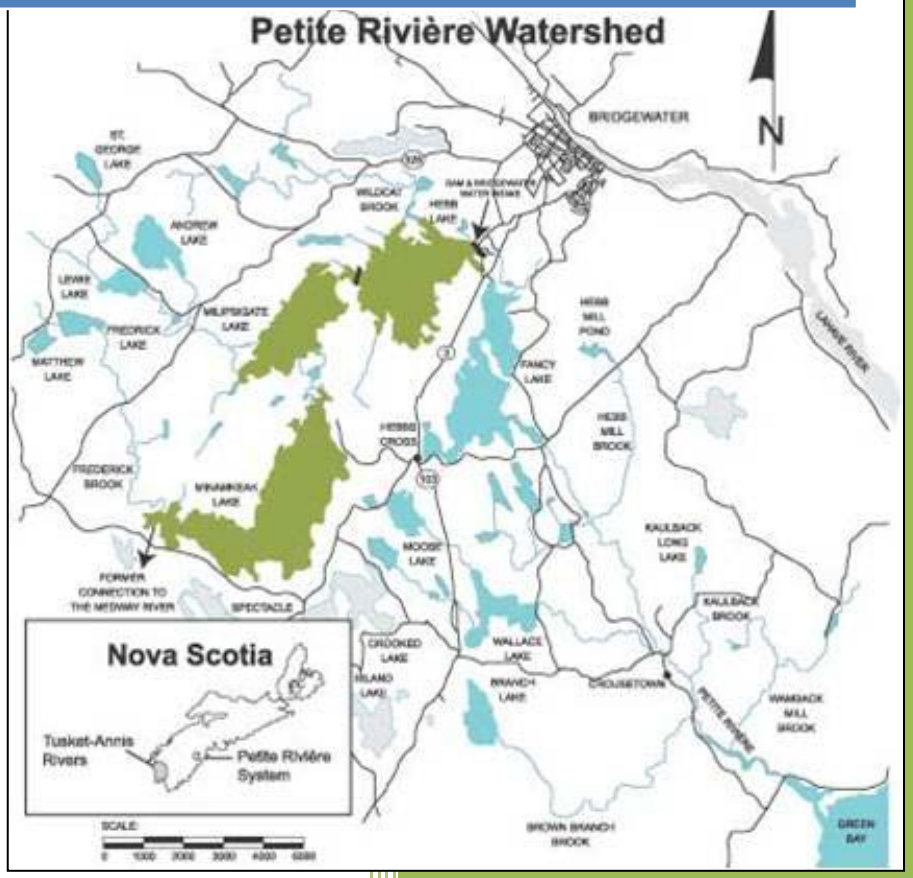
2006

Bathymetric Surveys on the Petite Rivière Lakes



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Introduction

On November 22-24, 2006, bathymetric surveys were conducted on Hebb, Minamkeak, and Milipsigate Lakes by Chris Wessel (BCAF), Darcy Pettipas (NSPI), and Ralph Heighton (NS DFA). These three lakes were chosen for this survey due to the fact that they are the last remaining wild habitat for the endangered Atlantic whitefish. Bathymetry is basically a map of the bottom of a water body that includes depth measurements. This information is extremely important for the Atlantic Whitefish Conservation and Recovery Team (AWC&RT) in order to determine valuable Atlantic whitefish habitat in the three lakes. Knowing the location of prime Atlantic whitefish within the three lakes may lead researchers in the discovery of the largest concentrations of Atlantic whitefish at any given time of year.

Equipment

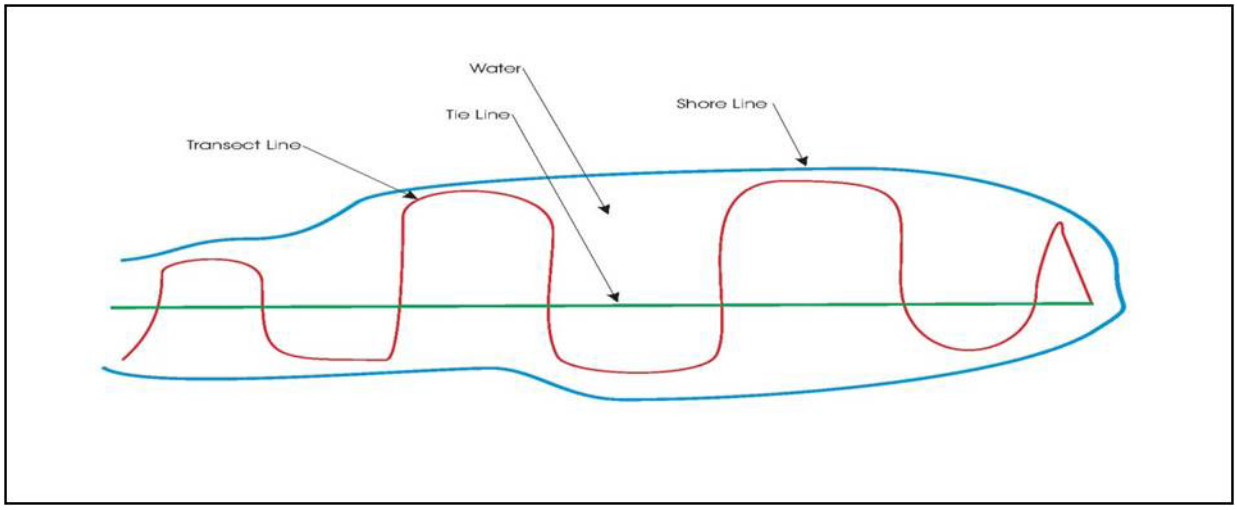
Nova Scotia Power (NSPI) provided a 12 foot Zodiac boat, 15 hp 4-stroke motor, bathymetry survey equipment, safety gear, and one technician for three days. The Nova Scotia Department of Fisheries and Aquaculture (NS DFA) provided one technician for a day. The Bluenose Coastal Action Foundation (BCAF) provided an oil spill clean up kit and one technician for two days.

