MINERAL OCCURRENCE DATA SYSTEM

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ABSTRACT

The Mineral Occurrence Data System (MODS) is a three-part database consisting of a manual Mineral Inventory File, mineral occurrence maps on geological bases and a computerized Mineral Inventory Database. The MODS contains information on approximately 4000 mineral occurrences and is designed to offer fast easy access to information on the province's mineral resources.

INTRODUCTION

The Mineral Occurrence Data System (O'Driscoll *et al.*, 1991) consists of a manual Mineral Inventory File, mineral occurrence maps on geological bases and a computerized database. The project is designed to offer an efficient information service on all the mineral occurrences in Newfoundland and Labrador (Figure 1).

Most of the MODS information was compiled from a systematic search of mineral-exploration company-assessment files. Other sources of information include publications of the Newfoundland Department of Mines and Energy, the Geological Survey of Canada, news items from the press, publications in geological and mining journals, and personal communications from mining company and government personnel.

MANUAL MINERAL INVENTORY FILE

The manual Mineral Inventory File is part of the National Mineral Inventory and consists of mineral occurrence reports that summarize all data on known mineral occurrences in the province. The file presently contains approximately 4000 reports, including all mineral occurrences for the Island of Newfoundland (Figure 2) and selected areas in Labrador (Figure 3). The file and topographic location maps have been microfiched and duplicates are available upon request.

The Mineral Inventory File is continually being updated. This file was started in 1978, and since then, much new geological mapping and exploration have been carried out and many new occurrences have been discovered. Updates were done in the past only on land tenure and major mineral occurrences. Areas that have been updated with new mineral occurrence descriptions include all of 12A, and major parts of 12B and 12H map areas. In addition, industrial minerals for all of Newfoundland have been documented.

Mineral occurrence maps having updated geological bases have been published at a 1:250 000 scale and are available upon request. In addition, selected areas have been published at 1:50 000 and 1:100 000 scales. These maps contain locations, a listing and a brief description of the occurrences. An industrial minerals map of the Island of Newfoundland at 1:1 000 000 scale on a geological base, is now available. This map contains locations, a listing and a brief description of occurrences.

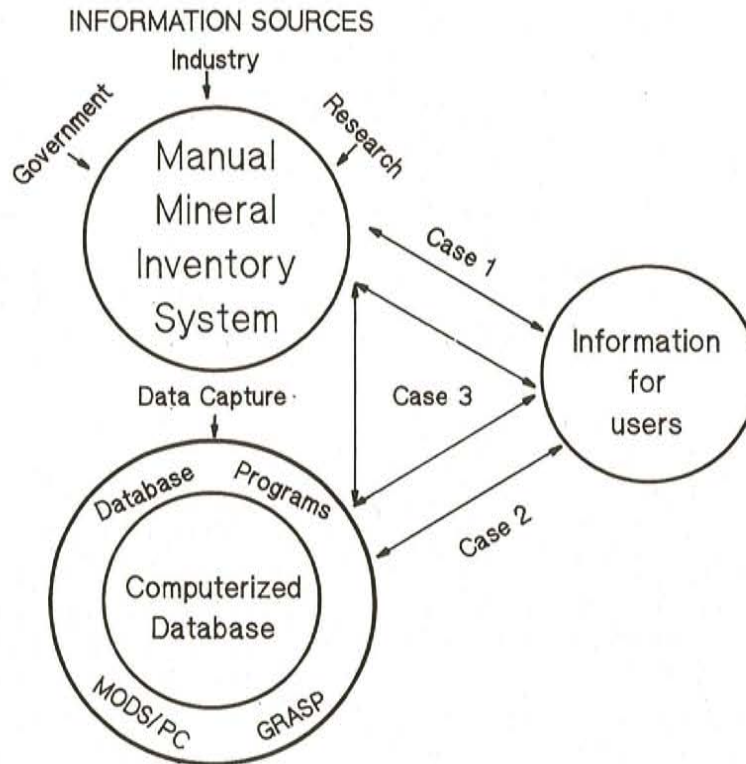## COMPUTERIZED MINERAL INVENTORY DATABASE

Since 1978, a computerized Mineral Inventory Database, which parallels the manual file, has been developed and maintained. This database contains information selectively extracted from the manual file and presently resides on a Hewlett Packard 9000/560 Unix-operated minicomputer, located at the Geological Survey Branch, Department of Mines and Energy, 95 Bonaventure Avenue, St. John's. The Geological Retrieval and Synopsis Program (GRASP) developed by the United States Geological Survey (Bowen and Botbol, 1975) is used to manage and manipulate the database. Although GRASP is a powerful program that allows complex searches to be performed, it is not user friendly or available for microcomputers. In the past, in order for users to access the computerized Mineral Inventory Database a visit to the Geological Survey Branch offices and the help of MODS personnel was required.

