

COLD WATER CONSERVATION PLAN  
FOR  
THE NORTH POCONO TRIBUTARY STREAMS  
OF THE  
LACKAWANNA RIVER WATERSHED



Rattlesnake Creek Falls

DEVELOPED BY

THE LACKAWANNA RIVER CORRIDOR ASSOCIATION  
AND  
THE NORTH POCONO WATERSHED COALITION

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MARCH 2006

WITH SUPPORT FROM

THE COLD WATER HERITAGE PARTNERSHIP

PENNSYLVANIA TROUT UNLIMITED

THE WESTERN PENNSYLVANIA WATERSHED PROGRAM

THE PENNSYLVANIA FISH AND BOAT COMMISSION

THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

AND THE

MEMBERSHIP OF THE LACKAWANNA RIVER CORRIDOR ASSOCIATION

# COLD WATER CONSERVATION PLAN FOR THE NORTH POCONO STREAMS

## CONTENTS

I.	Introduction and Background.....	1
II.	Watershed Descriptions.....	2
III.	Previous Studies/Analysis of Watershed.....	3
IV.	Exceptional Value Determinations.....	6
V.	Unique and Outstanding Watershed Values.....	8
VI.	Areas of Concern and Potential Conflicts.....	8
VII.	Recommendations and Next Steps.....	9
VIII.	Summary/Conclusions.....	10
IX.	Stream Photos.....	11
	Appendices.....	13

## I. INTRODUCTION AND BACKGROUND

The Lackawanna River Corridor Association (LRCA) is a not for profit charitable and educational organization incorporated in 1987 by local residents “to promote the conservation, restoration and appropriate management of the Lackawanna river and its watershed resources”. The mission of the LRCA is also “to involve the citizens of the watershed in mutually beneficial relationships with the River and Watershed”.

The LRCA developed The Lackawanna River Citizens Master Plan (LRCMP) in 1988/1990. The LRCMP proposed a paradigmatic change in the relationship between the human and natural community in the Lackawanna River Watershed. The LRCA continues to be involved in numerous partnerships and collaborations to implement and advance the recommendations contained in the LRCMP.

The LRCA partnered with the National Park Services’ Rivers and Trails Conservation Assistance Program and the United States Army Corps of Engineers to conduct a Lackawanna River Greenway Reconnaissance Study in 1993. That study further assessed recommendations for Environmental mitigation of abandoned mine land problems and dysfunctional combined sewer overflows along the main stem of the Lackawanna. It further identified opportunities for Rail to Trail/greenway projects along the river and tributary streams.

The LRCA works with the Lackawanna Heritage Valley Authority and other county agencies on implementation of these programs.

The LRCA conducted an update of the LRCMP from 2000 to 2003 through the PA DCNR River Conservation Program. A Lackawanna River Watershed Conservation Plan (LRWCP) was completed and the Lackawanna Watershed in its entirety is now included on the Pennsylvania Rivers Conservation Registry. The LRWCP plan includes recommendations for the North Pocono Tributaries that are further detailed in this plan.

During the process to conduct the planning and outreach work for the LRWCP, the LRCA asked its members residing in the North Pocono area to form a coalition to involve their neighbors, local municipalities, and business interests with the review of planning recommendations for the LRWCP. LRCA continues to work through its members and the North Pocono Coalition on projects and issues in these critical tributary watersheds.

The LRWCP indicated that these streams had the potential to qualify for a higher level of protection under Pennsylvania Title 25, Chapter 93 regulations, by virtue of the “EXCEPTIONAL VALUE” of their water and aquatic habitat quality. These streams are presently classified as High Quality Coldwater Fisheries (HQ-CWF). Under this plan, water quality data was collected that would support a petition to the Pennsylvania Environmental Quality Board to reclassify three stream reaches as Exceptional Value (EV) waters under Chapter 93. They include: the headwaters of Roaring Brook upstream of Hollister Reservoir; Green Run, a tributary to Spring Brook; and a large portion of Stafford Meadow Brook.

## II. WATERSHED DESCRIPTIONS

The North Pocono streams and their watersheds, which are the subject of this report, are tributaries to the Lackawanna River. They include headwater reaches of Roaring Brook, Spring Brook and Stafford Meadow Brook, all located in the southeastern portion of Lackawanna County, with a small area of the headwaters of the East Branch of Roaring Brook in southern Wayne County. As its name implies, these streams lie in the northern and western portion of the Pocono plateau.

The northern Poconos are the headwaters source of the Lehigh River, which rises at Pocono Peak Lake just east of the source springs of Roaring Brook in southern Wayne County. Wallenpaupack Creek, a tributary to the Lackawaxen River, rises at near by Moosic Lake on the summit of Moosic Mountain in Jefferson Township, Lackawanna County.

The watershed topography is rolling plateau with elevations ranging between 1600 to 2000 feet above sea level. The topography consists primarily of ridges of Catskill sandstone and extensive wetlands. The area is 80% vegetated, with second and third growth stands of mixed deciduous forests predominating. There are also recognizable Hemlock-Rhododendron glades, which surround the numerous wetlands and glacial bogs that comprise source waters.

Headwater areas of North Pocono streams originate from extensive wetland complexes, which provide the hydrology for the formation of small first order streams. These streams soon confluence to form second and third order streams that remain in near pristine condition, and support native brook trout and also hold river otter. Takes of otter from the Pocono plateau have been used as part of U.S. Fish and Wildlife Service associated otter population restoration projects.

As the streams increase in size, they flow in a west-southwesterly direction and encounter the Moosic Mountains. Each of the streams penetrate the Moosic Range through water gaps. The most dramatic of these is Cobb's Gap, where Roaring Brook passes through a canyon with a large escarpment rising to the ridgeline. Several large (100-400 acre) water supply reservoirs operated by The Pennsylvania American Water Company (PAWC) are located in proximity to the stream courses through the Moosic Range. Several thousand acres of land surrounding the reservoirs are retained by PAWC as buffering.

Once through the Moosic Range, the tributaries enter the urbanized area of the City of Scranton and its contiguous boroughs. Water and habitat quality quickly reflect urban influences; lower reaches of these tributaries are influenced by Abandoned Mine Lands and Combined Sewer Overflow points.

The development and parcel ownership patterns are somewhat limited due to the ownership of large tracts of headwater parcels owned by a public water supply utility. However during the last 10 years, the utility has constructed water supply filtration plants at its reservoirs. That utility, the former Pennsylvania Gas and Water Company sold its water business to PAWC in 1998, while selling a majority of its watershed lands in 2000 to a private concern, the Theta Corporation.

There are numerous farmland areas that are returning to successional forest cover throughout the North Pocono watersheds. Approximately 20% of the land area is covered by built development in small village centers at Elmhurst, Moscow and Daleville. There are also some older residential sub-divisions dating from the 1960's, and a number of newer and proposed developments on abandoned farmland and in forest areas. Most of the developed areas are located along major state roads and in areas served by sewer treatment plants.

The LRCA's LRWCP contains very detailed reach-by-reach descriptions of the North Pocono streams in Appendix C, River and Tributary Stream Walk Reports. This report is available on line at [www.lrca.org](http://www.lrca.org) under the Publications link. LRCA has also developed several Watershed Fact Sheets on the North Pocono streams that are appended to this report.

### III. PREVIOUS STUDIES AND WATERSHED ANALYSIS

Since 1980, the North Pocono watersheds have been the subject of several studies by the Pennsylvania Fish and Boat Commission, the Department of Environmental Resources (Protection), the Lackawanna River Corridor Association, and the University of Scranton's Biology Department. The PG&W and PAWC utility companies have also engaged in extensive monitoring and sampling in these waters, as part of their responsibilities to maintain potable water supplies.

