

FINAL REPORT

AQUATIC RESOURCES OF THE

ALLEGHENY PORTAGE

RAILROAD

NATIONAL HISTORIC SITE



March 1997

Pennsylvania Cooperative Fish and Wildlife Research Unit

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Prepared by

**Dean E. Arnold, Michael B. Cole, Matthew J. Gray, Phong L. Trieu,
Rance S. Harmon, Richard M. Mitchell, Janet J. Pugh, and Ellyn J. DelCorso
Pennsylvania Cooperative Fish and Wildlife Research Unit
School of Forest Resources
The Pennsylvania State University
101 Merkle Building, University Park, PA 16802-1100
Phone 814-865-4511, FAX 814-863-4710
E-mail deal@psu.edu**

for

**U. S. National Park Service
Allegheny Portage Railroad National Historic Site
P. O. Box 189, Cresson, PA 16630
Brian Eick, Project Liaison**

**U. S. Custom House, Third Floor
200 Chestnut St., Philadelphia, PA 19106
John F. Karish, Regional Chief Scientist**

INTRODUCTION

Goal Statement: An accurate description of the water resources within Allegheny Portage Railroad National Historic Site (ALPO) is needed. The park goals are to establish baseline information on the water quality and aquatic biota of the streams that cross park boundaries, and develop a basic description of the hydrologic environment. Upon completion of this work, the park will decide if a water resource management plan and further research are required.

(Note: due to cost limitations, the present report does not address water quality factors other than temperature, conductivity, pH, alkalinity, turbidity, total suspended solids, and discharge at selected stations. Also, we did not examine standing water in the reservoirs and ponds on and next to park property either chemically or biologically. Chemical data on the reservoir water are supposedly collected by the Altoona Water Authority, but repeated calls to their offices yielded only a vague promise to "see if we have any data" and call back. We have received no response. We will make further efforts and provide the park with any information obtained.)

Description of Aquatic Resources: Most of the Summit Level Unit, and all of the Units comprising Inclines 6 through 10, fall within the watershed of Blair Gap Run. The extent of Blair Gap Run and tributaries within park boundaries has been estimated at about 18,000 linear feet. The total drop in altitude of Blair Gap Run from source to end of park property is about 1220 feet. Blair Gap Run and its tributaries supply municipal water to downstream communities via three reservoirs (not on park property). An alternate, local name for the stream is Fountain Inn Run, after a large stagecoach stop - hotel that stood near Gallitzin Spring in the early 20th century. Several other small intermittent springs and seeps occur at the Summit Level unit and the Staple Bend Tunnel unit. We initially identified the following distinct water segments for study. Later negotiations reduced the study to include only segments a, b, e, g, h, i, and j.

Blair Gap Run - two branches, joining just below Valley Forge Road; other tributaries joining as noted below.

- a). The northern (main) branch goes up the gap to two reservoirs and Summit Level.
- b). The southern branch travels through grasslands and a former fish pond / recreation area; its sources are outside the park, south of the former PRR Muleshoe Line.
- c). Plane Nine (Hollidaysburg) Reservoir, east of Mule Shoe Curve along Rt. 22.
- d). Blair Gap Reservoir, between road lanes upper part of Blair Gap, has small tributary from north.

- e). Tributary from south, crosses field behind staff houses south of Foot of Ten, two branches. Passes under abandoned PRR Muleshoe Line in stone culvert. (May be locally known as "Dry Run")
- f). Gallitzin Spring, roadside near head of Blair Gap.
- g). Small tributaries north and south of Skew Arch Bridge. Apparently polluted by acid mine drainage, but not very acidic.
- h). Small pond/wetland area near western boundary of Summit Level unit.
- i). Small tributaries from north above Muleshoe Curve.
- j). Adams Run and Blair Run - enter Muleshoe Reservoir (outside park) and flow as combined outlet stream (name should be one of above but not certain) to join Blair Gap Run just below Muleshoe Curve. Bed and flow of this combined stream are about equal to that of Blair Gap Run at their confluence.
- k). Tributary to Little Conemaugh River flowing across APRR right-of-way at west end of Staple Bend Tunnel. Probably has been polluted by acid mine drainage in the past if not now.
- l). Three small streams crossing APRR roadbed east of Staple Bend Tunnel. All appear mildly polluted by acid mine drainage from strip mine on top of hill.

STUDY SITES

Within the sites mentioned above, we established seven stations for sampling water, sampling macroinvertebrates, and measuring flow. We collected only water samples at a few additional sites. The stations (shown in Figure 1) were:

1. Blair Gap Run across Route 22 from Lemon House ("a" above)
2. Blair Gap Run below Skew Arch Bridge ("a" above)
3. Blair Gap Run below Muleshoe Bridge ("a" above)
4. Adams/Blair Run below Muleshoe Reservoir ("j" above)
5. Tributary below Foot of Ten ("e" above)
6. Picnic area above Foot of Ten ("b" above)
7. Stream west of Staple Bend Tunnel ("k" above)

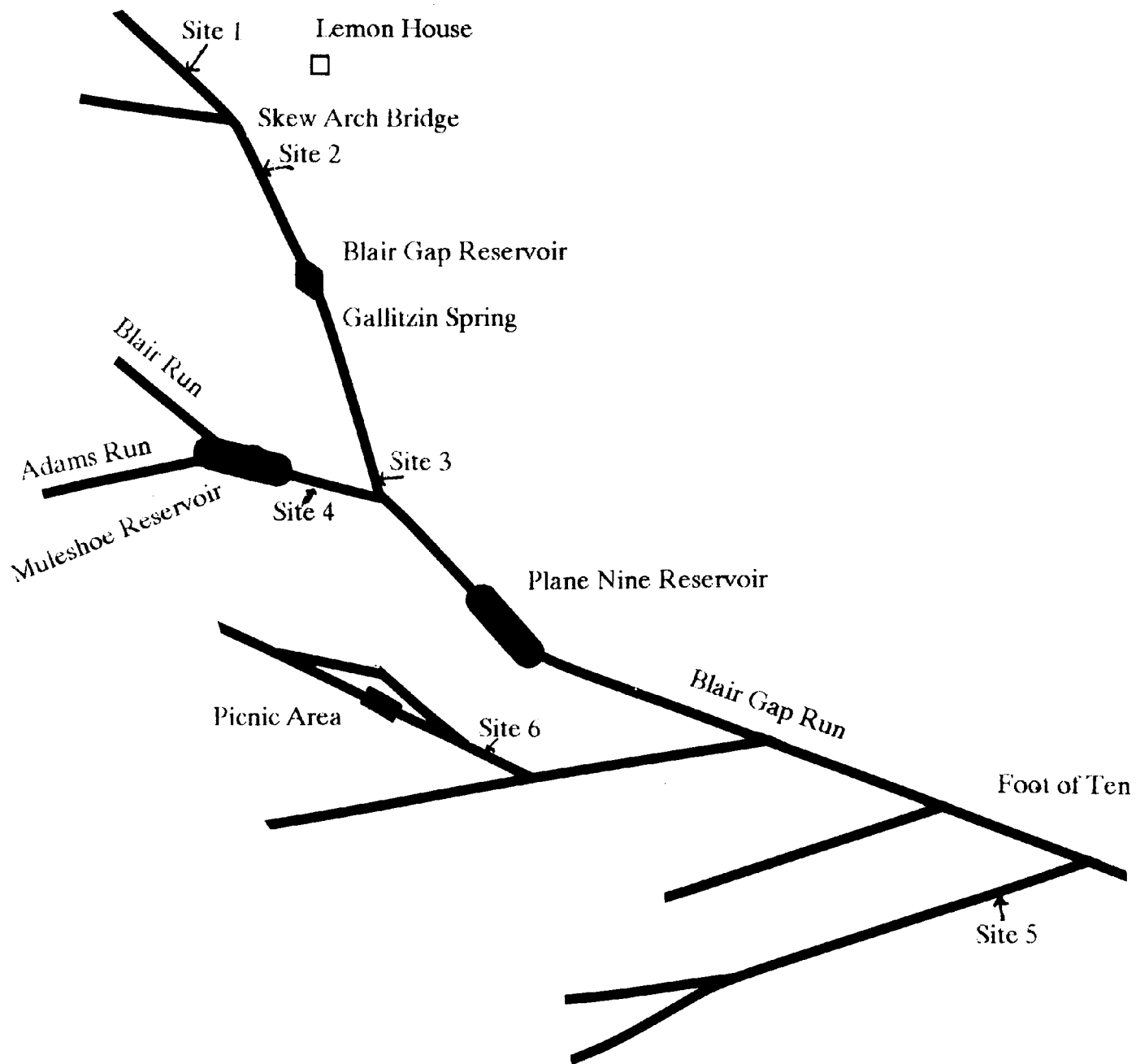


Figure 1. Schematic map of Blair Gap Run and tributaries, showing aquatic resource sampling stations.

METHODS

We made various field collections on six dates: May 15, May 23, June 10, July 12, and September 18, 1996, and March 7, 1997. We usually concentrated on one type of sampling (water and flow, macroinvertebrates, and/or fishes) on a given day. We made discharge measurements at five stations by stretching a measuring tape across the stream and, at 10 or more locations across the stream, measuring depth and velocity. The velocity was measured at 0.6 of the depth with a Marsh-McBirney electrophysical current meter, following the standard U. S. Geological Survey protocol (Buchanan and Somers 1969).

Water samples were collected in acid-rinsed polyethylene bottles, rinsed three times with the sampled water, filled and capped underwater to exclude air. We transported the water samples to the laboratory on ice, and analyzed them within 24 hours. Analytical methods were generally those given in the 18th edition of "Standard Methods" (A.P.H.A. 1992). Only conductivity was measured in the field, although instrument failure prevented readings at some sites. Alkalinity was measured using the double end point method.

