



Department of
Environmental
Conservation

FISHERIES INVESTIGATION PLAN FOR THE DELAWARE TAILWATERS

2018-2020

With Assistance from the Commonwealth of
Pennsylvania

December 12, 2017

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Problem Statement

The information on the biological and angler use characteristics of the wild trout fishery of the Delaware tailwaters available to New York State Department of Environmental Conservation (NYSDEC) and Pennsylvania Fish and Boat Commission (PAFBC) biologists is outdated. It predates significant changes in the fishery, including current flow management and fishing pressure and patterns. The existing information is inadequate to support a scientific evaluation of whether declines in the quality of the fishery have occurred and whether changes in management objectives and strategies are warranted in response to current patterns of angler use and trout population dynamics.

Need Statement

A new trout management plan addressing both the current trout populations supported by enhanced flows since 2010 and current angling pressure and pattern is needed. In this document, NYSDEC and PAFBC identify the information most urgently needed to develop a new trout management plan and the strategies necessary to obtain that information over the next three years. While a robust information base is essential to all phases of the management process (Figure 1), it is particularly critical to the development of an effective management plan in which actions can be evaluated relative to explicitly stated goals and objectives. The development of this information base is the subject matter of this investigation plan.



Figure 1. From Kreuger, C. C., and Decker, D. J. 1999. The Process of Fisheries Management. Page 39 in C. C. Kohler and W.A. Hubert, editors. Inland Fisheries Management in North America, 2nd Edition. American Fisheries Society, Bethesda, Maryland

Based on the results of the studies completed under this investigation plan, NYSDEC and PAFBC will develop a new trout management plan as the next step in the adaptive management of the recreational trout fishery of the Delaware tailwaters.

Research Objectives

1. Acquire a fishery-independent biological data set sufficient to characterize the current trout population.
2. Acquire a quantitative and qualitative assessment of the recreational trout fishery sufficient to characterize current angling pressure and patterns of recreational use.

System Definition and Scope of Plan

1. NYSDEC and PAFBC concur that, based on the documented movements of trout and interaction of flows, the Delaware tailwater trout fishery should be understood to include the following stream reaches (Figure 2).
 - a. The main stem of the Delaware River from Callicoon upstream to the confluence of the East and West Branches at Hancock, NY
 - b. The West Branch from Hancock to the weir in Stilesville
 - c. The East Branch from Hancock to Downsville
 - d. The following tributaries
 - i) Delaware River - Hollister Creek, Hankins Creek, Cooley Creek, Little Equinunk Creek, Basket Creek, Hoolihan Creek, Pea Brook, Bouchoux Brook, Abe Lord Creek, Humphries Brook, Equinunk Creek
 - ii) West Branch - Shehawken Creek, Sands Creek, Balls Creek, Roods Creek, Sherman Creek, Oquaga Creek, Cold Spring Creek
 - iii) East Branch - Cadosia Creek, Peas Eddy Brook, Fish Creek, Read Creek, Morrison Brook, Baxter Brook, Trout Brook, Campbell Brook, Downs Brook.
2. NYSDEC and PAFBC concur that the system as described above should be managed holistically, but, with respect to obtaining fishery-independent biological information, the scope of this 3-year plan pertains to the West Branch and the following tributaries (Shehawken Creek, Sands Creek, Balls Creek, Roods Creek, Sherman Creek, Cold Spring Creek). This decision is a function of agency capacity and importance of the West Branch to the larger system in terms of productivity and intensity of angler use. Additional biological survey work on the other components of the system will be identified and conducted in the future under a comprehensive trout management plan.
3. Due to the operational considerations associated with conducting an angler creel survey and the potential to compare results with existing creel survey data, the East Branch is included as part of the creel survey.

Plan Strategy

In this section, the specific information required for each objective is identified and the approach to obtain that information is described.

OBJECTIVE ONE: Acquire a fishery-independent biological data set sufficient to characterize the current trout population.

