

**PA FISH AND BOAT COMMISSION
COMMENTS AND RECOMMENDATIONS
September 16, 2013**

WATER: Aylesworth Creek (405A) Lackawanna County
Sections 01 and 02

EXAMINED: August 2013

BY: Robert Wnuk, Aaron Frey, and Brian Shurmanek

Bureau Director Action: _____ Date: _____

Division Chief Action: _____ Date: _____

WW Unit Leader Action: _____ Date: _____

CW Unit Leader Action: _____ Date: _____

AREA COMMENTS:

Mining activities historically limited the fishery potential of Aylesworth Creek. Over the last 40 years, however, both public and private remediation activities have produced acceptable water quality. Sections 01 and 02 of Aylesworth Creek now support Class A wild Brook Trout populations. 12.1% of Section 01 and 12% of Section 02 was sampled.

AREA RECOMMENDATIONS:

1. Add Sections 01 and 02 of Aylesworth Creek (05A), to the Class A Wild Trout Waters list.
2. Request the Pennsylvania Department of Environmental Protection to upgrade Aylesworth Creek, from the headwaters downstream to Aylesworth Creek Lake, to High Quality Cold Water Fishes, Migratory Fishes in the Chapter 93 Water Quality Standards.
3. Add Aylesworth Creek (05A), (from the headwaters to the mouth) to the list of stream sections that support natural reproduction of trout.

This work made possible by funding from the Sport Fish Restoration Act Project F-57-R Fisheries Management.

**Pennsylvania Fish & Boat Commission
Bureau of Fisheries
Division of Fisheries Management**

Aylesworth Creek (405A)
Sections 01 and 02
Fisheries Management Report

Prepared by:
Robert T. Wnuk and Aaron P. Frey

Date Sampled: August 2013 Date Prepared: September 2013

Introduction

Aylesworth Creek is a 7.05 km long stream located in Lackawanna County. It originates from the outlet of an unnamed pond in the Moosic Mountains and flows generally southwest to its confluence with the Lackawanna River in Jermyrn. The Pennsylvania Fish and Boat Commission (PFBC) manages Aylesworth Creek as three separate sections separated by small impoundments. The Pennsylvania Department of Environmental Protection classifies the stream for Cold Water Fishes and Migratory Fishes (CWF, MF) in its Chapter 93 Water Quality Standards. Aylesworth Creek is located on the Carbondale and Waymart United States Geological Survey's 7.5 minute quadrangles.

Historically, a 1997 survey that found a low density wild Brown Trout *Salmo trutta* population in Section 03 (Wnuk et al. 1998). The PFBC did not survey Sections 01 and 02 during the 1997 examination because construction activities for the Casey Highway blocked all access. Bourke and Selcher (1971) electrofished three stations in Section 02 but did not capture any fish. Strip mining and associated runoff had created conditions toxic to fish life. Private individuals and government agencies attempted to correct this condition by sealing acid outfalls, diverting a stream, and installing a limestone treatment system at the inlet to Aylesworth Creek Lake. The original treatment system failed and was replaced by an anoxic limestone drain field in 2006.

Sections 01 and 02 of Aylesworth Creek were examined in the summer of 2013 to determine if the stream had recovered from past pollution and responded to acid remediation efforts.

Methods

Aylesworth Creek was examined in August of 2013. All procedures followed those outlined by Detar et al. (2011).

Physical habitat, chemical parameters, and fish communities were assessed at two sampling stations (Figure 1). Station 0101 was located at the first trail crossing upstream from Edgerton Reservoir (RM 2.87) and Station 0201 was located at the dam upstream from the backwaters of Aylesworth Creek Lake (RM 1.18). Physical habitat evaluations followed the United States Environmental Protection Agency's Rapid Bioassessment Protocols for high gradient streams (Barbour et al. 1999). All chemical parameters were measured in the field using a colorimetric method for pH, a mixed indicator for total alkalinity, and EDTA titration for total hardness.