For our purposes, the work of the PA F&BC Fisheries Biologists are most relevant. The following reports have been assessed in formulating the sampling work of LRCA presented in this plan:

#### On Roaring Brook:

- Daniels / PA F&BC 1979
- Copeland / PA F&BC 1990
- Moase / PA F&BC 1996
- Rider & Blacksmith / PA DEP 1985
- Popp & McGurl / LRCA 2003

#### On Spring Brook:

- USGS water chemistry data 1971-1975
- Daniels / PAF&BC 1976
- Copeland / PAF&BC 1992
- Moase / PAF&BC 1993
- Rider & Blacksmith / PA DEP 1985
- Popp & McGurl / LRCA 2003

#### On Stafford Meadow Brook:

- Sample data / PA F&BC 1980
- Popp & McGurl / LRCA 2003

A Land Use Management Plan For PG Energy Lands in the Lackawanna and Wyoming Valleys (Johnson, McGurl & Magnotta, PG Energy Land Use Committee, 1998) was developed between 1997-98 under a consent decree from the Pennsylvania Public Utility Commission as a resolution to protests of the sale of the water utility assets by the PG&W holding company, Pennsylvania Enterprises Incorporated (PEI), to the PAWC. PG&W subsequently became PG Energy, which retained 45,000 acres of watershed lands titled in the name of Theta Corporation, a wholly owned subsidiary.

PAWC received 8,000 acres, in conjunction with 36 reservoirs, which PAWC continues to maintain as water supply resources. In November of 2000, PEI merged with Southern Union Gas, a gas utility holding company based in Austin, Texas. In February 2001, Southern Union announced that it had sold its entire stock interest in its subsidiary, Theta Corporation, to an undisclosed buyer for \$12 million. The buyer has maintained his/its anonymity. Theta Corp maintains offices in the former Spring Brook Water Service building on North Franklin Street in Wilkes-Barre, PA.

The Land Use Plan recommended a wide variety of management options for application to the watershed lands now owned by Theta Corp, including: sustainable yield forestry, hunting and fishing access, conveyance to state forest and game agencies, and development with conservation subdivision practices. While maintaining the anonymity of its ownership, Theta seems to be following some of the Management Plans strategy in a broad manner. Its stewardship of these critical watershed resources continues to generate some concern and controversy. For instance, it had conveyed rights for the harvest of timber on many of its holdings to Deer Park Lumber Co. of Tunkhannock, PA. The conveyances of these rights are encumbrances on the title of the property that proceed to subsequent owners. The rights for wind powered electrical generation, communication towers and related utility rights-of-way, have also been segregated as separate marketable properties.

The PG Energy/Theta Plan will remain an important influence on the North Pocono watersheds, due to the fact that Theta continues to own and manage approximately 20,000 acres of land that comprise a majority of the critical habitat of these watershed lands. This plan does recognize the importance of the resource values associated with water supply, and it catalogues all of these aspects relative to regulatory requirements. The Comprehensive Plans of several municipalities also recognize these values.

An analysis of the watersheds in all of the above mentioned studies recognizes that Roaring Brook headwater reaches and the East Branch of Roaring Brook; the headwaters and main stem of Stafford Meadow Brook to the lower PA 307 bridge; and the entirety of Rattlesnake Creek, a tributary of Spring Brook, are candidates for a petition to the Environmental Quality Board for consideration as *Exceptional Value* waters. All of these reaches lie above drinking water supply reservoirs, and generally remain in better than 90% near natural condition. Only minor impacts from development, in the form of a few residential sites and associated roadways are apparent. They also remain in nearly 100% forest cover, however recent timber harvesting activities have occurred. Although these harvests have been assessed as unsustainable high yield, impacts on ambient water quality conditions have not presented any measurable negative impacts as indicated in biological data sampling conducted by LRCA as part of this work (Re: Contact with Consulting Foresters and analysis of LRCA biological data). Below the several water

supply reservoirs, the streams tend to have warmer temperatures, however they maintain good HQ-CWF attributes.

The following is a brief summary of conditions along the subject streams:

### Roaring Brook

Roaring Brook is impacted by storm water flows from the Daleville Shopping area, Moscow Borough, Elmhurst village and PA Routes 435, 590 and 690. This reach also holds more intensive suburban and village commercial development, more fragmentation of natural habitat and the discharge points of three municipal sewerage treatment plants.

Between Elmhurst and Dunmore, Roaring Brook drops through the Nay Aug Canyon at Cobb's Gap as it breaches the Moosic Range. The routes and stream crossings of Interstates 380 and 84 as well as PA 435, 590 and 348, impact this reach. The main line of the Scranton to New York metropolitan rail corridor (The Lackawanna Railroad/Route of The Phoebe Snow) follows Roaring Brook from Scranton, eastward to the summit of the Pocono Plateau. The rail corridor is directly along the banks and flood plain of Roaring Brook. The Cobb's Gap reach exhibits several indications of record flooding activity from the Hurricane Dianne event of August 1955. The Lackawanna Railroad was cut in 88 pieces along Roaring Brook and down Broadhead Creek to the Delaware Water Gap. Hurricane Gloria in 1985, and Hurricane Ivan in 2004 caused significant channel instability in this reach. Most notable are two large 1000-foot long wash outs along an abandoned rail corridor on the north bank, near a location known locally as Chico's.

The next reach of Roaring Brook flows from Dunmore Number Seven reservoir, to the Nay Aug Gorge in Scranton. This reach is impacted by urban storm flows; the junction of Interstates 380, 84, 81 & US 6; a large automobile recycling operation and abandoned coal mine features. The Nay Aug Gorge holds a scenic waterfall accessible by pedestrian trails in Nay Aug Park. The Gorge is on the National Register of Natural and Geologic Landmarks.

The final reach of the Brook flows through Downtown Scranton in a concrete flood control sluice. It has its confluence with the Lackawanna River near South Washington Avenue.

### Stafford Meadow Brook

Stafford Meadow Brook (SMB) rises in Bear Swamp just east of Blue Shutters Road. It flows through a completely forested watershed with several beaver swamps and wetlands along its flood plain. This stream maintains relatively unimpacted for several miles to the point where it enters the impoundment at Williams Bridge Dam along PA 307.

Stafford Meadow Brook then flows into Lake Scranton a 400+/- acre water supply reservoir on the edge of the East Mountain neighborhood. This lake has a popular 4-mile walking trail around its shoreline. There is a handicap fishing access pier in addition to the walking trail but no other recreation at Lake Scranton. There is also a 22 million gallon per day water supply filtration plant at the lake.

The next reach of Stafford Meadow Brook flows through the Montage Mountain area. There are ski slopes, up-scale residential areas, office/retail sites, and a multi-sport stadium. SMB then

flows through the historic South Scranton residential neighborhoods where there is extensive culvertization, channel encroachment, sewage inputs and habitat loss. The final reach to the confluence with the Lackawanna River flows in a concrete flood sluice.

#### Spring Brook

Parts of Spring Brook's northern headwaters are influenced by rural-suburban development. Spring Brook flows through Watres Reservoir, while picking up several southern and eastern first and second order headwater streams. These streams rise on Theta Corp property, which is under contract for conveyance to PA DCNR Bureau of Forestry. Rattlesnake Creek has its confluence with Spring Brook at the head of Nesbitt reservoir along PA 502. These waters have been protected as part of the water supply utility. The status of Theta parcels in the Rattlesnake Creek watershed is yet to be determined. Our analysis of Rattlesnake Creek indicates that it is a strong candidate for elevation to Exceptional Value status.