We collected macroinvertebrates by a modified Surber sampler that enclosed approximately 0.1 m². The sampler was equipped with Nytex mesh with 270-micron openings. These dimensions are larger and smaller, respectively, than those of the standard commercial version of the Surber sampler. The modified version collects more organisms and more of the smaller organisms and life stages, giving a better assessment of macroinvertebrate diversity. Five samples were collected at each site. In the field, we washed samples from the nets into plastic or glass jars and preserved them in formalin-alcohol-water mixture. In the laboratory, the samples were washed in a 250-micron mesh screen and the insects were removed from the remaining debris under a dissecting microscope. Clean insect samples were preserved in 90% ethyl alcohol and identified to genus under dissecting microscopes. Diptera of the family Chironomidae (midges) were identified by mounting head capsules on microscope slides and examining them under a compound microscope. References used for identification included Ferrington (1987), Peckarsky et al. (1990), Stewart and Stark (1993), Merritt and Cummins (1996), Wiggins (1996), and others.

We entered the data from the sorted and identified macroinvertebrate samples into Excel spreadsheets, and calculated several statistics and biological indices to describe the community structure and condition at each site. Certain indices commonly used by aquatic biologists were calculated as described in Plafkin et al. (1989). Explanations of these metrics follow:

Number of Samples is the number of individual Surber samples retrieved and cleaned of all macroinvertebrates at the named site on the named date.

Mean Organisms / Sample is the total of all organisms from all the samples at the named site at the named time, divided by the number of baskets.

Mean Taxa / Sample is the total number of taxa (kinds of organisms) found in all the samples retrieved and cleaned at the named site on the named date, divided by the number of samples. Usually, "taxa" here means "genera," since the aquatic insect larvae are the most abundant animals in the samples, and they are identified to genus. A few insects are identified only to family, and some other invertebrates only to order; in those cases "taxa" implies those levels. Thus, a list of the taxa counted (see attached tables) might include some genera, some families, and some orders, but the three levels would not overlap.

Maximum organisms / sample is the largest total number of organisms of all kinds found in an individual sample at the named place and date.

Minimum organisms / sample is the smallest total number of organisms of all kinds found in an individual sample at the named place and date.

Combined Total Organisms equals the total counts of individual organisms, added from all samples at the named site on the named date.

Combined Total Taxa equals the total number of different taxa (kinds) of organisms found in all the samples at the named site on the named date.

Dominant Taxon is the one genus (or other group) that is most numerous among all the organisms collected from all the rock baskets recovered at the named site on the named date.

Percent Dominant Taxon is the number of individuals of the dominant taxon (above) divided by the combined total organisms, expressed as a percentage.

Total EPT is the total number of organisms belonging to the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) which are present in the combined total organisms of each group of samples. This is not to be confused with the EPA's "EPT Index" (Plafkin *et al.*, 1989), which reflects the number present in a random sample of 100 organisms from the total.

Percent EPT equals the portion of the combined total organisms in each group of samples (same time, same site) which belong to the three orders Ephemeroptera, Plecoptera, and Trichoptera, expressed as a per cent.

Total Chironomidae equals the number of individual organisms from the family Chironomidae (midges) of the order Diptera (true flies) that are present in the combined total organisms or each group of samples.

Percent Chironomidae equals the portion of the combined total organisms in each group of samples (same time, same site) which belong to the family Chironomidae, expressed as a per cent.

EPT/Chironomidae Ratio equals the *Total EPT* value divided by the *Total Chironomidae* value. The EPT/Chironomidae abundance ratio uses relative abundance of these indicator groups as a measure of community balance. Good biotic condition is reflected in communities having a fairly even distribution among all four major groups, and with substantial representation in the sensitive groups Ephemeroptera, Plecoptera, and Trichoptera. Skewed populations having mostly the generally tolerant Chironomidae, compared with the more sensitive insect groups, may suggest environmental stress (Plafkin et al. 1989). Chironomids tend to become increasingly dominant in terms of percent taxonomic composition and relative abundance along a gradient of increasing enrichment or heavy metals concentration (Ferrington 1987).

HFBI (family level) represents the Hilsenhoff Biotic Index (Hilsenhoff, 1987, 1988) for the family level as calculated by the formula:

$$HFBI = \frac{\sum (x_i t_i)}{n}$$

where

x_i = the number of individuals within a given family that are found in a given sample

t_i = the tolerance level of that family according to Appendix C of Plafkin et al. (1989) and Hilsenhoff (1988).

n = the total number of organisms in the sample

The tolerance values given by the Hilsenhoff Family Biotic Index range from 0 to 10, increasing as water quality decreases. Although this index was originally developed to measure the impact of organic pollution, it appears to have some value in situations where the pollution is primarily inorganic. Although it probably should not be used to compare different systems, it appears to have value for showing differences within systems such as the Blair Gap Run watershed, especially from one sampling date to another.

Fish were collected from a 100-meter stretch of stream at five stations, using three passes with a backpack electrofishing unit. This enabled us to make population estimates using the Zippin (1958) method. We counted, identified, and measured the fish, and held them in cages until sampling was completed, then released them near their point of capture. We used a light dose of MS-222 (Tricaine methanesulfonate) to anaesthetize fish to prevent injury during handling. Fish identification followed Cooper (1983). We plotted length-frequency data for brook trout (*Salvelinus fontinalis*) and blacknose dace (*Rhinichthys atratulus*), which were the only fish species abundant enough for population analysis.

PHYSICAL / CHEMICAL FACTORS

The limited water analyses done during this study suggested no unusual or undesirable water quality problems in the main waterway, Blair Gap Run, or its tributaries. This agreed with visual impressions except in the gorge just below the Skew Arch Bridge. Above this location there are several areas of the ground surface that have the appearance of old coal spoil dumps. Surface runoff from these areas is small, but there are some groundwater inflows to the stream below, at which point the bottom shows the characteristic red-orange color of ferric hydroxide, usually associated with acid mine drainage. Just below these flows, water samples had normal pH and alkalinity values (Table 1, Stations 2 & 2B). The most likely explanation for this is that weakly acidic water from the coal waste has been neutralized by limestone in the native rock or the road fill before it enters the open stream. However, the iron released by the same acid-forming reaction probably remains suspended in the flowing groundwater as the soluble ferrous form until it reaches the open air, is oxidized, and then precipitates to form the visible coating. The precipitate area extends only a few feet downstream. Most of the iron-bearing water comes from a 10-12" corrugated culvert that enters from the right bank of the stream. The origin of this culvert is unknown.

Another possible source of minor acid and metal pollution could be an abandoned coal mine that shows as an entry symbol (Y) on older USGS topographic maps just south of the former U. S. Route 22, opposite the service road near Skew Arch Bridge. The land on this side of the road was or is owned by Bethlehem Steel Corporation, who have long been actively involved in coal mining throughout the region. Although we detected no surface evidence of the mine other than scattered coal waste, such a mine, even if sealed and filled in at the entrance, could easily be a source of acidic, iron-laden ground water. In any case, our water samples indicate that any adverse effects of the acid and iron are soon lost by dilution in the otherwise good quality water coming down Blair Gap Run.

At the Staple Bend Tunnel Unit, active surface coal mining is in progress across the top of the hill around which the right-of-way and the tunnel pass. Several small streams east of the tunnel, and one larger one west of it, drain the hilltop and would be expected to carry acid mine drainage. At the points where they cross park property, none of these streams had obvious signs of ferric hydroxide precipitate, although they did appear "sterile" to the eye, as acidic streams often do. Water samples showed that the western stream was not significantly acidic but that at least one small stream crossing the access right-of way had typical qualities of mine drainage (pH 3.79, alkalinity 0) (Table 1). Since these small streams traverse only a small distance on park property and flow directly to the polluted Little Conemaugh River, they should be of little management concern at this time. If the right-of-way is improved for access to the Tunnel, they should be routed through nonmetallic culverts.

Table 1. Chemical analyses of water samples, and measured discharge at selected stations, at the Allegheny Portage Railroad National Historic Site, summer 1996, winter 1997. (BGR = Blair Gap Run) (20 ueq/l carbonate alkalinity in equivalence units = 1 mg/l or 1 ppm)

Station Number	Location Description	Collection Date	Conductivity uS/cm	pH units	Alkalinity ueq/l CaCO ₃	Discharge m ³ /sec
1	BGR opposite Lemon House	15 May 96	112	6.35	104	
"	" "	23 May 96		6.83	262	0.026
"	" "	10 June 96		4.88	-5	
"	" "	7 Mar. 97	377	5.99	186	
2A	Culvert discharge below Skew Arch	7 Mar. 97	414	6.47	888	
2B	BGR in gorge below Skew Arch Bridge	15 May 96		6.66	918	
"	" "	23 May 96		7.05	473	
"	" "	7 Mar. 97	265	6.38	252	0.104
3	BGR below Mule-shoe Underpass	15 May 96	120	6.65	233	
"	" "	23 May 96		7.04	321	0.184
"	" "	10 June 96		6.95	332	
"	" "	7 Mar. 97	141	6.29	244	0.616
4	Combined outlets of Muleshoe Reservoir	15 May 96	48	6.28	83	
"	" "	23 May 96		6.48	72	
"	" "	10 June 96		6.62	99	
"	" "	7 Mar. 97	38	5.92	94	1.135

Station Number	Location Description	Collection Date	Conductivity uS/cm	pH units	Alkalinity ueq/l CaCO ₃	Discharge m ³ /sec
5	Trib. from South below Foot of Ten	15 May 96		6.48	157	0.064
"	" "	23 May 96		6.39	127	
"	" "	7 Mar. 97	75	6.18	148	0.62
6	Tributary at Picnic Area - Foot of Ten	15 May 96		6.08	71	
"	" "	23 May 96		6.41	187	0.0003
"	" "	7 Mar. 97	43	6.06	114	0.232
7	Stream west of Staple Bend Tunnel	15 May 96		6.18	113	
"	" "	23 May 96		6.48	135	
"	" "	18 Sept 96	166			
none	2nd stream east of Staple Bend Tunnel	15 May 96		3.79	0	
none	BGR - culvert under South lane of Rt..22	15 May 96		6.60	295	
none	Marshy tributary from south , crossing picnic area access	15 May 96		6.53	265	

Table 2: Additional factors measured on March 1997 samples (earlier samples for these analyses were inadvertently discarded)

Station Number	Location Description	Collection Date	Turbidity N.T.U.	Total Suspended Solids (mg/l)	Lab Conductivity uS/cm
1	BGR opposite Lemon House	7 Mar 97	1.4	0.009	350
2A	Culvert discharge below Skew Arch	"	8.2	0.010	383
2B	BGR in gorge below Skew Arch Bridge	"	3.2	0.002	243
3	BGR below Mule shoe Underpass	"	3.4	0.001	139
4	Combined outlets of Muleshoe Reservoir	"	1.1	0.000	35
5	Trib. from South below Foot of Ten	"	3.5	0.003	73
6	Tributary at Picnic Area- Foot of Ten	"	2.6	0.003	55

The general impression of moderate productivity and acceptable water quality given by the water analyses (Table 1) was confirmed by the biological results following. An additional round of samples at all stations will be collected in June 1997, analyzed for all the constituents listed in both tables above, and the results furnished as an addendum to this report.