DEVELOPMENT OF MODS/PC

With the proliferation of microcomputers and the need for easier access to MODS information, it was decided to develop a microcomputer version of this information system in 1990 (Stapleton *et al.*, 1991; Stapleton and Parsons, 1991). The Mineral Occurrence Data System microcomputer

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How MODS is Used

The Mineral Occurrence Data System can be used in three ways.

Case 1: The user wants detailed information on a specific mineral occurrence or group of mineral occurrences in a specific area. This information can be retrieved quickly using the manual mineral inventory file.

Case 2: The user wants less detailed information on all occurrences of a particular type, ie. vein type, located over a large geographic area. The computerized mineral deposits database can provide this information in printout format along with a computer generated location map.

Case 3: The user wants detailed comprehensive information on all occurrences of several types over a large geographic area. The purpose being to access the regions mineral potential and hopefully zero in on an area for field investigation and staking. In this case the computerized mineral deposits database is searched and used to narrow down and define specific occurrences or areas of interest. The more detailed manual mineral inventory reports can then be provided. The user can then use references contained in the manual reports to locate other information sources.

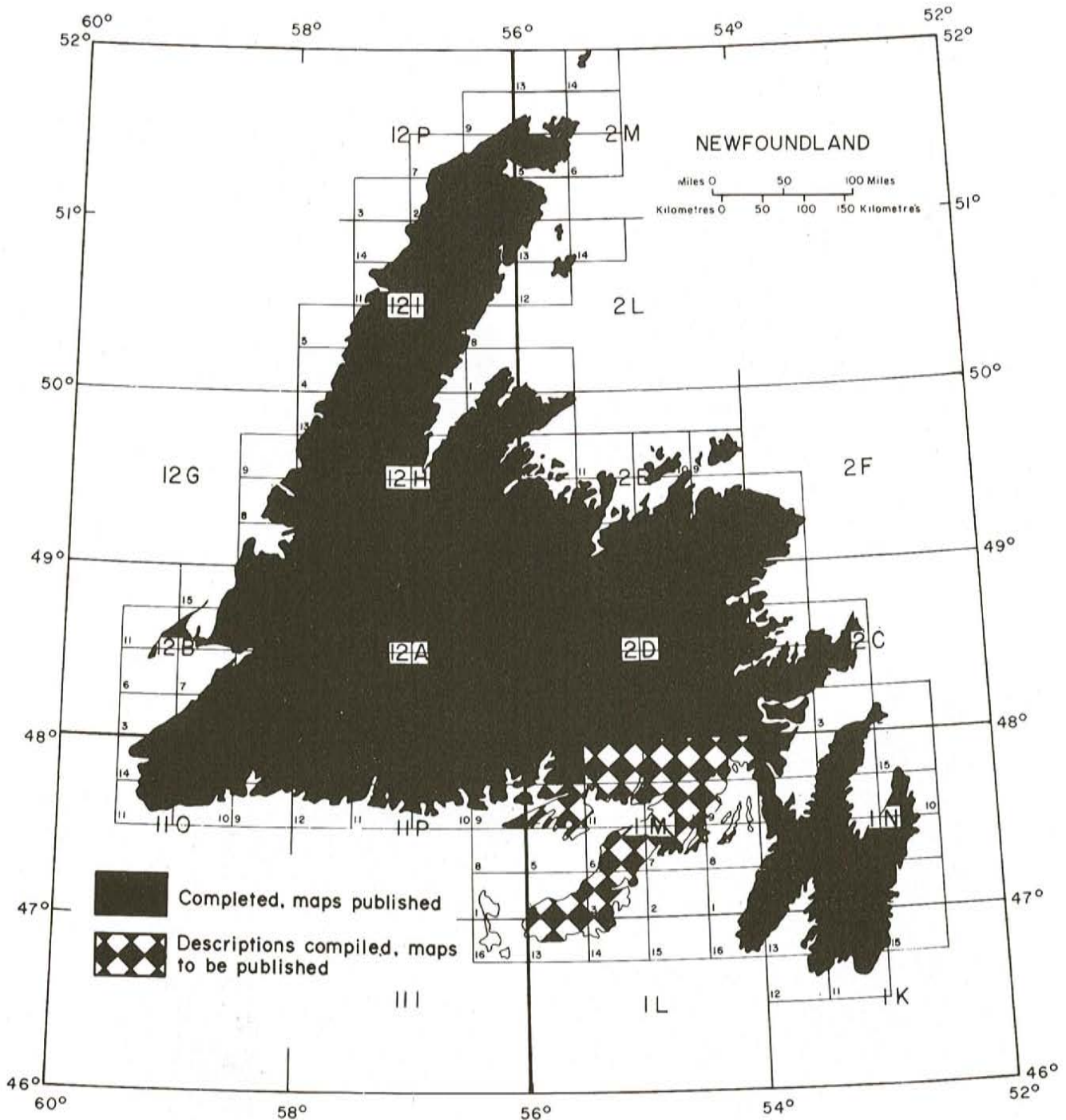**Figure 1.** *Sketch illustrating how MODS is used.*

