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PENNSYLVANIA FISH AND BOAT COMMISSION
BUREAU OF FISHERIES
FISHERIES MANAGEMENT DIVISION

Little Juniata River (711A)
Sections 05 and 06
Management Report

Prepared by
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Fisheries Management Area 7

Fisheries Management Database Name: Little Juniata River
Lat/Lon: 40°33'40"/78°04'06"

Date Sampled: August 2010 Date Prepared: November 2010

Introduction

The Little Juniata River originates within the Norfolk Southern railroad yard in Logan Township in the vicinity of the City of Altoona, Blair County, at the confluence of Spring Run and Kettle Creek and flows northeasterly to the Borough of Tyrone and then southeasterly to its confluence with the Frankstown Branch of the Juniata River in Logan Township, Huntingdon County, in the vicinity of the Borough of Petersburg (Figure 1). The river is 50.1 km (31.1 mi) in length and drains an 888.0 km^2 (342.9 mi^2) watershed in the Appalachian Mountain section of the Ridge and Valley Province. The underlying geology consists of sandstone, shale, limestone, and dolomite of various formations of the Silurian, Devonian, Ordovician and Cambrian Periods. Land use within the watershed varies but is primarily agriculture with undeveloped hardwood forests interspersed by urban and industrial developments. Numerous coldwater tributaries (Sandy Run, Tipton Run, Spruce Creek, among others) and springs enter the Little Juniata River along its path to the mouth, and the river is characteristic of a small, limestone spring influenced river, somewhat unique to Pennsylvania for a flowing water of this magnitude. The Pennsylvania Department of Environmental Protection (PADEP) under 25 PA Code Chapter 93 currently designates the Little Juniata River as Trout Stocking, Migratory Fishes (TSF, MF), from its source downstream to Logan Spring Run and Cold Water Fishes, Migratory Fishes (CWF, MF),

from Logan Spring Run downstream to its mouth. Map coverage is provided by Altoona, Bellwood, Tipton, Tyrone, Spruce Creek, and Alexandria 7.5 minute United States Geological Survey Pennsylvania quadrangles.

During 2010, Sections 05 and 06 of the Little Juniata River were reexamined to evaluate the status of the naturally reproducing brown trout population and to estimate the contribution to the fishery from stocked fingerling brown trout. Section 05 extends 11.2 km (6.9 mi) from the railroad bridge at the east (downstream) border of the Village of Ironville downstream to the mouth of Spruce Creek. Section 06 extends 5.8 km (3.6 mi) from the mouth of Spruce Creek downstream to the Barree Road Bridge (SR 4004) at the Village of Barree (Table 1; Figure 2).

Historically, the Little Juniata River fishery was impaired by poor water quality originating from a variety of point and nonpoint sources. Water pollution reports filed by the PFBC from 1969 to present indicated that discharges from sewage treatment plants, industrial oils from railroad yards, train derailments, and unknown causes, among others, created water quality problems. Effects of these incidents ranged from no detectable damage to major fish kills. However, during the 1970s improved water quality allowed the Pennsylvania Fish and Boat Commission (PFBC) to begin stocking fingerling brown trout *Salmo trutta* from the Village of Ironville downstream to the mouth in an effort to establish a trout fishery. Based on data collected during trout population surveys conducted by the PFBC in 1977, 1983, 1987, 1990, 1991, and 1996, the PFBC continued the use of fingerling brown trout plants to maintain and supplement the trout fishery. Numbers of fingerling brown trout stocked varied over the years and currently the PFBC stocks 30,000 fingerling brown trout annually during spring into this portion of the river (15,000 in each of Sections 05 and 06) to bolster the naturally reproducing wild brown trout population residing in the river (Table 2).

The PFBC has managed the Little Juniata River from the upper section limit of Section 05 downstream to its mouth, a distance of 22.0 km (13.7 miles), with various regulations over the years. Beginning in the 1970s the PFBC managed this portion of the river with Miscellaneous Water Special Regulations. These regulations permitted year-round angling and harvest of trout with an eight trout creel limit and seven inch (178 mm) minimum size limit from the opening day of regular trout season to Labor Day, and a three trout creel limit from the day after Labor Day to the following opening day of trout season. To address public petitions to implement more restrictive angling regulations, the PFBC applied All Tackle Trophy Trout Regulations to this portion of the river beginning with the opening day of the 1996 trout season. These regulations allowed for year-round trout angling

with a 356 mm (14 in) minimum length limit and two trout daily creel limit for the period from the opening day of trout season through Labor Day with a catch and release (no harvest) period from the day after Labor Day until the following opening day of trout season. The PFBC then applied more restrictive angling regulations to this portion of the river. Beginning in January 2006, the regulations changed to Catch-and-Release All Tackle regulations. These regulations allow for year-round angling and no trout may be killed or had in possession.

Methods

The examination of the Little Juniata River fishery in Sections 05 and 06 was conducted from August 2 – 4, 2010. All procedures were carried out according to those outlined by Marcinko et al. (1986). To facilitate differentiation from wild brown trout residing in the river, all fingerling brown trout stocked by the PFBC (60,000 total) during May 2009 and May 2010 were marked by removing the adipose fin. Two representative historic sampling stations were surveyed in Section 05 in the vicinity of the villages of Shoenberger (River Mile 10.61; 465 m station length) and Pemberton (River Mile 9.16; 237 m station length) totaling 6.3% of the section length. One representative sampling station was surveyed in the vicinity of the Village of Barree (River Mile 3.25; 435 m station length) totaling 7.6% of the section length (Table 3). This site did not directly correspond to the historic July 1983 electrofishing site (River Mile 3.51; 330 m station length) due to ongoing bridge construction at the time of the survey.

Two towed boat electrofishing units equipped with a Pow'r Gard model 1736DCV generator designed to deliver straight DC current operated at 250 volts DC were used to electrofish the river. Two, three person crews with one roaming netter electrofished the stations simultaneously. Brown trout were the target species and total species composition and relative abundance of non-target species were determined. Captured trout were measured and recorded in 25 millimeter (1.0 in) length groups and examined for adipose fin marks to differentiate between hatchery versus wild trout. Statewide average weights calculated for each length group were used to generate the biomass (kg/ha) estimate for all trout captured at the Pemberton station (River Mile (RM) 9.16). The exact total length (mm) and weight (g) was recorded for a subset of trout per 25 mm length group for trout captured greater than or equal to 200 mm (7.9 in) at the Shoenberger (RM 10.61) and Barree (RM 3.25) stations to facilitate calculation of relative weight (W_r; Wege and Anderson 1978), and were incorporated into the biomass (kg/ha) estimate at these stations. All captured trout were given an identifying upper caudal fin clip during the initial

electrofishing pass to facilitate a mark-recapture population estimate. Trout densities were determined using the Chapman modification of the Petersen estimator (Ricker 1975). Scientific and common fish names reference the Integrated Taxonomic Information System (http://www.itis.gov).

Physicochemical attributes including air temperature (°C), water temperature (°C), specific conductance (µS/cm), pH (standard units), total alkalinity (mg/l), total hardness (mg/l), and dissolved oxygen (mg/l) were recorded following procedures outlined by Marcinko et al. (1986). Additionally, one temperature data logger (Onset HOBO Pro v2) was deployed in each of the two river sections under examination during May 2009 prior to stocking the fin marked fingerling brown trout. Temperature data loggers were located at RM 11.0 in Section 05 and RM 4.0 in Section 06. Temperature data loggers recorded a water temperature (°C) at 15 minute intervals and remained active throughout the period of evaluation. Rapid bioassessment protocols (RBP) were used to assess the habitat in this stream (Barbour et al. 1999).

Results

Section 05

The Shoenberger sampling station (RM 10.61) was located downstream from the Babe Road Bridge (T-506) in the vicinity of the Village of Shoenberger at 40°37’44” latitude and 78°10’56” longitude. The 465 m long station averaged 27.9 m in wetted width and comprised 4.2 percent of the total section length (Table 3). The RBP analysis yielded a final score of 162. Physicochemical attributes and their associated values measured under low flow conditions were as follows: air temperature 27°C, water temperature 18.3°C, specific conductance 339.4 µS/cm, pH 8.0 standard units, total alkalinity 114 mg/l, total hardness 108 mg/l, and dissolved oxygen 9.8 mg/l (Table 4). Water temperature recorded at the monitoring station located within the sampling station varied throughout the year and the maximum daily water temperature recorded over the period of record was 23.1°C (73.5°F) on July 20, 2010 (Figure 3).

