

Summer 2007 trap net monitoring of littoral fish communities at Rat Cove and Brookwood Point

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INTRODUCTION

This study was the continuation of an ongoing effort to monitor population dynamics of littoral fish species in Rat Cove since 1979 (MacWaters 1980) and Brookwood Point since 2002 (Wayman 2003). Alewife (*Alosa pseudoharengus*) were illegally introduced to Otsego Lake in 1986 (Foster 1990). They, among other fish, use the littoral zones of Rat Cove and Brookwood Point as a spawning ground and as a nursery area for egg development (Closs et al. 2004). As an efficient, sight oriented planktivore, alewife have decreased the number of large-body algae grazing crustacea such as *Daphnia* spp. and *Bosmina* spp. in the lake (Warner 1999). Combined with high nutrient input and increased chlorophyll *a* concentrations (Harman et al. 2002), this decrease has resulted in reduced Secchi transparencies in the lake, high algal growth (Harman et al 1997), and increased rates of hypolimnetic oxygen demands (Albright 2001).

Walleye (*Sanders vitreus*) are a natural predator of alewife, and were abundant in Otsego Lake until the late 1950s. A reintroduction effort for walleye as a sport fishery began in 2000 (Cornwell 2005). Since then, alewife population density and distribution has been monitored by trap net, by gill net, and hydro-acoustically (Brooking and Cornwell 2005). Trap netting surveys are intended to further evaluate the effectiveness of this effort. It is the goal of the reintroduction not only to develop a sport fishery around walleye, but also to affect the abundance of alewife, thereby increasing crustacean plankton abundance and body size. Increased grazing by these organisms should reduce algal biomass in Otsego Lake through the resulting trophic cascade. To measure the success of this effort, the Otsego Lake zooplankton community were measured biweekly (Albright 2008), chlorophyll *a* concentrations were measured weekly (Ottley 2008) and water quality was measured biweekly (Albright 2008).

MATERIALS & METHODS

Pennsylvania trap nets were set daily at Rat Cove and Brookwood Point Monday through Thursday 24 May 2007 through 10 August 2007 (Figure 1). Trap nets were set perpendicular to the shore. Nets were pulled Tuesday through Friday at 0830 hrs. Fish were removed from trap nets and processed on the dock of the SUNY Oneonta Biological Field Station for length (mm) and weight (g). Fish were released after processing.