Below Nesbitt, Spring Brook flows through the Moosic Mountain Range at Spring Brook Gap. The Spring Brook Intake Reservoir and Filtration Plant are located within the Gap reach. The next reach features numerous trailer homes along the flood plain followed by an urban reach in Moosic Borough, with the last mile in a concrete flood sluice to the confluence with the Lackawanna River.

#### **IV. EXCEPTIONAL VALUE DETERMINATIONS**

Based on a review of the previously described documents, and a comprehensive field examination of the three watersheds, a total of eight sites were selected for sampling to determine if stream conditions could achieve Exceptional Value (EV) status. Sites were generally chosen at the downstream end of what could be considered headwater reaches. These sites often coincided with stream reaches that lie just upstream of drinking water supply reservoirs. If these sites achieved EV conditions, stream reaches upstream of the site could be classified as EV. The eight sites that were chosen for sampling are described below. In addition, refer to the site maps included in the Appendix. Latitude and Longitude coordinates for these sites are included with the macroinvertebrate data sheets in the Appendix.

#### Sites in Stafford Meadow Brook Watershed (Roaring Brook Township)

- 1) SMB1 – site on Stafford Meadow Brook, just upstream of Williams Bridge Dam and Rte. 307. This site covers a substantial amount of SMB's length as well as all tributaries to the stream, upstream of this site.

#### Sites in Roaring Brook Watershed (Covington Township)

- 2) RB1 – site on Roaring Brook, just upstream of Hollister Reservoir. This site covers headwater reaches that lie above the reservoir.
- 3) RB2 – site on the East Branch Roaring Brook, just upstream of Hollister Reservoir. This site covers a major headwater tributary stream that has its confluence with Roaring Brook's main stream at the reservoir.
- 4) RB3 – site is on Roaring Brook's main stream, approximately one-half mile downstream of Hollister Reservoir. This site covers all of Roaring Brook's length from the headwaters downstream to the Borough of Moscow.



Sites in Spring Brook Watershed (Spring Brook Township)

- 5) SB1 – site on Six Springs Run, a named tributary to Rattlesnake Creek (trib to Spring Brook), immediately upstream of its confluence with Rattlesnake Creek. This site covers all of Six Springs Run.
- 6) SB2 – site on Rattlesnake Creek, a tributary to Spring Brook, just upstream of its confluence with Nesbitt Reservoir. This site covers all of Rattlesnake Creek.
- 7) SB3 – site on Green Run, a tributary to Spring Brook, just upstream of its confluence with Spring Brook, within the tail waters of Nesbitt Reservoir. This site covers all of Green Run.
- 8) SB4 – site on Spring Brook, approximately one-quarter mile upstream of Watres Reservoir. This site covers all Spring Brook headwater reaches downstream to Watres.

In order to determine if conditions at these sites would achieve Exceptional Value status, the procedures for determining attainment detailed in Chapter 5 and Appendix A of PA DEP's *Water Quality Antidegradation Implementation Guidance (2003)* were followed. Specifically, protocols for qualifying as EV waters based on the **Biological Assessment Qualifier** (the macroinvertebrate community) were chosen (procedures for basing attainment on water chemistry is a second option, however this required considerable water sampling efforts and costly lab analysis). These protocols essentially call for a one-time sampling of the macroinvertebrate community within an appropriate time frame (November-May). The following is a brief summary of the procedures that were followed to determine if EV attainment is achieved. Detailed protocols can be found in Chapter 5 and Appendix A of the Antidegradation Guidance document.

- 1) Macroinvertebrate samples were collected from riffle and run reaches at each site, combined in one container, and preserved for subsequent lab sorting and identification.
- 2) Field measurements of water temperature, dissolved oxygen, pH, conductivity, hardness, alkalinity, and acidity were also taken. Subsequent site visits to measure these parameters were also made.
- 3) Macroinvertebrate samples were returned to the lab, and all organisms were removed from the sample.
- 4) A Habitat Assessment following protocols detailed in Appendix A was also conducted. This assessment involves rating 12 physical parameters that characterize the stream and surrounding lands, which in turn affect macroinvertebrate structure and composition.
- 5) A 200-count random subsample of organisms was picked and identifications to Genus level were made; some organisms were identified only to Order or Family.
- 6) Reference macroinvertebrate data from an EV stream was obtained from DEP, in order to make comparisons between the macroinvertebrate community of the candidate stream and a stream with EV designation.
- 7) Biological indice values were calculated for the candidate stream and compared to indice values of the reference stream.
- 8) If values of the candidate stream attained at least 92% of those of the reference stream, the candidate stream could be considered to have achieved EV status.

Of the eight sites sampled, three attained EV status based on macroinvertebrate comparisons to a reference stream. The three sites included: Stafford Meadow Brook (SMBI), the headwaters of

Roaring Brook (RB1), and Green Run (SB3). All three attained indice values greater than 92% of the reference stream. The percentages for each site are listed below:

Stafford Meadow Brook (SMB1)	92.5
Roaring Brook Headwaters (RB1)	92.5
East Branch Roaring Brook (RB2)	72.5
Main Stem Roaring Brook (RB3)	90.0
Six Springs Run (SB1)	82.5
Rattlesnake Creek (SB2)	87.5
Green Run (SB3)	92.5
Main Stem Spring Brook (SB4)	85.0

## V. UNIQUE AND OUTSTANDING WATERSHED VALUES

This report indicates and documents that the North Pocono Watersheds have a number of “Unique and Outstanding Values”. They are as follows:

- Three reaches of waters qualifying for consideration as Exceptional Value (EV) water under PA chapter 92 regulations
- Balance of waters in North Pocono reaches will be maintained as High Quality Cold Water Fishery (HQ-CWF)
- Extensive tracts of relatively unfragmented forest and wetland habitat, several under single ownership
- Adjacent areas with extensive ownership in State Game lands and Forest
- Near by upland ridge lines with scenic vistas
- Nay Aug gorge on National Natural Landmark Register
- Entire Lackawanna watershed including North Pocono on Pa River Conservation Registry

Residents of the North Pocono watersheds generally value the rural open space attributes, low-density development, and relaxed country-based life style that is supported by the natural resource wealth and diversity of the area. The challenges to protect these values are addressed in the following sections.

## VI. AREAS OF CONCERN AND POTENTIAL CONFLICTS

The future of these watersheds and their resources should be a concern of all. These critical waters are the top of the watershed in Pennsylvania. These North Pocono streams are vital in replenishing the Susquehanna with cool, fresh, clean water. Nearby headwater reaches to the east provide the same values to the Delaware River basin.

LRCA and local residents have identified several areas of concern during the course of our work in the North Pocono watersheds during the past ten years. The concerns relate to actions by

individuals property and business owners, and municipal or governmental agencies, which could degrade water and aquatic habitat quality or further fragment forest cover.

The current quality of municipal planning and land use practices in Pennsylvania is generally inadequate to protect these resources. Local municipalities could benefit from enhancement of their plans and ordinances. At the county level, Lackawanna County completed an Open Space Plan in 2003. This plan would provide funding for planning and ordinance updates, acquisition and management of watershed resource lands, and support for private conservation work such as conservation easements.

Lackawanna County has yet to fund or implement this plan. The County has also identified a role to coordinate and support municipal compliance with NPDES Phase II storm water quality regulations. There is as yet no funding allocated for these needs.

The management and expansion of public sewage facilities is another concern given the lack of adequate open space protections. There have been several regional conflicts related to this issue in the community in recent years.

There is some multi-municipal planning underway, with Madison and Salem Townships working on a joint plan and ordinance program. Other municipalities generally intend to maintain their rural character according to interviews conducted recently by LRCA.

