

## **Data - NFWF Brook Trout and Black Duck Habitat in the Southern Wyoming Valley**

Data in this section is organized by watershed (north to south) and then stream mouth to headwaters. Warrior Creek, Nanticoke Creek and Newport Creek were evaluated for habitat then certain sites in 2 neighboring watersheds: Susquehanna River Plymouth Flats and Solomon Creek were also evaluated.

### **Brook Trout Habitat:**

Twenty-one instream monitoring points were established on the mainstem near the mouth of each stream, upstream of each major tributary confluence and in the headwaters. Not all sites were flowing at the time of sampling. Temperature, dissolved oxygen, conductivity, total dissolved solids (TDS), pH, oxidative reductive potential (ORP), and flow were measured as conditions allowed. Some of these sites were also picked for a Pennsylvania Fish and Boat Commission Fish Presence Study conducted on 7/28/2022. Information on fish species presence and habitat score from that study is summarized in the text. A Habitat Score < 140 for forested, cold water & high gradient or < 120 for warm water low gradient is generally impaired.

Culverts and bridges were assessed for aquatic organism passage (AOP), following North Atlantic Aquatic Connectivity Collaborative (NAACC) methods. Each crossing is evaluated to be an insignificant, minor, moderate, significant, severe or no barrier to fish passage.

Sixteen HOBO Water temperature probes were placed in streams in the South Wyoming Valley. Average Max and Min Water Temperature values for 2023 are included in the text below, and hydrographs are in the Appendix. For comparison, 2023 Maximum Daily Air Temperatures are average: 57.5°F, maximum: 88.9°F, and minimum 15.0°F in Ashley, PA. Brook Trout require water temperatures less than 70°F to grow and reproduce.

Some stream locations in the Nanticoke Creek Watershed show up incorrectly on USGS topographic maps. These streams, like others in the Wyoming and Lackawanna valleys, were moved or put in flumes by mining companies in the late 1800's to early 1900's. Original stream channel locations are shown in Pennsylvania Second Geologic Survey maps from the 1890's.

### **Black Duck Habitat:**

Location ID and site name are identified along with the location coordinates, a description, the waterbody class, Chapter 93 use, and date the site was evaluated. Physical parameters in table format followed by flow, land use, chemical parameters in table format, flora, fauna, other observations, water elevation, mine pool elevation, and photos are included for each site. Elevation datum is feet above mean sea level (AMSL).

Reclaimed Abandoned Mine Land Inventory System (RAMLIS) Investigations were completed for each habitat area. This includes mine inspector's notes related to an Abandoned Mine Land (AML) Site which describe the area from the early 1980s to the late 1990s and serves as a good source for historical background of the site post mining. AML features are referenced for each site. RAMLIS investigations are found in the Appendix.

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# Susquehanna River Segment

## Black Duck Habitat

E41227107596787 “Flat Road Pond Park”

Location: 41.227102, -75.967873

3.63 acre pond north of Flat Road in Plymouth Twp, Susquehanna River floodplain.

Waterbody Class: PUB4EM2/x Chapter 93 Use: WWF

Evaluated: 8/11/2022 12:27:00 PM

Physical Parameters: Table 1-1

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp
Sunny	85.0	Humid	Muddy	Brown	89.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	Fishy	Scattered	Floating	Brown

Water Flow: no flow

Land Use: 60% Other: Open Water, 20% Pasture, 20% Forest

Chemical Parameters: Table 1-2

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
6.00	8.59	141.00	105.00	100.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
40.00	0.00	0.05	0.00	0.00	1.80

Flora: purple loosestrife, silver maples, and emergent vegetation present at the eastern end of the wetland but couldn't get there.

Fauna: No macros found along the edge of the pond which was shallow and sediment-laden for over 12"; Dragonflies and damselflies abundant; 5 mallard(?) goslings were swimming about; a great blue heron flew out and back into the wetlands while we were obtaining water quality results; fish were rising;

Other Observations: a family was fishing at the north side of the pond; very little vehicle traffic; quiet spot; no outlet to pond, likely a surface manifestation of the mine pool;

Water Elevation: 520 ft AMSL Mine Pool Elevation: Northwest Lower @ ~520 ft

RAMLIS Investigation: No AML site is directly related.

Photos: [https://drive.google.com/drive/folders/19v1AuuPv9SvldBAC\\_r8TUXxrM2gz0GCG](https://drive.google.com/drive/folders/19v1AuuPv9SvldBAC_r8TUXxrM2gz0GCG)



*Figure 1-1: E41227107596787 "Flat Road Pond Park" from road on southeast side.*



*Figure 1-2: E41227107596787 "Flat Road Pond Park" zoom to far shore on north side.*



*Figure 1-3: E41227107596787 "Flat Road Pond Park" possibly mallard ducklings*



*Figure 1-4: E41227107596787 "Flat Road Pond Park" from southwest side.*

# Solomon Creek

## Mainstem

### Downstream of San Souci Parkway

#### *Brook Trout Habitat*

Temperature Station 12: Breaker Road, Solomon Creek, Hanover Twp., Luzerne County, PA

2023 Water Temperature Average: 56.5 °F, Maximum: 70.5 °F, Minimum: 46.5 °F - The site is likely groundwater influenced keeping the temperature cooler in the summer and warmer in the winter. In the Wyoming Valley, groundwater is a polluted aquifer known as a mine pool with abandoned mine discharges. In this situation the South Wilkes-Barre Boreholes are discharging upstream of this point.

### Downstream of Interstate 81

#### *Brook Trout Habitat*

Temperature Station 15: Davis Street, Solomon Creek, Ashley, PA

2023 Water Temperature Average: 51.0 °F, Maximum: 74.7 °F, Minimum: 31.9 °F - The site is in the headwater section of Solomon Creek.

#### *Black Duck Habitat*

E41214427592564 “Wetland near St Mary's Cemetery”

*Location: 41.21442804863901, -75.92564202144879*

*2.87 acres (when wet based on aerial photos) in Hanover Twp., Solomon Creek Watershed.*

*Evaluated: 8/31/22*

*Flora: buttonbush, swamp loosestrife*

*Fauna: none observed*

*Other Observations: The area was dry upon field investigation; only photos were taken; surface water is likely lost to the mine pool.*

*Water Elevation: 702 ft AMSL Mine Pool Elevation: Huber Upper @ ~650 ft*

*RAMLIS Investigation: No AML site is directly related.*

Photos: [https://drive.google.com/drive/folders/1FA9ym2\\_eiHx90wiqAYXDeCrXJDG6KhII](https://drive.google.com/drive/folders/1FA9ym2_eiHx90wiqAYXDeCrXJDG6KhII)



*Figure 2-1: E41214427592564 "Wetland near St Mary's Cemetery" from northeast corner*



*Figure 2-2: "Wetland near St Mary's Cemetery" from northeast corner dry understory*



Figure 2-3 E41214427592564 “Wetland near St Mary's Cemetery” from northeast corner; dry forested wetland

## Spring Run

### *Brook Trout Habitat*

Temperature Station 13: E. Division Street, Spring Run, Newtown, PA

2023 Water Temperature Average: 53.0 °F, Maximum: 76.7 °F, Minimum: 33.9 °F - The site is near the mouth of Spring Run upstream of the confluence with Solomon Creek.

## Sugar Notch Run

### *Brook Trout Habitat*

Temperature Station 14: Earth Conservancy Drive, Sugar Notch Run, Ashley, PA

2023 Water Temperature Average: 50.5 °F, Maximum: 68.0 °F, Minimum: 32.4 °F - The site mid watershed. The headwaters of Sugar Notch Run are in the heavily forested State Gamelands No. 207 which seems to keep the water colder in general and good for Brook Trout.

## Pine Creek

### *Brook Trout Habitat*

Temperature Station 16: Pine Run Road Powerline, Pine Creek, Mountain Top, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 40.7°F, Maximum: 58.8 °F, Minimum: 32.1 °F - The site mid watershed and the headwaters are in a forested area.



Solomon Creek is heavily urbanized in the lower to mid watershed, therefore Black Duck habitat, other than listed above, was not evaluated. A few isolated ponded areas do exist in the headwaters of Pine Creek and Spring Run which were also not evaluated. Other water quality, fish survey, and habitat information is available in the Solomon Creek Coldwater Conservation Plan published by EPCAMR in November 2012.

# Warrior Creek

## Mainstem

### Downstream San Souci Parkway

#### Brook Trout Habitat

Warrior Mainstem 41.211099, -75.964204

Sampled 7/27/2022: Table 3-1

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
69.6	7.68	928	504	7.74	143.2	~200

Fish Study (7/28/2022) showed a Habitat Score of 95 (generally impaired), Fish Presence: Blacknosed Dace, Creek Chubs, White Suckers, Fallfish, Green Sunfish, Bluegill, Largemouth Bass, & Spottail Shiner. Summarized by type: 1 Cold, 4 Cool, 3 Warmwater species.

Sans Souci Parkway AOP Insignificant Barrier (Survey ID 90289 & 90290)

Sans Souci Parkway AOP Minor Barrier (Survey ID 90282)

Temperature Station 11: Sans Souci Parkway, Warrior Creek, Hanover Twp., Luzerne County, PA

2023 Water Temperature Average: 52.8 °F, Maximum: 80.3 °F, Minimum: 32.8 °F - The site is near the mouth of Warrior Creek.

#### Black Duck Habitat

E41211127597014 “UGI Wetlands (A)”

Location: 41.2119213, -75.9652763

34 acre historical former beaver complex on Warrior Creek and the Susquehanna River floodplain.

Evaluated: 8/31/2022 2:12:00 PM

Waterbody Class: PUB3EM15Hb0tg Chapter 93 use: CWF

Physical Parameters: Table 3-2

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	79.0	Humid/Rain	Clear	None	72.9
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 60% Other: Open Wetlands, 40% Pasture

Chemical Parameters: Table 3-3

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
1.22	6.98	6.90	817.00	20.00	427.40
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
130.00	0.30	N/A	98.00	0.24	1.60

Flora: paper birch, cattail and phragmites

Fauna: red dragonflies and red-winged blackbirds.

Aquatic macroinvertebrates: Table 3-4

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
35	0	0	2

Other Observations: surface water could potentially be augmented by the mine pool.

Water Elevation: 522 ft AMSL                      Mine Pool: Loomis Lower @ Elevation ~530 ft

RAMLIS Investigation: Hanover Green directly related to AMLF 1 & 2. See Appendix for details.

Photos: [https://drive.google.com/drive/folders/19v1AuuPv9SvldBAC\\_r8TUXxrM2gz0GCC](https://drive.google.com/drive/folders/19v1AuuPv9SvldBAC_r8TUXxrM2gz0GCC)



Figure 3-1: E41211127597014 “UGI Wetlands (A)” open water area looking west



Figure 3-2: E41211127597014 “UGI Wetlands (A)” open water area looking east

E41211407597052 “Phragmite Wetlands”

Location: 41.2114009, -75.9705374

3.4 acre riverine wetlands within UGI Wetland along Warrior Creek and the Susquehanna River floodplain

Evaluated: 8/31/2022 12:42:00 PM

Waterbody Class: R2UB3EM Chapter 93 use: CWF

Physical Parameters: Table 3-5

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	76.0	Humid/Rain	Murky	Brown	71.2
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: 0.71 cfs

Land Use: 60% Other: Wetland, 20% Commercial, 20% Forest

Chemical Parameters: Table 3-6

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.95	7.20	171.80	385.20	30.00	205.40
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
100.00	0.45	N/A	91.00	0.17	2.00

Flora: phragmite dominated, purple loosestrife, wool grass, jewelweed, stinging nettle, poison ivy, silver maples, wild grape, and packing grass all were prevalent in the area

Fauna: no aquatic macro invertebrates found; no ducks present;

Other Observations: accessed from Chet Hummel's property; very quiet area; surface water could potentially be augmented by the mine pool.

Water Elevation: 522 ft AMSL

Mine Pool Elevation: Loomis Lower @ ~530 ft

Photos: [https://drive.google.com/drive/folders/1d\\_9Ltab5zVHDGxJi931PAoAziXrfzh-P](https://drive.google.com/drive/folders/1d_9Ltab5zVHDGxJi931PAoAziXrfzh-P)



Figure 3-3: E41211407597052 "Phragmite Wetlands" looking west



Figure 3-4: E41211407597052 "Phragmite Wetlands" looking at sampling point.

## Upstream of Route 29

### *Brook Trout Habitat*

Warrior at Middle Road 41.199479, -75.9595285

Sampled 7/27/2022: *Table 3-7*

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
71.8	6.58	504	268	6.6	NA	81

*Middle Road AOP Insignificant Barrier (Sample ID 90932)*

*South Street AOP Insignificant Barrier (Sample ID 90933)*

*Main Street in Sugar Notch AOP Minor Barrier (Sample ID 90270)*

Temperature Station 10: S. Main & South Street, Warrior Creek, Warrior Run, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 39.2 °F, Maximum: 78.2 °F, Minimum: 12.9 °F

- The site is mid watershed and often stagnant water due to water loss upstream.

Warrior Headwaters 41.193001, -75.945259

Visited 7/27/2022: dry, no samples were taken

### *Black Duck Habitat*

E41199177593896 “Hanover Street Wetland”

*Location: 41.200103, -75.936461*

*Fauna: phragmite dominated; lily pads on surface of open water*

*Other Observations: Photos only; in the middle of an industrial park; likely a surface manifestation of the mine pool, wetland intermittently flows southwest along Hanover Street to Warrior Creek*

*Evaluated: 8/12/22*

*Water Elevation: 571 ft AMSL Mine Pool Elevation: Southeast Upper @ ~570 ft*

RAMLIS Investigation: East Askam directly related to AMLF 3. See Appendix for details.

