

# Characterization of rainbow smelt (*Osmerus mordax*) spawning in Mohican Canyon, 2004

Mark D. Cornwell<sup>1</sup>

## INTRODUCTION

Rainbow smelt were introduced to Otsego Lake illegally in 1979 and were abundant by 1982 (Sanford 1986). By the late 1980's smelt were rare, presumably due to displacement by alewives (*Alosa pseudoharengus*) which were introduced in the mid-1980's (Harman et al. 1997). However, even during this period of smelt decline from the late 1980's to 2001, reports of smelt spawning in Leatherstocking Creek (Foster 2002) and Mohican Canyon (Breiten 2001) occurred annually. Smelt have also been observed in the creek at Six Mile Point and Shadow Brook (Harman 2002) and the creek at Three Mile Point (personal observation). Figure 1 illustrates smelt spawning tributaries. Harman et al (1997) reported that lake residents observed smelt spawning runs in larger lake tributaries in 1995.

Cornwell (2001) found groups of 3-5 smelt congregated at near-shore riffles in Mohican Canyon in 2001. Smaller smelt, presumably males, were located slightly downstream of larger females. Approximately 10 groups of smelt totaling 50 individuals were observed in spawning behavior in 2001. Smelt sampled in 2001 had an average total length of 176.8mm and weight of 34.2g with a size range of 170-231mm.

The goal of this study was to determine if smelt were still spawning in Mohican Canyon, and to characterize the spawning population.

## MATERIALS AND METHODS

Adult smelt were observed in Mohican Canyon on 15 April 2004 at 8:45pm with a handheld spotlight and red lens headlamp. Collections of fish were made with a 20ft shore seine having (1/8") mesh. One seine was collected, that being in the mouth and first riffle of Mohican Canyon at 5 Mile Point. Smelt were measured in total length (TL) to the nearest mm with a measuring board and weighed to nearest 0.1g with a portable electronic balance.

---

<sup>1</sup> SUNY Oneonta Biology MA candidate. State University of NY at Cobleskill. Fisheries and Wildlife Department. Cobleskill, NY 12043.

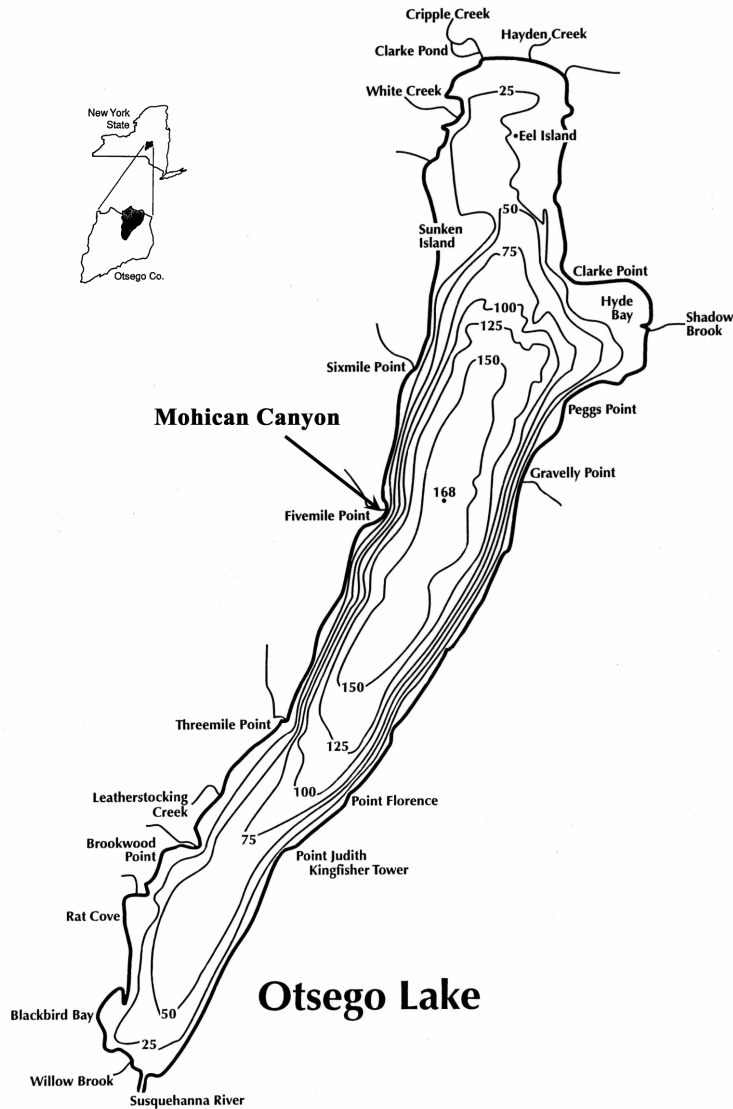


Figure 1. Map of Otsego Lake Illustrating Smelt Spawning Location in 2004.

## RESULTS AND DISCUSSION

In 2004, a single seine yielded 33 smelt (length= 125mm, weight 9.9g) which, on average, were considerably smaller than 2001 fish. In 2001, three shore seines were made yielding a total of only 17 smelt. Those smelt had an average total length of 176.8mm, weight of 34.2g and a size range of 170-231mm. In 2004 smelt were an

average of 50mm smaller and weighed 20g less than 2001 smelt at the same time in the same location (Table 1, Figure 2).