Figure 2. *Index map for Mineral Occurrence Data System project, insular Newfoundland.*

Application (MODS/PC V1.0) was written in-house by W. Keith Parsons, Systems Analyst with the Geological Survey Branch of the Department of Mines and Energy. It was written in the R:Base Database language (V2.11) and compiled using the R:Base compiler (V1.02). R:Base was chosen as the development tool because of the program's support of long string fields and the availability of a vendor-supplied compiler.

The minimum system requirements needed to run the MODS/PC program include an IBM-compatible microcomputer with an 80286 processor, 640 K of RAM, a hard disk, and a CGA videocard/monitor. As well, the system must have at least 475 K of free memory. To achieve this, certain memory resident programs may have to be deactivated.

The MODS/PC system is distributed on four 5 1/4" diskettes in a compressed format. An installation program (install.exe) aids the user in setting up the system by checking the target microcomputer's parameters, copying files to the
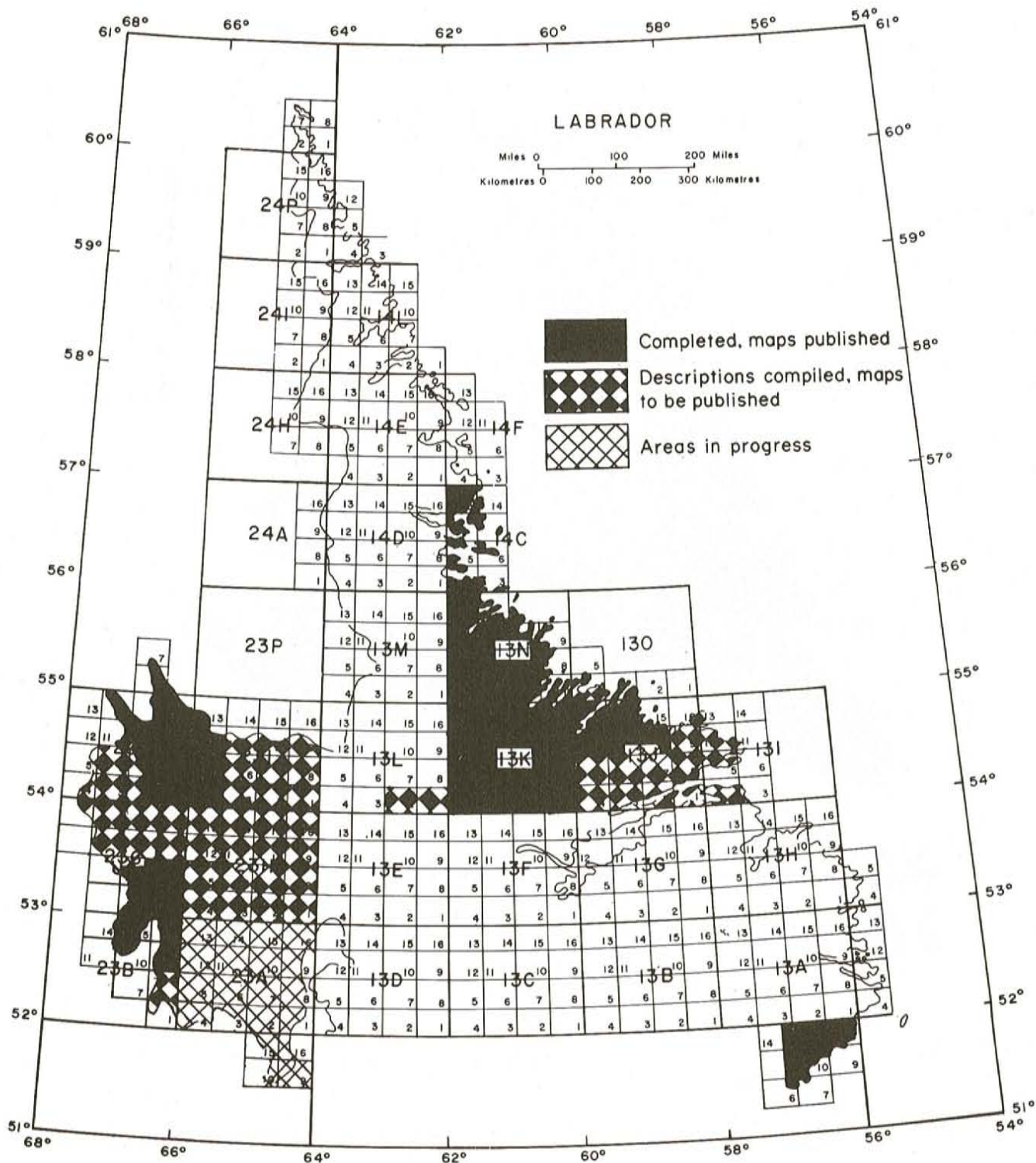
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Figure 3. *Index map for Mineral Occurrence Data System project, Labrador.*