Fish sampling employed a Smith-Root backpack electrofishing unit (Model 12-A POW, 500 Volts pulsed direct current) at Station 0101 and a Coffelt backpack electrofishing unit (Model BP 1C, 200 Volts alternating current) at Station 0201. All fish were identified to species according to the Integrated Taxonomic Information System (<http://www.itis.gov>). All trout captured were classified as being of wild or hatchery origin based on species, coloration, size, and fin wear. Wild trout were measured to 25 mm length groups and given an upper caudal fin clip. When at least 30 wild trout were captured at an individual site, a second electrofishing pass was made to generate a Chapman modified Petersen population estimate (Ricker 1975). Wild trout biomass estimates were determined using statewide average weights calculated on September 11, 2013.

Results and Discussion

Section 01

Section 01 extended 2.48 km from the outlet of an unnamed pond downstream to the backwaters of Edgerton Reservoir (Table 1). Edgerton Reservoir is a 1.09 ha backup water supply impoundment owned by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry. This impoundment and a small strip of land surrounding its shoreline comprise the only public land in the section. The remainder is privately owned and leased by several hunting clubs. Forests and abandoned strip mines dominate land use in the area. Road access to Section 01 is poor.

Station 0101 represented 12.1% of the section length. Physical habitat was optimal with a total score of 172, although deep water was scarce (Table 2). Plunge pools and overhanging rhododendron *Rhododendron maximum* provided habitat for adult fish. Shading was dense and the substrate was composed of boulders, rubble, gravel, and occasional bedrock outcrops. Water

quality data indicated an acidic system that was vulnerable to acid precipitation. Total alkalinity was 5 mg/l and pH was 6.3 (Table 3). Wild Brook Trout *Salvelinus fontinalis* along with a few Brown Bullheads *Ameiurus nebulosus* and Pumpkinseeds *Lepomis gibbosus* from the reservoir were the only fish species present.

A total of 308 individual (M + C - R) wild Brook Trout ranging from 50 to 224 mm in total length were captured at Station 0101 (Figure 2). Total wild Brook Trout biomass was estimated at 41.18 kg/ha and the biomass of wild Brook Trout < 150 mm was 32.98 kg/ha (Table 4). This was sufficient to qualify Section 01 for Class A status. An estimated 42 legal size fish were present in the section.

Section 02

Section 02 extended 2.51 km from the outlet of Edgerton Reservoir downstream to the backwaters of Aylesworth Creek Lake (Table 1). Aylesworth Creek Lake is a 4.0 hectare flood control reservoir operated by the US Army Corps of Engineers. The PFBC stocks the lake with adult trout and Lackawanna County manages the surrounding property as a local park. The park encompasses 46% of Section 02 with the remainder leased by private hunting clubs. Forests and abandoned strip mines dominate land use in the area and road access is poor.

Station 0201 represented 12.0% of the section length. Physical habitat was optimal/sub-optimal with a total score of 149 (Table 2). Overhanging rhododendron and Eastern hemlock *Tsuga canadensis* in combination with deep pools created by instream logs provided good habitat for adult trout. Shading was dense. The main physical habitat problems were erosion and sediment deposition. The soft, shifting substrate was composed of boulders embedded among silt, gravel, and coal fine deposits. Water quality was more acidic than at Station 0101 despite the discharge from the anoxic limestone drain. Total alkalinity was 3 mg/l and pH was 6.1 (Table 3). Nevertheless, water quality was acceptable for fish life. The fish community at Station 0201 was composed of wild Brook Trout and five species that had probably originated from the lake. Those species were hatchery Rainbow Trout *Oncorhynchus mykiss*, Banded Killifish *Fundulus diaphanus*, Pumpkinseed, Yellow Perch *Perca flavescens*, and Yellow Bullhead *Ameiurus natalis*.

A total of 148 individual (M + C - R) wild Brook Trout ranging from 50 to 274 mm in total length were captured at Station 0201 (Figure 2). Total wild Brook Trout biomass was estimated at 32.10 kg/ha and the biomass of wild Brook Trout < 150 mm was 14.92 kg/ha (Table 5). This was sufficient to qualify Section 02 for Class A status. An estimated 108 legal size fish were present in the section.

Acknowledgements

We thank John Maza, Pennsylvania Department of Conservation and Natural Resources, and the Carbondale Township Sportsmen's Association for providing access to Section 01.