Methodology

Bathymetric surveys are conducted by taking sonar readings through a water body to find depth measurements at specific locations. The actual sonar equipment used consists of an “Active 3” transducer that is mounted on the back of the boat, a “Sonarlite” receiver that is kept in the boat, and a “GBX Pro” GPS Receiver that is accurate within one meter horizontally and 20 to 40 centimeters vertically. The transducer sends off a sonar “ping” every second once it is turned on. This ping bounces off the bottom of the lake floor and is picked up again by the receiver where the data is stored. The GPS receiver takes measurements of its location through satellites and stores it in its memory. This information corresponds directly with that being recorded by the sonar, showing surveyors the exact location of the depth readings. Surveyors also brought an “ETREX” GPS unit with them on board the boat. The purpose of having the additional GPS unit aboard the boat was to help navigate through the lake, as well as tracking the path surveyed to ensure the same path was not surveyed twice.

The first step in conducting bathymetric surveys is planning a route to establish “tie lines”. Tie lines are the lines that will run through all of the transects in the lake. It is best to try to plot these lines as close to the middle of the area being surveyed as possible. Transect lines are made once the tie line is established. These lines are used to collect the depth data from the middle of the survey area to the shore (Figure 1).

Figure 1: Diagram of Tie lines and Transect lines.



Data begins being logged once surveyors start the tie lines. The receiver is closely monitored to make sure any problem is caught as soon as possible if it were to occur. The GBX receiver's memory may fill during the survey due to the fact that the information being collected is detailed and takes up large amounts of memory space. If this happens, the information on the GBX receiver must be downloaded to a computer prior to restarting the survey. Once the information has been downloaded to a computer, the data on the receiver can be erased and the survey continued from where it was left.

At the end of the bathymetric survey, all data is downloaded onto a computer. The data downloaded consists of the information from the Sonarlite and GBX receivers, as well as the data from the additional handheld GPS. The information from the Sonarlite and the GBX receivers creates a graph showing the depths of the transects traveled by the boat. The handheld GPS provides an actual map of the survey location as well as the area covered during the survey. The information collected is still considered "raw" data until it can be transferred to a GIS mapping program creating proper bathymetry maps using the raw data.

Discussion

Chris Wessel, Ralph Heighton, and Darcy Pettipas began conducting the bathymetric surveys on Wednesday, November 22nd, 2006. It took a total of three days to complete the surveys on all three lakes. The first day, Ralph Heighton and Darcy Pettipas conducted the bathymetry on Minamkeak Lake. Minamkeak Lake was considered to be the easiest lake to conduct bathymetry surveys on due to the fact that it is a fairly open lake, making the survey easier as the surveyors do not have to maneuver the boat around various islands and coves found in many other lakes within NS. The weather cooperated for the duration of the Minamkeak Lake survey resulting in extremely calm waters for the entire day, ensuring that the survey went smoothly.