Photos: <https://drive.google.com/drive/folders/1E4w7OzUJnxvHnU5esIsa11t7gVkesiZ>



Figure 3-5: E41199177593896 “Hanover Street Wetland” from the road looking southeast

# East Branch of Warrior Creek

## Hanover Crossing

### Brook Trout Habitat

East Branch 41.211192, -75945532

Sampled 7/9/2022: Table 3-8

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
75.0	7.57	1154	589	7.59	35.2	Small flow

Great Valley Blvd AOP Severe Barrier (Survey ID 90292)

Great Valley Blvd AOP Insignificant Barrier (Survey ID 90291)

Main Street AOP Insignificant Barrier (Survey ID 90293)

East Branch Headwaters 41.205123, -75.93615

Sampled 7/9/2022: Table 3-9

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
72.1	7.95	73	38.9124.70	7.75	59.4	Small flow

Allegheny Drive AOP Insignificant Barrier (Survey ID 90294)

### Black Duck Habitat

E41212367594482 "Wetland Pond to West (P)"

Location: 41.21250, -75.94421

0.48 acre mitigation wetland in Hanover Twp, Warrior Creek Watershed East Branch Tributary

Evaluated: 7/1/2022 2:08:00 PM

Waterbody Class: PAB41/r Chapter 93 use: CWF

Physical Parameters: Table 3-10

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	90.0	Sunny	Murky	Brown	77.9
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	Heavy	Floating	Light Green

Water Flow: no flow

Land Use: 80% Other: Wetland, 20% Pasture

Chemical Parameters: Table 3-11

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
1.32	6.39	37.30	124.70	16.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
50.00	0.50	0.00	0.00	0.00	0.00

Flora: floating duckweed, cattails, wool grass, iris, willow witch hazel,

Fauna: Dragonflies

*Aquatic Macroinvertebrates: Table 3-12*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
15	0	0	2

*Other Observations: noise of Ashley Street is close to wetlands. Created in 2001 as replacement to impacts in Hanover Crossings development; potential mine pool discharge (blue-green water) in beaver dammed wetland (O) to west did not visit.*

*Water Elevation 592 ft AMSL*

*Mine Pool Elevation: Inman Upper @ ~625 ft*

*RAMLIS Investigation: Korn Krest South directly related to AMLF 2. See appendix for detail.*

*Photos: <https://drive.google.com/drive/u/0/folders/1Ap4sfGdfxpzTAmYS302LXHafKAoIeH0e>*



*Figure 3-6: E41212367594482 "Wetland Pond to West (P)" Looking north*



*Figure 3-7: E41212367594482 "Wetland Pond to West (P)" Looking west*



E41211867594362 “Upper Wetland Pond (Q)”

Location: 41.21189, -75.94340

0.42 acre mitigation wetland in Hanover Twp, Warrior Creek Watershed East Branch Tributary

Evaluated: 7/1/2022 1:00:00 PM

Waterbody Class: PABEM/a Chapter 93 use: CWF

Physical Parameters: Table 3-13

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	90.0	Sunny	Murky	Brown	68.9
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	Musky	Heavy	Floating	Light Green

Water Flow: no flow

Land Use: 80% Other: Wetland, 20% Pasture

Chemical Parameters: Table 3-14

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.41	6.63	170.30	491.00	110.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
30.00	0.75	0.05	0.00	0.00	0.00

Flora: duck weed floating on surface, cattails, bull rush, paper birch, milkweed

Fauna: redwing blackbirds, green frogs, dragonflies, heavy organic matter, not macros except a few fresh water snails.

Aquatic Macroinvertebrates: Table 3-15

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
5	0	0	1

Other Observations: noise of Ashley Street is close to wetlands. Created in 2001 as a replacement to impacts in Hanover Crossings development. dense organic matter

Water Elevation 604 ft AMSL

Mine Pool Elevation: Inman Upper @ ~625 ft

RAMLIS Investigation: Korn Krest South directly related to AMLF 1. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1fQqtWIZYm0jEAKiE5b2RHyhkKtAoAI>



*Figure 3-8: E41211867594362 "Upper Wetland Pond (Q)" looking southeast*



*Figure 3-9: E41211867594362 "Upper Wetland Pond (Q)" looking northeast*

E41211367594534 “Below Hanover Crossing Road Culvert (M)”

Location: 41.21173, -75.94564

0.3 acres former beaver dam (breached) in Hanover Twp, Warrior Creek Watershed East Branch Tributary

Evaluated: 7/19/2022 2:00:00 PM

Waterbody Class: R5\*UBEM Chapter 93 use: CWF

Physical Parameters: Table 3-16

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	90.0	Humid	Clear	None	75.0
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: 200 gpm

Land Use: 80% Other: Wetland, 20% Pasture

Chemical Parameters: Table 3-17

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
7.57	7.59	35.20	1154.00		N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
95.00	0.03	N/A	94.00	0.01	9.80

Flora: cattails, purple loosestrife, canary grass, nut sedge, sawtooth tearthumb, swamp milkweed, wool grass, packing grass, black willow.

Stream Habitat: Table 3-18

Stream Habitat Score	Sediment Impairment Score	Bank Erosion Impairment Score
189	38	25

Fauna: frogs, minnows, black nosed dace, past beaver activity; dragonflies and damselflies;

Aquatic Macroinvertebrates: Table 3-19

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
10	3	30%	3

Other Observations: very quiet area; severe barrier to AOP just downstream (beaver dam) and insignificant barrier just upstream on Great Valley Road. Need better definition of mine pool boundaries to determine flow loss/discharge potential.

Water Elevation 591 ft AMSL

Mine Pool: on the edge of Inman Upper @ Elevation ~625 ft and Loomis Lower @ Elevation ~530 ft

RAMLIS Investigation: Korn Krest South indirectly related several features. See appendix for detail.

Photos: <https://drive.google.com/drive/u/3/folders/1-IjgCxaENsVQdmprLUnOEefphKCa68Cl>



Figure 3-10: E41211367594534 "Below Hanover Crossing Road Culvert (M)" looking southeast



Figure 3-11: E41211367594534 "Below Hanover Crossing Road Culvert (M)" looking northeast

E41206457593751 “Hanover Crossings NBLT Wetlands (T)”

Location: 41.20720, -75.93852

16.6 acre preserved wetland complex with >15 acres of emergent/open water habitats in Hanover Twp, Warrior Creek Watershed East Branch Tributary

Evaluated: 7/1/2022 10:36:00 AM

Waterbody Class: PABEM/b Chapter 93 use: CWF

Physical Parameters: Table 3-20

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	77.0	Sunny	Clear	None	76.6
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	Moderate	Matted	N/A

Water Flow: 90 gpm

Land Use: 80% Other: Wetland, 10% Residential, 10% forest

Chemical Parameters: Table 3-21

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
2.93	7.13	33.20	1064.00	10.00	585.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
105.00	0.25	0.05	68.00	0.01	3.10

Flora: bullrush, lilly pads, sedge (stp), invaded with Phragmites.

Fauna: Active beaver use (counted 3 huts). Songbirds calling, redwing blackbirds and tree swallows observed. A review of the wetland on 12/02/2020 found 35 mallards feeding and resting on open water area; Known as nesting site for Virginia Rails; Fish present, know fish and amphibian reproduction area; Dragonflies observed; Aquatic Macroinvertebrates summarized below:

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
56	1	2%	3

Other Observations: Wood duck boxes installed; Lots of vehicle traffic on Spencer Lane and Main Street; Water level frequently fluctuates due to beaver dam removal and preservation of Spencer Lane access to Town Home complex; Maintenance work at outlet by Luzerne County causing heavy siltation, makeshift “beaver-proof” cage on outlet pipe to be replaced with pipes and gabion basket in center of wetland by Luzerne Conservation District; Wetland coincidentally treats abandoned mine drainage from Huber Upper Mine Pool; Highly beneficial

Water Elevation 639 ft Mine Pool: Huber Upper @ Elevation ~650 ft

RAMLIS Investigation: No AML site directly related. However, AMD seeps emanate from several areas in the Hanover Industrial Park (formerly mined lands).

Photos: [https://drive.google.com/drive/u/3/folders/1drY4BGkHM9Ltms1SguVMCKjtOGKk\\_MBI](https://drive.google.com/drive/u/3/folders/1drY4BGkHM9Ltms1SguVMCKjtOGKk_MBI)



Figure 3-12: E41206457593751 "Hanover Crossings NBLT Wetlands (T)" looking northwest from road



Figure 3-13: E41206457593751 "Hanover Crossings NBLT Wetlands (T)" looking southeast at sampling location



*Figure 3-14: E41206457593751 "Hanover Crossings NBLT Wetlands (T)" looking southeast at outlet*

# Nanticoke Creek

## Nanticoke Mainstem

### Above Sans Souci

#### *Brook Trout Habitat*

Nanticoke Mainstem 41.207135, -75.983769

Sampled 7/26/2022: Table 4-1

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
71.2	7.94	788	420	7.16	1.4	1,598

Fish Survey (7/28/2022) showed a Habitat Score of 105 (generally impaired), Fish Presence: Creek Chubs, White Suckers, Stone Roller, Fallfish, Green Sunfish, Swallow Tail Shiner, & Brown Bullhead. Summarized by type: 5 Cool, 2 Warmwater species.

*E. Main Street AOP Insignificant Barrier (Survey ID 90240)*

*Dundee Cross Road AOP Minor Barrier (Survey ID 90278)*

*Loomis Park Road AOP Insignificant Barrier (Survey ID 90276)*

Temperature Station 7: Loomis Park Road, Nanticoke Creek, Loomis Park, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 52.8 °F, Maximum: 60.9 °F, Minimum: 46.9 °F - The site groundwater influenced as it is downstream of the Askam Treatment Area.

### Askam Treatment Area

#### *Brook Trout Habitat*

Nanticoke Below Askam 41.201845, -75.968105

Sampled 7/26/2022: Table 4-2

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
65.3	8.81	654	370702.00	7.32	-30.2	1,472

*S. Main Street AOP Minor Barrier (Survey ID 90239)*

*Hanover Street AOP Insignificant Barrier (Survey ID 90222)*

#### *Black Duck Habitat*

E41201637596786 “Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)”

Location: 41.20163, -75.96786

1.41 acre pond in Hanover Twp, Nanticoke Creek Watershed

Evaluated: 8/29/2022 10:40:00 AM

Waterbody Class: R2UB3EM2 Chapter 93 use: CWF



Physical Parameters: Table 4-3

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny, Hot	80.0	Humid	Clear	Orange	68.4
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Orange	None	Rotten Egg	None	N/A	N/A

Water Flow: 0.87 cfs

Land Use: 60% Other: Open Water; 40% Pasture

Chemical Parameters: Table 4-4

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
6.24	6.61	138.90	702.00	0.00	383.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
100.00	1.00	N/A	195.00	0.01	4.10

Flora: phragmites, purple loosestrife, bullrush, golden rod, locust, sumac, autumn olive, birch

Fauna: no bugs found in stream due to heavy AMD presence Nanticoke Creek; noticed whirligig beetles on the surface of the water across the channel outside of the D net sampling and several dragonfly species flying around, green frogs jumping along the water's edge. no ducks present, but sometimes are seen on other occasions.

Other Observation: Between Dundee Road and SR 29 highway bridge. Aeration system removes oxidizes iron from the Askam AMD discharge which settles in the pond and in the stream when the discharge is above design capacity; In the late 90s and early 2000s the area used to be a historic beaver dam complex which was removed prior to the construction of the treatment system

Water Elevation 570 ft

Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: Dundee Road directly related to AMLF 4. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1DiIY6OBPZO39Wh6hj-UBPy9X7y06T508>



Figure 4-1: E41201637596786 "Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)" looking at settling pond



*Figure 4-2: E41201637596786 "Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)" looking upstream of sampling point*



*Figure 4-3: E41201637596786 "Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)" looking upstream of sampling point*

E41200127596592 “Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (inlet sampling)”

Location: 41.20012, -75.96592

0.11 acre pond in Hanover Twp, Nanticoke Creek Watershed

Evaluated: 8/29/2022 10:15:00 AM

Waterbody Class: R2UB3EM2 Chapter 93 use: CWF

Physical Parameters: Table 4-5

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny, Hot	80.0	Humid	Clear	Orange	55.4
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Orange	None	Rotten Egg	None	N/A	N/A

Water Flow: 0.87 cfs

Land Use: 60% Other: Open Water, 40% Pasture

Chemical Parameters: Table 4-6

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
2.80	6.30	103.00	835.00	0.00	541.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
145.00	25.50	N/A	190.00	0.04	0.30

Flora: See E41201637596786 “Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)” above.

Fauna: See E41201637596786 “Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (outlet sampling)” above.

Other Observation: Askam AMD discharge flows directly into Nanticoke Creek at elevation 570 ft from 2 boreholes drilled by OSMRE in 2009. The variable discharge mixes with Nanticoke Creek (often 0 flow) to create a ponded area above the inlet of the Maelstrom Oxidizer.

RAMLIS Investigation: Dundee Road directly related to AMLF 4. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1DiIY6QBPZO39Wh6hj-UBPy9X7y06T508>



Figure 4-4: E41200127596592 “Askam Wetlands Maelstrom Oxidizer AMD Treatment System on Nanticoke Creek (inlet sampling)”

E412006075965680 “(Lower) Phase 2 Dundee Wetlands”

*Location: 41.20156, -75.96600*

0.82 acre basin was dry (former polishing wetland for Dundee AMD Treatment System);

*Evaluated 7/19/22*

*Flora: cattails, purple loosestrife, goldenrod, milkweed, sumac*

*Fauna: no ducks present; red-wing black birds and muskrat or beaver huts in basin*

*Other Observations: Photos only; AMD water is no longer pumped into wetland above, now the system likely takes stormwater drainage from the adjacent dirt road.*

*Water Elevation: 586 ft      Mine Pool Elevation: Southeast Upper @ ~570 ft*

*RAMLIS Investigation: Askam North directly related to AMLF 1. See appendix for detail.*

Photos: [https://drive.google.com/drive/u/0/folders/1-Pngab\\_OmK62WovkTkDJGcwE3Uma1\\_IT](https://drive.google.com/drive/u/0/folders/1-Pngab_OmK62WovkTkDJGcwE3Uma1_IT)



Figure 4-5: E412006075965680 “(Lower) Phase 2 Dundee Wetlands” looking north toward outlet



Figure 4-6: E412006075965680 “(Lower) Phase 2 Dundee Wetlands” looking toward south toward former inlet

E41200407596539 "(Higher) Phase 2 Dundee Wetlands"

*Location: 41.20148, -75.96630*

1.39 acre basin was dry (former settling pond for Dundee AMD Treatment System)

*Evaluated 7/19/22*

*Flora: cattails, purple loosestrife, rushes, phragmites, goldenrod, milkweed, sumac*

*Fauna: no ducks present; red-wing black birds*

*Other Observations: See E412006075965680 "(Lower) Phase 2 Dundee Wetlands" above.*

*Water Elevation 590 ft                      Mine Pool Elevation: Southeast Upper @ ~570 ft*

*RAMLIS Investigation: Askam North directly related to AMLF 1. See appendix for detail.*

*Photos: <https://drive.google.com/drive/u/0/folders/1-RW7bOUWGY0JVHHP9zzazZEAIU-E9ob->*



*Figure 4-7: E41200407596539 "(Higher) Phase 2 Dundee Wetlands" looking east*



Figure 4-8: E41200407596539 "(Higher) Phase 2 Dundee Wetlands" looking north.

