

Appendix B:

Lower Milford Township Fishery Survey



Lower Milford Township Fishery Survey Lehigh County, Pennsylvania

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1.0 Introduction

Princeton Hydro was retained to perform a fishery survey in Lower Milford Township, Lehigh County, Pennsylvania to assess trout populations in the township, particularly within the Hosensack Creek watershed, which is tributary to the Upper Perkiomen Creek. The Delaware Riverkeeper Network (DRN) along with Lower Milford and a number of other co-petitioners were seeking redesignation of the Upper Perkiomen watershed, including the Hosensack Creek watershed and its tributaries to Exceptional Value (EV) waterways. Ultimately, the petition was denied before a Pennsylvania Department of Environmental Protection (PADEP) Environmental Quality Board (EQB) hearing in March 2014 for not meeting the biological (macroinvertebrate) qualifiers for High Quality (HQ) status, a prerequisite in most cases to attaining EV status. However, the EQB and technical specialists at PADEP agreed to continue to work with the petitioners and would accept further technical data and waive the normal waiting period for re-submission of the petition. To date, one HQ qualifier that had not been explored was that for Class A wild trout streams. Existing information regarding the fishery in the Hosensack Creek is outdated, although the Hosensack Creek is already regarded as Wild Trout Water by the Pennsylvania Fish and Boat Commission (PFBC). In light of anecdotal evidence of wild trout and trout reproduction in the Hosensack, as well as more current fisheries data in other reaches of the Upper Perkiomen watershed, and the general habitat quality of the system driven in part by geology of the watershed, the PFBC pledged to assess the Hosensack in 2014. This effort was designed to provide some baseline data regarding the status of trout in the system and to help focus the efforts of PFBC in their work.

2.0 Survey Methods and Locations

Prior to initiation of the project Princeton Hydro secured a Scientific Collectors Permit from the PFBC. A backpack electrofishing unit was used to capture fish. The survey methodology involved working a discrete stream segment moving upstream and sampling all likely locations within the reach, including riffles, runs, pools, and glides and specific habitat elements such as undercut banks, coarse woody debris, vegetation mats, and similar fish holding locations. Once captured fish were held temporarily, not more than five minutes, generally identified to species, measured for total length, and released. In total, six reaches were surveyed over a two day period from May 28 to May 29, 2014. These segments ranged from approximately 170 m to 350 m. Segment lengths and stream widths were estimated using Google Earth. Each reach was worked for approximately 1.3 to 1.5 hours, except for Macoby Creek because of its extremely shallow depths. The streams represent various sizes from as small as first order up to third order streams. Five of the streams are within the Hosensack watershed; only Macoby Creek lies outside. A summary of the surveyed streams is provided below, which includes an estimate of area worked. Figure 1 is a map of the same locations.

Table 1: Summary of Survey Locations

Reach ID	Nearest Road or Intersection	Reach Name	Foot of Reach		Distance m	Width m	Area ha
			Lat.	Long.			
Krauss	W. Mill Hill Road	UNT Hosensack Creek	40.4341	-75.5142	167.0	3.0	0.050
Shelly	W. Mill Hill Road and Yeakels Road Limeport Pike and	Hosensack Creek	40.4366	-75.5176	280.0	10.3	0.287
Koplin	Spring Road	Hosensack Creek	40.4574	-75.4860	215.0	4.9	0.105
Stauffer	Schultz Bridge Road	Indian Creek	40.4488	-75.5155	210.0	5.8	0.122
Schultz Bridge	Schultz Bridge	Hosensack Creek	40.4493	-75.5102	350.0	7.5	0.263
Macoby Creek	Kraussdale Road	Macoby Creek	40.4276	-75.4892	240.0	3.8	0.091