Management Recommendations

1. Add Sections 01 and 02 of Aylesworth Creek (05A), to the Class A Wild Trout Waters list.
2. Request the Pennsylvania Department of Environmental Protection to upgrade Aylesworth Creek, from the headwaters downstream to Aylesworth Creek Lake, to High Quality Cold Water Fishes, Migratory Fishes in the Chapter 93 Water Quality Standards.
3. Add Aylesworth Creek (05A), (from the headwaters to the mouth) to the list of stream sections that support natural reproduction of trout.

LITERATURE CITED

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- Bourke, D.E., and J. Selcher. 1971. Aylesworth Creek stream survey report. Pennsylvania Fish and Boat Commission files, 450 Robinson Lane, Bellefonte, PA.
- Detar, J., R. Wnuk, R.T. Greene, and M. Kaufmann. 2011. Standard electrofishing protocols for sampling Pennsylvania wadeable streams. Pages 5-24 in D. Miko, editor. Sampling protocols for Pennsylvania's wadeable streams. Pennsylvania Fish and Boat Commission, Harrisburg, PA.
- Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191.
- Wnuk, R, R. Moase, T. Copeland, and R. Mulberger. 1998. Lackawanna River Basin (405A) fisheries management report. Pennsylvania Fish and Boat Commission files, 450 Robinson Lane, Bellefonte, PA.

Table 1. Physical and social data for Sections 01 and 02 of Aylesworth Creek (405A).

Parameter	Section 01	Section 02
County	Lackawanna (100%)	Lackawanna (100%)
Gradient (m/km)	26.20	26.30
Length (km)	2.48	2.51
Width (m)	2.70	3.20
Road Access (% Within:)		
100 m	0	0
300 m	1	1
500 m	2	2
Ownership	99% Private 1% PA DCNR (BOF)	54% Private % US ACOE
2010 Human Population Density (#/km ²)	103	161

Table 2. Physical habitat data collected at Stations 0101 and 0201 of Aylesworth Creek (405A) in 2013.

Parameter	Station 0101	Station 0201
Available Cover	14	15
Embeddedness	18	13
Velocity/Depth Regime	12	18
Sediment Deposition	16	10
Channel Flow Status	18	16
Channel Alteration	19	14
Frequency of Riffles	19	16
Bank Stability:		
Left Bank	8	6
Right Bank	8	6
Vegetative Protection:		
Left Bank	10	7
Right Bank	10	8
Vegetative Zone Width:		
Left Bank	10	10
Right Bank	10	10
Total Score:	172	149

Table 3. Physical-chemical parameters measured at Stations 0101 and 0201 of Aylesworth Creek (405A) in 2013.

Parameter	Station 0101	Station 0201
Date	08/27	8/07
Time (24 hour)	1210	0930
Air Temperature (°C)	24.0	22.0
Water Temperature (°C)	16.8	14.6
pH (Standard Units)	6.3	6.1
Total Alkalinity (mg/l)	5	3
Total Hardness (mg/l)	10	20
Specific Conductance (µmhos)	41	68

Table 4. Wild Brook Trout abundance and biomass estimates for Station 0101 of Aylesworth Creek (405A) determined in 2013.

Length Group (mm)	Population Estimate	Number per Hectare	Kilograms per Hectare	Number per Kilometer
50 - 74	324	4,000	9.84	1,080
75 - 99	51	630	3.75	170
100 - 124	79	975	13.36	263
125 - 149	20	247	6.03	67
150 - 174	7	86	3.55	23
175 - 199	3	37	2.37	10
200 - 224	2	25	2.28	7
Totals	486	6,000	41.18	1,620
< 150 mm	474	5,852	32.98	1,580
> 175 mm	5	62	4.65	17

Estimated Number of Legal Fish in Section 01: 42

Table 5. Wild Brook Trout abundance and biomass estimates for Station 0201 of Aylesworth Creek (405A) determined in 2013.

