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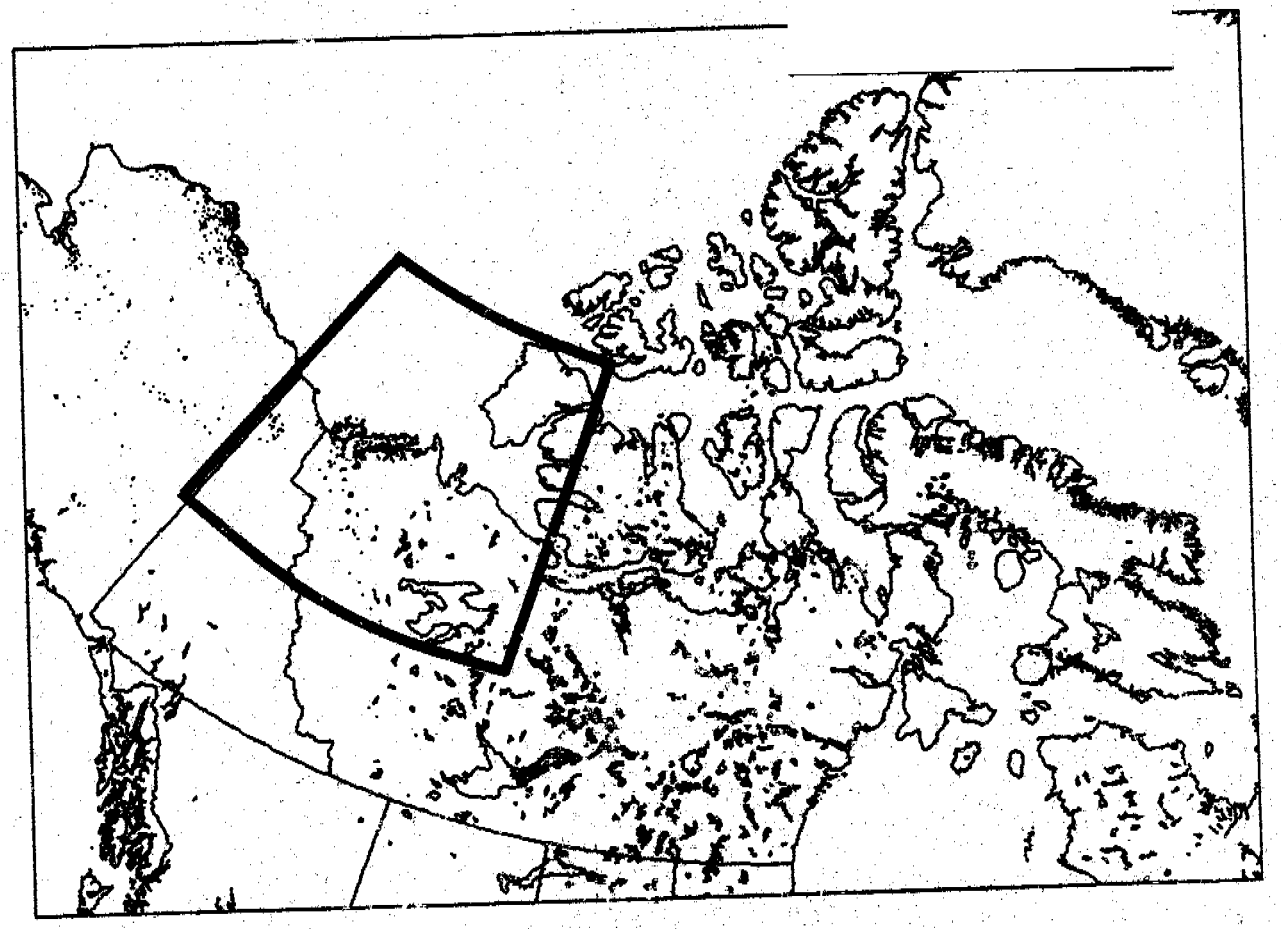
ATLAS OF GRANULAR RESOURCE INFORMATION

WEST CANADIAN ARCTIC



AN INFOCUS APPLICATION

Earth & Ocean Research Ltd.

ATLAS OF GRANULAR RESOURCE INFORMATION FOR THE WEST CANADIAN ARCTIC - AN INFOCUS APPLICATION

SUBMITTED TO:

Indian and Northern Affairs Canada
Natural Resources and Economic Development
Les Terrasses de la Chaudiere
Hull, Quebec
K1A 0H4

SUBMITTED BY:

Earth & Ocean Research Ltd.
22 Waddell Ave.
Dartmouth, Nova Scotia
B3B 1K3

Submission Date: *March 31, 1990*
Scientific Authority: *Bob Gowan*
EOR Project Manager: *John Peters*
Report Prepared by: *Brian Eddy*
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1 *SUMMARY*

This report describes work undertaken to build an **InFOcus** application for granular resource and related information for the Northwest and Yukon Territories and the Beaufort Sea. **InFOcus** is a data management system that interfaces with a mapping engine (QUIKMap). The result is a desktop **Geographic Information System (GIS)** that enables the end-user to have rapid access to map information and hardcopy output.

2 *INTRODUCTION*

The purpose of this project was to build an **InFOcus** application forexisting granular resource and related information for the Northwest and Yukon Territories and Beaufort Sea. The data were supplied in a variety of formats including dBASE III Plus, SUPERTECH, AutoCAD, and PAMAP file formats. A test sample of deposit outlines from aerial photographs was also included.

The data were compiled and converted to the required formats of the **InFOcus** system, that is FoxPro database files (.dbf), and QUIKMap basemaps. The **InFOcus** system is designed with mapping and database management routines that allow for quick and easy access to a wide range of geographic information. The geographic location and associated attributes were provided for onshore and offshore granular resource deposits, borehole locations, geophysical survey lines, and bibliographic information for selected granular resource studies.

Any combination of, or portion of these datafiles may be quickly displayed and printed or plotted in any common map projection at any scale, and in combination with a range of basemap information such as shorelines, lakes, rivers, bathymetry, and political boundaries. Published results from previous scientific studies were also included in basemap form such as proven, probable, and prospective granular resources, and isopach contours of granular resource deposits and associated units.