Ten unique fish species were identified at the Shoenberger electrofishing station (Table 5). A total of 880 individual brown trout between 75 mm (3.0 in) and 449 mm (17.7 in) in total length were captured during both passes of the two-pass mark-recapture electrofishing survey, of which 40 (approximately 4.5%) were missing their adipose fin and consequently were determined to have originated from fingerling plants during 2009 or 2010. Hatchery origin brown trout ranged in total length from 100 mm (3.9 in) to 274 mm (10.8 in). Based on these results, the estimated biomass of wild brown trout was 143.60

kg/ha (127.81 lbs/ac; Table 6). The estimated biomass of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 1.38 kg/ha (1.23 lbs/ac). Estimated total wild brown trout abundance was 2,071/km (3,334/mi), while the estimated number of wild brown trout greater than or equal to 175 mm (7.0 in) was 1,841/km (2,964/mi). The estimated total abundance of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 102/km (164/mi). The mean Relative Weight of wild brown trout greater than or equal to 200 mm (7.9 in) was 87 and the mean weight (g) for 25 mm (1.0 in) length groups was predominantly lower than the statewide average (Table 7).

The Pemberton sampling station (RM 9.16) was located 300 m downstream from the SR 1013 Bridge in the vicinity of the limestone quarry near the Village of Pemberton at 40°37′04″ latitude and 78°09′55″ longitude. The 237 m long station averaged 19.8 m in wetted width and comprised 2.1 percent of the total section length (Table 3). The RBP analysis yielded a final score of 157. Physicochemical attributes and their associated values measured under low flow conditions were as follows: air temperature 28°C, water temperature 19.6°C, specific conductance 350.1 µS/cm, pH 8.0 standard units, total alkalinity 164 mg/l, total hardness 160 mg/l, and dissolved oxygen 11.3 mg/l (Table 4).

Eight unique fish species were identified at the Pemberton electrofishing station (Table 5). A total of 702 individual brown trout between 50 mm (2.0 in) and 474 mm (18.7 in) in total length were captured during both passes of the two-pass mark-recapture electrofishing survey, of which 32 (approximately 4.6%) were missing their adipose fin and consequently were determined to have originated from fingerling plants during 2009 or 2010. Hatchery origin brown trout ranged in total length from 100 mm (3.9 in) to 274 mm (10.8 in). Based on these results, the estimated biomass of wild brown trout was 218.32 kg/ha (194.30 lbs/ac), while the estimated biomass of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 4.19 kg/ha (3.73 lbs/ac). Estimated total wild brown trout abundance was 7,671/km (12,350/mi), while the estimated number of wild brown trout greater than or equal to 175 mm (7.0 in) was 1,730/km (2,785/mi; Table 8). The estimated total abundance of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 182/km (293/mi).

Considering both electrofishing stations surveyed in Section 05 during the August 2010, a total of 1,582 individual brown trout between 50 mm (2.0 in) and 474 mm (18.7 in) in total length were captured during both passes of the two-pass mark-recapture electrofishing survey, of which 71 (approximately 4.49%) were

missing their adipose fin and consequently were determined to have originated from fingerling plants during 2009 or 2010. Hatchery origin brown trout ranged in total length from 100 mm (3.9 in) to 274 mm (10.8 in). Based on these results, the estimated section biomass of wild brown trout was 180.96 kg/ha (161.05 lbs/ac; Table 9). The estimated biomass of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 2.79 kg/ha (2.48 lbs/ac). Estimated total wild brown trout abundance was 4,869/km (7,839/mi), while the estimated number of wild brown trout greater than or equal to 175 mm (7.0 in) was 1,784/km (2,872/mi). The estimated total abundance of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 142/km (229/mi) or 1,590 fish within the 11.2 km (6.9 mi) Section 05. Based on this estimate 5.3% of the 30,000 fin marked fingerling brown stocked in Section 05 survived until the time of the survey. The estimated abundance of Age-1 hatchery brown trout originating from the 2009 plant residing in the 11.2 km (6.9 mi) Section 05 was 246 or 1.64 % of the 15,000 fingerlings stocked, and ranged in total length from 225 mm (8.9 in) to 274 mm (10.8 in;).

Section 06

The Barree sampling station (RM 3.25) was located 79 m upstream from the Barree Road Bridge (SR 4004) in the vicinity of the Village of Barree at 40°35′10″ latitude and 78°06′05″ longitude. The 435 m long station averaged 23.4 m in wetted width and comprised 7.6 percent of the total section length (Table 3). The RBP analysis yielded a final score of 156. Physicochemical attributes and their associated values measured under low flow conditions were as follows: air temperature 27°C, water temperature 19.0°C, specific conductance 359.3 µS/cm, pH 7.4 standard units, total alkalinity 130 mg/l, total hardness 165 mg/l, and dissolved oxygen 8.7 mg/l (Table 4). Water temperature recorded at the monitoring station located just upstream from the sampling station varied throughout the year and the maximum daily water temperature recorded during the period of record was 25.2°C (77.4°F) on July 24, 2010 (Figure 3).

Twelve unique fish species were identified at the Barree electrofishing station (Table 5). A total of 658 individual brown trout between 50 mm (2.0 in) and 449 mm (17.7 in) in total length were captured during both passes of the two-pass mark-recapture electrofishing survey, of which 12 (approximately 1.8%) were missing their adipose fin and consequently were determined to have originated from fingerling plants during 2009 or 2010. Hatchery origin brown trout ranged in total length from 125 mm (4.9 in) to 274 mm (10.8 in). Based on these results, the estimated biomass of wild brown trout was 159.34

kg/ha (141.81 lbs/ac; Table 10). The estimated biomass of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 1.22 kg/ha (1.09 lbs/ac). Estimated total wild brown trout abundance was 2,036/km (3,278/mi), while the estimated number of wild brown trout greater than or equal to 175 mm (7.0 in) was 1,887/km (3,038/mi). The estimated total abundance of hatchery brown trout originating from the 2009 and 2010 fingerling plants was 27/km (43/mi), or 157 fish within the 5.8 km (3.6 mi) Section 06. Based on this estimate less than 1% of the 30,000 fin marked fingerling brown stocked in Section 06 survived until the time of the survey. The estimated abundance of Age-1 hatchery brown trout originating from the 2009 plant residing in the 5.8 km (3.6 mi) Section 06 was 93 or less than 1 % of the 15,000 fingerlings stocked, and ranged in total length from 225 mm (8.9 in) to 274 mm (10.8 in). The mean Relative Weight of wild brown trout greater than or equal to 200 mm (7.9 in) was 87 and the mean weight (g) for 25 mm (1.0 in) size groups was predominantly lower than the statewide average (Table 7).

Discussion

Sections 05 and 06 of the Little Juniata River supported natural reproduction of brown trout. The wild brown trout biomass determined from the survey exceeded the PFBC minimum biomass criteria of 40 kg/ha (35.6 lbs/ac) for a Class A wild brown trout population. Section 05 total wild brown trout biomass was estimated to be 180.96 kg/ha (161.05 lbs/ac), substantially above the minimum criteria for consideration as a Class A brown trout population. Section 06 total wild brown trout biomass was estimated at 159.34 kg/ha (141.81 lbs/ac), also substantially greater than the minimum criteria for consideration as a Class A brown trout population.

Fin-marked fingerling brown trout stocked by the PFBC captured during the survey ranged in size from 100 mm (3.9 in) to 274 mm (10.8 in). As such, brown trout captured within this size range that were not fin marked did not originate from the 2009 or 2010 PFBC fingerling plants and were determined to be the result of natural reproduction in the Little Juniata River Basin. However, a portion of the brown trout captured that were greater than 274 mm (10.8 in) in total length could have been stocked by the PFBC prior to 2009 and 2010, as these were the only years that the PFBC fin marked fingerling brown trout stocked in the Little Juniata River. Based on the length-at-age of brown trout aged from scale samples collected during past surveys, the Agency Resource Database was used to generate an age index key to estimate the age of wild brown trout captured during the 2010 survey. The estimated number of Age-0 wild brown trout captured during the 2010 survey was 409 and the number of Age-1 wild

brown trout captured was 519. Based on the low percentage of fin marked brown trout relative to total Age-0 (13.32%) and Age-1 (3.71%) brown trout captured (Figure 4), it is likely that very few brown trout captured greater than 274 mm (10.8 in) in total length originated from PFBC fingerlings stocked prior to 2009. The biomass of wild brown less than or equal to 274 mm (10.8 in) in total length, or the maximum size fin-marked fingerling brown trout were observed during the August 2010 survey, was 64.95 kg/ha (57.81 lbs/ac) in Section 05 and 52.76 kg/ha (46.96 lbs/ac) in Section 06. These figures provide biomass estimates from the size range where hatchery versus wild origin brown trout was determined based on fin marks. Based on the absence of a fin mark, the estimated biomass of wild brown trout less than or equal to 274 mm (10.8 in), exceeded the PFBC minimum criteria of 40 kg/ha (35.6 lbs/ac) for a Class A wild brown trout population.

