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**PENNSYLVANIA FISH AND BOAT COMMISSION  
BUREAU OF FISHERIES  
DIVISION OF FISHERIES MANAGEMENT**

Gap Run (309C)  
Section 01  
Tributary to Logan Branch  
Centre County  
Management Report

Prepared by  
Jason Detar and Dave Kristine  
Fisheries Management Area 3

Fisheries Management Database Name: Gap Run  
Lat/Lon: 405159/774404

Date Sampled: August 22, 2008

Date Prepared: May 2009

### **Introduction**

Gap Run (309C) is a small, 3.65-km long mountain stream located in Centre County that flows into a sinkhole in Pleasant Gap, a short distance downstream of the T-367 Bridge. Gap Run is a tributary to Logan Branch, but its surface flow does not reach Logan Branch. However, it is thought that Gap Run's subsurface flow enters Logan Branch in the vicinity of Pleasant Gap. The 7.61 sq km basin is comprised mostly of forest land with some agriculture and residential and commercial development in the upper and lower portions of the watershed. The middle portion of the watershed is heavily forested, however, SR 0144 closely parallels and in some places has severely encroached on the stream in this area. Gap Run is depicted on the USGS 7.5 minute Centre Hall quadrangle. Current Pennsylvania Department of Environmental Protection (DEP) Chapter 93 designation for the Logan Branch basin (UNT 23007 to T-371 bridge), which includes Gap Run, is Coldwater Fishes, Migratory Fishes (CWF, MF).

PFBC files indicate that an electrofishing survey was conducted on Gap Run on December 31, 1979, to obtain background information on the fish community prior to Penn DOT's planned highway widening project on SR 0144 (Hollender 1980). Two 300-m long sites were surveyed and a total of 14 brook trout *Salvelinus fontinalis*, were collected ranging in size from 125 mm to 225 mm. However, the data was not subsequently entered

into the agency database when it was developed in the 1980s and Gap Run was not added to the Stream Sections that Support Natural Reproduction of Trout list.

During summer 2008, Fisheries Biologist Aide Andy Leakey reported catching high numbers of brook trout in Gap Run. Area 3 staff were not aware of the potential for a strong wild brook trout population to be inhabiting Gap Run. Upon further review of PFBC files, we learned that limited information was available for Gap Run and, therefore, scheduled a subsequent survey of the stream.

### Study Area and Methods

A 230-m long site was sampled at River Mile (RM) 0.27 on August 22, 2008 (Figure 1). The site can be described as a mixture of forest and residential/commercial land with considerable overhanging, brushy vegetation. This site was terminated at 230 m and not extended to 300 m because of increased overhead vegetation that made sampling extremely difficult. Moderate bank erosion was present in areas where residential lawns were adjacent to the stream. Stream gradient was relatively high and instream habitat was comprised of riffle-run, step pool sequences. Substrate was comprised of a mixture of boulder, cobble, and small gravel. Water flows at the time of the survey were low and mean width of the sample site was 2.0 m.

One pulsed-DC backpack electrofishing unit was used to survey the site. All fish species collected were identified and recorded. All trout captured were enumerated, measured by 25 millimeter (mm) size groups, and released following the survey. A subset of 10 individuals per 25 mm size group were measured to the nearest mm and weighed to the nearest gram (g) to facilitate calculating a biomass estimate. A Zippin three-pass estimator was used to obtain a population estimate of the wild brook trout population at the site.

Standard PFBC field water chemistries were also conducted during the survey.

### Results and Discussion

Only two fish species were captured during our electrofishing survey - brook trout and slimy sculpin *Cottus cognatus*. Wild brook trout ranged in size from the 75 mm through the 250 mm length groups (Table 1). Total estimated biomass of wild brook trout was 231.45 kg/ha. Total estimated abundance was 1,277 brook trout/km which included an estimated 334 legal-size ( $\geq$  175 mm) brook trout/km (Table 1). Condition factor was excellent,

with a mean relative weight ( $W_r$ ) of 99 for fish ranging from 125 - 250 mm ( $n=50$ ).