InFOcus came about as the result of a cooperative effort of the Mineral Policy Sector of the Department of Energy, Mines and Resources and Earth & Ocean Research Ltd. to create an "Integrated Resource Management Information System (**IRMIS**) that would facilitate the environmentally sound development of Canada's offshore non fuel mineral resources. The name **IRMIS** is now more broadly used to include all **InFOcus** applications that portray resource, environmental or socio-economic information for the purpose of resource management.

3 *DATA COMPILATION AND CONVERSION*

3.1 BASEMAPS

Fifteen basemaps were included in the application at the time this report was prepared. These include the portion of the North American Basemap (NRTHAMER.BMF) showing coastline, rivers, lakes, and political boundaries, and each of the fourteen maps for the Isserk and Erksak Borrow Areas which detail information on bathymetry, data coverage, surficial sediment type, and structure and thickness of reported granular resource deposits. A listing of basemaps and their corresponding selection titles is given in Appendix B.

All basemap information in the system now exists in QUIKMap basemap format. Details on this format may be acquired by referring to the QUIKMap Users Guide (Vers. 2.50). The source of the basemap information was obtained by splitting the North American basemap (NRTHAMER.BMF) using SPLIT.EXE in QUIKMap. The portion selected covers the geographic area bounded by latitudes 65 to 75 degrees North, and longitudes 115 to 141.1 degrees West. The new basemap files (.bmf, .idx, .pnt) reside in the directory '**ARCTIC**', which is accessed by selecting the '**Coast, Islands, Rivers, Bound's**' title under the '**MAP AREAS**' sub menu.

It is important to understand that the basemap of North America supplied with the QUIKMap software (NRTHAMER.BMF) was compiled from the WORLDBANK 2 digital basemap of the world. This information was gathered from satellite image data and compiled into one vector database. As a result the source scale of the data is variable from 1:1,000,000 to 1:9,000,000. For Canada the data is mostly between the scales of 1:2,000,000 to 1:3,000,000. Therfore, the coarseness of geographic features such as shorelines, lakes, and rivers, increases dramatically above the 1:250,000 scale display; either on screen or on hard copy output. Higher resolution of primary basemap features would require the conversion of 1:250,000 NTS Series digital maps which exist in CARIS (.NTX) format.

Published information on granular resource areas from EOR (1988) were also included as basemaps. These maps were converted from AutoCAD data exchange files (.DXF) to QUIKMap format using the DXF2ESL.EXE translator utility. The process translates all vector data (points, lines, polylines) from AutoCAD to QUIKMap and maintains the layered structure set up in the original AutoCAD drawing file. This enables layers to be manipulated by changing colors or turning them on or off.

Some features transported from the AutoCAD drawings are represented as AutoCAD hatch patterns. These features include the surficial sediment types and granular resource potential areas for both the Erksak and Isserk Blocks. **It is important to understand that hatch patterns from AutoCAD are registered in QUIKMap in 'real world' coordinates, whereas hatch patterns associated with point and polygon data in the QUIKMap datafile format are registered in screen coordinates.** This presents a limitation for adequate representation of hatch areas in basemaps in the legends. Although hatch types and orientations are adequately matched, the hatch spacing in the legend cannot reproduce the viewed hatch spacing in most cases. Therefore, one must rely more on hatch types, colors, and line orientations for reference, rather than line spacing within hatch patterns.

3.2 DBASE COMPATIBLE FILES (.DBF)

Fifteen dBASE format files were supplied which consisted of five files with borehole information, five files of sors information, and five catalog files containing bibliographic information. The conversion of this data set into **inFOcus** is straight forward, however some additional steps needed to be taken during the process.

The "**CONVERT TO A MAP DATABASE**" utility in **inFOcus** requires the data to be registered in latitude and longitude. The borehole and sors database files were supplied with registration in UTM coordinates. Therefore an additional utility called '**UTM2LL**' was used to convert the UTM coordinates to latitude and longitude. In some cases the database file structure needed to be modified with the addition of the latitude and longitude fields.

An additional process was also involved in converting the bibliographic information. The geographic coordinates for the lower right and upper left corners of the study areas were supplied in the database files, however they were only being displayed as points on the map. An additional routine (the QUIKMap utility 'MKPOLY') was used to create a polygon using the given coordinates as the extents of the defined box.

Once these tasks were complete the conversion was straight forward. By selecting the "CONVERT TO A MAP DATABASE" function under the "UTILITIES" sub-menu, the user simply enters the filename of the database to be converted and chooses the fields in which the latitude and longitude positions reside. The files were then added to the selection of databases under the "DATABASES" menu option. A listing of the original database filenames and their corresponding selection titles is given in APPENDIX C.

3.3 SUPERTECH TRACK DATA

The track data files were supplied in SUPERTECH format. Two database files were created for each track line within each track directory. One file is for quick display of track lines in which the data is stored as polygon data, or 'P' data type in QUIKMap format. The other file stores the data as 'S' type (point) data for each recorded fix. This enables the user to have a choice in having either quick display of track lines, or a detailed display of fixes with their labels.

The conversion process employed a special utility which transformed the track data into a format compatible with the QUIKMap 'MKPOLY' utility, which allowed for the creation of lines for each track data set. The same data was also converted as point data and appended to a QUIKMap compatible database file. Each database file was then added to the database selection menu. A listing of the original track directories with there corresponding selection titles is given in APPENDIX C.

3.4 PAMAP FILES

The conversion of PAMAP files to the QUIKMap format requires a secondary conversion process through AutoCAD. The process requires a translation from PAMAP into AutoCAD, and then from AutoCAD into QUIKMap. Since the translation routine from PAMAP to AutoCAD was not available, this data was not included in this present application.

3.5 AERIAL PHOTO DATA

A series of aerial photographs were supplied which outlined onshore granular resource deposits. The intent was to digitize the areas through the QUIKMap digitizing routine and compile the information in a database file. A 'Summagraphics' 12" X 12" tablet was used to perform this task. Several problems were encountered during the experiment which are described below.