## VII. RECOMMENDATIONS AND NEXT STEPS

The LRCA and the membership of the North Pocono Watershed Coalition recommend that the petition for an up-grade in classification from HQ-CWF to EV be conducted for the headwater reaches of Stafford Meadow Brook (SMB1) and Roaring Brook (RBI), and for Green Run. Follow-up sampling efforts on stream segments that narrowly missed qualifying for EV attainment might also be considered.

We further recommend that the Lackawanna County Commissioners consider innovative use of a special land fill closure fund to finance implementation of the Open Space Plan and to up grade the Lackawanna Basin Act 67 Storm Water Plan.

We recommend that work continue to convey important tracts of Theta land to state agencies or to private conservancies in the context of the land use plan developed for the PGEnergy / Theta properties, and in the context of the County Open Space Plan.

The LRCA will seek funding to support staff work and related expenses to coordinate the Exceptional Value petition process to the PA Environmental Quality Board. This work will include follow up contacts with municipal officials and property owners through the North Pocono Watershed Coalition, in order to gain support for the petition process to upgrade designations for the three stream segments that qualified for EV status.

LRCA will continue to develop opportunities to advance up grades to municipal ordinances and plans to protect water resources. This work will include collaboration with Lackawanna

College's Environmental Institute, the Lackawanna County Conservation District, and the Lackawanna County Planning Commission.

LRCA will also collaborate through our affiliated land trust, the Lackawanna Valley Conservancy (LVC), to advocate for implementation of Open Space Plan components.

There are also continuing needs to provide for Public Involvement and Public education to instill a greater awareness of and respect for these water resources. Therefore, LRCA will continue its work to involve and educate the public to enhance the environmental ethic of our watersheds human community.

## VIII. SUMMARY/ CONCLUSIONS

In sum, we conclude that three stream reaches examined in the course of this study of the North Pocono Watersheds, possess Exceptional Value Waters. We believe that these waters and the human and natural habitats that these waters help to sustain would benefit by a greater level of protection afforded by an up-grade to the water quality designation through Chapter 92 of the regulations of the Commonwealth of Pennsylvania.

We recommend a process to advance these waters to this higher level of regulatory protection and to expand work to raise the understanding of the human community to the value that these waters and their watershed resources provide in their natural condition.

IX. Stream Photos



Stafford Meadow Brook (SMB1)



Roaring Brook Headwaters (RB1)



East Branch Roaring Brook (RB2)



Roaring Brook Main Stem (RB3)



Six Springs Run (SB1)



Rattlesnake Creek (SB2)



Green Run (SB3)



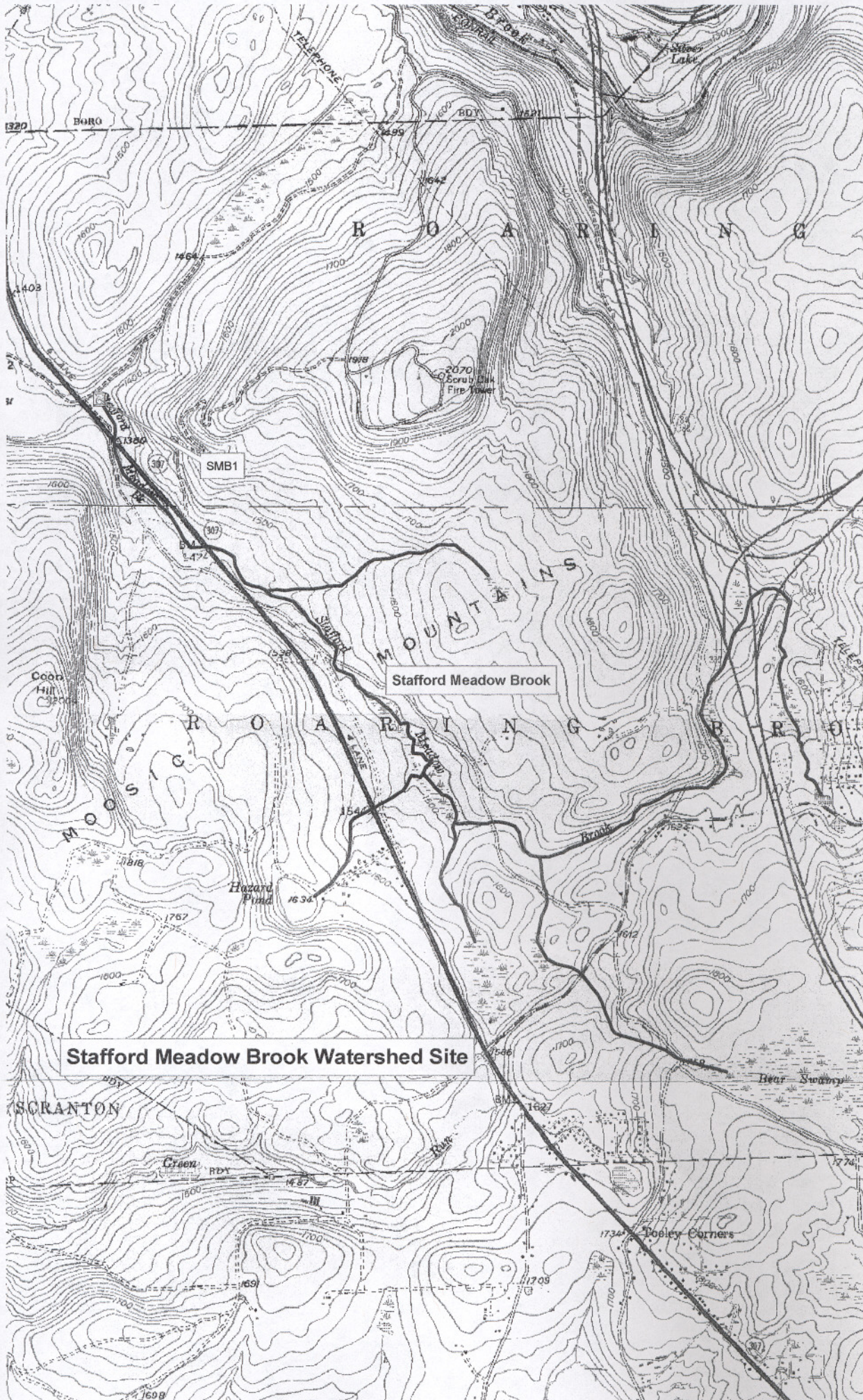
Spring Brook Headwaters (SB4)

# APPENDICES

Appendix A	Site Maps
Appendix B	Macroinvertebrate Data
Appendix C	North Pocono Streams Fact Sheets

## APPENDIX A





**Stafford Meadow Brook Watershed Site**

**Stafford Meadow Brook**

**SMB1**

**SCRANTON**

**Pooley Corners**

**Bear Swamp**

**Hazard Pond**

**Coon Hill**

**2070  
Scrub Oak  
Fire Tower**

**TELEPHONE**

**BORG**

**RDY**

**307**

**1320**

**4403**

**2**

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**Roaring Brook Watershed Sites**