STREAM MACROINVERTEBRATE COMMUNITIES

Abundance and diversity of macroinvertebrates generally reflected the nutrient and habitat conditions seen at the sampling points. In the following sections, the calculated metrics are listed and discussed for each site. Complete sample data are presented in Appendix I.

Site 1: Across Route 22 from the Lemon House

No. of samples - 5
Mean no. of organisms - 79.5
Mean no. of taxa - 11.4
Maximum organisms - 127
Minimum organisms - 23
Total organisms - 398
Combined total taxa - 28

Dominant taxon - Orthocladinae
Percent dominant taxon - 32.66
Hilsenhoff FBI - 3.27
Total EPT - 242
Percent EPT - 60.8
Total Chironomidae - 146
Percent Chironomidae - 36.68
EPT/Chironomidae ratio - 1.66

This site is somewhat degraded by erosion of the surface upgrade from the stream. This area south of Route 22 appears to have once been a coal loading facility or waste dump. The stream is also quite small at this point, although there is some diversity of substrate. Although the Orthocladinae midges are the dominant taxon, they are closely followed by the stoneflies *Leuctra* and *Amphinemura*. The presence of these common stoneflies reflects the swiftly running water at the site, and implies a lack of any serious pollution.

Site 2: Blair Gap Run Below the Skew Bridge

No. of samples - 5
Mean no. of organisms - 52.4
Mean no. of taxa - 7.4
Maximum organisms - 86
Minimum organisms - 10
Total organisms - 262
Combined total taxa - 16

Dominant taxon - Orthocladinae
Percent dominant taxon - 63.4%
Hilsenhoff FBI - 4.26
Total EPT - 92
Percent EPT - 35.7
Total Chironomidae - 166
Percent Chironomidae - 64.3
EPT/Chironomidae ratio - 0.55

Here we see several changes in the macroinvertebrate community. Diversity has decreased, with both the number of organisms and of taxa significantly lower than at Site 1. The Orthocladinae midges are still the dominant taxon, and their proportion of total taxa here is much higher. All the "quality" indices given have moved toward the disturbed end of their scales. This is probably due to several factors including the iron-laden coal drainage mentioned above, lack of light in the forested gully here, road salt runoff, etc.

Site 3: Blair Gap Run Below Muleshoe Bridge

No. of samples - 5	Dominant taxon - Orthocladinae
Mean no. of organisms - 174.2	Percent dominant taxon - 29.5
Mean no. of taxa - 23.6	Hilsenhoff FBI - 4.27
Maximum organisms - 312	Total EPT - 434
Minimum organisms - 105	Percent EPT - 49.8
Total organisms - 871	Total Chironomidae - 406
Combined total taxa - 37	Percent Chironomidae - 46.6
	EPT/Chironomidae ratio - 1.07

Some recovery in stream conditions is noted here; the Orthoclad midges are still the dominant taxon, but the second most abundant taxon is now the mayfly *Baetis* - more or less a "clean stream" indicator organism. Overall abundance and diversity of organisms have rebounded, and the indices are more indicative of favorable conditions.

Site 4: Tributary below the Muleshoe Reservoir

No. of samples - 5	Dominant taxon - Orthocladinae
Mean no. of organisms - 304.8	Percent dominant taxon - 23.3
Mean no. of taxa - 28.2	Hilsenhoff FBI - 4.41
Maximum organisms - 375	Total EPT - 526
Minimum organisms - 217	Percent EPT - 34.5
Total organisms - 1524	Total Chironomidae - 891
Combined total taxa - 50	Percent Chironomidae - 58.5
	EPT/Chironomidae ratio - 0.59

The stream here is about the same size as Blair Gap Run at the confluence just below the site. Habitat is diverse, and a variety of substrate sizes from sand to large cobbles. The quality indices reflect this favorable habitat with good water quality. Although Chironomid midges are still the most abundant group, the number of mayfly and stonefly taxa is higher here than at any of the upstream stations. We observed trout fishermen at play during our sampling; these data indicate that their efforts were directed at the right place.

Site 5: Tributary Below Foot of Ten

No. of samples - 5	Dominant taxon - Orthocladinae
Mean no. of organisms - 153.6	Percent dominant taxon - 17.5
Mean no. of taxa - 29	Hilsenhoff FBI - 3.44
Maximum organisms - 236	Total EPT - 436
Minimum organisms - 79	Percent EPT - 56.8
Total organisms - 768	Total Chironomidae - 246
Combined total taxa - 51	Percent Chironomidae - 32.0
	EPT/Chironomidae ratio - 1.77

This tributary is smaller, has a lower gradient, and probably has greater temperature fluctuations than the above stations. Although the Orthocladinae are still the dominant taxon, their percent of the community is down to 17.5, reflecting the greater number of other abundant taxa. In particular, the Ephemerellid mayflies are abundant at this site, and the EPT/Chironomidae ratio is well above 1, indicating improved conditions for the primary food processors of the stream.

Site 6: Picnic Area Above Foot of Ten

No. of samples - 5	Dominant taxon - <i>Paraleptophlebia</i>
Mean no. of organisms - 367.8	Percent dominant taxon - 66.3
Mean no. of taxa - 17.6	Hilsenhoff FBI - 2.24
Maximum organisms - 653	Total EPT - 1700
Minimum organisms - 173	Percent EPT - 92.4
Total organisms - 1839	Total Chironomidae - 111
Combined total taxa - 29	Percent Chironomidae - 6.0
	EPT/Chironomidae ratio - 15.32

The sample here was collected in the "through" tributary channel, not the side channel which includes a small artificial pond. Although the tributary here has some gradient and substrate characteristics of Blair Gap Run at the lower sites, the productivity seems greater. Also, the community has shifted in composition so that, unlike the other stations, a mayfly is the dominant taxon, rather than a Chironomid midge. This is reflected in the very high EPT/Chironomidae ratio and percent EPT. The other indices are not particularly different from the other stations. This change is probably due to a larger and more diverse pool of nutrients entering the tributary in its upper reaches than are available in the rocky, restricted watershed of Blair Gap Run.

Site 7: Stream at West End of Staple Bend Tunnel

No. of samples - 5	Dominant taxon - <i>Leuctra</i>
Mean no. of organisms - 92.4	Percent dominant taxon - 32.5
Mean no. of taxa - 8.6	Hilsenhoff FBI - 1.72
Maximum organisms - 165	Total EPT - 433
Minimum organisms - 46	Percent EPT - 93.7
Total organisms - 462	Total Chironomidae - 26
Combined total taxa - 16	Percent Chironomidae - 5.63
	EPT/Chironomidae ratio - 16.65

This stream is quite different from Blair Gap Run and its tributaries. It has the appearance of having once been a mine drainage carrier, although it does not seem to be so now. The lower part of the stream is shaded by a thick growth of knotweed, a pest plant in the area. Further up, it traverses a semi-open forest. No farm fields or other nutrient sources were observed, and no fish were found in this stream. However, the water is quite pure, and seems to promote the presence of certain mayflies and stoneflies while other taxa are depressed. The low Hilsenhoff index suggests good water quality, as does the high EPT percent. There appears to be adequate food for fish, if they were present. If all fish have been removed from the stream by former mine drainage or other influences, there would be no natural source for colonization. (The stream flows directly and steeply into the Little Conemaugh River, which is inhospitable to sport fish.) This stream might be a good candidate for an experimental stocking.

FISH COMMUNITIES

We determined fish abundance and diversity at three stations and confirmed their presence at a fourth. We did not collect scales to analyze growth rates, nor determine other common fishery indices except length-frequency, due to lack of time and funds. Most of Blair Gap Run and its tributaries have potential for recreational fishing, although most of the sport fish we collected were sublegal brook trout. The following results represent the fish present in a section of stream 100 meters long at each site.

Site 2: Blair Gap Run Below Skew Arch Bridge

Species	Number Collected	Population Estimate	Mean Length (mm)
Brook trout	14	n/a	92.1

Brook Trout Length Frequency - Station 2

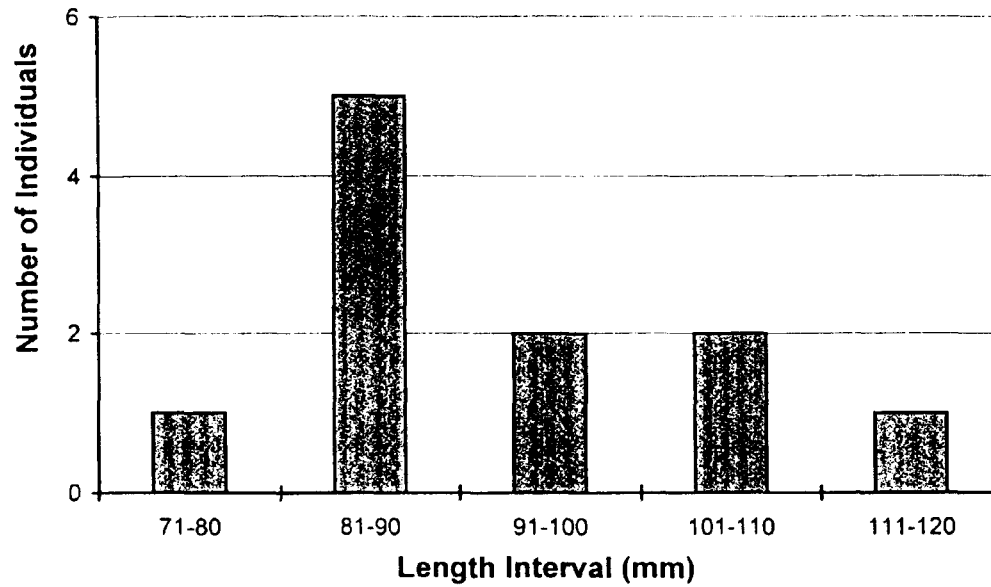


Figure 2: Length-frequency distribution of brook trout at Site 2. The population at this site appears to be dominated by young-of-the-year fish, most of which probably move downstream as they grow larger.