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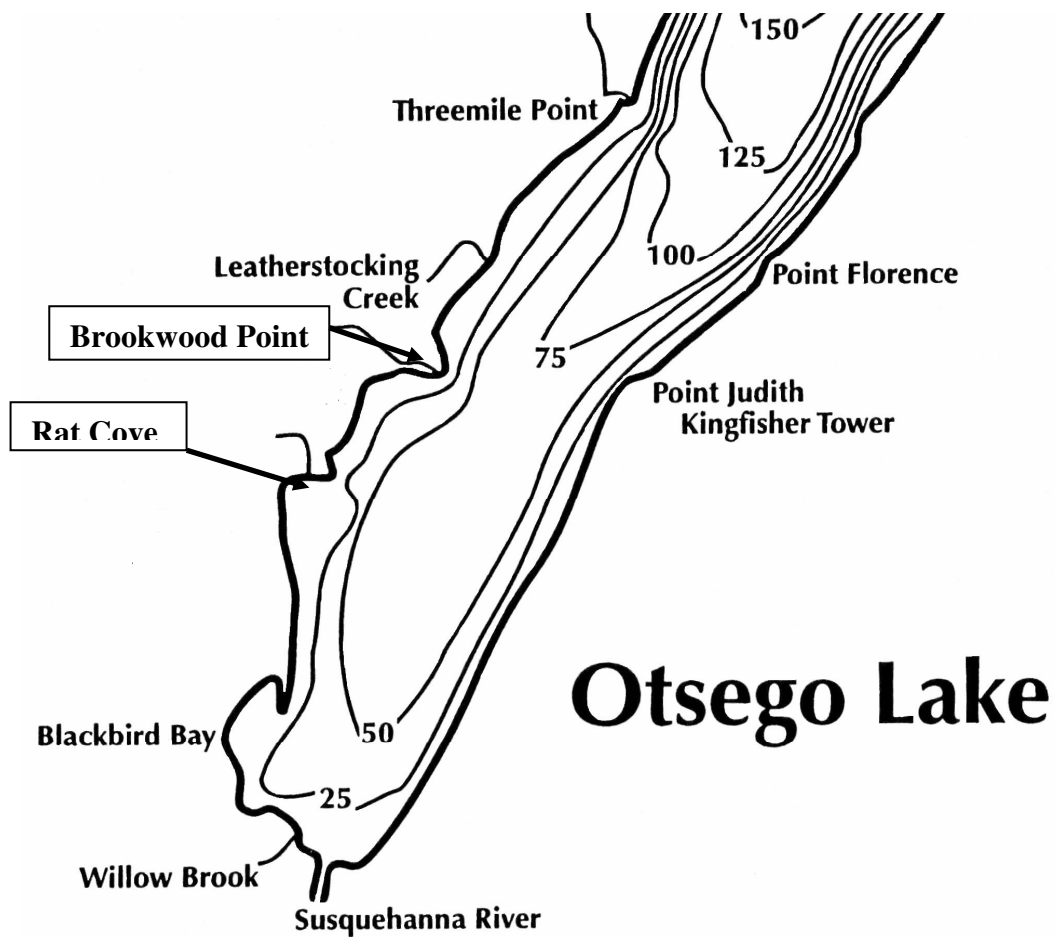


Figure 1. Bathymetric contour map of Otsego Lake, NY. Trap nets were set perpendicular to the shore at Brookwood Point and Rat Cove.

RESULTS

Figure 2 illustrates the mean catch per week of alewife in trap nets from summers 2000-2007 in Rat Cove and Brookwood Point. The overall trend is a decreasing mean catch per week, although catch per week increased from 2006 to 2007 in both Rat Cove and Brookwood Point trap nets. Figure 3 illustrates mean length of alewife in trap nets summers 2000-2007. The overall trend is an increase in mean length from 2000-2006. Increases in mean catch per week in 2007 trap nets correspond with decreases in mean alewife length in 2007. The mean catch per week for all species encountered, 2000-2007, for Rat Cove and Brookwood Point are given in Tables 1 and 2, respectively.