**Roaring Brook**

**East Branch Roaring Brook**

RB1

RB2

RB3

Brook

Henry Lake

Thompsonville

Bippenington

Memory Lake

Thousand Acre Swamp

Evansville

Thompson Camp

Telephone

Telephone

Telephone

St. Catherine's Camp

St. Catherine's

St. Catherine's

St. Catherine's

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Green Run

SB3

Six Springs  
Creek

Rattlesnake  
Creek

SB1

SB2

SPRING BROOK

Spring Brook

Spring Brook Watershed Sites

SB4



## APPENDIX B

**Site SMB1 - Stafford Meadow Brook, upstream of Dam No. 2 and Rte. 307 (41o 22' 47 N, 75o 36' 53 W)**

EV Status macroinvertebrate sampling: 5/20/04, D-frame net - 3 riffles and 3 runs  
200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	9
	Ephemerellidae	<i>Drunella</i>	1
		<i>Ephemerella</i>	9
		<i>Eurylophella</i>	1
		<i>Epeorus</i>	1
Plecoptera	Leuctridae	<i>Leuctra</i>	14
	Nemouridae	<i>Amphinemura</i>	23
	Perlidae	<i>Acroneuria</i>	6
	Perlodidae	<i>Isoperla</i>	2
	Pteronarcyidae	<i>Pteronarcys</i>	1
Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i>	4
		<i>Hydropsyche</i>	62
	Lepidostomatidae	<i>Lepidostoma</i>	4
	Limnephilidae	<i>Pycnopsyche</i>	1
	Molannidae	<i>Molanna</i>	1
	Philopotamidae	<i>Dolophilodes</i>	1
	Rhyacophilidae	<i>Rhyacophila</i>	4
	Uenoidae	<i>Neophylax</i>	1
<b>Non-EPT's</b>			
Coleoptera	Elmidae	<i>Promoresia</i>	1
		<i>Stenelmis</i>	1
		<i>Dicranopsleaphus</i>	1
Megaloptera	Corydalidae	<i>Nigronia</i>	2
Odonata	Cordulegastridae	<i>Cordulegaster</i>	1
	Gomphidae	<i>Lanthus</i>	10
Diptera	Chironomidae		27
	Simuliidae	<i>Simulium</i>	3
	Tipulidae	<i>Antocha</i>	2
		<i>Dicranota</i>	2
		<i>Hexatoma</i>	11
Amphipoda	Crangonyctidae	<i>Crangonyx</i>	1
Decapoda	Cambaridae		1
Oligochaeta			1
<b>Total Organisms</b>			<b>210</b>

Reference Site  
Poplar Run (Monroe Co.)

Biological Condition Scoring Criteria	6/21/2003	SMB1	Difference	Score
Taxa Richness	26	33	127%	8
Modified EPT Index	17	14	82%	8
Modified Hilsenhoff Index	3.1	3.82	0.72	7
Percent Dominant	35	29.5	5.50%	8
Percent Modified Mayflies	24.2	5.7	18.50%	6
<b>Total Score</b>				<b>37</b>

37/40 = 92.5%

**Does meet EV attainment criteria**

**Site RB1 - Roaring Brook headwaters upstream of Hollister Reservoir (41° 18' 18 N, 75° 29' 15 W)**

EV Status macroinvertebrate sampling: 5/21/04, D-frame net - 3 riffles and 3 runs

200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	2
	Ephemerellidae	<i>Drunella</i>	3
		<i>Ephemerella</i>	22
		<i>Epeorus</i>	34
	Heptageniidae	<i>Stenonema</i>	1
Plecoptera	Leuctridae	<i>Paraleptophlebia</i>	2
	Perlidae	<i>Leuctra</i>	1
		<i>Acroneuria</i>	1
Trichoptera	Glossosomatidae	<i>Agentina</i>	10
		<i>Agapetus</i>	5
	Hydropsychidae	<i>Cheumatopsyche</i>	2
		<i>Hydropsyche</i>	59
		<i>Dolophilodes</i>	5
	Polycentropodidae	<i>Polycentropus</i>	1
	Rhyacophilidae	<i>Rhyacophila</i>	4
Uenoidae	<i>Neophylax</i>	2	
<b>Non-EPT's</b>			
Coleoptera	Elmidae	<i>Optioservus</i>	1
	Psephenidae	<i>Psephenus</i>	5
Megaloptera	Corydalidae	<i>Nigronia</i>	3
Odonata	Aeshnidae	<i>Boyeria</i>	1
Diptera	Chironomidae		42
		Tipulidae	<i>Antocha</i>
		<i>Dicranota</i>	1
		<i>Hexatoma</i>	1
Decapoda	Cambaridae	<i>Orconectes</i>	1
<b>Totals Organisms</b>			<b>212</b>

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	RB1	Difference	Score
Taxa Richness	26	25	96%	8
Modified EPT Index	17	12	71%	5
Modified Hilsenhoff Index	3.1	3.25	0.15	8
Percent Dominant	35	27.8	7.20%	8
Percent Modified Mayflies	24.2	29.2	5.00%	8
<b>Total Score</b>				<b>37</b>

37/40 = 92.5%

**Does meet EV attainment criteria**

**Site RB2 - East Branch Roaring Brook just upstream of Hollister Reservoir (41° 18' 28 N, 75° 29' 17 W)**

EV Status macroinvertebrate sampling: 5/21/04, D-frame net - 3 riffles and 3 runs

200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	3
	Ephemerellidae	<i>Drunella</i>	1
		<i>Ephemerella</i>	43
		<i>Epeorus</i>	49
	Heptageniidae	<i>Stenonema</i>	3
	Leptophlebiidae	<i>Paraleptophlebia</i>	3
Plecoptera	Perlidae	<i>Acroneuria</i>	8
		<i>Agentina</i>	4
	Pteronarcyidae	<i>Pteronarcys</i>	1
Trichoptera	Glossosomatidae	<i>Agapetus</i>	5
		<i>Glossosoma</i>	8
	Hydropsychidae	<i>Cheumatopsyche</i>	2
		<i>Hydropsyche</i>	20
	Limnephilidae	<i>Pycnopsyche</i>	1
	Philopotamidae	<i>Dolophilodes</i>	4
	Rhyacophilidae	<i>Rhyacophila</i>	9
	Uenoidae	<i>Neophylax</i>	8
<b>Non-EPT's</b>			
Coleoptera	Elmidae	<i>Promoresia</i>	1
	Psephenidae	<i>Psephenus</i>	9
Megaloptera	Corydalidae	<i>Nigronia</i>	10
Diptera	Chironomidae		11
		Simuliidae	<i>Prosimulium</i>
	Tipulidae	<i>Hexatoma</i>	6
Decapoda	Cambaridae	<i>Cambarus</i>	2
<b>Totals Organisms</b>			<b>212</b>

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	RB2	Difference	Score
Taxa Richness	26	24	92%	8
Modified EPT Index	17	14	82%	8
Modified Hilsenhoff Index	3.1	1.80	1.3	1
Percent Dominant	35	23.1	11.90%	7
Percent Modified Mayflies	24.2	46.7	22.50%	5
<b>Total Score</b>				<b>29</b>

29/40 = 72.5%

**Does not meet EV attainment criteria**

**Site RB3 - "Turnerville Glen" area (41° 19' 16 N, 75° 30' 01 W)**

EV Status macroinvertebrate sampling: 5/24/04, D-frame net - 3 riffles and 3 runs  
200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	1
	Ephemerellidae	<i>Drunella</i>	22
		<i>Ephemerella</i>	25
		<i>Epeorus</i>	5
	Heptageniidae	<i>Stenonema</i>	11
		Oligoneuriidae	<i>Isonychia</i>
Plecoptera	Leuctridae	<i>Leuctra</i>	2
	Perlidae	<i>Acroneuria</i>	8
		<i>Agentina</i>	2
Trichoptera	Perlodidae	<i>Isoperla</i>	1
	Glossosomatidae	<i>Agapetus</i>	1
	Hydropsychidae	<i>Cheumatopsyche</i>	2
<i>Hydropsyche</i>		42	
	Philopotamidae	<i>Chimarra</i>	12
	Rhyacophilidae	<i>Rhyacophila</i>	11
	Uenoidae	<i>Neophylax</i>	1
<b>Non-EPT's</b>			
Coleoptera	Elmidae	<i>Optioservus</i>	2
		<i>Stenelmis</i>	1
		<i>Psephenus</i>	8
Odonata	Gomphidae	<i>Lanthus</i>	2
Megaloptera	Corydalidae	<i>Nigronia</i>	10
Diptera	Chironomidae		33
Decapoda	Cambaridae	<i>Orconectes</i>	2
Gastropoda	Ancylidae	<i>Ferrissia</i>	2
Oligochaeta			2
<b>Totals Organisms</b>			<b>210</b>