Site 3: Blair Gap Run Below Muleshoe Bridge

<u>Species</u>	<u>Number Collected</u>	<u>Population Estimate</u>	<u>Mean Length (mm)</u>
Brook trout	46	51	113.5
Brown trout	9	10	111.9
White sucker	10	13	135.2
Slimy sculpin	48	n/a	75.6
Longnose dace	1	n/a	98.0

Brook Trout Length Frequency - Station 3

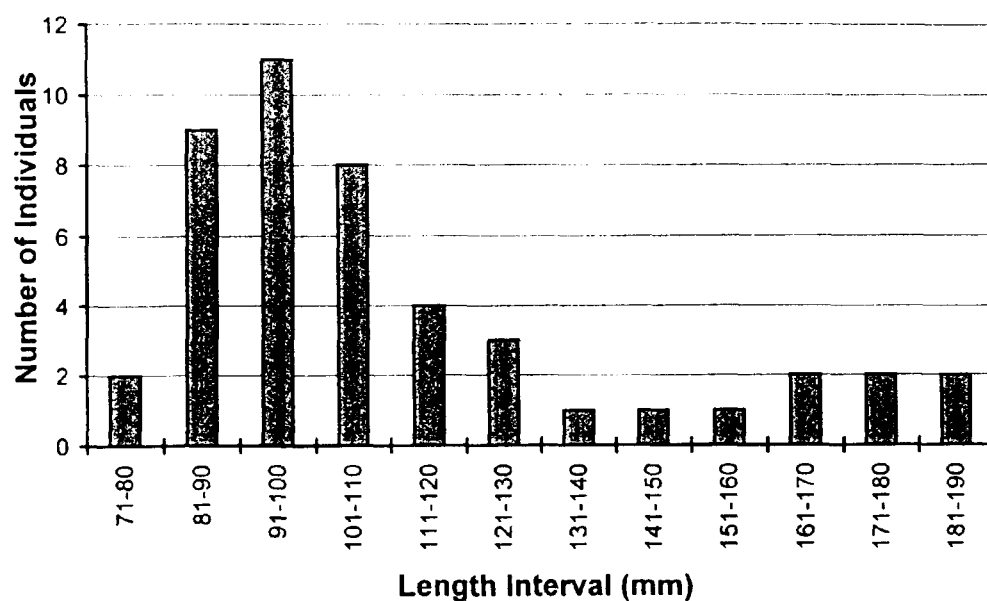


Figure 3: Length-frequency distribution of brook trout from Site 3. There is evidence of at least two year classes and satisfactory reproduction. Some of the larger fish may be survivors of stocking in the spring.

Site 4: Tributary from Muleshoe Reservoir

<u>Species</u>	<u>Number Collected</u>	<u>Population Estimate</u>	<u>Mean Length (mm)</u>
Brook trout	32	44	75.8
Brown trout	1	n/a	115.0
White sucker	9	12	129.4
Slimy sculpin	15	20	72.0
Longnose dace	9	10	90.2
Blacknose dace	11	11	59.2

also collected: 1 salamander, 1 crayfish

Black nose Dace Length Frequency - Station 4

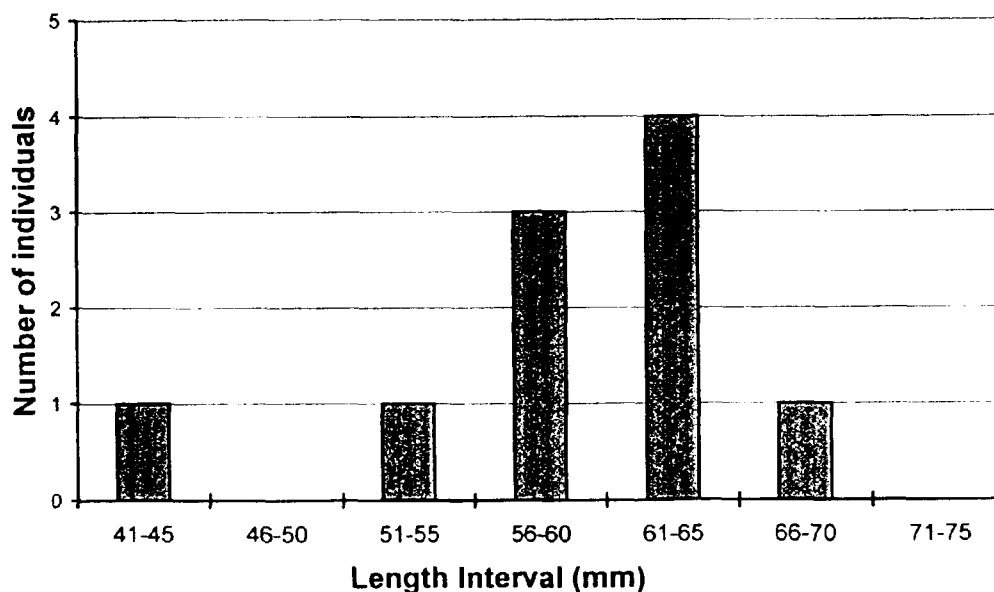
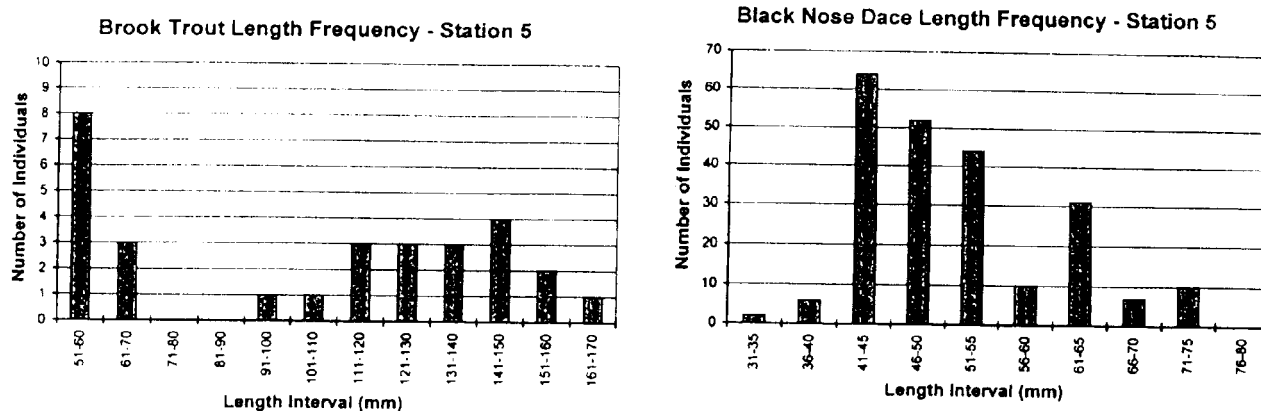


Figure 4: Length-frequency distribution for blacknose dace at Site 4. Since the bulk of the population are adults (or young-of-the-year were not collected proportionally), year-classes cannot be distinguished. However, reproduction is apparently successful.

Site 6: Picnic Area Above Foot of Ten

<u>Species</u>	<u>Number Collected</u>	<u>Population Estimate</u>	<u>Mean Length (mm)</u>
Brook trout	29	30	100.8
Brown trout	1	n/a	370
Longnose dace	6	n/a	78.5
Blacknose dace	235	250	53.9



Figures 5 and 6: Length frequency of brook trout and blacknose dace at station 6. At least two age classes of brook trout, including young-of-the-year, are present. The distribution for blacknose dace suggests at least two year classes, with very strong 1996 reproduction.

HISTORICAL INFORMATION

Several sources of historical information on the aquatic resources were investigated. As mentioned above, the Altoona Water Authority proved unhelpful, but we may yet be able to inspect what records they have. Originally, the Muleshoe Reservoir was owned and operated by the Borough of Hollidaysburg, but operation is now done by Altoona. The Blair Gap, Plane Nine, and Muleshoe Reservoirs all have effects on the quality and quantity of water in Blair Gap Run. The sampling points we chose should show the net effect of the reservoirs as a whole.

The central office of the Bureau of Fisheries, Pennsylvania Fish and Boat Commission, maintains a statewide stream file at its offices in Pleasant Gap. Both Blair Gap Run and Blair Run (generally above Muleshoe Reservoir, not on park lands) have folders in this file. The most recent survey of Blair Gap Run was done in December 1978. It extended beyond park property, from Muleshoe Reservoir downstream to the railroad crossing 0.6 km from the mouth, a distance of 8.5 km (5.3 miles). This is the area currently approved for stocking (1997). At a station ("A") 1.0 km downstream of the LR 07043 bridge, the pH was 7.1, alkalinity 16 mg/l (= 320 ueq/l as in Table 1) and conductivity 95 uS/cm. At another station ("B") at the railroad crossing 0.6 km above the mouth, pH was 8.2, alkalinity 26 mg/l (= 520 ueq/l), and conductivity 120. The increase from A to B reflects the increasing urbanization as the stream enters Duncansville. The larger, slower nature of the stream in this area is reflected in the increased number of fish taxa collected as listed below.