At the time the process started, the most recent QUIKMap digitizing routine only registered map information in latitude and longitude. A short program was written to translate the UTM registration on the aerial photos to latitude and longitude.

The deposit outlines from each photo were digitized as single database records where each SITE # from the photo was entered under the 'KEY' field of the database record. The database file create for this information was named 'SITEPLAN.DBF'. Even though the data was entered, the reliablity of this information remains in question for several reasons:

1) The user interface in the QUIKMap digitizing routine was found to be primitive and unreliable.

2) The requirement to translate the registration from UTM to latitude and longitude added an onerous additional step. The recent version of the digitizing routine permits registration using UTM corrdinates, however the procedure remained inoperative.

3) The positional error of the features were quite large mainly due to the skewness of the aerial photo. These errors ranged from tens to hundreds of metres, however the ability to determine the errors reliably were frustrated by the QUIKMap registration procedure.

Given the questionable reliability of the whole experiment, no effort was made to rationalize outlines that cross from one photo to another. Digitizing this type of data using a small digitizing tablet has great potential for many end users, however this capability must await significant improvements in the software.

4 BUILDING THE APPLICATION

4.1 DIRECTORY STRUCTURE

One of the most important features of the **inFOcus** system is its menu-driven database management system. **InFOcus** was designed in such a way to minimize the effort involved in building and maintaining a clean database. Therefore whenever any database is copied, created, updated, or manipulated in **inFOcus**, it is stored in its proper place. The important thing to keep in mind with the structure of the system is that basemaps and datafiles are always two separate features of any application.

To build a map of selected datafiles and basemaps, the steps taken by the user are quite similar to those taken if the task were done manually with hard copy information. With hard copy information the user would acquire data from a shelf in one part of the office, then select a basemap from the map cabinet to use to display the data. In **inFOcus**, the databases (.dbf files) are stored in one directory, and basemaps (.bmf files) in an another directory. Appendices A, B, and C show the directory structure and contents of the database and basemap directories.

All database files are stored in the application directory below the **inFOcus** root directory. When the user builds a new application, the process opens a new subdirectory under the **inFOcus** root directory. For this application that root directory is called **'BEAUDATA'**. All files necessary for the application are instantly copied into that directory. The user's database files (.dbf) must then be copied into the same directory, and thereafter are ready to be added to the database menu selection.

The basemaps for any application can be stored anywhere on the harddisk as long as the proper directory sub-structure is maintained. (Refer to QUIKMap users guide version 2.50). In this application the root directory for the basemaps is called **'BEAUMAPS'**. Under this directory is a subdirectory called **'MAPS'**. The directories for each basemap in the application reside under the **'MAPS'** sub-directory. QUIKMap basemap files, (.BMF, .PNT, and .IDX) can then be copied into their respective sub-directories, and are ready to be added to the basemaps menu selection.

4.2 DATAFILE MANAGEMENT

It is important to keep in mind while working in any application that all files created or manipulated will remain in the application sub-directory. **InFOcus** requires 600k storage in order to write temporary files to disk while making a map. Therefore, poor house keeping habits may cause problems, such as creating numerous temporary database files while working with the application. It is suggested that one person be responsible for maintaining the application to see that it is in proper working order.

4.3 BASEMAP MANAGEMENT

The basemaps in the Granular Resource Application as described above are stored under the sub-directory '**MAPS**' in a root directory called '**BEAUMAPS**'. The basemap directory structure follows that of QUIKMap in all aspects. It is important to remember that any basemap in the system has a given filename for its basemap file (.BMF). For example, with the selection of '**Coast, Islands and Rivers**', **inFOcus** reads in a basemap called '**ARCTIC.BMF**'. This file is stored in a directory that bears an identical name '**ARCTIC**', under the sub-directory '**MAPS**', in the root directory '**BEAUMAPS**'. The same is true for all other basemaps presently in the system. (i.e. '**Erksak Bathymetry**' is stored under the sub-directory '**ERKBATH**').

Any new basemaps to be added to the application will have to be stored under the directory '**BEAUMAPS/MAPS**'. If the user chooses to build an new application with different functions in mind, and with different basemaps, it is recommended that a new directory be created to store the new basemaps. For example, a new application may have different basemaps, datafiles, geographic areas, etc., the user may open a new directory and sub-directory '**NEWMAPS/MAPS**', under which all basemaps for that application will reside. It is important at this point to modify the **SET** command in the **AUTOEXEC.BAT** file as instructed in the **inFOcus** users guide.

5 USES AND LIMITATIONS

5.1 QUERY AND DISPLAY

The **inFOcus** system is designed mainly as a geographic database query and display system. The most common mapping routines are embedded at the heart of the system, such as enabling the user to select a database file and display that data on a selected basemap. This operation ranges from as little as three menu selections to approximately ten, for any given selection of datafiles, map areas, and basemaps. A final map with grid, north arrow, scale bar and legend can be created within minutes. Once existing maps are created, they may be saved under the **SHOW MAP** menu in the **VIEW EXISTING MAPS**. This allows for instant access to previously created maps, and hardcopy output to a printing or plotting facility.

5.2 INTERROGATION AND UPDATE

Database information may be accessed from the menu system or from the map once it is displayed. **InFOcus** allows for full database creation, modification, and updating through the menu driven interface. Database records accessed from within the map display may be updated by changing any value in the listed fields, and pressing '**Ctrl-End**'. It is important not to change attributes for critical fields related to location, or sample number, etc. Although these fields are not write-protected in the current application, it is possible to make some fields 'read-only', so they may not be modified by casual users.

5.3 REPORTING

The **inFOcus** system offers a comprehensive reporting capability. The user may create custom reports, or modify existing reports, and query the database simultaneously. The only limitation within the system with this operation, is that printouts cannot be run directly from within **inFOcus**. The report is written to an ASCII file which can be printed using the DOS PRINT command, or word processing software.

5.4 *HARDCOPY MAP OUTPUT*

The **inFOcus** system supports a wide range of printers and plotters for hard copy output. The quality of output will depend on several factors relating to the amount of information displayed and the dependability of the plotting and printing facility. The user should refer to the QUIKMap users guide for full instruction on map output.