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	RB3	Difference	Score
Taxa Richness	26	25	93%	8
Modified EPT Index	17	13	76%	7
Modified Hilsenhoff Index	3.1	3.34	0.24	8
Percent Dominant ( <i>Epeorus</i> )	35	20	15.00%	5
Percent Modified Mayflies	24.2	31	6.80%	8
<b>Total Score</b>				<b>36</b>

36/40 = 90%

**Does not meet EV attainment criteria**



**Site SB1 - Six Springs Creek, just upstream of confluence with Rattlesnake Cr. (41° 18' 53 N, 75° 35' 01 W)**  
 EV Status macroinvertebrate sampling: 5/25/04, D-frame net - 3 riffles and 3 runs  
 200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	2
	Ephemerellidae	<i>Drunella</i>	10
		<i>Ephemerella</i>	1
		<i>Epeorus</i>	1
Plecoptera	Leuctridae	<i>Leuctra</i>	5
	Nemouridae	<i>Amphinemura</i>	2
	Perlidae	<i>Acroneuria</i>	8
	Perlodidae	<i>Isoperla</i>	1
	Trichoptera	Glossosomatidae	<i>Agapetus</i>
Hydropsychidae		<i>Cheumatopsyche</i>	3
		<i>Diplectrona</i>	1
		<i>Hydropsyche</i>	9
Philopotamidae		<i>Dolophilodes</i>	80
Rhyacophilidae		<i>Rhyacophila</i>	2
<b>Non-EPT's</b>			
Odonata	Gomphidae	<i>Lanthus</i>	1
Megaloptera	Corydalidae	<i>Nigronia</i>	1
Diptera	Chironomidae		60
		<i>Dicronota</i>	9
	Tipulidae	<i>Hexatoma</i>	3
		<i>Tipula</i>	1
<b>Totals Organisms</b>			<b>202</b>

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	SB1	Difference	Score
Taxa Richness	26	20	77%	7
Modified EPT Index	17	11	65%	4
Modified Hilsenhoff Index	3.1	2.48	0.62	8
Percent Dominant ( <i>Epeorus</i> )	35	39.6	4.60%	8
Percent Modified Mayflies	24.2	5.9	18.30%	6
<b>Total Score</b>				<b>33</b>

33/40 = 82.5%

**Does not meet EV attainment criteria**

**Site SB2 - Rattlesnake Cr., just upstream of confluence with Watres Res. (41° 18' 53 N, 75° 38' 13 W)**  
 EV Status macroinvertebrate sampling: 5/27/04, D-frame net - 3 riffles and 3 runs  
 200-count Subsample

Order	Family	Genus	Count	
<b>EPT's</b>				
Ephemeroptera	Baetidae	<i>Baetis</i>	3	
		<i>Drunella</i>	48	
	Ephemerellidae	<i>Ephemerella</i>	28	
		<i>Eurylophella</i>	1	
		<i>Epeorus</i>	22	
		<i>Paraleptophlebia</i>	2	
	Leptophlebiidae	<i>Leptophlebia</i>	1	
	Oligonueriidae	<i>Isonychia</i>	1	
	Plecoptera	Leuctridae	<i>Leuctra</i>	2
		Nemouridae	<i>Amphinemura</i>	3
Perlidae		<i>Acroneuria</i>	4	
		<i>Paragnetina</i>	1	
Perlodidae	<i>Isoperla</i>	1		
Trichoptera	Glossosomatidae	<i>Agapetus</i>	2	
		<i>Cheumatopsyche</i>	1	
	Hydropsychidae	<i>Hydropsyche</i>	26	
		<i>Pycnopsyche</i>	3	
		<i>Dolophilodes</i>	4	
	Polycentropodidae	<i>Polycentropus</i>	3	
	Rhyacophilidae	<i>Rhyacophila</i>	1	
	Uenoidae	<i>Neophylax</i>	1	
	<b>Non-EPT's</b>			
Odonata	Aeshnidae	<i>Boyeria</i>	1	
Megaloptera	Corydalidae	<i>Nigronia</i>	6	
Diptera	Chironomidae		41	
		<i>Hexatoma</i>	10	
Lepidoptera			1	
<b>Totals Organisms</b>			<b>216</b>	

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	SB2	Difference	Score
Taxa Richness	26	25	96%	8
Modified EPT Index	17	16	94%	8
Modified Hilsenhoff Index	3.1	2.64	0.46	8
Percent Dominant	35	22.2	12.80%	6
Percent Modified Mayflies	24.2	47.2	23.00%	5
<b>Total Score</b>				<b>35</b>

35/40 = 87.5%

**Does not meet EV attainment criteria**

**Site SB3 - Green Run, just upstream of confluence with Spring Brook (41° 19' 46 N, 75° 39' 22 W)**

EV Status macroinvertebrate sampling: 5/27/04, D-frame net - 3 riffles and 3 runs

200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	10
	Ephemerellidae	<i>Drunella</i>	3
		<i>Ephemerella</i>	57
Plecoptera	Heptageniidae	<i>Epeorus</i>	9
	Leuctridae	<i>Leuctra</i>	5
	Perlidae	<i>Acroneuria</i>	6
	Perlodidae	<i>Isoperla</i>	4
	Pteronarcyidae	<i>Pteronarcys</i>	17
Trichoptera	Glossosomatidae	<i>Agapetus</i>	2
	Hydropsychidae	<i>Cheumatopsyche</i>	19
		<i>Hydropsyche</i>	5
	Lepidostomatidae	<i>Lepidostoma</i>	1
	Limnephilidae	<i>Pycnopsyche</i>	3
	Philopotamidae	<i>Dolophilodes</i>	7
	Polycentropodidae	<i>Polycentropus</i>	3
	Rhyacophilidae	<i>Rhyacophila</i>	3
	<b>Non-EPT's</b>		
Coleoptera	Elmidae	<i>Optioservus</i>	4
Odonata	Aeshnidae	<i>Boyeria</i>	1
	Gomphidae	<i>Lanthus</i>	4
Megaloptera	Corydalidae	<i>Nigronia</i>	2
Diptera	Chironomidae		39
	Tipulidae	<i>Hexatoma</i>	5
Decapoda	Cambaridae		1
<b>Totals Organisms</b>			<b>210</b>

Reference Site  
Poplar Run (Monroe Co.)