Fish Collected in December 1978 Survey by Pennsylvania Fish Commission staff:

at Station "A"

brown trout (*Salmo trutta*)
brook trout (*Salvelinus fontinalis*)
central stoneroller (*Campostoma anomalum*)
cutlips minnow (*Exoglossum maxilllingua*)
blacknose dace (*Rhinichthys atratulus*)
longnose dace (*Rhinichthys cataractae*)
creek chub (*Semotilus atromaculatus*)
white sucker (*Catostomus commersoni*)
northern hog sucker (*Hypentelium nigricans*)
brown bullhead (*Ictalurus nebulosus*)
margined madtom (*Noturus insignis*)
tessellated darter (*Etheostoma olmstedii*)

at Station "B"

central stoneroller (*C. anomalum*)
cutlips minnow (*E. maxilllingua*)
blacknose dace (*R. atratulus*)
longnose dace (*R. cataractae*)
creek chub (*S. atromaculatus*)
white sucker (*C. commersoni*)
rock bass (*Ambloplites rupestris*)

(note that trout and other fish associated with clean, cool water were not present in this lower section. but the warm water rock bass has joined the list)

Macroinvertebrate Families Collected in December 1978 Survey by Pennsylvania Fish Commission staff: (* = only present at one station)

at Station "A"

Ephemeroptera (mayflies):
 Ephemerellidae
 Heptageniidae
 Leptophlebiidae
Plecoptera (stoneflies):
 Nemouridae
 Peltoperlidae *
 Perlidae
Coleoptera (beetles):
 Psphenidae
Trichoptera (caddisflies):
 Hydropsychidae
 Lepidostomatidae *
 Philopotamidae *
Diptera (true flies):
 Chironomidae
 Simuliidae
 Rhagionidae

at Station "B"

Ephemeroptera (mayflies):
 Ephemerellidae
 Heptageniidae
 Leptophlebiidae
 Baetidae *
 Siphonuridae *
Plecoptera (stoneflies):
 Nemouridae
 Perlidae
Coleoptera (beetles):
 Psphenidae
 Dytiscidae *
Trichoptera (caddisflies):
 Hydropsychidae
 Rhyacophilidae *
Diptera (true flies):
 Chironomidae
 Simuliidae
 Rhagionidae

In addition, Cambaridae (crayfish), Asellidae (isopods), and Gastropoda (snails) were listed from Station "B", but not "A".

There were some additional historical events of interest in the Pleasant Gap files, although actual data were not present.

- 1931: "Blair Creek [?] contains trout and suckers"
- 1935: Muleshoe Reservoir belonged to (built by?) Pennsylvania Railroad
- 1944: Fish Commission did survey to plan stocking. Plane Nine Reservoir owned by Blair Gap Water Company.
- 1945: Brook trout (1,900) were stocked.
- 1984: Fish kill on Muleshoe (Hollidaysburg) Reservoir after treatment with copper sulfate (probably for weed control), "warning issued." At that time it was stated that Hollidaysburg owned the Muleshoe Reservoir and Altoona owned the Blair Gap Reservoir and "4,000 feet downstream."

Several other fish kills have occurred due to problems at the Duncansville reservoir and sewage treatment plant, both of which discharge into Blair Gap Run below the park boundary.

The Fish and Boat Commission's Area Manager office had no records beyond those mentioned above. However, the Regional Water Pollution Biologist for the Pennsylvania Department of Environmental Protection has records from an August, 1970 investigation of a fish kill due to weed control (copper sulfate) overdose at the Plane Nine Reservoir, as follows:

Water Chemistry at Plane Nine Reservoir on August 24, 1970 (Pa. DEP)		
Measurement	at "Tumbling Hole" (pool at end of spillway)	in Plane Nine Reservoir
pH	7.4	7.8
alkalinity (mg/l)	26	24
Total iron (mg/l)	0.3	0.2
Sulfate (mg/l)	0	4
Manganese (mg/l)	0.03	na
Copper (mg/l)	0.2	0.12

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

Blair Gap Run is the dominant water resource on the Allegheny Portage Railroad National Historic Site. Its management is complicated by the presence of the Altoona Water Authority's three reservoirs and adjacent stream sections not on park land. However, the water quality and animal community are in good condition, and present no major problems. The small iron problem at the upper end is not serious, and probably does not justify major excavation to trace the water back through and beyond the culvert from which most of it flows. As development and beautification of the park setting proceeds, a low cost approach would be to spread relatively heavy doses (in consultation with a soil or turf specialist, probably available through the county Conservation District) of agricultural lime or limestone on the grassy areas on both sides of Old Route 22 in the Summit Level area. This would have some likelihood of raising the groundwater pH to reduce iron liberation, and in any case would be beneficial in developing sod on the rather poor ground now present. Probably the area on the south side of the road should receive an addition of topsoil and fertilizer besides the lime, and should be made smoother in the process. This would enhance the appearance and future use potential of the area.

Naturally protection of the stream from pollution and other abuse is an important management goal. So far as possible, ditches and banks should be constructed or maintained to prevent road runoff from entering the stream directly. The most acute problem seems to be in the Site 2 area above and below the Skew Arch Bridge. The erosion potential is great here due to the steep banks. A few check dams and swales on the eroded runoff channels now developing should make a big difference. Care should also be taken to protect and preserve, in an unobtrusive way, the springs and wetlands scattered through the Summit Level area.

The other major management need that we observed is the lack of good access to the stream throughout its length, especially to the most fishable portion - the Muleshoe Curve area. Lack of attention, and careless construction over the years have resulted in poor quality woodlands with very uneven ground surface, downed trees, heavy brush and vines, and a high level of trash. Construction of fisherman access trails (usable by hikers, of course) along and/or to the stream, from the Game Commission parking lot and the partly developed inclined plane area above the Muleshoe, would be possible by Youth Conservation Corps or similar groups. Similar groups might be invited to help with a general cleanup of the woods, although considerations of naturalness must be included. Sportsmen's groups such as Blair County Trout Unlimited are often willing to assist or take general responsibility for stream cleanup and improvement projects that involve trout populations (as in Blair Gap Run) and public visibility. Some cleanup and trail development in the woods below the Skew Arch Bridge might be a desirable, if lower-priority, later objective.

Management plans for the Staple Bend Tunnel unit seem to be still developing. It seems that public use will focus on access to the tunnel rather than use of the surrounding property. However, the stream at the west end of the tunnel has some recreational potential if access is developed. A longer-term water quality study, including nutrient levels, would be desirable before making any decision about trial stocking of fish. As mentioned above, the small tributaries, polluted with mild acid mine drainage, that cross the right-of-way northeast of the tunnel, are too small for any use. They should be routed through nonmetallic culverts (for long life under acidic conditions) the full width of the passageway. Trail development might include a small sign by each stream, cautioning that drinking the water is not recommended. (Acid mine drainage per se is not poisonous, but the high sulfate level makes it a good laxative! We do not know the bacteriological status of these streams.) Probably at some time all the surface waters on the park should be given a public health testing for drinkability. As the number of visitors increases, the chances of the stream water being ingested will certainly increase.

In general, the aquatic resources of the Allegheny Portage Railroad National Historic Site were found to be functioning well in an ecological sense. At this time, management should probably focus on protection, cleanup, and controlled public access.

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APPENDIX - INVERTEBRATE COLLECTION DATA

Across from Lemon House

Date 5/23/96

Surber

Site 1

Taxa	S1	S2	S3	S4	S5
EPHEMEROPTERA					
BAETIDAE					
<i>Baetis</i>					1
EPHEMERELLIDAE					
<i>Ephemerella</i>				1	
HEPTAGENIIDAE					
<i>Epeorus</i>	1	1	1		2
LEPTOPHLEBIIDAE					
<i>Paraleptophlebia</i>					
AMELETIDAE					
<i>Ameletus</i>	1	1	5		10
LEPTOPHLEBIIDAE					
<i>Paraleptophlebia</i>	1				
PLECOPTERA					
LEUCTRIDAE					
<i>Leuctra</i>	8	1	15	5	36
NEMOURIDAE					
<i>Amphinemura</i>	41	17	18	5	47
PERLODIDAE					
<i>Isoperla</i>			1		
PELTOPERLIDAE					1
<i>Peltoperla</i>	1				
PERLIDAE					
<i>Acro-neuria</i>			1		
CHLOROPERLIDAE	1				
<i>Sweltsa</i>		4	1		
<i>Haploperla</i>				1	2
TRICOPTERA					
HYDROPSYCHIDAE					
<i>Hydropsyche</i>					1
RHYACOPHILIDAE					
<i>Pupa</i>					2
<i>Rhyacophila</i>	2				1
POLYCENTROPODAE					
<i>Polycentropus</i>					1
UENOIDAE					
<i>Neophylax</i>	2				
LEPIDOSTOMATIDAE					
<i>Lepidostoma</i>			2		
COLEOPTERA					
PSEPHENIDAE					
<i>Psephenus</i>					1

Site 1

Taxa	S1	S2	S3	S4	S5
DIPTERA					
CHIRONOMIDAE					
<i>pupa</i>	1	3	9		2
ORTHOCLADIINAE	26	18	59	10	17
TANYTARSINI					1
SIMULIIDAE				1	
TIPULIDAE					
<i>Dicranota</i>			1		
EMPIDIDAE					
<i>Chelifera</i>			1		
CERATOPOGONIDAE					
<i>Bezzia</i>			1		1
BIVALVIA			1		
DECAPODA			1		
OLIGOCHAETA	1				1
	12	7	15	6	17
	86	45	117	23	127

Below Skew Bridge
Site 2

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
Ephemeroptera					
Baetidae					
<i>Baetis</i>	1				
Heptageniidae					
<i>Epeorus</i>	2	1		1	
Ameletidae					
<i>Ameletus</i>				1	
Plecoptera					
Leuctridae					
<i>Leuctra</i>	10	2	2	6	
Nemouridae					
<i>Amphinemura</i>	15	10	2	7	6
Peltoperlidae					
<i>Peltoperla</i>	1	1			
Chloroperlidae					
<i>Sweltsa</i>		2	2		2
<i>Haploperla</i>	5	2	1	4	
Capniidae					
<i>Paracapnia</i>	3				
Taeniopterygidae					
<i>Taeniopteryx</i>	1				
Tricoptera					
Hydropsychidae					
<i>Hydropsyche</i>					1
Lepidostomatidae					
<i>Lepidostoma</i>	1				
Coleoptera					
Curculionidae					
<i>Stenopelmus</i>		1			
Diptera					
adult		1			1
Chironomidae					
pupa				1	
Orthocladiinae	47	51	39	27	
Tanytarsini			1		
Hydrochnidia		1			
	10	10	6	7	4
	86	72	47	47	10