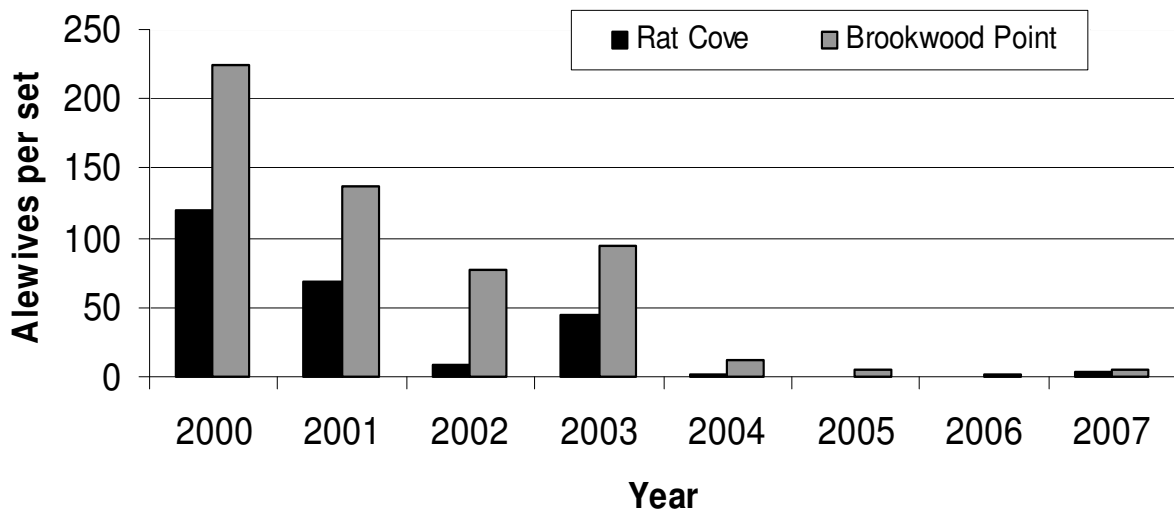


Figure 2. Mean weekly catch of alewife in Rat Cove and Brookwood Point trap nets 2000-2007.

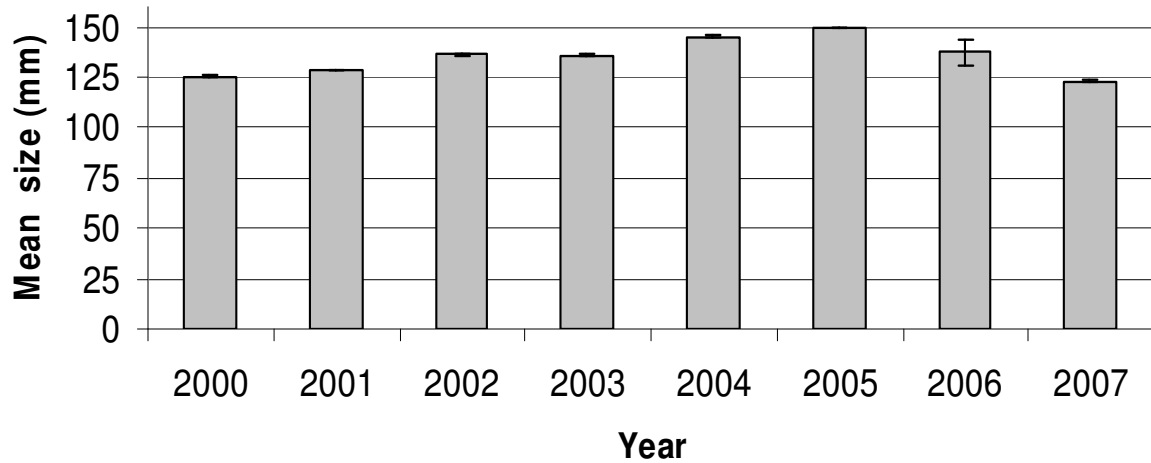


Figure 3. Mean total length of alewife captured in trap nets over summers 2000-2007.

Table 1. Total mean weekly catch at Rat Cove and catch contributed by each species, 2000-2007 (modified from Walters 2007)

| Mean Catch Per Week | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Alewife | 120.1 | 67.8 | 8 | 45.2 | 2.4 | 0.4 | 0 | 3.18 |
| Golden Shiner | 0.6 | 0.3 | 0.4 | 0.7 | 0.5 | 0.3 | 0 | 0.09 |
| Pumpkinseed | 9.7 | 20.8 | 15.1 | 32.8 | 12.9 | 4.6 | 2 | 2.18 |
| Blue Gill | 2 | 2.9 | 3.7 | 1.7 | 1.5 | 1.4 | 0.8 | 3.18 |
| Redbreast Sunfish | 0.8 | 0.6 | 0.3 | 0.4 | 0.3 | 0.1 | 0 | 0 |
| Rock Bass | 1.6 | 1.5 | 3.8 | 1 | 1.8 | 0.5 | 0.5 | 0.55 |
| Largemouth Bass | 0.1 | 0.6 | 0.3 | 0.3 | 0.1 | 0.1 | 0 | 0.64 |
| Chain Pickerel | 0.6 | 0.5 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.27 |
| Atlantic Salmon | 0 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| Yellow Perch | 2.5 | 0.5 | 1.3 | 0.3 | 1.2 | 0.3 | 0.6 | 0.18 |
| White Sucker | 1.1 | 0.2 | 1.1 | 0.1 | 1.9 | 0.2 | 0.5 | 0 |
| Common Carp | 0.3 | 0.3 | 0.2 | 0.5 | 0.3 | 0.7 | 0.1 | 0 |
| Brown Bullhead | 1.7 | 0.1 | 6.4 | 2.6 | 1.6 | 0.1 | 0 | 0.09 |
| Spottail Shiner | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0.18 |
| Smallmouth Bass | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0.09 |
| European Rudd | 0.1 | 0 | 0.3 | 0.7 | 0.2 | 0 | 0.1 | 0 |
| Total | 141 | 96 | 41 | 87 | 25 | 9 | 5 | 11 |

