.1
ANCESTRY (single or multiple)		
Total population	**129,144**	**100.0**
Total ancestries reported	*134,937*	*104.5*
Arab	397	0.3
Czech[1]	425	0.3
Danish	142	0.1
Dutch	3,291	2.5
English	9,469	7.3
French (except Basque)[1]	2,381	1.8
French Canadian[1]	321	0.2
German	49,435	38.3
Greek	292	0.2
Hungarian	630	0.5
Irish[1]	21,756	16.8
Italian	12,464	9.7
Lithuanian	245	0.2
Norwegian	187	0.1
Polish	4,945	3.8
Portuguese	34	-
Russian	468	0.4
Scotch-Irish	2,397	1.9
Scottish	2,105	1.6
Slovak	706	0.5
Subsaharan African	97	0.1
Swedish	1,057	0.8
Swiss	483	0.4
Ukrainian	343	0.3
United States or American	9,525	7.4
Welsh	1,626	1.3
West Indian (excluding Hispanic groups)	42	-
Other ancestries	9,674	7.5

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**103,379**	**100.0**
In labor force	61,655	59.6
Civilian labor force	61,589	59.6
Employed	57,756	55.9
Unemployed	3,833	3.7
Percent of civilian labor force	6.2	(X)
Armed Forces	66	0.1
Not in labor force	41,724	40.4
Females 16 years and over	**54,717**	**100.0**
In labor force	28,395	51.9
Civilian labor force	28,393	51.9
Employed	26,638	48.7
Own children under 6 years	**8,464**	**100.0**
All parents in family in labor force	5,154	60.9
COMMUTING TO WORK		
Workers 16 years and over	**56,733**	**100.0**
Car, truck, or van - - drove alone	46,626	82.2
Car, truck, or van - - carpooled	5,897	10.4
Public transportation (including taxicab)	258	0.5
Walked	2,080	3.7
Other means	492	0.9
Worked at home	1,380	2.4
Mean travel time to work (minutes)[1]	20.2	(X)
Employed civilian population 16 years and over	**57,756**	**100.0**
OCCUPATION		
Management, professional, and related occupations	14,775	25.6
Service occupations	9,469	16.4
Sales and office occupations	15,439	26.7
Farming, fishing, and forestry occupations	469	0.8
Construction, extraction, and maintenance occupations	6,354	11.0
Production, transportation, and material moving occupations	11,250	19.5
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	949	1.6
Construction	3,529	6.1
Manufacturing	9,159	15.9
Wholesale trade	2,595	4.5
Retail trade	8,391	14.5
Transportation and warehousing, and utilities	4,091	7.1
Information	1,243	2.2
Finance, insurance, real estate, and rental and leasing	2,495	4.3
Professional, scientific, management, administrative, and waste management services	3,100	5.4
Educational, health and social services	12,603	21.8
Arts, entertainment, recreation, accommodation and food services	4,488	7.8
Other services (except public administration)	2,924	5.1
Public administration	2,189	3.8
CLASS OF WORKER		
Private wage and salary workers	47,557	82.3
Government workers	6,599	11.4
Self-employed workers in own not incorporated business	3,420	5.9
Unpaid family workers	180	0.3

Subject	Number	Percent
INCOME IN 1999		
Households	**51,622**	**100.0**
Less than $10,000	5,940	11.5
$10,000 to $14,999	4,903	9.5
$15,000 to $24,999	8,458	16.4
$25,000 to $34,999	7,845	15.2
$35,000 to $49,999	9,967	19.3
$50,000 to $74,999	8,934	17.3
$75,000 to $99,999	3,182	6.2
$100,000 to $149,999	1,588	3.1
$150,000 to $199,999	408	0.8
$200,000 or more	397	0.8
Median household income (dollars)	32,861	(X)
With earnings	38,087	73.8
Mean earnings (dollars)[1]	42,564	(X)
With Social Security income	17,405	33.7
Mean Social Security income (dollars)[1]	11,738	(X)
With Supplemental Security Income	2,718	5.3
Mean Supplemental Security Income (dollars)[1]	5,609	(X)
With public assistance income	1,553	3.0
Mean public assistance income (dollars)[1]	2,566	(X)
With retirement income	9,266	17.9
Mean retirement income (dollars)[1]	12,240	(X)
Families	**35,267**	**100.0**
Less than $10,000	2,060	5.8
$10,000 to $14,999	2,038	5.8
$15,000 to $24,999	5,017	14.2
$25,000 to $34,999	5,563	15.8
$35,000 to $49,999	7,895	22.4
$50,000 to $74,999	7,693	21.8
$75,000 to $99,999	2,832	8.0
$100,000 to $149,999	1,436	4.1
$150,000 to $199,999	370	1.0
$200,000 or more	363	1.0
Median family income (dollars)	40,160	(X)
Per capita income (dollars)[1]	16,743	(X)
Median earnings (dollars):		
Male full-time, year-round workers	30,968	(X)
Female full-time, year-round workers	21,828	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**3,201**	**9.1**
With related children under 18 years	2,425	14.8
With related children under 5 years	1,087	18.2
Families with female householder, no husband present	**1,654**	**29.3**
With related children under 18 years	1,453	42.9
With related children under 5 years	630	53.8
Individuals	**15,840**	**12.6**
18 years and over	10,700	11.1
65 years and over	1,783	8.8
Related children under 18 years	4,946	17.2
Related children 5 to 17 years	3,497	16.3
Unrelated individuals 15 years and over	5,773	26.6

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**55,061**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	38,600	70.1
1-unit, attached	2,005	3.6
2 units	3,242	5.9
3 or 4 units	2,480	4.5
5 to 9 units	1,850	3.4
10 to 19 units	963	1.7
20 or more units	1,962	3.6
Mobile home	3,933	7.1
Boat, RV, van, etc	26	-
YEAR STRUCTURE BUILT		
1999 to March 2000	698	1.3
1995 to 1998	2,077	3.8
1990 to 1994	2,345	4.3
1980 to 1989	4,678	8.5
1970 to 1979	7,277	13.2
1960 to 1969	4,666	8.5
1940 to 1959	11,333	20.6
1939 or earlier	21,987	39.9
ROOMS		
1 room	435	0.8
2 rooms	1,175	2.1
3 rooms	3,284	6.0
4 rooms	7,024	12.8
5 rooms	10,785	19.6
6 rooms	13,645	24.8
7 rooms	9,036	16.4
8 rooms	5,474	9.9
9 or more rooms	4,203	7.6
Median (rooms)	5.9	(X)
Occupied housing units	**51,518**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	7,077	13.7
1995 to 1998	11,356	22.0
1990 to 1994	8,061	15.6
1980 to 1989	9,406	18.3
1970 to 1979	6,214	12.1
1969 or earlier	9,404	18.3
VEHICLES AVAILABLE		
None	5,036	9.8
1	18,510	35.9
2	19,939	38.7
3 or more	8,033	15.6
HOUSE HEATING FUEL		
Utility gas	31,213	60.6
Bottled, tank, or LP gas	680	1.3
Electricity	4,438	8.6
Fuel oil, kerosene, etc	13,330	25.9
Coal or coke	764	1.5
Wood	891	1.7
Solar energy	-	-
Other fuel	143	0.3
No fuel used	59	0.1
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	111	0.2
Lacking complete kitchen facilities	125	0.2
No telephone service	536	1.0

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**51,518**	**100.0**
1.00 or less	50,886	98.8
1.01 to 1.50	467	0.9
1.51 or more	165	0.3
Specified owner-occupied units	**31,614**	**100.0**
VALUE		
Less than $50,000	7,802	24.7
$50,000 to $99,999	15,453	48.9
$100,000 to $149,999	5,705	18.0
$150,000 to $199,999	1,641	5.2
$200,000 to $299,999	704	2.2
$300,000 to $499,999	217	0.7
$500,000 to $999,999	63	0.2
$1,000,000 or more	29	0.1
Median (dollars)	73,600	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	18,076	57.2
Less than $300	185	0.6
$300 to $499	2,320	7.3
$500 to $699	5,130	16.2
$700 to $999	5,978	18.9
$1,000 to $1,499	3,365	10.6
$1,500 to $1,999	674	2.1
$2,000 or more	424	1.3
Median (dollars)	756	(X)
Not mortgaged	13,538	42.8
Median (dollars)	271	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	13,525	42.8
15.0 to 19.9 percent	5,575	17.6
20.0 to 24.9 percent	4,276	13.5
25.0 to 29.9 percent	2,604	8.2
30.0 to 34.9 percent	1,423	4.5
35.0 percent or more	4,064	12.9
Not computed	147	0.5
Specified renter-occupied units	**13,753**	**100.0**
GROSS RENT		
Less than $200	1,486	10.8
$200 to $299	1,493	10.9
$300 to $499	5,930	43.1
$500 to $749	3,201	23.3
$750 to $999	486	3.5
$1,000 to $1,499	149	1.1
$1,500 or more	31	0.2
No cash rent	977	7.1
Median (dollars)	411	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	2,550	18.5
15.0 to 19.9 percent	1,788	13.0
20.0 to 24.9 percent	1,716	12.5
25.0 to 29.9 percent	1,592	11.6
30.0 to 34.9 percent	1,027	7.5
35.0 percent or more	3,897	28.3
Not computed	1,183	8.6

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Allegheny township, Blair County, Pennsylvania

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent	Subject	Number	Percent
Total population	**6,965**	**100.0**	**HISPANIC OR LATINO AND RACE**		
			Total population	**6,965**	**100.0**
SEX AND AGE			Hispanic or Latino (of any race)	12	0.2
Male	3,487	50.1	Mexican	8	0.1
Female	3,478	49.9	Puerto Rican	1	-
			Cuban	-	-
Under 5 years	340	4.9	Other Hispanic or Latino	3	-
5 to 9 years	385	5.5	Not Hispanic or Latino	6,953	99.8
10 to 14 years	433	6.2	White alone	6,855	98.4
15 to 19 years	418	6.0			
20 to 24 years	304	4.4	**RELATIONSHIP**		
25 to 34 years	704	10.1	**Total population**	**6,965**	**100.0**
35 to 44 years	967	13.9	In households	6,311	90.6
45 to 54 years	974	14.0	Householder	2,658	38.2
55 to 59 years	453	6.5	Spouse	1,416	20.3
60 to 64 years	371	5.3	Child	1,748	25.1
65 to 74 years	762	10.9	Own child under 18 years	1,299	18.7
75 to 84 years	646	9.3	Other relatives	268	3.8
85 years and over	208	3.0	Under 18 years	119	1.7
Median age (years)	44.3	(X)	Nonrelatives	221	3.2
			Unmarried partner	133	1.9
18 years and over	5,526	79.3	In group quarters	654	9.4
Male	2,745	39.4	Institutionalized population	653	9.4
Female	2,781	39.9	Noninstitutionalized population	1	-
21 years and over	5,333	76.6			
62 years and over	1,825	26.2	**HOUSEHOLD BY TYPE**		
65 years and over	1,616	23.2	**Total households**	**2,658**	**100.0**
Male	818	11.7	Family households (families)	1,838	69.1
Female	798	11.5	With own children under 18 years	754	28.4
			Married-couple family	1,416	53.3
RACE			With own children under 18 years	522	19.6
One race	6,940	99.6	Female householder, no husband present	320	12.0
White	6,866	98.6	With own children under 18 years	185	7.0
Black or African American	45	0.6	Nonfamily households	820	30.9
American Indian and Alaska Native	-	-	Householder living alone	734	27.6
Asian	25	0.4	Householder 65 years and over	346	13.0
Asian Indian	5	0.1			
Chinese	4	0.1	Households with individuals under 18 years	830	31.2
Filipino	3	-	Households with individuals 65 years and over	802	30.2
Japanese	2	-			
Korean	6	0.1	Average household size	2.37	(X)
Vietnamese	4	0.1	Average family size	2.87	(X)
Other Asian [1]	1	-			
Native Hawaiian and Other Pacific Islander	3	-	**HOUSING OCCUPANCY**		
Native Hawaiian	3	-	**Total housing units**	**2,847**	**100.0**
Guamanian or Chamorro	-	-	Occupied housing units	2,658	93.4
Samoan	-	-	Vacant housing units	189	6.6
Other Pacific Islander [2]	-	-	For seasonal, recreational, or occasional use	18	0.6
Some other race	1	-			
Two or more races	25	0.4	Homeowner vacancy rate (percent)	1.4	(X)
			Rental vacancy rate (percent)	8.4	(X)
***Race alone or in combination with one or more other races:* [3]**					
			HOUSING TENURE		
White	6,891	98.9	**Occupied housing units**	**2,658**	**100.0**
Black or African American	53	0.8	Owner-occupied housing units	2,187	82.3
American Indian and Alaska Native	11	0.2	Renter-occupied housing units	471	17.7
Asian	31	0.4			
Native Hawaiian and Other Pacific Islander	3	-	Average household size of owner-occupied units	2.42	(X)
Some other race	1	-	Average household size of renter-occupied units	2.15	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Allegheny township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**1,420**	**100.0**
Nursery school, preschool	138	9.7
Kindergarten	62	4.4
Elementary school (grades 1-8)	685	48.2
High school (grades 9-12)	432	30.4
College or graduate school	103	7.3
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**5,062**	**100.0**
Less than 9th grade	328	6.5
9th to 12th grade, no diploma	494	9.8
High school graduate (includes equivalency)	2,732	54.0
Some college, no degree	756	14.9
Associate degree	173	3.4
Bachelor's degree	402	7.9
Graduate or professional degree	177	3.5
Percent high school graduate or higher	83.8	(X)
Percent bachelor's degree or higher	11.4	(X)
MARITAL STATUS		
Population 15 years and over	**5,829**	**100.0**
Never married	1,343	23.0
Now married, except separated	3,069	52.7
Separated	63	1.1
Widowed	647	11.1
Female	523	9.0
Divorced	707	12.1
Female	443	7.6
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**63**	**100.0**
Grandparent responsible for grandchildren	42	66.7
VETERAN STATUS		
Civilian population 18 years and over	**5,517**	**100.0**
Civilian veterans	1,052	19.1
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**1,332**	**100.0**
With a disability	134	10.1
Population 21 to 64 years	**3,652**	**100.0**
With a disability	910	24.9
Percent employed	49.6	(X)
No disability	2,742	75.1
Percent employed	81.4	(X)
Population 65 years and over	**1,009**	**100.0**
With a disability	443	43.9
RESIDENCE IN 1995		
Population 5 years and over	**6,642**	**100.0**
Same house in 1995	4,329	65.2
Different house in the U.S. in 1995	2,255	34.0
Same county	1,729	26.0
Different county	526	7.9
Same state	316	4.8
Different state	210	3.2
Elsewhere in 1995	58	0.9

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**6,978**	**100.0**
Native	6,928	99.3
Born in United States	6,883	98.6
State of residence	6,270	89.9
Different state	613	8.8
Born outside United States	45	0.6
Foreign born	50	0.7
Entered 1990 to March 2000	15	0.2
Naturalized citizen	29	0.4
Not a citizen	21	0.3
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**50**	**100.0**
Europe	17	34.0
Asia	6	12.0
Africa	-	-
Oceania	-	-
Latin America	-	-
Northern America	27	54.0
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**6,642**	**100.0**
English only	6,423	96.7
Language other than English	219	3.3
Speak English less than "very well"	33	0.5
Spanish	82	1.2
Speak English less than "very well"	7	0.1
Other Indo-European languages	86	1.3
Speak English less than "very well"	9	0.1
Asian and Pacific Island languages	51	0.8
Speak English less than "very well"	17	0.3
ANCESTRY (single or multiple)		
Total population	**6,978**	**100.0**
Total ancestries reported	*7,626*	*109.3*
Arab	42	0.6
Czech[1]	51	0.7
Danish	-	-
Dutch	160	2.3
English	578	8.3
French (except Basque)[1]	190	2.7
French Canadian[1]	-	-
German	2,890	41.4
Greek	-	-
Hungarian	95	1.4
Irish[1]	1,296	18.6
Italian	402	5.8
Lithuanian	-	-
Norwegian	3	-
Polish	227	3.3
Portuguese	-	-
Russian	31	0.4
Scotch-Irish	204	2.9
Scottish	130	1.9
Slovak	16	0.2
Subsaharan African	-	-
Swedish	71	1.0
Swiss	14	0.2
Ukrainian	5	0.1
United States or American	834	12.0
Welsh	89	1.3
West Indian (excluding Hispanic groups)	-	-
Other ancestries	298	4.3

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Allegheny township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**5,680**	**100.0**
In labor force	3,214	56.6
Civilian labor force	3,214	56.6
Employed	3,030	53.3
Unemployed	184	3.2
Percent of civilian labor force	5.7	(X)
Armed Forces	-	-
Not in labor force	2,466	43.4
Females 16 years and over	**2,853**	**100.0**
In labor force	1,428	50.1
Civilian labor force	1,428	50.1
Employed	1,369	48.0
Own children under 6 years	**400**	**100.0**
All parents in family in labor force	227	56.8
COMMUTING TO WORK		
Workers 16 years and over	**2,970**	**100.0**
Car, truck, or van - - drove alone	2,553	86.0
Car, truck, or van - - carpooled	240	8.1
Public transportation (including taxicab)	5	0.2
Walked	89	3.0
Other means	-	-
Worked at home	83	2.8
Mean travel time to work (minutes)[1]	19.1	(X)
Employed civilian population 16 years and over	**3,030**	**100.0**
OCCUPATION		
Management, professional, and related occupations	628	20.7
Service occupations	478	15.8
Sales and office occupations	864	28.5
Farming, fishing, and forestry occupations	8	0.3
Construction, extraction, and maintenance occupations	433	14.3
Production, transportation, and material moving occupations	619	20.4
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	27	0.9
Construction	187	6.2
Manufacturing	402	13.3
Wholesale trade	258	8.5
Retail trade	567	18.7
Transportation and warehousing, and utilities	261	8.6
Information	41	1.4
Finance, insurance, real estate, and rental and leasing	126	4.2
Professional, scientific, management, administrative, and waste management services	144	4.8
Educational, health and social services	495	16.3
Arts, entertainment, recreation, accommodation and food services	215	7.1
Other services (except public administration)	206	6.8
Public administration	101	3.3
CLASS OF WORKER		
Private wage and salary workers	2,578	85.1
Government workers	245	8.1
Self-employed workers in own not incorporated business	191	6.3
Unpaid family workers	16	0.5

Subject	Number	Percent
INCOME IN 1999		
Households	**2,662**	**100.0**
Less than $10,000	283	10.6
$10,000 to $14,999	181	6.8
$15,000 to $24,999	502	18.9
$25,000 to $34,999	521	19.6
$35,000 to $49,999	519	19.5
$50,000 to $74,999	433	16.3
$75,000 to $99,999	98	3.7
$100,000 to $149,999	103	3.9
$150,000 to $199,999	-	-
$200,000 or more	22	0.8
Median household income (dollars)	31,962	(X)
With earnings	2,020	75.9
Mean earnings (dollars)[1]	40,204	(X)
With Social Security income	982	36.9
Mean Social Security income (dollars)[1]	11,474	(X)
With Supplemental Security Income	167	6.3
Mean Supplemental Security Income (dollars)[1]	5,250	(X)
With public assistance income	16	0.6
Mean public assistance income (dollars)[1]	1,425	(X)
With retirement income	511	19.2
Mean retirement income (dollars)[1]	9,592	(X)
Families	**1,868**	**100.0**
Less than $10,000	97	5.2
$10,000 to $14,999	91	4.9
$15,000 to $24,999	340	18.2
$25,000 to $34,999	351	18.8
$35,000 to $49,999	411	22.0
$50,000 to $74,999	370	19.8
$75,000 to $99,999	83	4.4
$100,000 to $149,999	103	5.5
$150,000 to $199,999	-	-
$200,000 or more	22	1.2
Median family income (dollars)	36,599	(X)
Per capita income (dollars)[1]	16,204	(X)
Median earnings (dollars):		
Male full-time, year-round workers	30,581	(X)
Female full-time, year-round workers	21,940	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**132**	**7.1**
With related children under 18 years	78	9.7
With related children under 5 years	25	12.0
Families with female householder, no husband present	**58**	**21.7**
With related children under 18 years	47	28.1
With related children under 5 years	17	60.7
Individuals	**571**	**9.0**
18 years and over	373	7.7
65 years and over	58	5.7
Related children under 18 years	183	12.7
Related children 5 to 17 years	147	13.2
Unrelated individuals 15 years and over	188	19.1