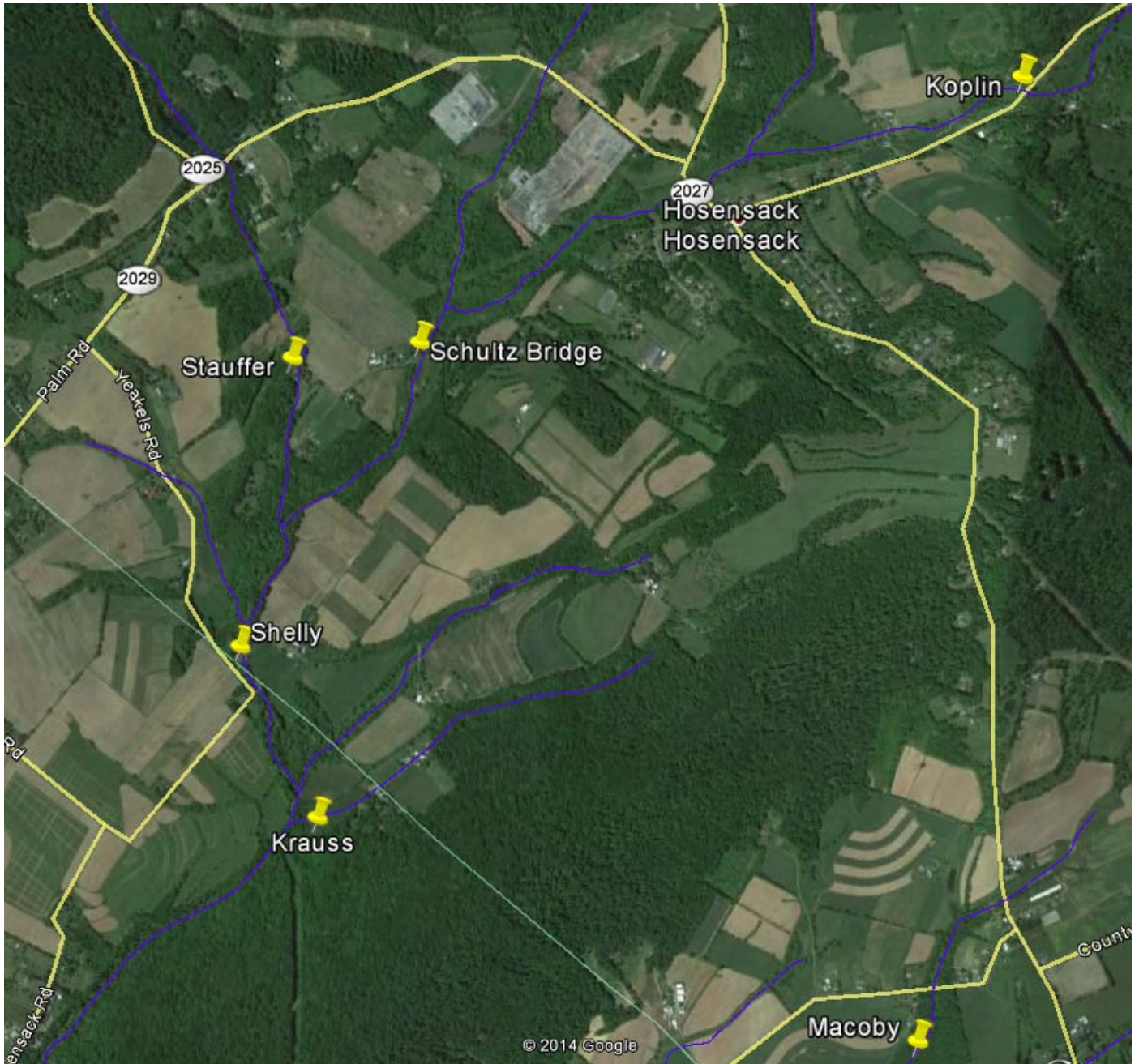


Figure 1: Segment Map

In addition to the fishery work, in-situ water quality measurements were taken with a calibrated multi-probe water quality meter to help to contextualize the results. A summary of the in-situ results are provided in Table 2. At the time of sampling the water quality conditions were acceptable for the maintenance of trout with slightly basic pH values, moderate conductance, good dissolved oxygen concentrations, and cool water temperatures. In fact, five of the six sites actually met the Coldwater Fishes (CWF) water quality standards for the May 16-31 period, and only Macoby Creek exceeded the standards, but still fell within the Trout Stocking (TSF) criterion. Macoby Creek also had slightly reduced dissolved oxygen concentration, both as a concentration and as percent