The estimated biomass of wild brown trout determined during the 2010 evaluation was substantially higher than estimates derived from prior surveys conducted during 1977, 1983, 1987, 1990, 1991, and 1996 (Figure 5). The wild brown trout population growth observed is likely attributable to a variety of factors including more restrictive angling regulations and the disturbance regime (point and/or non-point source pollution events, drought frequency, etc.), among other factors. All Tackle Trophy Trout regulations and Catch-and-Release All Tackle regulations enacted in 1996 and 2006, respectively, likely reduced fishing mortality attributable to harvest from anglers. However, no surveys were conducted between 1997 and 2009 to assess the effect of these regulations on the fishery.

Additionally, the Little Juniata River fishery was historically impaired by poor water quality originating from a variety of point and nonpoint sources, including a near total fish kill on October 25, 1984, from the Borough of Birmingham downstream to the mouth of Spruce Creek. The most recent major incident on record that impaired the aquatic community of the Little Juniata River was a severe macroinvertebrate kill that occurred in 1996. Although smaller-scale incidents have negatively impacted the water quality and biota of the Little Juniata River post-1996, none appeared to have had negative implications of the magnitude of those previously described.

For general inventories, the PFBC requires investigators to sample 10% of the section length when examining coldwater systems. The sampling stations surveyed in Sections 05 and 06 comprised 6.3% and 7.6% of the total section lengths, respectively, and did not meet the target 10%. Time constraints and physical habitat characteristics of Sections 05 and 06 of the Little Juniata River precluded additional electrofishing

stations from being surveyed during 2010. This portion of the river is characterized by frequent large and deep pools associated with numerous railroad trestle crossings and natural fluvial geomorphic characteristics that created water depths in excess of levels that could be effectively and safely sampled while utilizing wadeable electrofishing gear such as towboat units. Additionally, access is limited to a large portion of the river flowing through Section 06 downstream from the mouth of Spruce Creek due to private property and lack of roads. Stations surveyed during August 2010 in Sections 05 and 06 were representative of the overall section physical habitat and water quality characteristics. As such, biomass estimates derived from those surveys are likely indicative of the brown trout population levels present throughout the length of each section.

Fingerling trout are utilized to develop put-grow-and-take fisheries and are allocated to lake and stream sections based on stocking requests from PFBC Area Fisheries Managers. Fingerling trout are stocked during the spring months and typically range from 50 mm (2 in) to 100 mm (4 in) in total length at the time of stocking. The goal of the fingerling trout program in flowing waters is to provide recreational trout angling opportunities through the planting of fingerling trout in stream sections capable of supporting a substantial standing stock of resident trout but where lack of spawning success or other factors prevent natural development of a trout fishery (Kuhn 2010). Wild brown trout biomass well in excess of minimum PFBC Class A criteria documented during this evaluation indicated that fingerling plants are not required to provide recreational angling opportunities and are not needed to maintain a directed fishery for brown trout in Sections 05 and 06 of the Little Juniata River. It is the PFBC's policy to recognize self-sustaining Class A wild trout populations as a renewable natural resource meriting special consideration in development of fisheries management plans and water quality/habitat protection, and as such, the Little Juniata River, Sections 05 and 06, should be managed as Class A wild brown trout waters with no stocking of hatchery fish.

Fingerling stocking may provide the opportunity to provide fisheries of high quality at lower costs than stocking with adult trout in some circumstances (Kuhn 2010). A primary objective of the fingerling trout program is for stocked fingerling trout to survive in the waterway they are stocked long enough to grow to between 225 mm (8.9 in) and 274 mm (10.8), or the target minimum size at which adult trout are stocked by the PFBC in Approved Trout Waters. The average cost for the PFBC to stock one adult trout is $2.73, while the average cost to stock one fingerling trout is $0.65 (Wisner 2009). As such, the cost of one adult trout is approximately

equal to four fingerling trout, and in order for the fingerling trout program to be cost effective it would require 25% survival and growth to the target size. A total of 20 Age-1 fin marked brown trout between 225 mm (8.9 in) and 274 mm (10.8 in) in total length originating from the 2009 plant were captured during the August 2010 examination of the Little Juniata River, or less than 1% of the 30,000 fingerlings stocked in May 2009. Additionally, the estimated abundance of fin marked brown trout within this size range was 246 in Section 05 and 93 in Section 06, or 1.64% and less than one percent, of the 15,000 fingerlings planted in each of the two sections during 2009. These survival rates were well short of the 25% survival target for fingerling supported trout waters. As such, fingerling brown trout plants in the Little Juniata River are not cost effective and do not survive and grow to a size that is sufficient to support a directed fishery.

The length and weight of a subset of fish captured during the survey was recorded to estimate overall condition of the brown trout population residing in the portion of the Little Juniata River under evaluation. The mean Relative Weight (W_r) of fish greater than 200 mm (7.8 in) was 87 and the mean weight (g) was predominantly lower than the statewide average (Table 7; Figure 6; Figure 7). This indicated that the population of brown trout residing in this portion of the Little Juniata River at the time of the evaluation was in somewhat depressed condition in terms of the body weight to length relationship relative to the standard for lotic brown trout populations (Anderson and Neumann 1996). Additionally, brown trout less than 300 mm (11.8 in) exhibited better body condition than fish greater than 300 mm (11.8 in).

When W_r for and individual fish or size group is below 100, problems may exist in food availability or feeding behavior (Anderson and Neumann 1996). The below standard body condition exhibited by this population may be attributable to a variety of reasons including density dependent factors or warm water temperatures, among other things. Due to the unusually warm summer experienced during 2010, this phenomenon was likely attributable to above normal water temperatures, as habitat or food availability did not appear to be limiting factors. Abundance of forage fish observed during the survey appeared adequate (Table 5). However, the highest daily maximum water temperatures were documented at both temperature monitoring stations just prior to the survey, and, in general, 2010 was warmer than 2009 during the summer months (Figure 3). Wehrly et al. (2007) determined that the upper thermal tolerance for maximum daily temperature of streams in Michigan and Wisconsin where brook and brown trout existed did not differ between species and ranged from 24.6°C to 27.6°C for 1-14 day exposure periods. Daily maximum temperatures in section 05 and 06 were

23.1°C and 25.2°C, respectively, during July. Metabolism, feeding, and growth of fishes is directly related to water temperature (Brett 1971; Elliot 1981), and warm temperature experienced during summer 2010 is likely the primary factor leading to reduced body condition of the Little Juniata River brown trout population at the time of the survey.

Based on these results, Sections 05 and 06 of the Little Juniata River will be added to Pennsylvania's Naturally Reproducing Trout Streams list and should be designated as Class A wild brown trout waters by the PFBC Board of Commissioners. Beginning in 2011, fingerling brown trout plants will be discontinued in favor of wild trout management. Additionally, the current 25 PA Code Chapter 93 water quality standards listing of Cold Water Fishes, Migratory Fishes, from Logan Spring Run downstream to the mouth does not adequately protect the existing flora and fauna present within this portion of the Little Juniata River. Should the Commission afford the Class A wild trout designation to Sections 05 and 06 of the Little Juniata River, the PADEP should consider upgrading the protected water use of this portion of the river to High Quality, Cold Water Fishes, Migratory Fishes to adequately protect the existing flora and fauna.

1. Add the Little Juniata River (11A), sections 05 and 06, to Pennsylvania's Naturally Reproducing Trout Streams list.

2. Discontinue fingerling brown trout plants in sections 05 and 06 beginning in 2011 in favor of wild trout management.

3. Managed the Little Juniata River (11A), sections 05 and 06, as Class A wild brown trout waters from the railroad bridge at the east (downstream) border of Ironville downstream to the Barree Road Bridge (SR 4004).

4. Pending Commission approval of Class A status for sections 05 and 06, provide a copy of this report to the Pennsylvania Department of Environmental Protection through the Pennsylvania Fish and Boat Commission's Environmental Services Division for a 25 PA Code Chapter 93 upgrade from Cold Water Fishes, Migratory Fishes to High Quality Cold Water Fishes, Migratory Fishes from the railroad bridge at the east (downstream) border of Ironville downstream to the Barree Road Bridge (SR 4004; sections 05 and 06; Environmental Services action needed).