Biological Condition Scoring Criteria	6/21/2003	SB3	Difference	Score
Taxa Richness	26	23	88%	8
Modified EPT Index	17	12	71%	5
Modified Hilsenhoff Index	3.1	2.83	0.27	8
Percent Dominant ( <i>Epeorus</i> )	35	27.1	7.90%	8
Percent Modified Mayflies	24.2	32.8	8.60%	8
<b>Total Score</b>				<b>37</b>

37/40 = 92.5%

**Does meet EV attainment criteria**

**Site SB4 - Spring Brook, about 300m upstream of confluence with Watres Res. (41° 17' 03 N, 75° 35' 42 W)**

EV Status macroinvertebrate sampling: 5/28/04, D-frame net - 3 riffles and 3 runs

200-count Subsample

Order	Family	Genus	Count
<b>EPT's</b>			
Ephemeroptera	Baetidae	<i>Baetis</i>	8
	Ephemerellidae	<i>Drunella</i>	28
		<i>Ephemerella</i>	25
	Heptageniidae	<i>Epeorus</i>	15
		<i>Stenonema</i>	4
	Leptophlebiidae	<i>Paraleptophlebia</i>	6
	Oligoneuriidae	<i>Isonychia</i>	1
Plecoptera	Leuctridae	<i>Leuctra</i>	11
	Nemouridae	<i>Amphinemura</i>	1
	Perlidae	<i>Acroneuria</i>	5
Trichoptera	Glossosomatidae	<i>Agapetus</i>	3
	Hydropsychidae	<i>Cheumatopsyche</i>	1
		<i>Hydropsyche</i>	20
	Lepidostomatidae	<i>Lepidostoma</i>	10
	Limnephilidae	<i>Pycnopsyche</i>	1
	Philopotamidae	<i>Dolophilodes</i>	2
	Rhyacophilidae	<i>Rhyacophila</i>	1
Uenoidae	<i>Neophylax</i>	1	
<b>Non-EPT's</b>			
Coleoptera	Elmidae	<i>Optioservus</i>	2
	Psephenidae	<i>Psephenus</i>	1
Odonata	Aeshnidae	<i>Boyeria</i>	1
Megaloptera	Corydalidae	<i>Nigronia</i>	4
Diptera	Chironomidae		34
	Tabanidae	<i>Tabanus</i>	1
	Tipulidae	<i>Hexatoma</i>	13
Decapoda	Cambaridae	<i>Cambarus</i>	1
<b>Totals Organisms</b>			200

Biological Condition Scoring Criteria	Reference Site			
	6/21/2003	SB4	Difference	Score
Taxa Richness	26	26	100%	8
Modified EPT Index	17	15	88%	8
Modified Hilsenhoff Index	3.1	2.56	0.54	8
Percent Dominant ( <i>Epeorus</i> )	35	17	18.00%	3
Percent Modified Mayflies	24.2	39.5	15.30%	7
<b>Total Score</b>				<b>34</b>

34/40 = 85%

**Does not meet EV attainment criteria**

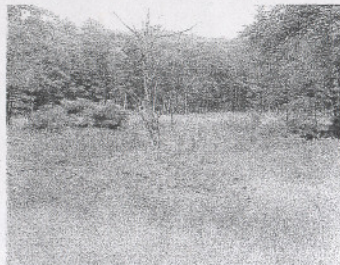
## APPENDIX C

## Stafford Meadow Brook

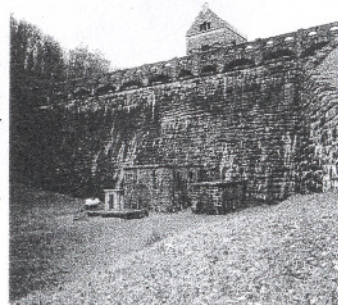
Stafford Meadow Brook (SMB) rises in Bear Swamp, a Pocono wetland bog adjacent to I-380 in Roaring Brook Township and flows west-southwest through a 14.11 mi<sup>2</sup> watershed for 12.0 miles to confluence with the Lackawanna River in South Scranton. It hosts significant wetland complexes as it flows through Simersons Gap in the Moosic Mountain range, between Coon Hill and Scrub Oak Mountain along PA Rte. 307. Water and habitat quality conditions along SMB in the North Pocono region are relatively undisturbed, and wetlands associated with the stream provide important habitat for plants and animals. In addition, extensive hemlock stands along SMB above Lake Scranton are a unique characteristic of this stream.

The SMB watershed is closely associated with the development of the Lackawanna Coal and Iron Company in the 1840's. Several iron ore quarries were operated along the stream through the 1880's. SMB later became, and remains today, a significant water supply resource. The Williams Bridge Reservoir, Lake Scranton, and the Lake Scranton Water Filtration Plant are major PAWC water supply facilities for the Scranton metropolitan area and are located along SMB on the western flanks of the Moosic Mountain range. Below Lake Scranton, the No. 5 Reservoir supplies water for snow making at the Montage Mountain Ski Resort. The reach between Lake Scranton and the No. 5 holds the remains of iron ore quarries, however it has returned to an undisturbed reach supporting native vegetation and good water quality.

Most of the land within the North Pocono region of the Stafford Meadow Brook watershed was protected watershed and reservoir recharge land, now owned by Theta Land Corporation, parcels of which are being extensively logged. The recently completed Lackawanna River Watershed Conservation Plan recommends that significant tracts of these properties be conveyed to public and private conservation agencies, to protect water resources and to insure long term protection. Funding from state, federal and private resources for the acquisition and protection of these lands is recommended as an action of the highest priority. If any development does occur on Theta property, the recommendations for limited, conservation type subdivisions, with state of the art storm water management systems, limited impervious surfaces and substantial buffer zones along water courses should be considered as requirements by township and county agencies. In particular, the Conservation Plan recommends that the Bear Swamp wetlands and SMB corridor along Simerson Road be protected with 1000 foot buffers, to be acquired and managed as part of the open space and natural areas included in the pending Lackawanna County Open Space Plan.



One of the numerous wetlands along Stafford Meadow Brook in Roaring Brook Twp.



Dam works at Lake Scranton in Roaring Brook Twp

## Challenges and Opportunities in the North Pocono Watershed

There are both challenges and opportunities facing the North Pocono Watershed. How do we manage the balance between growth and protecting our environment. What are your concerns, comments or suggestions. The LRCA would like to hear from you! Please contact us.



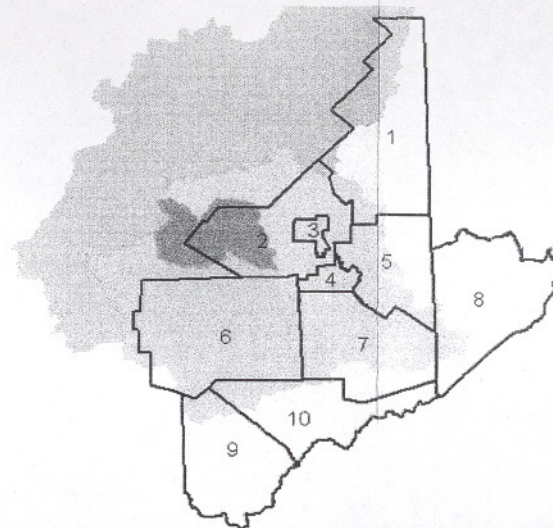
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# North Pocono Watershed Fact Sheet

## An Introduction to the NP Watershed

Prepared by the



### North Pocono Municipalities and Watersheds

- 1 Jefferson Twp
- 2 Roaring Brook Twp
- 3 Elmhurst Twp
- 4 Moscow Borough
- 5 Madison Twp
- 6 Spring Brook Twp
- 7 Covington Twp
- 8 Sterling Twp
- 9 Thornhurst Twp
- 10 Clifton Twp

### Roaring Brook Watershed

### Stafford Meadow Brook Watershed

### Spring Brook Watershed

### Wallenpaupack Creek Watershed

### Lehigh River Watershed

### Lackawanna River Watershed

A majority (about 66%) of the North Pocono area of Lackawanna County is in the Lackawanna River Watershed, a part of the larger Susquehanna River and Chesapeake Bay Watersheds. The remaining 34% is in the Delaware River Watershed with half of that in the Wallenpaupack Creek-Lackawanna River drainage and the other half in the Lehigh River drainage.

The two largest tributary streams to the Lackawanna River, Roaring Brook and Spring Brook, rise in the North Poconos, as does a smaller third tributary, Stafford Meadow Brook. Together, the watersheds of these three streams form what is considered the North Pocono Watershed region of the greater Lackawanna River Watershed. The ten municipalities shown above lie within this watershed region. Several smaller tributaries to the Lackawanna River rise on parts of Moosic Mountain in the North Pocono area as well. They include Eddy Creek, Grassy Island Creek, Laurel Run and White Oak Run, whose headwaters all lie within Jefferson Township.

