
**Analysis of the short- and long-term
processes involved in coastline erosion**

N. CROWELL¹, T. WEBSTER², AND S. BONDRUP-NIELSEN¹

*1. Department of Biology, Acadia University, 33 University
Avenue, Wolfville, Nova Scotia B4P 2R6, Canada*

*<052720c@acadiau.ca> ¶ 2. Applied Geomatics Research
Group, Centre of Geographic Sciences (COGS), Nova Scotia
Community College, 295 Main St., Middleton, Nova Scotia
B0S 1M0, Canada*

Coastline erosion is of particular interest to policy makers, land planners, and inhabitants of any coastal community. The processes of erosion must be well understood in order to minimize risk to infrastructure and maintain sustainable habitats. To better understand these processes, analysis focused on long and short term aspects of coastal erosion observed across the highly diverse coastline of Antigonish, Nova Scotia. The research addressed two major objectives: (a) to develop a coastal erosion risk map which highlighted areas predicted to be prone to erosion based on historical observations and (b) to obtain high precision measurements of glacial till banks susceptible to erosion by seasonal storm surges using a ground based light detection and ranging (LiDAR) system. A broad analysis of long-term coastline change focused on average rates of erosion between 1939 and 2008. Historical changes were assessed by delineating coastline vectors based on orthorectified aerial photography ($n = 257$) which spanned the length of the Antigonish coastline. Delineated coastline vectors will ultimately be used to quantify the average rates of scarp retreat and accumulation between temporally spaced aerial surveys. These rates are predicted to range widely due to the highly variable composition of bedrock and surficial geology throughout the coastal area. Local relief was assessed using the results of an airborne LiDAR survey conducted by the Applied Geomatics Research Group in December of 2008. LiDAR return data will provide useful information regarding slope, vegetation densities, and drainage

characteristics throughout the coastal zone. Detailed analysis of short-term till bank erosion focused on an eroding drumlin in the Dunns Beach area, located east of Antigonish Harbour. A ground based LiDAR survey was conducted along a 200 m span of a drumlin in the fall of 2009. The survey achieved an average point spacing of 1 cm and will serve as a baseline for future change detection. Subsequent scans are planned for the spring of 2010. The analysis is anticipated to provide us insight into the processes involved in erosion of the drumlin.