

American Eel Sampling in Lake Champlain 2007 Progress Report

Introduction

American eel *Anguilla rostrata* support important commercial fisheries where populations remain at harvestable levels. However, downward trends in harvest data have raised concern for the population of eel in the United States and Canada. Organizations such as the Great Lakes Fishery Commission and the Atlantic States Marine Fisheries Commission have identified the eel as a high research priority and/or have prepared management plans for the species (www.glfcc.org/research/Priorities.pdf, [http://www.asmfcc.org/species Documents/eel/annual reports/fmpreviews/eelFMPreview06.pdf](http://www.asmfcc.org/species/Documents/eel/annualreports/fmpreviews/eelFMPreview06.pdf)).

The Richelieu River connects northern Lake Champlain to the St. Lawrence River and supported a commercial eel fishery until it was closed in 1998 because harvest dramatically declined. The rebuilding of two dams on the river has been partly to blame for the decline (Verdon et al. 2002). The Dams at Saint-Ours, Québec and Chambly, Québec were refurbished in the mid 1960s. Evidence of these dam's impacts on eel recruitment to Lake Champlain can be seen in eel surveys in 1979 and 1985. Mark-recapture studies conducted in three Lake Champlain bays: Paradise, Keelers and Converse Bay indicated a decline in estimated population size (Labar and Facey 1983, Labar 1987) and an increase in average size of eel caught, reflecting an aging population that has not been sufficiently supplemented by recruits. Total catch in Paradise Bay declined from 85 eels captured in 1979 to 50 in 1985. Keeler Bay eel catch dropped from 146 eels captured to 81; and Converse Bay catch dropped from 138 to 78 eel.

In 1997 an eel ladder was constructed at the dam in Chambly and in 2001 a fish ladder and an eel ladder were built at St Ours. Faune Québec, in cooperation with a commercial fishermen union and Hydro- Québec, initiated a ten-year eel stocking program in 2005 in the Richelieu River to further enhance eel recruitment. In May 2005 and 2006, and in June 2007, 600,000, 1 million and 421,500 elvers, respectively (circa 50-60 mm TL) were transferred from the Atlantic Coast (Nova Scotia, Canada) to the Richelieu River. They were scattered during daytime in the first 15 km of the river, between Saint-Paul-de-l'Ile-aux-Noix and the Canada-US border. In order to monitor the success of these stocking efforts and new passage facilities, Québec asked the United States Fish and Wildlife Service's Lake Champlain Fish and Wildlife Resources Office in Essex Junction, Vermont for assistance by repeating the Lake Champlain surveys. This report presents the findings of the 2007 sampling efforts.

Study Area

Lake Champlain (1,140 km²) borders New York and Vermont and extends into Québec (Figure 1). Keeler and Paradise Bays are situated on the eastern side of South Hero, Vermont in what is described as the northeast arm of the lake. Converse Bay is located further south on the lake in the town of Charlotte/Ferrisburg. All the bays varied in

substrate from mud with vegetation to bear rock. In addition to the bays, the shoreline along Grand Isle was also sampled.

Methods

Electro-fishing was conducted utilizing a SR-20 Smith-Root electro-fishing boat with a pulsed direct current of 2.5-3.0 amps at a setting of 340 volts. Sampling was conducted after dark when eels were presumed to be most active. Sampling transects were electronically recorded using a global positioning unit (Garmin GPSmap model 398) and followed the shoreline generally staying in less than 2 meters depth. Collected eels were anesthetized, measured, weighed and implanted with a passive integrated transponder tag (Biomark, model TX1405L) near the back of the head and released.

Results

Eel sampling occurred on the nights of July 12 (Paradise and Keeler Bay), July 16 (Converse Bay) and August 14 (Grand Isle) in 2007. One American eel was collected and two other eels were observed but not captured from the Grand Isle shoreline station (Figure 4). This eel measured 665 millimeters and weighed 0.93 kilograms. The eel was checked for a previously implanted PIT tag and finding none, tagged with a PIT tag and released. No eels were captured from any of the 3 bays sampled. Over 16 kilometers of shoreline was sampled (Keeler Bay: 3.8 km; Paradise Bay: 3.4; Converse Bay: 5.9; Grand Isle: 3.7; Figures 2, 3 and 4).