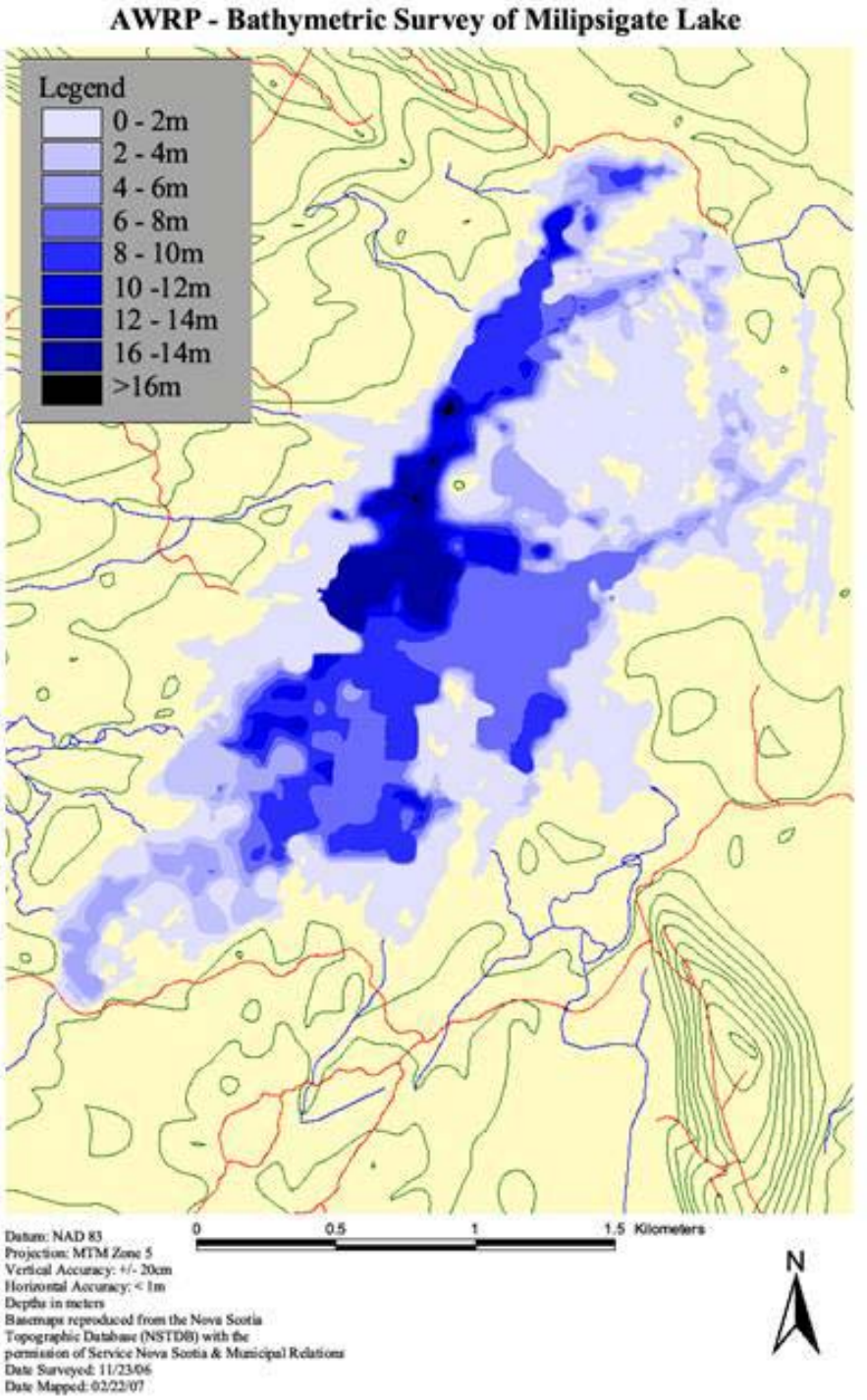
Chris Wessel and Darcy Pettipas started surveying Milipsigate Lake the next day, Thursday, November 23rd, starting at 10:30am. The boat was launched from the dam connecting Hebb and Milipsigate Lakes. Milipsigate Lake was more difficult to survey then Minamkeak, due to the fact that there were more coves and islands to maneuver around then found in Minamkeak Lake. The surveyors did not encounter any major problems conducting the Milipsigate survey besides hitting the occasional rock. They stayed on the lake until the survey had been completed for the entire lake, finishing up at 4:15pm.

Hebb Lake was surveyed on Friday, November 24th, by Chris Wessel and Darcy Pettipas. The survey started at 7:30am. Hebb proved to be the most difficult to survey of the three lakes due to the fact that it contained the most obstacles. The boat was launched from the same location as the previous day at the dam connecting Hebb and Milipsigate Lakes. When Darcy and Chris first entered Hebb Lake, a trap net was observed about 10 meters from shore. After a quick inspection of the trap, surveyors noticed that although it appeared that the trap was not intended to catch fish, it contained six dead Yellow perch. Surveyors notified Adam Cook, who confirmed that the trap had been set by himself and Fisheries and Oceans Canada (DFO) Science personnel. However, it was not yet supposed to be active. Chris informed Mr. Cook of their discovery of the dead Yellow perch, as well as contacted BCAF's Executive Director, Brooke Cook, with the news of the dead fish. The weather on Friday cooperated for the morning; however, it quickly turned very windy in the afternoon. Chris and Darcy finished the survey on Hebb Lake around 2:00pm just before the weather became to extreme to conduct the surveys.

Results

See Appendix 1 for bathymetry maps of Hebb and Milipsigate Lakes. At the time this report was written, NSPI staff had not completed the bathymetry map for Minamkeak Lake.

Appendix 1: Bathymetric Survey Results for Milipsigate Lake



Appendix 1: Bathymetric Survey Results for Hebb Lake