5. Re-inventory the Little Juniata River, Section 07 (Barree Road Bridge (SR 4004) downstream to the mouth) to determine the downstream limits of the Class A wild brown trout population.

6. Re-inventory the Little Juniata River, sections 05 and 06, in 2011 and every five years thereafter to monitor changes in the wild brown trout population.

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Table 1. Physical characteristics of the Little Juniata River (11A), sections 05 and 06, Blair and Huntingdon counties.

Physical characteristics	Section 05	Section 06
USGS Quadrangles	Tyrone/Spruce Creek	Spruce Creek/Alexandria
UPS Section Limit	East (downstream) border Ironville; 40°39'25"/78°12'46"	Mouth of Spruce Creek; 40°36'30"/78°08'10"
DNS Section Limit	Mouth of Spruce Creek; 40°36'30"/78°08'10"	Barree Road Bridge (SR 4004); 40°35'13"/78°06'02"
Length (km)	11.17	5.76
Mean Width (m)	24.45	25.54
Area (ha)	27.14	15.33

Table 2. Pennsylvania Fish and Boat Commission fingerling brown trout stocking history of the Little Juniata River (11A).

Year	Number of fingerling brown trout stocked
1978	15,500
1979	12,500
1980	6,100
1981	57,500
1982	20,000
1983	42,000
1984	105,000
1985	82,700
1986	82,000
1987	100,000
1988	
1989	100,000
1990	100,000
1991	100,000
1992	75,000
1993	75,000
1994	95,000
1995	140,000
1996	100,000
1997	
1998	25,000
1999	33,000
2000	38,000
2001	45,000
2002	25,000
2003	12,000
2004	24,000
2005	24,000
2006	45,000
2007	30,000
2008	30,000
2009	30,000
2010	30,000

Table 3. Station locations, lengths and average widths for sections 05 and 06 of the Little Juniata River (11A), Blair and Huntingdon counties surveyed August 2010.

Section	Station	Downstream limit	Length (m)	Mean width (m)
05	Shoenberger	Downstream from Babe Rd Bridge; 40°37'44"/78°10'56"	465	27.9
05	Pemberton	300 m downstream from SR 1013 Bridge; 40°37'04"/78°09'55"	237	19.8
06	Barree	79 m upstream from Barree Road Bridge (SR 4004); 40°35'10"/78°06'05"	435	23.4

Table 1. Physicochemical parameters and their associated values measured at Little Juniata River (11A), sections 05 and 06, Blair and Huntingdon counties, surveyed 2010.

Parameter	Station		
	Shoenberger (RM 10.61)	Pemberton (RM 9.16)	Barree (RM 3.25)
Date	3-Aug-10	2-Aug-10	2-Aug-10
Time (24 hour)	1430	1330	1300
Air temperature (°C)	27	28	27
Water temperature (°C)	18.3	19.6	19.0
Specific conductance (µS/cm)	339.4	350.1	359.3
pH (standard units)	8.0	8.0	7.4
Total alkalinity (mg/l)	114	164	130
Total hardness (mg/l)	108	160	165
Dissolved oxygen (mg/l)	9.8	11.3	8.72

Table 5: Fish species occurrence and relative abundance observed during the August 2010 two towed boat electrofishing survey at the Little Juniata River (11A), sections 05 and 06, Blair and Huntingdon counties.

Common name	Scientific name	Station		
		Shoenberger (RM 10.61)	Pemberton (RM 9.16)	Barree (RM 3.25)
Black Crappie	*Pomoxis nigromaculatus*			R
Blacknose Dace	*Rhinichthys atratulus*	A	C	A
Bluntnose Minnow	*Pimephales notatus*		R	
Brown Trout	*Salmo trutta*	A	A	A
Brown Trout - Hatchery	*Salmo trutta*	C	P	P
Cutlips Minnow	*Exoglossum maxillingua*	C	C	A
Longnose Dace	*Rhinichthys cataractae*	C	A	A
Northern Hog Sucker	*Hypentelium nigricans*			P
Rainbow Trout - Hatchery	*Oncorhynchus mykiss*	R		P
River Chub	*Nocomis micropogon*		R	
Rock Bass	*Ambloplites rupestris*	P		P
Shield Darter	*Percina peltata*			R
Slimy Sculpin	*Cottus cognatus*	C		
Smallmouth Bass	*Micropterus dolomieu*	P		P
Tessellated Darter	*Etheostoma olmstedi*	P	P	P
White Sucker	*Catostomus commersonii*	A	C	C
Number of unique species		10	8	12

*Subjective Abundance Index based on 300 m long station:
A = Abundant (> 100)
C = Common (26 - 100)
P = Present (3 - 25)
R = Rare (< 3)

Table 6. Estimated abundance and biomass of wild brown trout from Little Juniata River (11A), section 05. Station was surveyed August 3, 2010 and was located at RM 10.61 (Shoenberger Station). Biomass was determined using the Chapman modification of the Petersen estimator.

Length group (mm)	Population estimate	Low 95 % CI	High 95% CI	Estimated number/ha	Estimated kg/ha	Estimated number/km
75-99	38			29	0.19	82
100-124	66	31	152	51	0.73	142
125-149	3			2	0.06	6
175-199	27	15	56	21	1.40	58
200-224	223	179	279	172	16.29	480
225-249	166	133	208	128	15.49	357
250-274	62	43	94	48	7.83	133
275-299	84	62	117	65	13.89	181
300-324	92	71	120	71	20.44	198
325-349	96	75	123	74	26.57	206
350-374	65	49	90	50	22.46	140
375-399	26	15	45	20	10.54	56
400-424	12	7	23	9	6.07	26
425-449	3			2	1.64	6
Total	963			742	144.60	2,071

Table 7. Mean Relative Weight (W_r) and mean weight (g) per 25 mm (1 in) length groups of a subset of wild brown trout greater than or equal to 200 mm (7.9 in) captured at the Little Juniata River (11A), RM 10.61 (Shoenberger station, Section 05) and RM 3.25 (Barree station, Section 06).

	Mean Relative Weight (W_r)			Mean weight (g)			
Length Group (mm)	Shoenberger	Barree	Both stations	Shoenberger	Barree	Both stations	Statewide Mean
200-224	89.63	96.13	93.53	95	100	98	97
225-249	85.70	93.66	89.87	121	129	125	135
250-274	83.60	90.08	86.67	164	179	171	183
275-299	86.23	89.09	87.79	215	227	222	237
300-324	84.90	82.00	82.34	288	276	278	304
325-349	86.04	82.84	84.37	359	336	347	384
350-374	90.18	81.27	85.73	448	394	421	476
375-399	85.09	81.70	83.39	526	495	511	580
400-424	92.24	77.93	86.52	656	584	631	696
425-449	80.33	83.00	81.00	710	713	711	870
All fish	86.79	86.57	86.68				

Table 8. Estimated abundance and biomass of wild brown trout from Little Juniata River (11A), Section 05. Station was surveyed August 2, 2010 and was located at RM 9.16 (Pemberton Station). Biomass was determined using the Chapman modification of the Petersen estimator.

Length group (mm)	Population estimate	Low 95 % CI	High 95% CI	Estimated number/ha	Estimated kg/ha	Estimated number/km
50-74	5			11	0.03	21
75-99	560	331	1,011	1,193	7.58	2,363
100-124	825	409	1,804	1,758	25.23	3,481
125-149	9			19	0.50	38
150-174	9			19	0.84	38
175-199	67	43	109	143	9.58	283
200-224	98	70	143	209	20.28	414
225-249	56	38	85	119	16.09	236
250-274	20	11	39	43	7.78	84
275-299	36	23	59	77	18.18	152
300-324	50	32	82	107	32.27	211
325-349	47	32	72	100	38.37	198
350-374	21	12	38	45	21.23	89
375-399	11	6	23	23	13.58	46
400-424	3			6	4.45	13
450-474	1			2	2.23	4
Total	1,818			3,874	218.32	7,671

Table 9. Mean abundance and biomass statistics of wild brown trout from Little Juniata River (11A), Section 05. Stations were located at RM 10.61 (Shoenberger Station) and RM 9.16 (Pemberton Station). Biomass was determined using the Chapman modification of the Petersen estimator.