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References

- Labar, G. W. 1987. Changes in population structure of American eels, *Anguilla rostrata*, in Lake Champlain, Vermont, U.S.A., after initiation of a commercial fishery. Presented at the 1987 meeting of the European Inland Fisheries Advisory Council Working Party on Eel, Bristol, England, 12-16 April, 1987.
- Labar, G. W., and D. E. Facey. 1983. Local movements and inshore population sizes of American eels in Lake Champlain, Vermont. *Transactions of the American Fisheries Society* 112:114-116.
- Verdon, R., D. Desrochers, and P. Dumont. 2003. Recruitment of American eels in the Richelieu River and Lake Champlain: Provision of upstream passage as a regional-scale solution to a large-scale problem. *American Fisheries Society Symposium* 33: 125-138.

Figure 1. Map of Lake Champlain showing sampling areas.

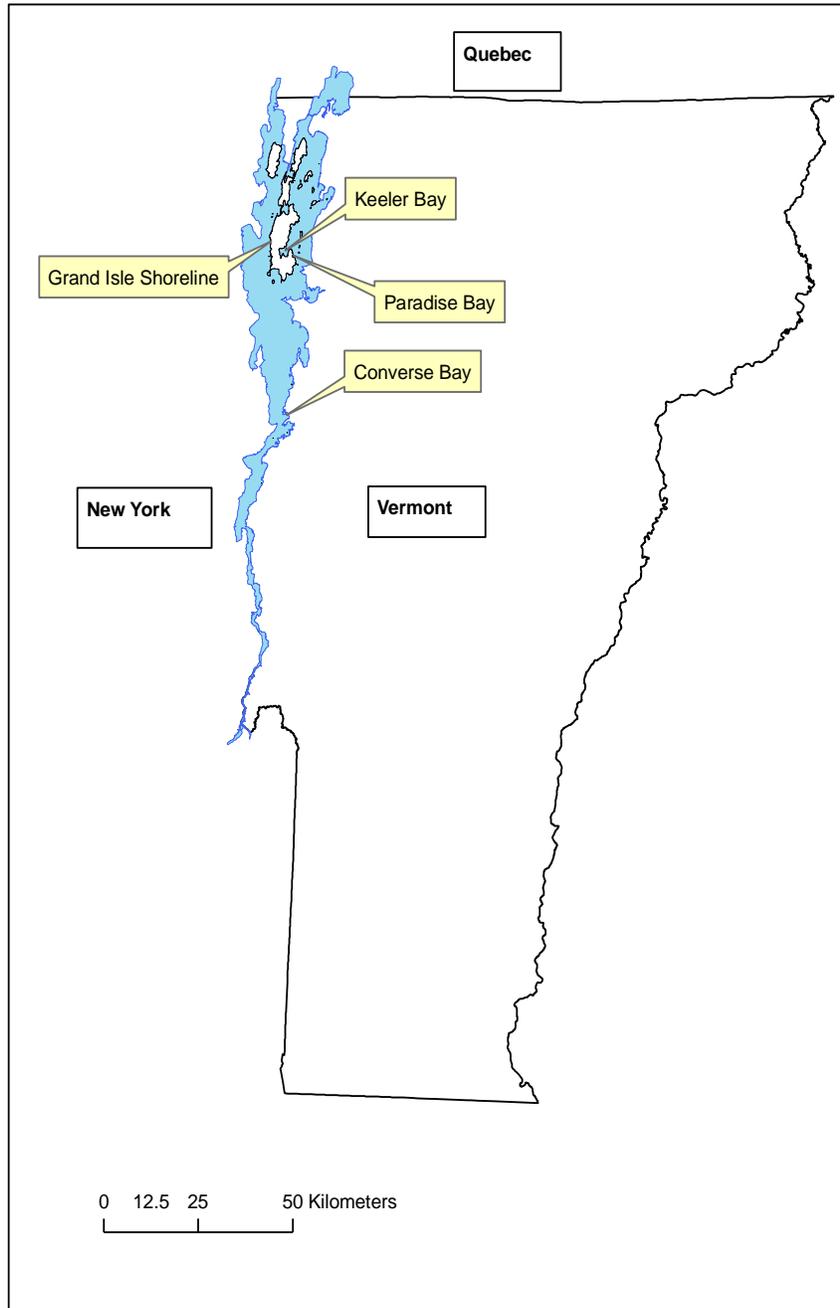


Figure 2. Map of Keeler and Paradise Bay showing electro-fishing transects.

