Evidence of rainbow smelt (*Osmerus mordax*) spawning in Mohican Canyon, a tributary of Otsego Lake

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ABSTRACT

Groups of Rainbow smelt were observed spawning in the first riffle in Mohican Canyon upstream of Otsego Lake. Adult smelt were collected with a shore seine on 22 April 2001. Sampled fish (n=17) had an average length of 176.8 mm total length (TL) and weight of 34.2 g. Despite these observations, no larval, juvenile or adult smelt were collected in any trawling or gill netting activities in Otsego Lake between May to October 2001.

INTRODUCTION

Rainbow smelt (*Osmerus mordax*) were introduced to Otsego Lake illegally in 1979 and were abundant by 1982 (Sanford, 1986). By the late 1980s smelt were rare, presumably due to displacement by alewives (*Alsoa pseudoharengus*) introduced in the mid-1980s (Harman et al., 1997). However, even during this period of smelt decline from the late 1980s to 2001, reports of smelt spawning in Leatherstocking Creek (Foster, pers. comm.) and Mohican Canyon (Breiten, pers .comm.) occurred annually. Smelt have also been observed in the creek at Six Mile Point and in Shadow Brook (Harman, pers. comm.) 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.

In New York, anadromous smelt are found in the lower Hudson River and in Long Island streams (Smith, 1985). Landlocked smelt populate the Lakes Erie, Ontario, Champlain, the Finger Lakes, Canadarago Lake, Lake George and several other Adirondack Lakes (Smith, 1985). Landlocked rainbow smelt reportedly migrate from their lake habitat to the tributary streams to spawn in February-March (Smith, 1985) when water temperatures reach 48°F. Smelt have been observed spawning as late as 22 April in Otsego Lake (personal observation). Adult fish move into the lower reaches of creeks each evening, with males arriving first, and typically return to the lake each morning (Smith, 1985). Langlois (*in* Smith, 1985), observing Finger Lakes smelt spawning in a riffle pockets, noticed that one female would be accompanied by several males who would remain behind the female even after eggs were released. Cooper (*in* Smith, 1985) observed smelt eggs hatching in 162-205h with resulting 5mm larvae. Smelt live in the thermocline in summer (Smith, 1985) and feed on large pelagic crustacean zooplankton in Otsego Lake (Harman et al., 1997).

