

# THE SHL-RAMS SYSTEM FOR NATURAL RESOURCE MANAGEMENT

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## BIOGRAPHICAL SKETCH

Robert J. Madill (P. Eng.) received a Bachelor of Electrical Engineering from McGill University in 1970, and a Master of Science in Forestry from the University of Toronto in 1973. He was employed for six years with Environment Canada as a Research Officer responsible for the management of biophysical inventory projects, and the application of mini computer based graphics systems for solving natural resource management problems. In 1979, Mr. Madill joined Systemhouse as a Senior Marketing Consultant responsible for domestic and international marketing of Systemhouse Mapping and Earth Resource Systems. Mr. Madill is also involved in the definition of market requirements for the development of Systemhouse mapping products.

## ABSTRACT

A system for natural resource management utilizes modern computing science principles to provide facilities for the formulation, analysis and solution of natural resource management problems. The challenge to system builders such as Systemhouse Ltd, is to look beyond the world of bits and bytes, and to adopt the frame of reference of the natural resource professions. This perspective is essential for the successful acceptance and use of computer based tools.

SHL-RAMS is a computer based system for natural resource mapping and analysis. The system aims to reduce the tedious and repetitive operations, such as drafting and manual numerical analysis, and thereby to increase the time available for creative problem solving and the exercise of judgement. The latter processes are made more efficient by the provision of flexible line mapping, thematic mapping and report generation facilities.

Two applications of SHL-RAMS are reviewed - the mapping and analysis of forest biomass data, and the charting and modeling of ice conditions in Canada's north.

## INTRODUCTION

SHL-RAMS is a turnkey mapping and analysis system for use in resource management, land use, socio-economic, general mapping and utility mapping applications. The system is used to prepare a geographic polygon database from which

line maps, thematic maps and reports may be produced.  
Two specific applications of RAMS are discussed:

- o Forestry - the Northern Forest Research Centre in  
Edmonton, Alberta
- o Ice Charting - the Ice Information Service of  
Environment Canada in Ottawa, Ontario

#### FORESTRY

The Northern Forest Research Centre (NFRC) of the Canadian Forestry Service is located in Edmonton, Alberta. Under the auspices of the National Energy From Forests Program (Enfor), NFRC has established a co-operative research program to study the energy available from forests in Saskatchewan, Manitoba, Alberta and the Northwest Territories. One area under investigation is the total quantity of wood matter that a forest now has and will produce in the future. Once this total biomass is determined, scientists will be able to calculate the total energy potential of a forest.

RAMS was installed at the NFRC in March 1982. NFRC scientists will use SHL-RAMS to demonstrate the conversion of conventional forest inventories to a biomass inventory. A forest inventory will be digitized and stored in RAMS, updated by Landsat satellite data, and then converted to a biomass inventory by the application of suitable transformations. Colour thematic maps that show the location and distribution of forest biomass will be produced, in addition to quantitative reports.

The NFRC installation included the interfacing of RAMS to an existing in-house mini computer system. This provided data transfer between the two systems and the sharing of peripherals. Two way data exchange software was also supplied for RAMS and the GIMMS system.

#### ICE CANADA

Floating ice affects a variety of marine activities, including shipping, off-shore resource exploration, and commercial fishing. It is also a major cause of damage to vessels and equipment, resulting in loss of life and ecological disasters.

To minimize the risk associated with marine activities near floating ice, Ice Central, Environment Canada (ICE Canada) located in Ottawa, Ontario, operates an ice information service. This service provides analysis, forecasting, and charting of ice conditions in Canada's navigable waters. ICE Canada is responsible for providing daily, up-to-date information in chart form by integrating data gathered by satellite, ice reconnaissance aircraft, ship and shore

stations. The charts are broadcast by HF radio facsimile to ships and other recording stations, and during winter months, are relayed on Atlantic regional weather facsimile circuits. An ice chart includes information on the position of ice edges, concentration boundaries, ice types, floe size, and topographic features.

SHL - RAMS was installed at ICE Canada in April 1982. The system will be used to develop an up-to-date digital ice information database. The database will be used as input to complex ice models to simulate ice behavior, and to produce current ice charts.

The ice information charts are produced in three series:

- o Daily current ice charts at scales of 1:1,000,000 to 1:2,000,000
- o Weekly composite ice charts at a scale of 1:4,000,000
- o Historical ice charts at a scale of 1:6,250,000

The reference base for the daily production of current ice charts is being digitized from Canada's 1:250,000 National Topographic Series. The ice information will be added as layers onto the reference base. Charts will be updated and distributed on a daily basis as new information is received.

The digital ice information database will also be used as input to complex ice models. Model simulation is intended to compliment ice observation and charting, in order to improve forecasts to maritime clients.

#### SUMMARY

SHL-RAMS is a resource analysis and general mapping system. This paper has reviewed two diverse applications of RAMS, one in forestry, and one in ice charting. SHL-RAMS minimizes the time and effort required to produce up-to-date maps and reports, through the use of sophisticated graphics display, editing and map production facilities.