E41191247596415 "Front Street Wetland"

Location: 41.1912417, -75.9641508

2.44 acre forested wetland in Hanover Twp, Nanticoke Creek Watershed

Evaluated: 5/10/2022 3:00:00 PM

Waterbody Class: PFO Chapter 93 use: CWF

Physical Parameters: Table 4-7

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	73.0	Sunny/Rain	Murky	Brown	63.9
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	Fishy	None	N/A	N/A

Water Flow: small flow

Land Use: 100% Forest

Chemical Parameters: Table 4-8

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
8.85	6.38	108.00	104.00	4.00	56.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.20	N/A	0.00	0.00	0.00

Flora: leaf litter on “wetland” bottom, ferns, maple, beach and other upland tree species

Fauna: Tadpoles, Green Frogs

Aquatic Macroinvertebrates: Table 4-9

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
21	0	0%	5

Other Observations: upland species indicate this area typically isn't wet (ephemeral). Likely a surface water loss to the mine pool below.

Water Elevation 597 ft      Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: No AML site directly related, however there are mining features present to the west of Clark's Crossroad.

Photos: [https://drive.google.com/drive/u/0/folders/171JvzyblTfb\\_XVWrF8dvvcyhA5-D9E5e](https://drive.google.com/drive/u/0/folders/171JvzyblTfb_XVWrF8dvvcyhA5-D9E5e)

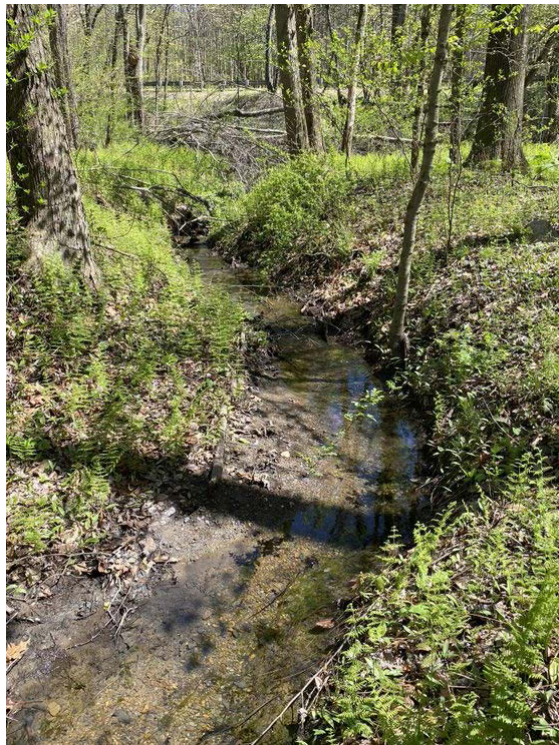


Figure 4-9: E41191247596415 “Front Street Wetland” looking south toward Front Street





*Figure 4-10: E41191247596415 "Front Street Wetland" looking northwest toward outlet*



*Figure 4-11: E41191247596415 "Front Street Wetland" looking northwest at outlet to Nanticoke Creek*

## Nanticoke Headwaters

### Brook Trout Habitat

Temperature Station 8: Clarks Crossroad, Nanticoke Creek, Askam, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 40.5 °F, Maximum: 60.5 °F, Minimum: 32.3 °F  
- The site mid watershed and often dry due to water loss upstream.

Nanticoke Creek Headwaters 41.183102, -75.951556

Sampled 7/28/2022: Table 4-10

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
65.3	8.81	654	370	7.32	-30.2	1,472

Fish Survey (7/28/2022) showed a Habitat Score of 123 (generally impaired), Fish Presence: Brook Trout, Pumpkinseed, Bluegill, Largemouth Bass, & Brown Bullhead. Summarized by type: 1 Cold, 4 Warmwater species (likely flushed out of Witinski Villa Lake). Historic mine concrete sluice would create a severe barrier to aquatic organism passage (AOP) as there is a ~10 foot drop to the next pool as well as a base flow loss of Nanticoke Creek Headwaters just downstream. Landowners plan to restore baseflow with a major stream sealing project soon.

Tomko Ave AOP Insignificant Barrier (Survey ID 90221)

Temperature Station 9: Holly Street, Nanticoke Creek, Witinski Villa, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 41.7 °F, Maximum: 60.8 °F, Minimum: 35.1 °F  
- The site in the headwaters with a pond upstream.

## Espy Run

### Espy Mainstem

#### Brook Trout Habitat

Espy Below Espy AMD Seeps 41.204828, -75.982524

Sampled 7/26/2022: Table 4-11

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
72.3	7.58	885	471	7.07	NA	126

Kosciuszko Street AOP Minor Barrier (Survey ID 88424)

Temperature Station 6: Kosciuszko Street, Espy Run, Nanticoke, PA

2023 Water Temperature Average: 54.7 °F, Maximum: 72.3 °F, Minimum: 33.6 °F - The site is mid watershed and was often stagnant water, but a recent reclamation project upstream reconnected the headwaters

College Drive AOP Significant Barrier (Survey ID 88426)

Middle Road AOP Insignificant Barrier (Survey ID 81469)

Espy Run at Espy Street 41.205123, -75.93615

Visited 7/26/2022: Stagnant water not sampled; known surface water loss to underground mines upstream of this location soon to be repaired by landowners (Earth Conservancy).

Espy Street AOP Insignificant Barrier (Survey ID 81468)

Espy Run Headwaters 41.178104, -75.989131

Sampled 7/26/2022: Table 4-12

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
72.3	7.58	885	471	7.07	NA	126

*Black Duck Habitat*

E41196737598797 "Espy Run Wet Stormwater Basins Vegetated"

Location: 41.196736, -75.987975

0.019 to 1.56 acre basins were dry n Hanover Twp, Nanticoke Creek Watershed Espy Run Tributary

Evaluated 5/10/22: photos only

Other Observations: Constructed wetlands in front of Spreetail Warehouses were dry (higher elevations at 599 ft) and Lexington Village stormwater fenced in; no ducks present; very close to high traffic area along Kosciusko Street which is a major artery Nanticoke. Likely surface water losses to mine pool below. Former beaver dam in back to east has an AMD seep possibly tied to Askam (lowest elevation of 565 ft).

Water Elevation 565-599 ft

Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: Loomis Park Southwest directly related to AMLF 1-3. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1z\\_Wzifys7tIw99d-43ZraF40-2jsNDNx](https://drive.google.com/drive/u/0/folders/1z_Wzifys7tIw99d-43ZraF40-2jsNDNx)



Figure 4-12: E41196737598797 "Espy Run Wet Stormwater Basins Vegetated" looking north at smallest fenced-in wetland in the complex (0.019 acre).



*Figure 4-13: E41196737598797 "Espy Run Wet Stormwater Basins Vegetated" looking west at largest wetland (1.56 acre)*



*Figure 4-14: E41196737598797 "Espy Run Wet Stormwater Basins Vegetated" looking south at 2 wetlands separated by a berm (0.61 acre in the foreground and 0.75 acre in the background)*

E41191647598030 "Concrete City Wetland"

Location: 41.1916598, -75.9797844

10.7 acre ponds and wetlands in Hanover Twp, Nanticoke Creek Watershed Espy Run Tributary

Evaluated: 5/10/2022 4:00:00 PM

Waterbody Class: PEM/r Chapter 93 use: CWF

Physical Parameters: Table 4-13

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	77.0	Sunny/Rain	Clear	None	83.8
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 60% Other: Open Water, 40% Pasture

Chemical Parameters: Table 4-14

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.72	9.38	38.00	78.00	8.00	42.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
20.00	0.05	N/A	0.00		0.20

Flora: phragmites, sedge (stp), cattails, wool grass, river birch, yellow birch

Fauna: Tadpoles, a pair of small black ducks and an egret were flushed out upon arrival; red-wing blackbirds; Canada geese and goslings

Aquatic Macroinvertebrates: Table 4-15

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
67	0	0%	7

Other Observations: Concrete City Ponds and South Valley Parkway Mitigation wetlands; quiet area; no flow in or out. Potentially a perched mine pool between the Alden and Hanover anticlinal ridges.

Water Elevation 637-642 ft

Mine Pool: Southeast Upper @ Elevation ~570 ft?

RAMLIS Investigation: Cross Valley Viaduct directly related to AMLF 2&3. See appendix for detail.

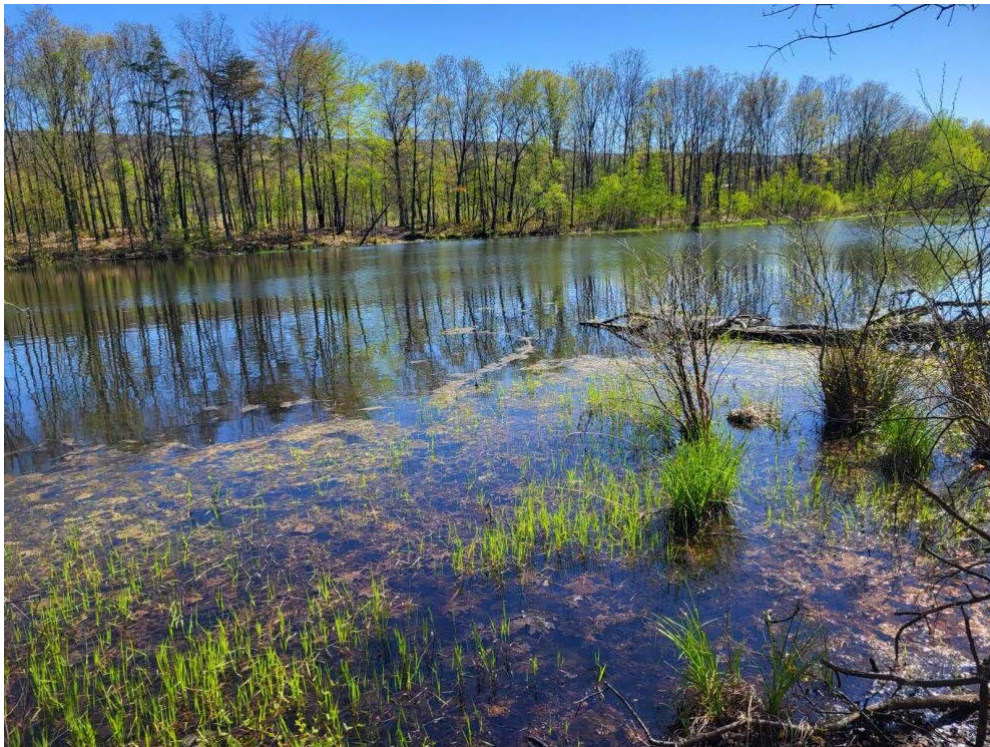
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Figure 4-15: E41191647598030 "Concrete City Wetland" constructed wetland in the foreground and pond in the background.



*Figure 16: E41191647598030 "Concrete City Wetland" constructed wetland close-up*



*Figure 17: E41191647598030 "Concrete City Wetland" pond close-up*

E41188077598938 “Wetland Mitigation for Espy Run Stream Project”

Location: 41.188073, -75.989389

2.01 acre wetland area in Hanover Twp, Nanticoke Creek Watershed Espy Run Tributary

Evaluated 8/11/22

Flora: full of wool grass, blackberries, various bulrush species, and sedge (stp).

Other Observations: was dry; photos only; no ducks present; construction activity on reclaimed mine lands less than a 1/2 mile away; blocked culvert near outlet filled with debris; no standing water. Likely a surface water loss to mine pool below.

Water Elevation 598 ft

Mine Pool Elevation: Southeast Upper @ ~570 ft?

Photos: <https://drive.google.com/drive/u/0/folders/15Bo4Fk6HoYzIlkCJbsOR83Kabf5QUwyH>



Figure 18: E41188077598938 “Wetland Mitigation for Espy Run Stream Project” looking north with Bobby Hughes in foreground.

E41177317598906 “Lower Hanover Reservoir”

Location: 41.177315, -75.989064

0.22 acre open water pond in Hanover Twp, Nanticoke Creek Watershed Espy Run Tributary

Evaluated: 5/12/2022 12:26:00 PM

Waterbody Class: LIRB/h Chapter 93 use: CWF

Physical Parameters: Table 16

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Partly Sunny	79.0	Sunny/Rain	Murky	Green	60.3
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	None	N/A	N/A

Water Flow: 115 gpm

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 4-17

<b>Dissolved Oxygen (mg/L)</b>	<b>pH (SU)</b>	<b>ORP (mV)</b>	<b>Conductivity (uS/cm)</b>	<b>Turbidity (NTU)</b>	<b>TDS (mg/L)</b>
6.79	6.93	38.00	27.20	4.00	16.50
<b>Alkalinity (mg/L)</b>	<b>Iron (mg/L)</b>	<b>Aluminum (mg/L)</b>	<b>Sulfates (mg/L)</b>	<b>Nitrates (mg/L)</b>	<b>Phosphates (mg/L)</b>
20.00	0.00	N/A	0.00	8.69	1.20

Flora: sedges(stp), yellow and river birch, maple, and pine trees

Fauna: Bass swimming around in deepwater.

Aquatic Macroinvertebrates: Table 4-18

<b>Total Macros</b>	<b>EPT Macros</b>	<b>% EPT Macros</b>	<b>Number of Taxa</b>
32	9	28%	10

Other Observations: Dam is deemed hazardous and soon to be removed. ATV traffic.

