Aggregate Program Activities

G. Prime and C. Jessome

Introduction

The Mines and Minerals Branch has been involved in aggregate resource geology for more than twenty years. Implemented as a response to dwindling aggregate reserves, the Aggregate Program initially focused on province-wide mapping of the sand and gravel resource (Fowler and Dickie, 1978). This was followed by detailed, regional granular aggregate studies in the early 1980s (Wright, 1985). More recently the research has shifted emphasis and become broader in scope. Although sand and gravel mapping remains an important component of the work, a greater emphasis is being placed on bedrock aggregate evaluation (Prime, 1992, 1994, in prep.). This shift largely reflects the tightening of materials standards by industry and the commonly superior quality that quarried stone offers. Identification of bedrock aggregate sources has also added significantly to overall resource potential. An offshoot of the bedrock aggregate study is the search for dimension stone deposits. During field investigation for aggregates all outcrop locations are being evaluated for building stone potential. As a result, several sites have been identified as promising for future development. However, a more detailed examination of these locations will be required in order to verify their economic potential.

In addition to the geotechnical research being conducted on aggregate resources, other factors must be considered. Issues such as land-use conflicts and potential environmental hazards can have serious implications for the economics of an aggregate deposit. Thus, identifying and documenting potential problems have become integral functions of the resource assessment process. This can include issues such as (1) accelerated residential development (e.g. potential opposition to quarrying or operator difficulties in meeting blasting setback distances), (2) competition for the resource land (e.g. recreational interests), (3) land-use constraints (e.g. parks and protected places) and (4) acid drainage (pyritic slates). Much of this information is obtained from work done by the Land-use Group; however, additional data are being recorded during aggregate field work.

The Aggregate Program, with the help of the Digital Data Services Group, is in the process of converting resource information to a digital format using a geographic information system (ArcView®). The use of this software with a GPS unit and field computer will ultimately permit a more efficient and timely delivery of aggregate maps. It is anticipated that future 1:50 000 preliminary resource map sheets will be publicly accessible shortly after each field season.

In addition to the research aspect of the Aggregate Program, a substantial amount of time is spent responding to client requests. This can include an aggregate producer looking for a new source of stone, a consultant requiring aggregate information for a client, a government agency looking for a source of armour stone, or a student working on a school project. This is an important component of work being done in the program and people are encouraged to take advantage of our expertise.

Current Project Activities

Aggregate Program activities in 1997 focused on field studies in the western region of the province (Fig. 1). The two main areas of interest were a cranberry sand project and an aggregate resource evaluation project. The first month of the field season consisted of an examination of sand deposits near potential cranberry production sites along the Annapolis Valley. This was followed by three months of aggregate resource mapping in Digby and Yarmouth Counties. The following discussion is a description of work accomplished during the field season.

Cranberry Project

There has recently been a surge in interest in the production of cranberries in North America. As a result the Nova Scotia Department of Agriculture and Marketing (NSDAM) and some of the regional development agencies have been aggressively promoting cranberry investment opportunities. In order to attract the attention of the major players in the industry a comprehensive resource study is required. This includes the identification of potential sites and an evaluation of each site on the basis of a variety of considerations. One important component of site selection is the identification of suitable sand sources. Cranberry production sites require a great deal of sand as a substrate for the cranberry plants. By way of example, if 15 cm of sand are required for initial site preparation, with 2.5 cm being added every 2-3 years thereafter, a 12 hectare bog would require more than