Roaring Brook, Spring Brook and Stafford Meadow Brook are a strategic water supply resource for the Scranton-Wilkes Barre metropolitan region. These three streams provide a significant portion of the freshwater that supplies the homes and businesses in the Lackawanna Valley. Along with the streams themselves, the wetlands, reservoirs and lakes within the North Poconos provide valuable and relatively undisturbed habitat for a diverse community of plants and animals. They also provide a large amount of freshwater into the Lackawanna River. Preserving the relatively undisturbed water quality and habitat values of the region while meeting the demand for new homes and services is a major challenge facing residents of the North Pocono Watershed; especially when balanced against the need for protecting water quality and maintaining the rural and village character of the region.

## Roaring Brook

Roaring Brook is the largest tributary to the Lackawanna River. It flows west for 18.0 miles from its wetland sources around Freytown, through the Moosic Mountain range at Cobbs Gap and to its confluence with the Lackawanna River in South Scranton. The Roaring Brook watershed covers 53.68 mi<sup>2</sup> and includes nineteen tributary streams.

The headwater reaches of Roaring Brook and its tributary streams, in the North Pocono townships of eastern Lackawanna County, are all high quality, cold-water fisheries. The headwaters also feature once protected watershed lands associated with the Pennsylvania Gas and Water Company, now owned by the Theta Corporation. Currently, Hollister, Elmhurst, and Curtis Reservoirs are operated by the Pennsylvania American Water Company. Seventy percent of the land cover in the upper Roaring Brook watershed is forested, twenty percent is agricultural or successional field and ten percent is developed with villages, shopping plazas and residential uses. Roaring Brook maintains high water quality and habitat values through Cobbs Gap and to the Dunmore No. 7 Reservoir. From the reservoir downstream to the confluence, impacts from urban development and abandoned mine land begin to affect Roaring Brook.

The recently completed Lackawanna River Conservation Plan recommends that county, state and federal agencies should consider the scenic, recreational and cultural importance of the Cobbs Gap reach of Roaring Brook. This area between Dunmore and Elmhurst includes the Pennsylvania Gravity Railroad Inlines, Moosic Mountain natural areas, the Moosic Lake Trolley corridor, early historic settlement Roads, and Scrub Oak Mountain. The pending Lackawanna County Open Space Plan presents an opportunity to focus on these resources. This area should be prioritized for acquisition of property, public use easements, public access sites for fishing and trail use and a public use and natural resource management plan.

The historic, cultural and recreational resources of Roaring Brook present important opportunities for both cultural tourism and local recreation. An opportunity to develop the Roaring Brook Greenway Trail as a link from the Lackawanna River Heritage Trail, Steamtown and the Scranton Iron Furnaces exists along the 12-mile, county owned Erie and Wyoming Valley rail corridor, which runs along the stream. A link to Jefferson Twp. and the Mt. Cobb-Moosic Lake area from the rail corridor at Wimmers, can connect to the Trolley corridor and PA Gravity Railroad corridor for a loop trail system over Moosic Mountain. An additional link trail to Moscow and Covington can be developed by rebuilding the Elmhurst Reservoir Bridge and using a forestry road and pipeline corridor along Kellum Creek and Roaring Brook to Moscow. Community links along the Roaring Brook Greenway could include links to educational facilities, residential, commercial and cultural sites and existing or proposed municipal parks and trails within the North Poconos.

Roaring Brook contains vital drinking water resources for the Lackawanna Valley. The protection and conservation of Roaring Brook's forested watersheds and source water areas is a strategic public interest. The Watershed Conservation Plan recommends that state, county, and local governments prioritize the acquisition, protection and appropriate management of real estate associated with the source waters of the drinking water supply reservoirs. The Freytown Marshes, the Turnerville Glen and the corridor of Roaring Brook from Covington through Moscow and Elmhurst to Dunmore, are a priority for protection by acquisition and conservation easement as well. A management program for these properties should be a key element in the Lackawanna County Open Space Study. In addition municipalities should include the protection of Roaring Brook and its tributaries, and technical requirements for that protection, in their zoning, land use and subdivision ordinances and comprehensive plans. They may consider enhancements to their zoning, land development and subdivision plans to improve the management of open space, natural areas, wetlands, woodlands, greenway and stream corridors, recreational corridors, ridge lines, escarpments, scenic view sheds, and historical and cultural resources.



Freytown Swamps in  
Covington Twp



Potential rails-trails greenway along  
Elmhurst Reservoir

## Spring Brook

Spring Brook, the second largest tributary to the Lackawanna River, flows west for 16.0 miles from its source near Yostville into the Lackawanna Valley through Spring Brook Gap in the Moosic Mountains near Nesbitt Reservoir, to confluence with the Lackawanna River in the Borough of Moosic. The Spring Brook watershed drains a 54.24 mi<sup>2</sup> and includes eighteen tributary streams.

Spring Brook and its tributary streams rise in Pocono Plateau wetland complexes and from springs along the western flank of the Moosic Mountain range, a majority of which is heavily forested. A significant portion of Spring Brook watershed, about 60%, is owned by Theta Company, and is presently subject to an extensive timber harvest program. There are some roadside residential and small suburban residential subdivision land uses along Spring Brook at Yostville, Maple Lake, and Spring Brook Village. The Spring Brook Township sewer treatment plant discharges into a tributary stream, Green Spring Run, near PA Rte. 307. Water and habitat quality conditions on Spring Brook and its tributary streams within the North Pocono region however remains essentially unimpacted. Spring Brook is rated as a High Quality-Coldwater Fisheries.

Small portions of the Spring Brook watershed are protected and managed by the Pennsylvania American Water Company (PAWC), which owns Watres, Nesbitt, Maple Lake and the Spring Brook Intake Reservoirs and several hundred acres of buffer lands adjacent to the reservoirs. It also operates the Nesbitt Water Filtration Plant near the Spring Brook Intake Reservoir in Pittston Township and this plant supplies freshwater to homes and business within the lower portion of the Lackawanna Valley, and the Wyoming Valley from Pittston to Wilkes-Barre.

As the stream enters the Lackawanna Valley through Spring Brook Gap, upland flanks of the ridge on either side of the stream show some evidence of coal mining, however, residential encroachment on the narrow flood plain along PA Rte. 502 at Belin Village and Spike Island provide the most significant environmental impacts. Response to numerous flood events in this reach has resulted in a variety of bank stabilization projects from Belin Village downstream to the confluence.

Due to the value of Spring Brook and its tributaries as a water supply resource, the recently completed Lackawanna River Watershed Conservation Plan recommends that municipalities in the Spring Brook watershed should review their zoning, land use and subdivision ordinances and comprehensive plans, to insure that state of the art ordinances and planning goals are included to provide the highest level of protection to the stream, its tributaries and reservoir areas.

The plan further recommends the acquisition of a majority of Theta Company properties, or the development of a conservation easement program to insure that management of these lands as watershed, open space, natural resource, and timberlands, continue into the future. These lands should be included in the review and policy outcomes of the pending Lackawanna County Open Space Study.

Recreational trail developments offer a potential to provide passive recreational access in the Spring Brook watershed to link the Lackawanna Valley to the Lackawanna State Forest, State Game Lands and other resources in the upper Lehigh River watershed. This plan recommends a trail program be developed along the former Wilkes-Barre and Eastern railroad alignment, which parallels Spring Brook. Other trail links on township roads and fire management roads should be included.



Nesbitt Reservoir in  
Spring Brook Twp



A view of Spring Brook in  
Spring Brook Twp