Length Group (mm)	Population Estimate	Number per Hectare	Kilograms per Hectare	Number per Kilometer
50 - 74	104	1,077	2.65	344
75 - 99	10	104	0.62	33
100 - 124	34	352	4.82	113
125 - 149	27	280	6.83	89
150 - 174	9	93	3.83	30
175 - 199	4	41	2.65	13
200 - 224	5	52	4.79	17
225 - 249	3	31	4.06	10
250 - 274	1	10	1.85	3
Totals	197	2,040	32.10	652
< 150 mm	175	1,813	14.92	579
> 175 mm	13	134	13.35	43

Estimated Number of Legal Fish in Section 02: 108

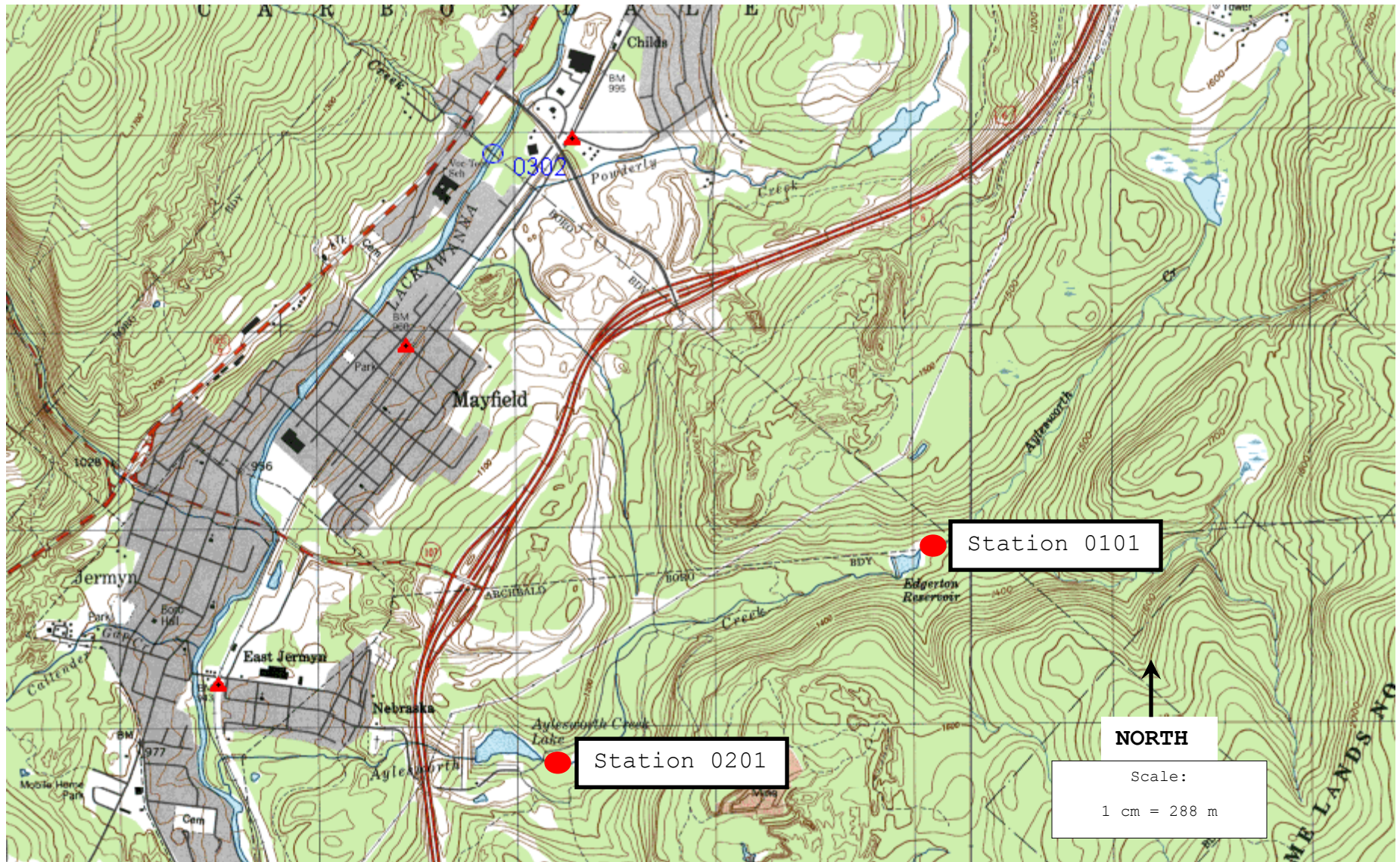


Figure 1. Location map for Aylesworth Creek (405A), Lackawanna County.