Water Elevation 898 ft                      Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: Hanover Back Road directly related to AMLF 21. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1-AGbvbxF9\\_KOpBQAOERX8Pgp081EqpLg](https://drive.google.com/drive/u/0/folders/1-AGbvbxF9_KOpBQAOERX8Pgp081EqpLg)

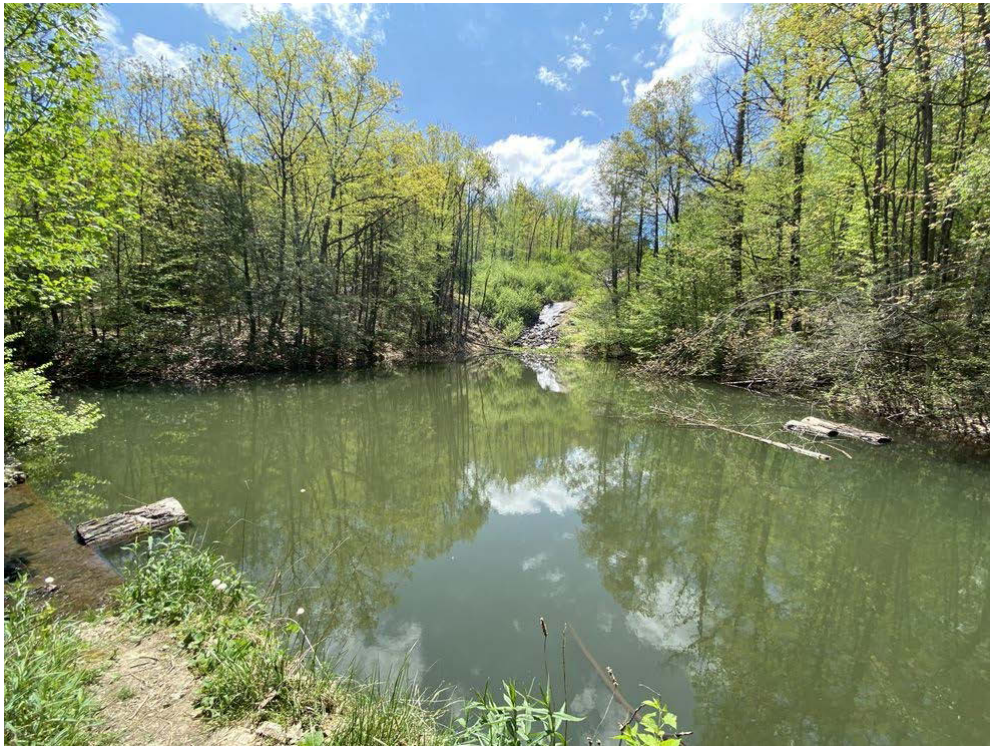
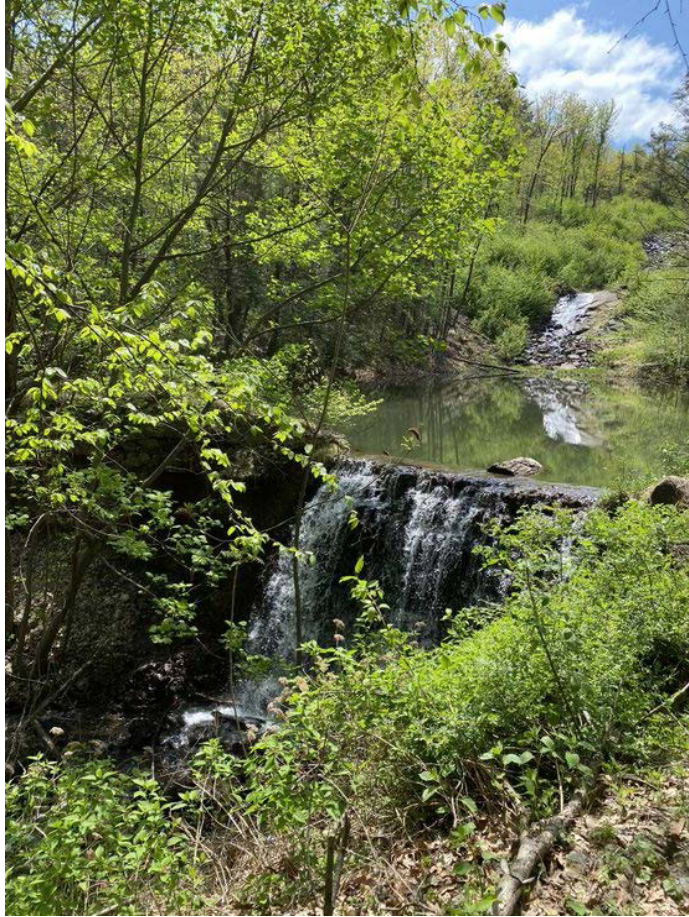


Figure 4-19: E41177317598906 “Lower Hanover Reservoir” looking south at pond behind dam





*Figure 4-20: E41177317598906 "Lower Hanover Reservoir" looking at hazardous dam to be removed.*



*Figure 4-21: E41177317598906 "Lower Hanover Reservoir" looking at macroinvertebrate sampling location*

E41174187598896 “Hanover Reservoir”

Location: 41.173007, -75.989118

15.9 acre pond in Hanover Twp, Nanticoke Creek Watershed Espy Run Tributary

Evaluated: 5/12/2022 1:42:00 PM

Waterbody Class: LIUB1/h -90%, PUBEM/h -10% Chapter 93 use: CWF

Physical Parameters: Table 4-19

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Sunny/Rain	Clear	None	67.8
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: 115 gpm

Land Use: 60% Other: Open Water, 40% Forest

Chemical Parameters: Table 4-20

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
7.02	6.82	90.00	29.30	6.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.00	N/A	0.00	0.00	1.60

Flora: Jack in the Pulpit (*Arisaema triphyllum*), Wild Violet, water shield, spike rush, cattail, birch

Fauna: Bass and frogs present.

Aquatic Macroinvertebrates: Table 4-21

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
58	1	2%	6

Other Observations: Former water company land with predominant deep water habitat. ATV traffic

Water Elevation 1066 ft

Mine Pool: None, just outside coal measures. The closest is Southeast Upper @ Elevation ~570 ft

RAMLIS Investigation: Hanover Reservoir directly related to AMLF 12. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1-97vByo37EPLd9-4XE2LHrHbYOJNXn6g>



Figure 4-22: E41174187598896 “Hanover Reservoir” standing on dam looking southwest



Figure 4-23: E41174187598896 "Hanover Reservoir" standing on dam looking southeast



Figure 4-25: E41174187598896 "Hanover Reservoir" looking at dam



Figure 4-24: E41174187598896 "Hanover Reservoir" looking at macroinvertebrate sampling site

## Espy Disconnected Tributary

### Black Duck Habitat

E41179577604215 “Stormwater Pond Wetland”

Location: 41.179535, -75.999114

1.14 acre pond SE of recently reclaimed Bliss Banks AML site in Hanover Twp, Nanticoke Creek Watershed Unnamed to Espy Run Tributary

Evaluated: 5/12/2022 4:30:00 PM

Waterbody Class: PEM/dx Chapter 93 use: CWF

Physical Parameters: Table 4-22

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Sunny/Rain	Clear	None	77.7
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 4-23

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.60	6.42	100.00	84.20	4.00	42.50
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
30.00	0.10	N/A	0.00	0.00	8.80

Flora: cattails, sedge (stp), wool grass

Fauna: Tadpoles, frogs, damselflies.

Aquatic Macroinvertebrates: Table 4-24

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
73	3	4%	8

Other Observations: development nearby with dynamic compaction; quiet area otherwise; possible source of surface water loss to mine pools

Water Elevation 739 ft AMSL

Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: Alden Mountain East indirectly related to multiple cropfall and vertical opening features where surface water is lost. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1-Hk87g7j8k\\_gNya8O7ffg\\_W6itj5cLqM](https://drive.google.com/drive/u/0/folders/1-Hk87g7j8k_gNya8O7ffg_W6itj5cLqM)



Figure 4-26: E41179577604215 “Stormwater Pond Wetland” looking southwest



Figure 4-27: E41179577604215 “Stormwater Pond Wetland” looking west

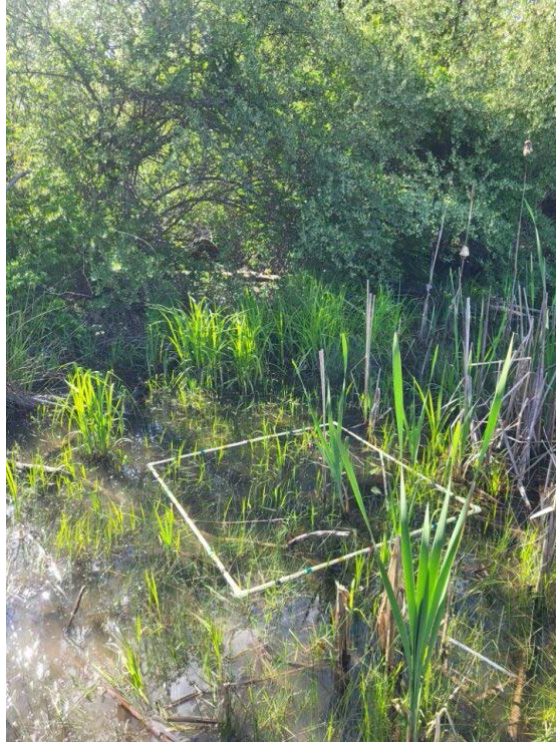


Figure 4-28: E41179577604215 “Stormwater Pond Wetland” looking north at potential outlet when water is higher

E41173367599817 “Hanover 3rd Reservoir Unnamed Pond”

Location: 41.173400, -75.998030

0.19 acre pond on Penobscot Mountain between Fairchild Pond & Hanover Reservoir in Hanover Twp, Nanticoke Creek Watershed Unnamed to Espy Run Tributary

Evaluated: 5/12/2022 3:24:00 PM

Waterbody Class: LIRB1/h Chapter 93 use: CWF

Physical Parameters: Table 4-25

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Sunny/Rain	Clear	Green	61.7
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	Scattered	N/A	Brown

Water Flow: no flow

Land Use: 100% Forest

Chemical Parameters: Table 4-26

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.85	5.74	96.00	39.90	4.00	23.70
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
0.00	0.50	N/A	0.00	0.00	0.80

Flora: spike rush, cattail, birch, maple

Fauna: Frogs, bluegills, bass, and catfish present.

Aquatic Macroinvertebrates: Table 4-27

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
66	2	3%	8

Other Observations: pond sits behind a natural rock outcrop; ATV road and campfire on east side.

Water Elevation 1050 ft AMSL

Mine Pool: None, just outside coal measures. Closest is Southeast Upper @ Elevation ~570 ft

Photos: <https://drive.google.com/drive/u/0/folders/18ndf3o28wu6PF5rsnDwXPOImy01SwoXP>



Figure 4-29: E41173367599817 “Hanover 3rd Reservoir Unnamed Pond” looking east with Steve Cornia on rock outcrop



Figure 4-30: E41173367599817 “Hanover 3rd Reservoir Unnamed Pond” looking at sampling area at suspected outlet

# Leuders Creek

## Brook Trout Habitat

Leuders Creek Headwaters 41.18007, -75.976227

Visited 4/20/2023: dry, no samples were taken

Hanover Street AOP Insignificant Barrier (Survey ID 90223)

## Black Duck Habitat

E41186777597290 “Leuders Creek Dam”

Location: 41.187722, -75.970074

2.36 acre pond behind a dam along Front Street in Hanover Twp, Nanticoke Creek Watershed Leuders Creek Tributary

Evaluated: 5/10/2022 1:30:00 PM

Waterbody Class: LIUB4/h Chapter 93 use: CWF

Physical Parameters: Table 4-28

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	73.0	Sunny/Rain	Murky	Green	60.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	Musky	None	N/A	N/A

Water Flow: 200 gpm

Land Use: 60% Other: Open Water, 40% Forest

Chemical Parameters: Table 4-29

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
7.48	6.66	115.00	40.00	8.00	21.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.15	N/A	0.00	0.07	0.80

Flora: maple, scotch pine, oak, blueberry bush

Fauna: water boatmen, dragonfly

Aquatic Macroinvertebrates: Table 4-30

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
18	0	0%	6

Other Observations: Front Street is adjacent to pond; noisy traffic; potential surface water loss to underground mines.

Water Elevation 633 ft

Mine Pool Elevation: Southeast Upper @ ~570 ft

RAMLIS Investigation: Hanover Back Road directly related to AMLF 5. See appendix for detail.



