Annapolis Valley Stone Resource Project: Progress Report

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Background

The Annapolis Valley Stone Resource Project is a regional mapping study examining all aspects of the stone resource in Hants, Kings, Annapolis, Digby and Yarmouth counties. The primary focus of the work is assessment of the region's granular- and bedrock-aggregate potential. The project also includes data for a broad range of other stone and soft sediment resource potential, including dimension stone, armourstone, landscape stone and clay deposits. The research has been accomplished through field work, a sampling program, laboratory analysis and the use of remote sensing techniques.

The primary goal of the study is to produce a digital dataset that identifies and evaluates the stone resource potential throughout the region. It will contain information on approximately 5000 point locations, including pits, quarries, road cuts, river cuts, shoreline exposures, excavation sites, land forms, concentrated boulder deposits and sites illustrating the various stone applications. The data collected at the sites consist of site descriptions, laboratory test data, photos, notes on suggested resource potential and discussions related to land use and environmental issues. Collectively, this information is being used to construct stone resource maps and an interactive map service to show where the potential occurs. This will be accompanied by a stone resource report that discusses the findings of this research. The project will also contain a digital virtual tour of the study area that introduces and highlights some of the best examples of sites for each resource theme. This will include areas of extreme weathering in the granitic rocks, dimension stone potential in the basalts, high-quality bedrock-aggregate potential in the metagreywacke of the Goldenville Formation and areas where concentrated glacial boulders could be used for natural armourstone.

Purpose of the Research

It is anticipated that the dataset, report and maps will be of interest to industry, government agencies, consultants and the public for a broad range of practical applications. This will include the identification of high-quality bedrock-aggregate potential, oversize piles of boulders in abandoned pits that could be used for retaining walls or landscaping, possible alternative sand sources (sandy tills) that could be used in the future, clay and clay-rich till deposits capable of producing engineered soils (e.g. impermeable materials for lining and capping landfills), and abandoned extraction sites that may have value for subsequent land uses (e.g. aquaculture or apiaries). The data will also be of interest to private land owners because of the possible presence of valuable stone resources on their land. For small wood-lot owners that utilize their land for a livelihood, this could be an important source of income. Some of the resource potential may lead to business opportunities in local and international markets. An example is the possibility of producing slow-release fertilizers from zeolitic basalt rock dust for the organic farmers and home gardeners. Preliminary agricultural research on these benign materials (jointly funded by the Nova Scotia Department of Natural Resources and Natural Resources Canada) indicates that they can increase crop yield. Producing environmentally friendly fertilizer products that have a proven efficacy based on scientific research could lead to a significant industry in the province. However, further research is required to determine if this is a viable concept.

A primary objective of this research is to create awareness in the land-use-planning community of the importance of including stone resources and geology in the planning decision-process. This reflects the critical need for many of these stone

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materials, which are used in large quantities for public infrastructure development and maintenance. For example, millions of tonnes of sand, gravel and stone are used each year in the region for highways, concrete, backfill, erosion control and coastal/harbour protection. Due to transportation costs, these heavy bulk products must be obtained locally in order to be cost effective for communities and public works agencies while minimizing effects on the environment. Locating the best sources of materials in proximity to the construction site optimizes the quality and life span of the stone product while reducing fuel consumption and air emissions per tonne of stone delivered. Currently, many of the aggregate deposits are being depleted and will require replacement with new high-quality sources of stone. Many other deposits are being sterilized (rendered unusable) by competing and conflicting land uses, without a thought for the importance of these strategic materials. It is hoped that land use planners will incorporate these data into their land-use-planning policies in the future. The rationale and urgency of including these deposits in the planning process and protecting the critical resource lands will be included in the final report.

2013 Project Activities and Progress

The field work and sampling program/laboratory analyses are completed. All of the data (including field descriptions, test results and photos) have been digitally inputted by GIS staff and students. The senior author has completed the editing of the digital data and made the necessary corrections, modifications and additions. New sites have been added to the dataset based on remote sensing tools, such as lidar and high-resolution orthophotos. This includes the delineation of (1) areas of thick sand and gravel within the glaciofluvial deposits of the surficial maps because they have the highest potential for economic development, (2) areas of thick till deposits because of the negative impact that they have on bedrock resource potential (i.e. high stripping costs to quarry) and (3) newly identified eskers.

The digital component of the project is in its final stages of preparation by the GIS staff and the senior author. All of the information is currently being reviewed to establish final interpretations of the data and determine how the results will be presented in a GIS system. Before its public release the project will require a large amount of input by GIS staff and others.