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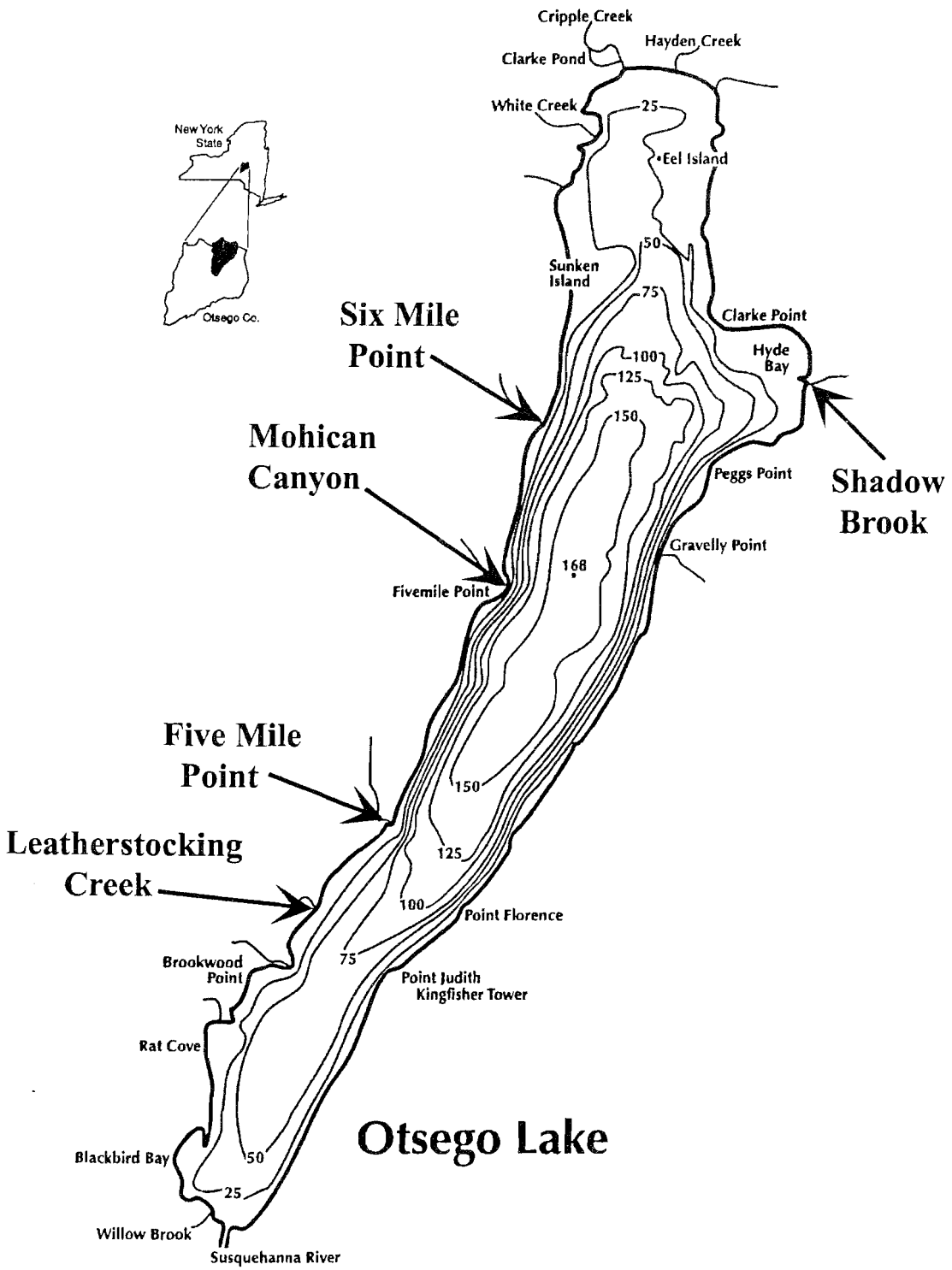

Figure 1. Map of Otsego Lake, NY, indicating streams where smelt spawning has been documented.

Recent collections of smelt in Otsego Lake have been made using a pelagic larval trawl. Larval smelt (ave.11.7mm, size range 7mm-15.9 n=15), juvenile smelt (ave. 30.6mm, size range 28-37mm, n=9) and one sub-adult (69mm) were collected in trawling activities in May, June and July 2000. No smelt were collected in any pelagic gill nets or larval trawls in 2001. Currently, the New York State Department of Environmental Conservation protects spawning smelt in Otsego Lake tributaries, prohibiting their collection (DEC fishing guide, 2001).

MATERIALS AND METHODS

Adult smelt were observed in Mohican Canyon on 22 April 2001 at 19:00-23:00 with a handheld spotlight and illuminated headlamp. Collections of fish were made with a 20ft shore seine (1/8" mesh) in 3 separate sweeps in the mouth and first riffle of Mohican Canyon. 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.

RESULTS AND DISCUSSION

Groups of 3-5 smelt congregated at near-shore riffles and were relatively calm until disturbed. Smaller smelt, presumably males, were located slightly downstream of larger females. Other spawning activity was difficult to observe due to high turbidity. Approximately 10 groups of smelt totaling 50 individuals were observed in spawning behavior.

Three relatively unsuccessful shore seines were made yielding a total of 17 smelt. Sampled smelt had a mean total length of 176.8 mm and weight of 34.2 g with a size range of 170-231 mm. Smelt collected in Pepacton Reservoir (32 mi South of Otsego Lake) by DEC during routine gillnetting in 1990-1997 had a mean TL of 250 mm with a size range from 125-255 mm (n=36) (Lindhart, 2002 DEC unpub. data), indicating that 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, pers. comm.; Harman, 1997; 2002; Sanford, 1986). Despite these spawning activities, successful recruitment to lake populations of adults appears to be limited, presumably by competition with, and fry predation 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 (*Steizostedion vitreum*) on the first strike from hatch to 16 mm. All larger walleye fry from 16 mm-19 mm were consumed by adult alewife within 1-h. Presumably, alewife will consume similarly sized smelt fry. In Otsego Lake larval smelt have been captured from 7 mm to 16 mm 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.

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