Glacial and environmental history of Lake Banook, Dartmouth, Nova Scotia, Canada

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Lake Banook in Dartmouth, Nova Scotia is an 11.5 meter deep glacially carved lake created during the Wisconsin glaciation and is located within a regional meltwater corridor. A small-craft geophysical survey was conducted on the lake during summer and fall of 2007, with methods including multibeam bathymetry, sidescan sonar, high resolution seismic (10 kHz) and underwater video data. The seismic character of the different units was used to define different facies spatially and temporally within the lake basin. Sub-bottom profiles show acoustic basement overlain by up to 10 m of well-stratified sediments mimicking the topography of the basement. This is in turn overlain by a ponded, weakly stratified unit up to 4 m thick. The acoustic basement is interpreted as basal till, correlated to onshore drumlins and tills. The well stratified sediments are tentatively interpreted as glaciolacustrine. A local unconformity at their top may be deglacial low-stand or flood related. Sub-basins in the lake show facies and thickness variations which may be influenced by ice configuration. The ponded uppermost unit shows some temporal evolution and potential for links with microfossil studies from nearby Penhorn Lake. Glacial boulders are common between the present lakeshore and 5 m water depth. These are likely washed from the till and will help constrain the low stand. Geological features include drumlinization, overdeepening, fluvial channels, paleo-shoreline, shallow gas, and slumps or debris flows. Observed biological and anthropogenic features in this study may be useful in understanding the more recent processes in the area. Freshwater mussels, bacterial mats, and abundant water plants were found in shallow areas less than 3 m. The degree of anthropogenic impact from deforestation, urbanization, and flooding from construction of the early 19th century Shubenacadie Canal can be assessed from these data. Recent dredging provides a baseline for very recent sedimentation and biological recovery rates. Future work will characterize the lake sediment geometry and stratigraphy, and will include coring for lithologic, environmental, and chronological control.

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