Below Muleshoe Bridge
Site 3

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
EPHEMEROPTERA					
BAETIDAE					
<i>Baetis</i>	6	10	23	15	7
<i>Acentrella</i>	3	4	13	2	
EPHEMERELLIDAE					
<i>Ephemerella</i>	2	1	4	2	1
<i>Drunella</i>		1	1		1
HEPTAGENIIDAE					
<i>Epeorus</i>	1	3	10	5	20
LEPTOPHLEBIIDAE					
<i>Paraleptophlebia</i>	2	3	1	2	2
AMELETIDAE					
<i>Ameletus</i>		5			
PLECOPTERA					
LEUCTRIDAE					
<i>Leuctra</i> Adult		1			
<i>Leuctra</i>	12	8	11	9	19
NEMOURIDAE					
<i>Amphinemura</i>	1	5	18	1	8
PERLODIDAE			6		
<i>Isoperla</i>		4			4
PELTOPERLIDAE		6	18	2	2
CHLOROPERLIDAE					
<i>Sweltsa</i>		1	6	2	
<i>Haploperla</i>	3	3	4		3
CAPNIIDAE					
<i>Paracapnia</i>			4		
TAENIOPTERYGIDAE					
<i>Taeniopteryx</i>	6	6	37		6
TRICOPTERA					
HYDROPSYCHIDAE					
<i>Hydropsyche</i>	1	3	1		2
<i>Diplectrona</i>	2	4	2		
<i>Cheumatopsyche</i>					1
RHYACOPHILIDAE					
<i>Rhyacophila</i>	3		3	2	
POLYCENTROPODAE					
<i>Polycentropus</i>	1	1		1	11
UENOIDAE					
<i>Neophylax</i>			1		1
LEPIDOSTOMATIDAE					
<i>Lepidostoma</i>	1		6		
PHILOPOTAMIDAE					
<i>Dolophilodes</i>			7	1	

Below Muleshoe Bridge
Site 3

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
GLOSSOMATIDAE					
<i>Agapetus</i>		1	1	1	
<i>Glossosoma</i>			1		
COLEOPTERA					
ELMIDAE					
<i>Optioservus</i>		3			
<i>Oulimnius</i>	4				
DIPTERA					
adult	1				1
CHIRONOMIDAE					
pupa	9	6	6	4	2
ORTHOCLADIINAE	36	36	87	61	37
TANYPODINAE	1	2		4	3
TANYTARSINI	7	11	17	9	9
CHIRONOMINI	3	21	22		13
SIMULIIDAE					
<i>Simulium</i>				7	
<i>Prosimulium</i>					14
TIPULIDAE					
<i>Dicranota</i>				2	
EMPIDIDAE					
<i>Chelifera</i>		4	2	1	
<i>Hemerodromia</i>					
PHORIDAE				1	
COPEPODA		2			
	21	27	27	21	22
	105	153	312	134	167

Below Muleshoe Reservoir

Date 5/23/96

Surber

Site 4

Taxa	S1	S2	S3	S4	S5
TRICOPTERA					
HYDROPSYCHIDAE					
<i>Hydropsyche</i> Pupa	1				
<i>Cheumatopsyche</i>				1	
POLYCENTROPODAE					
<i>Polycentropus</i>		10	2	1	
LEPIDOSTOMATIDAE					
<i>Lepidostoma</i>	1				
LIMNephilidae					
<i>Goera</i>	1				
PHILOPOTAMIDAE					
<i>Dolophilodes</i>	4	1	15	2	3
GLOSSOMATIDAE					
<i>Glossosoma</i>	3				
HYDROPTILIDAE					
<i>Orthotrichia</i>				1	
COLEOPTERA					
ELMIDAE					
<i>Optioservus</i>		2	12	6	3
<i>Optioservus</i> Adult			2		
<i>Oulimnius</i>	1				
DIPTERA					
CHIRONOMIDAE					
adult					1
pupa	15	29	9	19	12
ORTHOCLOADIINAE	49	134	72	47	53
TANYPODINAE	27	27	37	42	31
TANYTARSINI	25	65	51	60	42
CHIRONOMINI	22			8	14
SIMULIIDAE					
Pupa		1			1
<i>Simulium</i>	1		3	1	
<i>Prosimulium</i>					1
TIPULIDAE					
<i>Dicranota</i>		1			1
<i>Antocha</i>	1				
EMPIDIDAE					
<i>Chelifera</i>	3		2		
Pupa				1	1
BLEPHARICERIDAE		1			

Below Muleshoe Reservoir

Date 5/23/96

Surber

Site 4

Taxa	S1	S2	S3	S4	S5
EPHEMEROPTERA					
BAETIDAE					
<i>Baetis</i>	11	10	4	9	3
<i>Acentrella</i>		19	6	5	
<i>Centroptilum</i>	2				
EPHEMERELLIDAE					
<i>Ephemerella</i>			2		
<i>Drunella</i>	6	1	7	8	3
<i>Serratella</i>			2		
HEPTAGENIIDAE				7	19
<i>Epeorus</i>	10	16	13		8
<i>Leucrocota</i>	10	3	14		
<i>Stenonema</i>	2	5	2	3	
<i>Heptagenia</i>	1				
<i>Cyngamulia</i>	4				
LEPTOPHLEBIIDAE					
<i>Paraleptophlebia</i>	2	9	11	11	13
AMELETIDAE					
<i>Ameletus</i>					2
ISONYCHIIDAE					
<i>Isonychia</i>					7
PLECOPTERA					
LEUCTRIDAE					
<i>Leuctra</i>	8	10	53	16	18
NEMOURIDAE					
<i>Amphinemura</i>	3	11	5	1	8
PERLODIDAE			3		
PELTOPERLIDAE					
<i>Peltoperla</i>		13	17	3	3
<i>Tallaperla</i>	1				
PERLIDAE				3	
<i>Acroneuria</i>	1	1	1	2	1
<i>Paragnetina</i>			1		
CHLOROPERLIDAE					
<i>Sweltsa</i>		1	1		
<i>Haploperla</i>	2		5	4	4
CAPNIIDAE					
<i>Paracapnia</i>				2	2
TAENIOPTERYGIDAE					
<i>Taeniopteryx</i>		3	1		1
PTERONARCYIDAE					
<i>Pteronarcys</i>		1			
MEGALOPTERA					
CORYDALIDAE					
<i>Nigronia</i>					1
BIVALVIA		1		3	3
OSTRACODA				19	21
OLIGOCHAETA			1		1
COPEPODA				7	5
	28	25	29	28	31
	217	375	354	292	286

Trib. Below Foot of Ten
Site 5

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
Ephemeroptera					
Baetidae					
<i>Baetis</i>	7		1	7	3
<i>Acentrella</i>		1			
Ephemerelellidae					
<i>Ephemerella</i>	22	11	20	23	32
<i>Drunella</i>	13	6	3	12	16
<i>Serratella</i>	1			1	
Heptageniidae					1
<i>Epeorus</i>					24
<i>Stenonema</i>	1	2		1	
<i>Cyngamula</i>	1	3		7	1
Leptophlebiidae					
<i>Paraleptophlebia</i>	6	22	8	11	7
Plecoptera					
Leuctridae					
<i>Leuctra</i>	6	7	2		
Nemouridae					
Adult	1				
<i>Amphinemura</i>	8	2	1	1	
Perlodidae		2			
Adult					1
<i>Isoperla</i>	4		1	2	3
<i>Yugus</i>			1		
Peltoperlidae		2			
<i>Peltoperla</i>	1				
Perlidae					
<i>Acroneuria</i>	1	1	1		1
<i>Agnetina</i>					2
Chloroperlidae					
<i>Haploperla</i>	2				
Capniidae					
<i>Paracapnia</i>	1			1	
Taeniopterygidae					
<i>Taeniopteryx</i>	2			14	
Pteronarcyidae					
<i>Pteronarcys</i>		2			
Tricoptera					
Hydropsychidae					
<i>Hydropsyche</i>					1
<i>Diplectrona</i>	3	5		11	
Rhyacophilidae					
Pupa	2	1		2	
<i>Rhyacophila</i>		1	1	1	1

Trib. Below Foot of Ten
Site 5

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
Polycentropidae					
<i>Polycentropus</i>	2				
Uenoidae					
<i>Neophylax</i>		1			2
Philopotamidae		4			1
<i>Dolophilodes</i>				10	
<i>Wormaldia</i>	16			1	
Glossomatidae					
<i>Agapetus</i>	2		6	8	7
Coleoptera					
Elmidae		1			
<i>Optioservus</i>	1				12
<i>Stenelmis</i>	1		1		
Adult	3			3	5
<i>Oulimnius</i>	3		1	17	
Psephenidae					
<i>Psephenus</i>		1		1	1
<i>Ectopria</i>	2	1		3	4
Diptera					
Chironomidae					
pupa	2	3	1	1	
Orthocladiinae	43	16	10	57	8
Tanypodinae	4	3	2	8	2
Tanytarsini	7	10	4	25	1
Chironomini	13	9	8	3	6
Simuliidae					
<i>Simulium</i>			2		
Tipulidae					
<i>Dicranota</i>	2	1			1
<i>Hexatoma</i>	1		2	2	
<i>Limnophila</i>					1
Empididae					
<i>Chelifera</i>				1	
Ceratopogonidae					
<i>Bezzia</i>			1		
Odonata					
Gomphidae					
<i>Stylogomphus</i>					1
Megaloptera					
Corydalidae					
<i>Nigronia</i>		1	1	1	
Bivalvia	1				
Decapoda	1		1	1	
Oligochaeta	1				
Hydracarina					1
Collembola					1
	36	27	23	30	29
	187	119	79	236	147

Picnic Area Above Foot of Ten

Date 5/23/96

Surber

Taxa	S1	S2	S3	S4	S5
EPHEMEROPTERA					
BAETIDAE					
<i>Baetis</i>	2	1	6	4	6
EPHEMERELLIDAE					
<i>Ephemerella</i>		1	9	4	3
<i>Serratella</i>	1				
HEPTAGENIIDAE					
<i>Epeorus</i>	16	18	6	17	13
<i>Cyngamula</i>					1
LEPTOPHLEBIIDAE					
<i>Paraleptophlebia</i>	154	88	502	323	152
AMELETIDAE					
<i>Ameletus</i>	6	2	16	4	13
PLECOPTERA					
LEUCTRIDAE					
<i>Leuctra</i>	4	7	14	5	14
NEMOURIDAE					
<i>Amphinemura</i>	5	10	13	6	5
CHLOROPERLIDAE					
<i>Sweltsa</i>	5		11	12	2
<i>Haploperla</i>	24	26	4	17	32
CAPNIIDAE					
<i>Paracapnia</i>	31	9	16	20	20
TAENIOPTERYGIDAE					
<i>Taeniopteryx</i>					2
TRICOPTERA					
HYDROPSYCHIDAE					
<i>Diplectrona</i>	1				
RHYACOPHILIDAE					
<i>Rhyacophila</i>			1		
PHILOPOTAMIDAE					
<i>Wormaldia</i>			9	1	2
COLEOPTERA					
DYTISCIDAE					
<i>Oreodytes</i>			2		
HISTERIDAE		2			
DIPTERA					
CHIRONOMIDAE					
pupa			2	1	
ORTHOCLADIINAE	8	1	15	8	16
TANYPODINAE	12		11	3	
TANYTARSINI		1	1		3