One of the limitations of hardcopy output, as with any map, is the amount and detail of information that is readable in hard copy form. The QUIKMap users guide provides information on how to finalize a readable map such as moving labels, adding text, changing line and hatch types, and colors and so on. With some practice, publishable quality maps can be accomplished. Should the user need to modify the map display, then exporting to AutoCAD through DXF is an effective means of achieving these results.

5.5 *CLASSIFICATION AND ANALYSIS*

Although **inFOcus** is built mainly for display and access to geographic information, the system supports substantial classification and analytical potential. Some of this capability is already built into the system either through the **DATABASE UTILITIES** or **VIEW/EDIT** menu options. For example, under the **VIEW/EDIT** menu the user can replace a certain field based on a search criteria, such as all samples with greater than 50 % gravel, replace symbol type with a triangle. This routine can be repeated until the whole database is classified. This process is limited only by the users imagination.

However, if the classification or analytical process is a task which is done on a routine basis, then the routine may be written as a hardwire operation and added to the menu system where appropriate. One example of such a routine is to tag all sample records in one database file within a geographic area defined by a polygon in another database file. The bounding polygon may be a mineral claim, a bibliographic area, or a user defined polygon. Another developed routine allows for the calculation of water volumes in a series of harbours within user defined boundaries using CHS hydrographic data. These are just two of several analytical routines already developed for other applications.

5.6 *DATA EXCHANGE*

Perhaps the most important concept in the design of **inFOcus** is to permit the exchange of data with other systems. The greatest demand for **inFOcus** applications lies in the need for quick and easy access to a specific set of geographic information. The effective use of such technology requires minimal effort in exchange of information from other GIS and CAD systems, and mainframe database networks.

The present version of **inFOcus** uses dBASE compatible (.dbf) and QUIKMap basemap (.bmf, .idx, .pnt) file formats. Therefore whenever data is to be imported into the system, or exported from the system, it must be subject to the necessary conversion process. The QUIKMap mapping engine supports direct exchange with CARIS (.NTX), INTERGRAPH (.DGN), and AutoCAD (.DXF). Other GIS or CAD systems usually require a secondary conversion process for exchange such as from ARC/INFO to AutoCAD to QUIKMap.

6 *CONCLUSIONS AND RECOMMENDATIONS*

The **inFOcus** application for granular resource information for the West Canadian Arctic was constructed with few serious difficulties. The application contains a variety of QUIKMap compatible basemaps and database files which were converted from original dBASE, AutoCAD, and SUPERTECH file formats. PAMAP files which were also supplied were not converted due to the unavailability of the PAMAP to AutoCAD conversion routine.

An experiment to digitize features of granular resource deposits from aerial photographs was proven unsuccessful. Although data was entered once registration problems were overcome, the reliability of this data remains in question. However, it is concluded that once software upgrading of this module is complete, it will be a valuable addition to the mapping system.

The application presently contains a selection of fifteen (15) basemaps and eighty-seven (87) database files. The basemaps include a portion of the NRTHAMER basemap supplied with QUIKMap for hydrographic and topographical features. Seven basemaps for each of the Erksak and Isserk Borrow Blocks are also included. These maps outline the data coverage, contoured bathymetry, surficial sediment type, structure and thickness of proven, probable and prospective granular resource deposits. The database files include five borehole files, five sors files, five catalogue files, and two files for each of thirty-six track lines.

In the interest of maintaining a fully functioning system, and expanding on this application, the following recommendations are addressed:

1) It is important to understand that the fundamental philosophy behind an **inFOcus** application is to provide rapid and easy access to a large amount of geographic information for non-technical users. The **inFOcus** system allows for the expansion and creation of new applications, and query, display and manipulation of data within the applications. The system is fully functional for dBASE compatible files and QUIKMap basemaps, and the user should have little or no difficulty in expanding applications or building new ones if the data is already in the required format. However, in the event that new data is to be added such as data from other GIS or CAD systems, or other database management systems (DBMS), it is recommended that this task be left to qualified individuals. Although the process of converting data from other systems into the required format of the **inFOcus** system is fairly straight forward, unforeseen problems are often encountered that require the consultation of a digital mapping or GIS expert.

2) The basemap included in this application was spliced from the **'NRTHAMER'** basemap supplied with the QUIKMap software. This map was digitized from satellite image data at scales ranging from 1:1,000,000 to 1:9,000,000. Therefore the resolution of the features on the map become very coarse above the 1:250,000 view scale. It is recommended that new basemaps be added to the application that offer greater detail and resolution for map scales lower than 1:250,000. For this the NTS Series for all of Canada are available at 1:250,000 source scale. This series is supplied in CARIS (.NTX) format, and primarily offers similar detail in information as do the standard hard copy equivalent NTS Series at 1:250,000. It is further recommended that conversion of this data, and inclusion in the application be done by qualified personnel.

3) The database files for all granular resource information in the system is now easily accessible. The ramification of this is that certain critical attributes of the data may be mistakenly, or intentionaly changed by casual users. Such critical attributes would be the latitude and longitude position, sample number, author, etc. A solution to this problem is to make certain fields in each database **'read only'** fields. This limits the editing capability of the user, but for good reasons.

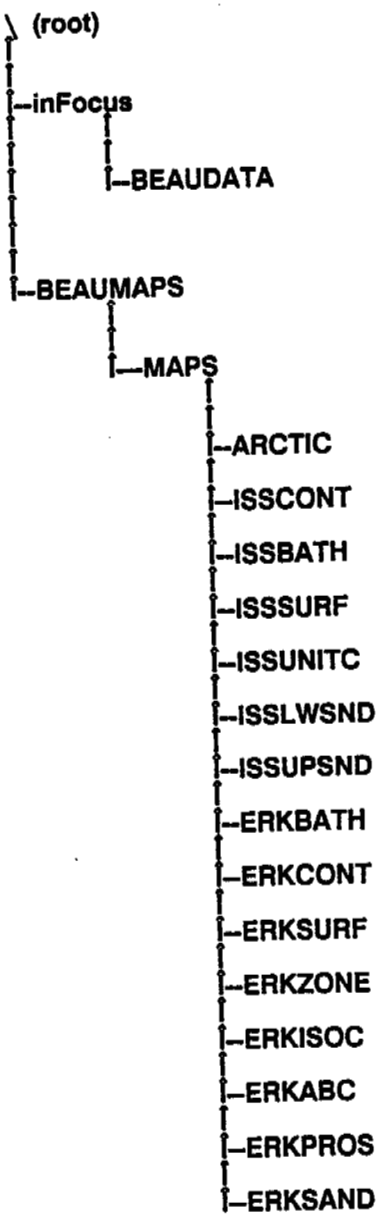
4) Other recommendations are directed toward further customization of the interface. Further customization would minimize time spent by users in interrogation and manipulation of data. An example would be to create a standard symbology for the various types of data that will be included in the system. Or, to include search routines on the basis of user defined radius, one polygon against a point file, etc. In most cases further customization of **inFOcus** to suit in-house operations requires very minimal effort and cost compared to the amount of time and money that would be spent by users of the system without further customization.