Length group (mm)	Population estimate	CPUE	Estimated number/ha	Estimated kg/ha	Estimated number/km
50-74	3	3.13	5	0.02	11
75-99	299	100.24	611	3.89	1,222
100-124	446	84.69	904	12.97	1,811
125-149	6	3.13	11	0.28	22
150-174	5	7.29	10	0.42	19
175-199	47	46.53	82	5.49	170
200-224	161	97.26	190	18.29	447
225-249	111	68.62	124	15.79	297
250-274	41	25.43	45	7.80	109
275-299	60	44.81	71	16.04	166
300-324	71	50.67	89	26.41	204
325-349	72	57.58	87	32.47	202
350-374	43	30.22	47	21.84	114
375-399	19	14.78	22	12.05	51
400-424	8	6.10	8	5.26	19
425-449	2	0.54	1	0.82	3
450-474	1	1.04	1	1.12	2
Total	1,395	642.06	2,308	180.96	4,869

Table 10. Estimated abundance and biomass of wild brown trout from Little Juniata River (11A), Section 06. Station was surveyed August 2, 2010 and was located at RM 3.25 (Barree Station). Biomass was determined using the Chapman modification of the Petersen estimator.

Length group (mm)	Population estimate	Low 95 % CI	High 95% CI	Estimated number/ha	Estimated kg/ha	Estimated number/km
50-74	1			1	0.00	2
75-99	14			14	0.12	32
100-124	12			12	0.21	28
125-149	10			10	0.25	23
150-174	28	14	62	28	1.27	64
175-199	124	87	185	122	8.98	285
200-224	199	142	288	196	19.46	457
225-249	111	63	215	109	14.04	255
250-274	48	29	85	47	8.43	110
275-299	86	58	134	84	19.19	198
300-324	86	60	128	84	23.34	198
325-349	83	57	127	82	27.41	191
350-374	54	38	81	53	20.92	124
375-399	20	10	40	20	9.73	46
400-424	8	4	21	8	4.59	18
425-449	2			2	1.40	5
Total	886			872	159.34	2,036

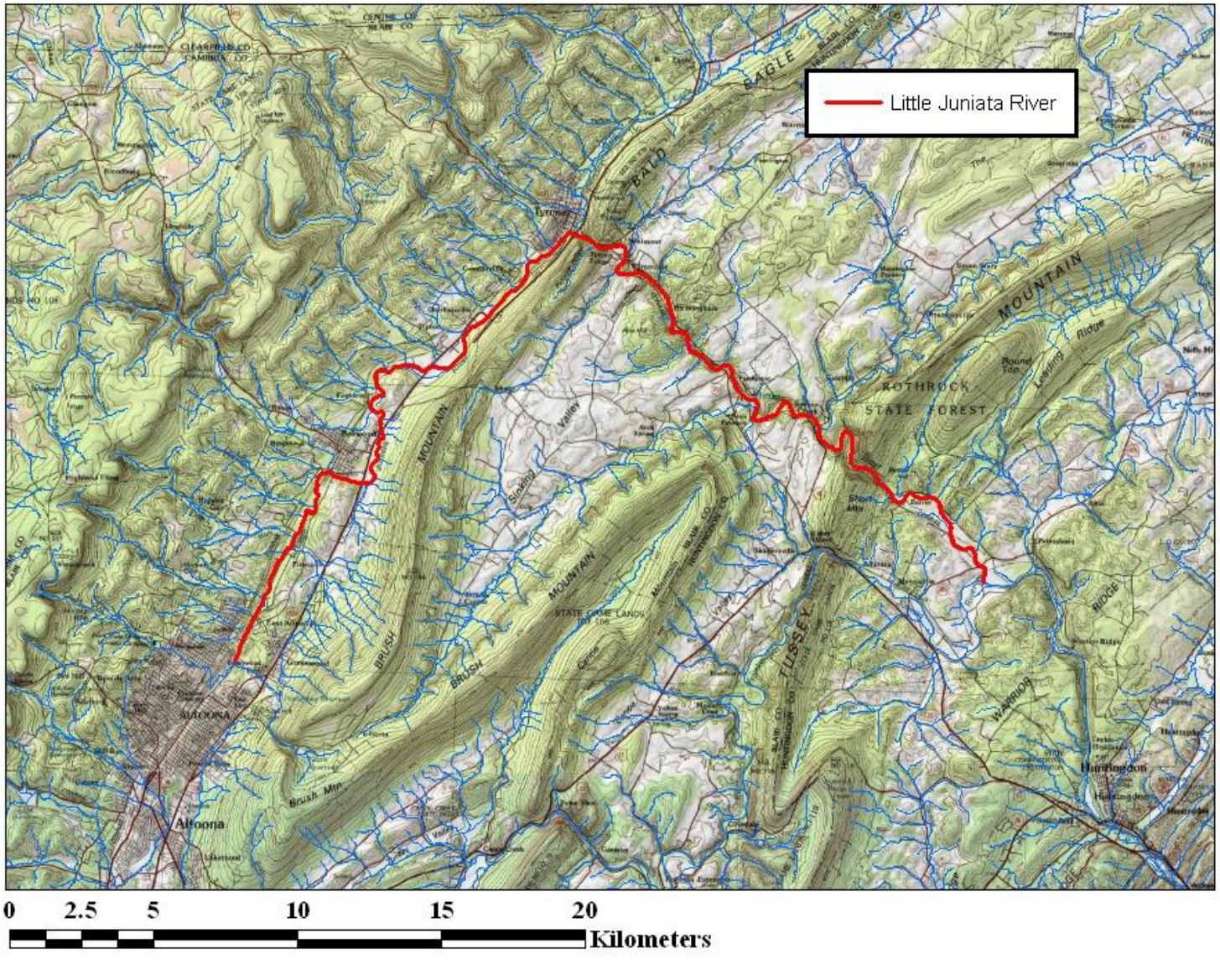

Figure 1. Location map for the Little Juniata River (11A), in Blair and Huntingdon counties.

DEP Stream Code: 15664

Little Juniata River

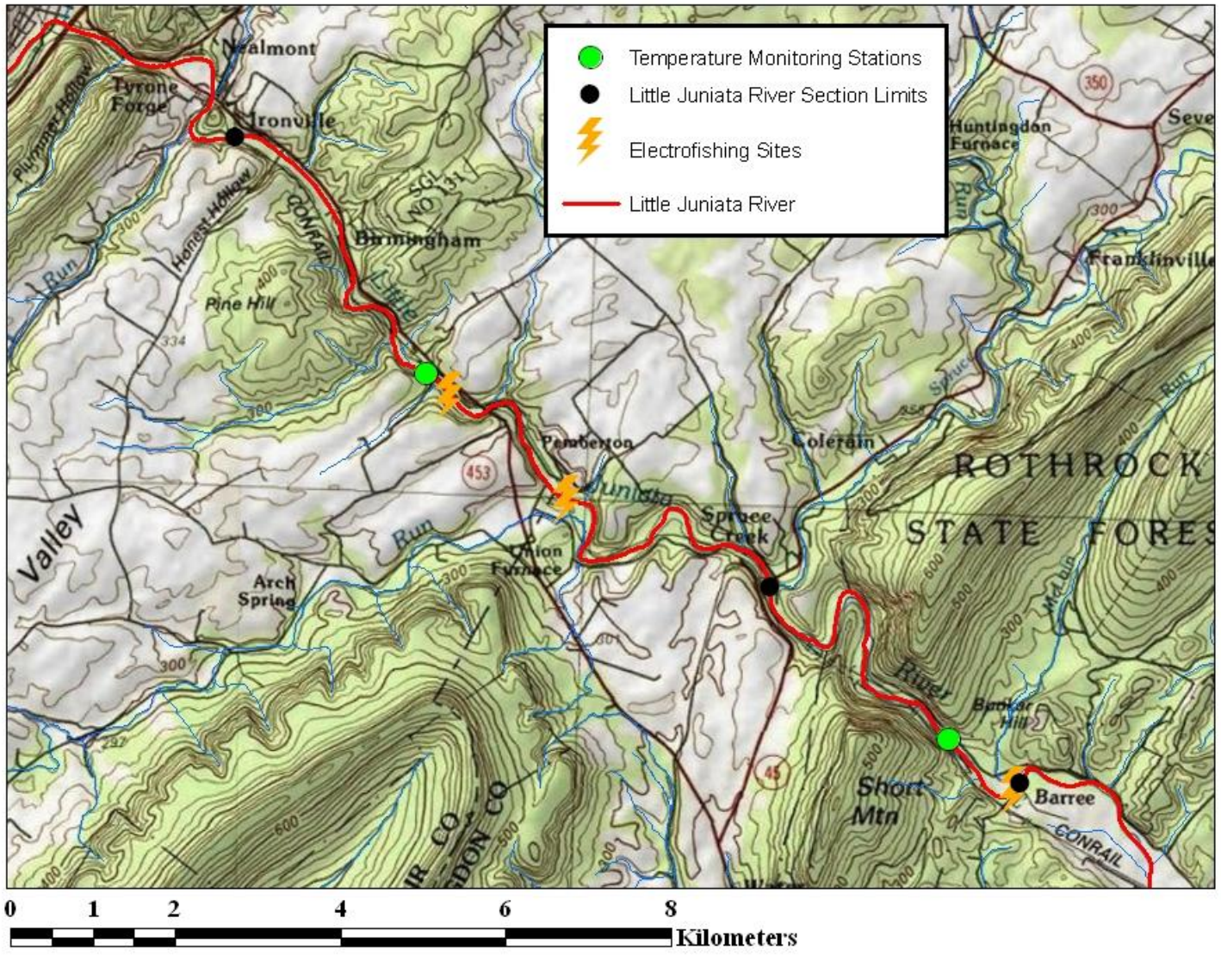

Figure 2. Location map for the Little Juniata River (11A), Sections 05 and 06, in Blair and Huntingdon counties.