Picnic Area Above Foot of Ten

Date 5/23/96

Surber

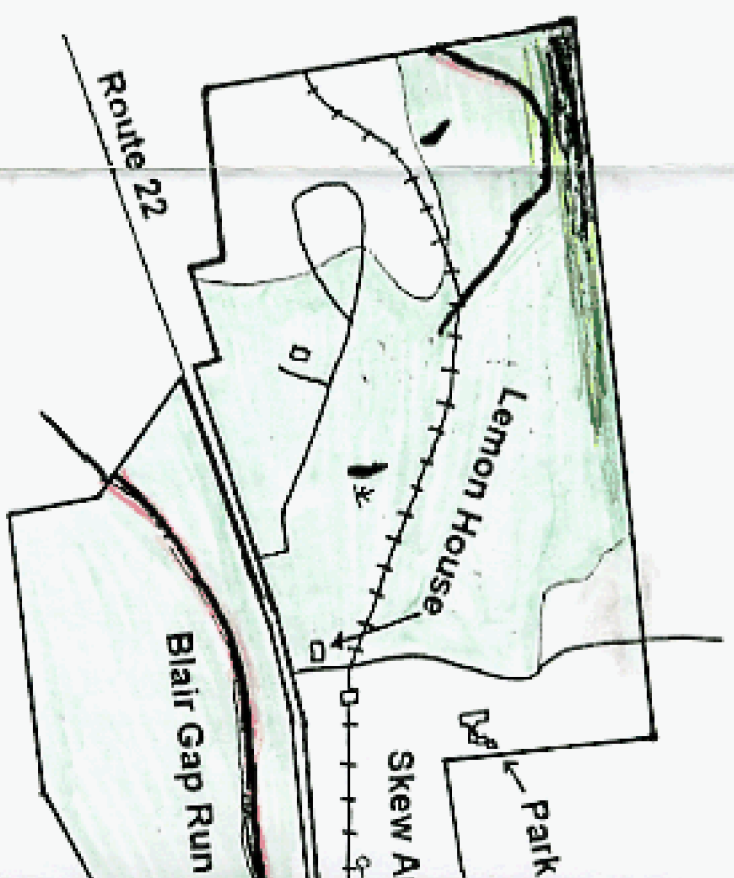
Taxa	S1	S2	S3	S4	S5
CHIRONOMINI	4	1	2	2	20
TIPULIDAE					
<i>Tipula</i>				1	
TABANIDAE					
<i>Merycomyia</i>					1
pupa					
CERATOPOGONIDAE					
<i>Bezzia</i>		1	4		1
MEGALOPTERA					
CORYDALIDAE					
<i>Nigronia</i>			1		
AMPHIPODA					1
OLIGOCHAETA		5	8	1	
COPEPODA				1	3
	14	15	21	18	20
	273	173	653	430	310

Little Conemaugh River

STAPLE BEND TUNNEL UNIT

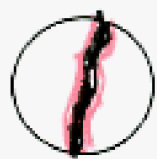
Staple Bend Tunnel

Unnamed Tributary (sampled)

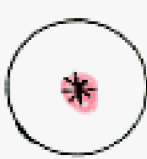




Stream
Spring



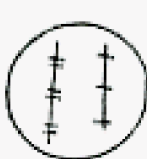
Streams within NPS Boundary
and Blair Gap Run Watershed



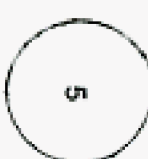
Water quantity and quality



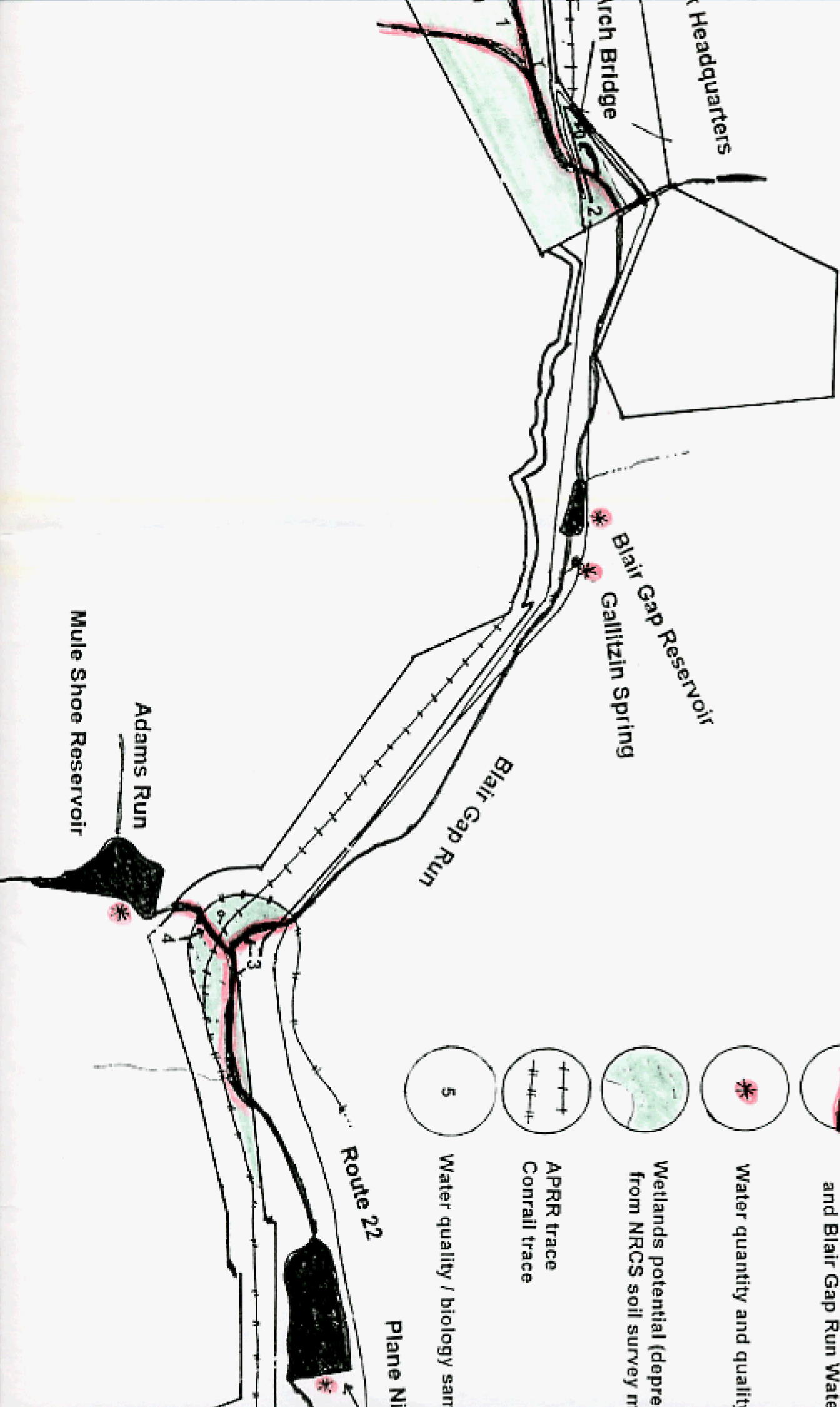
Wetlands potential (depressed
from NRCS soil survey map)



