

**New Jersey Audubon Final Report
Lower Delaware Wild & Scenic River 2021 Mini-Grant**

Description of Work Accomplished Through Grant award:

[New Jersey Audubon](#) (NJA) has been working with [Merrill Creek Reservoir](#) over the last 5 years implementing a state approved Forest Stewardship Plan (FSP) for the property. Merrill Creek Reservoir is a 650-acre reservoir surrounded by a 290-acre environmental preserve and 2,000 additional acres of woods and fields. Its basic purpose is to provide stored water that can be released to the Delaware River to make up for the evaporative water usage at certain electric generating units in times of low flow in the river. The property also supports several state and federally listed species, as well as having a high Ability to Produce Clean Abundant Water. With the implementation of the plan and associated monitoring of the work implemented in the plan, the project is important to its geographic/landscape context because it ties into the [Delaware River Watershed Initiative](#) Highlands Cluster work.

Although forest stewardship work has been ongoing at the site, no water chemistry monitoring in a stream on site had been taking place. There are water chemistry data collection points in the reservoir itself, however in some of the current or planned restoration areas (where this stream meanders through) no monitors were currently in place. Therefore, NJA, through funding from the Lower Delaware Wild & Scenic River 2021 Mini-Grant, purchased water datalogger collection equipment that was installed in the stream that feeds the reservoir for data collection. This stream is the Merrill Creek, which is designated by the NJDEP as a FW2-TPC1 waterbody. This designation means: the Merrill Creek is a Freshwater Trout Production water. Additionally, the C1 classification means surface waters designated as C1 waters (see N.J.A.C. 7:9B-1.4) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources.

Additionally, as part of the project NJA trained the [NJ Youth Corps \(NJYC\) of Phillipsburg](#) staff and students on installing the loggers, maintaining the loggers, and collecting the water data and interpreting the data to be used in the student's education as citizen scientists. This training means NJYC staff can now educate their students in water chemistry monitoring services as part of their program curriculum and service work to the community.

Training activities by NJA included two in-the-field workshops (July 21, 2021 and October 19, 2021) at Merrill Creek reservoir with NJ Youth Corps staff and students, which incorporated hands-on use of the water chemistry data collectors, installation and retrieval of the loggers, and further training on how to download and interpret the data. Merrill Creek education staff also provided an additional level of monitoring training to the NJYC at the Oct. 19, 2021 field workshop. This included NJYC staff and students receiving macroinvertebrate survey training and education on water quality as it relates to living organisms use and presence in waterbodies. This additional level of training and education helped with the students understanding of why we need to monitor, and the specific use of the water chemistry data collection. It also gave them a broader understanding of the many organisms that live in stream (besides fish) and how these organisms play an important role in the food chain and other ecological processes.

Lastly, as part of the evaluation of water quality equipment training sessions, as well as, to determine understanding and impact of the project towards increasing public understanding of watershed health, evaluation surveys were given out to NJ Youth Corps participants (staff and students) at each training session and were turned in and evaluated by NJA. These responses are summarized below and are used to determine the level of understanding of the training, as well as, data collection accuracy, and any changed attitudes or behavior towards conservation

work experienced by the student using the equipment and the trainings. The following is a summary of those surveys:

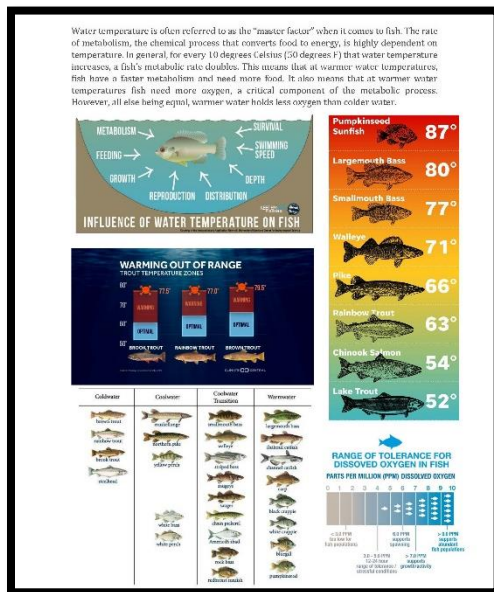


Please note that all water data collected and analyzed are included in this report as an attachment, however this data will also be submitted to the Delaware River Watershed Initiative (DRWI) Highlands Cluster monitoring team for consideration for inclusion in the overall DRWI water monitoring efforts. The data retrieved from the Loggers (Temperature and Dissolved Oxygen) revealed that the study stream at all 3 sample locations (headwaters (temp and DO), midpoint (temp) and outflow to the reservoir (temp and DO)) were in the ranges needed to support trout.