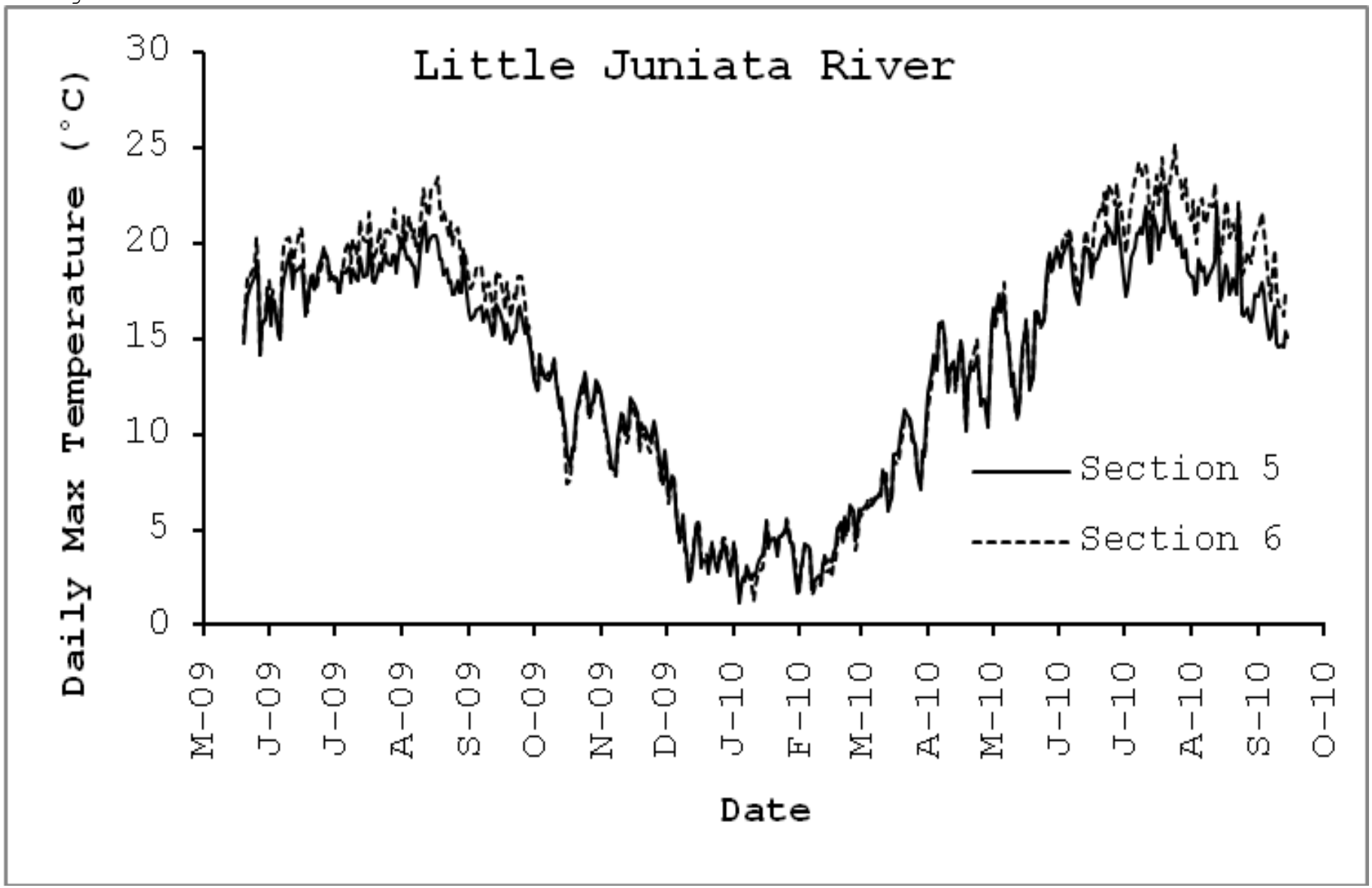

Figure 3. Daily maximum water temperature (°C) recorded at monitoring stations located at RM 4.0 and 11.0 in Sections 05 and 06 respectively.

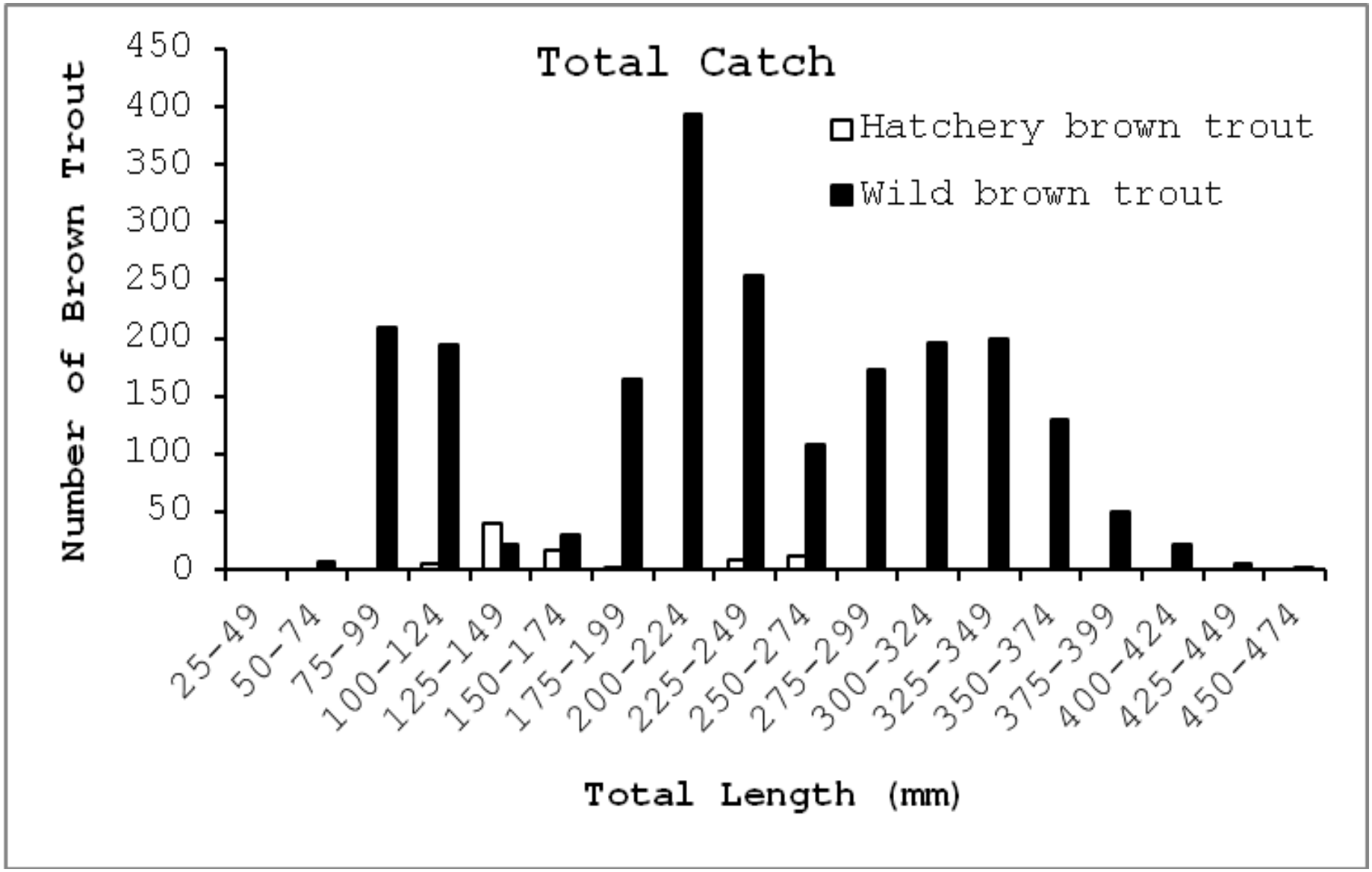

Figure 4. Total catch of individual brown trout captured at Sections 05 and 06 of the Little Juniata River (11A) during the August 2010 survey.