Water chemistry in Gap Run was excellent, with a pH of 8.1 and total alkalinity of 65 mg/l (Table 2).

Compared to the 1979 survey, the abundance of wild brook trout in 2008 was several orders of magnitude higher. We were quite surprised by the very high abundance of wild brook trout in Gap Run, especially given that it is located only a half-mile from our office. The combination of good physical habitat and apparent alkaline groundwater inputs likely account for the streams ability to produce and maintain such a high density and biomass of wild brook trout. Gap Run is one of only a few streams in the Commonwealth that continues to support an apparent allopatric brook trout population comprised of multiple age-classes and very high densities of legal-size individuals. Therefore, this stream should be provided maximum protection during any future development or highway projects.

In addition, historic PFBC files indicate that two unnamed tributaries to Gap Run (locally known as Armour Run and Lonebarger's Run) are water supplies for Pleasant Gap/Spring Township. A 1983 memo from Jack Miller, PFBC Environmental Services, to the Spring Township Authority questioned whether their requested withdrawal of 600,000 gpd was reliably available without jeopardizing Gap Run (Miller 1983). The current water withdrawal limits for the Gap Run watershed are unknown to Area 3 staff, but any future requests for additional withdrawals should be closely reviewed by DEP and PFBC Division of Environmental Services to ensure maximum protection for the brook trout population.

### **Management Recommendations**

1. Gap Run (309C), Section 01, supports an outstanding wild brook trout population with multiple age-classes present and a high abundance of legal-size trout. Results of the 2008 survey estimated the total wild brook trout biomass to be 231.45 kg/ha, one of the highest brook trout biomass estimates documented in the Commonwealth to date. Add Gap Run, Section 01, to the Commission's Class A Wild Trout Waters Program and continue to manage it for wild trout under Commonwealth Inland Waters regulations with no stocking.
2. Submit the Logan Branch basin (UNT 23007 to T-371 bridge), which includes Gap Run to DEP for consideration for a 25 PA Code, Chapter 93 designation upgrade to High-Quality Coldwater Fishes (HQ-CWF). Given the extremely high

biomass of the unique allopatric brook trout population inhabiting Gap Run, we recommend that Northcentral Region DEP staff examine the invertebrate community inhabiting Gap Run, Section 01, for consideration of a 25 PA Code Chapter 93 designation upgrade to Exceptional Value (EV).

3. Due to the exceptional quality of the brook trout population in Gap Run, provide maximum protection for this stream during any future development or highway projects.
4. Historic PFBC files indicate that Gap Run is a water supply for Pleasant Gap/Spring Township. Any future requests for increased water withdrawals should be closely reviewed by DEP and PFBC Division of Environmental Services to ensure that Gap Run's exceptional brook trout population is protected.
5. Gap Run is a good candidate for the PFBC's Division of Habitat Management to work with private landowners to improve the existing riparian buffer along residential/commercial properties and stabilize eroding banks in the lower reaches of the stream between the SR 0144 crossing and the sinkhole a short distance downstream of the T-367 bridge. Provide a copy of this report to the regional habitat biologist for consideration.

### **Literature Cited**

Hollender, B. H. 1980. Survey of Gap Run (309C), Centre County, memorandum. Pennsylvania Fish and Boat Commission files, Bellefonte, PA.

Miller, J. G. 1983. Application for water allocation, Spring Township Authority, RM-WR WA 14-437, Centre County, memorandum. Pennsylvania Fish and Boat Commission files, Bellefonte, PA.

Table 1. Estimated abundance and biomass of brook trout from Gap Run (309C), using a Zippin three-pass estimator. Site located at River Mile 0.27 with a site Lat/Lon of 405146/774357. Site currently located within Section 01. Survey Date: 08/22/08.