APRR trace
Conrail trace

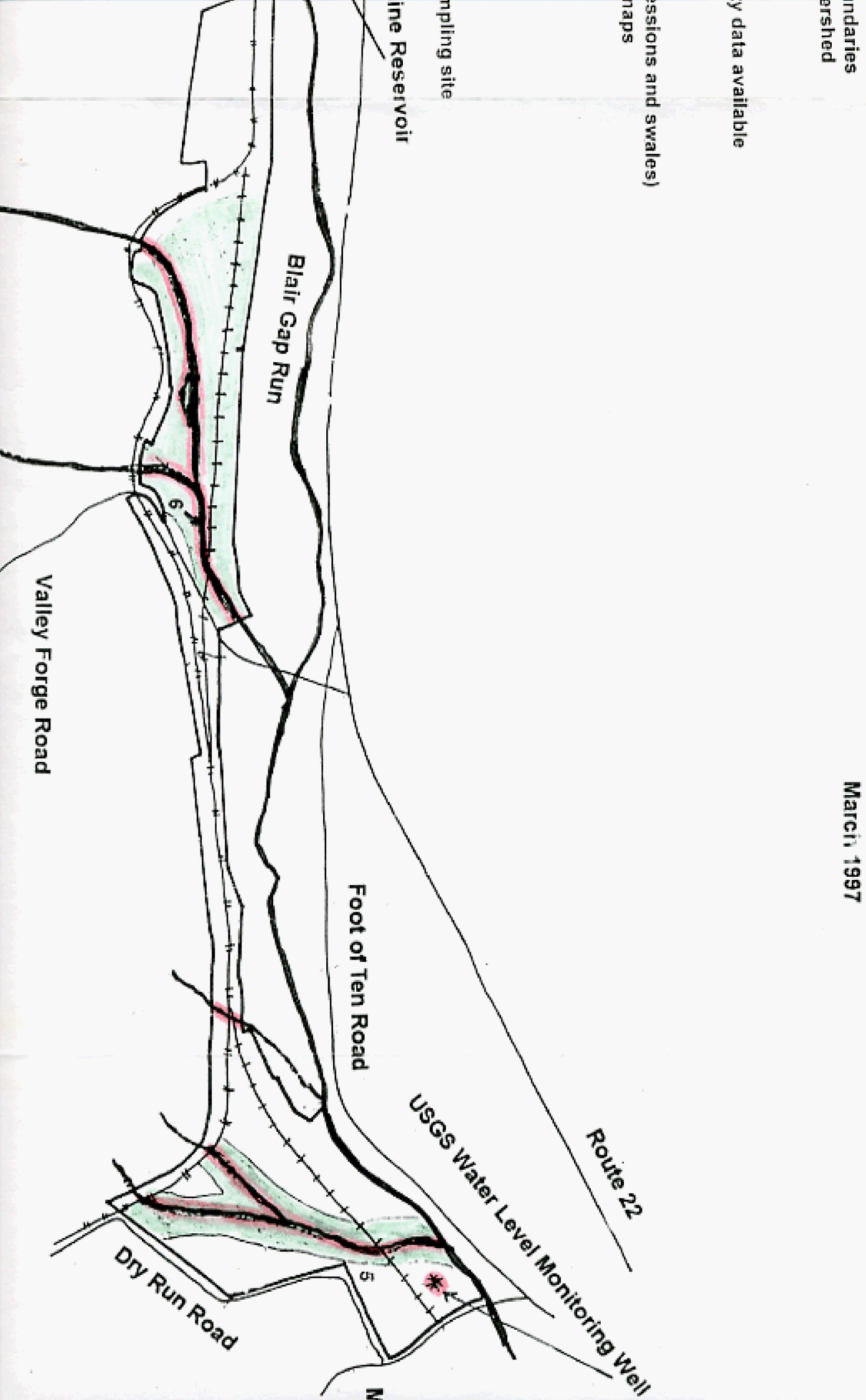


Water quality / biology sampling



ALLEGHENY PORTAGE RAILROAD NATIONAL HISTORIC SITE

March, 1997





United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Biological Resources Division

Pennsylvania Cooperative Fish & Wildlife Research Unit

101 Merkle Building, University Park, PA 16802-1100

Tel: 814-865-4511 Fax: 814-863-4710

June 30, 1997

U. S. National Park Service
Mid-Atlantic Region
Office of the Chief Scientist (att. Michelle Batcheller)
209 Ferguson Building, University Park, PA 16802

Dear Sirs:

Attached is the supplementary report on our aquatic resources survey of the Allegheny Portage Railroad, as requested in your memo of February 10, 1997. Ms. Ellyn DelCorso and I did the necessary sampling on June 25, 1997. There were two problems:

- (1) Station 5, in the Foot of Ten area, was completely dry. As a supplement, we sampled the main stem of Blair Gap Run adjacent to Station 5, and the results are included in this report. This segment of Blair Gap Run is, of course, not on NPS property.
- (2) We were unable to sample Station 7, the stream west of Staple Bend Tunnel, due to unexpected construction activity on the access right-of-way. Brian Eick did not mention this activity when he gave us the key; perhaps he was unaware of its extent. We managed to get about 1/2 mile in, with some difficulty, but we were completely stopped by two open trenches across the "road," several feet deep, ready for culvert installation. This point is a mile or more from the stream, and we did not have time to walk in. I was quite surprised that this "improvement" of the access road, which is really the old APRR right of way, is so extensive as to obliterate any of the original features and relics associated with the route. Perhaps this was seen as a necessary tradeoff to allow public access to the tunnel.

In the earlier report, and in our last coordination meeting, we discussed the occurrence of iron hydroxide deposits at our Stations 2 and 2A, downhill from the Skew Arch Bridge. Our earlier visits convinced us that the iron was originating in the area across the westbound lanes of Old Route 22, where there may have been coal storage and loading facilities once. On our June 25, 1997 visit, with, of course, no snow obscuring the ground, and surface water not frozen, we noticed extensive iron seeps at and near the "eastern" pier base of the bridge. I now believe that this is the source of the iron that discharges through and near the pipe. It may be that there are native iron deposits in the soil/rock at that point, which leach into the groundwater and become oxidized as it seeps out at the surface, or after it enters the pipe and discharges to the open, down in the gorge. Further investigation of this question might best be done by a hydrogeologist or geochemist.

June 30, 1997

Anyway, the effects seem to disappear fairly quickly downstream, especially after the flow is diluted by the larger flow coming from the cast concrete culvert under the south lanes of Old Route 22. I suspect, based on personal observation and our invertebrate samples, that there is no significant adverse effect, other than visual, of the iron deposits.

We observed a private contractor laying drain pipe buried in limestone rock fill along the side of Old Route 22. It appears that this was to end in or next to the existing culvert box that we had earlier supposed was the source of the pipe entering Blair Gap Run at Station 2A as described above. If the new drain connects with the old box, the flow through this pipe will be partly or completely diverted. We did not determine where the lower end of the new drain will be - probably the runoff it collects will end in Blair Gap Run further downstream, but still above the Altoona Water Authority's reservoirs.

Finally, I must report failure and frustration in obtaining any historical water quality data on Blair Gap Run from the Altoona Water Authority. After many phone calls and many referrals to different people, the most definite information we obtained was in the nature of "we don't know if we have any records or not, and if we do, we don't know where they are." In a subsequent conversation, a friend of mine at the Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, told me that the Authority certainly is required to keep records, and that they (DEP) inspect them periodically. We could probably push this matter to the point of seeing some records, but I really question whether the information gained would be worth while. Certainly most of their samples are collected directly from the reservoirs, not the stream - and the reservoirs are not on NPS property.

Please advise if you have any further questions or needs concerning this report or the project. Otherwise, I consider the attached to be the final deliverable under the contract, which is now closed. Thank you for your support and provision of this study opportunity.

Sincerely,



Dr. Dean E. Arnold
Asst. Unit Leader for Fisheries
and
Adjunct Asst. Professor of Aquatic Ecology

cc: Brian Eick (NPS), Bob Carline, Larry Jackson (PFBC), Bob Schott (DEP), Del Graff (PFBC), Ed Perry (USFWS), Ellyn DelCorso, Larry McCormick

Table 1. Chemical analyses of water samples, and measured discharge at selected stations, at the Allegheny Portage Railroad National Historic Site, summer 1996, winter 1997. (BGR = Blair Gap Run) (20 ueq/l carbonate alkalinity in equivalence units = 1 mg/l or 1 ppm)

Station Number	Location Description	Collection Date	Field - read Conductivity uS/cm	pH units	Alkalinity ueq/l CaCO ₃	Discharge m ³ /sec
1	BGR opposite Lemon House	15 May 96	112	6.35	104	too low to measure (*)
"	" "	23 May 96	X	6.83	262	0.026
"	" "	10 June 96	113	4.88	-5	*
"	" "	7 Mar. 97	377	5.99	186	*
"	" "	25 June 97	465	5.93	262	*
2	BGR in gorge below Skew Arch Bridge	15 May 96	X	6.66	918	*
"	" "	23 May 96	X	7.05	473	*
"	" "	7 Mar. 97	265	6.38	252	0.104
"	" "	25 June 97	363	6.39	923	*
2A	Culvert discharge below Skew Arch	7 Mar. 97	414	6.47	888	*
3	BGR below Mule-shoe Underpass	15 May 96	120	6.65	233	
"	" "	23 May 96	X	7.04	321	0.184
"	" "	10 June 96	120	6.95	332	
"	" "	7 Mar. 97	141	6.29	244	0.616
"	" "	25 June 97	136	6.38	652	0.074
4	Combined outlets of Muleshoe Reservoir	15 May 96	48	6.28	83	
"	" "	23 May 96	X	6.48	72	

Station Number	Location Description	Collection Date	Conductivity uS/cm	pH units	Alkalinity ueq/l CaCO ₃	Discharge m ³ /sec
4 (cont.)	" "	10 June 96	48	6.62	99	
"	" "	7 Mar. 97	38	5.92	94	1.135
"	" "	25 June 97	45	5.83	152	0.215
5	Trib. from South below Foot of Ten	15 May 96	X	6.48	157	0.064
"	" "	23 May 96	X	6.39	127	*
"	" "	7 Mar. 97	75	6.18	148	0.62
"	" "	25 June 97	totally dry -	no	sampling	possiiible
5-A	BGR Main Stream Opposite Station 5	25 June 97	85	6.63	432	n/a
6	Tributary at Picnic Area - Foot of Ten	15 May 96	X	6.08	71	*
"	" "	23 May 96	X	6.41	187	0.0003
"	" "	7 Mar. 97	43	6.06	114	0.232
"	" "	25 June 97	57	5.98	210	0.038
7	Stream west of Staple Bend Tunnel	15 May 96	X	6.18	113	
"	" "	23 May 96	X	6.48	135	
"	" "	25 June 97	access	not	possible - no	sampling
none	2nd stream east of Staple Bend Tunnel	15 May 96	X	3.79	0	*
none	BGR - culvert under Old Rt. 22	15 May 96	X	6.60	295	*
none	Marshy tributary crossing under picnic area road	15 May 96	X	6.53	265	*

X = reading not obtained, instrument failure * = measurement not possible, low flow

Table 2: Additional factors measured on March 1997 and June 1997 samples (earlier samples for these analyses were inadvertently discarded)

Station Number	Location Description	Collection Date	Turbidity N.T.U.	Total Suspended Solids (mg/l)	Lab Conductivity uS/cm
1	BGR opposite Lemon House	7 Mar 97	1.4	0.009	350
"	" "	25 June 97	54.0	0.102	432
2A	Culvert discharge below Skew Arch	7 Mar. 97	8.2	0.010	383
2	BGR in gorge below Skew Arch Bridge	7 Mar. 97	3.2	0.002	243
"	" "	25 June 97	17	0.017	338
3	BGR below Mule shoe Underpass	7 Mar. 97	3.4	0.001	139
"	" "	25 June 97	2.4	0.002	133
4	Combined outlets of Muleshoe Reservoir	7 Mar. 97	1.1	0.000	35
"	" "	25 June 97	4.5	0.003	52
5	Trib. from South below Foot of Ten	7 Mar. 97	3.5	0.003	73
"	" "	25 June 97	2.5	0.002	532
6	Tributary at Picnic Area- Foot of Ten	7 Mar. 97	2.6	0.003	55
"	" "	25 June 97	14	0.0115	57