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Allegheny township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**2,851**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	1,603	56.2
1-unit, attached	48	1.7
2 units	18	0.6
3 or 4 units	117	4.1
5 to 9 units	68	2.4
10 to 19 units	40	1.4
20 or more units	74	2.6
Mobile home	883	31.0
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	76	2.7
1995 to 1998	170	6.0
1990 to 1994	180	6.3
1980 to 1989	485	17.0
1970 to 1979	766	26.9
1960 to 1969	451	15.8
1940 to 1959	400	14.0
1939 or earlier	323	11.3
ROOMS		
1 room	-	-
2 rooms	50	1.8
3 rooms	85	3.0
4 rooms	480	16.8
5 rooms	924	32.4
6 rooms	541	19.0
7 rooms	368	12.9
8 rooms	156	5.5
9 or more rooms	247	8.7
Median (rooms)	5.4	(X)
Occupied housing units	**2,662**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	234	8.8
1995 to 1998	726	27.3
1990 to 1994	448	16.8
1980 to 1989	526	19.8
1970 to 1979	338	12.7
1969 or earlier	390	14.7
VEHICLES AVAILABLE		
None	114	4.3
1	936	35.2
2	1,121	42.1
3 or more	491	18.4
HOUSE HEATING FUEL		
Utility gas	1,003	37.7
Bottled, tank, or LP gas	70	2.6
Electricity	271	10.2
Fuel oil, kerosene, etc	1,229	46.2
Coal or coke	62	2.3
Wood	27	1.0
Solar energy	-	-
Other fuel	-	-
No fuel used	-	-
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	-	-
Lacking complete kitchen facilities	-	-
No telephone service	14	0.5

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**2,662**	**100.0**
1.00 or less	2,625	98.6
1.01 to 1.50	23	0.9
1.51 or more	14	0.5
Specified owner-occupied units	**1,300**	**100.0**
VALUE		
Less than $50,000	134	10.3
$50,000 to $99,999	578	44.5
$100,000 to $149,999	400	30.8
$150,000 to $199,999	153	11.8
$200,000 to $299,999	28	2.2
$300,000 to $499,999	7	0.5
$500,000 to $999,999	-	-
$1,000,000 or more	-	-
Median (dollars)	96,300	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	711	54.7
Less than $300	-	-
$300 to $499	64	4.9
$500 to $699	168	12.9
$700 to $999	256	19.7
$1,000 to $1,499	159	12.2
$1,500 to $1,999	38	2.9
$2,000 or more	26	2.0
Median (dollars)	837	(X)
Not mortgaged	589	45.3
Median (dollars)	308	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	614	47.2
15.0 to 19.9 percent	221	17.0
20.0 to 24.9 percent	175	13.5
25.0 to 29.9 percent	149	11.5
30.0 to 34.9 percent	38	2.9
35.0 percent or more	103	7.9
Not computed	-	-
Specified renter-occupied units	**445**	**100.0**
GROSS RENT		
Less than $200	17	3.8
$200 to $299	10	2.2
$300 to $499	211	47.4
$500 to $749	160	36.0
$750 to $999	18	4.0
$1,000 to $1,499	-	-
$1,500 or more	-	-
No cash rent	29	6.5
Median (dollars)	449	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	35	7.9
15.0 to 19.9 percent	69	15.5
20.0 to 24.9 percent	91	20.4
25.0 to 29.9 percent	27	6.1
30.0 to 34.9 percent	47	10.6
35.0 percent or more	147	33.0
Not computed	29	6.5

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Logan township, Blair County, Pennsylvania

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**11,925**	**100.0**
SEX AND AGE		
Male	5,791	48.6
Female	6,134	51.4
Under 5 years	573	4.8
5 to 9 years	659	5.5
10 to 14 years	738	6.2
15 to 19 years	906	7.6
20 to 24 years	704	5.9
25 to 34 years	1,228	10.3
35 to 44 years	1,788	15.0
45 to 54 years	1,996	16.7
55 to 59 years	656	5.5
60 to 64 years	599	5.0
65 to 74 years	1,154	9.7
75 to 84 years	709	5.9
85 years and over	215	1.8
Median age (years)	41.7	(X)
18 years and over	9,483	79.5
Male	4,520	37.9
Female	4,963	41.6
21 years and over	8,813	73.9
62 years and over	2,427	20.4
65 years and over	2,078	17.4
Male	869	7.3
Female	1,209	10.1
RACE		
One race	11,872	99.6
White	11,736	98.4
Black or African American	70	0.6
American Indian and Alaska Native	8	0.1
Asian	50	0.4
Asian Indian	23	0.2
Chinese	10	0.1
Filipino	1	-
Japanese	8	0.1
Korean	3	-
Vietnamese	1	-
Other Asian [1]	4	-
Native Hawaiian and Other Pacific Islander	1	-
Native Hawaiian	-	-
Guamanian or Chamorro	1	-
Samoan	-	-
Other Pacific Islander [2]	-	-
Some other race	7	0.1
Two or more races	53	0.4
***Race alone or in combination with one or more other races:* [3]**		
White	11,789	98.9
Black or African American	86	0.7
American Indian and Alaska Native	27	0.2
Asian	62	0.5
Native Hawaiian and Other Pacific Islander	1	-
Some other race	18	0.2
HISPANIC OR LATINO AND RACE		
Total population	**11,925**	**100.0**
Hispanic or Latino (of any race)	48	0.4
Mexican	5	-
Puerto Rican	18	0.2
Cuban	3	-
Other Hispanic or Latino	22	0.2
Not Hispanic or Latino	11,877	99.6
White alone	11,699	98.1
RELATIONSHIP		
Total population	**11,925**	**100.0**
In households	11,711	98.2
Householder	4,728	39.6
Spouse	2,732	22.9
Child	3,214	27.0
Own child under 18 years	2,196	18.4
Other relatives	428	3.6
Under 18 years	166	1.4
Nonrelatives	609	5.1
Unmarried partner	220	1.8
In group quarters	214	1.8
Institutionalized population	192	1.6
Noninstitutionalized population	22	0.2
HOUSEHOLD BY TYPE		
Total households	**4,728**	**100.0**
Family households (families)	3,340	70.6
With own children under 18 years	1,287	27.2
Married-couple family	2,732	57.8
With own children under 18 years	997	21.1
Female householder, no husband present	436	9.2
With own children under 18 years	200	4.2
Nonfamily households	1,388	29.4
Householder living alone	1,149	24.3
Householder 65 years and over	523	11.1
Households with individuals under 18 years	1,419	30.0
Households with individuals 65 years and over	1,387	29.3
Average household size	2.48	(X)
Average family size	2.91	(X)
HOUSING OCCUPANCY		
Total housing units	**4,975**	**100.0**
Occupied housing units	4,728	95.0
Vacant housing units	247	5.0
For seasonal, recreational, or occasional use	19	0.4
Homeowner vacancy rate (percent)	0.9	(X)
Rental vacancy rate (percent)	7.4	(X)
HOUSING TENURE		
Occupied housing units	**4,728**	**100.0**
Owner-occupied housing units	3,864	81.7
Renter-occupied housing units	864	18.3
Average household size of owner-occupied units	2.54	(X)
Average household size of renter-occupied units	2.18	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Logan township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**2,628**	**100.0**
Nursery school, preschool	181	6.9
Kindergarten	168	6.4
Elementary school (grades 1-8)	1,123	42.7
High school (grades 9-12)	656	25.0
College or graduate school	500	19.0
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**8,362**	**100.0**
Less than 9th grade	341	4.1
9th to 12th grade, no diploma	1,003	12.0
High school graduate (includes equivalency)	4,040	48.3
Some college, no degree	1,116	13.3
Associate degree	469	5.6
Bachelor's degree	923	11.0
Graduate or professional degree	470	5.6
Percent high school graduate or higher	83.9	(X)
Percent bachelor's degree or higher	16.7	(X)
MARITAL STATUS		
Population 15 years and over	**9,958**	**100.0**
Never married	2,391	24.0
Now married, except separated	5,666	56.9
Separated	208	2.1
Widowed	850	8.5
Female	749	7.5
Divorced	843	8.5
Female	469	4.7
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**161**	**100.0**
Grandparent responsible for grandchildren	31	19.3
VETERAN STATUS		
Civilian population 18 years and over	**9,480**	**100.0**
Civilian veterans	1,534	16.2
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**2,474**	**100.0**
With a disability	158	6.4
Population 21 to 64 years	**6,786**	**100.0**
With a disability	1,403	20.7
Percent employed	58.8	(X)
No disability	5,383	79.3
Percent employed	81.7	(X)
Population 65 years and over	**1,894**	**100.0**
With a disability	748	39.5
RESIDENCE IN 1995		
Population 5 years and over	**11,351**	**100.0**
Same house in 1995	8,059	71.0
Different house in the U.S. in 1995	3,216	28.3
Same county	2,385	21.0
Different county	831	7.3
Same state	525	4.6
Different state	306	2.7
Elsewhere in 1995	76	0.7

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**11,923**	**100.0**
Native	11,695	98.1
Born in United States	11,661	97.8
State of residence	10,739	90.1
Different state	922	7.7
Born outside United States	34	0.3
Foreign born	228	1.9
Entered 1990 to March 2000	88	0.7
Naturalized citizen	155	1.3
Not a citizen	73	0.6
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**228**	**100.0**
Europe	108	47.4
Asia	88	38.6
Africa	12	5.3
Oceania	-	-
Latin America	-	-
Northern America	20	8.8
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**11,351**	**100.0**
English only	10,985	96.8
Language other than English	366	3.2
Speak English less than "very well"	116	1.0
Spanish	82	0.7
Speak English less than "very well"	29	0.3
Other Indo-European languages	220	1.9
Speak English less than "very well"	74	0.7
Asian and Pacific Island languages	54	0.5
Speak English less than "very well"	13	0.1
ANCESTRY (single or multiple)		
Total population	**11,923**	**100.0**
Total ancestries reported	*13,947*	*117.0*
Arab	31	0.3
Czech[1]	27	0.2
Danish	26	0.2
Dutch	313	2.6
English	874	7.3
French (except Basque)[1]	406	3.4
French Canadian[1]	63	0.5
German	4,812	40.4
Greek	41	0.3
Hungarian	57	0.5
Irish[1]	2,388	20.0
Italian	1,383	11.6
Lithuanian	123	1.0
Norwegian	16	0.1
Polish	615	5.2
Portuguese	-	-
Russian	10	0.1
Scotch-Irish	221	1.9
Scottish	253	2.1
Slovak	59	0.5
Subsaharan African	17	0.1
Swedish	77	0.6
Swiss	59	0.5
Ukrainian	94	0.8
United States or American	1,018	8.5
Welsh	140	1.2
West Indian (excluding Hispanic groups)	-	-
Other ancestries	824	6.9

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Logan township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**9,838**	**100.0**
In labor force	6,073	61.7
Civilian labor force	6,073	61.7
Employed	5,804	59.0
Unemployed	269	2.7
Percent of civilian labor force	4.4	(X)
Armed Forces	-	-
Not in labor force	3,765	38.3
Females 16 years and over	**5,111**	**100.0**
In labor force	2,784	54.5
Civilian labor force	2,784	54.5
Employed	2,631	51.5
Own children under 6 years	**672**	**100.0**
All parents in family in labor force	526	78.3
COMMUTING TO WORK		
Workers 16 years and over	**5,647**	**100.0**
Car, truck, or van - - drove alone	5,043	89.3
Car, truck, or van - - carpooled	379	6.7
Public transportation (including taxicab)	20	0.4
Walked	52	0.9
Other means	55	1.0
Worked at home	98	1.7
Mean travel time to work (minutes)[1]	17.3	(X)
Employed civilian population 16 years and over	**5,804**	**100.0**
OCCUPATION		
Management, professional, and related occupations	1,629	28.1
Service occupations	721	12.4
Sales and office occupations	1,865	32.1
Farming, fishing, and forestry occupations	12	0.2
Construction, extraction, and maintenance occupations	635	10.9
Production, transportation, and material moving occupations	942	16.2
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	15	0.3
Construction	365	6.3
Manufacturing	721	12.4
Wholesale trade	277	4.8
Retail trade	937	16.1
Transportation and warehousing, and utilities	554	9.5
Information	167	2.9
Finance, insurance, real estate, and rental and leasing	286	4.9
Professional, scientific, management, administrative, and waste management services	341	5.9
Educational, health and social services	1,340	23.1
Arts, entertainment, recreation, accommodation and food services	391	6.7
Other services (except public administration)	225	3.9
Public administration	185	3.2
CLASS OF WORKER		
Private wage and salary workers	4,749	81.8
Government workers	717	12.4
Self-employed workers in own not incorporated business	308	5.3
Unpaid family workers	30	0.5

Subject	Number	Percent
INCOME IN 1999		
Households	**4,730**	**100.0**
Less than $10,000	319	6.7
$10,000 to $14,999	426	9.0
$15,000 to $24,999	708	15.0
$25,000 to $34,999	747	15.8
$35,000 to $49,999	915	19.3
$50,000 to $74,999	953	20.1
$75,000 to $99,999	383	8.1
$100,000 to $149,999	192	4.1
$150,000 to $199,999	32	0.7
$200,000 or more	55	1.2
Median household income (dollars)	36,993	(X)
With earnings	3,528	74.6
Mean earnings (dollars)[1]	47,762	(X)
With Social Security income	1,603	33.9
Mean Social Security income (dollars)[1]	12,545	(X)
With Supplemental Security Income	242	5.1
Mean Supplemental Security Income (dollars)[1]	5,619	(X)
With public assistance income	67	1.4
Mean public assistance income (dollars)[1]	1,712	(X)
With retirement income	1,042	22.0
Mean retirement income (dollars)[1]	15,854	(X)
Families	**3,333**	**100.0**
Less than $10,000	73	2.2
$10,000 to $14,999	139	4.2
$15,000 to $24,999	445	13.4
$25,000 to $34,999	537	16.1
$35,000 to $49,999	715	21.5
$50,000 to $74,999	811	24.3
$75,000 to $99,999	348	10.4
$100,000 to $149,999	183	5.5
$150,000 to $199,999	27	0.8
$200,000 or more	55	1.7
Median family income (dollars)	44,772	(X)
Per capita income (dollars)[1]	18,439	(X)
Median earnings (dollars):		
Male full-time, year-round workers	35,000	(X)
Female full-time, year-round workers	21,717	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**109**	**3.3**
With related children under 18 years	74	5.6
With related children under 5 years	9	2.3
Families with female householder, no husband present	**35**	**9.0**
With related children under 18 years	35	21.2
With related children under 5 years	9	16.1
Individuals	**852**	**7.3**
18 years and over	661	7.1
65 years and over	104	5.5
Related children under 18 years	165	7.1
Related children 5 to 17 years	154	8.8
Unrelated individuals 15 years and over	460	23.7

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Logan township, Blair County, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**4,974**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	3,698	74.3
1-unit, attached	189	3.8
2 units	161	3.2
3 or 4 units	68	1.4
5 to 9 units	131	2.6
10 to 19 units	68	1.4
20 or more units	32	0.6
Mobile home	627	12.6
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	65	1.3
1995 to 1998	309	6.2
1990 to 1994	333	6.7
1980 to 1989	676	13.6
1970 to 1979	928	18.7
1960 to 1969	614	12.3
1940 to 1959	943	19.0
1939 or earlier	1,106	22.2
ROOMS		
1 room	5	0.1
2 rooms	96	1.9
3 rooms	191	3.8
4 rooms	657	13.2
5 rooms	1,180	23.7
6 rooms	1,085	21.8
7 rooms	824	16.6
8 rooms	516	10.4
9 or more rooms	420	8.4
Median (rooms)	5.8	(X)
Occupied housing units	**4,727**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	515	10.9
1995 to 1998	974	20.6
1990 to 1994	691	14.6
1980 to 1989	1,004	21.2
1970 to 1979	734	15.5
1969 or earlier	809	17.1
VEHICLES AVAILABLE		
None	187	4.0
1	1,401	29.6
2	2,129	45.0
3 or more	1,010	21.4
HOUSE HEATING FUEL		
Utility gas	2,815	59.6
Bottled, tank, or LP gas	97	2.1
Electricity	459	9.7
Fuel oil, kerosene, etc	1,220	25.8
Coal or coke	57	1.2
Wood	53	1.1
Solar energy	-	-
Other fuel	26	0.6
No fuel used	-	-
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	8	0.2
Lacking complete kitchen facilities	15	0.3
No telephone service	16	0.3
OCCUPANTS PER ROOM		
Occupied housing units	**4,727**	**100.0**
1.00 or less	4,703	99.5
1.01 to 1.50	24	0.5
1.51 or more	-	-
Specified owner-occupied units	**3,281**	**100.0**
VALUE		
Less than $50,000	442	13.5
$50,000 to $99,999	1,751	53.4
$100,000 to $149,999	641	19.5
$150,000 to $199,999	274	8.4
$200,000 to $299,999	121	3.7
$300,000 to $499,999	44	1.3
$500,000 to $999,999	-	-
$1,000,000 or more	8	0.2
Median (dollars)	85,300	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	1,941	59.2
Less than $300	6	0.2
$300 to $499	171	5.2
$500 to $699	583	17.8
$700 to $999	641	19.5
$1,000 to $1,499	360	11.0
$1,500 to $1,999	109	3.3
$2,000 or more	71	2.2
Median (dollars)	783	(X)
Not mortgaged	1,340	40.8
Median (dollars)	259	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	1,439	43.9
15.0 to 19.9 percent	527	16.1
20.0 to 24.9 percent	575	17.5
25.0 to 29.9 percent	272	8.3
30.0 to 34.9 percent	118	3.6
35.0 percent or more	336	10.2
Not computed	14	0.4
Specified renter-occupied units	**843**	**100.0**
GROSS RENT		
Less than $200	6	0.7
$200 to $299	27	3.2
$300 to $499	365	43.3
$500 to $749	326	38.7
$750 to $999	28	3.3
$1,000 to $1,499	11	1.3
$1,500 or more	5	0.6
No cash rent	75	8.9
Median (dollars)	494	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	155	18.4
15.0 to 19.9 percent	144	17.1
20.0 to 24.9 percent	195	23.1
25.0 to 29.9 percent	56	6.6
30.0 to 34.9 percent	49	5.8
35.0 percent or more	169	20.0
Not computed	75	8.9

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Tunnelhill borough, Pennsylvania

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**409**	**100.0**
SEX AND AGE		
Male	192	46.9
Female	217	53.1
Under 5 years	18	4.4
5 to 9 years	27	6.6
10 to 14 years	22	5.4
15 to 19 years	26	6.4
20 to 24 years	21	5.1
25 to 34 years	31	7.6
35 to 44 years	66	16.1
45 to 54 years	56	13.7
55 to 59 years	21	5.1
60 to 64 years	21	5.1
65 to 74 years	48	11.7
75 to 84 years	39	9.5
85 years and over	13	3.2
Median age (years)	43.9	(X)
18 years and over	328	80.2
Male	153	37.4
Female	175	42.8
21 years and over	311	76.0
62 years and over	116	28.4
65 years and over	100	24.4
Male	33	8.1
Female	67	16.4
RACE		
One race	407	99.5
White	404	98.8
Black or African American	-	-
American Indian and Alaska Native	1	0.2
Asian	1	0.2
Asian Indian	-	-
Chinese	-	-
Filipino	-	-
Japanese	1	0.2
Korean	-	-
Vietnamese	-	-
Other Asian [1]	-	-
Native Hawaiian and Other Pacific Islander	1	0.2
Native Hawaiian	1	0.2
Guamanian or Chamorro	-	-
Samoan	-	-
Other Pacific Islander [2]	-	-
Some other race	-	-
Two or more races	2	0.5
Race alone or in combination with one or more other races: [3]		
White	406	99.3
Black or African American	-	-
American Indian and Alaska Native	2	0.5
Asian	2	0.5
Native Hawaiian and Other Pacific Islander	1	0.2
Some other race	-	-

