Aggregate Program

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Each year more than ten million tonnes of sand, gravel and crushed stone are extracted from pits and quarries throughout the province. This annually represents approximately fifty million dollars and more than five hundred jobs to the economy. As fundamental structural materials, aggregates play a key role in the construction industry and the development of our infrastructure. From highways to dams to water filtration systems to play sand, aggregate affects all aspects of our society. However, maintaining an adequate supply of these materials for our needs is becoming an increasing challenge. This largely reflects the population growth and industrial expansion that we have experienced in the last couple of decades. Issues such as increased market demands, land-use conflicts, and competition for the resource land have resulted in a decrease in aggregate reserves. This has become particularly troublesome near the more populated centres of the province which, ironically, are the areas where aggregate materials are needed the most.

In recognition of the growing concerns for the future of the resource, the Aggregate Program was established by the former Mines and Minerals Branch more than two decades ago. Today the primary goals of the program are: (1) to identify and evaluate the aggregate resource throughout the province, (2) to promote its protection for the future, and (3) to identify new economic opportunities for the resource. Since its inception, the Aggregate Program has examined both surficial and bedrock aggregate potential. This has included a province-wide mapping project, more detailed regional studies and a diamond-drilling program. There have also been several specialized projects examining new economic opportunities for aggregate. This has included identification of aggregate deposits with export potential and testing of aggregate fines as slow-release fertilizers and as constituents in the manufacture of synthetic topsoil. Field work for the Aggregate Program has also provided the opportunity to examine the potential for other industrial minerals, such as clay and building stone deposits.

The current focus of research is an evaluation of the aggregate resource in the Annapolis Valley region (Fig. 1). Initiated in 1995, the Annapolis Valley Project consists of field mapping the surficial and bedrock aggregate potential in Hanse, Kings, Annapolis, Digby and Yarmouth Counties. The study has involved literature research, field work, air photo interpretation and preparation of maps and reports. The procedure for a study area begins with background research, identifying any previous work done in the project area. This can include examination of geological maps and reports, groundwater studies, geophysical surveys and diamond-drill data. This is followed by a preliminary look at the most recent air photos covering the area to identify the location of pits, quarries and landforms which should be examined during the field investigation. The field work phase involves traversing all accessible roads in each county. Modern forestry practices have resulted in construction of a large and growing network of woods access roads, opening huge, previously inaccessible areas to field examination. Although this has slowed the progress of field work considerably, it has permitted access to very remote parts of the province and a more thorough inventory of the aggregate resource in many regions. While travelling through an area, as many exposures as possible are examined. This includes road and ditch cuts, excavation sites, pits and quarries, shoreline exposures, and natural outcrop. Landforms with aggregate potential are also investigated. At locations where no surface exposure is present, a shovel, auger or mattock is used to determine if sand and gravel are present. The characteristics of each site are then documented using a standardized data sheet. In addition to recording standard sedimentological and lithological data, other characteristics, such as aggregate extraction history and potential land-use conflicts, are documented where available. Finally, the field data are used in conjunction with a detailed examination of air photos to categorize the depositional origin of the surficial deposits and to delineate their areal extent.

Approximately 3500 site descriptions have been compiled for the project to date. Materials documented include sand, gravel, till, residuum, talus and bedrock. Many of the promising sand/gravel and bedrock deposits have been sampled to determine aggregate quality. Laboratory tests conducted on the samples include sieve analysis, Petrographic Number, MgSO₄, Soundness Loss, LA Abrasion Loss, and micro-Deval Abrasion Loss. Collectively the information will be processed as point data and descriptive fields in an ArcView® database. Using air photo interpretation, the areal extent of the deposits will be delineated and entered as a polygon digital data set. The result will be a series of 1:50 000 Scale resource maps showing the surficial and bedrock aggregate potential.
Figure 1. Field studies carried out in 1999 for the Aggregate Program.

The focus of the 1999 field season was completion of Hants and Kings Counties and included field work in parts of NTS map areas 11E/03, 11E/04, 11D/13, 21A/10, 21A/15 and 21A/16. Air photo interpretation of Hants and Kings Counties will be conducted in 2000. Digital aggregate resource maps for each county will be released as they are completed.