Date	Number Collected	Mean Length (mm)	Mean Weight (g)	Size Range (mm)
4/22/01	17	176.8	34.2	170-231
4/15/04	33	125	9.9	96-196

Table 1. Characteristics of Spawning Rainbow Smelt Populations in Mohican Canyon in 2001 and 2004.

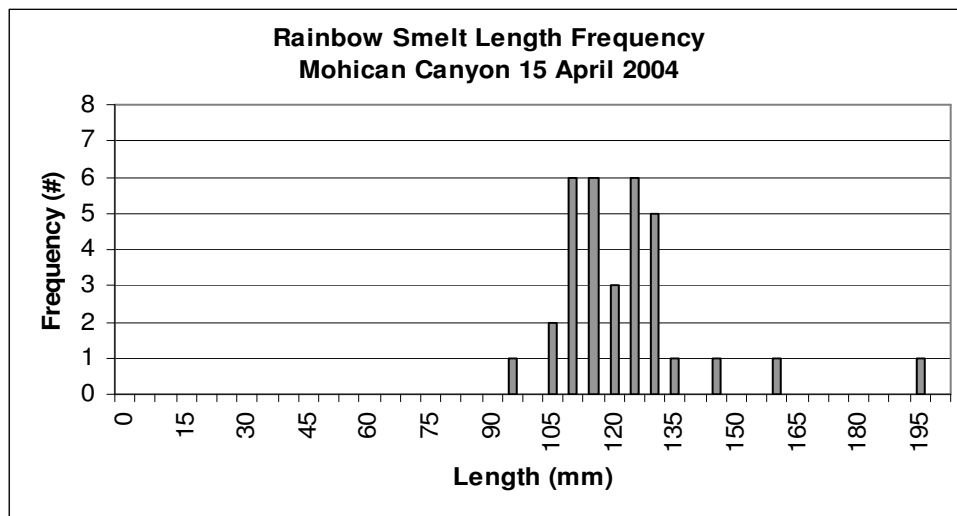


Figure 2. Length frequency distribution of spawning rainbow smelt in Mohican Canyon in 2004.

Smelt collected in Pepacton Reservoir (32mi South of Otsego Lake) by DEC during routine gillnetting in 1990-1997 had ave. TL= 250mm with a size range from 125-255, n=36 (Lindhart 2002). Pepacton Reservoir adults are slightly larger than Otsego Lake’s spawning population.

Spawning smelt have been anecdotally observed in several Otsego Lake tributaries by Otsego Lake residents and documented by BFS and DEC staff (Foster 2002; Harman 1997; Harman 2002; Sanford 1986). Despite these spawning activities, successful recruitment to lake populations of adults appears to be limited, presumably by alewife.

Alewives are considered significant predators on ichthyoplankton and have contributed to the decline of several Great Lakes fisheries (Brandt et al. 1987; Crowder 1980; Wells 1977). Brooking et al. (1998) demonstrated that adult alewives will consume larval walleye on the first strike from hatch to 16mm. It is assumed that alewives will exhibit similar ichthyoplanktivory on larval smelt as well. In Otsego Lake larval smelt have been captured from 7mm to 16mm in the surface waters in May and

June during trawling activities. During this time adult alewife overlap the habitat of the larval smelt, which are usually in the thermocline later in summer as juveniles and adults. It is highly likely adult smelt spawning is successful but that larval smelt recruitment is curtailed by intense alewife predation on smelt fry during late spring and early summer.

Smelt and alewives occupy similar niches and compete directly for resources. It is likely that during periods of high alewife density smelt may be limited directly by predation on smelt fry by alewife and by direct competition (limiting smelt growth) with alewife for food.

## REFERENCES

- Brandt, S.B., D.M. Mason, D.B. McNeil, T. Coates and J.E. Ganon. 1987. Predation by alewives on larvae of yellow perch in Lake Ontario. *Transaction of the American Fisheries Society*. 116:641-645.
- Brooking, T.E., L.G. Rudstam, M.H. Olsen and A.J. VandeValk. 1998. Size-dependant predation on larval walleyes in laboratory experiments. *North American Journal of Fisheries Management*. 18: 960-965.
- Breiten, T. 2001. Personal communication. State Highway 80. Cooperstown, NY 13326.
- Crowder, L.B. 1980. Alewife, rainbow smelt, and native fishes in Lake Michigan: competition or predation? *Environmental Biology of Fishes*. 5:225-233.
- Foster, J.R. 2002. Personal communication. Professor of Fisheries and Aquaculture. SUNY Cobleskill, Cobleskill, NY 12043.
- Harman, W.N., L.P. Sohacki, M.F. Albright and D.L. Rosen. 1997. The state of Otsego Lake 1936-1996. pp.252-266.
- Harman, W.N. 2002. Personal communication. Director SUNY Oneonta Biological Field Station. 5838 St. Hwy. 80, Cooperstown, NY 13326.
- Lindhart, F. 2002. Principal Fisheries Technician, New York State Department of Environmental Conservation. Region 4, Stamford, NY 12167 (unpublished data).
- Sanford, D.L. 1986. Sr. Aquatic Biologist. New York State Department of Environmental Conservation. Region 4, Stamford, NY 12167 (unpublished report).
- Smith, C.L. 1985, *The inland fishes of New York State*. Dept. of Envir. Cons. Albany, NY. 521p.

Wells, L. 1977. Changes in yellow perch *Perca flavescens* populations of Lake Michigan, 1957-75. Journal of the Fisheries Research Board of Canada 34:1811-1829.