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**409**	**100.0**
Hispanic or Latino (of any race)	-	-
Mexican	-	-
Puerto Rican	-	-
Cuban	-	-
Other Hispanic or Latino	-	-
Not Hispanic or Latino	409	100.0
White alone	404	98.8
RELATIONSHIP		
Total population	**409**	**100.0**
In households	404	98.8
Householder	178	43.5
Spouse	75	18.3
Child	115	28.1
Own child under 18 years	74	18.1
Other relatives	19	4.6
Under 18 years	6	1.5
Nonrelatives	17	4.2
Unmarried partner	6	1.5
In group quarters	5	1.2
Institutionalized population	-	-
Noninstitutionalized population	5	1.2
HOUSEHOLD BY TYPE		
Total households	**178**	**100.0**
Family households (families)	100	56.2
With own children under 18 years	41	23.0
Married-couple family	75	42.1
With own children under 18 years	30	16.9
Female householder, no husband present	15	8.4
With own children under 18 years	7	3.9
Nonfamily households	78	43.8
Householder living alone	69	38.8
Householder 65 years and over	39	21.9
Households with individuals under 18 years	45	25.3
Households with individuals 65 years and over	73	41.0
Average household size	2.27	(X)
Average family size	3.09	(X)
HOUSING OCCUPANCY		
Total housing units	**188**	**100.0**
Occupied housing units	178	94.7
Vacant housing units	10	5.3
For seasonal, recreational, or occasional use	-	-
Homeowner vacancy rate (percent)	0.8	(X)
Rental vacancy rate (percent)	3.2	(X)
HOUSING TENURE		
Occupied housing units	**178**	**100.0**
Owner-occupied housing units	118	66.3
Renter-occupied housing units	60	33.7
Average household size of owner-occupied units	2.59	(X)
Average household size of renter-occupied units	1.63	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Tunnelhill borough, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**84**	**100.0**
Nursery school, preschool	5	6.0
Kindergarten	7	8.3
Elementary school (grades 1-8)	34	40.5
High school (grades 9-12)	30	35.7
College or graduate school	8	9.5
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**297**	**100.0**
Less than 9th grade	49	16.5
9th to 12th grade, no diploma	38	12.8
High school graduate (includes equivalency)	136	45.8
Some college, no degree	22	7.4
Associate degree	23	7.7
Bachelor's degree	20	6.7
Graduate or professional degree	9	3.0
Percent high school graduate or higher	70.7	(X)
Percent bachelor's degree or higher	9.8	(X)
MARITAL STATUS		
Population 15 years and over	**352**	**100.0**
Never married	112	31.8
Now married, except separated	160	45.5
Separated	4	1.1
Widowed	49	13.9
Female	40	11.4
Divorced	27	7.7
Female	13	3.7
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**4**	**100.0**
Grandparent responsible for grandchildren	4	100.0
VETERAN STATUS		
Civilian population 18 years and over	**331**	**100.0**
Civilian veterans	48	14.5
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**87**	**100.0**
With a disability	5	5.7
Population 21 to 64 years	**207**	**100.0**
With a disability	53	25.6
Percent employed	37.7	(X)
No disability	154	74.4
Percent employed	76.0	(X)
Population 65 years and over	**97**	**100.0**
With a disability	46	47.4
RESIDENCE IN 1995		
Population 5 years and over	**391**	**100.0**
Same house in 1995	300	76.7
Different house in the U.S. in 1995	91	23.3
Same county	47	12.0
Different county	44	11.3
Same state	42	10.7
Different state	2	0.5
Elsewhere in 1995	-	-

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**403**	**100.0**
Native	391	97.0
Born in United States	391	97.0
State of residence	387	96.0
Different state	4	1.0
Born outside United States	-	-
Foreign born	12	3.0
Entered 1990 to March 2000	-	-
Naturalized citizen	11	2.7
Not a citizen	1	0.2
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**12**	**100.0**
Europe	12	100.0
Asia	-	-
Africa	-	-
Oceania	-	-
Latin America	-	-
Northern America	-	-
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**391**	**100.0**
English only	374	95.7
Language other than English	17	4.3
Speak English less than "very well"	11	2.8
Spanish	3	0.8
Speak English less than "very well"	-	-
Other Indo-European languages	14	3.6
Speak English less than "very well"	11	2.8
Asian and Pacific Island languages	-	-
Speak English less than "very well"	-	-
ANCESTRY (single or multiple)		
Total population	**403**	**100.0**
Total ancestries reported	*434*	*107.7*
Arab	-	-
Czech[1]	3	0.7
Danish	-	-
Dutch	4	1.0
English	25	6.2
French (except Basque)[1]	21	5.2
French Canadian[1]	-	-
German	91	22.6
Greek	-	-
Hungarian	4	1.0
Irish[1]	80	19.9
Italian	54	13.4
Lithuanian	-	-
Norwegian	2	0.5
Polish	83	20.6
Portuguese	-	-
Russian	1	0.2
Scotch-Irish	2	0.5
Scottish	11	2.7
Slovak	10	2.5
Subsaharan African	-	-
Swedish	3	0.7
Swiss	-	-
Ukrainian	-	-
United States or American	18	4.5
Welsh	-	-
West Indian (excluding Hispanic groups)	-	-
Other ancestries	22	5.5

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Tunnelhill borough, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**338**	**100.0**
In labor force	176	52.1
Civilian labor force	176	52.1
Employed	167	49.4
Unemployed	9	2.7
Percent of civilian labor force	5.1	(X)
Armed Forces	-	-
Not in labor force	162	47.9
Females 16 years and over	**183**	**100.0**
In labor force	82	44.8
Civilian labor force	82	44.8
Employed	80	43.7
Own children under 6 years	**12**	**100.0**
All parents in family in labor force	8	66.7
COMMUTING TO WORK		
Workers 16 years and over	**167**	**100.0**
Car, truck, or van - - drove alone	125	74.9
Car, truck, or van - - carpooled	20	12.0
Public transportation (including taxicab)	6	3.6
Walked	-	-
Other means	-	-
Worked at home	16	9.6
Mean travel time to work (minutes)[1]	28.9	(X)
Employed civilian population 16 years and over	**167**	**100.0**
OCCUPATION		
Management, professional, and related occupations	32	19.2
Service occupations	33	19.8
Sales and office occupations	30	18.0
Farming, fishing, and forestry occupations	-	-
Construction, extraction, and maintenance occupations	38	22.8
Production, transportation, and material moving occupations	34	20.4
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	-	-
Construction	14	8.4
Manufacturing	10	6.0
Wholesale trade	3	1.8
Retail trade	32	19.2
Transportation and warehousing, and utilities	24	14.4
Information	4	2.4
Finance, insurance, real estate, and rental and leasing	-	-
Professional, scientific, management, administrative, and waste management services	8	4.8
Educational, health and social services	37	22.2
Arts, entertainment, recreation, accommodation and food services	7	4.2
Other services (except public administration)	14	8.4
Public administration	14	8.4
CLASS OF WORKER		
Private wage and salary workers	126	75.4
Government workers	27	16.2
Self-employed workers in own not incorporated business	14	8.4
Unpaid family workers	-	-

Subject	Number	Percent
INCOME IN 1999		
Households	**185**	**100.0**
Less than $10,000	31	16.8
$10,000 to $14,999	31	16.8
$15,000 to $24,999	42	22.7
$25,000 to $34,999	27	14.6
$35,000 to $49,999	24	13.0
$50,000 to $74,999	25	13.5
$75,000 to $99,999	4	2.2
$100,000 to $149,999	1	0.5
$150,000 to $199,999	-	-
$200,000 or more	-	-
Median household income (dollars)	22,604	(X)
With earnings	115	62.2
Mean earnings (dollars)[1]	29,770	(X)
With Social Security income	83	44.9
Mean Social Security income (dollars)[1]	9,920	(X)
With Supplemental Security Income	17	9.2
Mean Supplemental Security Income (dollars)[1]	5,088	(X)
With public assistance income	-	-
Mean public assistance income (dollars)[1]	-	(X)
With retirement income	48	25.9
Mean retirement income (dollars)[1]	10,416	(X)
Families	**96**	**100.0**
Less than $10,000	2	2.1
$10,000 to $14,999	4	4.2
$15,000 to $24,999	22	22.9
$25,000 to $34,999	21	21.9
$35,000 to $49,999	22	22.9
$50,000 to $74,999	20	20.8
$75,000 to $99,999	4	4.2
$100,000 to $149,999	1	1.0
$150,000 to $199,999	-	-
$200,000 or more	-	-
Median family income (dollars)	34,500	(X)
Per capita income (dollars)[1]	13,042	(X)
Median earnings (dollars):		
Male full-time, year-round workers	23,500	(X)
Female full-time, year-round workers	16,250	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**10**	**10.4**
With related children under 18 years	10	22.2
With related children under 5 years	5	50.0
Families with female householder, no husband present	**-**	**-**
With related children under 18 years	-	-
With related children under 5 years	-	-
Individuals	**68**	**16.9**
18 years and over	52	15.7
65 years and over	10	10.3
Related children under 18 years	16	22.2
Related children 5 to 17 years	10	16.7
Unrelated individuals 15 years and over	32	30.2

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Tunnelhill borough, Pennsylvania

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**200**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	134	67.0
1-unit, attached	5	2.5
2 units	-	-
3 or 4 units	-	-
5 to 9 units	3	1.5
10 to 19 units	6	3.0
20 or more units	46	23.0
Mobile home	6	3.0
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	-	-
1995 to 1998	-	-
1990 to 1994	3	1.5
1980 to 1989	58	29.0
1970 to 1979	22	11.0
1960 to 1969	8	4.0
1940 to 1959	28	14.0
1939 or earlier	81	40.5
ROOMS		
1 room	-	-
2 rooms	4	2.0
3 rooms	39	19.5
4 rooms	21	10.5
5 rooms	24	12.0
6 rooms	50	25.0
7 rooms	38	19.0
8 rooms	13	6.5
9 or more rooms	11	5.5
Median (rooms)	5.7	(X)
Occupied housing units	**188**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	16	8.5
1995 to 1998	28	14.9
1990 to 1994	31	16.5
1980 to 1989	40	21.3
1970 to 1979	37	19.7
1969 or earlier	36	19.1
VEHICLES AVAILABLE		
None	22	11.7
1	87	46.3
2	53	28.2
3 or more	26	13.8
HOUSE HEATING FUEL		
Utility gas	-	-
Bottled, tank, or LP gas	6	3.2
Electricity	60	31.9
Fuel oil, kerosene, etc	97	51.6
Coal or coke	24	12.8
Wood	1	0.5
Solar energy	-	-
Other fuel	-	-
No fuel used	-	-
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	2	1.1
Lacking complete kitchen facilities	-	-
No telephone service	3	1.6

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**188**	**100.0**
1.00 or less	188	100.0
1.01 to 1.50	-	-
1.51 or more	-	-
Specified owner-occupied units	**102**	**100.0**
VALUE		
Less than $50,000	54	52.9
$50,000 to $99,999	45	44.1
$100,000 to $149,999	3	2.9
$150,000 to $199,999	-	-
$200,000 to $299,999	-	-
$300,000 to $499,999	-	-
$500,000 to $999,999	-	-
$1,000,000 or more	-	-
Median (dollars)	48,400	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	52	51.0
Less than $300	-	-
$300 to $499	9	8.8
$500 to $699	17	16.7
$700 to $999	18	17.6
$1,000 to $1,499	8	7.8
$1,500 to $1,999	-	-
$2,000 or more	-	-
Median (dollars)	700	(X)
Not mortgaged	50	49.0
Median (dollars)	243	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	37	36.3
15.0 to 19.9 percent	22	21.6
20.0 to 24.9 percent	8	7.8
25.0 to 29.9 percent	9	8.8
30.0 to 34.9 percent	5	4.9
35.0 percent or more	21	20.6
Not computed	-	-
Specified renter-occupied units	**72**	**100.0**
GROSS RENT		
Less than $200	20	27.8
$200 to $299	9	12.5
$300 to $499	26	36.1
$500 to $749	6	8.3
$750 to $999	-	-
$1,000 to $1,499	-	-
$1,500 or more	-	-
No cash rent	11	15.3
Median (dollars)	307	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	14	19.4
15.0 to 19.9 percent	3	4.2
20.0 to 24.9 percent	8	11.1
25.0 to 29.9 percent	8	11.1
30.0 to 34.9 percent	9	12.5
35.0 percent or more	19	26.4
Not computed	11	15.3

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

A Brief History of Blair County
by
Sylva Emerson

A hundred years before the chartering of Blair County, the territory now comprising the area was primeval forest. It is doubtful if any portion of the county had been cleared. It was densely covered with a great variety of trees - oak, pine, chestnut, hemlock, hickory and walnut. In these forests could be found elk, deer, bear, squirrel, rabbit and here and there an eastern buffalo. Mountain streams were filled with salmon, bass and trout. In the low lying areas, streams were filled with beaver who built dams which created swamps.

Some historical records indicate that there was a Delaware Indian village called Assunnepachla at Frankstown, even though the land was occupied by the Delaware Indians, the ownership of the land was claimed by the Iroquois. Francois Etienne (Frank Stevens) for whom the village of Frankstown acquired its name, had a trading post at this location. Indians visited at certain seasons to trade for supplies. Conrad Weiser states in his journal of August 20, 1748 that he passed the location of Frankstown on that date and found no houses or cabins there. Land could not be legally owned by the whites prior to July 6, 1754 when the treaty was negotiated at Albany, N.Y. for the purchase of a large block of central Pennsylvania land from the confederacy known as the Six Nation - Oneida, Cayuga, Seneca, Mohawk, Onondaga and Tuscaroras. It was sold for four hundred pounds or about $2,500. At this time land warrants were issued at Philadelphia to whites who wished to settle in the newly acquired territory.

Much of the travel from the east came by way of the Frankstown Path also known as the Kittanning Trail. Col. Armstrong marched his band of men along this trail in September of 1756 on their way to the Kittanning Indian village. This expedition was necessary to quell the savage Indian attacks on the settlers of the Juniata Valley. Located in the most mountainous regions of the Commonwealth of Pennsylvania, Blair County is estimated to cover five hundred-thirty square miles. Although not opened to settlement until 1754, a few squatters occupied sections of the land.

Cumberland County was formed in January of 1750 and covered the area from Lancaster and York Counties on the east to the western border of the State. On the ninth of March 1771, Bedford County was formed from the western half of Cumberland County and on September 20, 1787, Huntingdon County was created from a part of Bedford County. On February 26, 1846 by an act of the Legislature, Blair County became the fifty-ninth county in the Commonwealth of Pennsylvania. The territory was taken form the townships of North Woodbury and Greenfield in the County of Bedford and the townships of Allegheny, Antes, Snyder, Tyrone, Frankstown, Blair, Huston and Woodbury and a portion of Morris Township lying westward of the line run by William Reed from the County of Huntingdon. With these townships and the two existing boroughs of Hollidaysburg and Gaysport, the County of Blair began. Hollidaysburg, with the largest population, became the County seat. Townships formed since that time have been Juniata from Greenfield in 1847; Logan from Allegheny and Antis in 1850; Taylor form Huston and North Woodbury in 1855 and Freedom from Juniata in 1857.

HAMLETS, VILLAGES, TOWNS, BOROUGHS & CITY

Hollidaysburg is one of the older communities in Blair County. Founded by Adam and William Holliday, brothers, in 1768, it bears their name today. Both Adam and William had been to the area with Col. Armstrong's expedition in 1756. Adam settled on one side of the Juniata river and William occupied land on the other side. Many of the settlers coming to the area were Scotch-Irish. The village was a farming community until the opening of the Huntingdon, Cambria and Indiana turnpike, a narrow road for wagon travel, not to be compared to the turnpikes of today. By 1830, Hollidaysburg had grown to a hamlet of seventy-two people. The Juniata division of the Pennsylvania Canal was opened to Hollidaysburg in November, 1832 and the growth of the community increased rapidly by several thousand people. A grand celebration marked the occasion. By 1834, the Portage Railroad opened, thus connecting by train, canal and incline plane the cities of Philadelphia and Pittsburgh.

Incorporated as a borough on August 10, 1836, Hollidaysburg was at one time the hub of transportation in the area. Although Gaysport was contemporaneous with the development of Hollidaysburg, it was incorporated as a borough on April 21, 1841, and even though settled by William Holliday, it acquired its name from John Gay, a prominent civil engineer. The two boroughs were united by agreement on January 1, 1924.

A foundry was established in 1835 by Devine and Evans for fabricating iron materials and tools to be used on the canal and Portage railroad. It is still in business today under the name of The McLanahan Corporation.
The County's earliest newspaper, "The Hollidaysburg Register" was established in 1836. When the new County of Blair was formed and Hollidaysburg became the County seat, Judge Jeremiah Black later became a Supreme Court Justice, an Attorney General and Secretary of State in the cabinet of President Buchanan. The first session of court was held on July 27, 1846 in the Methodist Episcopal Church on Walnut Street. The church was used until a court house could be constructed. A stone building adjacent to the church and owned by John Mahoney served as a jail.

On July 4, 1846, Daniel K. Reamey was appointed to construct the first court house and jail at the site of the present court house on Allegheny Street. The cost of the work was $14,576.18. The jail was located at the rear of the court house. After a number of years, the first court house building became inadequate due to increased business and a contract was let for the removal of that building and the construction of a larger building by a Pittsburgh contractor, John Schreiner. The contract price was $103,700. Since its construction in 1875-76, an addition was built and several annexes added, including the former school for girls, Highland Hall. A large addition has been constructed in 1999. A new prison, located between Mulberry and Blair Streets, was constructed in 1868-69 at a cost of $100,000. Additions and improvements have been made during the past decade.

In 1905 the Berwind-White Coal Mining Company erected care repair shops just east of Hollidaysburg. These shops have been in continuous operation and employ many Hollidaysburg residents. About the same time, the Pennsylvania Railroad expanded its shops and yards in Hollidaysburg and extended their lines to other communities. Later in the twentieth century, the Samuel Rea shops were constructed which employ many persons from the entire area. They bear the name of a Hollidaysburg native who became a president of the Pennsylvania Railroad. James Industries, manufacturer of the Slinky toys located here in the 1960's. Hollidaysburg is largely a residential community, taking pride in its many beautiful homes and in its historical significance.

Williamsburg is another of the older communities in the County. It was a borough from 1829 to 1841 when the charter was forfeited. In 1893 it was reincorporated. Failure to elect borough officials was the reason for the forfeiture of the charter.
Land was purchased by Jacob Ake in 1790. It contained three hundred-fourteen acres. Mr. Ake was attracted to the site because of its beauty and its big spring. By 1810 there were thirty-four houses in the village. The name of the village was changed from Aketown to Williamsburg to honor William Ake, the son of the founder. Jacob Ake established the first free school in the area. He donated the land, erected the building, hired the teachers and when the neighborhood children failed to attend school, he acted as truant officer.

By 1820 an inn was owned and operated by John Martin who was assessed with a distillery and one slave. This is the only record of slavery in Williamsburg. On the first of June in 1831, contract bids for work on the Pennsylvania canal between Huntingdon and Hollidaysburg were received at Williamsburg. Several thousand people attended and there were more than four thousand bids. This included work on fourteen dams, forty-three locks and seventy three sections. Completed in 1832, the canal was opened on November 28th and the packet boat "John Blair" left its berth in Huntingdon, proceeding westward. At Williamsburg a great celebration took place, greeting with music and musketry the prominent citizens aboard the boat.

Small businesses flourished in the village. By 1905 the Williamsburg Manufacturing Company's new plant was opened and was given the franchise to furnish light and power to the borough. The West Virginia Pulp and Paper Company purchased this company in 1906 and operated a paper manufacturing plant in the borough for many years.

The Blair County home for homeless children was located in Williamsburg.
The United States Envelope Company was officially opened on January 1, 1965 in the borough. It employs a number of persons.

Claysburg was an early settlement at the eastern end of Greenfield Township. The first settlers were Valentine Lingenfelter and his two sons who were here about 1770. Shortly after their arrival, the Dively family settled here and soon to follow were Thomas Ives and John Nicholas. Following the Revolutionary War many settlers arrived from the east and south. About 1804, John Ulrich Seth cleared some of the land and put up a saw mill and grist mill.

Dr. Peter Shoenberger settled one mile south of Claysburg and operated the Sarah Furnace at Sproul. The furnace operated for some few years and was unsuccessful. Thus there was no public works in the Claysburg area until the cobblestone road was built through town about 1906-07.

