Bureau of Fisheries Plan: Oneida Lake Walleye Telemetry Pilot Study
Tony VanDeValk and Jeff Loukmas, March 15, 2023

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Issues:

The Oneida Lake walleye fishery is New York State's most popular (Duda et al. 2019), and it has been intensively monitored and managed by Cornell University and NYSDEC for over 60 years. The lake's walleye population is also the sole source of brood stock for the State's walleye culture program, with egg take, incubation and hatching occurring at the Oneida Lake Fish Cultural Station (Hatchery) in all but 5 years since 1897. Despite the long history of walleye management and culture on Oneida Lake, little is known about the distribution and relative use of spawning locations, or the movements and distribution of adult walleyes after they spawn.

Management of the Oneida Lake walleye fishery is based mainly on annual estimates of adult population abundance. To obtain these estimates a mark-recapture assessment is conducted every 3 years, with less precise estimates between those years based on mortality and recruitment. For the mark-recapture assessment, 15-20 thousand adult walleye are marked with a fin clip after they are stripped during egg take operations, and then are immediately released into Scriba Creek, which is adjacent to the hatchery. Subsequent samples of fish are collected and examined for marks during the remainder of the open water season using electrofishing (inshore) and trawls (offshore) throughout the lake. The ratio of marked to unmarked fish in the recapture sample is combined with the number of fish initially marked to generate estimates of abundance and precision.

A valid mark-recapture estimate requires that following release, marked fish become randomly mixed with unmarked fish, or recapture effort is distributed in proportion to the number of fish in different parts of the population area (Van Den Avyle 1993). Previous mark-recapture experiments have indicated that marked fish do not randomly mix throughout the lake as there is always a higher proportion of marked to unmarked adults near the marking site than in the rest of the lake (although clipped fish are found throughout the entire lake). As a result, sampling effort is conducted uniformly throughout the entire lake. However, because electrofishing effort cannot be compared to trawling effort, there is uncertainty regarding whether inshore and offshore abundances are sampled proportionally. Mark-recapture estimates generated from only electrofishing catches often differ substantially from estimates generated from only trawl samples.

Objectives:

1. Identify Oneida Lake walleye spawning sites and determine relative use.
2. Determine if Oneida Lake walleye exhibit seasonal movement patterns and document habitat use.
3. Determine post-spawning distributions of adult walleye processed at the hatchery.

Methods:

In August 2023, 64 Vemco acoustic telemetry receivers will be deployed throughout the lake and major tributaries (Figure 1). Fifty-five of these receivers will be deployed in an array, 2 km apart, throughout the lake, and nine receivers will be placed in major tributaries to identify tributary use during the spawning season. Fifty-five receivers should provide full coverage of the lake assuming a 1 km transmitter range.

Figure 1. Approximate locations of the acoustic telemetry receiver array at 2km spacing in the lake and additional receivers in major tributaries. Actual locations will be determined after receiver range tests are conducted in summer 2023.

Figure 2. The Vemco V13 coded transmitter. These transmitters are 13 mm in diameter and 36 mm long.

In October 2023, 100 adult walleye will be collected using electrofishing from inshore areas around Oneida Lake. Each fish will be measured, sex determined (if possible), implanted with a Vemco V13 coded transmitter (Figure 2) and immediately released. The ping rate for transmitters will be set at 4-minute intervals as this rate is thought to be the most appropriate for tracking large scale walleye movements, it allows for an extended battery life of up to 6 years, and it will also minimize signal "collisions". Movements of tagged fish will be monitored for the duration of the tag's battery life or until the fish is harvested or otherwise dies. Receivers will be deployed year-round, which will allow tracking of the movements and distributions of adult walleye throughout the year. GIS will be used to describe seasonal walleye habitat use, including spawning sites, and identify any patterns in movement throughout the lake and year. Information on spawning activity timeframes will be available through the egg take operations at the hatchery. Walleye tracked in this portion of the study will address Objectives 1 and 2.

In March and April 2024, 100 adult walleye (50 males and 50 females) collected for egg take procedures at the hatchery will be implanted with an acoustic transmitter and then immediately released into Scriba Creek. Subsequent movements of tagged fish will be monitored as described above. GIS will be used to determine if and when adult walleye caught during hatchery operations show a preference for inshore or offshore areas during the remainder of the year. This will help determine if adjustments to mark-recapture estimates are needed to account for any biases related to recapture samples. Walleye tracked in this portion of the study will primarily address Objective 3, but will also contribute to Objective 2 results. For both portions of the study (covering all objectives), the first data download from receivers and redeployment will take place in summer 2024.

Signs will be placed at access points around the lake to notify anglers about the study and to provide instructions on reporting and returning tags from harvested fish to study leaders. There will be no external marks on tagged walleye (other than surgical scars, which will heal over time), therefore anglers will not be aware of a tagged fish until filleting it. This is being done to eliminate release bias of tagged fish and help minimize potential bias in the tracked population.

Timeline:

August 2023 –	Install receiver array in lake and major tributaries; Install access site study signs
October 2023 –	Collect and implant V13 acoustic tags in 100 adult walleye from inshore areas via electrofishing
October 2023 –	Initiate tracking of tagged walleye for Objectives 1 and 2
March-April 2024 –	Implant V13 acoustic tags in 100 walleye (50 males and 50 females) collected during hatchery egg take operations.
April 2024 –	Initiate tracking of tagged walleye for Objective 3 (and 2)
Jan. 31(annual) –	Complete annual interim reports
March 2027 –	Complete all tracking
March 2028 –	Complete final study report

Literature cited:

Duda, M. D., M. Jones, T. Beppler, S. J. Bissell, A. Center, A. Criscione, P. Doherty, G. L. Hughes, C. Gerken, and A. Lanier. 2019. New York angler effort and expenditures in 2017: Report 1 of 4. Report for the New York State Department of Environmental Conservation, Division of Fish and Wildlife by Responsive Management. Harrisonburg, Virginia.

Van Den Avyle, M. J. 1993. Dynamics of exploited fish populations. Pages 105-136 *in* Kohler, C. C. and W. A. Hubert, editors. Inland fisheries management in North America. American Fisheries Society, Bethesda, Maryland.