7 REFERENCES

Earth & Ocean Research Ltd., 1988. ***"Synthesis and Interpretation of Bathymetric, Geophysical, Geological and Geotechnical Data: Isserk Borrow Block - South Central Beaufort Sea".*** *Part of the Northern Oil and Gas Action Program (NOGAP Project A4-20), Sumitted to DEPARTMENT OF INDIAN AND NORTHERN DEVELOPMENT, INDIAN AND NORTHERN AFFAIRS CANADA.*

Earth & Ocean Research Ltd., 1988. ***"Synthesis and Interpretation of Bathymetric, Geophysical, Geological and Geotechnical Data: Erksak Borrow Block - South Central Beaufort Sea".*** *Part of the Northern Oil and Gas Action Program (NOGAP Project A4-21), Sumitted to DEPARTMENT OF INDIAN AND NORTHERN DEVELOPMENT, INDIAN AND NORTHERN AFFAIRS CANADA.*

APPENDIX A - INFOCUS DIRECTORY STRUCTURE AND CONTENTS



APPENDIX B - LIST OF DATABASE FILES AND SELECTION TITLES

FILENAME	*SELECTION TITLE*
BFT_BH	*Beaufort Sea boreholes*
COREMAP	*Beaufort cores/new bholes*
MAPDHCBH	*Dempster Highway bholes*
MAPISRBH	*Inuvialuit boreholes*
MAPNAHBH	*North Alaska Highway bh's*
DEMP_CAT	*Dempster High. Catalogue*
N-AL_CAT	*N. Alaska Catalogue*
BFT_CAT	*Beaufort bhole Catalogue*
GEOPHCAT	*Beaufort bathymetric Cat*
INUV_CAT	*Inuvialuit Catalogue*
DEMPSORS	*Demp.Gran. Material(Sors)*
N-ALSORS	*N. Alaska (Sors)*
UMACSORS	*U. MacKenzie Valley Sors*
LMACSORS	*L. MacKenzie Valley Sors*
INUVSORS	*Inuvialuit Sors*
DO78791	*Dome regional HR 1978/9*
DO7879F	*Dome 78/9 fixes*
DOME8021	*Dome regional HR 1980/2*
DOME802F	*Dome 80/2 fixes*
ESSO7781	*ESSO Regional 77/82 track*
ESSO778F	*ESSO Regional 77/82 fixes*
ESSO831	*ESSO Regional 1983 tracks*

FILENAME	*SELECTION TITLE*
ESSO83F	*ESSO Regional 1983 fixes*
GULF81L	*Gulf Regional 1981 tracks*
GULF81F	*Gulf Regional 1981 fixes*
GULF82L	*Gulf Regional 1982 tracks*
GULF82F	*Gulf Regional 1982 fixes*
BA84L	*Govt Banksland /84 tracks*
BA84F	*Govt Banksland /84 Fixes*
EDADL	*Govt EDAD tracks*
EDADF	*Govt EDAD fixes*
NA83L	*Govt Nahidik /83 tracks*
NA83F	*Govt Nahidik /83 fixes*
NA85L	*Govt Nahidik /85 tracks*
NA85F	*Govt Nahidik /85 fixes*
NA85L	*Govt Nahidik /86 tracks*
NA86F	*Govt Nahidik /86 fixes*
TY85L	*Govt Tulley /85 tracks*
TY85F	*Govt Tulley /85 fixes*
TY86L	*Govt Tulley /86 tracks*
TY86F	*Govt Tulley /86 fixes*
SEIS708L	*Govt 1970-1980 tracks*
SEIS708F	*Govt 1970-1980 fixes*
SEIS818L	*Govt 1981-1982 tracks*

FILENAME	*SELECTION TITLE*
SEIS818F	*Govt 1981-1982 fixes*
AE-90L	*Dome SS Ae-1990 : tracks*
AE-90F	*Dome SS Ae-1990 : fixes*
GSHNIL	*Dome SS Gsnhi : tracks*
GSNHIF	*Dome SS Gsnhi : fixes*
HERSCHEL	*Dome SS Herschel : tracks*
HERSCHEF	*Dome SS Herschel : fixes*
ISSERKL	*Dome SS Isserk : tracks*
ISSERKF	*Dome SS Isserk : fixes*
KAGLULIL	*Dome SS Kaglulik : tracks*
KAGLULIF	*Dome SS Kaglulik : fixes*
KOGYUKL	*Dome SS Kogyuk : tracks*
KOGYUKF	*Dome SS Kogyuk : fixes*
NERLERKL	*Dome SS Nerlerk : tracks*
NERLERKF	*Dome SS Nerlerk : fixes*
TARSIUTL	*Dome SS Tarsiut : tracks*
TARSIUTF	*Dome SS Tarsiut : fixes*
TINGMIAL	*Dome SS Tingmiark tracks*
TINGMIAF	*Dome SS Tingmiark fixes*
TINK91L	*D.SS Tingmiark-91 tracks*
TINK91F	*D.SS Tingmiark-91 fixes*
UP66L	*Dome SS Up - 66 : tracks*