An early school was built near the limestone quarry, south of Claysburg about 1795. A second school was built in 1812. It was a log building with a clapboard roof and slab benches. James Lonham was the teacher. Rules were strict for teachers in those days. One of the rules was that gentlemen teachers may take one evening a week for courting purposes or two evenings a week if they went to church regularly. Teachers who performed their labors well and without fault for five years were given an increase of twenty-five cents per week in pay providing the Board of Education approved. Following the completion of the State road and the railroad in 1910, outside interest grew in the Claysburg area. The area of Sarah Furnace was now the site of a brick plant by 1911 and in 1913 a brickyard was constructed north of town. General Refractories Company who owned these brickyards employed about twelve hundred men and products were among the finest in the United States.

Duncansville lies along the route of the old Philadelphia-Pittsburgh turnpike. Once the town was a beehive of activities with the iron industry and received the nickname "Irontown" when forges, iron mills and foundries were the communities industries. Not to be ignored were the woolen mills, wagon works, grist mills and lime production. Ground was acquired and laid out by Samuel Duncan and Jacob Walters. Duncan named his plot west of the Blair's Creek, Duncansville while Walters land on the east side of the stream was named Walterstown. A bridge at the stream connected the two villages. There was considerable confusion and rivalry between Duncan’s section of town and Walterstown. To settle the issue Duncan and Walters agreed to choose a common name. It was decided that they would meet on the bridge which separated the plots and by the toss of a coin decide that the entire area would be named for Duncan or Walters. A large crowd gathered on both sides of the bridge for the toss of the coin. Duncan won and thus Walterstown was part of Duncansville.

In the 1840's a forge was built which was later transformed into a rolling mill. By 1882 the iron industry was a booming business. In 1896 the rolling mill company began construction of a wire mill. When production flourished the mill produced more than four hundred kegs of finished nails daily. The mill closed in 1904. Another industry which flourished for many years in the community was the manufacturing of bricks. Duncansville was incorporated as a borough on March 4, 1891. About 1930 a large airport was established and existed for a number of years. One of the nations first air mail pick-up systems was initiated here whereby a plane could pick-up and dispatch mail by special device without landing the plane.

East Freedom was first established as Three Forges in Bedford County in February 1829. When Blair County was established, the name was changed to East Freedom. In the early days, it was an important center for travel and transportation. Now surrounded by a number of businesses and highways, it presents some of the most beautiful scenery in Blair County.

Frankstown is probably the oldest name of a town in the County. Legend says that it was named for Francois Etienne (Frank Stevens) who was of French descent and had a trading post there before white men lived in the area. Supplies and weapons were traded for meat and furs with the Indian tribes. By 1800 Frankstown contained about twenty houses and several taverns and was considered an important business center due to its location on the Huntingdon, Cambria and Indiana turnpike which was the main artery of transportation for mails and passenger traffic. An iron furnace was built in 1836 and was the main industry of the town, employing fifty men and producing five-hundred-fifty tons of pig iron per month. It was put out of blast in 1885 and dismantled.

Martinsburg is surrounded by a rich agricultural community in the heart of Morrison's Cove, one of the most beautiful and fertile valleys in the central part of Pennsylvania. Most of the early settlers were Dunkards of German origin who came from the Conococheague Valley. They came in groups and bought land grants and original deeds. Some names given to home sites were Richlands, Blooming Grove and Hatters Delight.

Mr. John Brumbaugh applied for a patent for fifteen hundred acres in 1785. He received the warrant dated September 7, 1792 which was signed by Richard and Thomas Penn. According to family tradition, Mr. Brumbaugh and his son-in-law, Daniel Camerer were driven out on their first visit to this section due to the news of an incursion of Indians. Later, his two sons-in-law divided the land between them with Mr. Camerer plotting the land on the eastside of South Market Street and Abraham Stoner laid out his plot on the westside of the street.

Martinsburg was incorporated in 1832. Although there is some confusion concerning the naming of the town, the markers at the edge of town state that it was named for Conrad Martin.

On May 6, 1872 a crowd gathered to see the first train come steaming in on the Morrison Cove Branch of the Pennsylvania Railroad. This was a great advantage for the people wishing swifter transportation to the various towns and the city. However, by August of 1934, their means of travel by train were shattered by the announcement that travel would be restricted to freight. Service would be totally discontinued in 1941.
The Franklin High School and Institute was opened in 1860 as a college preparatory and ladies finishing school. This school had varied functions and has been known as Juniata Collegiate Institute and as an Indian school.
Governor George Earle of Pennsylvania appeared in Martinsburg on October 22, 1938 at the opening of the Altoona-Blair County airport. Originally called the Cove Valley airport, this facility has undergone many changes and improvements over the years.

Today we see more improvements developing for future years. One of the finest features of Martinsburg is its Memorial Park.

McKee or McKees Gap played several roles in the history of the region. The town was named for George McKee who purchased the land about 1810 from George Myers who had built a grist mill and a saw mill in the Gap about 1797-98. Dr. Peter Shoenberger built a forge here in 1830 and his son, Edwin, expanded the business by establishing Martha furnace.

In the summer of 1863, the news went out that the Army of the South was about to invade Pennsylvania. They were expected to strike in the Gap area. Bells rang and horns blew to summon all men and boys who were not with the Union army to bear arms. Out to the Gap they flew to protect their homes and farms. This citizen's army had made no provision for feeding the men at the "front". Shovels and picks were used to set up breastworks at the Gap. By this time the gallant men were hungry and having no food provided, they raided the chicken houses and smokehouses of the nearby farmers. Hams and chickens were easily cooked over an open fire. But the small fires grew into larger fires and a forest of trees were accidentally set aflame. From this time on the citizen army was referred to as "The Chicken Raiders". Instead of coming up the valley, the Southern army met the Union at Gettysburg.

Newry owes much to Patrick Cassidy, its founder. He was born in Newry, Ireland in 1738. He came to America as an employee of a British officer when he was but fourteen years of age. He fought in the Revolutionary war on the side of the Colonists when he was in his late thirties. Returning from the war, he purchased about three hundred acres of land which included the present town of Newry from Samuel and John Gilbert. About 1787 he became a permanent resident on his land. He had become a proficient surveyor and laid out twenty-six lots in the original plot and later added fifty lots on the north and south sides of the village.

Newry was served by a branch line of the Pennsylvania Railroad for passenger and freight service for thirty years. During this time business flourished for a carpet weaving shop and a hat factory. Other enterprises were a wagon shop, tin shop, furniture store and a general store.

Two churches are in the borough and occupy land donated to them by Patrick Cassidy - St. Patricks Roman Catholic Church and the Lutheran church.
In 1876 the town was incorporated as a borough. Today, at the southern end of the town, there is a large market open daily and a flea market open on weekends.

Roaring Spring received its name from the great spring which was at one time said to roar and could be heard a mile away. The spring still flows but in order to change the flow of water from the spring, several large stones were moved thus eliminating the source of the roar.

One of the earliest settlers was Edward Sanders who bought the property about 1776. He sold parts of the land to various individuals. Daniel Ullery purchased much of the land in 1780. Jacob Neff built and operated a grist mill here during the War of Independence. Mr. George Span operated a grist mill in 1821 and for a time the village was called Spang's Mills.

In 1864 Daniel Bare and his son moved to the village and established a mill and mercantile business. By 1865 they constructed the first paper mill. During the next year it was destroyed by fire and then rebuilt as a larger facility. Since Mr. Bare was a prominent citizen of the community, some individuals wished to change the name of the town to Baretown. However, when the name was changed in 1868, it was changed to Roaring Spring and on October 3, 1887, it was chartered as a borough. By 1886 the Blank Book Factory was built by Mr. Bare. Both paper mill and book factory remain active today. Roaring Spring is a thriving community.

Bellwood, or Bells Mills as it was once known, was founded by Edward "Neddy" Bell about 1800. A grist mill was built. About 1832 Edward Bell and his son, Martin became interested in the iron industry and built a furnace which they named for Edward Bell's daughter, Elizabeth. The ruins of this furnace are still visible today. Martin Bell devised a system of using escaping gasses from the iron furnace to give added power to the operation and secured a patent for the process. John Bell owned Mary Ann Forge and the Isetts owned Cold Spring Forge.

The Bells Gap Railroad, a narrow gauge road, was built and put into operation in 1872. Its main function was to bring coal and lumber to the main line of the Pennsylvania Railroad. The railroad extended from Lloydsville to Bellwood, a descent of eleven hundred feet in the nine miles of track. In the 1880's it was widened to standard gauge and by 1891 had been extended to Fordham. In 1892 it merged with other lines and became known as the Pennsylvania and Northwestern Railroad. Although abandoned a number of years ago, the bed of the railroad makes an excellent hiking trail with its deep gorges and mountainous slopes. It is truly a spot of beauty.

Incorporation of the Borough of Bellwood occurred on February 9, 1888. Trolley service was initiated into the borough on July 1, 1894. It was later replaced by bus service. Bellwood is a progressive community. During the past years many improvements have been made in the borough. A fine library has been built and provides excellent service to the community.

Tyrone is one of the youngest boroughs in the County of Blair, being established on July 27, 1857. It was named for County Tyrone in Ireland. It is said that early in the history of the area, John Logan, an Indian friend to the white man, lived here with his wife, Vastina, near the Big Spring. Vastina was a beautiful woman but a plague caused her death along with five of their six children. Logan remained in this location for some years.
Jacob Burley was the first white man to build a home on the bank of Bald Eagle Creek. He became a merchant in partnership with the Rev. John Stewart.

The Pennsylvania Railroad came to Tyrone about 1850 and by 1856 the Tyrone and Pennsylvania Railroad took over the line. In 1868 the Pennsylvania Railroad established shops in Tyrone.

One of the catastrophes that happened in the area was the wreck of the Walter Main Circus train on Memorial Day 1893. Five miles north of Tyrone, the train coming from Houtzdale derailed at McCann's Crossing. Many of the wild animals were killed or escaped into the woods. Five men were killed and many others injured. Tyrone residents came to the rescue of those who needed food and shelter. The circus was reorganized, new equipment purchased, new personnel recruited and new animals bought by Walter Main with the assistance of Tyrone people.

The St. Patrick's day flood of 1936 affected almost all of the business district and more than half of the residential district. Floodwaters from three to sixteen feet roared through the main streets. Recovery began immediately. Channeling of the river and creek have done much to eliminate flooding in the future.
Following World War II, more industry located in Tyrone. In the 1950's a hospital was constructed. The community continues its progress into the twenty-first century.

Alatoona owes its existence to the Pennsylvania Railroad. In 1849, David Robeson owned a farm of two hundred and twenty acres located in what is now the heart of downtown Altoona. He had built a log home near the site of where the Altoona Post Office now stands. To the southwest of Mr. Robeson's farm was land owned by William Loudon and to the northeast the farm was owned by Andrew Green. The story is often told that when the railroad company became interested in the purchase of the land, a Mr. Cadwallader came from Philadelphia for the purchase of the Robeson farm. He represented a Mr. Archibald Write, Esq. who later transferred the land to his son, John. When Mr. Cadwallader arrived at the Robeson home, Robeson was engaged in butchering hogs. Summoning her husband for the negotiations, Mrs. Robeson found a letter which had been dropped by Cadwallader. Mr. Cadwallader, not noticing that he had dropped the letter, offered Mr. Robeson six thousand dollars for the farm. In the meantime, Mrs. Robeson, not knowing the source of the letter, opened it to see to whom it belonged. She discovered that the price offered for the farm was mentioned in the letter as the sum of ten thousand dollars. This information she communicated to her husband and the price offered was immediately improved to ten thousand dollars.

The rapid growth and development of the city can be attributed to the expanding interest of the railroad. Since the land lay at the base of the Allegheny Mountains and was at the end of the line in the earliest days, repair shops had to be built for cars and locomotives. The first trains in the area had to be taken to Duncansville, hooked onto the Portage railroad and hauled over the mountain by that means. The first cars to take this journey were on September 17, 1850. This was a tedious procedure. Engineering for the tracks over the mountain caused many problems. The elevation at the Robeson farm was 1,174 feet above sea level and an additional 984 feet were needed to reach the top of the Allegheny Mountains. Thus, the World Famous Horseshoe Curve and the Gallitzin tunnels were laid out and opened in 1854, eliminating the trek to Duncansville and the use of the old Portage Railroad.

The town was laid out in lots and streets were named for the wives or sweethearts of the civil engineers; Emma, Virginia, Harriet, Adeline, Helen, Rebecca, Annie, Julia and Caroline. Due to some comic stories which came out of street names, the names were changed to what they are today.

The new village received the name of Altoona. Mr. Andrew Green had wanted the town to be named Greensburg and when it was not accepted, he laid out his streets at a different angle than Altoona streets and thus it remains today to the north east of Eleventh Street.

While the railroad remained the dominant industry, smaller industries grew to provide services to the railroad and people living in the community. Long before the coming of the railroad, the iron industry had flourished at the Allegheny Furnace. Elias Baker and his nephew, Roland Diller, had purchased the furnace in 1835 from the firm of Allison and Henderson who had built the furnace in 1811 and abandoned it in 1818. As man abandons, nature takes over. Reconstruction of the furnace was necessary and a village of furnace workers, iron ore miners, colliers, draymen, farmers and construction workers soon sprung up. Baker soon felt he was of sufficient means to erect a home "second to none in Pennsylvania and twice as good as any for the price". A Greek Revival architectural home was erected which still stands today. It is open to the public as a museum and is owned and operated by the Blair County Historical Society.

The Bakers had interests in other industries such as the Glen White railroad and coal company, brick manufacturing, ganister rock and lumber. Thus, many of these products were used by the railroad in its everyday business operations.

As the city grew, a rolling mill was added, a silk mill, ice plant, planing mills, soap, broom and brush factories, harness and saddlers' shops, feed mills and retail shops. Persons with talents in other fields were imported from other areas to work for the railroad. Entertainment and recreation facilities were set up by the company. Several railroad bands were formed. A railroad YMCA and a Mechanics Library were built and staffed. Many churches were built and flourished in the city.

A grand hotel, known as the Logan House, was constructed (in the area of the Robeson farm) by the Pennsylvania Railroad in order to accommodate travelers on their journeys from Pittsburgh to Philadelphia. It had one-hundred-two rooms, two large parlors and an excellent dining room. It is said by many that the food was the best in the Commonwealth of Pennsylvania and the ice cream served was the best that money could buy.

A goodly number of the young men of Altoona were engaged in the military during the early years of the railroad as the Union forces were called upon to defend their freedoms against the southern army. By late summer of 1862, the cause of the North seemed to ebb, causing much concern of Gov. Andrew Curtin of Pennsylvania. He invited the governors of the various states to a conference at the Logan House to unite the war effort and chart a course of loyalty to President Abraham Lincoln. It was deemed a success and a delegation was dispatched to Washington to deliver the message personally to President Lincoln. It is said that this support was largely responsible for the favorable turn of events for the Union cause.

By 1924 the population of Altoona was estimated at sixty-seven thousand persons and by 1944 the population had reached 82,000. During World War II, the military moved many troop trains and equipment by way of the Pennsylvania Railroad through the Altoona area. A canteen was set up near the Altoona station to serve refreshments to service men and women who were passing through town.

Following World War II, there was a program of action to find employment for returning service men and women known as "Jobs for Joes" which was successful in placing former military personnel in the workplace. Later another program was implemented for a revitalization of the area's business community after the decline of the railroad. Altoona looks to the future and celebrated their Sesquicentennial in 1999.

Sinking Valley is a scenic valley, lying between Canoe Ridge on the southeast and Brush Mountain on the northwest. It is not determined as to when the first people arrived in the valley. Some stories say the French mined lead here about 1750. By 1778 the House of Assembly learned about the lead and since it was a great necessity to procure the lead for the Revolutionary War army, General Daniel Roberdeau was sent to build a stockade fort to protect the lead miners from Indian and Tory attack. Under the direction of Major Robert Cluggage, lead was mined here for more than a year. Lead was sent by packhorse to Water Street where it could be sent by boat down the Juniata River. The lead being very heavy required many packhorses. Transportation was slow through the wilderness. Indian attacks were always feared. Many other persons from the area used the fort when there were alarms that the Indians might attack. In 1779 General Roberdeau abandoned the Fort due to difficulty in removing the lead and transporting it to the east. At that time many miners left the valley and a few returned after there was no longer the threat of attacks. Fort Roller was also located in the valley. Many of early families coming to the valley were the Stewarts, Kyles, Moores, Wilsons, McClains, McMullens, Dysarts, Burleys, Isetts, Bridenbaughs and Rollers.

The reason for the name of the valley is evident by the stream which flows through it. Due to the limestone formation, the stream sinks many times and reappears several miles further down the valley. The beautiful Arch Spring is one example. A cave is located about eight hundred feet above the spring. Water, disappearing into this cave is found to reappear nearly a mile below and flows under a natural bridge which is a perfect arch of rocks. The water is extremely frigid.

A number of very old homes are located here. It is unsurpassed for beauty in the spring when laurel blooms in abundance amid the rocks and narrow passages of the valley.

Curryville was founded as a railway freight and passenger station in 1872. Its principal business is dairy and feed products. It is located in the agricultural area of the County and provides produce used in many areas.

Blair Four is located in Catherine Township five miles east of Williamsburg. There was an iron furnace and limestone industry here. Remains of the furnace still remain.

Blair Furnace an iron furnace was located here. It was located at East Altoona in Logan Township.

Barbara is now known as Clappertown and is located in Huston Township and was established in an agricultural district. Mining of iron ore and a smelting furnace were located here.

Beryl is located in Allegheny Township near the village of Cross Keys and Carson Valley.

Bennington is located near the Cambria County line in Allegheny Township. An iron furnace was located here and a hundred men were employed prior to 1898. The Kittanning and Cambria Iron and Coal Companies operated mines in this area. A short distance away the railroad saw a disastrous wreck of the Red Arrow train in 1947.

Blue Knob is located in Juniata Township. It is adjoining the Bedford County line. The community was engaged in agriculture and lumbering for many years. A ski resort is now operated at Blue Knob.

Canoe Creek is located in Frankstown Township. The remains of the old limestone furnaces are here as a reminder that it was once an industrial site for the preparation of limestone to be used in the iron industry. A State Park is the recreational facility located here.

Cove Forge is located in Catherine Township about five miles east of Williamsburg. For many years people engaged in the iron industry lived here but it is basically an agricultural community.

Culp is located in Tyrone Township and named for a family of the district.

Drab is now known as Beavertown and is located in Huston Township on the Clover Creek highway between Williamsburg and Fredericksburg.

East Sharpsburg is located one and a half mile south of Roaring Spring.

Elberta was established as Bushman and changed to Elberta in 1906. It is about six miles from Altoona in the Sinking Valley area.

Fostoria is located along the main line of the Pennsylvania railroad near Tyrone.

Ganister is located in Woodbury Township. This was the site of Three- Mile Dam on the Pennsylvania canal. Persons working in the ganister and limestone quarries lived at this location.

Glen White began with the coming of the Glen White railroad which served the coal mines. The name was changed to Kittanning Point in 1872. The area was engaged in coal mining and the production of coke for iron furnaces.

Charlotteville is a small village in Antis Township near Tipton.

Geeseytown, named for the Geesey family, is located in Frankstown Township along the old Huntingdon, Cambria and Indiana Turnpike. It has an active fire company.

Grazierville is in Snyder Township along the Pennsylvania Railroad. It was formerly known as Kratzer.

Henrietta was originally called Leathercracker and lies in North Woodbury Township. The development of the iron ore mines and the smelting furnaces was responsible for the railroad moving into this section thus creating towns along its lines.

Horrell is located about three miles east of Hollidaysburg. Its only industry was the Atlas Powder Works.

Isett is in Catherine Township about five miles east of Williamsburg and is a rural community. It was originally established by persons interested in the limestone industry.

Kittanning Point lies within the bend of the Horseshoe Curve. At one time a post office was located here and a railroad station. Both have disappeared through time.

Klahr is located in Greenfield Township about two miles west of what was known as Sarah Furnace. Agriculture and lumbering are the principal occupations.

Lakemont, South Lakemont, Lakemont Terrace received their names from the lake in the area. Several of Elias Baker's ore mines were located here within the area of the present Lakemont Park. The land was donated by the Bakers to provide a recreational facility for public use. It became a trolley park in the 1890's and while no longer a trolley park, the amusement park still operates each summer and many activities are held at the Casino.