Photos: [https://drive.google.com/drive/folders/16i5IH\\_APUqG\\_8Wi\\_qQE6X8ggKvHD\\_oKH](https://drive.google.com/drive/folders/16i5IH_APUqG_8Wi_qQE6X8ggKvHD_oKH)



Figure 4-31: E41186777597290 "Leuders Creek Dam" standing on the dam looking west



Figure 4-32: E41186777597290 "Leuders Creek Dam" looking at flow over the dam



Figure 4-33: E41186777597290 “Lueders Creek Dam” looking at flow in overflow channel between pond and road

E41184917597264 “Emerald Anthracite Pond”

Location: 41.18524, -75.97249

1.58 acre pond in Hanover Twp, Nanticoke Creek Watershed Lueders Creek Tributary

Evaluated: 7/19/2022 11:44:00 PM

Waterbody Class: PUBEM/s Chapter 93 use: CWF

Physical Parameters: Table 4-31

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	86.0	Humid	Murky	Green	84.4
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	Moderate	Floating	Brown

Water Flow: no flow

Land Use: 60% Other: Open Water, 40% Pasture

Chemical Parameters: Table 4-32

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.67	7.38	157.00	985.00		45.80
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
30.00	0.01	N/A	12.00	0.00	4.10

Flora: Some emergent vegetation present, wetland boundary is phragmites dominant;

*Fauna: Green frogs, small fish jumping at dragonflies and damselflies, a variety of songbirds species, but no ducks present;*

*Aquatic Macroinvertebrates: Table 4-33*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
0	0	0%	0

*Other Observations: possible source of surface water to mine pools; very quiet area; active fishing by people; trail and haul road within 50' of pond*

*Water Elevation 683 ft*

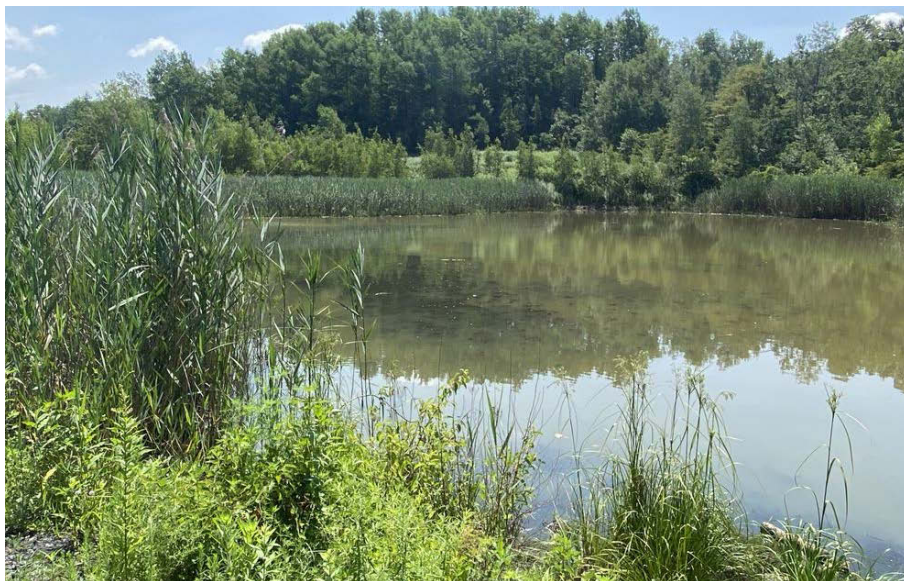
*Mine Pool: Southeast Upper @ Elevation ~570 ft*

*RAMLIS Investigation: Hanover Back Road directly related to AMLF 9. See appendix for detail.*

*Photos: <https://drive.google.com/drive/u/3/folders/1-Pm4T4LnDpK2pmeiz1O7kWg7fPR4MlxA>*



*Figure 4-34: E41184917597264 “Emerald Anthracite Pond” looking south*



*Figure 4-35: E41184917597264 “Emerald Anthracite Pond” looking southeast*

# Newport Creek

## Mainstem

### Near Lower Broadway Bridge

#### Brook Trout Habitat

Newport Mainstem #19 41.206457, -76.009741

Sampled 7/26/2022: Table 5-1

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
74.7	6.39	1000	533	7.6	NA	~800

Fish Survey (7/28/2022) showed a Habitat Score of 128 (not impaired), Fish Presence: Blacknosed Dace, Creek Chubs, White Suckers, & Green Sunfish. Summarized by type: 1 Cold, 2 Cool, 1 Warmwater species. Susquehanna No. 7 discharge to Newport Creek downstream of this location may create a barrier to aquatic organism passage (AOP) to the Susquehanna River.

#### Temperature Station 5: Industrial Road, Newport Creek, Nanticoke, PA

2023 Water Temperature Average: 54.0 °F, Maximum: 103.7 °F, Minimum: 31.3 °F - The site is near the mouth of Newport Creek. Temperatures from May to September were often higher than air temperatures indicating the probe could have been out of the water.

Industrial Park Rd. AOP Insignificant Barrier (Survey ID 90267)

Market Street AOP Insignificant Barrier (Survey ID 90266)

#### Black Duck Habitat

E41207697600129 “Lower Broadway (Tar Pit) Wetlands”

Location: 41.210924, -76.003940

24 acre historic wetland complex in Nanticoke City, Newport Creek Watershed Unnamed Tributary

Evaluated: 8/11/2022 1:30:00 PM

Waterbody Class: PUB4EM5x Chapter 93 use: CWF

Physical Parameters: Table 5-2

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Humid	Clear	None	79.5
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 5-3

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.06	7.69	162.00	814.00	0.00	397.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
220.00	0.15	0.08	96.00	0.08	11.00

Flora: jewel weed, purple loosestrife, phragmites, mile-a-minute, thicket creeper, sawtooth tearthumb,

*japanese knotweed, silver maples, sumac, birch catalpa*

*Fauna: dozens of minnows, long-nosed dace, green frogs, no ducks present*

*Aquatic Macroinvertebrates: Table 5-4*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
3	0	0%	3

*Other Observations: was frequented by Black Duck in the late 1970s to 1980s. Site is contaminated with coal tar residue from a coal gasification plant presence in the early to mid 1900s. No cleanup of the site has occurred. The location on the Superfund Site list; Constant overhead traffic from the Lower Broadway Bridge. Known AMD seeps to the wetlands, but not found during investigation.*

*Water Elevation 518 ft                      Mine Pool: Susquehanna No. 7 @ Elevation ~544 ft*

*RAMLIS Investigation: No AML site related.*

*Photos: [https://drive.google.com/drive/folders/1vVxp6mla5F9Xj47CeGgsQR\\_jOyuQbIST](https://drive.google.com/drive/folders/1vVxp6mla5F9Xj47CeGgsQR_jOyuQbIST)*



*Figure 5-1: E41207697600129 "Lower Broadway (Tar Pit) Wetlands" looking east toward former soccer field up the hill*



*Figure 5-2: E41207697600129 "Lower Broadway (Tar Pit) Wetlands" looking northeast toward farm fields*



*Figure 5-3: E41207697600129 "Lower Broadway (Tar Pit) Wetlands" looking at sampling location*

E41207197599792 “Nanticoke Bottomland Wetland Loomis St.”

41.207191, -75.997929

37.5 acre wetland in Nanticoke City, bridges Nanticoke and Newport Watershed

*Evaluated 8/11/22*

*Other Observations: Photos only as it was dry upon field investigation. This location contains hydrology suspected as a part of the stormwater discharge from Nanticoke City. Overflow from this complex enters the tar pit wetland. It is commonly back flooded during high water events from the Susquehanna River. Potential surface flow loss to the underground mine pool.*

*Water Elevation 542 ft                      Mine Pool: Northwest Lower @ Elevation ~520 ft*

*RAMLIS Investigation: No AML site related.*

*Photos: <https://drive.google.com/drive/u/0/folders/1kRWQeukSJ7UuB-h517Se5fgT1c7W7wCA>*



*Figure 5-4: E41207197599792 “Nanticoke Bottomland Wetland Loomis St.” looking north from Loomis Street*

## North Branch Newport

### Newport Center

#### Brook Trout Habitat

North Branch Newport #10 41.201835, -76.016274

Sampled 7/26/2022: Table 5-5

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
72.7	6.15	1016	532	7.36	127.6	Small flow

Newport Red Lake outfall, Glen Nan East and West seeps AMD all upstream of this location

North Branch Above Red Lake 41.190939, -76.041182

Sampled 7/22/2022: Table 5-6

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
66.7	6.52	927	455	7.04	NA	34

Stearns and Glen Lyon Pump AMD all upstream of this location

#### Black Duck Habitat

E41201457601620 “Mine Spoil Wetland at Confluence”

Location: 41.2023832, -76.0139349

6.41 acres palustrine wetland at confluence of N. & S. Br. Newport Creeks in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 9/1/2022 2:30:00 PM

Waterbody Class: PUB3EM5Hbsx0tn Chapter 93 use: CWF

Physical Parameters: Table 5-7

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Sunny/Humid	Clear	light Orange	71.2
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
light Orange	None	None	None	N/A	N/A

Water Flow: no flow (water seemed to be backed up in the wetland from the creeks)

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 5-8

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.25	6.15	177.50	851.00	0.00	453.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.25	0.08	205.00	0.11	7.10

Flora: phragmite dominant, deer tongue, thistle, red maples, birch, ferns, jewelweed, knotweed, sedge (stp), and duckweed on surface of water

Fauna: some dragonfly larvae found during D-net sampling



*Aquatic Macroinvertebrates: Table 5-9*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
3	0	0%	0

*Other Observations: sampled at an outlet from the wetland due to a beaver dam near the confluence (41.2023833, -76.0139349); Potential surface water loss to underground mine pool.*

*Water Elevation 554 ft                      Mine Pool Elevation: Susquehanna No. 7 @ ~544 ft*

*RAMLIS Investigation: Nanticoke/Newport Creek directly related to AMLF 1. See appendix for detail.*

*Photos: <https://drive.google.com/drive/folders/1qVZwBNMJt8CEV7gRckznO4XCFJxRf0Dn>*



*Figure 5-5: E41201457601620 "Mine Spoil Wetland at Confluence" looking southwest*



*Figure 5-6: E41201457601620 "Mine Spoil Wetland at Confluence" looking southwest at sampling location*

E41196487602707 “Abandoned Strip-mine Marsh Meadow”

Location: 41.2010109, -76.0183927

8.99 acre palustrine wetland along N. Br. Newport Creek in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 9/1/2022 1:44:00 PM

Waterbody Class: R2UB13EM Chapter 93 use: CWF

Physical Parameters:

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	78.0	Sunny/Humid	Clear	Orange	69.6
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Orange	None	None	None	N/A	N/A

Water Flow: 3000 gpm

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters:

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
8.07	7.07	-3.50	980.00	4.00	531.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
60.00	0.55	0.11	190.00	0.27	3.20

Flora: phragmites dominant, birch trees, red maples

Fauna: a few crayfish were found during D-net sampling; water striders at the surface of the creek and green frogs

Aquatic Macroinvertebrates:

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
3	0	0%	1

Other Observations: AMD from Red Lake and slightly AMD impacted water from N. Branch Newport Creek (outlet sampled at 41.2010105, -76.0183927). Potential surface water loss to underground mine pool.

Water Elevation 560 ft

Mine Pool: Susquehanna No. 7 @ Elevation ~544 ft

RAMLIS Investigation: Susquehanna #7 Mine directly related to several features. See appendix for detail.

Photos: [https://drive.google.com/drive/folders/1LHDwQJGbKql02SRI-U2Rmd-\\_RimvD6GO](https://drive.google.com/drive/folders/1LHDwQJGbKql02SRI-U2Rmd-_RimvD6GO)



*Figure 5-7: E41196487602707 "Abandoned Strip-mine Marsh Meadow" looking upstream*



*Figure 5-8: E41196487602707 "Abandoned Strip-mine Marsh Meadow" looking at ATV crossing to waste coal pile*

E41196487602707 “Strip-mine Pond Emergent Meadow”

Location: 41.1963267, -76.0292674

4.81 acre palustrine wetland along N. Br. Newport Creek in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 9/1/2022 12:06:00 PM

Waterbody Class: PUB3EM5Hsx0tm Chapter 93 use: CWF

Physical Parameters: Table 5-10

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	76.0	Humid	Clear	Orange	73.0
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Light Orange	None	None	None	N/A	N/A

Water Flow: 1500 gpm

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 5-11

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.75	6.97	54.80	1054.00	10.00	550.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
60.00	0.90	0.07	195.00	0.21	3.60

Flora: Phragmite dominated; deep water

Fauna: operculate snails were found; green frogs in abundance

Aquatic Macroinvertebrates: Table 5-12

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
12	0	0%	1

Other Observations: crossed a fallen tree over N. Branch of Newport Creek to reach berm of wetlands meadow; AMD from Red Lake flows through the wetland which outlets directly in N. Branch of Newport Creek (outlet sampled at 41.196733, -76.027513). Potential surface water loss to underground mine pool.

Water Elevation 568 ft

Mine Pool: Susquehanna No. 7 @ Elevation ~544 ft

RAMLIS Investigation: Susquehanna #7 Mine directly related to several features. See appendix for detail.

Photos: [https://drive.google.com/drive/folders/1Xu\\_YD8MGp4TbqvoheSwSc2rfO58WA0S3](https://drive.google.com/drive/folders/1Xu_YD8MGp4TbqvoheSwSc2rfO58WA0S3)



Figure 5-9: E41196487602707 “Strip-mine Pond Emergent Meadow” looking west toward waste coal pile in background



Figure 5-10: E41196487602707 “Strip-mine Pond Emergent Meadow” Michael Hewitt collecting water sample at outflow

E41192457603641 “Newport (Red Lake) Flooded Strip Mine”

Location: 41.196443, -76.031491

21.6 acre lake of AMD in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 8/25/2022 2:00:00 PM

Waterbody Class: PUB1EM5Hsx0im Chapter 93 use: CWF

Physical Parameters: Table 5-13

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	86.0	Rain/Humid	Murky	Orange	77.2
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Orange	None	Rotten Egg	N/A	N/A	N/A

Water Flow: 3000 gpm

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-14

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
7.40	6.49	33.60	1113.00	40.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
50.00	9.40	0.08	190.00	0.02	0.80

Flora: Cattails and phragmites around the edge of the entire stripping pit

Fauna: no bugs found; Observed 2 blue-winged teals flying out of the stripping pit to the south from the center of the water-filled stripping pit;

Other Observations: AMD enters subsurface on north side of lake; makeshift target range on west end. ATV trail along the length of the lake. Former concrete dam outlet @ 41.196443, -76.031491)

Water Elevation 587 ft Mine Pool Elevation: Wanamie Lower @ ~592 ft

RAMLIS Investigation: Newport Cemetery directly related to AMLF 1. See appendix for detail.

Photos: [https://drive.google.com/drive/folders/1MVNI-RAAsetdNO0\\_BjeYbThsCGRYyXue](https://drive.google.com/drive/folders/1MVNI-RAAsetdNO0_BjeYbThsCGRYyXue)



Figure 5-11: E41192457603641 “Newport (Red Lake) Flooded Strip Mine” looking east from target range



*Figure 5-12: E41192457603641 “Newport (Red Lake) Flooded Strip Mine” looking at outlet just upstream of sampling point*



*Figure 5-13: E41192457603641 “Newport (Red Lake) Flooded Strip Mine” looking northwest as water flows into next wetland (E41196487602707 “Strip-mine Pond Emergent Meadow”)*

E41196647603189 “Strip Mine Wetland West of Haul Road”

Location: 41.196719, -76.031924

4.16 acre palustrine wetland adjacent to N. Branch Newport Creek in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 8/25/2022 2:35:00 PM

Waterbody Class: PUB4EM1es0i Chapter 93 use: CWF

Physical Parameters: Table 5-15

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	86.0	Humid	Clear	None	72.3
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 5-16

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
6.54	7.96	140.00	407.00	0.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
285.00	0.45	0.07	0.60	0.01	0.00

Flora: golden rod, yellow vetch, sedge (stp), woolgrass, cattail, sweet fern, gray birch,

Fauna: no bugs found; water level seemed low

Other Observations: May need to revisit to see if N. Branch Newport flows through it at the other end of wetland to determine if it's riverine; Water outlet was along ATV trail that crosses N. Branch of Newport Creek

Water Elevation 575 ft Mine Pool Elevation: Wanamie Lower @ ~592 ft

RAMLIS Investigation: Newport Cemetery indirectly related to several features. See appendix for detail.



