Littoral fish community survey of Rat Cove & Brookwood Point, summer 2009

Justin Potter

INTRODUCTION

Monitoring the littoral zone fish communities of Rat Cove and Brookwood Point was continued during the summer of 2009. A variety of sampling methods have been employed to study the weedy embayment of Rat Cove along the southwestern shore of Otsego Lake, beginning with age and growth evaluations of fishes in 1979 by MacWatters (1980). Following the introduction of the alewife (Alosa pseudoharengus) (Foster 1989) and their rapid rise to become the dominant fish population of Otsego Lake (Foster and Gallup 1990), summer trap netting of Rat Cove has been a component in creating a long term data set (Cornwell 2005). To provide a habitat comparison of inshore movements and spawning activity of the alewife, summer trap netting protocol was expanded in 2002 to include Brookwood Point, a rocky shoal habitat with abrupt depth increases (Wayman 2003). Other methods used to assess yearly and seasonal alewife population dynamics have included trawls, gill netting and hydroacoustics (Cornwell 2005).

The alewife is an anadromous fish species. Mature, ocean inhabitants are capable of reaching 381 mm (15 inches), while landlocked populations average 152 mm (6 in) (Palmer and Fowler 1975). Alewife are eplimnetic planktivores that school during daylight hours while dispersing inshore over night (Smith 1985), where they often compete with warm-water fishes for reproduction and nursery purposes in the summer. Shifts in trophic relationships have been associated with alewife proliferation in Otsego Lake. Research has indicated an increase in algal production as the zooplankton community has shifted from large, effective-grazing cladocerans, (Daphnia spp.) to smaller (Bosmina spp.) causing reduced water transparency and increased total phosphorus loading (Harman et. al. 2002; Warner 1999). Historically important cold-water game fish, such as, the lake whitefish, (Coregonus clupeaformis) and cisco (C. artedii) are in decline (Harman et al. 2002). Although lake trout (Salvelinus namaycush) have experienced faster growth rates in response to the alewife introduction (McBride and Sanford 1997), declines in hypolimnetic oxygen during summer stratification, caused indirectly by the alewife population, would likely diminish the lake’s future ability to sustain a cold-water fishery (Harman et al. 2002).

The walleye (Sander vitreus) reintroduction program that began in 2000 continues to date. It has enhanced the game fish diversity in Otsego Lake, while providing a significant predator of alewife and presumed ecological balance on their future populations (Cornwell 2005). In 1989, Lehman et al. (1990) were not able to document any walleye during a spring block-net tributary survey. The loss of walleye from the lake’s food chain has been linked to alewife proliferation (Foster and Gallup 1990). Annual studies conducted by the BFS evaluate abiotic and biotic responses to alewife density fluctuations. Walleye stocking in Otsego Lake has been deemed successful, however further research will be required to support evidence of trophic cascade improvements (Cornwell 2005).

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MATERIALS & METHODS

A standard Pennsylvania trap net with a 45ft lead was set at each survey location from 3 June to 7 August 2009. Trap nets were deployed perpendicular to shore and fished for 24-hour intervals Monday through Friday. Captured fish were placed into totes and transported to the BFS dock for processing. Fish were weighted in grams on a digital scale; a measuring board was used to collect total length measurements, taken in millimeters. All collected species were returned to the lake. Nets were pulled each Friday. Repairs were made in the field when necessary.

Results of mean catch per week of alewife during summer trap netting of Rat Cove and Brookwood Point 2000-2009 are given in Figure 2. A continued decrease in mean weekly capture of alewife has been indicated, while total length of alewife has been increasing since 2007, represented in Figure 3. Tables 1 and 2 present the mean catch per week of all collected species, respectively for Rat Cove and Brookwood Point, 2000-2009.

Figure 1. Bathymetric contour map of Otsego Lake, NY. Trap nets were set perpendicular to the shore at Brookwood Point and Rat Cove.
Figure 2. Mean weekly catch of alewife in Rat Cove and Brookwood Point trap nets 2000-2009.

Figure 3. Mean total length of alewife captured during summer trap netting 2000-2009.
Table 1. Total mean weekly catch at Rat Cove and catch contributed by each species, 2000-2009 (modified from Byrne 2008).

**Rat Cove; Mean Catch per Week (2000-2009)**

<table>
<thead>
<tr>
<th>Species</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
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<th>2008</th>
<th>2009</th>
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<td>0.4</td>
<td>0.7</td>
<td>0.5</td>
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<td>15.1</td>
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<td>2</td>
<td>2.18</td>
<td>4.38</td>
<td>5.1</td>
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<td>1.7</td>
<td>1.5</td>
<td>1.4</td>
<td>0.8</td>
<td>3.18</td>
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<td><strong>41</strong></td>
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<td><strong>9</strong></td>
<td><strong>5</strong></td>
<td><strong>11</strong></td>
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</tbody>
</table>

Table 2. Total mean weekly catch at Brookwood Point and catch contributed by each species, 2000-2009 (modified from Byrne 2008).

**Brookwood Point: Mean Catch per Week 2000-2009**

<table>
<thead>
<tr>
<th>Species</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<tr>
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<tr>
<td>European Rudd</td>
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<td>0.2</td>
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<td><strong>152</strong></td>
<td><strong>101</strong></td>
<td><strong>121</strong></td>
<td><strong>37</strong></td>
<td><strong>10</strong></td>
<td><strong>4</strong></td>
<td><strong>8.0</strong></td>
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<td><strong>5.4</strong></td>
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</table>
DISCUSSION

A total of eight alewives were collected during the summer 2009 trap netting survey. All five alewife collected in Rat Cove occurred within a 24-hour set between 9 and 10 June. The last alewife observed was taken from Brookwood Point during mid-June. Length and weight measurements (unpublished data) indicated the majority of fish taken to be adult. A total of one-hundred and fifty fish were collected in Rat Cove, with eleven species representing the overall catch. During the last week of the survey, a large increase in bluegill (Lepomis macrochirus) captured in Rat Cove was observed. This corresponds with data collected by Byrne (2009) in 2008. Evidence suggests successful year classes for bluegill over two consecutive years. An increase in mean total length of collected alewife was observed in the summer of 2009 (see Figure 2). Future summer trap netting surveys are recommended for the purpose of evaluating the population dynamics of littoral zone fishes, and the interactions of non-native alewife within the represented habitats.

REFERENCES


Smith, C.L. 1985. The inland fishes of New York State. NY SDEC, Albany, NY.