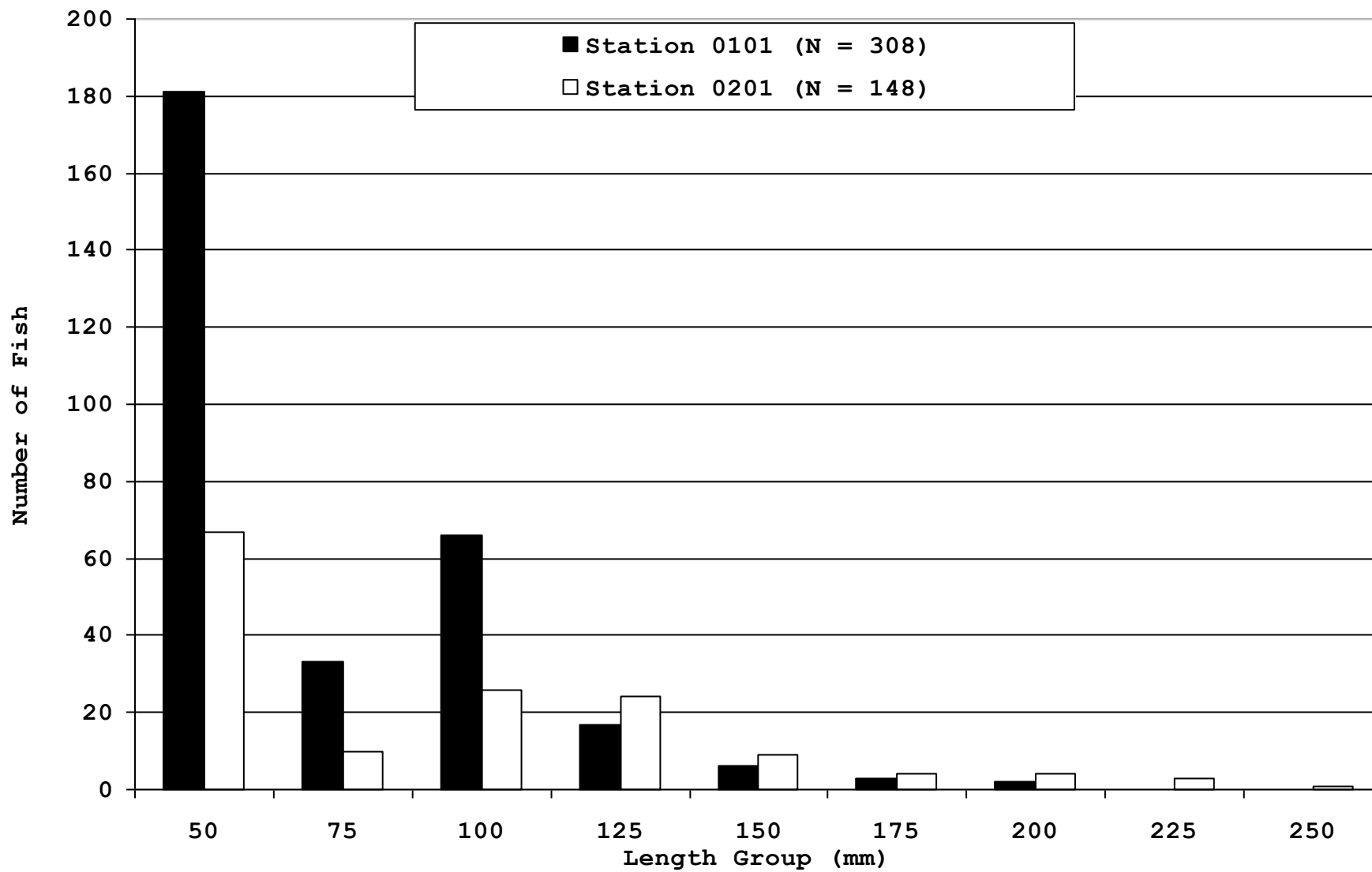


Figure 2. Length-frequency distributions (M + C - R) of wild Brook Trout captured in Aylesworth Creek (405A), Lackawanna County, during 2013.

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