Photos: [https://drive.google.com/drive/folders/1iDIeLiY0rwrzO35P4976\\_F0RiasQvwnu](https://drive.google.com/drive/folders/1iDIeLiY0rwrzO35P4976_F0RiasQvwnu)



Figure 5-14: E41196647603189 "Strip Mine Wetland West of Haul Road" looking west from ATV road



Figure 5-15: E41196647603189 "Strip Mine Wetland West of Haul Road" looking north at southern edge of wetland

E41194037604503 “North of Creek”

Location: 41.194031, -76.045033

0.68 acre water-filled pit in Newport Twp., Newport Creek Watershed North Branch Tributary.

Evaluated 7/22/21

Other Observations: Could not find suspected water filled pit in the field. Photos only. Seems to be ephemeral upon review of historical aerial photos dating back to 4/1992. Potential surface water loss to underground mine pool.

Water Elevation 667 ft

Mine Pool: Wanamie Lower @ Elevation ~592 ft

RAMLIS Investigation: Newport North directly related to AMLF 9& 10. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1DPJ3runSiQhW2PxVI3vXhmKDBgyNYFkZ>



Figure 5-16: E41194037604503 “North of Creek” looking at a dry, but potential water filled pit from aerials

E41190747603972 “Pond A Old AMD TS”

Location: 41.1911790, -76.0410660

<1 acre pond flows to N. Br. Newport in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 7/22/2021 10:25:00 AM

Waterbody Class: PABEM

Chapter 93 use: CWF

*Physical Parameters: Table 5-17*

<b>Weather</b>	<b>Ambient Temp.(F)</b>	<b>Past Weather</b>	<b>Water Clarity</b>	<b>Water Color</b>	<b>Water Temp (F)</b>
Sunny	70.0	Humid, Showers	Clear	None	56.7
<b>Substrate Color</b>	<b>Surface Foam</b>	<b>Water Odor</b>	<b>Algae Abundance</b>	<b>Algae Growth</b>	<b>Algae Color</b>
Orange/Red	None	Rotten Egg	Scattered	Floating	Brown

*Water Flow: 0.54 cfs*

*Land Use: 90% Forest, 10% AML*

*Chemical Parameters: Table 5-18*

<b>Dissolved Oxygen (mg/L)</b>	<b>pH (SU)</b>	<b>ORP (mV)</b>	<b>Conductivity (uS/cm)</b>	<b>Turbidity (NTU)</b>	<b>TDS (mg/L)</b>
0.27	6.96	119.00	1145.00	0.00	N/A
<b>Alkalinity (mg/L)</b>	<b>Iron (mg/L)</b>	<b>Aluminum (mg/L)</b>	<b>Sulfates (mg/L)</b>	<b>Nitrates (mg/L)</b>	<b>Phosphates (mg/L)</b>
460.00	2.20	0.03	195.00	0.00	0.00

*Flora: woolgrass, sedge (stp), nut sedge, wild grape, nettle, arrow wood, fern, multi-flora rose, maple, aspen, oak, locust, white pine*

*Stream Habitat: Table 5-19*

<b>Stream Habitat Score</b>	<b>Sediment Impairment Score</b>	<b>Bank Erosion Impairment Score</b>
114	7	40

*Fauna: green frog, dragonfly, butterflies, songbirds*

*Aquatic Macroinvertebrates: Table 5-20*

<b>Total Macros</b>	<b>EPT Macros</b>	<b>% EPT Macros</b>	<b>Number of Taxa</b>
20	3	15%	3

*Other Observations: Pond A contains 3 AMD borehole discharges from old pump station*

*Water Elevation 592 ft                      Mine Pool: Wanamie Lower @ Elevation ~592 ft*

*RAMLIS Investigation: Newport Cemetery directly related to AMLF 4. See appendix for detail.*

*Photos: [https://drive.google.com/drive/u/0/folders/1710mnq1wXPrTSQzY0fBM\\_0PPIT05Mw3W](https://drive.google.com/drive/u/0/folders/1710mnq1wXPrTSQzY0fBM_0PPIT05Mw3W)*



*Figure 5-17: E41190747603972 "Pond A Old AMD TS" looking northwest*



*Figure 5-18: E41190747603972 "Pond A Old AMD TS" looking at one of the boreholes discharging AMD from the mine pool*



*Figure 5-19: E41190747603972 "Pond A Old AMD TS" looking at the outlet downstream of sampling location*

E41190837604010 “Pond B Old AMD TS”

Location: 41.1923410, -76.0400920

Two ponds (B&C) of 3.60 acres in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 7/22/2021 12:57:00 PM

Waterbody Class: PABEM Chapter 93 use: CWF

Physical Parameters: Table 5-21

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	70.0	Humid, Showers	Murky	Green	78.8
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	Scattered	Matted	Dark Green

Water Flow: 0.03 cfs

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-22

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.80	6.74	83.00	815.00	6.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
40.00	0.15	0.04	195.00	0.33	4.80

Flora: cattails, red maple and white pond on banks

Stream Habitat: Table 5-23

Stream Habitat Score	Sediment Impairment Score	Bank Erosion Impairment Score
120	13	20

Fauna: no aquatic macroinvertebrates other than tadpoles and smooth newts; pileated woodpecker calling, flushed out a wood duck, green frogs, salamanders, dragonflies

Other Observations: ponds separated by manmade berm. No specific outlets. ATV trail along the north side. Assume separate clogged pipes discharge water directly to N. Br. Newport. Former treatment area from 1970s when mines were pumped.

Water Elevation 593 ft Mine Pool Elevation: Wanamie Lower @ ~592 ft

RAMLIS Investigation: Newport Cemetery directly related to AMLF 4. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1Nb0MtdvzT44zfh\\_9Lf1hDg6OplUlbleg](https://drive.google.com/drive/u/0/folders/1Nb0MtdvzT44zfh_9Lf1hDg6OplUlbleg)



Figure 5-20: E41190837604010 "Pond B Old AMD TS" looking north



Figure 5-21: E41190837604010 "Pond B Old AMD TS" looking south from ATV trail near sampling location



Figure 5-22: E41190837604010 “Pond B Old AMD TS” looking south from ATV trail at outlet to North Branch Newport Creek

E41190837604010 “Pond C Old AMD TS”

Location: 41.190929, -76.039861

Two ponds (B&C) of 3.60 acres in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 7/22/2021 12:00:00 PM

Waterbody Class: PABEM Chapter 93 use: CWF

Physical Parameters: Table 5-24

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Humid, Showers	Murky	Green	77.0
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	None	Matted	Dark Green

Water Flow: no flow

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-25

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.42	7.22	168.00	389.00	6.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
70.00	0.25	N/A	126.00	0.23	4.10

Flora: wool grass; red maples and white pines on bank

Stream Habitat: Table 5-26



<b>Stream Habitat Score</b>	<b>Sediment Impairment Score</b>	<b>Bank Erosion Impairment Score</b>
120	13	40

*Fauna: damselfly, whirligig beetles, sunfish, tadpoles, green frogs, a variety of songbirds*

*Aquatic Macroinvertebrates: Table 5-27*

<b>Total Macros</b>	<b>EPT Macros</b>	<b>% EPT Macros</b>	<b>Number of Taxa</b>
4	0	0%	3

*Other Observations: See description of Pond B above.*

*Water Elevation 593 ft                      Mine Pool Elevation: Wanamie Lower @ ~592 ft*

*RAMLIS Investigation: Newport Cemetery directly related to AMLF 4. See appendix for detail.*

*Photos: <https://drive.google.com/drive/u/0/folders/1Y74wpWmwbHo1XE3Ie24gmP10HG4rIHXI>*



*Figure 5-23: E41190837604010 "Pond C Old AMD TS" looking south from ATV trail*



*Figure 5-24; E41190837604010 "Pond C Old AMD TS" looking east from ATV trail at sampling location*

## Wanamie North

### Brook Trout Habitat

North Branch Glen Lyon 41.177365, -76.068728

Sampled 7/26/2022: Table 5-28

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
66.6	5.51	855	455	6.95	NA	Small flow

### Black Duck Habitat

E41183367604901 "Stearns Emergent Wetland Complex"

Location: 41.1839667, -76.0482027

3.34 acre riverine wetland along N. Br. Newport Creek in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 11/18/2021 4:30:00 PM

Waterbody Class: RUB2h Chapter 93 use: CWF

Physical Parameters: Table 5-29

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Light Rain	50.0	Dry, Warmer than average	N/A	N/A	53.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
N/A	N/A	N/A	N/A	N/A	N/A

Water Flow: 200 gpm

Land Use: 60% Other: Wetland, 20% AML, 20% Forest

Chemical Parameters: Table 5-30

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
11.05	3.50	490.00	844.00	0.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
40.00	22.00	4.30	195.00	0.27	10.00

Flora: oak, pine and birch on bank

Fauna: no aquatic macroinvertebrates; frogs jumping in the water; variety of songbirds calling

Other Observations: orange precipitate on this wetland adjacent to but higher than creek. Suspected AMD discharge.

Water Elevation 614 ft

Mine Pool Elevation: Stearns @ ~614 ft

RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 1. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1mCOYuIxp\\_yKcWoB\\_0pcfB4A4pVEGiG\\_J](https://drive.google.com/drive/u/0/folders/1mCOYuIxp_yKcWoB_0pcfB4A4pVEGiG_J) & <https://drive.google.com/drive/u/0/folders/1SBQgBKXgyTncocOvY0aChB1psMLAS8mT>



Figure 5-25; E41183367604901 "Stearns Emergent Wetland Complex" looking northeast toward creek



Figure 5-26; E41183367604901 "Stearns Emergent Wetland Complex" looking southwest at riverine section along creek



Figure 5-27: E41183367604901 "Stearns Emergent Wetland Complex" looking west at perched AMD discharge to creek

E41182137604928 "PGW Mallard Mine Wetland"

Location: 41.1822728, -76.0480727

1.36 acre wetland in Newport Twp, Newport Creek Watershed North Branch Tributary

Evaluated: 10/15/2021 2:30:00 PM

Waterbody Class: PABEM Chapter 93 use: CWF

Physical Parameters: Table 5-31

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Sunny	Clear	Green	68.0
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 100% Forest

Chemical Parameters: Table 5-32

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
4.82	5.01	166.00	223.00	6.00	120.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.85	0.23	95.00	0.26	4.50

*Flora: Woolgrass, sedge (stp), bulrush. Forested boundary edge.*

*Fauna: Flushed out 12-15 mallard ducks. Frogs, spring peepers.*

*Aquatic Macroinvertebrates: Table 5-33*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
50	0	0%	4

*Other Observations: Excellent habitat. Low human interference. No outlet, likely a surface manifestation of the mine pool.*

*Water Elevation 615 ft*

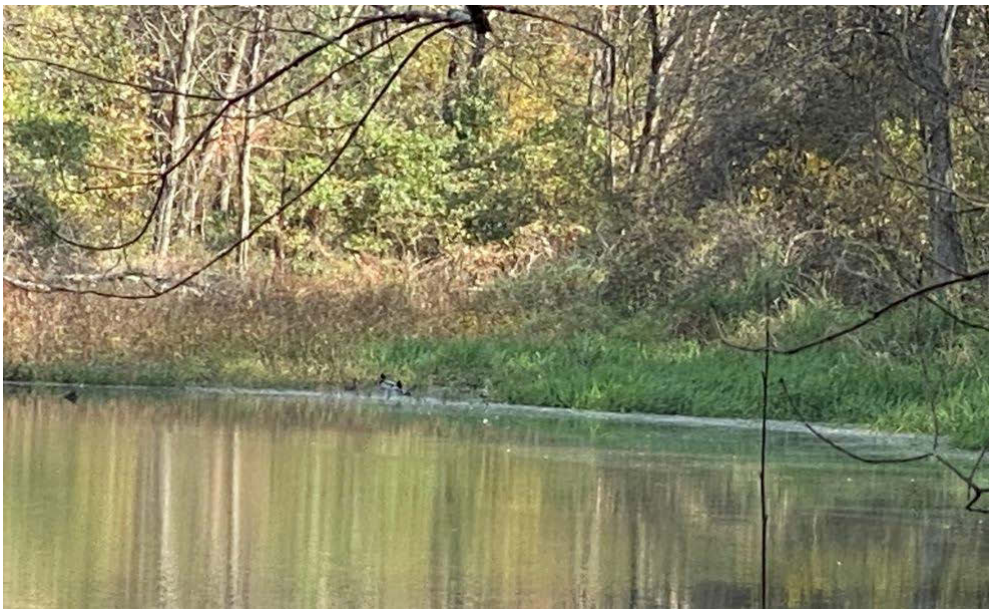
*Mine Pool Elevation: Stearns @ ~614 ft*

*RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 1. See appendix for detail.*

Photos: <https://drive.google.com/drive/u/0/folders/1WGIBUD7gSODOrgaNojZoHgvZWeVC52Pn>



*Figure 5-28: E41182137604928 “PGW Mallard Mine Wetland” looking east from ATV trail*



*Figure 5-29: E41182137604928 “PGW Mallard Mine Wetland” looking at mallard ducks that we spooked upon arrival*



Figure 5-30: E41182137604928 “PGW Mallard Mine Wetland” looking at sampling location; could not locate outlet

E41179437604291 ”Center Street Pit Ponds”

Location: 41.1793078, -76.0433993

0.27 acre wetland and 3 smaller wetlands on private land in Newport Twp, Newport Creek Watershed North Branch (?) Tributary