saturation. While this is of no concern at this point, it is worth noting that this stream was much more turbid than any of the other surveyed waters and carried a higher suspended solids load.

Table 2: In-Situ Water Quality Data

Reach Name	T	SpC	DO		pH
	°C	mS/cm	mg/L	% sat.	
Krauss	12.41	0.224	9.92	92.8	7.67
Shelly	13.30	0.243	9.76	93.1	7.90
Koplin	13.30	0.324	9.87	94.1	7.94
Stauffer	13.28	0.190	9.92	94.5	7.79
Schultz Bridge	13.60	0.274	10.11	97.1	7.95
Macoby Creek	15.55	0.217	8.90	89.3	7.74

3.0 Results

Each of the stream segments surveyed is discussed below.

Krauss

This was the smallest reach that was surveyed, but as a first-order tributary with good water quality metrics it held trout. Three Brown Trout (*Salmo trutta*) were captured in this reach ranging from 6” to 10”. All trout were believed to be wild fish due to their brilliant coloring and lack of fin damage or clipping common in stocked trout. All three fish were caught in a single deep pool. Other fish identified included Blacknose Dace (*Rhinichthys atratulus*), Creek Chub (*Semotilus atromaculatus*), Bluegill (*Lepomis macrochirus*), White Sucker (*Catostomus commersonii*), and Shiners (*Notropis* sp.). Other organisms include crayfish and Northern Dusky Salamander (*Desmognathus fuscus*).



Photograph 1: Brown Trout, Krauss

Shelly

In contrast to Krauss, the Shelly site was the largest reach located on the most downstream section of the Hosensack Creek in Lower Milford. It was determined to be third-order and on average in excess of 10 m wide. It also had some of the largest substrate, up to boulder-sized, although some of this was placed. This stream reach also held trout, and seven Brown Trout exceeding 6" were captured. The fish ranged in size from 6" to 13", and were mostly wild fish, although the two biggest fish, at 11" and 13" were likely stocked fish and appeared to have clipped fins. In addition, two Brown Trout parr were captured measuring 50 mm and 55 mm clearly indicating recruitment within the reach. These two trout were preserved as voucher specimens. In a pattern that would become apparent in other reaches, these fish were captured at the channel margins in very shallow water in gravel and amongst cobble that still maintained flow and presented the perfect refuge for small fish. In addition to the Brown Trout, other species captured included Blacknose Dace, Rock Bass (*Ambloplites rupestris*), Pumpkinseed (*Lepomis gibbosus*), Creek Cub, Longnose Dace (*Rhinichthys cataractae*), and Tessellated Darter (*Etheostoma olmstedii*).



Photograph 2: Brown Trout Parr, Shelly

Koplin

This segment was also located on the main-stem of the Hosensack Creek, upstream of both Shelly and Schultz Bridge and is generally smaller. This reach was the most geomorphically active probably as a result of legacy sediments in the valley, however the features of adjustment processes, prominently undercut banks and even mass-wasting, provided the highest density of pools and generally the most variable hydraulic habitat. Additionally, there are visible and active springs in and around this reach. In total, 30 larger Brown Trout were captured in this reach ranging from 6" to 15". All trout, with the exception of one, were believed to be wild fish and were described as vibrant; one of the fish was much darker and had a clipped fin. While the density of trout was very high throughout this reach, the density of parr was similarly high. In total, 17 parr were captured measuring from 35 to 45 mm. The parr displayed a high habitat preference for marginal locations usually within coarse sands or fine gravels with minor cobble particularly near roots masses or where sedges and other

herbaceous plants leaned into the water. This mix of habitat features was often associated with wasted edges and minors avulsions, again providing valuable refuge, especially in such a dense fishery and with large fish. The predominance of trout in this section also seemed to alter the general community composition, although Blacknose Dace continued to be well represented. Other fish included White Sucker and Longnose Dace.