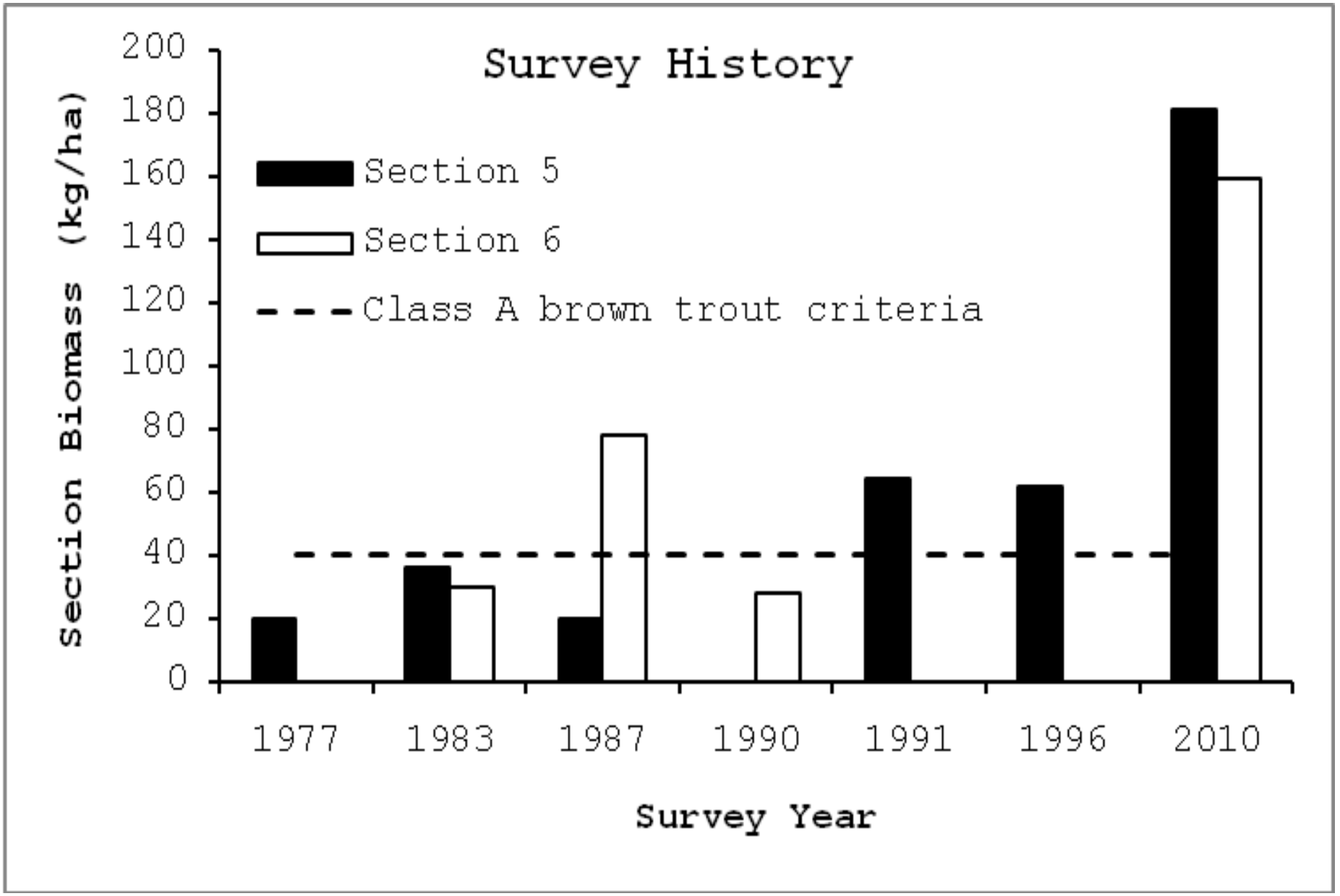

Figure 5. Estimated biomass of the period of record for brown trout collected during PFBC surveys at the Little Juniata River (11A), Sections 05 and 06.

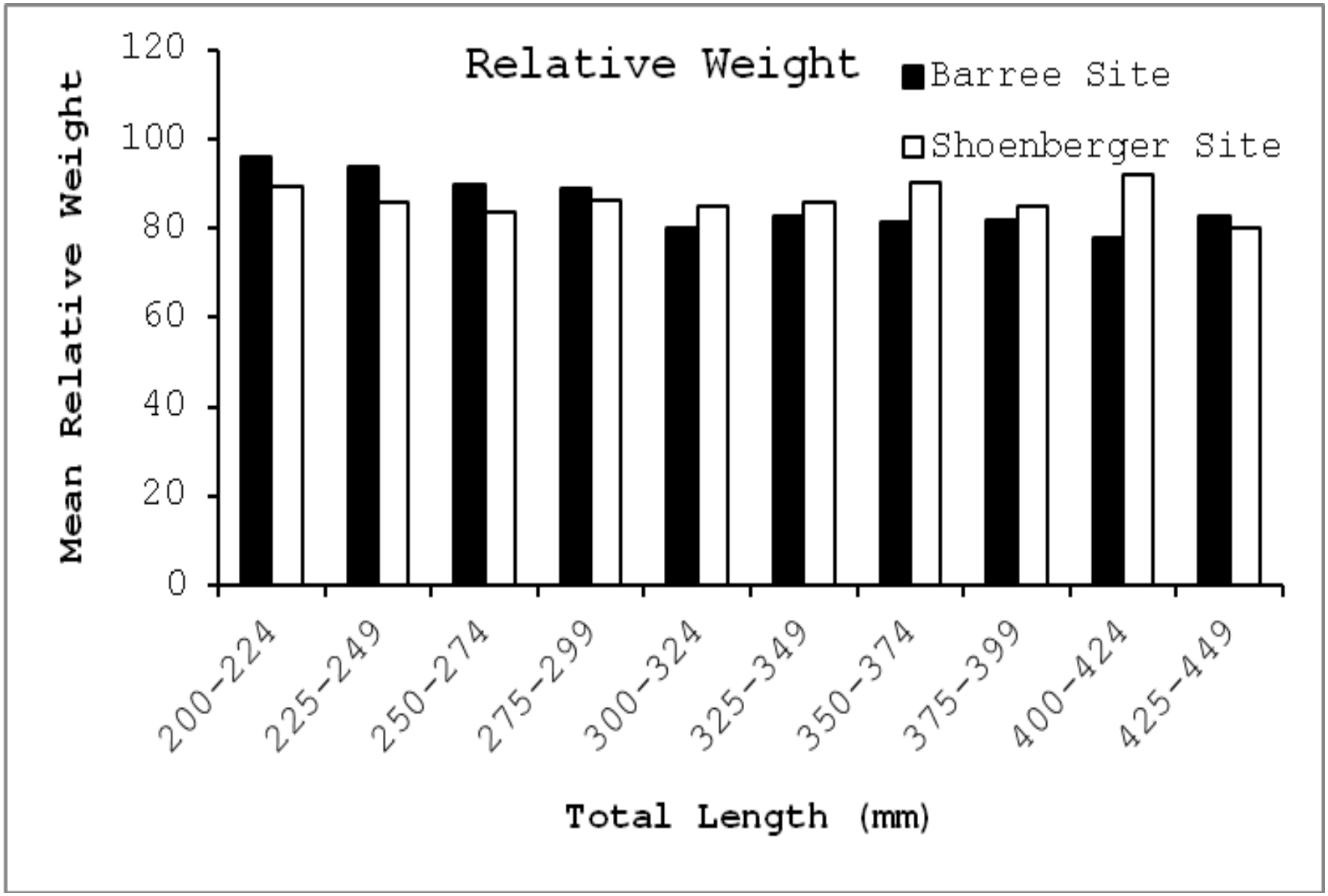

Figure 6. Relative Weight (W_r) of a subset of trout collected at RM 10.61 (Shoenberger Station) and RM 3.25 (Barree Station) August 2010.