FILENAME	*SELECTION TITLE*
UP66F	*Dome SS Up - 66 : fixes*
UVILUKL	*Dome SS Uviluk : tracks*
UVILUKF	*Dome SS Uviluk : fixes*
ALPAKL	*Gulf SS Akpak : tracks*
AKPAKF	*Gulf SS Akpak : fixes*
AMAULIGL	*Gulf SS Amauligak tracks*
AMAULIGF	*Gulf SS Amauligak fixes*
GISSERKL	*Gulf SS Issurk : tracks*
GISSERKF	*Gulf SS Issurk : fixes*
GISSUNGL	*Gulf SS Issung : tracks*
GISSUNGF	*Gulf SS Issung : fixes*
KASLL	*Gulf SS Kashutut tracks*
KASLF	*Gulf SS Kashutut fixes*
NUKAKL	*Gulf SS Nukalerk tracks*
NUKAKF	*Gulf SS Nukalerk fixes*
SKOAKL	*Gulf SS Skoak : tracks*
SKOAKL	*Gulf SS Skaok : fixes*
SUKALERL	*Gulf SS Sukalerk : tracks*
SUKALERF	*Gulf SS Sukalerk : fixes*
WTINGL	*Gulf SS W.Tingmiark track*
WTINGF	*Gulf SS W.Tingmiark fixes*

APPENDIX C - LIST OF BASEMAPS AND SELECTION TITLES

DIRECTORY	*SELECTION TITLE*
ARCTIC	*Coast, islands, rivers, bound's*
ISSCONT	*Isserk block control data*
ISSBATH	*Isserk block bathymetry*
ISSSURF	*Isserk block surficial cover*
ISSUNITC	*Isserk block overburden isopach*
ISSLWSND	*Isserk block lower sand unit*
ISSUPSND	*Isserk block upper sand unit*
ERKBATH	*Eriksak block bathymetry*
ERKCONT	*Eriksak block control data*
ERKSURF	*Eriksak block surficial cover*
ERKZONE	*Eriksak block zone boundaries*
ERKISOC	*Eriksak block overburden isopach*
ERKSAND	*Eriksak block depth structure*
ERKABC	*Eriksak block data source zones*
ERKPROS	*Eriksak block prospect distrib*