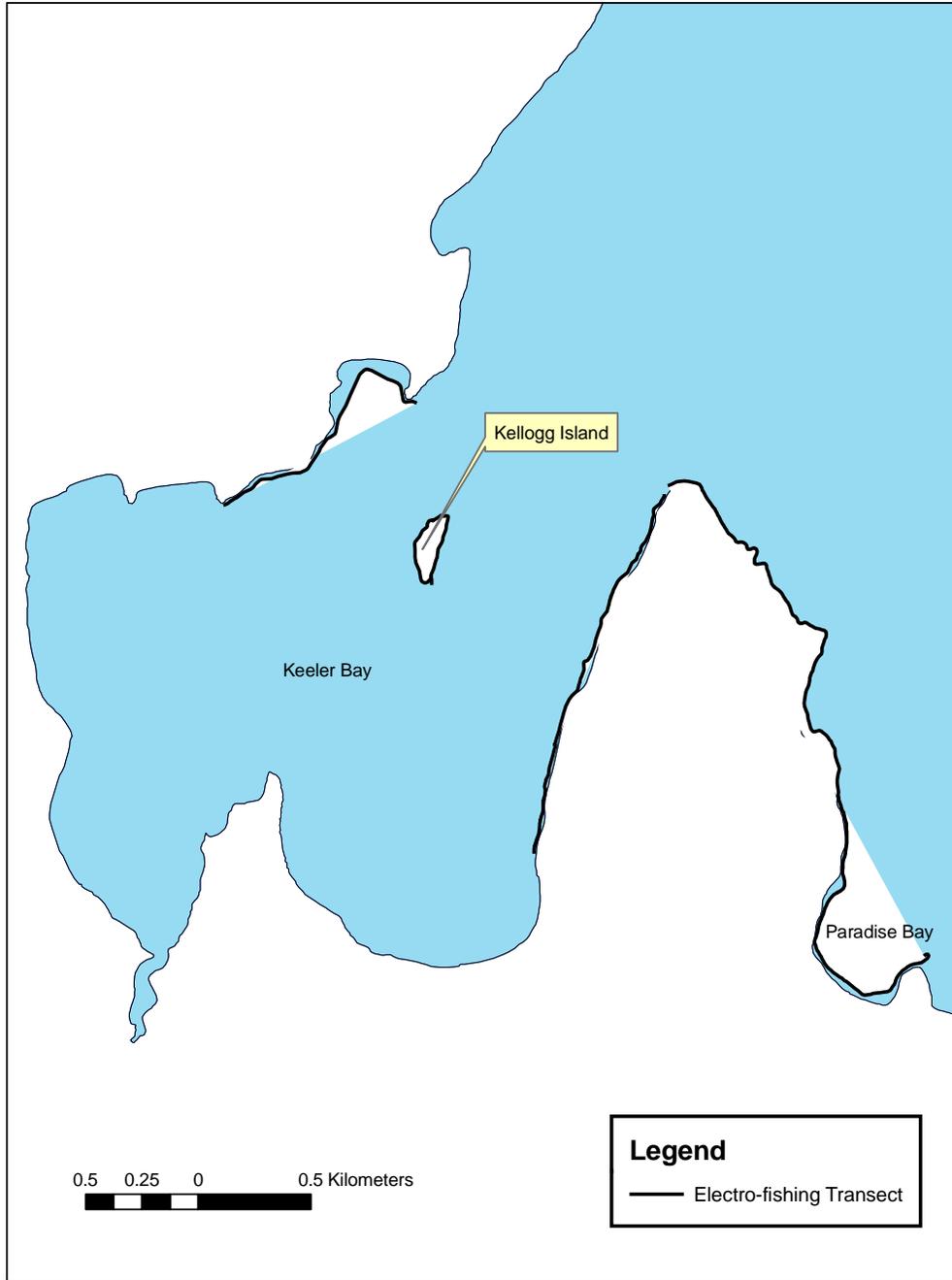


Figure 3. Map of Converse Bay showing electro-fishing transects.