Size Group	Population Estimate	Low 95% CI	High 95% CI	Estimated Number/Ha	Estimated Kg/Ha	Estimated Number/Km
75	134	134	136	2921	22.14	584
100	33	32	37	726	8.06	145
125	9	9	9	196	5.88	39
150	40	40	40	870	42.1	174
175	35	35	35	762	53.93	152
200	30	30	30	652	64.58	130
225	11	11	11	239	31.24	48
250	1	1	1	22	3.52	4
Totals:	294			6387	231.45	1277

Table 2. Water Chemistry measurements collected from Gap Run (309C). Site located at River Mile 0.27 with a site Lat/Lon of 405146/774357. Site currently located within Section 01. Survey Date: 08/22/08.

Air Temperature (°C): Not Collected  
 General Chemistries Sample Time of Day: 1255  
 Dissolved Oxygen Test: Not Collected  
 Alkalinity Test: Total Alkalinity Field Mixed Indicator  
 Hardness Test: Not Collected  
 pH Test: pH Field Colorimetric

Sample Depth (m)	Water Temp (°C)	Dissolved Oxygen (ml/g)	Alkalinity (mg/l)	Hardness (mg/l)	Specific Conductance (umhos/cm@25°C)	pH (SU)
0	18	---	65	---	186	8.1