Larke is located three miles west of Williamsburg and is a rural community.

Mines or Oremenia is located in Huston Township. For many years the principal industry was mining and shipping of sand by way of the Springfield branch of the Pennsylvania Railroad.

Ore Hill is located three miles west of Roaring Spring. At one time this community was populated by employees of the mining industry. It is now an agricultural community.

Poplar Run, also known as Puzzletown is in the western portion of Freedom Township.

Juniata, a section of Altoona, was once named Kipple for Andrew Kipple who was a general foreman in the railroad shops. The name was changed to Juniata in 1904.

Reservoir which is to the south of Hollidaysburg was named for the large reservoir which supplied water to the Pennsylvania canal during the dry seasons. At the western end of the reservoir is **Catfish** which acquired its name from the large number of catfish caught in the reservoir and served to travelers at a nearby inn.

Royer was formerly called Springfield Furnace due to the iron furnace operated there by the Royers. After the discontinuance of the furnace operations, the community was engaged in agriculture and the limestone industry.

Sabbath Rest is located in Antis Township between Altoona and Bellwood. The name given to this community came from Martin Bell's invention making it possible to bank his iron furnace on Saturday night and not reopening until Monday without injury to the smooth operation of the business.

Shellytown was named for David Shelly and is located about six miles west of Williamsburg in Woodbury Township. It is a rich farming area.

Sproul is located about two miles from Claysburg in Greenfield Township. It was named for Governor William C. Sproul who was interested in the formation of the brick industry. A large brick manufacturing plant was operated here for many years.

Tipton is located in Antis Township and named for the Tipton family who were early settlers. It lies along the main line of the Pennsylvania Railroad. There was an airport here for many years and the site of the Altoona Speedway, which had a wooden track used for racing cars. The New Pig Corporation is now located here. The Pittsburgh Plate Glass Company, the manufacturers of safety glass, operate a plant in Tipton.

Wertz is located in Woodbury Township. Many men who worked in the limestone quarries lived here in the past. It is now a rural community.

Wopsononock was originally called Stains and is located on one of the highest points in the Allegheny Mountain range. At one time a large hotel and cottages were located here and were served by the Wopsononock Railroad which extended from Juniata to the Dougherty mines. A disastrous fire destroyed the hotel. Today, a number of cottages remain and the mountain top is dotted with the towers of radio and television stations.

Yellow Springs is located in Catherine Township. Formerly, travelers stopped here at a tavern where they could remain the night when traveling on the Huntingdon, Cambria and Indiana Turnpike. Equipment and horses were exchanged here by stage coach and wagon drivers. Today it is a rural community. The stone house, built shortly after the Revolutionary War by the Kinkeads, still stands here.

Blair County celebrated its Sesquicentennial in 1996. We have looked to our past with the knowledge that our ancestors have made our County what it is today. Now, we look forward to future plans which will carry us into the twenty-first century and new generations. We have great opportunities to carry Blair County forward in the coming years. We are proud of our past and are confident that in the future, as in the past, we are able to say, "We're Blair County Proud!"

SRWA-26

Sampled Monthly beginning in May, 2002
Latitude: 40 29’ 16.4”
Longitude: 78 30’ 55.4”
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority

		Minimum	Maximum
Average Flow:	35.3 gpm	5.5	90
Average pH:	4.3	3.8	4.5
Average Specific Conductivity:	1,322 us/cm	924	1680
Average Total Acidity:	200.57 mg/l	54.0	260.0
Average Total Alkalinity:	0.43 mg/l	0.0	3.0
Average Total Iron:	81.6 mg/l	49.4	101.0
Average Total Aluminum:	2.37 mg/l	1.0	4.1
Average Total Manganese:	30.21 mg/l	24.0	37.2
Average Total Sulfates:	763.71 mg/l	599.0	974.0
Average Acidity Loading:	90.68 lbs/d	16.5	270.5
Average Iron Loading:	45.56 lbs/d	5.7	105.8

Note: water quality data listed above was taken from sampling point 26-1

SRWA-26A

Sampled Monthly beginning in May, 2002
Latitude: 40 29’ 20.2”
Longitude: 78 30’ 30.0”
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority

		Minimum	Maximum
Average Flow:	3.19 gpm	0.5	6.7
Average pH:	3.71	3.1	4.7
Average Specific Conductivity:	2205.56 us/cm	2,030	2,780
Average Total Acidity:	424.44 mg/l	290	620
Average Total Alkalinity:	0.33 mg/l	0.0	3.0
Average Total Iron:	122.60 mg/l	71.0	176.0
Average Total Aluminum:	10.25 mg/l	0.10	38.0
Average Total Manganese:	52.19 mg/l	43.7	63.7
Average Total Sulfates:	1384.44 mg/l	1,120.0	1,900.0
Average Acidity Loading:	15.68 lbs/d	2.6	31
Average Iron Loading:	4.16 lbs/d	1.0	9.5

SRWA-26B (Paradise)

Sampled Monthly beginning in May, 2002
Latitude: 40 28’ 49.2”
Longitude: 78 30’ 36.9”
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority and Cooney Brothers Coal Company

		Minimum	Maximum
Average Flow:	11.50 gpm	2	33
Average pH:	3.13	2.5	3.9
Average Specific Conductivity:	3030 us/cm	2,370	2,820
Average Total Acidity:	724.29 mg/l	610	950
Average Total Alkalinity:	0.00 mg/l	0	0
Average Total Iron:	147.61 mg/l	69.6	276.0
Average Total Aluminum:	33.93 mg/l	13.4	54.4
Average Total Manganese:	70.89 mg/l	54.4	92.8
Average Total Sulfates:	2137.14 mg/l	1,900.0	2,610.0
Average Acidity Loading:	92.79 lbs/d	23.8	254.9
Average Iron Loading:	16.51 lbs/d	2.8	31.6

SRWA-Kittanning

Sampled Monthly beginning in May, 2002
Latitude: 40 28’ 36.3”
Longitude: 78 31’ 46.6”
USGS Quadrangle: Cresson
Property Owner: This discharge is located directly within the right of ways for Sugar Run Road and U.S. Route 22. Any portion not within the right of way would belong to the Pennsylvania Game Commission.

		Minimum	Maximum
Average Flow:	594.62 gpm	170	1347
Average pH:	3.10	3.0	3.3
Average Specific Conductivity:	858.8 us/cm	395	1080
Average Total Acidity:	136.40 mg/l	64	170
Average Total Alkalinity:	0.0 mg/l	0	0
Average Total Iron:	12.65 mg/l	2	19
Average Total Aluminum:	12.00 mg/l	5	16
Average Total Manganese:	1.81 mg/l	0.6	2.2
Average Total Sulfates:	328.20 mg/l	121.0	400.0
Average Acidity Loading:	912.69 lbs/d	327.9	2429.7
Average Iron Loading:	77.03 lbs/d	20.6	207.3

SRWA-Bennington

Sampled Monthly beginning in May, 2002
Latitude: 40 28’ 49.5”
Longitude: 78 31’ 27.4”
USGS Quadrangle: Cresson
Property Owner: This discharge is adjacent to the Norfolk Southern right of way on Pennsylvania Game Commission property (any restoration project would need to be coordinated with both landowners)

		Minimum	Maximum
Average Flow:	43.13 gpm	18	75
Average pH:	4.49	4.0	4.9
Average Specific Conductivity:	567.11 us/cm	509	659
Average Total Acidity:	22.00 mg/l	2	34
Average Total Alkalinity:	1.33 mg/l	0	3
Average Total Iron:	3.58 mg/l	1.7	6
Average Total Aluminum:	1.67 mg/l	1.4	2.2
Average Total Manganese:	5.29 mg/l	4.3	6.2
Average Total Sulfates:	259.44 mg/l	220.0	314.0
Average Acidity Loading:	11.68 lbs/d	0.9	28
Average Iron Loading:	1.94 lbs/d	0.7	4.9

SRWA-Orange Falls

Sampled Monthly beginning in July, 2002
Latitude: 40 28' 52.8"
Longitude: 78 30' 59.1"
USGS Quadrangle: Cresson
Property Owner: This discharge is adjacent to the Norfolk Southern right of way on Pennsylvania Game Commission property (any restoration project would need to be coordinated with both landowners)

		Minimum	Maximum
Average Flow:	37.29 gpm	33	40
Average pH:	5.51	5.3	5.7
Average Specific Conductivity:	652.63 us/cm	570	760
Average Total Acidity:	65.75 mg/l	44	140
Average Total Alkalinity:	3.0 mg/l	3	3
Average Total Iron:	104.63 mg/l	41	390
Average Total Aluminum:	0.10 mg/l	0.10	0.10
Average Total Manganese:	5.76 mg/l	4.9	6.6
Average Total Sulfates:	304.25 mg/l	260.0	340.0
Average Acidity Loading:	30.45 lbs/d	17.5	67.3
Average Iron Loading:	53.72 lbs/d	0.0	178.1

SRWA-GT-Aluminum

Sampled Monthly beginning in May, 2002
Latitude: 40 28’ 50.6”
Longitude: 78 30’ 58.2”
USGS Quadrangle: Cresson
Property Owner: This discharge is adjacent to the Norfolk Southern right of way on Pennsylvania Game Commission property (any restoration project would need to be coordinated with both landowners)

		Minimum	Maximum
Average Flow:	25 gpm	20	32
Average pH:	4.5	4.2	4.6
Average Specific Conductivity:	873 us/cm	817	993
Average Total Acidity:	139.6 mg/l	56	390
Average Total Alkalinity:	1.8 mg/l	0	3
Average Total Iron:	0.50 mg/l	0.1	2.9
Average Total Aluminum:	41.47mg/l	7.7	146.0
Average Total Manganese:	13.4 mg/l	8.8	21.1
Average Total Sulfates:	459.4 mg/l	312	646
Average Acidity Loading:	42 lbs/d	13.5	117.2
Average Iron Loading:	0.20 lbs/d	0.0	0.9

SRWA-Switchbox

Sampled Monthly beginning in May, 2002
Latitude: 40 28’ 47.6”
Longitude: 78 31’ 26.0”
USGS Quadrangle: Cresson
Property Owner: This discharge is located directly within the Norfolk Southern right of way

		Minimum	Maximum
Average Flow:	24.29 gpm	20	30
Average pH:	4.8	4.0	5.6
Average Specific Conductivity:	540.75 us/cm	492	598
Average Total Acidity:	13.75 mg/l	4	30
Average Total Alkalinity:	3.38 mg/l	0	12
Average Total Iron:	0.09 mg/l	0.1	0.4
Average Total Aluminum:	1.33 mg/l	1.1	1.5
Average Total Manganese:	4.53 mg/l	3.9	4.9
Average Total Sulfates:	243.88 mg/l	207	294
Average Acidity Loading:	3.83 lbs/d	1.4	7.2
Average Iron Loading:	0.0.3 lbs/d	0.0	0.1

SRWA-White Discharge

Sampled Quarterly beginning in May, 2002
Latitude: 40 28’ 25.0”
Longitude: 78 32’ 1.4”
USGS Quadrangle: Cresson
Property Owner: This discharge is located directly adjacent to the right of way for Sugar Run Road

		Minimum	Maximum
Average Flow:	2 gpm	2	2
Average pH:	6.1	5.7	6.3
Average Specific Conductivity:	3,970 us/cm	3140	4630
Average Total Acidity:	-28.7 mg/l	-64	-8
Average Total Alkalinity:	84 mg/l	40	114
Average Total Iron:	0.99 mg/l	0.0	0.2
Average Total Aluminum:	36.8 mg/l	0.9	80.1
Average Total Manganese:	14.6 mg/l	11.4	17.9
Average Total Sulfates:	602.0 mg/l	406.0	740.0
Average Acidity Loading:	-0.9 lbs/d	-1.5	-0.3
Average Iron Loading:	0.04 lbs/d	0.0	0.1
Average Aluminum Loading:	1.32 lbs/d	0.7	1.9

SRWA-Keystone

Sampled Quarterly beginning in May, 2002
Latitude: 40 28’ 32.3”
Longitude: 78 31’ 57.7”
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission

		Minimum	Maximum
Average Flow:	22.5 gpm	20	25
Average pH:	4.1	4.0	4.2
Average Specific Conductivity:	271.5 us/cm	238	305
Average Total Acidity:	46.0 mg/l	38.0	54.0
Average Total Alkalinity:	0.0 mg/l	0.0	0.0
Average Total Iron:	0.2 mg/l	0.0	0.4
Average Total Aluminum:	5.1 mg/l	4.8	5.4
Average Total Manganese:	1.21 mg/l	0.9	1.6
Average Total Sulfates:	97.2 mg/l	94.3	100.0
Average Acidity Loading:	12.68 lbs/d	9.1	16.2
Average Iron Loading:	0.06 lbs/d	0.0	0.1

26 Borehole

Sampled Quarterly beginning in May, 2002
Latitude: 40 29' 23.3"
Longitude: 78 30' 58.9"
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority

		Minimum	Maximum
Average Flow:	40.4 gpm	1	162
Average pH:	4.3	4.0	4.6
Average Specific Conductivity:	243.8 us/cm	194	337
Average Total Acidity:	24.5 mg/l	16.0	32.0
Average Total Alkalinity:	0.8 mg/l	0.0	3.0
Average Total Iron:	0.6 mg/l	0.1	1.3
Average Total Aluminum:	2.7 mg/l	1.9	3.6
Average Total Manganese:	1.4 mg/l	1.1	1.7
Average Total Sulfates:	85.7 mg/l	69.3	100.0
Average Acidity Loading:	14.15 lbs/d	0.2	46.7
Average Iron Loading:	0.09 lbs/d	0.0	0.2

SRWA-UNT Top Weir (Turkey Run)

Sampled Quarterly beginning in May, 2002
Latitude: 40 29’ 17.8”
Longitude: 78 30’ 58.1”
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority

		Minimum	Maximum
Average Flow:	64.96 gpm	2	420
Average pH:	4.1	3.9	4.3
Average Specific Conductivity:	276.56 us/cm	205	393
Average Total Acidity:	28.0 mg/l	0.0	42.0
Average Total Alkalinity:	0.0 mg/l	0.0	0.0
Average Total Iron:	0.39 mg/l	0.1	1.0
Average Total Aluminum:	2.60 mg/l	0.9	4.1
Average Total Manganese:	2.22 mg/l	1.2	3.7
Average Total Sulfates:	100.03 mg/l	74.3	135.0
Average Acidity Loading:	27.54 lbs/d	0.0	181.7
Average Iron Loading:	0.10 lbs/d	0.0	0.2

SRWA-UNT Low Weir (Gumtree Run)

Sampled Quarterly beginning in May, 2002
Latitude: 40 29' 9.3"
Longitude: 78 30' 53.7"
USGS Quadrangle: Cresson
Property Owner: Pennsylvania Game Commission with necessary access from the Altoona City Authority

		Minimum	Maximum
Average Flow:	234.66 gpm	17	1,275
Average pH:	5.3	4.0	6.1
Average Specific Conductivity:	734.90 us/cm	328	1,220
Average Total Acidity:	102.80 mg/l	26	210
Average Total Alkalinity:	2.70 mg/l	0.0	3.0
Average Total Iron:	45.91 mg/l	6.6	112.0
Average Total Aluminum:	0.68 mg/l	0.1	1.8
Average Total Manganese:	12.05 mg/l	3.8	25.3
Average Total Sulfates:	378.30 mg/l	147.0	680.0
Average Acidity Loading:	130.99 lbs/d	41.4	398.5
Average Iron Loading:	45.64 lbs/d	19.8	101.8

Resource Inventory Report Prepared by United States Department of Agriculture's Natural Resources Conservation Service. This report is to give an estimate cost associated with the restoration projects outlined above under Abandoned Mine Lands and Abandoned Mine Discharges.

Site 26

This site includes discharges 26-1 and 26-2 and the small borehole discharge.

Representative Water Chemistry:

Flow Rate – 165 gpm
pH – 4.5
Total Alkalinity – 18 mg/l
Total Acidity – 175 mg/l
Total Iron – 90 mg/l
Aluminum – 4 mg/l
Manganese – 31 mg/l

Major Work Items:

- Remove existing four ponds and cattail wetland
- Construct a treatment system consisting of a Vertical Flow Wetland → Settling Basin → Wetland
- Construct a bentonite slurry trench on the opposite side of the road to cut off any additional water we believe to be escaping under the treatment ponds and into Turkey Run
- Construct a sandstone drain upslope of the bentonite trench to convey the bentonite cut-off water to the treatment system
- A manhole and valve can be used to collect and regulate a small flow from a borehole across the road
- A diversion and rock lined waterway will convey surface water away from the site

Cost Estimate:

Clearing and Grubbing	$5,000
Dewater Existing Ponds	$2,500
Sludge Removal From Ponds	$25,000
*Bentonite Slurry Trench,	
~12,500 $ft.^2$ @ $5/$ft.^2$	$62,500
*Sandstone Drain,	
~7,500 $ft.^2$ @ $3.50/$Ft.^2$	$26,250
Settling Basin, Excavation and Fill	$15,000
Vertical Flow Wetland, Excavation and Fill	$20,000
Wetland, Excavation and Fill	$20,000

Cattail Salvaging and Replanting	$5,000
*HDPE Liner for Vertical Flow Wetland	$30,000
Rockfill, Vertical Flow Wetland, 4000 tons @ $20/ton	$80,000
Compost, Vertical Flow Wetland, 3000 yd.^{2} @ $4.50/yd.^{2}	$13,500
6" Perforated Pipe, Vertical Flow Wetland, 2000 ft. @ $7/ft.	$14,000
8" PVC Pipe, Vertical Flow Wetland, 200 ft. @ $10/ft.	$2,000
12" PVC Pipe, Vertical Flow Wetland, 300 ft. @ $20/ft.	$6,000
12" PVC Gate Valves, 3 @ $2,750 ea.	$8,250
8" Gate Valves, 2 @ $1,000 ea.	$2,000
Rock Channels Treatment System, 100 ft. @ $25/ft.	$2,500
Water Level Control Structure	$2,000
Flumes, 2 @ $1,800 ea.	$3,600
Intake @ Borehole	$2,500
6" Pipeline, Borehole, 500 ft. @ $8/ft.	$4,000
Diversion, 1,000 ft. @ $5/ft.	$5,000
Rock Lined Waterway, 300 ft. @ $40/ft.	$12,000
Land Liming, 2.5 ac. @ $1,000/ac.	$2,500
Seeding, 10 ac. @ $1,500/ac.	$15,000
Pollution Control	$5,000
*Fence Around Vertical Flow Wetland, 1,000 ft. @ $20/ft.	$20,000
Mobilization, $411,100 @ 7%	$28,777
Construction Subtotal	$439,877
Construction Cost with 12% Contingencies	$492,662
Engineering – 10% of Construction	$49,266
Project Administration – 8% of Construction	$39,413
Total Cost	Use $582,000

*Further site investigation needed to determine the extent to which these items are needed.

Site 26A

<u>Representative Water Chemistry:</u>

Flow Rate – 35 gpm
pH – 3.9
Total Alkalinity – 10 mg/l

Total Acidity – 525 mg/l
Total Iron – 143 mg/l
Aluminum – 21 mg/l
Manganese – 57 mg/l

Major Work Items:

- Remove existing five ponds and cattail wetlands
- Construct a treatment system consisting of a Vertical Flow Wetland → Settling Basin → Vertical Flow Wetland → Settling Basin → Wetland. Vertical Flow Wetlands will be designed using a two layered flush system.
- Construct a sandstone drain upslope of the treatment ponds to capture as much of the mine seepage as possible. Seeps not captured in the stone drain may have to enter the system at a lower elevation.
- A diversion will convey upslope surface water away from the site.
- Apply course lime at a rate of 40 T/Ac to ~26 acres adjacent to treatment site.