Logger ID	Average Water Temp over 93 days (7/26/21-10/19/21)	Average Water DO over 93 days (7/26/21-10/19/21)
NJANJYC-#1 (headwaters)	62.53° F	6.277 ppm
NJANJYC-#2 (outflow)	60.21° F	6.053 ppm
NJANJYC-#3 (mid point)	62.45° F	N/A – the funding did not cover a third DO sensor

The following graphics were used in the classroom with the students to help them understand the results of the data collected. It was also discussed that different wildlife species do not always have the same habitat needs (example trout vs bass), thus consideration must be given to understanding what species are at the site and how could their life cycle and associated dependent species (example fish and mussels) be impacted by any work you do on that stream corridor, regardless of perceived good intent to

“improve” something.



Eastern elliptio (*Elliptio complanatus*)

Habitat Requirements/Constraints: This widely distributed species is a true generalist and is found in small streams, large rivers, ponds and lakes. It has been observed in a wide range of substrate types and on several occasions in degraded urban settings (sometimes in staggering numbers).

Host fish: Yellow perch, Banded killifish, various centrarchid species, American eel, Brook trout, Slimy sculpin. Known extremes of optimal water temperature ranges from Slimy sculpin (4-16 deg. C) to Bluegill (27 deg. C).

Water Quality Requirements/Constraints: This species not known to be sensitive to high levels of turbidity and in fact is often found in highly turbid lakes and ponds. This species is not limited by water temperature and utilizes a variety of host fish with a wide range of temperature constraints.

Brook floater (*Alasmidonta varicosa*)

New Jersey status: Endangered

Habitat Requirements/Constraints: This is one of our rarest species. It is of conservation concern throughout its range and currently under consideration for federal listing. The Brook floater is strictly limited to running water. It is often found wedged between rocks imbedded into the stream in riffles. It has been found in both heavily shaded rivers and open, exposed areas.

Host fish: Slimy sculpin, Blacknose dace, Longnose dace, Golden shiner, Yellow perch, Mudpuppy catfish are among the known host fish utilized by this species. Known extremes of optimal water temperature ranges from Slimy sculpin (4-16 deg. C) to Yellow Perch (19-24 deg. C)

Water Quality Requirements/Constraints: The Brook floater is not known to be sensitive to high levels of turbidity. The segment occupied by the species periodically experiences brief periods of elevated turbidity levels. This species is also not particularly limited by water temperature itself but dependent on host fish requirements (which are dependent upon water temperature).

Unexpected changes to Timeline, Benefits, Funding or Challenges during Implementation:

The only unexpected changes to timeline and challenges were because of equipment production delays from the logger manufacturer, we were only able to obtain and deploy the monitoring equipment a month later than we anticipated, thus we retrieved the loggers a month later than anticipated to evaluate data collected. Additionally, the class of students for NJ Youth Corps for this semester was unusually small, note NJ Youth Corps students complete the program every six months, so the number of students per class varies. However, the NJ Youth Corps Staff were trained by NJA on the equipment setup, installation, data retrieval and interpretation so future students can also be trained and deploy the equipment on future projects as part of their curriculum.

Listing of Matching Funds/Services in Support of the Grant:

NJA Match \$23,300.00 – Funded by William Penn Foundation DRWI Operational Grant – in-kind labor
 NJYC Match in-kind services - \$24,515
 Merrill Creek Reservoir staff also provided a contribution of in-kind service with the students by performing Macroinvertebrate Surveys with the students on the day the loggers were retrieved from the stream

Copies of all publicity associated with the grant:

Video: <https://www.youtube.com/watch?v=gqGLYRunJiY>

Blog: <https://www.njycphillipsburg.com/blog/2021/10/21/citizen-science-amp-outdoor-classrooms?fbclid=IwAR0OmQF-niBcN6txCqnoQQN308lv0-CNpNdsokIXuSXlvoMB9Yq0GRilsoq>

A listing of the LDWS Mini-Grant Program will be included in the NJ Audubon 2021 Annual Report