Photographs 3 and 4: Brown Trout Parr and Adult, Koplin

Stauffer

This reach is located on Indian Creek, the largest named tributary to the Hosensack. This segment had the highest stream slope and as a result the coarsest substrate, although bedrock shelves were also quite common as well. Brown Trout were captured here as well, although at a slightly reduced density. 8 larger trout were captured, ranging from 6" to 12" and all were deemed to be wild fish. Two parr were also captured, at 48 mm and 50 mm. The reduction of parr density here may have been related to a decrease in some of the marginal habitat, erased by the higher edge velocities and lack of finer sediments. While trout were at a lower density, there was a good overall diversity through this section including Fallfish (*Semotilus corporalis*), Blacknose Dace, White Sucker, Shiners, Creek Chub, Bluegill, and Pumpkinseed. The sunfishes were found near the head of the reach where riparian vegetation was disturbed and canopy cover was lacking near the high-tension lines.



Photograph 5: Brown Trout, Stauffer

Schultz Bridge

This segment is located along the main stem Hosensack Creek between Shelly and Koplín and upstream of the confluence with Indian Creek. As with the Koplín site, this segment has a high level of geomorphic activity and due to its proximity to Schultz Bridge Road the lower portions of this segment have been armored to protect the road and bridge. This reach is also characterized by a high rate of loading of sand, yet riffles continue to be quite coarse. This section also has a high density of pools, but they tend to be quite large with depths approaching 6'. This was the second most productive segment, yielding 15 Brown Trout between 5" and 13". In addition, six Brown Trout parr were captured, ranging from 32 to 50 mm. This site also yielded the only Brook Trout (*Salvelinus fontinalis*) of the survey, the 8" fish distinguished by the light vermiculations and light spots against a dark background. The provenance of this fish is unknown, but it did have a distinct wound between the dorsal fin and adipose fin that looked like a bite. Other species captured here include Bluegill, a number of White Suckers both adult and juvenile, Fallfish, Creek Chub, Rock Bass, Tessellated Darter, and Shiners.



Photograph 6: Brook Trout, Schultz Bridge

Macoby Creek

Macoby Creek, as discussed above, is not located within the Hosensack Creek watershed. It differs in other ways including water quality metrics such as temperature and dissolved oxygen, turbidity, and flow. While the other creeks showed good flow and depth, flow in this stream was very sluggish and was extremely shallow, probably around 3" or less for 75% of the bottom. While the substrate was acceptable here, with a mix of cobble, gravel, and platy elements, the flow and depth to support trout at least in the surveyed reach seem lacking. No trout were captured here, although other small stream dwellers were fairly abundant, especially Blacknose Dace. Several Tessellated Darters, Shiners, and Creek Chubs were identified. One surprise was pet store grade Goldfish (*Carassius auratus*) in a sluggish pool.

Class A Wild Trout Stream Criteria

While the goal of the survey effort was a general assessment of the trout fishery, some additional analyses were performed to evaluate surveys results relative to the Class A Wild Trout Stream criteria. Chapter 57.8a outlines the criteria for various Class A trout Streams; only two of which are considered appropriate for this system.