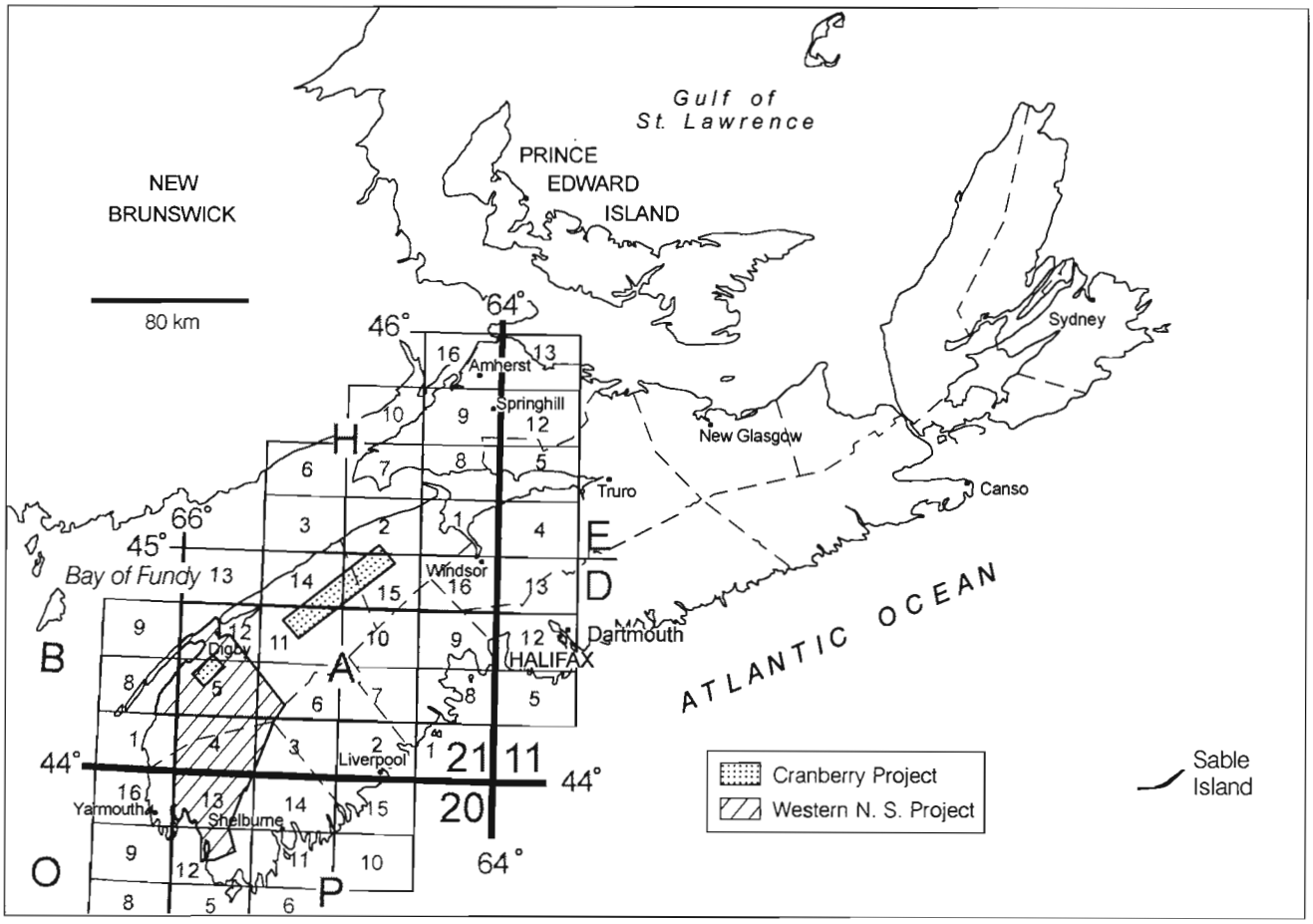

Figure 1. Map of Nova Scotia showing areas studied for the Aggregate Program in 1997.

150 000 cubic metres of materials over a hundred year period (Webster, 1996). This sand must also be relatively clean for good drainage, with an ideal grain size composition of 80% 2-0.2 mm and 20% <0.2-0.02 mm. Furthermore, due to haulage costs, the materials should be located reasonably near the cranberry production site. Thus, sand availability limits the number of potential sites for cranberry production in the province.

In early 1997, NSDAM approached the Department of Natural Resources with a request for information on sand deposits in southwestern Nova Scotia. Specifically, they wanted to know where large amounts of suitable sand could be found in proximity to selected sites. As a result, the author and geologist Phillip Finck have conducted a preliminary field survey in chosen areas to determine their sand potential. The author's participation consisted of an examination of the region from Kentville to Annapolis Royal in the Annapolis Valley and the North Range area, Digby County (Fig. 1). Approximately a month was used to examine the surficial database and conduct reconnaissance field work. Eighteen deposits were identified as having reasonable potential. This information and a report done by Phillip Finck (on the South Shore area) were forwarded to NSDAM and a publicly tendered contract was subsequently awarded to examine the deposits in more detail. Apparently developers have been very receptive to the potential production sites they have seen and some small scale experimental commercial plantings are anticipated in the near future. This project has been very rewarding because it represents one of the practical applications to the studies of surficial geology being done by the department.

Western Nova Scotia Project

This project was implemented in 1994 to evaluate the aggregate potential in western Nova Scotia. The project area comprises Lunenburg, Queens, Shelburne, Yarmouth, Digby, Annapolis, Kings and Hants Counties. During three years of field work the project has progressed westward on the north side of the region from Walton,

Hants County, to the Meteghan, Yarmouth County, area. The study area for the current field season comprised Digby County and approximately two-thirds of Yarmouth County (Fig. 1). Over a three month period, the granular and bedrock aggregate potential was comprehensively examined. This included a review of all surficial maps, and an examination and description of all pits, quarries, and other natural and man-made exposures. Samples of selected deposits were taken throughout the area. The area was also examined for building stone potential.

One more year will be required to complete the field work phase on the northern side of western Nova Scotia. This will finish the area from Hants County to Yarmouth County, inclusive. In the meantime, air photo interpretation and the preparation of preliminary digital maps for completed map sheets will be done in 1998. It is anticipated that final maps and a report for this area will be completed in 1999.

References

Fowler, J. H. and Dickie, G. B. 1978: Sand and gravel occurrence maps; Nova Scotia Department of Mines, Open File Report 378.

Prime, G. 1992: Aggregate potential of Cumberland and Colchester Counties, Nova Scotia; Nova Scotia Department of Natural Resources, Mines and Energy Branches Economic Geology Series 92-2, 162 p.

Prime, G. 1994: A diamond-drilling program near Amherst market, investigating bedrock potential in the northwestern Cobequid Highlands, Nova Scotia; Nova Scotia Department of Natural Resources, Mines and Energy Branches Paper 94-1, 38 p.

Prime, G. in preparation: An overview of bedrock aggregate potential in the Halifax-Dartmouth metropolitan area, Halifax County, Nova Scotia; Nova Scotia Department of Natural Resources.

Wright, W. J. 1985: Aggregate resources of Cape Breton Island; Nova Scotia Department of Mines and Energy, Maps 85-3 to 85-6.

Webster, T. 1996: Fact sheet - cranberry bog site selection; Nova Scotia Department of Agriculture and Marketing, 5 p.