



White Clay Creek Fish Passage Assessment RFP DRAFT Scope of Work

White Clay Wild and Scenic River Alosine Assessment Context:

American shad (*Alosa sapidissima*) were once an abundant migratory fish found throughout East Coast rivers and streams of North America, including those in the Delaware River basin. Shad have been identified by a range of partners in the basin as a priority species for restoration. There are numerous shad restoration and fish-passage projects in the Mid-Atlantic region, in efforts to restore shad populations to pre-industrialization numbers. These projects would also help support other alosines such as blueback herring (*Alosa aestivalis*), hickory shad (*Alosa mediocris*), and alewife (*Alosa pseudoharengus*). A summary of seven Mid-Atlantic region shad restoration and fish-passage projects is presented in the report by DNREC Fisheries "***Restoration of Shad and Anadromous Fish to the White Clay Creek National Wild and Scenic River: A FEASIBILITY REPORT.***"

The White Clay Creek (Figure 1.1) drains 107 square miles and is one of the four major watersheds in the 565-sq.-mi. Christina River Basin, which in turn is part of the larger 13,000-sq.-mi. Delaware River Basin. The White Clay Creek watershed was added to the National Wild and Scenic Rivers System in 2000 and extended in 2014, adding protections to 199 miles of the main stem and its tributaries. The White Clay Creek Wild and Scenic River Committee works with the National Park Service to accomplish the goals of the River Management Plan, as outlined at the time of designation. The waters of the White Clay Creek support over 24 species of fish; the creek is stocked annually by both Delaware and Pennsylvania and is considered Delaware's premier trout-fishing stream. The Creek has seven historical dams along its mainstem, with one having been opened up for fish passage (Dam #1), and 3 others (Dams 2, 4 and 7) currently in design for partial removal.

While shad have been seen returning to the nearby Brandywine River post dam removals, the relative abundance of alosines in the White Clay Creek following the removal in 2014 of Dam #1 is unknown. Minimal numbers were documented in 2016 below Dam 1 after it was breached. It is generally agreed that the breaching of Dam #1 did not lead to an increase in shad, as anecdotally, none have been seen upstream seeking passage at Dam #2, as they were on the Brandywine. Despite this information gap, a design for breaching of Dam #2 as a fish passage project is currently in development, and there is some funding secured for dam removals further upstream. NPS and the Wild and Scenic Steering Committee remain committed to dam removal as a critical step in overall ecological restoration. Data from this assessment, therefore, will be critical in informing the design of dam removals as well as additional shad restoration efforts on the White Clay Creek.

Goal of Assessment:

The National Park Service and the Wild and Scenic River Committee seek to lead a collaborative effort with partner agencies to assess the presence and abundance of American shad and other native

migratory fish downstream of Dam #2 on the White Clay Creek Wild and Scenic River, and to explore potential reasons why alosines have not returned to White Clay Creek in greater numbers since the partial removal of Dam #1. To do so, we seek to accurately confirm the presence, distribution, and relative abundance of alosines in White Clay Creek Wild and Scenic River, and research possible limiting factors for alosines such as fish passage barriers, degraded in-stream or riparian habitat, and impaired water quality.

This assessment would complement, and be conducted in consult with, other fish assessment efforts potentially going on in the immediate area on alosines, including:

- University of Delaware/Delaware SeaGrant, Ed Hale – Analysis of fish distribution via digital acoustic receiver tagging with emphasis on the Brandywine, Red Clay, Christina River, and main stem Delaware, to determine differential habitat preferences and migration routes. Ed is waiting to hear about NFWF funding, which could include acoustic tagging in White Clay Creek.
- DNREC, Ed Hale – Seasonal eDNA sampling and routine water quality data on the White Clay Creek in summer 2022 (to assess presence/absence).

Scope of Work:

Physical Survey:

- Foot by foot visual survey of channel/riparian conditions from Dam #2 on White Clay Creek to the confluence of the Brandywine and Christina Rivers conducted by wading, floating, or combination thereof, to identify and characterize possible physical elements that could be barriers to fish passage or create conditions unfavorable for alosines.
- Habitat suitability and passage feasibility assessment for alosines; compare results to habitat/passage criteria below Dam #1 upstream through to Dam #2.
 - Transects at potential fish passage barriers looking at water depth and velocity at critical bio-periods (such as during migration); field assessments and professional analysis of those factors
 - Assessment of flows and sediment transport/deposition, including potential impacts of run-off coming from the White Clay Creek Country Club and Golf Course, and close analysis of sediment control efforts by Delaware Park
 - Water temperature gradient along White Clay Creek Country Club and Golf Course
 - Identification of potential contaminant (pesticide, nutrient) impacts from the White Clay Creek Country Club and Golf Course
 - Instream cover (protection from predation, e.g., cormorant, heron, osprey)
 - Canopy (shade)
- Identify potential areas for future investigation - Consideration of other potential limiting factors below Dam #1 such as impact of industry, impervious areas, or Waste Water Treatment Plant discharge/overflow, and potential approach to non-point source impacts

Fish Survey:

- Seine survey for shad below Dam #2 through to the confluence of the Brandywine and the Christina to assess relative abundance.

- 2-3 sites in between Dam #2, Dam #1, and the confluence with the Christina (DNREC currently samples in the Christina River.)

Literature Review:

- Literature search:
 - Is there anecdotal historical information and documentation of shad in 1700 and 1800's on the White Clay?
 - What data exists on the Christina or main stem Delaware?
 - Can we find additional documentation about any declines in species? (Some information exists; determine gaps in data.)
- Historical photos or documentation assessing changes in sediment since Golf Course establishment, and since construction of the weir (39.698923°, -75.667378°)

Timeline:

- RFP released upon determination of funding
- Research this spring/summer 2022, Field work in 2022 and/or 2023

Project advisors:

- Mike Stangl, Fisheries Program Manager, DNREC DE
- Jim MacCartney, NPS Wild and Scenic Rivers restoration specialist
- Shane Morgan, White Clay Creek Wild and Scenic Rivers Committee
- Ed Hale, University of Delaware SeaGrant Program

Other potential partners:

- NOAA
- Lenape Nations of PA and DE
- The Nature Conservancy
- Stroud Water Resources Center
- National Marine Fisheries
- PA DCNR Preserve Manager Lexi Rose and DE State Park Superintendent Laura Lee
- American Rivers

Resources related to fish in the White Clay:

Restoration of Shad and Anadromous Fish to the White Clay Creek National Wild and Scenic River, A Feasibility Report, June 2010, IPA Univ of DE, Narvaez, Martha...

static1.squarespace.com/static/552801ede4b0f154af070737/55ca4b6ee4b06a8572aa130a/55ca4b4ee4b06a8572aa0da0/1368492657000/ShadRestoration.pdf?format=original

[DRB Restoration Roadmap Shad & River Herring 2022 TNC.pdf - Google Drive](#)

[Kaufman, Shad Observed in White Clay Creek, 2015](#)