Evaluated: 10/14/2021 3:40:00 PM

Waterbody Class: PUB/sx Chapter 93 use: CWF

Physical Parameters: Table 5-34

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	79.0	Partly Sunny	Clear	Black	63.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Black	Slight Oil Sheen	Rotten Egg	None	N/A	N/A

Water Flow: no flow

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-35

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.68	6.46	100.00	180.00	4.00	96.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
30.00	0.60	0.08	50.00	0.44	3.30

Flora: ferns, barberry, maples, aspen, birch, pine



*Fauna: Woodpeckers, tadpoles, newts, whirligig beetles, green frogs, turtle, red dragonflies;*

*Aquatic Macroinvertebrates: Table 5-36*

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
56	2	4%	9

*Other Observations: Quiet Area. Trail is off in the distance over a hill. Slate piles separate the ponds. Likely a surface manifestation of the mine pool.*

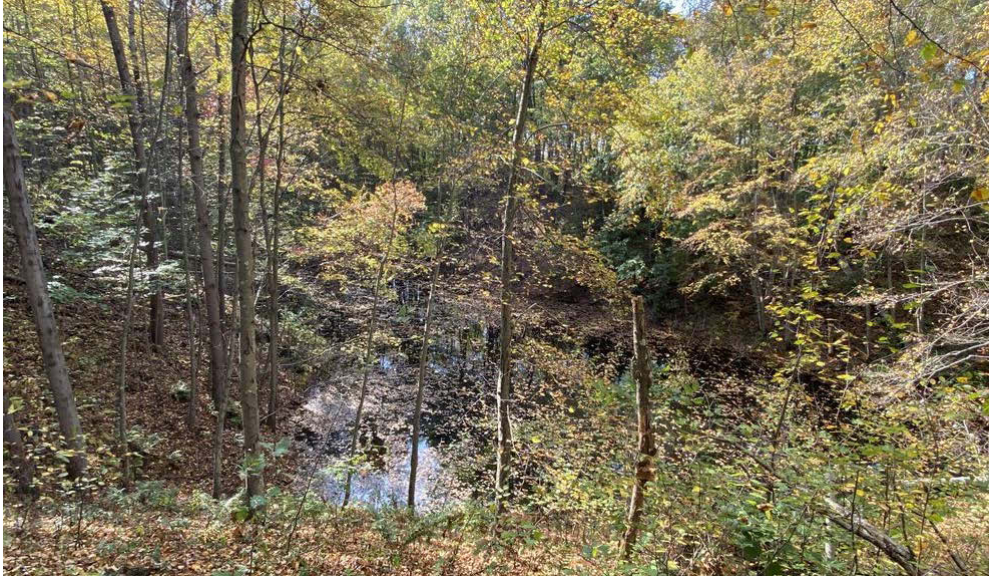
*Water Elevation 760 ft                      Mine Pool Elevation: Wanamie Upper @ ~768 ft*

*RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 8. See appendix for detail.*

*Photos: <https://drive.google.com/drive/u/0/folders/1W2d7zmk6motsGvV15ManoZsZkXYkLhVn>*



*Figure 5-31: E41179437604291 "Center Street Pit Ponds" looking east at larger pond we sampled*



*Figure 5-32: E41179437604291 "Center Street Pit Ponds" looking north at another pond from the road*

E41178697604941“D&H RR Turtle (ATV damage) Pond”

Location: 41.178753, -76.0486350

0.3 acre wetland in Newport Twp, Newport Creek Watershed North Branch (?) Tributary

Evaluated: 10/14/2021 11:15:00 AM

Waterbody Class: PABEM/rx Chapter 93 use: CWF

Physical Parameters: Table 5-37

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Cloudy	79.0	Partly Sunny	Clear	Brown	62.4
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	Rotten Egg	None	Floating	N/A

Water Flow: no flow

Land Use: 100% Other: Reclaimed AML

<https://drive.google.com/drive/folders/1VpIIzrAe2TTmOfrn9Vx7wIyvn24SpXU6?usp=sharing>

Chemical Parameters: Table 5-38

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.12	6.08	164.00	41.00	22.00	22.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
45.00	0.95	0.07	0.00	0.01	0.01

Flora: Floating lily pads, sedge (stp), rushes

Fauna: Variety of songbirds calling in the area. Turtles, tadpoles, Spring peepers.

Aquatic Macroinvertebrates: Table 5-39

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
36	0	0%	4

Other Observations: north of cemetery across from compost center: Former Delaware - Hudson Railroad right of way. Evidence of ATV traffic thru the pond. No outlet, likely surface manifestation of the mine pool.

Water Elevation 767 ft

Mine Pool Elevation: Wanamie Upper @ ~768 ft

RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 3. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1VpIIzrAe2TTmOfrn9Vx7wIyvn24SpXU6>



Figure 5-33: E41178697604941 “D&H RR Turtle (ATV damage) Pond” looking west at ATV trail thru pond area



*Figure 5-34: E41178697604941 “D&H RR Turtle (ATV damage) Pond” looking west at wetland area and sampling location*



*Figure 5-35: E41178697604941 “D&H RR Turtle (ATV damage) Pond” zoom in of north bank of wetland area*

E41177667604830 “D&H RR Strip Pit Pond”

Location: 41.1780047, -76.045698

0.47 acre water filled strip pit in Newport Twp, Newport Creek Watershed North Branch (?) Tributary

Evaluated: 10/14/2021 11:54:00 AM

Waterbody Class: PRB/sx Chapter 93 use: CWF

Physical Parameters: Table 5-40

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Partly Sunny	Clear	Black	62.6
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Black	Slight Oil Sheen	None	None	N/A	N/A

Water Flow: no flow

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-41

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
23.00	7.00	162.00	159.00	12.00	86.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
55.00	0.10	0.06	0.00	0.32	0.00

Flora: birch, sassafras, oak, aspen, larch pine, scotch pine

Fauna: Spring peepers, songbirds green frogs, red dragonflies;

Aquatic Macroinvertebrates: Table 5-42

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
5	0	0%	1

Other Observations: bedrock on far bank. Steep bottom rock drop offs, over 10' within 3' of bank. Quiet area. Some camping around with fire pit. Low interference from humans. Crushed/blocked pipe at road. No outlet. Likely a surface manifestation of the mine pool.

Water Elevation 803 ft Mine Pool Elevation: Wanamie Upper @ ~768 ft

RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 5. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1W0gKToRrjD-MMqSN2D9sbwC8nfHYWtd>

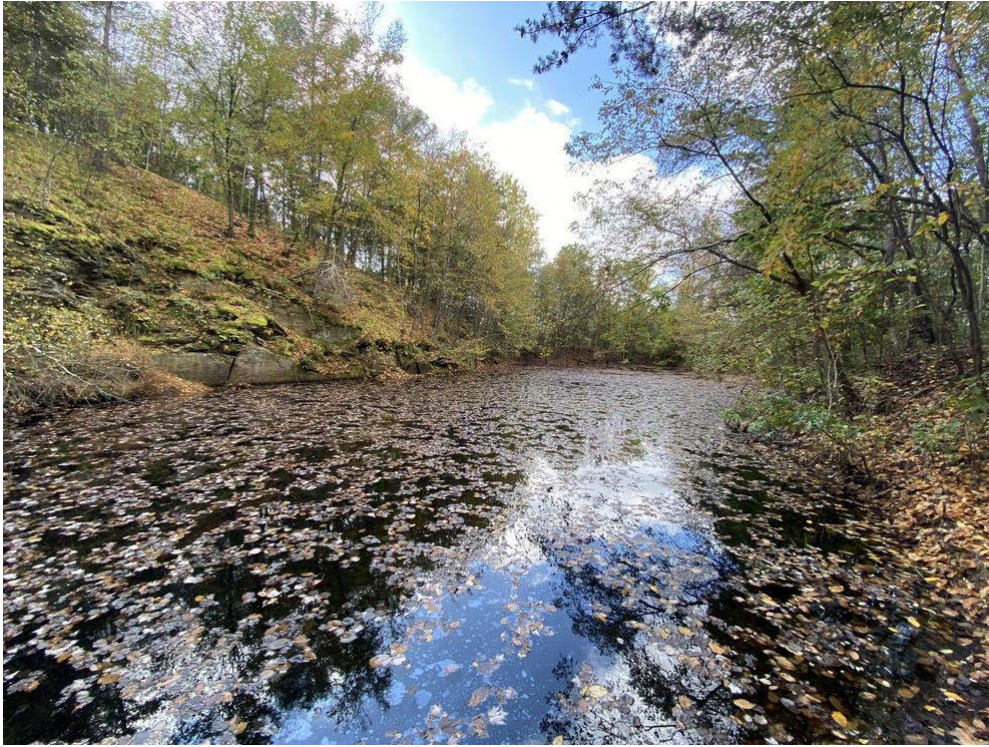


Figure 5-36: E41177667604830 "D&H RR Strip Pit Pond" looking northeast



Figure 5-37: E41177667604830 "D&H RR Strip Pit Pond" looking southwest

E41175737604921 “Aspen Strip Pit Forested Wetland”

Location: 41.175611, -76.03492713

0.24 acre wetland in Newport Twp, Newport Creek Watershed Middle Branch (?) Tributary

Evaluated: 10/14/2021 1:29:00 PM

Waterbody Class: PFO/sx Chapter 93 use: CWF

Physical Parameters: Table 5-43

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Partly Sunny	Clear	Black	61.7
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Black	Slight Oil Sheen	Rotten Egg	None	N/A	N/A

Water Flow: no flow

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-44

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.35	6.49	148.00	170.00	0.00	65.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
0.00	0.00	0.00	0.00	0.38	0.00

Flora: ferns, aspen, maple, scotch pine, hickory, birch,

Fauna: Black duck spotted. Red dragonflies, tadpoles;

Aquatic Macroinvertebrates: Table 5-45

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
36	0	0%	3

Other Observations: Quiet area. Low human impact. Forested, off a trail. No outlet likely a surface manifestation of the mine pool.

Water Elevation 795 ft Mine Pool Elevation: Wanamie Upper @ ~768 ft

RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 2. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1850GEXm36gyWgUkZBdz7iGeOu7YWBPcD>



Figure 5-38: E41175737604921 “Aspen Strip Pit Forested Wetland” looking south from ATV trail



Figure 5-39: E41175737604921 “Aspen Strip Pit Forested Wetland” looking east



E41175137605160” Pole Line Strip Pit Wetland”

Location: 41.1751084, -76.0517091

0.6 acre wetland in Newport Twp, Newport Creek Watershed Middle Branch (?) Tributary

Evaluated: 10/14/2021 2:15:00 PM

Waterbody Class: PFO/sx Chapter 93 use: CWF

Physical Parameters: Table 5-46

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Partly Sunny	Clear	Black	62.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Black	Slight Oil Sheen	Rotten Egg	Scattered	Floating	Brown/Orange

Water Flow: 200 gpm

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-47

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
1.07	7.01	-35.00	228.00	0.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
60.00	0.30	0.06	39.00	0.20	2.20

Flora: Boundary is forested. Knotweed to edge of pit.

Fauna: Dragonflies; No aquatic macroinvertebrates found

Other Observations: Very quiet. Minimal human impact. Pole line trail used by ATVs. Some trash and tires in the pit holding back the water; pond bottom covered by leaves; About 200 gpm weak AMD discharge from the pit.

Water Elevation 784 ft

Mine Pool: Wanamie Upper @ Elevation ~768 ft

RAMLIS Investigation: Delaware and Hudson RR directly related to AMLF 2. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/15OIUueJVx--fJUKN4Ir3jJl5PlfK1U4G>



Figure 5-40: E41175137605160" Pole Line Strip Pit Wetland" looking northeast from middle of pond

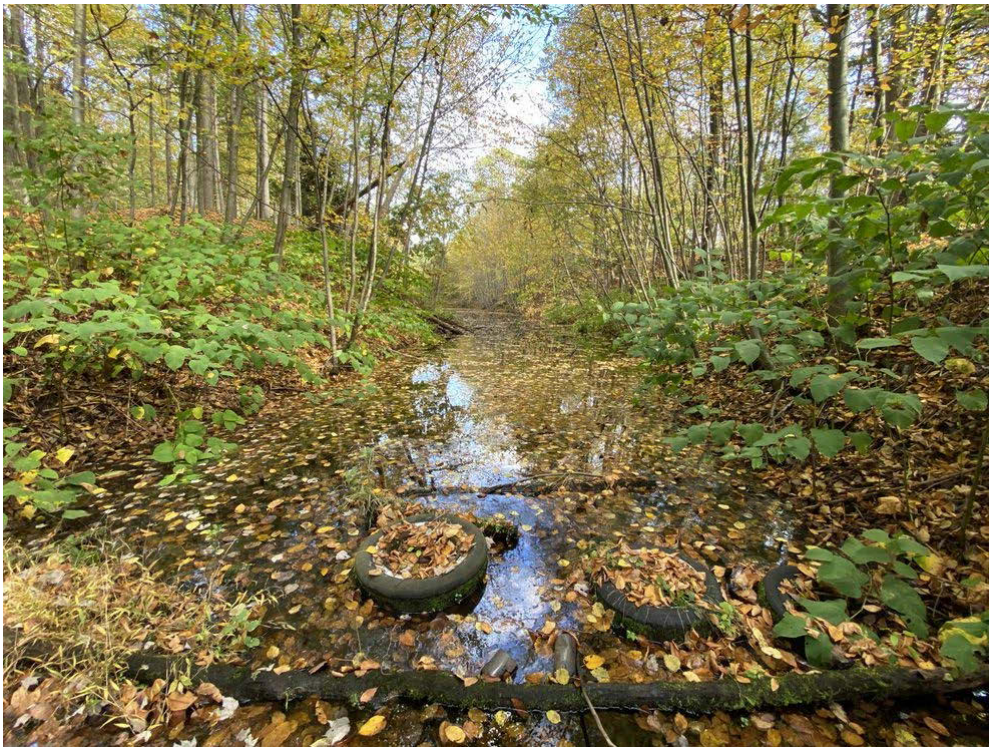


Figure 5-41: E41175137605160" Pole Line Strip Pit Wetland" looking east at makeshift dam?