1. **Information Need:** Estimates of the following population characteristics are needed for wild brown and rainbow trout in the Delaware tailwaters
 - a. Relative abundance of adult and young-of-year brown and rainbow trout
 - b. Size distribution of brown and rainbow trout populations (from individual fish length and weight measurements)
 - c. Age structure of brown and rainbow trout populations
 - d. Growth rates
 - e. Mortality – rates at which trout die due angling related (harvest, hooking mortality) and non-angling related causes (natural predators, environmental stresses)
 - f. Habitat use with particular attention to reproduction and recruitment of juveniles
2. **Approach:** To obtain the above estimates the following methods will be employed:
 - a. Daytime electrofishing for young-of-the-year trout (YOY) and nighttime electrofishing for adult trout to develop time-series of annual abundance (based on electrofishing catch per unit of effort). Measurements and (non-lethal) scale samples obtained during this sampling will allow estimation of the other population characteristics listed above. The scope of annual sampling includes the following (Figure 3):
 - i) 4 adult sites with 2 runs April-October (West Branch) yielding 56 independent samples/year (adult trout)
 - ii) 17 YOY sites single pass July-October (5 West Branch, 2 main stem, 10 tributaries) yielding 68 independent samples/year (YOY trout)
 - b. PIT tags, stationary PIT tag detection arrays, and mobile PIT tag readers will be deployed to assess trout movements, habitat usage and connectivity between main stem and tributary habitats
 - i) PIT tag arrays deployed in Cold Spring Creek, Sherman Creek, Roods Creek, Balls Creek, Sands Creek and Shehawken Creek to compare timing of PIT tagged trout entering tributaries to changes in tributary flows and reservoir releases.
 - ii) Water level loggers deployed at same locations as PIT tag arrays.
 - iii) Tag approximately 1,000 brown and rainbow trout (12 inches in length or larger) per year in 2018, 2019 and 2020 during electrofishing surveys at four West Branch sampling sites.
 - iv) Tag approximately 1,000 yearling brown and rainbow trout annually in the West Branch, Shehawken Creek, Sands Creek, Balls Creek, Roods Creek, Sherman Creek, Cold Spring Creek in 2018, 2019 and 2020.
 - c. Conduct annual redd counts in the West Branch and tributaries to confirm the location of important spawning habitats and investigate the influence of reservoir releases on the utilization of main stem and tributary spawning habitats.
 - i) West Branch counts to be performed by NYSDEC and PAFBC staff
 - ii) Tributary counts to be performed by volunteers according to PAFBC protocol developed by Mark Hartle.
 - iii) Volunteer assistance also required to contact landowners and obtain permission to access tributary sections and complete counts.
 - iv) Data analysis to be completed by NYSDEC and PAFBC biologists.
 - d. Further details on the methods and information expected to be gained from each of the three operational components described above will be provided in three short form plans currently being written.

OBJECTIVE TWO: Acquire a quantitative and qualitative assessment of the recreational trout fishery sufficient to characterize current angling pressure and patterns of recreational use.

1. **Information Need:** Understanding of current fishery characteristics of the West Branch, East Branch and Main Stem tailwaters including:
 - a. Catch rates for brown and rainbow trout
 - b. Harvest rates for brown and rainbow trout
 - c. Size structure and species composition of catch and harvest
 - d. Fishing Pressure (estimates of total angler hours by reach, month, etc.)
 - e. Fishing Pattern (trends and seasonal variations in angling methods, demographics, etc.)

2. **Approach:** To estimate the above parameters a roving creel survey will be conducted from April 1 thru October 15 in 2018 and 2019. Data collection in the defined reaches (Figure 2) will be conducted by three seasonal creel clerks under the supervision of NYSDEC biologists. Data analysis will be completed by NYSDEC and PAFBC biologists according to American Fisheries Society accepted methods. The survey will entail the following components:
 - a. Outreach to anglers and stakeholders to maximize awareness and cooperation during the survey
 - b. Data collection on all weekend days, all holidays and two randomly selected weekdays per week for the duration of the survey
 - c. Angler counts conducted three times per day by creel clerks on the ground
 - d. Additional angler counts conducted by airplane to correct for reaches where sightlines do not permit a satisfactory ground-based count and provide for greater accuracy in fishing pressure estimates
 - e. Angler interviews conducted by creel clerks to record catch, harvest, and angler information
 - f. Catch cards distributed to anglers to increase the number of completed fishing trips documented in the survey and improve quality of catch and harvest estimates
 - g. A detailed creel survey plan has been written to guide the implementation of the study outlined above.