Cost Estimate:

Clearing and Grubbing	$5,000
Dewater Existing Ponds	$2,500
Sludge Removal From Ponds	$25,000
*Sandstone Drain, ~6,000 $ft.^2$ @ $3.50/$ft.^2$	$21,000
Settling Basin, Excavation and Fill, 2 @ $10,000 ea.	$20,000
Vertical Flow Wetland, Excavation and Fill, 2 @ $12,500 ea.	$25,000
Wetland, Excavation and Fill	$10,000
Cattail, Salvaging and Replanting	$5,000
*HPDE Liner For Vertical Flow Wetland, 2 @ $15,000 ea.	$30,000
Rockfill, Vertical Flow Wetland, 2000 tons @ $20/ton	$40,000
Compost, Vertical Flow Wetland and Wetland, 2000 $yd.^2$ @ $4.50/$yd.^2$	$9,000
4" PVC Pipe, 1000 ft. @ $6/ft.	$6,000
6" PVC Pipe, 900 ft. @ $7/ft.	$6,300
8" PVC Pipe, 500 ft. @ $10/ft.	$5,000
12" PVC Pipe, 400 ft. @ $20/ft.	$8,000
12" PVC Gate Valves, 2 @ $2750 ea.	$5,500
8" Gate Valves, 2 @ $1000 ea.	$2,000
Rock Channels, Treatment System, 100 ft. @ $25/ft.	$2,500
Water Level Control Structure, 2 @ $2000 ea.	$4,000

Flumes, 2 @ $1800/ea.	$3,600
Diversion, 3550 ft. @ $5/ft.	$17,750
Rock Lined Waterway, 1320 ft. @ $50/ft.	$66,000
Culvert at Access Location	$1,000
Land Liming, 26 ac. @ 40 T/Ac. = 1040 Tons @ $18/Ton	$18,720
Seeding, 5 ac. @ $1500/ac.	$7,500
*Fence Around Vertical Flow Wetland, 1000 ft. @ $20/ft.	$20,000
Mobilization, $366,370 @ 7%	$25,646
Construction Subtotal	$392,016
Construction with 12% Contingencies	$439,058
Engineering – 10% of Construction	$43,906
Project Administration – 8% of Construction	$35,125
Total Cost	Use $518,000

*Further site investigation needed to determine the extent to which these items are needed.

Turkey Run Land Treatment

Waterway #1

Major Work Items:

- Place 2" AASHTO #10 screenings and 4" of AASHTO #1 limestone in an existing low gradiant vegetated channel (no excavation required).
- Provide ~100 ton of riprap at waterway outlet over steep bank.
- Apply coarse lime at a rate of 40 T/Ac. to ~14 Ac. adjacent to the waterway.

Cost Estimate:

Limestone Channel ~550 ft. @ $6/ft.	$3,330
~100 Ton of R-5 rock in-place @ $25/Ton	$2,500
Land Liming, 14 Ac. @ 40T/Ac = 560 Tons @ $18/Ton	$10,080
Subtotal	$15,880

Waterway #2

Major Work Items:

- Remove existing CMP spillway from cattail pond
- Reconstruct cattail pond into a wetland including a water level control structure and pipe principal spillway.
- Convert two existing vegetated waterways (~800') into rock lined waterways and outlet into the wetland. Provide two expanded sections for road crossings.
- Construct ~300' of rock lined waterway outlet channel.
- Apply coarse lime at a rate of 40 T/Ac. to ~14 Ac. adjacent to the construction area.

Cost Estimate:

Clearing and Grubbing	$1,000
Reconstruct cattail pond, earthwork	$15,000
8" principal spillway	$2,000
Water level control structure	$1,500
Rock lined waterway,	
~1100 ft. @ $35/ft.	$38,500
Land Liming, 14 Ac. @ 40 T/Ac. =	
560 Tons @ $18/Ton	$10,080
Seeding, 2 Ac. 2 $1500/Ac.	$3,000
Subtotal	$71,080
Total for Waterway #1 and #2	$86,960
Mobilization, $86,960 @ 7%	$6,087
Construction Subtotal	$93,047
Construction with 12% Contingencies	$104,213
Engineering – 10% of Construction	$10,421
Project Administration – 8% of Construction	$8,337
Total Cost	Use $123,000

Site 26B (Paradise)

Representative Water Chemistry:

Flow Rate – 35 gpm
pH – 3.5
Total Alkalinity – 0 mg/l
Total Acidity – 600 mg/l

Total Iron – 150 mg/l
Aluminum – 25 mg/l
Manganese – 65 mg/l

Major Work Items:

- Construct a limestone lined diversion to capture the mine seeps and convey to system the treatment.
- Construct a diversion upslope of the limestone channel to divert surface water around the treatment system.
- Construct a treatment system consisting of Settling Basin → Vertical Flow Wetland → Settling Basin → Vertical Flow Wetland → Settling Basin → Wetland. Vertical Flow Wetlands will be designed using a two layered flush system.
- Close the existing "air pond" above the treatment area.

Cost Estimate:

Close and Grade "Air Pond"	\$5,000
Clearing and Grubbing	\$5,000
Sludge Removal From Ponds	\$5,000
Cattail, Salvaging and Replanting	\$5,000
Settling Basin, Excavation and Fill, 3 @ \$10,000 ea.	\$30,000
Vertical Flow Wetland, Excavation and Fill, 2 @ \$12,500 ea.	\$25,000
Wetland, Excavation and Fill	\$10,000
Rockfill, Vertical Flow Wetlands, 2000 tons @ \$20/ton	\$40,000
Compost, Vertical Flow Wetland and Wetland, 2000 $yd.^2$ @ \$4.50/$yd.^2$	\$9,000
4" PVC Pipe, 1000 ft. @ \$6/ft.	\$6,000
6" PVC Pipe, 900 ft. @ \$7/ft.	\$6,300
8" PVC Pipe, 500 ft. @ \$10/ft.	\$5,000
12" PVC Pipe, 400 ft. @ \$20/ft.	\$8,000
12" PVC Gate Valves, 4 @ \$2750 ea.	\$11,000
8" Gate Valves, 2 @ \$1000 ea.	\$2,000
Rock Channel, Treatment System, 200 ft. @ \$25/ft.	\$5,000
Water Level Control Structure, 2 @ \$2000 ea.	\$4,000
Flumes, 2 @ \$1800/ea.	\$3,600
Surface Water Diversion, ~500 ft. @ \$5/ft.	\$2,500
Mine Water Diversion with Limestone, ~500 ft. @ \$10/ft.	\$5,000
Surface Water Diversion Outlet	\$2,500

Seeding, 5 ac. @ $1500/ac.	$7,500
Mobilization, $202,400 @ 7%	$14,168
Construction Subtotal	$216,568
Construction with 12% Contingencies	$242,556
Engineering – 10% of Construction	$24,256
Project Administration – 8% of Construction	$19,404
Total Cost	Use $287,000

*Estimate based on using existing soils for construction of treatment cells.

Gob Pile

The site consists of a coal refuse pile approximately 1 acre in size. The recommended method of clean up is removal, taking the waste to a Co-Gen Plant. If this is not feasible, the area can be graded, seeded and mulched.

Cost Estimate (Grading and Seeding):

Grading	$5,000
Seed and Mulch	$2,500
Mobilization, $7,500 @ 7%	$525
Construction Subtotal	$8,025
Construction with 12% Contingencies	$8,988
Engineering – 10% of Construction	$899
Project Administration – 8% of Construction	$719
Total Cost	Use $11,000

Highwall Waterway

This site consists of collecting an area of ponded water adjacent to a highwall and conveying the water in a limestone channel approximately 450 feet.

Cost Estimate:

Clearing and Grubbing	$1,000
Grading to Convey Water into Channel	$2,500
Rock Lined Waterway, 450 ft. @ $45/ft.	$20,250
Seeding	$1,500
Mobilization, $25,250 @ 7%	$1,768

Construction Subtotal	$27,018
Construction with 12% Contingencies	$30,260
Engineering – 10% of Construction	$3,026
Project Administration – 8% of Construction	$2,421
Total Cost	Use $36,000

Upper Sugar Run

This site includes construction of two separate alkaline addition beds with stream intake structures to add alkalinity in the upper reach of the watershed.

Cost Estimate:

Clearing and Grubbing	$2,000
Excavation, $5000 each bed x 2 beds	$10,000
Rockfill, 500 Ton each bed x 2 beds = 1000 Ton @ $20/Ton	$20,000
Intake Structure, $5000 each x 2	$10,000
6" PVC Perforated and Solid Pipe, 400 ft. @ $6/ft.	$2,400
8" PVC Perforated and Solid Pipe, 400 ft. @ $8/ft.	$3,200
4' Water Level Control Structure, 2 @ $1250 each	$2,500
8" Gate Valves, 2 @ $1750 each	$3,500
Mobilization, $53,600 @ 7%	$3,752
Construction Subtotal	$57,352
Construction with 12% Contingencies	$64,234
Engineering – 10% of Construction	$6,423
Project Administration – 8% of Construction	$5,139
Total Cost	Use $75,796

Bennington

Representative Water Chemistry:

Flow Rate – 70 gpm
pH – 4.7
Total Alkalinity – 10 mg/l
Total Acidity – 20 mg/l
Total Iron – 4 mg/l
Aluminum – 2 mg/l
Manganese – 5 mg/l

There is a very limited amount of treatment area available between a steep slope and the railroad tracks. It does not appear feasible to construct any type of passive treatment system. However, one alternative is to construct a limestone channel from the discharge to a culvert which crosses the tracks approximately 375 ft. downstream. It may also be possible to construct a series of stilling basins at various points along the channel to remove some of the metals.

Cost Estimate:

Clearing and Grubbing	$500
*Limestone Channel and Stilling Basins, 375 ft. @ $60/ft.	$22,500
Seeding	$500
Mobilization, $23,500 @ 7%	$1,645
Construction Subtotal	$25,145
Construction Cost with 12% Contingencies	$28,162
Engineering – 10% of Construction	$2,816
Project Administration – 8% of Construction	$2,253
Total Cost	Use $59,000

*Topography and railroad R.O.W. limits needed to determine actual size and configuration of channel and basins.

Switchbox

Representative Water Chemistry:

Flow Rate – 50 gpm
pH – 5.0
Total Alkalinity – 0 mg/l
Total Acidity – 10 mg/l
Total Iron – 0 mg/l
Aluminum – 1.2 mg/l
Manganese – 3.9 mg/l

Due to site topography, there is no treatment area available for construction of a passive treatment system. However, a limestone channel could be constructed along the access road and combined with the Bennington discharge. More limestone could be placed on the steep slope at the merger of the two discharges.

Cost Estimate:

Limestone Channel, 355 ft. @ $30/ft.	$10,650

Additional Limestone (R-5) on slope, 75 Tons @ $20/Ton	$1,500
Seeding	$500
Mobilization, $12,650 @ 7%	$886
Construction Subtotal	$13,536
Construction Cost with 12% Contingencies	$15,160
Engineering – 10% of Construction	$1,516
Project Administration – 8% of Construction	$1,083
Total Cost	Use $45,000

Orange Falls and GT-Aluminum

Representative Water Chemistry:

	Orange Falls	GT Aluminum
Flow Rate (gpm)	39	20
pH	5.5	4.5
Total Alkalinity (mg/l)	0	0
Total Acidity (mg/l)	73	157
Total Iron (mg/l)	140	1
Aluminum (mg/l)	0	50
Manganese (mg/l)	6	14

These two sites, although close in proximity, have very different chemistry. Space and chemical limitations dictate that realistically only one of the discharges can be treated. The high iron content in the Orange Falls discharge and the aluminum levels in the GT Aluminum discharge should be kept separate and only combined in a final Settling Basin.

For cost purposes, the system will be sized for the Orange Falls discharge, with an additional 6" pipeline from the GT Aluminum discharge for combining at the end of the system.

Major Work Items:

- Construct 8" pipeline from Orange Falls discharge to treatment location. This is complicated by surface rock and stream location.
- Construct a treatment system consisting of a Settling Basin → Vertical Flow Wetland → Settling Basin. It appears that a liner will be needed.
- Construct 6" pipeline from GT Aluminum discharge to treatment area.
- Construct Diversion to convey upslope water away from site.

Cost Estimate:

Clearing and Grubbing	$5,000
Settling Basin, Excavation and Fill, 2 @ $10,000 ea.	$20,000
Vertical Flow Wetland, Excavation and Fill, 1 @ $12,500	$12,500
*HDPE Liner for Settling Basins (2) and Vertical Flow Wetland, 3 @ $15,000 ea.	$45,000
Rockfill, Vertical Flow Wetland, 1000 tons @ $20/ton	$20,000
Compost, Vertical Flow Wetland, 500 $yd.^2$ @ $4.50/$yd.^2$	$2,250
6" PVC Pipe (Vertical Flow Wetland), 450 ft. @ $7/ft.	$3,150
8" PVC Pipe (Vertical Flow Wetland), 250 ft. @ $10/ft.	$2,500
12" PVC Pipe (Vertical Flow Wetland), 200 ft. @ $20/ft.	$4,000
12" PVC Gate Valves, 2 @ $2750 ea.	$5,500
Rock Channels, Treatment System, 100 ft. @ $25/ft.	$2,500
Water Level Control Structure	$1,000
Flume	$1,800
8" Pipeline (Orange Falls), 850 ft. @ $17.50/ft.	$14,875
6" Pipeline (GT Aluminum), 700 ft. @ $12/ft.	$8,400
6" Gate Valve (GT Aluminum)	$800
Expose Orange Falls discharge and construct cut off	$10,000
Expose GT Aluminum discharge and construct cut off	$5,000
Surface Water Diversion, 1000 ft. @ $5/ft.	$5,000
Rock Lined Waterway, 400 ft. @ $35/ft.	$14,000
Seeding, 7 ac. @ $1500/ac.	$10,500
Pollution Control	$5,000
*Fence Around all Lined Structures, $2,000 ft. @ $20/ft.	$40,000
Mobilization, $238,775 @ 7%	$16,714
Construction Subtotal	$255,489
Construction Costs with 12% Contingencies	$286,148
Engineering – 10% of Construction	$28,615
Project Administration – 8% of Construction	$22,892
Total Cost	Use $338,000

*Further site investigation needed to determine the extent to which these items are needed.

Kittanning

Representative Water Chemistry:

Flow Rate – 600 gpm
pH – 3.0
Total Alkalinity – 10 mg/l
Total Acidity – 180 mg/l
Total Iron – 15 mg/l
Aluminum – 14 mg/l
Manganese – 2 mg/l

Treatment of the Kittanning discharge is severely limited by site topography. Although the chemistry is within a treatable range the high average flow and inadequate work area limit any feasible alternative using passive treatment technologies. The Blair County Conservation District is planning to solicit proposals to study this discharge for possible relocation and/or insitu treatment.

In order to associate a cost with reclamation of the Kittanning discharge a design and cost estimate were developed for the site. The design of a passive treatment system for the Kittanning discharge would be similar to one on Indian Creek. That design shares similarities with the Kittanning site due to high flows, similar water chemistry and difficulties related to limited space. The estimated cost which includes provisions for complications due to space, appropriate number of vertical flow wetlands, installation of HDPE liners, and extensive piping would be approximately $2,000,000.

Erosion Loss on Previously Reclaimed Areas

The following provides details on the extent of erosion issues of the area directly above site 26A. This study was meant to provide a relative idea of the amount of annual soil lost and to determine if a significant amount of acidity was being transported to the stream due to this continual erosion. Since the land had been reclaimed in the mid 1980s excessive erosion has taken place due to poorly placed and/ or constructed diversions. Several gullies extend for over 800 feet and are 7 feet wide and 6 feet deep.
This erosion has added tons of sediment annually into the watershed and has added a significant amount of acidity in a watershed that is already impaired by a low pH with limited buffering capacity. See the attached spreadsheets detailing the extent of erosion.



Erosion within the study area is estimated to be:

Sheet/ Rill Erosion	835 Tons/ Year of soil erosion 43 Tons / Year of acidity into the watershed (added through the erosion of acidic soils)
Gully Erosion	5,127 Tons of soil erosion 28 Tons of acidity into the watershed (added through the erosion of acidic soils)

SITE 26A SHEET EROSION CALCULATION

GOOD GROUND COVER AREA

A	K	R	L	S	L/S	C	P	ACRES IN FIELD	TOTAL SOIL LOSS PER YEAR	ACIDITY MEQ/100G	ACIDITY LB/TON	ACIDITY TON/ ACRE PER YEAR	TONS OF ACIDITY PRODUCED PER YEAR
0.9152	0.32	110	300	9	2.6	0.01	1	25	22.88	2	0.001	0.02288	0.572

POOR GROUND COVER AREA

A	K	R	L	S	L/S	C	P						
16.896	0.32	110	220	5	1.2	0.4	1	10	168.96	10.2	0.0051	0.861696	8.61696

STEEP AREA

A	K	R	L	S	L/S	C	P						
66.528	0.32	110	150	25	6.3	0.3	1	10	665.28	10.2	0.0051	3.392928	33.92928

Revised Universal Soil Loss Equation	A=RK(LS)CP
Soil Loss (tons/acre/year)	A
Rainfall Factor	R
Soil Erodibility Factor	K
Slope Length Factor	L
Slope Gradient Factor	S
Cover & Management Factor	C
Support Practice Factor	P

SITE 26A GULLY EROSION CALCULATION

GULLY1

STATION	WIDTH	DEPTH	CROSS SECTION AREA	LENGTH	CUBIC FEET	WEIGHT PER CU/ FT	TONS
0+00	11.00	1.80	19.80				
1+00	12.00	3.00	36.00				
2+00	10.20	1.50	15.30				
3+00	10.60	2.50	26.50				
4+00	17.50	4.90	85.75				
5+30	12.80	3.00	38.40				
	12.35	2.78	36.96	530.00	19589.00	105.00	1028.42

GULLY2

STATION	WIDTH	DEPTH	CROSS SECTION AREA	LENGTH	CUBIC FEET	WEIGHT PER CU/ FT	TONS
0+00	12.00	4.50	54.00				
0+20	10.00	4.50	45.00				
0+70	6.00	1.50	9.00				
	9.33	3.50	36.00	70.00	2520.00	105.00	132.30

GULLY3

STATION	WIDTH	DEPTH	CROSS SECTION AREA	LENGTH	CUBIC FEET	WEIGHT PER CU/ FT	TONS
0+00	9.00	3.20	28.80				
1+00	7.50	3.00	22.50				
2+00	6.80	1.00	6.80				
	7.77	2.40	19.37	200.00	3873.33	105.00	203.35

GULLY4

STATION	WIDTH	DEPTH	CROSS SECTION AREA	LENGTH	CUBIC FEET	WEIGHT PER CU/ FT	TONS
0+10	8.00	3.00	24.00				
0+50	11.00	5.00	55.00				
0+90	9.00	4.00	36.00				
	9.33	4.00	38.33	90.00	3450.00	105.00	181.13

GULLY5

STATION	WIDTH	DEPTH	CROSS SECTION AREA	LENGTH	CUBIC FEET	WEIGHT PER CU/FT	TONS
0+10	8.00	1.30	10.40				
1+00	8.00	2.40	19.20				
2+00	7.00	1.60	11.20				
3+00	7.00	2.20	15.40				
4+00	7.70	3.50	26.95				
5+00	9.00	3.50	31.50				
6+00	12.00	5.50	66.00				
7+00	11.80	4.00	47.20				
8+00	14.00	5.30	74.20				
8+60	12.40	5.50	68.20				
10+00	11.00	5.70	62.70				
	11.70	4.92	58.30	1170.00	68211.00	105.00	3581.08

SUMMARY

	TONS ERODED	ACIDITY MEQ/100G	ACIDITY LB/TON	TONS OF ACIDITY FROM GULLY EROSION
GULLY 1	**1028.42**	**5.30**	**0.00265**	**2.73**
GULLY 2	**132.30**	**5.30**	**0.00265**	**0.35**
GULLY 3	**203.35**	**5.30**	**0.00265**	**0.54**
GULLY 4	**181.13**	**5.30**	**0.00265**	**0.48**
GULLY 5	**3581.08**	**5.30**	**0.00265**	**9.49**
TOTAL	**5126.28**	**5.30**	**0.00265**	**13.58**

Note: Length of time of the erosion event not yet determined

Monitoring Point ID: SR SS 10

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)
05/28/02	N/A	6.7	4.8	429	22	*3*	1.14	N/A	1.72	1.41	39	120	N/A	N/A	N/A
09/25/02	2921.69	N/A	6.3	616	-8	*3*	*0.02*	N/A	*0.1*	0.49	68.9	200	483	-280.95	105.36
Count	1.00	1.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2921.69	6.70	6.30	616.00	22.00	3.00	1.14	0.00	1.72	1.41	68.90	200.00	483.00	-280.95	105.36
Min	2921.69	6.70	4.80	429.00	-8.00	3.00	0.02	0.00	0.10	0.49	39.00	120.00	483.00	-280.95	105.36
Avg.	2921.69	6.70	5.55	522.50	7.00	3.00	0.58	N/A	0.91	0.95	53.95	160.00	483.00	-280.95	105.36