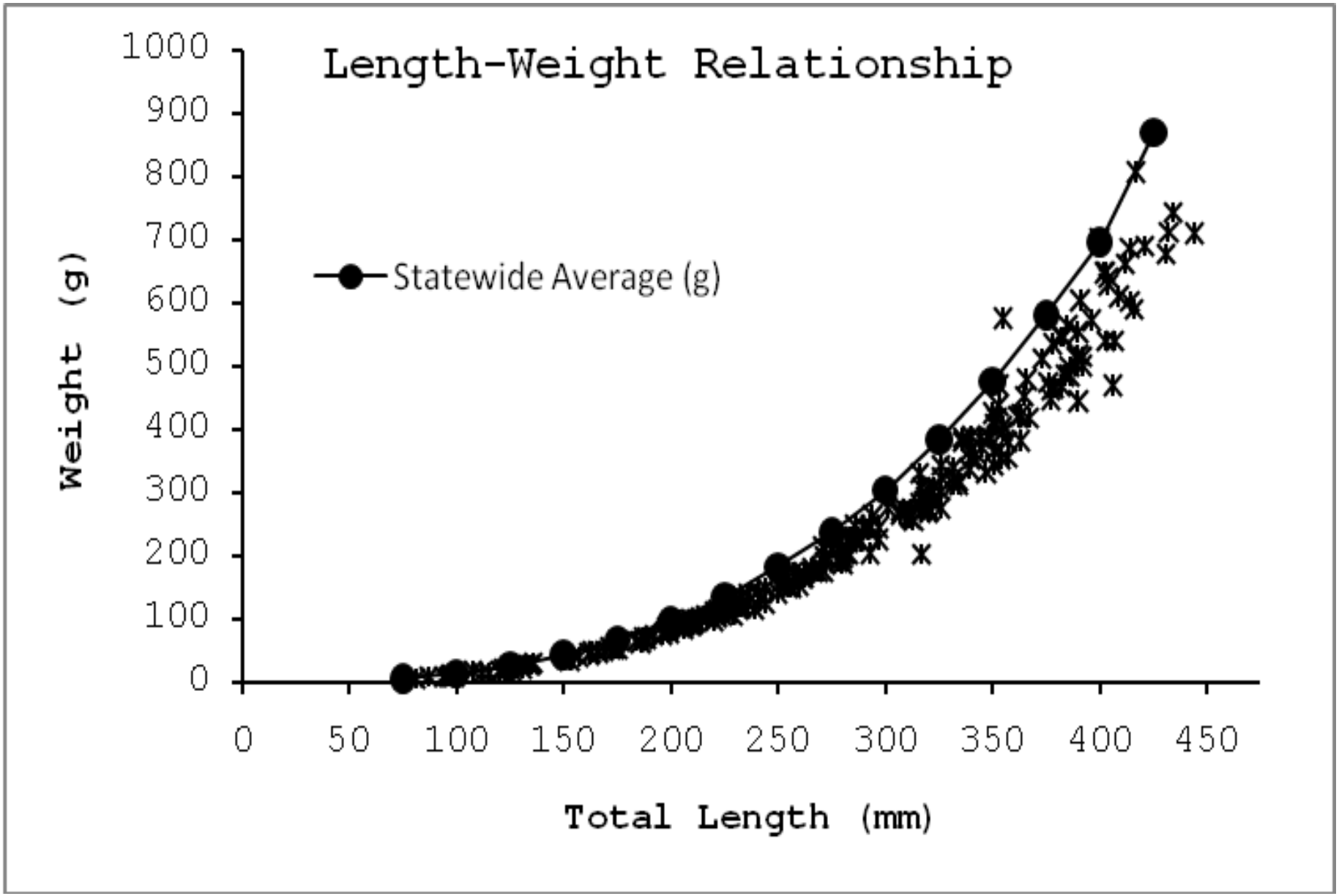

Figure 7. Length-weight relationship of a subset of trout captured at RM 10.61 (Shoenberger Station) and RM 3.25 (Barree Station) August 2010.

DEP Stream Code: 15664 **PA FISH AND BOAT COMMISSION** Little Juniata River

COMMENTS AND RECOMMENDATIONS

February 16, 2012

WATER: Little Juniata River (711A) Blair/Huntingdon County

EXAMINED: August 2010

BY: K. Kuhn, J. Frederick, K. DesJardins, T. Greene, R. Weber, D. Nihart, J. Detar, D. Kristine, A. Leakey, M. Kaufmann

Bureau Director Action:_____ Date:_____

Division Chief Action:_____ Date:_____

WW Unit Leader Action:_____ Date:_____

CW Unit Leader Action:_____ Date:_____

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AREA COMMENTS:

The Little Juniata River (11A) is a 50.1 km (31.2 mi) long limestone influenced river located in sub-subbasin 11A in Blair and Huntingdon counties. Section 05 extends 11.2 km (6.9 mi) from the railroad bridge at the east (downstream) border of the Village of Ironville downstream to the mouth of Spruce Creek. Section 06 extends 5.8 km (3.6 mi) from the mouth of Spruce Creek downstream to the Barree Road Bridge (SR 4004) at the Village of Barree. During August 2010, Sections 05 and 06 of the Little Juniata River were reexamined to evaluate the status of the naturally reproducing brown trout population and to estimate the contribution to the fishery from stocked fingerling brown trout.

Pennsylvania Fish and Boat Commission criteria require that the estimated biomass of a wild brown trout population must exceed 40 kg/ha for a water to be designated as a Class A wild trout water. During the August 2010 survey, the Section 05 total wild brown trout biomass was estimated at 180.96 kg/ha (161.05 lbs/ac), or substantially above the minimum criteria for a Class A wild brown trout population. The Section 06 total wild brown trout biomass was estimated at 159.34 kg/ha (141.81 lbs/ac), also substantially greater than the minimum criteria for a Class A wild brown trout population.

A total of 20 Age-1 fin marked brown trout between 225 mm (8.9 in) and 274 mm (10.8 in) in total length originating from the 2009 plant were captured during the August 2010 examination of the Little Juniata River, or less than 1% of the 30,000 fingerlings stocked in May 2009. Additionally, the estimated abundance of fin marked brown trout within this size range was 246 in Section 05 and 93 in Section 06, or 1.64% and less than 1%, of the 15,000 fingerlings planted in each of the two sections during 2009. As such, fingerling brown trout plants in the Little Juniata River are not

cost effective and do not survive and grow to a size that is sufficient to support a directed fishery.

The water quality protection offered by the 25 PA Chapter 93 designation of Cold Water Fishes, Migratory Fishes was determined to be inadequate to satisfactorily protect the resource. The Little Juniata River (11A) Sections 05 and 06 would be more appropriately protected under the High Quality-Cold Water Fishes, Migratory Fishes designation. This designation would not only provide protection for the propagation of coldwater fishes but would also place more stringent antidegradation requirements on any new, or increased discharges proposed for this stream.

The Class A wild brown trout population documented in sections 05 and 06 developed under All Tackle Trophy Trout Regulations and, most recently Catch-and-Release All Tackle Regulations. The Little Juniata River sections 05 and 06, should be managed as Class A wild brown trout waters under Catch-and-Release All Tackle regulations sustained through natural reproduction, with no stocking of hatchery trout.

AREA RECOMMENDATIONS:

1. Add the Little Juniata River (11A), sections 05 and 06, to Pennsylvania's Naturally Reproducing Trout Streams list.

2. Discontinue fingerling brown trout plants in sections 05 and 06 beginning in 2011 in favor of wild trout management.

3. Managed the Little Juniata River (11A), sections 05 and 06, as Class A wild brown trout waters from the railroad bridge at the east (downstream) border of Ironville downstream to the Barree Road Bridge (SR 4004).

4. Pending Commission approval of Class A status for sections 05 and 06, provide a copy of this report to the Pennsylvania Department of Environmental Protection through the Pennsylvania Fish and Boat Commission's Environmental Services Division for a 25 PA Code Chapter 93 upgrade from Cold Water Fishes, Migratory Fishes to High Quality Cold Water Fishes, Migratory Fishes from the railroad bridge at the east (downstream) border of Ironville downstream to the Barree Road Bridge (SR 4004; sections 05 and 06; Environmental Services action needed).

5. Re-inventory the Little Juniata River, Section 07 (Barree Road Bridge (SR 4004) downstream to the mouth) to determine the downstream limits of the Class A wild brown trout population.

6. Re-inventory the Little Juniata River, sections 05 and 06, in 2011 and every five years thereafter to monitor changes in the wild brown trout population.