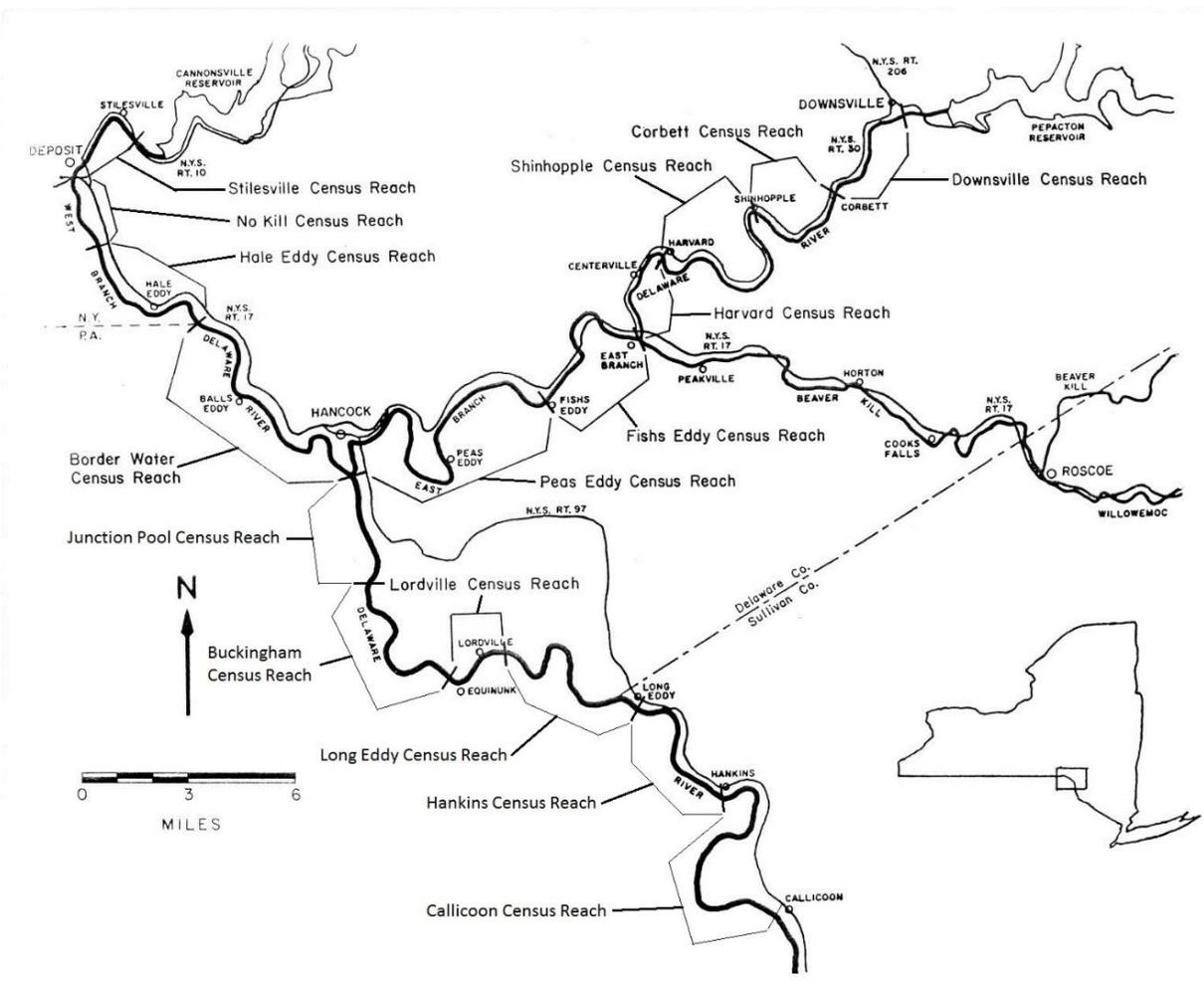


Figure 2. Map of the Delaware Tailwaters showing the system reaches on the West Branch, East Branch and Delaware River