- Wild Brown Trout Fisheries
 - Total Brown Trout biomass of at least 40 kg/ha
 - Total biomass of Brown Trout less than 15 cm in total length of at least 0.1 kg/ha
 - Brown Trout biomass shall comprise at least 75% of the total trout biomass

- Mixed Wild Brook and Brown Trout Fisheries
 - Combined Brook and Brown Trout biomass of at least 40 kg/ha
 - Total biomass of Brook Trout less than 15 cm in total length of at least 0.1 kg/ha
 - Total biomass of Brown Trout less than 15 cm in total length of at least 0.1 kg/ha
 - Brook Trout biomass shall comprise less than 75% of the total trout biomass
 - Brown Trout biomass shall comprise less than 75% of the total trout biomass

To provide some sense of whether the surveyed stream segments approach these criteria an estimate of the trout biomass per unit area was calculated for each segment using surveyed reach area (Table 1) and by estimating mass. Mass estimates were made using standard mass length formulas; a and b variables were selected from a median of literature values available for the United States while juveniles were estimated using specific juvenile variables. A summary of the metrics is provided below in Table 3.

Table 3: Class A Wild Trout Stream Metrics

	Area ha	Total		<15 cm	
		kg	Biomass kg/ha	g	Biomass kg/ha
Krauss	0.05	0.30	6.01	0.00	0.00
Shelly	0.29	0.84	2.94	2.96	0.01
Koplin	0.11	3.67	34.83	14.17	0.13
Stauffer	0.12	0.95	7.83	2.39	0.02
Schultz Bridge	0.26	1.38	5.27	24.93	0.09
Macoby Creek	0.09	0.00	0.00	0.00	0.00

Of the sites surveyed the Koplin segment is the one that comes closest to satisfying the criteria for Class A Wild Brown Trout. While the total biomass is short (approximately 12% under the criterion), it does satisfy the criterion for juvenile fish. The Schultz Bridge site also comes quite close to satisfying the biomass criteria for juveniles, including the 5 inch fish clearly larger than remainder of the parr which are 55 mm (approximately 2.25”) or less.

3.0 Discussion

The results of the fishery survey are powerful and several simple facts ably demonstrate this:

- Wild Brown Trout were identified in all five of the surveyed reaches located within the Hosensack watershed
- Brown Trout recruitment is high and parr less than 55 mm were identified in four of the five Hosensack reaches
- Brook Trout are present in the system

- Water and habitat quality is sufficiently high to support a robust coldwater fishery dominated by trout biomass

As mentioned above, the only sampled stream that did not yield trout was Macoby Creek, which is not tributary to the Hosensack, which simply lacks the habitat or hydrology to support trout at the sampled reach and may have marginal water quality. However, the distribution of trout throughout the Hosensack as well as successfully reproducing wild populations is a good indicator of the high quality of the system. Indeed, secondary analysis of biomass and comparisons to the Class A Wild Trout criteria show that at least in portions of the Hosensack Creek the Class A standards can likely be met, especially when conducted under a formalized methodology and in the autumn when trout biomass, particularly of the parr, is likely to be at its peak.

At this point it is important that the results of this effort be forwarded to the PFBC both to guide their future survey and assessments efforts, but more importantly to alert the agency to the need for conservation and management of Hosensack Creek as a Class A Wild Trout Stream.

Appendix I

Site	Trout Capture Data		
	Brown Trout, inches	Brown Trout Parr, abundance	Brook Trout, inches
Krauss	6, 9, 10	0	0
Shelly	6, 6, 6, 6, 10, 11, 13	2	0
Koplin	6, 6, 6, 6, 6, 6.5, 7, 7, 7, 7, 7, 7, 7, 7, 7, 8, 9, 9, 9, 9, 9.5, 10, 10, 10, 10, 12, 12, 12, 13, 15	17	0
Stauffer	6, 6, 8, 9, 9, 10, 10, 12	2	0
Schultz Bridge	5, 6, 6, 6, 7, 7, 7, 8, 9, 9, 9, 9, 9, 9, 13	6	8
Macoby Creek	0	0	0