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	29	*0.04*	*0.1*	20.7	*1.000*
09/25/02	0.70	3.51	17.21	51	*0.04*	*0.1*	23.9	97
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	0.70	3.51	17.21	51.00	0.04	0.10	23.90	97.00
Min	0.70	3.51	17.21	29.00	0.04	0.10	20.70	1.00
Avg.	0.70	3.51	17.21	40.00	0.04	0.10	22.30	49.00

Monitoring Point ID: SR SS 15

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)
05/28/02	N/A	6.3	4.6	432	16	*3*	1.98	N/A	2.36	1.41	36.3	130	N/A	N/A	N/A
09/25/02	2524.5	N/A	6.0	621	4	*3*	*0.02*	N/A	*0.1*	0.489	68.5	200	490	121.38	91.03
Count	1.00	1.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2524.50	6.30	6.00	621.00	16.00	3.00	1.98	0.00	2.36	1.41	68.50	200.00	490.00	121.38	91.03
Min	2524.50	6.30	4.60	432.00	4.00	3.00	0.02	0.00	0.10	0.49	36.30	130.00	490.00	121.38	91.03
Avg.	2524.50	6.30	5.30	526.50	10.00	3.00	1.00	#DIV/0!	1.23	0.95	52.40	165.00	490.00	121.38	91.03

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	29	*0.04*	*0.1*	12.3	*1.000*
09/25/02	0.61	3.03	14.84	56	*0.04*	*0.1*	23.6	210
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	0.61	3.03	14.84	56.00	0.04	0.10	23.60	210.00
Min	0.61	3.03	14.84	29.00	0.04	0.10	12.30	1.00
Avg.	0.61	3.03	14.84	42.50	0.04	0.10	17.95	105.50

Monitoring Point ID: SR SS 20

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Total Dissolved Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Dissolved Acidity (lbs/day)	Total Dissolved Alkalinity (lbs/day)
05/28/02	N/A	5.8	4.5	426	18	*0*	1.33	N/A	2.12	1.75	41.9	130	N/A	N/A	N/A
09/25/02	2064.48	N/A	5.7	642	8	*3*	0.113	N/A	0.588	0.985	59.5	210	490	198.52	74.45
Count	1.00	1.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2064.48	5.80	5.70	642.00	18.00	3.00	1.33	0.00	2.12	1.75	59.50	210.00	490.00	198.52	74.45
Min	2064.48	5.80	4.50	426.00	8.00	0.00	0.11	0.00	0.59	0.99	41.90	130.00	490.00	198.52	74.45
Avg.	2064.48	5.80	5.10	534.00	13.00	1.50	0.72	#DIV/0!	1.35	1.37	50.70	170.00	490.00	198.52	74.45

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	29	*0.04*	*0.1*	14.5	*1.000*
09/25/02	2.80	14.59	24.44	51	*0.04*	*0.1*	19.8	36
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	2.80	14.59	24.44	51.00	0.04	0.10	19.80	36.00
Min	2.80	14.59	24.44	29.00	0.04	0.10	14.50	1.00
Avg.	2.80	14.59	24.44	40.00	0.04	0.10	17.15	18.50

Monitoring Point ID: SR SS 25

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Total Dissolved Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Dissolved Acidity (lbs/day)	Total Dissolved Alkalinity (lbs/day)
05/28/02	N/A	N/A	4.5	465	26	*3*	1.77	N/A	2.77	2.13	46.4	150	N/A	N/A	N/A
09/25/02	2120.49	N/A	4.8	648	16	*3*	0.673	N/A	2.76	1.97	72.6	230	520	407.81	76.46
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2120.49	0.00	4.80	648.00	26.00	3.00	1.77	0.00	2.77	2.13	72.60	230.00	520.00	407.81	76.46
Min	2120.49	0.00	4.50	465.00	16.00	3.00	0.67	0.00	2.76	1.97	46.40	150.00	520.00	407.81	76.46
Avg.	2120.49	N/A	4.65	556.50	21.00	3.00	1.22	N/A	2.77	2.05	59.50	190.00	520.00	407.81	76.46

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	31	*0.04*	*0.1*	14.3	*1*
09/25/02	17.15	70.35	50.21	54	*0.04*	*0.1*	25.1	*1*
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	17.15	70.35	50.21	54.00	0.04	0.10	25.10	1.00
Min	17.15	70.35	50.21	31.00	0.04	0.10	14.30	1.00
Avg.	17.15	70.35	50.21	42.50	0.04	0.10	19.70	1.00

Monitoring Point ID: SR SS 30

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Acidity (lbs/day)	Alkalinity (lbs/day)
05/28/02	N/A	N/A	3.9	518	38	*0*	2.16	N/A	4.08	2.45	41.5	190	N/A	N/A	N/A
09/25/02	1823.25	N/A	4.5	698	44	*0*	1.89	N/A	5.59	2.83	66.9	260	538	964.28	0.00
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	1823.25	0.00	4.50	698.00	44.00	0.00	2.16	0.00	5.59	2.83	66.90	260.00	538.00	964.28	0.00
Min	1823.25	0.00	3.90	518.00	38.00	0.00	1.89	0.00	4.08	2.45	41.50	190.00	538.00	964.28	0.00
Avg.	1823.25	N/A	4.20	608.00	41.00	0.00	2.03	N/A	4.84	2.64	54.20	225.00	538.00	964.28	0.00

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	30	*0.04*	*0.1*	14.3	*1*
09/25/02	41.42	122.51	62.02	46	*0.04*	*0.1*	18	2
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	41.42	122.51	62.02	46.00	0.04	0.10	18.00	2.00
Min	41.42	122.51	62.02	30.00	0.04	0.10	14.30	1.00
Avg.	41.42	122.51	62.02	38.00	0.04	0.10	16.15	1.50

Monitoring Point ID: SR SS 35

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Acidity (lbs/day)	Alkalinity (lbs/day)
05/28/02	N/A	N/A	3.9	542	38	*0*	3.72	N/A	4.3	2.51	41.7	190	N/A	N/A	N/A
09/25/02	1454.11	N/A	3.8	728	52	*0*	3.59	N/A	6.16	2.98	67.1	280	579	908.88	0.00
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	1454.11	0.00	3.90	728.00	52.00	0.00	3.72	0.00	6.16	2.98	67.10	280.00	579.00	908.88	0.00
Min	1454.11	0.00	3.80	542.00	38.00	0.00	3.59	0.00	4.30	2.51	41.70	190.00	579.00	908.88	0.00
Avg.	1454.11	N/A	3.85	635.00	45.00	0.00	3.66	N/A	5.23	2.75	54.40	235.00	579.00	908.88	0.00

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	29	*0.04*	*0.1*	14.6	*1.0*
09/25/02	62.75	107.67	52.09	46	*0.04*	*0.1*	18	*1*
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	62.75	107.67	52.09	46.00	0.04	0.10	18.00	1.00
Min	62.75	107.67	52.09	29.00	0.04	0.10	14.60	1.00
Avg.	62.75	107.67	52.09	37.50	0.04	0.10	16.30	1.00

Monitoring Point ID: SR SS 40

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total	Total Dissolved			
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Ca	Sulfate	Solids	Acidity	Alkalinity
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)
05/28/02	N/A	N/A	3.7	617	46	*0*	3.4	N/A	4.45	2.75	44.6	230	N/A	N/A	N/A
09/25/02	1490.02	N/A	3.3	930	76	*0*	6.63	N/A	7.71	3.75	75.3	330	636	1361.16	0.00
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	1490.02	0.00	3.70	930.00	76.00	0.00	6.63	0.00	7.71	3.75	75.30	330.00	636.00	1361.16	0.00
Min	1490.02	0.00	3.30	617.00	46.00	0.00	3.40	0.00	4.45	2.75	44.60	230.00	636.00	1361.16	0.00
Avg.	1490.02	N/A	3.50	773.50	61.00	0.00	5.02	N/A	6.08	3.25	59.95	280.00	636.00	1361.16	0.00

	Loading							
Sample	Fe	Al	Mn	Chloride	Phosphorus	Ammonia	Sodium	Fecal Coliform
Date	(lbs/day)	(lbs/day)	(lbs/day)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
05/28/02	N/A	N/A	N/A	32	*0.04*	*0.1*	14.1	2.0
09/25/02	118.74	138.09	67.16	50	*0.04*	*0.1*	18.5	*1*
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	118.74	138.09	67.16	50.00	0.04	0.10	18.50	2.00
Min	118.74	138.09	67.16	32.00	0.04	0.10	14.10	1.00
Avg.	118.74	138.09	67.16	41.00	0.04	0.10	16.30	1.50

Monitoring Point ID: SR SS 45

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total	Total Dissolved			
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Ca	Sulfate	Solids	Acidity	Alkalinity
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)
05/28/02	N/A	N/A	5.8	220	0	*3*	*0.02*	N/A	*0.1*	0.0471	13.8	51	N/A	N/A	N/A
09/25/02	2	N/A	5.9	444	6	*3*	*0.02*	N/A	*0.1*	*0.02*	47	120	281	0.14	0.07
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2.00	0.00	5.90	444.00	6.00	3.00	0.02	0.00	0.10	0.05	47.00	120.00	281.00	0.14	0.07
Min	2.00	0.00	5.80	220.00	0.00	3.00	0.02	0.00	0.10	0.02	13.80	51.00	281.00	0.14	0.07
Avg.	2.00	N/A	5.85	332.00	3.00	3.00	0.02	N/A	0.10	0.03	30.40	85.50	281.00	0.14	0.07

	Loading							
Sample	Fe	Al	Mn	Chloride	Phosphorus	Ammonia	Sodium	Fecal Coliform
Date	(lbs/day)	(lbs/day)	(lbs/day)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
05/28/02	N/A	N/A	N/A	13	*0.04*	*0.1*	3.59	3.0
09/25/02	0.00	0.00	0.00	45	*0.04*	*0.1*	9.62	70
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	0.00	0.00	0.00	45.00	0.04	0.10	9.62	70.00
Min	0.00	0.00	0.00	13.00	0.04	0.10	3.59	3.00
	0.00	0.00	0.00	29.00	0.04	0.10	6.61	36.50

Monitoring Point ID: SR SS 50

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Ca (mg/L)	Total Dissolved Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Acidity (lbs/day)	Alkalinity (lbs/day)
05/28/02	N/A	N/A	6.4	212	-8	18	0.278	N/A	*0.1*	0.0465	22.9	49	N/A	N/A	N/A
09/25/02	2	N/A	6.6	244	-18	24	0.439	N/A	0.216	0.0231	32.8	79	160	-0.43	0.58
Count	1.00	0.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Max	2.00	0.00	6.60	244.00	-8.00	24.00	0.44	0.00	0.22	0.05	32.80	79.00	160.00	-0.43	0.58
Min	2.00	0.00	6.40	212.00	-18.00	18.00	0.28	0.00	0.10	0.02	22.90	49.00	160.00	-0.43	0.58
Avg.	2.00	N/A	6.50	228.00	-13.00	21.00	0.36	N/A	0.16	0.03	27.85	64.00	160.00	-0.43	0.58

Sample Date	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)	Chloride (mg/L)	Phosphorus (mg/L)	Ammonia (mg/L)	Sodium (mg/L)	Fecal Coliform (mg/L)
05/28/02	N/A	N/A	N/A	4	*0.04*	*0.1*	0.843	62.0
09/25/02	0.01	0.01	0.00	*2*	*0.04*	*0.1*	0.626	130
Count	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Max	0.01	0.01	0.00	4.00	0.04	0.10	0.84	130.00
Min	0.01	0.01	0.00	2.00	0.04	0.10	0.63	62.00
Avg.	0.01	0.01	0.00	3.00	0.04	0.10	0.73	96.00

Monitoring Point ID: 26 Borehole

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total Dissolved		Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	10	N/A	4.4	337	26	*0*	1.28	N/A	3	1.28	99	N/A	3.13	0.00	0.15	0.36	0.15
06/27/02	16.9	N/A	4.1	248	32	*0*	0.314	N/A	3.57	1.53	100	212	6.50	0.00	0.06	0.73	0.31
08/27/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/25/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/29/02	1.2	N/A	4.6	196	16	*3*	0.717	*0.2*	1.88	1.68	69.3	109	0.23	0.04	0.01	0.03	0.02
03/19/03	162	N/A	4.0	194	24	*0*	0.0617	*0.2*	2.59	1.08	74.6	91	46.73	0.00	0.12	5.04	2.10
Count	4.00	0.00	4.00	4.00	4.00	4.00	4.00	2.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00
Max	162.00	0.00	4.60	337.00	32.00	3.00	1.28	0.20	3.57	1.68	100.00	212.00	46.73	0.04	0.15	5.04	2.10
Min	1.20	0.00	4.00	194.00	16.00	0.00	0.06	0.20	1.88	1.08	69.30	91.00	0.23	0.00	0.01	0.03	0.02
Avg.	47.53	N/A	4.28	243.75	24.50	0.75	0.59	0.20	2.76	1.39	85.73	137.33	14.15	0.01	0.09	1.54	0.65

Monitoring Point ID: Bennington

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total Dissolved		Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	75	N/A	4.9	624	18	*3*	3.63	N/A	1.5	5.53	290	N/A	16.23	2.70	3.27	1.35	4.99
06/27/02	69	N/A	4.7	509	34	*3*	5.94	N/A	2.16	6.14	260	376	28.20	2.49	4.93	1.79	5.09
07/24/02	36	N/A	4.5	529	2	*0*	3.32	2.52	1.76	5.43	260	439	0.87	0.00	1.44	0.76	2.35
08/27/02	21	N/A	4.4	526	22	*0*	2.84	1.52	1.4	4.62	220	397	5.55	0.00	0.72	0.35	1.17
09/26/02	18	N/A	4.5	537	20	*0*	4.05	1.2	1.37	4.29	230	392	4.33	0.00	0.88	0.30	0.93
10/29/02	29.2	N/A	4.0	596	34	*0*	3.7	2.24	2.08	4.8	234	383	11.93	0.00	1.30	0.73	1.68
11/26/02	45	N/A	4.2	659	30	*0*	1.65	1.34	1.74	5.84	314	410	16.23	0.00	0.89	0.94	3.16
02/07/03	43	N/A	4.6	596	18	*3*	3.79	N/A	1.59	5.41	284	366	9.30	1.55	1.96	0.82	2.80
04/30/03	52	N/A	4.6	528	20	*3*	3.29	1.1	1.44	5.52	243	377	12.50	1.88	2.06	0.90	3.45
Count	9.00	0.00	9.00	9.00	9.00	9.00	9.00	6.00	9.00	9.00	9.00	8.00	9.00	9.00	9.00	9.00	9.00
Max	75.00	0.00	4.90	659.00	34.00	3.00	5.94	2.52	2.16	6.14	314.00	439.00	28.20	2.70	4.93	1.79	5.09
Min	18.00	0.00	4.00	509.00	2.00	0.00	1.65	1.10	1.37	4.29	220.00	366.00	0.87	0.00	0.72	0.30	0.93
Avg.	43.13	N/A	4.49	567.11	22.00	1.33	3.58	1.65	1.67	5.29	259.44	392.50	11.68	0.96	1.94	0.88	2.85

Monitoring Point ID: GT-Alum

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)
06/27/02	20	N/A	4.4	854	100	*0*	*0.02*	N/A	16.4	12.3	480	768	24.04	0.00	0.00	3.94	2.96
08/27/02	20	N/A	4.6	817	56	*3*	*0.02*	*0.2*	7.64	8.8	420	689	13.46	0.72	0.00	1.84	2.12
10/29/02	28	N/A	4.6	855	82	*3*	0.0436	*0.2*	27.4	12.4	439	697	27.60	1.01	0.01	9.22	4.17
11/26/02	25	N/A	4.3	993	390	*0*	2.87	0.22	146	21.1	646	864	117.20	0.00	0.86	43.87	6.34
03/19/03	32	N/A	4.6	845	70	*3*	*0.02*	*0.2*	9.9	12.3	312	609	26.92	1.15	0.01	3.81	4.73
Count	5.00	0.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Max	32.00	0.00	4.60	993.00	390.00	3.00	2.87	0.22	146.00	21.10	646.00	864.00	117.20	1.15	0.86	43.87	6.34
Min	20.00	0.00	4.30	817.00	56.00	0.00	0.02	0.20	7.64	8.80	312.00	609.00	13.46	0.00	0.00	1.84	2.12
Avg.	25.00	N/A	4.50	872.80	139.60	1.80	0.59	0.21	41.47	13.38	459.40	725.40	41.84	0.58	0.18	12.54	4.06

Monitoring Point ID: Kittanning

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)
05/31/02	1028	N/A	3.3	827	110	*0*	9.16		9.62	1.62	290		1359.22	0.00	113.19	118.87	20.02
06/27/02	1347.05	N/A	3.2	748	150	*0*	12.8		11.4	1.65	300	446	2428.73	0.00	207.25	184.58	26.72
07/24/02	289.11	N/A	3.0	924	160	*0*	16.7	13.2	13.5	2.03	400	664	556.02	0.00	58.03	46.91	7.05
08/27/02	200	N/A	3.0	968	170	*0*	15.7	5	14.9	2.17	390	623	408.68	0.00	37.74	35.82	5.22
09/25/02	200	N/A	3.0	1060	150	*0*	17.7	12.6	15.4	2.19	400	629	360.60	0.00	42.55	37.02	5.26
10/29/02	170	N/A	3.3	1080	160	*0*	18.7	8	15.7	2.24	385	620	326.94	0.00	38.21	32.08	4.58
11/26/02	645	N/A	3.0	857	130	*0*	8.99	6	13.3	1.97	338	477	1007.88	0.00	69.70	103.11	15.27
02/07/03	480	N/A	3.0	924	130	*0*	13		11.4	1.9	355	486	750.05	0.00	75.00	65.77	10.96
03/19/03	812	N/A	3.2	395	64	*0*	2.01	1	4.68	0.587	121	137	624.66	0.00	19.62	45.68	5.73
04/30/03	775	N/A	3.0	805	140	*0*	11.7	6.6	10.1	1.72	303	471	1304.17	0.00	108.99	94.09	16.02
Count	10.00	0.00	10.00	10.00	10.00	10.00	10.00	7.00	10.00	10.00	10.00	9.00	10.00	10.00	10.00	10.00	10.00
Max	1347.05	0.00	3.30	1080.00	170.00	0.00	18.70	13.20	15.70	2.24	400.00	664.00	2428.73	0.00	207.25	184.58	26.72
Min	170.00	0.00	3.00	395.00	64.00	0.00	2.01	1.00	4.68	0.59	121.00	137.00	326.94	0.00	19.62	32.08	4.58
Avg.	594.62	N/A	3.10	858.80	136.40	0.00	12.65	7.49	12.00	1.81	328.20	505.89	912.69	0.00	77.03	76.39	11.68

Monitoring Point ID: 26-1

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved			Loading		
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	90	5.0	4.5	1530	250	*0*	97.8	N/A	4.04	32.5	830		270.45	0.00	105.80	4.37	35.16
06/27/02	50	N/A	4.5	1250	54	*3*	90.1	N/A	1.88	29.6	750	1140	32.45	1.80	54.15	1.13	17.79
07/24/02	5.5	N/A	4.5	1230	250	*0*	86	39	0.984	28.8	700	1200	16.53	0.00	5.69	0.07	1.90
08/27/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/25/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/29/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/26/02	18	N/A	4.4	1350	200	*0*	76.7	46	2.54	30.6	770	1160	43.27	0.00	16.59	9.95	0.55
02/07/03	13	N/A	4.3	1680	260	*0*	101	N/A	3.06	37.2	974	1430	40.63	0.00	15.78	#VALUE!	0.48
03/19/03	N/A	N/A	4.4	924	170	*0*	49.4	41.8	0.987	24	599	765	N/A	N/A	N/A	N/A	N/A
04/30/03	N/A	N/A	3.8	1290	220	*0*	70.2	44	3.12	28.8	723	1160	N/A	N/A	N/A	N/A	N/A
Count	5.00	1.00	7.00	7.00	7.00	7.00	7.00	4.00	7.00	7.00	7.00	6.00	5.00	5.00	5.00	4.00	5.00
Max	90.00	5.00	4.50	1680.00	260.00	3.00	101.00	46.00	4.04	37.20	974.00	1430.00	270.45	1.80	105.80	#VALUE!	35.16
Min	5.50	5.00	3.80	924.00	54.00	0.00	49.40	39.00	0.98	24.00	599.00	765.00	16.53	0.00	5.69	#VALUE!	0.48
Avg.	35.30	5.00	4.34	1322.00	200.57	0.43	81.60	42.70	2.37	30.21	763.71	1142.50	80.67	0.36	39.60	#VALUE!	11.18