## Earth Conservancy Compost Facility

### *Brook Trout Habitat*

Temperature Station 1: Enterprise Street, Newport Creek, Glen Lyon, PA

2023 Water Temperature Average: 52.2 °F, Maximum: 77.0 °F, Minimum: 26.3 °F - The site is near the headwaters and is intermittently groundwater influenced as the Glen Lyon Pump periodically discharges upstream when the groundwater table (mine pool) is high.

### Middle Branch Newport Creek

Visited 7/27/2022: dry, no samples were taken; lost streambed that shows up on topographic maps

### *Black Duck Habitat*

E41174517605477 “Wetland across Kirmar Ave from EC Compost”

*Location:* 41.174519, -76.054775

*Flora:* Cattails present, sawtooth tearthumb

*Other Observations:* Photos only; was dry and no outlet detected.

*RAMLIS Investigation:* no AML site directly related .

*Photos:* [https://drive.google.com/drive/u/0/folders/1pVELYx64ThyVIZC5Hn5tm82ic29Z\\_Wf](https://drive.google.com/drive/u/0/folders/1pVELYx64ThyVIZC5Hn5tm82ic29Z_Wf)



Figure 5-42: E41174517605477 “Wetland across Kirmar Ave from EC Compost” looking north from road

E41174327605426 "Pond near EC Compost"

Location: 41.174320, -76.054267

1.27 acre pond in Newport Twp, Newport Creek Watershed Middle Branch (?) Tributary

Evaluated: 7/23/2021 12:00:00 PM

Waterbody Class: PEMSS/hsx Chapter 93 use: CWF

Physical Parameters: Table 5-48

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	80.0	Humid, Showers	Murky	Green	69.3
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Green	None	None	Moderate	Floating	Light/Dark Green

Water Flow: no flow

Land Use: 80% Forest, 10% Industrial, 10% AML

Chemical Parameters: Table 5-49

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
2.70	6.43	148.00	245.00	42.00	N/A
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
85.00	0.45	0.06	0.30	1.68	0.60

Flora: duckweed, rushes, cattail, wild grape, oak, birch, dogwood, maple, box alder, scotch pine

Fauna: whirligig beetle, dragon flies, turtles

Aquatic Macroinvertebrates: Table 5-50

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
28	0	0%	8

Other Observations: next to Earth Conservancy Compost facility. Lots of noise from equipment. No outlet likely a surface manifestation of the mine pool, but water may overflow to storm drain along Kirmar Parkway.

Water Elevation 751 ft Mine Pool Elevation: Wanamie South @ ~750 ft

RAMLIS Investigation: Ballfield East indirectly related to several features. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1sQSU8iiBulu\\_BsFoTc1cxkYUgYPySbSE](https://drive.google.com/drive/u/0/folders/1sQSU8iiBulu_BsFoTc1cxkYUgYPySbSE)



Figure 5-43: E41174327605426 "Pond near EC Compost" looking at a turtle sunning itself on a floating tire



*Figure 5-44: E41174327605426 "Pond near EC Compost" looking south toward compost facility on other side of trees*



*Figure 5-45: E41174327605426 "Pond near EC Compost" looking at sampling location near possible outlet*

E41170857606225 “Two small ponds in forest”

Location: 41.1712300, -76.0619220

0.06 acre ponds separated by a berm in Newport Twp, Newport Creek Watershed Middle Branch (?) Tributary

Evaluated: 7/23/2021 10:23:00 AM

Waterbody Class: PFO Chapter 93 use: CWF

Physical Parameters: Table 5-51

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	77.0	Humid, Showers	Murky	Brown	62.1
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: no flow

Land Use: 100% Forest

Chemical Parameters: Table 5-52

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.20	6.44	7.00	81.00	52.00	42.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
10.00	1.75	0.04	4.00	0.16	0.00

Flora: Canada mayflower, forested, leaf litter dominant on bottom of ponds.

Fauna: frogs, mosquitos, cicadas, dragonflies;

Aquatic Macroinvertebrates: Table 5-53

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
11	0	0%	3

Other Observations: Quiet area. Some litter and tires could show human visitation. No outlet likely a surface manifestation of the mine pool, but evidence water may overflow the ATV Trail toward dry streambed of Newport Creek Middle Branch.

Water Elevation 752 ft Mine Pool Elevation: Wanamie South @ ~750 ft

RAMLIS Investigation: Ballfield East indirectly related to AMLF 7 & 11. See appendix for detail.

Photos: <https://drive.google.com/drive/u/0/folders/1ih2axWm4FgECDZcndgcs7Fe6VEilObBF>



Figure 5-46: E41170857606225 "Two small ponds in forest" looking southwest at Pond A



Figure 5-47: E41170857606225 "Two small ponds in forest" looking west at Pond B

E41171907606326 "Kapik Pond"

Location: 41.1708451, -76.0633291

0.22 acre pond in Newport Twp, Newport Creek Watershed Middle Branch (?) Tributary

Evaluated: 10/13/2021 1:05:00 PM

Waterbody Class: PUBAB Chapter 93 use: CWF

Physical Parameters: Table 5-54

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Humid	67.0	Dry	Murky	Brown	63.5
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	Scattered	Hairy	Dark Green

Water Flow: no flow

Land Use: 95% Forest, 5% AML

Chemical Parameters: Table 5-55

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
0.42	5.58	124.00	34.00	48.00	20.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
0.00	0.90	0.05	0.00	0.01	0.00

Flora: Forested boundary mainly hemlock, birch and pin oak; no invasive plants

Fauna: Flushed out a duck. Downy woodpecker, "peeper" frogs, and crickets calling;

Aquatic Macroinvertebrates: Table 5-56

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
17	0	0%	5

Other Observations: Excellent habitat. Low human interference. ATV trail is about 100 feet away. No outlet likely a surface manifestation of the mine pool, but evidence water may overflow the ATV Trail toward dry streambed of Newport Creek Middle Branch. Topographic maps show this is where the Middle Branch of Newport Creek originates (unconfirmed).

Water Elevation 750 ft Mine Pool Elevation: Wanamie South @ ~750 ft

RAMLIS Investigation: Ballfield East indirectly related to AMLF 7 & 11. See appendix for detail.

Photos: [https://drive.google.com/drive/u/0/folders/1W9LnyaemdlK8aC87n5gIIB\\_W\\_Ad-y909](https://drive.google.com/drive/u/0/folders/1W9LnyaemdlK8aC87n5gIIB_W_Ad-y909)



Figure 5-48: E41171907606326 "Kapik Pond" looking north at pond (panoramic photo)





Figure 5-49: E41171907606326 "Kapik Pond" looking south at sampling location near potential outlet

## South Branch Newport

### *Brook Trout Habitat*

South Branch Newport #17 41.197026, -76.012635

Sampled 7/26/2022: Table 5-57

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
70.9	4.55	501	268.1	7.14	-11.8	Small flow

Temperature Station 4: W. Main Street, S. Br. Newport Creek, Nanticoke, PA

2023 Water Temperature Average: 53.1 °F, Maximum: 76.8 °F, Minimum: 36.7 °F - The site is upstream of the confluence with the North Branch Newport Creek.

*W. Main Street AOP Insignificant Barrier (Survey ID 90931)*

*W. Union Street AOP Insignificant Barrier (Survey ID 90930)*

*Roberts Street AOP Insignificant Barrier (Survey ID 90936)*

*Kirmar Ave AOP Minor Barrier (Survey ID 88271)*

Temperature Station 3: W. Kirmar Ave, S. Br. Newport Creek Trib., Alden, PA

2023 Water Temperature Average: 52.0 °F, Maximum: 83.2 °F, Minimum: 21.1 °F - The site is upstream of the confluence with Forge Creek. There are times when this channel is dry or stagnant water reflected by water temperatures mirroring air temperature. For example, see April 2023 temperatures on the chart in the Appendix.

South Branch Above Forge Creek 41.180772, -76.017219

Visited 7/26/2022: dry except some flow in channel above Forge Creek confluence (AMD?)

## Penobscot Trail

### Brook Trout Habitat

South Branch Along Kirmar 41.176854, -76.027972

Visited 7/26/2022: dry

Kirmar Ave AOP Insignificant Barrier (Survey ID 88274)

### Black Duck Habitat

E41168147604586 "Penobscot Trail Pond"

Location: 41.1682422, -76.0458348

0.25 acres pond in Newport Twp, Newport Creek Watershed South Branch Tributary

Evaluated: 10/14/2021 4:30:00 PM

Waterbody Class: PUBAB/s Chapter 93 use: CWF

Physical Parameters: Table 5-58

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	82.0	Sunny	Muddy	Brown	78.3
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	Scattered	N/A	Light Green

Water Flow: no flow

Land Use: 100% Other: Reclaimed AML

Chemical Parameters: Table 5-59

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
5.92	7.00	158.00	103.00	140.00	56.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
15.00	0.55	0.11	9.00	0.25	52.00

Flora: bullrush, sedge, spaddock

Fauna: frogs, black flies, blue damselfly; no aquatic macroinvertebrates found.

Other Observations: Poor habitat right in the middle of the Penobscot Bike Trail' ~6" mud in the pond.

Possible surface manifestation of the mine pool.

Water Elevation 759 ft Mine Pool: right on the edge of Wanamie South @ Elevation ~750 ft

RAMLIS Investigation: Ballfield East indirectly related to AMLF 29. See appendix for detail.

Photos: <https://drive.google.com/drive/folders/1VnnX5Vh1Tzj7v-6UWz5ORonRZHfa7KN3>



*Figure 5-50: E41168147604586 "Penobscot Trail Pond" looking east*



*Figure 5-51: E41168147604586 "Penobscot Trail Pond" looking at plant species in edge-water habitat*

## Forge Creek

### *Brook Trout Habitat*

Forge Creek Headwaters 41.164056, -76.013643

Visited 7/26/2022: dry at Railroad Street; Fairchild Pond posted with a trailcam at entrance; continued up Alden Mtn. Rd. to find creek feeding Fairchild Pond (no sample).

*Kirmar Parkway AOP No Barrier (Survey ID 88272)*

*Railroad Street AOP Severe Barrier (Survey ID 88428)*

*Alden Mountain Road (2<sup>nd</sup> Sharp Curve) AOP Moderate Barrier (Survey ID 90218)*

*Alden Mountain Road (3<sup>rd</sup> Sharp Curve) AOP Moderate Barrier (Survey ID 88427)*

### *Black Duck Habitat*

E41169087600940 "Fairchild Pond Deepwater Habitat"

*Location: 41.169083, -76.009401*

9.97 acre wetland in Newport Twp, Newport Creek Watershed Forge Creek Tributary

*Other Observations:.. Could not confirm habitat qualities due to uncooperative landowners. No photos.*

## Reservoir Creek

### Brook Trout Habitat

Temperature Station 2: Wanamie Tract Bridge, Reservoir Creek, Wanamie, PA

We could not relocate the probe in the field, but had data an earlier download of data from November 15, 2022 to April 15, 2023. The Water Temperature Average: 40.1 °F, Maximum: 66.0 °F, Minimum: 32.0 °F  
 - The site mid watershed on Reservoir Creek where the stream was recently redirected to mitigate flooding of houses downstream and keep the water from disappearing into a water loss point.

Reservoir Creek Headwaters 41.170176, -76.024416

Sampled 7/26/2022: Table 5-60

Temperature (F)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	TDS (mg/L)	pH (SU)	ORP (mV)	Flow (GPM)
66.2	8.26	72	40.1	7.09	161.3	29

Fish Survey (7/28/2022) showed a Habitat Score of 144 (not impaired), Fish Presence: Brook Trout. Summarized buy type: 1 Coldwater species.

Kirmar Ave AOP Insignificant Barrier (Survey ID 88273) – but stream was rerouted

Wanamie East Access Trail Bridge AOP Minor (Survey ID Barrier 88420)

Wanamie East Access Trail Bridge AOP Insignificant (Survey ID Barrier 88422)

### Black Duck Habitat

E41167077602486 "Reservoir Creek Beaver Dam (Former Wanamie Dam)"

Location: 41.166871, -76.024574

4.17 acre former Wanamie Dam in Newport Twp, Newport Creek Watershed South Branch Tributary

Evaluated: 5/10/2022 11:00:00 AM

Waterbody Class: PEMPO/b Chapter 93 use: CWF

Physical Parameters: Table 5-61

Weather	Ambient Temp.(F)	Past Weather	Water Clarity	Water Color	Water Temp (F)
Sunny	65.0	Sunny/Rain	Clear	Brown	49.5
Substrate Color	Surface Foam	Water Odor	Algae Abundance	Algae Growth	Algae Color
Brown	None	None	None	N/A	N/A

Water Flow: 200 gpm

Land Use: 90% Forest, 10% AML

Chemical Parameters: Table 5-62

Dissolved Oxygen (mg/L)	pH (SU)	ORP (mV)	Conductivity (uS/cm)	Turbidity (NTU)	TDS (mg/L)
8.42	6.91	80.00	30.00	4.00	16.00
Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Sulfates (mg/L)	Nitrates (mg/L)	Phosphates (mg/L)
25.00	0.20	N/A	0.00	0.08	0.20

Flora: mostly forested, wetland meadow

Fauna: big brown snake, garter snake, green frogs;

Aquatic Macroinvertebrates: Table 5-63

Total Macros	EPT Macros	% EPT Macros	Number of Taxa
58	5	9%	6

*Other Observations: Excellent habitat, possible area for volunteer beaver activity/black duck nesting*  
*Water Elevation 894 ft*

*Mine Pool: None, just outside coal measures. Closest is Wanamie South @ Elevation ~750 ft*

*Photos: [https://drive.google.com/drive/folders/16HBjvcc\\_L0trJdquV2bmVhDAYGsoy4zT](https://drive.google.com/drive/folders/16HBjvcc_L0trJdquV2bmVhDAYGsoy4zT)*



*Figure 5-52: E41167077602486 "Reservoir Creek Beaver Dam (Former Wanamie Dam)" looking south*



Figure 5-53: E41167077602486 "Reservoir Creek Beaver Dam (Former Wanamie Dam)" looking southwest



Figure 5-54: E41167077602486 "Reservoir Creek Beaver Dam (Former Wanamie Dam)" looking southwest



Figure 5-55: E41167077602486 "Reservoir Creek Beaver Dam (Former Wanamie Dam)" looking at sampling location above beaver dam