West Branch Delaware River Fisheries Investigation Plan 2018-2020

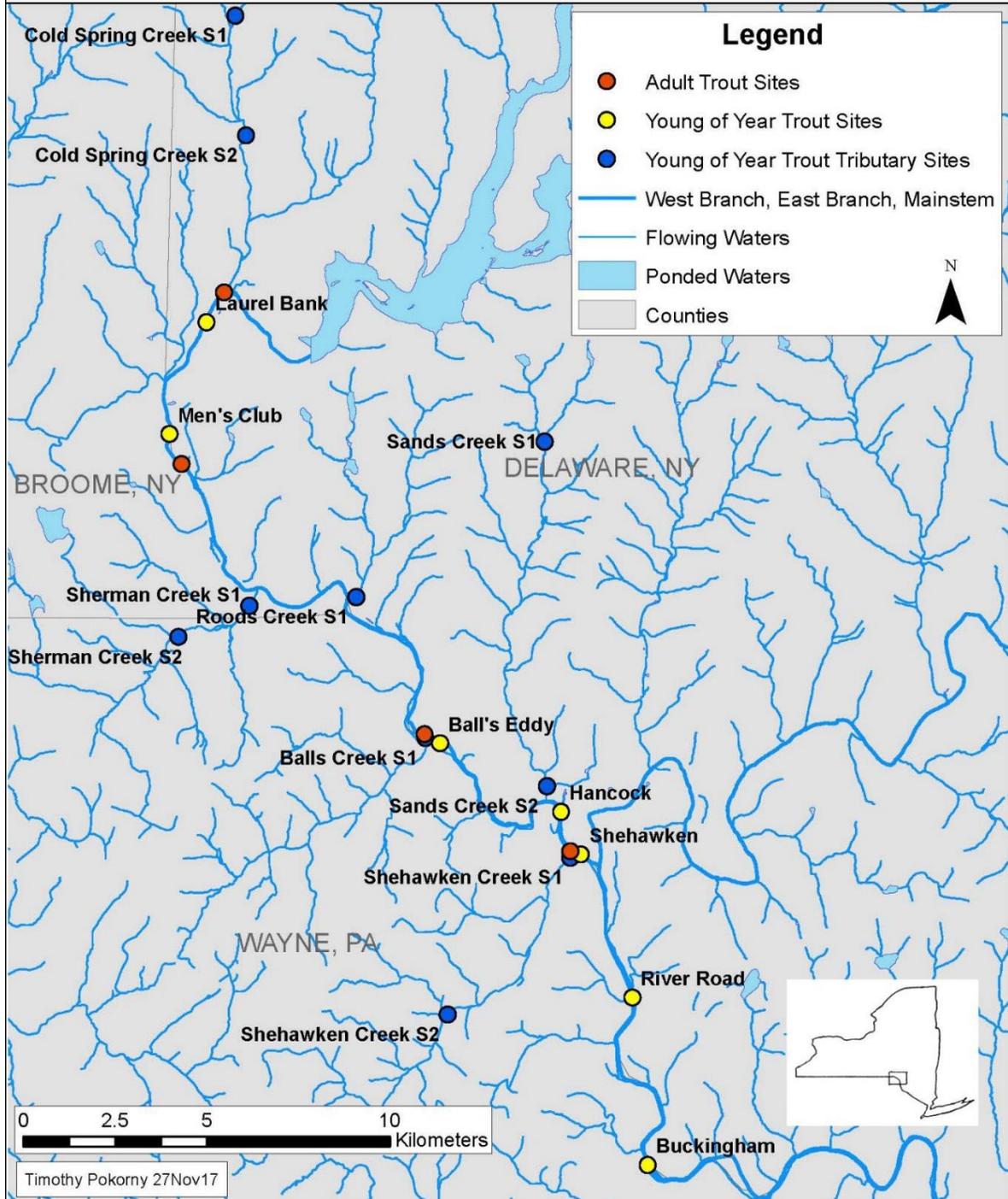


Figure 3. Map of Adult and Juvenile Trout Sampling Sites