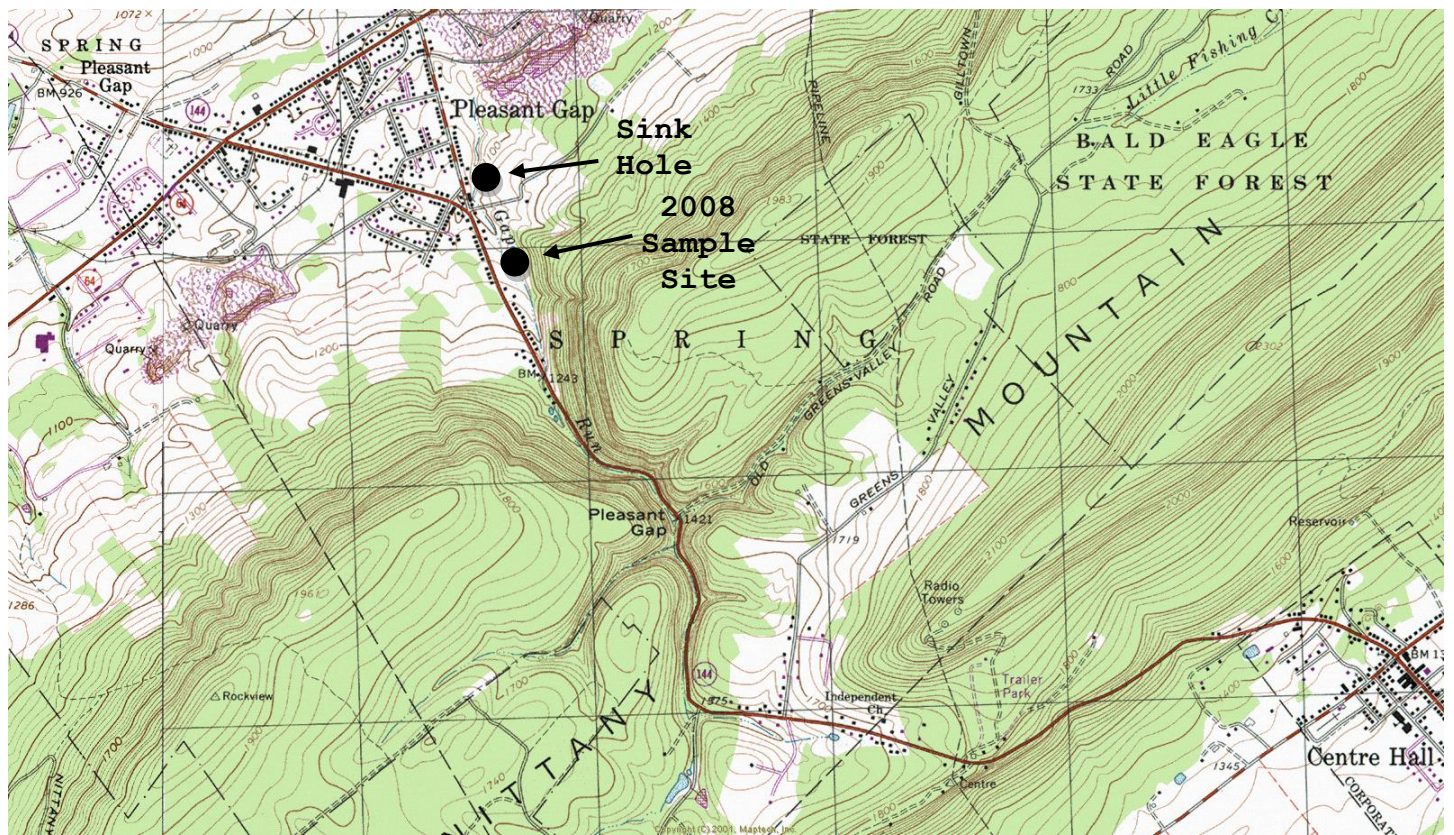


Figure 1. Gap Run depicted on the USGS Centre Hall 7.5 minute quadrangle showing the location of the August 22, 2008 sample site at RM 0.27 and the sinkhole a short distance downstream of T-367.

**PA FISH AND BOAT COMMISSION  
COMMENTS AND RECOMMENDATIONS  
September 9, 2009**

**WATER:** Gap Run to Logan Branch (309C) Centre County

**EXAMINED:** August 22, 2008

**BY:** Jason Detar and Dave Kristine

Bureau Director Action: \_\_\_\_\_ Date: \_\_\_\_\_

Division Chief Action: \_\_\_\_\_ Date: \_\_\_\_\_

WW Unit Leader Action: \_\_\_\_\_ Date: \_\_\_\_\_

CW Unit Leader Action: \_\_\_\_\_ Date: \_\_\_\_\_

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**AREA COMMENTS:**

Gap Run (309C) is a small, 3.65 km long mountain stream located in Centre County. Gap Run is one of only a few streams in the Commonwealth that continues to support an apparent allopatric brook trout population comprised of multiple age-classes and very high densities of legal-size individuals; therefore, this stream should be provided maximum protection during any future development or highway projects.

Based on the results from the 2008 examination, the estimated standing stock of wild brook trout was recorded at 1,277 trout/km and 231.45 kg/ha. The estimated abundance of legal size ( $\geq$  seven inches in length) wild brook trout was 334/km. Based on a section length of 3.65 km (2.26 mi.) this translated into an estimated total of 1,219 legal size brook trout ranging from seven to ten inches in length in Gap Run, Section 01.

**AREA RECOMMENDATIONS:**

1. Gap Run (309C), Section 01, supports an outstanding wild brook trout population with multiple age-classes present and a high abundance of legal-size trout. Results of the 2008 survey estimated the total wild brook trout biomass to be 231.45 kg/ha, one of the highest brook trout biomass estimates documented in the Commonwealth to date. Add Gap Run, Section 01, to the Commission's Class A Wild Trout Waters Program and continue to manage it for wild trout under Commonwealth Inland Waters regulations with no stocking.
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Section 01, for consideration of a 25 PA Code Chapter 93 designation upgrade to Exceptional Value (EV).

3. Due to the exceptional quality of the brook trout population in Gap Run, provide maximum protection for this stream during any future development or highway projects.
4. Historic PFBC files indicate that Gap Run is a water supply for Pleasant Gap/Spring Township. Any future requests for increased water withdrawals should be closely reviewed by DEP and PFBC Division of Environmental Services to ensure that Gap Run's exceptional brook trout population is protected.
5. Gap Run is a good candidate for the PFBC's Division of Habitat Management to work with private landowners to improve the existing riparian buffer along residential/commercial properties and stabilize eroding banks in the lower reaches of the stream between the SR 0144 crossing and the sinkhole a short distance downstream of the T-367 bridge. Provide a copy of this report to the regional habitat biologist for consideration.

Distribution

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