Monitoring Point ID: 26-2

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved			Loading		
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	4.5	4.9	4.4	1620	270	*0*	76.7	N/A	7.29	31.8	880	N/A	14.60	0.00	4.15	0.39	1.72
06/27/02	4.5	N/A	4.1	1380	250	*0*	78.1	N/A	5.29	30.1	710	1400	13.52	0.00	4.22	0.29	1.63
07/24/02	1.5	N/A	3.9	1240	190	*0*	79.9	68.8	3.57	30.8	740	1240	3.43	0.00	1.44	0.06	0.56
08/23/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/25/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/29/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/26/02	2.5	N/A	3.8	1330	180	*0*	55.5	53.8	5.34	33.6	799	1130	5.41	0.00	1.67	0.16	1.01
02/07/03	2	N/A	3.7	1750	390	*0*	86.2	N/A	6.46	38	1070	1480	9.38	0.00	2.07	0.16	0.91
03/19/03	N/A	N/A	5.3	1440	210	20	62.3	50	2.44	35.7	920	1280	N/A	N/A	N/A	N/A	N/A
Count	5.00	1.00	6.00	6.00	6.00	6.00	6.00	3.00	6.00	6.00	6.00	5.00	5.00	5.00	5.00	5.00	5.00
Max	4.50	4.90	5.30	1750.00	390.00	20.00	86.20	68.80	7.29	38.00	1070.00	1480.00	14.60	0.00	4.22	0.39	1.72
Min	1.50	4.90	3.70	1240.00	180.00	0.00	55.50	50.00	2.44	30.10	710.00	1130.00	3.43	0.00	1.44	0.06	0.56
Avg.	3.00	4.90	4.20	1460.00	248.33	3.33	73.12	57.53	5.07	33.33	853.17	1306.00	9.27	0.00	2.71	0.21	1.17

Monitoring Point ID: 26-A

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved	Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	3	4.2	3.7	2780	620	*0*	109	N/A	38	52.3	1900	N/A	22.36	0.00	3.93	1.37	1.89
06/27/02	4.5	N/A	4.1	2030	430	*0*	176	N/A	3.76	61.6	1400	2550	23.26	0.00	9.52	0.20	3.33
07/24/02	1.8	N/A	4.7	2050	530	*3*	176	36.8	0.17	54.2	1400	2380	11.47	0.06	3.81	0.00	1.17
08/27/02	1.2	N/A	4.4	2120	440	*0*	151	155	*0.1*	48.8	1500	2190	6.35	0.00	2.18	0.00	0.70
09/25/02	0.5	N/A	3.1	2370	440	*0*	162	131	0.552	62.7	1300	2260	2.64	0.00	0.97	0.00	0.38
10/29/02	1.8	N/A	3.8	2130	290	*0*	82.9	45.2	6.14	42.7	1180	1910	6.27	0.00	1.79	0.13	0.92
11/26/02	4.2	N/A	3.2	2180	340	*0*	104	87.8	13.8	50	1120	2060	17.16	0.00	5.25	0.70	2.52
03/19/03	6.7	N/A	3.1	2120	380	*0*	71.5	60	17.8	50.6	1380	1950	30.60	0.00	5.76	1.43	4.08
04/30/03	5	N/A	3.3	2070	350	*0*	71	67.6	11.9	46.8	1280	1990	21.04	0.00	4.27	0.72	2.81
Count	9.00	1.00	9.00	9.00	9.00	9.00	9.00	7.00	9.00	9.00	9.00	8.00	9.00	9.00	9.00	9.00	9.00
Max	6.70	4.20	4.70	2780.00	620.00	3.00	176.00	155.00	38.00	62.70	1900.00	2550.00	30.60	0.06	9.52	1.43	4.08
Min	0.50	4.20	3.10	2030.00	290.00	0.00	71.00	36.80	0.10	42.70	1120.00	1910.00	2.64	0.00	0.97	0.00	0.38
Avg.	3.19	4.20	3.71	2205.56	424.44	0.33	122.60	83.34	10.25	52.19	1384.44	2161.25	15.68	0.01	4.16	0.51	1.98

Monitoring Point ID: 26-B **Take all samples from weir marked 26B-2**

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved	Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	8	4.3	3.9	2820	610	*0*	205	N/A	13.4	54.4	2000		58.66	0.00	19.71	1.29	5.23
06/27/02	5	N/A	3.8	2370	690	*0*	223	N/A	18.2	65.7	1900	2760	41.47	0.00	13.40	1.09	3.95
07/24/02	5	N/A	3.7	2760	680	*0*	276	195	19	74.7	2000	3310	40.87	0.00	16.59	1.14	4.49
08/27/02	2	N/A	2.5	3820	950	*0*	76.6	22	53.4	91.8	2500	3780	22.84	0.00	1.84	1.28	2.21
09/25/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/29/02	4.2	N/A	2.7	3700	820	*0*	68.6	47	54.3	83.3	2610	3750	41.40	0.00	3.46	2.74	4.21
11/26/02	33	N/A	2.6	2860	640	*0*	77.1	60	44	70	1970	2880	253.86	0.00	30.58	17.45	27.77
04/30/03	23.3	N/A	2.7	2880	680	*0*	107	53	35.2	56.3	1980	2930	190.44	0.00	29.97	9.86	15.77
Count	7.00	1.00	7.00	7.00	7.00	7.00	7.00	5.00	7.00	7.00	7.00	6.00	7.00	7.00	7.00	7.00	7.00
Max	33.00	4.34	3.90	3820.00	950.00	0.00	276.00	195.00	54.30	91.80	2610.00	3780.00	253.86	0.00	30.58	17.45	27.77
Min	2.00	4.34	2.50	2370.00	610.00	0.00	68.60	22.00	13.40	54.40	1900.00	2760.00	22.84	0.00	1.84	1.09	2.21
Avg.	11.50	4.34	3.13	3030.00	724.29	0.00	147.61	75.40	33.93	70.89	2137.14	3235.00	92.79	0.00	16.51	4.98	9.09

Monitoring Point ID: Switchbox

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Dissolved Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)
06/27/02	25	N/A	5.6	559	6	12	0.385	N/A	1.3	4.65	240	358	1.80	3.61	0.12	0.39	1.40
07/24/02	25	N/A	4.8	529	18	*3*	*0.02*	0.22	1.43	4.81	240	429	5.41	0.90	0.01	0.43	1.45
08/27/02	20	N/A	4.5	515	30	*0*	*0.02*	*0.2*	1.42	4.84	230	378	7.21	0.00	0.00	0.34	1.16
09/26/02	20	N/A	4.0	493	14	*0*	0.045	*0.2*	1.46	4.07	220	367	3.37	0.00	0.01	0.35	0.98
10/29/02	28	N/A	5.0	524	10	*3*	0.0681	*0.2*	1.16	3.92	207	360	3.37	1.01	0.02	0.39	1.32
11/26/02	30	N/A	4.9	598	4	*3*	*0.02*	*0.2*	1.51	4.88	294	388	1.44	1.08	0.01	0.54	1.76
02/07/03	22	N/A	4.5	589	16	*3*	0.0609	N/A	1.31	4.8	283	375	4.23	0.79	0.02	0.35	1.27
04/30/03	N/A	N/A	4.9	519	12	*3*	0.126	*0.2*	1.05	4.26	237	361	N/A	N/A	N/A	N/A	N/A
Count	7.00	0.00	8.00	8.00	8.00	8.00	8.00	6.00	8.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	7.00
Max	30.00	0.00	5.60	598.00	30.00	12.00	0.39	0.22	1.51	4.88	294.00	429.00	7.21	3.61	0.12	0.54	1.76
Min	20.00	0.00	4.00	493.00	4.00	0.00	0.02	0.20	1.05	3.92	207.00	358.00	1.44	0.00	0.00	0.34	0.98
Avg.	24.29	N/A	4.78	540.75	13.75	3.38	0.09	0.20	1.33	4.53	243.88	377.00	3.83	1.06	0.03	0.40	1.33

Monitoring Point ID: White Discharge

Note: Italicized entries indicate lowest detectable limit and result was below this level.

Sample Date	Flow (gpm)	pH (field)	pH (lab)	Conductivity (us/cm)	Acidity (mg/L)	Alkalinity (mg/L)	Total Fe (mg/L)	Ferrous Iron (mg/L)	Total Al (mg/L)	Total Mn (mg/L)	Total Dissolved Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Loading Acidity (lbs/day)	Loading Alkalinity (lbs/day)	Loading Fe (lbs/day)	Loading Al (lbs/day)	Loading Mn (lbs/day)
05/31/02	2	N/A	6.3	4630	-64	98	0.727	N/A	29.5	14.4	740	N/A	-1.54	2.36	0.02	0.71	0.35
06/27/02	2	N/A	6.1	4140	-14	114	2.22	N/A	80.1	17.9	660	2900	-0.34	2.74	0.05	1.93	0.43
03/19/03	2	N/A	5.7	3140	-8	40	0.02	0.2	0.876	11.4	406	1860	-0.19	0.96	0.00	0.02	0.27
Count	3.00	0.00	3.00	3.00	3.00	3.00	3.00	1.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00
Max	2.00	0.00	6.30	4630.00	-8.00	114.00	2.22	0.20	80.10	17.90	740.00	2900.00	-0.19	2.74	0.05	1.93	0.43
Min	2.00	0.00	5.70	3140.00	-64.00	40.00	0.02	0.20	0.88	11.40	406.00	1860.00	-1.54	0.96	0.00	0.02	0.27
Avg.	2.00	N/A	6.03	3970.00	-28.67	84.00	0.99	0.20	36.83	14.57	602.00	2380.00	-0.69	2.02	0.02	0.89	0.35

Monitoring Point ID: ORANGE FALLS

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total Dissolved		Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
07/24/02	40	N/A	5.6	609	56	*3*	89.2	88.4	*0.1*	5.08	340	555	26.92	1.44	42.89	0.05	2.44
08/27/02	40	N/A	5.4	760	62	*3*	46.1	22	*0.1*	6.52	300	518	29.81	1.44	22.16	0.05	3.13
09/26/02	35	N/A	5.6	659	56	*3*	60.4	15	*0.1*	5.65	300	494	23.56	1.26	25.41	0.04	2.38
10/29/02	38	N/A	5.6	658	50	*3*	390	34	*0.1*	5.75	260	396	22.84	1.37	178.14	0.05	2.63
11/26/02	40	N/A	5.3	570	140	*3*	N/A	25	*0.1*	6.59	286	380	67.31	1.44	N/A	0.05	3.17
02/07/03	35	N/A	5.3	708	60	*3*	40.5	N/A	*0.1*	6.33	339	473	25.24	1.26	17.04	0.04	2.66
03/19/03	33	N/A	5.7	590	44	*3*	58.7	9	*0.1*	4.85	288	392	17.45	1.19	23.28	0.04	1.92
04/30/03	N/A	N/A	5.6	667	58	*3*	47.5	27.5	*0.1*	5.32	321	540	N/A	N/A	N/A	N/A	N/A
Count	7.00	0.00	8.00	8.00	8.00	8.00	7.00	7.00	8.00	8.00	8.00	8.00	7.00	7.00	6.00	7.00	7.00
Max	40.00	0.00	5.70	760.00	140.00	3.00	390.00	88.40	0.10	6.59	340.00	555.00	67.31	1.44	178.14	0.05	3.17
Min	33.00	0.00	5.30	570.00	44.00	3.00	40.50	9.00	0.10	4.85	260.00	380.00	17.45	1.19	17.04	0.04	1.92
Avg.	37.29	N/A	5.51	652.63	65.75	3.00	104.63	31.56	0.10	5.76	304.25	468.50	30.45	1.34	51.49	0.04	2.62

Monitoring Point ID: UNT Top W

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total	Total Dissolved		Loading				
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	25	5.0	4.3	333	22	*0*	0.302	N/A	2.8	1.65	98		6.61	0.00	0.09	0.84	0.50
06/27/02	31.2	N/A	4.1	259	42	*0*	0.313	N/A	3.4	1.86	98	194	15.75	0.00	0.12	1.28	0.70
07/24/02	24.7	N/A	3.9	278	30	*0*	0.585	0.8	1.97	2.64	97	231	8.91	0.00	0.17	0.58	0.78
08/27/02	2	N/A	4.0	247	8	*0*	0.961	*0.2*	0.873	3.71	95	171	0.19	0.00	0.02	0.02	0.09
09/25/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/29/02	4.7	N/A	4.3	235	0	*0*	0.519	0.36	1.36	2.4	74.3	14	0.00	0.00	0.03	0.08	0.14
11/26/02	38	N/A	4.1	393	38	*0*	0.29	*0.2*	4.13	2.76	135	195	17.36	0.00	0.13	1.89	1.26
02/07/03	25	N/A	4.1	288	34	*0*	0.244	N/A	3.64	2.24	123	125	10.22	0.00	0.07	1.09	0.67
03/19/03	420	N/A	4.2	205	36	*0*	0.045	*0.2*	2.78	1.18	80.8	101	181.74	0.00	0.23	14.03	5.96
04/30/03	14	N/A	4.1	251	42	*0*	0.247	*0.2*	2.49	1.57	99.2	170	7.07	0.00	0.04	0.42	0.26
Count	9.00	1.00	9.00	9.00	9.00	9.00	9.00	6.00	9.00	9.00	9.00	8.00	9.00	9.00	9.00	9.00	9.00
Max	420.00	5.00	4.30	393.00	42.00	0.00	0.96	0.80	4.13	3.71	135.00	231.00	181.74	0.00	0.23	14.03	5.96
Min	2.00	5.00	3.90	205.00	0.00	0.00	0.05	0.20	0.87	1.18	74.30	14.00	0.00	0.00	0.02	0.02	0.09
Avg.	64.96	5.00	4.12	276.56	28.00	0.00	0.39	0.33	2.60	2.22	100.03	150.13	27.54	0.00	0.10	2.25	1.15

Monitoring Point ID: UNT Low W

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved			Loading		
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
05/31/02	403	6.0	6.1	569	42	*3*	18.6	N/A	0.486	4.34	260	N/A	203.45	14.53	90.10	2.35	21.02
06/27/02	93.27	N/A	5.8	566	56	*3*	30.1	N/A	0.554	6.73	270	466	62.78	3.36	33.75	0.62	7.55
07/24/02	41.5	N/A	5.7	864	150	*3*	65.7	39	*0.1*	14.9	500	811	74.82	1.50	32.77	0.05	7.43
08/27/02	25	N/A	5.6	1170	210	*3*	96.4	86.6	*0.1*	22.5	610	1100	63.11	0.90	28.97	0.03	6.76
09/25/02	17	N/A	5.7	1220	210	*3*	112	N/A	*0.1*	25.3	680	1140	42.91	0.61	22.89	0.02	5.17
10/29/02	31.3	N/A	5.3	714	110	*3*	52.6	39	0.174	13.9	352	581	41.38	1.13	19.79	0.07	5.23
11/26/02	71	N/A	5.0	543	66	*3*	25.1	20	0.98	6.95	272	387	56.33	2.56	21.42	0.84	5.93
02/07/03	60.5	N/A	5.3	624	80	*3*	31.2	N/A	1.23	8.17	310	421	58.18	2.18	22.69	0.89	5.94
03/19/03	1275	N/A	4.8	328	26	*3*	6.64	1	1.26	3.84	147	199	398.46	45.98	101.76	19.31	58.85
04/30/03	329	N/A	4.0	751	78	*0*	20.8	19.5	1.8	13.9	382	553	308.46	0.00	82.26	7.12	54.97
Count	10.00	1.00	10.00	10.00	10.00	10.00	10.00	6.00	10.00	10.00	10.00	9.00	10.00	10.00	10.00	10.00	10.00
Max	1275.00	6.00	6.10	1220.00	210.00	3.00	112.00	86.60	1.80	25.30	680.00	1140.00	398.46	45.98	101.76	19.31	58.85
Min	17.00	6.00	4.00	328.00	26.00	0.00	6.64	1.00	0.10	3.84	147.00	199.00	41.38	0.00	19.79	0.02	5.17
Avg.	234.66	6.00	5.33	734.90	102.80	2.70	45.91	34.18	0.68	12.05	378.30	628.67	130.99	7.28	45.64	3.13	17.89

Monitoring Point ID: Keystone

Note: Italicized entries indicate lowest detectable limit and result was below this level.

							Total	Ferrous	Total	Total		Total Dissolved			Loading		
Sample	Flow	pH		Conductivity	Acidity	Alkalinity	Fe	Iron	Al	Mn	Sulfate	Solids	Acidity	Alkalinity	Fe	Al	Mn
Date	(gpm)	(field)	(lab)	(us/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
06/27/02	25	N/A	4.2	305	54	*0*	0.384	N/A	5.37	1.55	100	146	16.23	0.00	0.12	1.61	0.47
08/27/02	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03/19/03	20	N/A	4.0	238	38	*0*	*0.02*	*0.2*	4.84	0.877	94.3	129	9.14	0.00	0.00	1.16	0.21
Count	2.00	0.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Max	25.00	0.00	4.20	305.00	54.00	0.00	0.38	0.20	5.37	1.55	100.00	146.00	16.23	0.00	0.12	1.61	0.47
Min	20.00	0.00	4.00	238.00	38.00	0.00	0.02	0.20	4.84	0.88	94.30	129.00	9.14	0.00	0.00	1.16	0.21
Avg.	22.50	N/A	4.10	271.50	46.00	0.00	0.20	0.20	5.11	1.21	97.15	137.50	12.68	0.00	0.06	1.39	0.34

September 19, 2002

RE: Sugar Run Watershed Assessment, Blair County

Dear Resource Conservationist:

The Blair County Conservation District is currently underway on a watershed assessment of the Sugar Run Watershed, Blair County. This assessment is to identify non-point source pollution issues within the watershed primarily focusing on abandoned mine drainage. It is the intent of the District to acquire as much information as necessary to complete a competent assessment of the watershed. Therefore to foster cooperation and to maximize the assessment's potential; I would like to survey any concerns regarding the Sugar Run watershed held by other cooperating organizations and/or agencies. If your office is currently investigating issues or believes that there is a resource within the watershed needing highlighted or preserved please let me know. All information would be helpful.

The Sugar Run Watershed is located on the Cambria/ Blair border and would be within state watershed 11-A (Frankstown Branch of the Juniata River). It is listed on page 93-113 of Pennsylvania Code. Title 25. Chapter 93 as a CWF.

Please forward any information that you feel may be beneficial to the study to the Blair County Conservation District office by October 31, 2002. If there would be any questions please feel free to give me a call at the District office at 814-696-0877 x 5.

Thanks for all your support,

James Eckenrode
Watershed Specialist

Blair County Conservation District

Public Meeting: Sugar Run Stream Study

Canan Station Fire Hall

Thursday
June 12, 2003
6:30 - 7:30 p.m.

Come out and take the opportunity to share your thoughts and concerns.

The Blair County Conservation District has spent the past two years working on an assessment of Sugar Run and would like to share with you what we have found. Due to the long history of coal mining in the Sugar Run watershed, Sugar run has been left highly degraded.

For Additional Information Contact the:
Blair County Conservation District, 1407 Blair Street, Hollidaysburg, PA 16648
www.blairconservationdistrict.org

Public Notice

Sugar Run Stream Study
Public Meeting Notice

The Blair County Conservation District will be holding a public informational meeting to discuss the study done on Sugar Run, Blair County. Sugar Run has been highly impacted by mine drainage and today has little life within its' streams. The meeting will be held at the Canan Station Fire Hall on June 12, 2003 at 6:30 p.m. Please come out to share your comments and express any concerns.

For additional information contact the,
Blair County Conservation District
1407 Blair Street
Hollidaysburg, PA 16648
814-696-0877 x5