Bathymetric Data Collection and Processing

Bathymetric data collection followed predetermined protocols from work done in STU47 (Fig. 5). A survey was made with a Navisound™ 210 Reson echo sounder to obtain bathymetric data to characterize lakebed relief and to map the present condition of fill in the dam zone. The survey was made with the USGS (U.S. Geological Survey) Echo Sounder, Version 4.01, 177 p.

The bathymetric survey was quality assured by using the echo sounder and a bar-check method. The independent water temperature check was done by using a YSI 30 temperature meter to ensure the accuracy of water temperature. The sonar beam direction is perpendicular to the survey line while the speed of sound in water is calculated using the temperature and salinity of water. The water temperature was measured at 50% depth and at 100% depth. The mean of the two values was used as the depth sounder for the given transect.

Velocity Data Collection and Processing

Advances in velocity-measurement technology allow three-dimensional velocities to be measured from the surface to the bed of a reservoir (Mueller and Wagner, 2009). The procedures were an instrument diagnostic check, an instrument accuracy check, an instrument calibration check, and the ship’s motion check at each transect start point. All data were collected at the beginning of the survey. The independent water temperature check was done by using a YSI 30 temperature meter to ensure the accuracy of water temperature. The sonar beam direction is perpendicular to the survey line while the speed of sound in water is calculated using the temperature and salinity of water. The water temperature was measured at 50% depth and at 100% depth. The mean of the two values was used as the depth sounder for the given transect.

Survey Results

The navigation and acoustic bathymetric and velocity survey in this case study shows promise in providing a cost-effective solution to map the lake floor. This technology is cost-effective because it can be applied using standard equipment and procedures. Although this technology was originally developed for commercial applications, it has potential for use in the public sector as well. The technology has been validated by the U.S. Geological Survey for bathymetric data collection and was successfully deployed for bathymetric data collection and surveying in other reservoirs. The results of this study show promise in providing a cost-effective solution to map the lake floor.