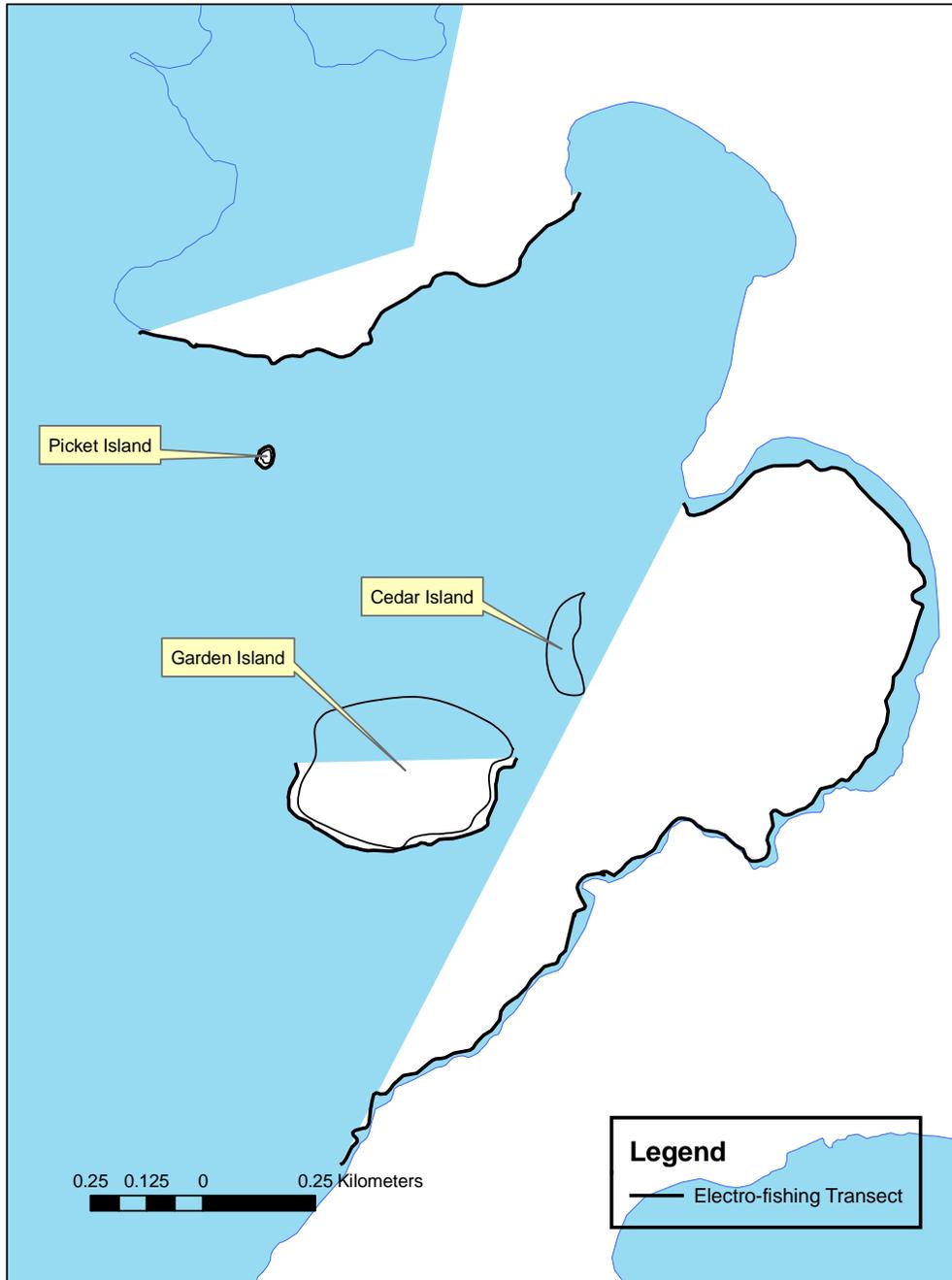


Figure 4. Map of Grand Isle shoreline showing electro-fishing transect.