APPENDIX D - ATLAS OF SELECTED MAPS

Map 1:	*Index Map.*
Map 2:	*Granular resource studies data base catalogues.*
Map 3:	*Borrow deposit data base - Canada's North West Arctic.*
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Map 5:	*Borrow deposit data base - Yukon Highway Corridor.*
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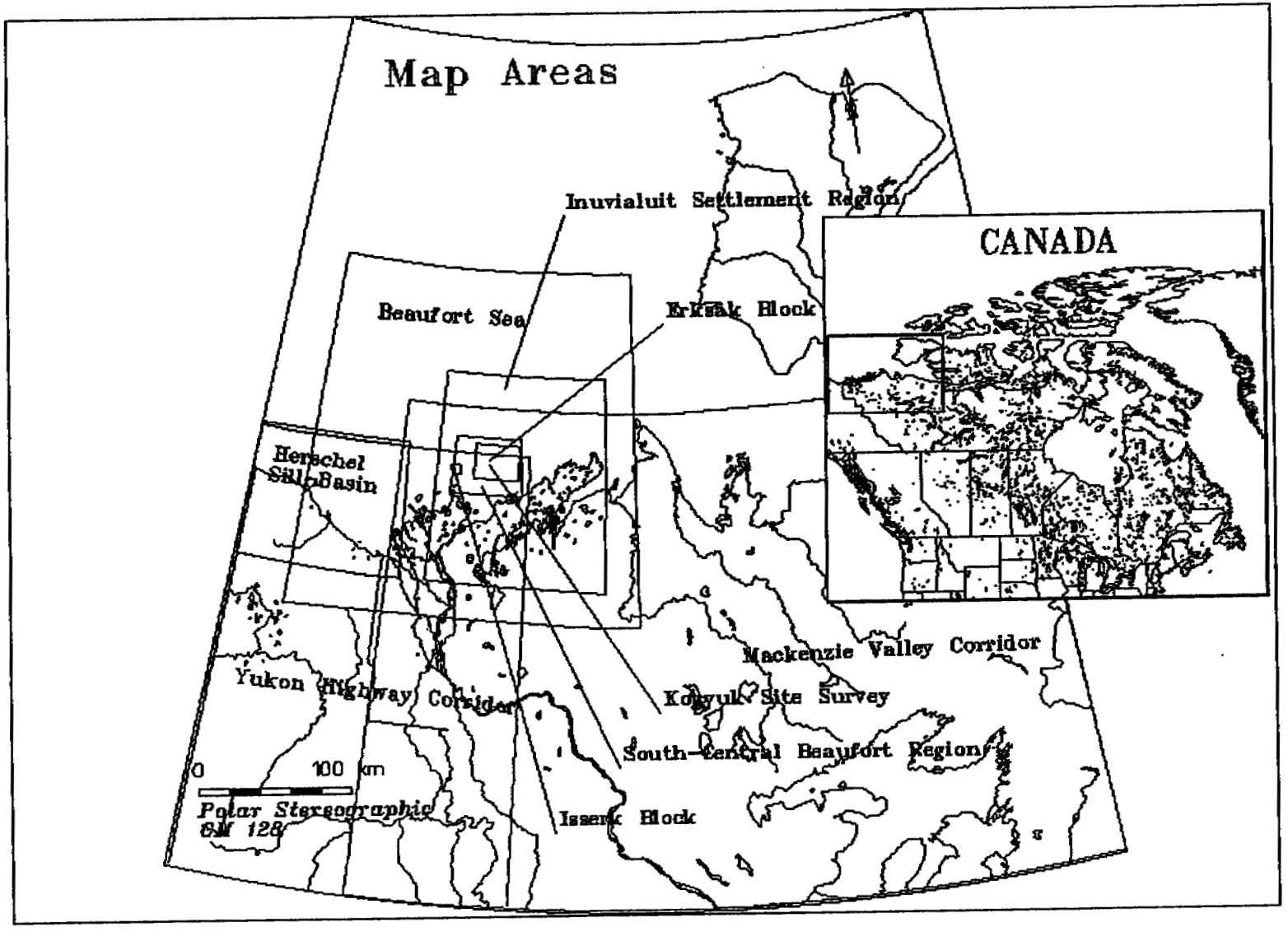
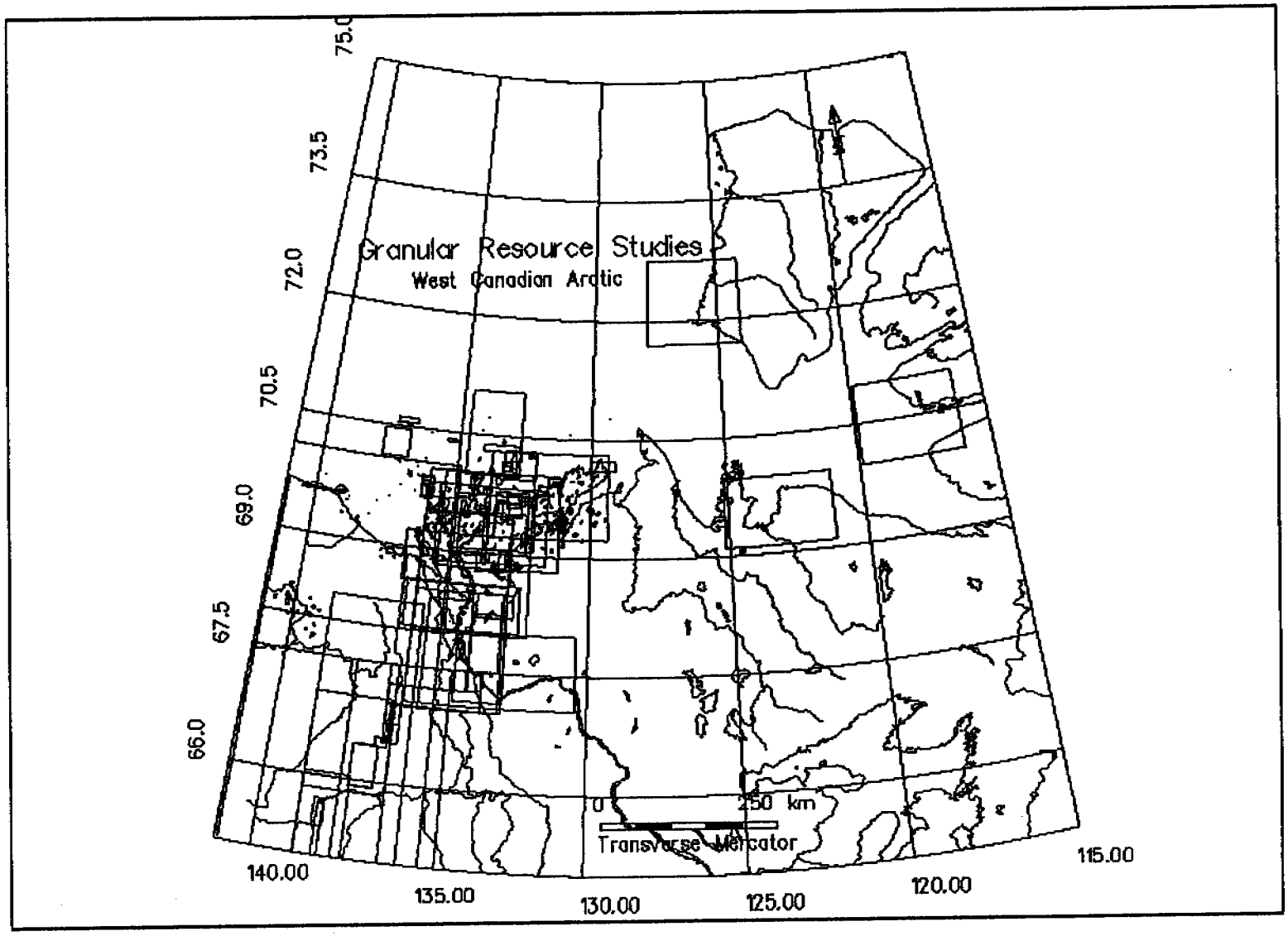
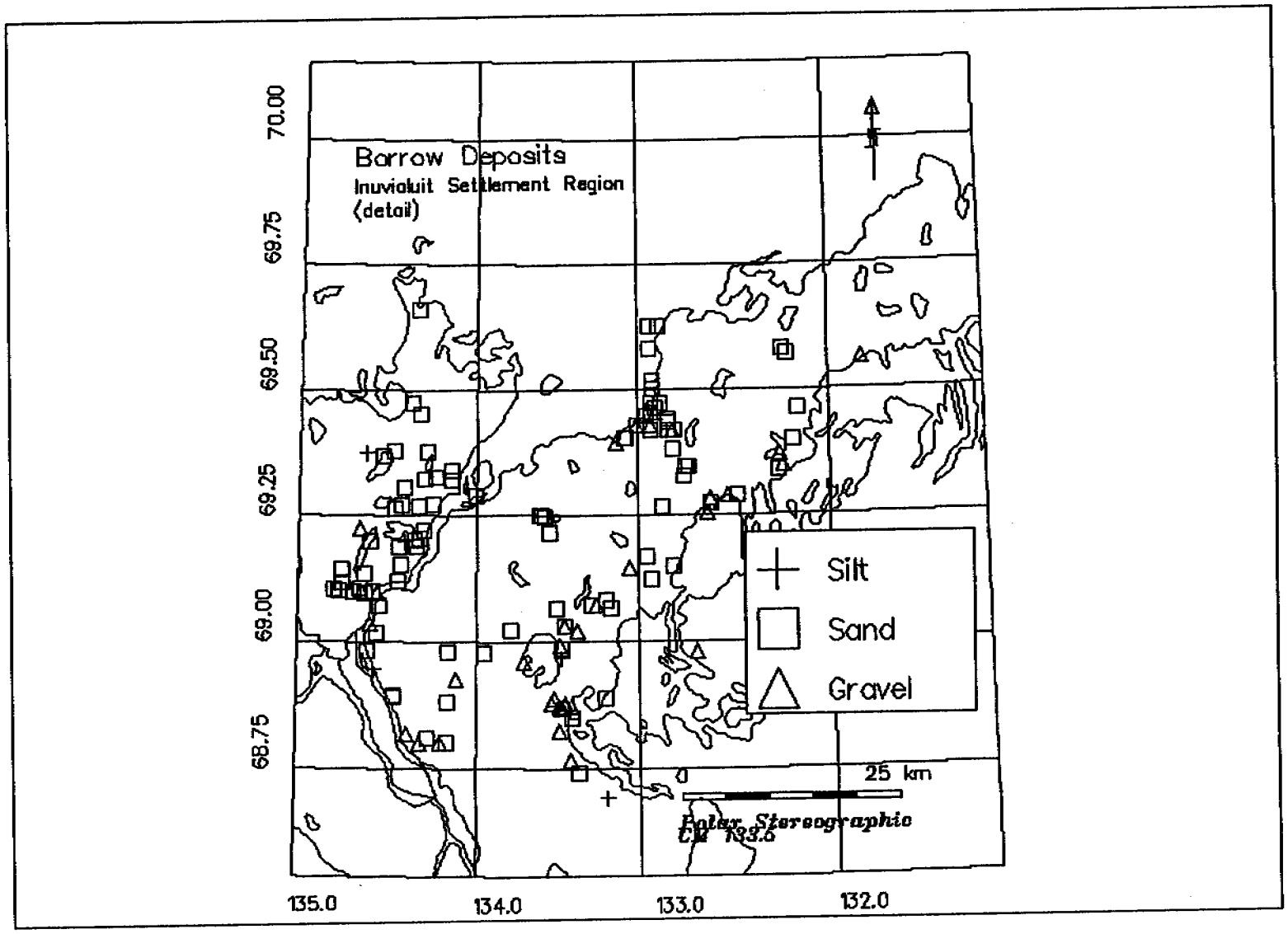
Map 14:	*Isserk Block - surficial sediment - bathymetry.*
Map 15:	*Isserk Block - resource potential - depth to deposit surface.*
Map 16:	*Erksak Block - surficial sediment - bathymetry.*
Map 17:	*Erksak Block - resource potential -overburden thickness.*