hard disk, and decompressing these files. PKZIP, the industry standard compression utility distributed by PKware Inc., is used to compress the MODS/PC system, however, possession of this software is unnecessary as the files are in a self-extracting executable format. The compression ratio is better than ten to one so considerable hard-disk space is required.

Only one dataset may be installed at a time. The user may select between Newfoundland occurrences (2566 records occupying 6.1 M), Labrador occurrences (1259 records occupying 3.0 M) or a demonstration dataset (164 records occupying 420 kb). The program itself occupies about 400 kb of hard-disk space.

The MODS/PC program is menu-driven and provides the user with complete access to the computerized Mineral Occurrence Data System. The program allows the user to search, view and output occurrences from the database. Custom-designed searches are achieved by setting conditions and using Boolean logic to combine these conditions in different ways. Data portability is provided by the ability to write data to an ASCII delimited file. This allows input of a user-selected dataset to other application programs such as spreadsheets and databases or portability to other types of computer systems such as non-DOS microcomputers, minicomputers, or mainframes. Full user documentation is supplied with the program.

Each mineral deposit is described by a single MODS record, which has fifty-nine information fields. More detailed information on the deposit can be obtained by consulting key references listed in each record or by examining the hard-copy mineral inventory reports maintained at the Geological Survey Branch. These reports will allow information to be traced back to its source publication.

Version 1.0 of the MODS/PC system was released to the public in November, 1991. Periodically, upgrades to the system will be made available to the user. Subsequent releases will update the current records, add new occurrences, and provide revisions to the program. The MODS/PC program will be upgraded to version 3.1 of R:Base once a new compiler is released by Microrim Inc. The revisions will produce a modernized user interface, faster access times, and improved report generation. The R:Base compiler produces object files compatible with common 3rd-generation languages such as C. Future versions of MODS/PC may make use of this ability to add graphical options such as plotting and mapping to the program.

In future, when optical disk technology becomes widely used, it is planned to release all of the MODS reports on optical disk. This will enable subscribers to have the entire Mineral Occurrence Data System, including maps, MODS/PC and reports, in-house.

MODS USERS

The MODS is used primarily by mineral-exploration-company personnel, however, it is also used by mineral-exploration consultants, geotechnical consultants, personnel and students of academic organizations and the general public.

The MODS is used daily by government geologists in land-use planning. Advice is given to various departments of government in establishing wilderness areas, hydro developments, provincial and national parks, and any other developments that may conflict with future mineral exploration and development. In addition, municipal councils and the Department of Municipal Affairs are advised of the location, extent, and nature of mineral deposits in specific areas, so that new housing and commercial developments, municipal parks, water reservoirs and sewage-disposal systems can be located, where possible, in areas of low mineral potential.

Copies of the file are made available to the various agencies of the federal government such as the Mineral Policy Sector and the Geological Survey of Canada. These are then adapted to the National Mineral Inventory, MINSYS and CANMINDEX.

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