Erosion Susceptibility Prediction (ESP) for Yarmouth, Nova Scotia

D.J. Utting
Nova Scotia Department of Natural Resources, P.O. Box 698, Halifax, Nova Scotia B3J 2T9, Canada <uttingdj@gov.ns.ca>

Planners and other decision makers require information about rates of erosion in order to take the measures necessary to protect public safety, including creating setbacks for locating infrastructure and housing. Interest in the rates of erosion is increasing because of sea-level rise and the potential for increased coastal storms. Generally, the approach is to measure past rates of erosion from aerial photography, and extrapolate this rate into the future. This is not an ideal method; for example, rapid rates of erosion of a drumlin in the past might reduce the potential for future erosion, or at least make it more likely that the erosion would occur at a lower rate. Erosion along the coast has been found to occur during major storms, which might not be reflected during the period of aerial photography, and some rates of erosion are difficult to calculate because of varying qualities of aerial photography. Because of these issues, an alternative approach similar to calculation of regional coastal sensitivity and vulnerability indexes (where variables contributing to coastal erosion and flooding are combined to determine an index) is proposed for a test for the Yarmouth, Nova Scotia area. Combining new surficial geology maps, including coastal deposits and backshore materials (e.g. dunes, beach ridges, drumlins, or bedrock), with new bedrock mapping, as well as slope from LiDAR, distance to the backshore, fetch, tidal range and wave climate, an index of erosion susceptibility can be calculated. In general, steep slopes of unconsolidated material have a higher erosion potential than steep slopes of durable bedrock. Similarly, steep slopes of the same material have different erosion potential with different exposures to wave attack. This Erosion Susceptibility Prediction (ESP) tool will be adapted with planners to provide a simplified, yet scientifically backed decision-making dataset for assigning setbacks in coastal areas. This would be applied coupled with flood mod-

Atlantic Geology, 2011, Volume 47, Number 1

eling based on LiDAR DEMs. Future work will attempt to test this model in other areas of Nova Scotia.