

White Clay Creek Fish Passage Assessment Scope of Work

Project Background:

Fishes of the alosine guild, including the American Shad (*Alosa sapidissima*), were once an abundant throughout East Coast rivers and streams of North America, including the Delaware River and its tributaries. Population restoration efforts focused on removal of barriers (dams) have resulted in upstream movement and re-occupation by migrating shad in some systems, such as the Brandywine Creek, but significant re-occupation was not observed following removal of Dam #1 on the neighboring White Clay Creek.

Project Goal:

The purpose of this study is to evaluate river habitat conditions between the Delaware-White Clay Creek confluence and Dam #2 on the White Clay and identify any potential limiting factors preventing American Shad migration.

Scope of Work:

The habitat survey will focus on flow velocity and depth, structural barriers to fish passage (obstruction), degraded in-stream or riparian habitat, and water temperature.

Tasks:

1. Conduct a visual survey of channel and riparian conditions in the fall/winter of 2022 from Dam #2 on White Clay Creek to the confluence of the Christina River conducted by wading, floating, or combination thereof, to identify reaches for intensive study to include all reaches of stream supporting $\leq 2'$ of depth at baseflow or any other possible physical elements that could be barriers to fish passage or create conditions unfavorable for alosine passage. Intensive study reaches will be located using GPS coordinates for future springtime fieldwork.
2. In the spring, survey the linear lengths of all intensive study stream reaches previously identified in task 1.
 - Transects will be established and geotagged at the beginning, middle and end of each linear length of stream.
 - Reach length will be measured using a laser range finder, and transects will be established at the beginning, middle and end of each reach.
 - At each transect, water depth and velocity will be recorded at a minimum of 2m intervals.
 - For each sampling date, discharge (cfs) and water temperatures (c) will be noted using the USGS gage data found here: <https://waterdata.usgs.gov/usa/nwis/uv?01479000>
 - Sampling will be conducted during periods of baseflow discharge based on the gage data, avoiding periods of elevated discharge.
 - Each reach will be surveyed 4-6 times generally during the months of March, April and May targeting water temperature and discharge conditions typical for alosine migration.

- In addition to shallow stream reaches, measure water depth and velocity directly up and downstream of any additional barriers during spring sampling.
3. Survey water temperature with discrete measurements during task #1 to identify any thermal discontinuities in the study reach main channel outside the suitable range for Shad migration (40-65F) and in all observed tributaries/outflows joining the reach.
 4. Establish continuous temperature loggers at locations identified in task #3 as potentially producing a thermal barrier to alosine movement, record temperatures continuously during the migration season, analyze this data to identify and characterize thermal barriers to alosine movement.
 5. Identify potential areas/issues for future investigation (e.g., impact of industry, impervious areas, or treatment plant discharge/overflow).
 6. Provide an interim written report of task #1 findings by October 31,2022 that includes maps and locations of linear stretches of stream ≤ 2 feet, and other potential barriers to alosine passage.
 7. Submit draft report for review and comment by the Wild and Scenic Committee by December 1 and final report by December 31, 2023.

Timeline:

2022

In the fall, we will complete tasks #1, #3 and #5. Based on information generated during these tasks, we will identify locations for tasks #2 and #4. In early winter we will complete the reporting requirements of task #6.

2023

In late winter, prior to the Shad migration season, we will deploy temperature loggers as specified in task #4 and continue maintaining them through the beginning of summer until the Shad migration season is finished. During the migration season, from March-May, we will complete task #2. In summer and early Fall we will complete data analysis and reporting requirements of task #7.

Budget:

Category	Year 1	Year 2	Total
Technicians	\$4,431.43	\$8,145.14	\$12,577.00
Lead Scientists	\$2,312.00	\$3,206.00	\$5,519.00
Personnel Fringe Benefits	\$2,124.00	\$3,576.00	\$5,700.00
Travel	\$117.00	\$122.00	\$239.00
Supplies	\$1,870.00	\$-	\$1,870.00
Indirect Costs	\$5,966.00	\$8,271.00	\$14,237.00

Total	\$16,821.00	\$23,321.00	\$40,142.00
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Year 1:

- Technicians (2 techs; 160 hours total): Conduct tasks #1, 3 and 5 - physical stream survey via wading/boat, data entry and processing
- Lead scientists (Daniels, Jackson; 30 hours total): Project coordination, assist in field data collection, data analysis, reporting
- Travel: 200 miles allowance to and from field sites
- Supplies: 10 Onset Hobo water temperature loggers; one Hobo shuttle (for downloading loggers); incidentals to secure and shield loggers in the field

Year 2:

- Technicians (2 techs; 280 hours total): Conduct tasks #2 and 4 – detailed barrier assessments and continuous temperature data collection
- Lead scientists (Daniels, Jackson; 40 hours total): Project coordination, assist in field data collection, data analysis, reporting
- Travel: 200 miles allowance to and from field sites

Invoicing:

Invoice Date	Payment Amount	Contingency/Condition
10.01.22	\$8,410.50	Signing of Agreement
12.01.22	\$8,410.50	Receipt of Interim Report
2.01.23	\$7,773.67	Commencement of 2023 Field Work
6.01.23	\$7,773.67	Completion of 2023 Field Work
12.31.23	\$7,773.66	Receipt of Final Report