Table 2. Total mean weekly catch at Brookwood Point and catch contributed by each species, 2000-2007 (modified from Walters 2007).

| Mean Catch Per Week | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Alewife | 224.2 | 137.3 | 77.4 | 94.7 | 12.6 | 5.7 | 1.4 | 5.45 |
| Golden Shiner | 0.3 | 0.3 | 1.1 | 1.8 | 1.6 | 0.3 | 0.1 | 0 |
| Pumpkinseed | 3.1 | 7.4 | 12 | 13.1 | 12.2 | 1.1 | 0.8 | 1 |
| Blue Gill | 6.5 | 0.9 | 0.9 | 1 | 0.8 | 0.5 | 0.3 | 0.27 |
| Redbreast Sunfish | 0.3 | 0 | 0.9 | 0.2 | 0.7 | 0.1 | 0.1 | 0.18 |
| Rock Bass | 7.7 | 3.5 | 4 | 3.8 | 3 | 1.1 | 0.3 | 0.27 |
| Largemouth Bass | 0.3 | 0.3 | 0.7 | 0.8 | 0 | 0.1 | 0 | 0.09 |
| Chain Pickerel | 0.3 | 0 | 0.3 | 0.2 | 0.2 | 0.2 | 0 | 0.18 |
| Atlantic Salmon | 0 | 0.3 | 0 | 0 | 0 | 0.1 | 0 | 0 |
| Yellow Perch | 1.8 | 0.3 | 0.2 | 0 | 0.6 | 0.1 | 0.2 | 0 |
| Walleye | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0.09 |
| White Sucker | 4.9 | 0 | 1.7 | 0.7 | 0.6 | 0.2 | 0.3 | 0 |
| Common Carp | 2.1 | 0.3 | 0.6 | 0.1 | 0.3 | 0 | 0.2 | 0 |
| Bluntnose Minnow | 0.3 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0 |
| Brown Bullhead | 6.7 | 0 | 1 | 3.6 | 4.2 | 0 | 0.1 | 0 |
| Spottail Shiner | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0.18 |
| Smallmouth Bass | 0 | 0 | 0 | 0.6 | 0.2 | 0 | 0 | 0 |
| European Rudd | 0 | 0.3 | 0 | 0.1 | 0.2 | 0 | 0.1 | 0.09 |
| Common Shiner | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0 |
| Total | 259 | 152 | 101 | 121 | 37 | 10 | 4 | 8.0 |

CONCLUSION

As alewife abundance in trap nets has decreased since 2000, individual size of alewife has generally increased. From 2006-2007, there was an increase in mean weekly catch of alewife at both Brookwood Point and Rat Cove, and a decrease in the mean length of alewife. These data indicate an increase in the overall abundance of alewife in Otsego Lake, most likely a result of the widely cyclical fluctuations of alewife population structure within the lake (Brooking and Cornwell 2004). Continued research will be necessary for a better understanding of the population dynamics of Otsego Lake alewife.

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