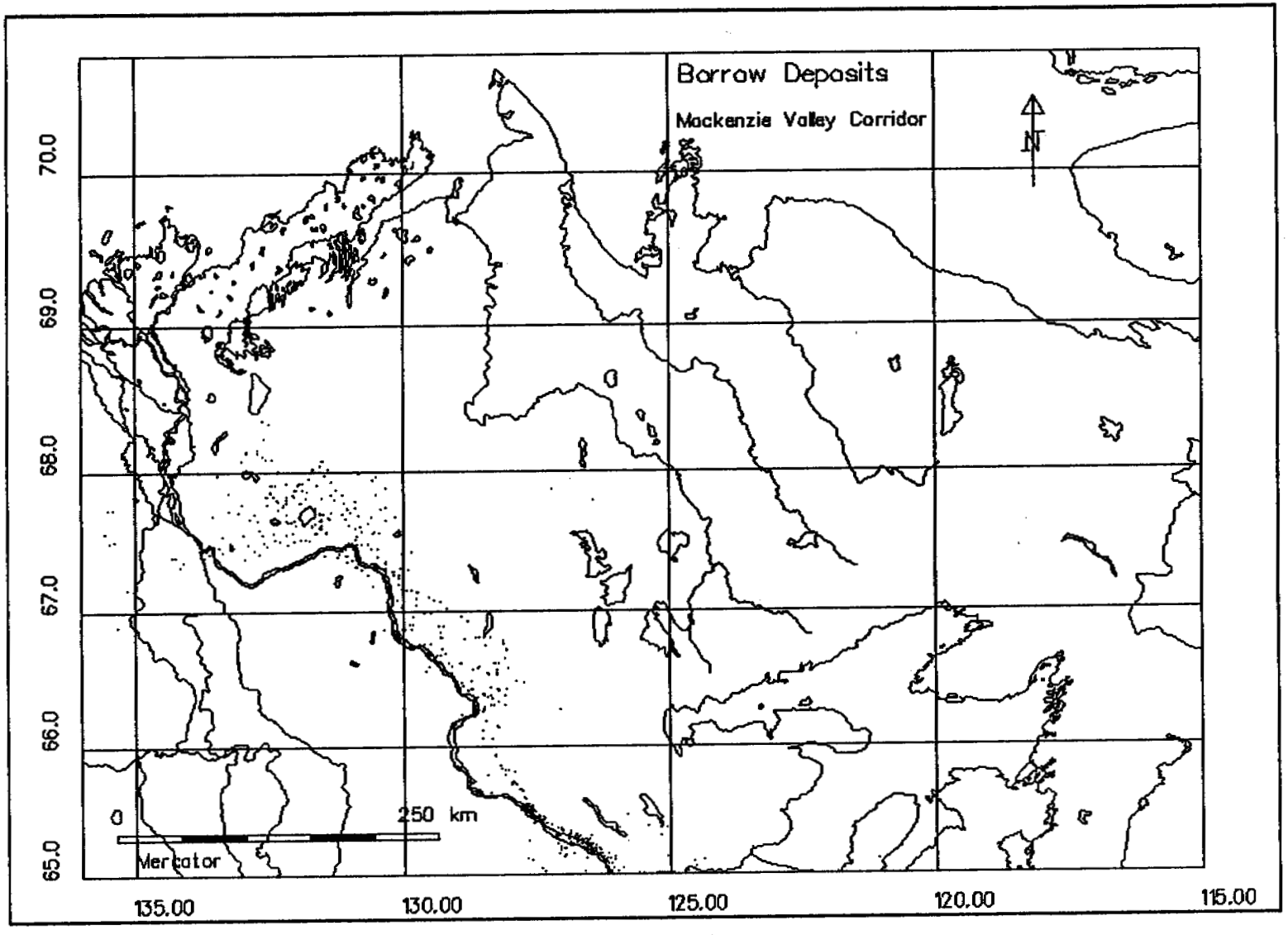
Map 1: **Index Map. Outlined areas are described in subsequent maps.**



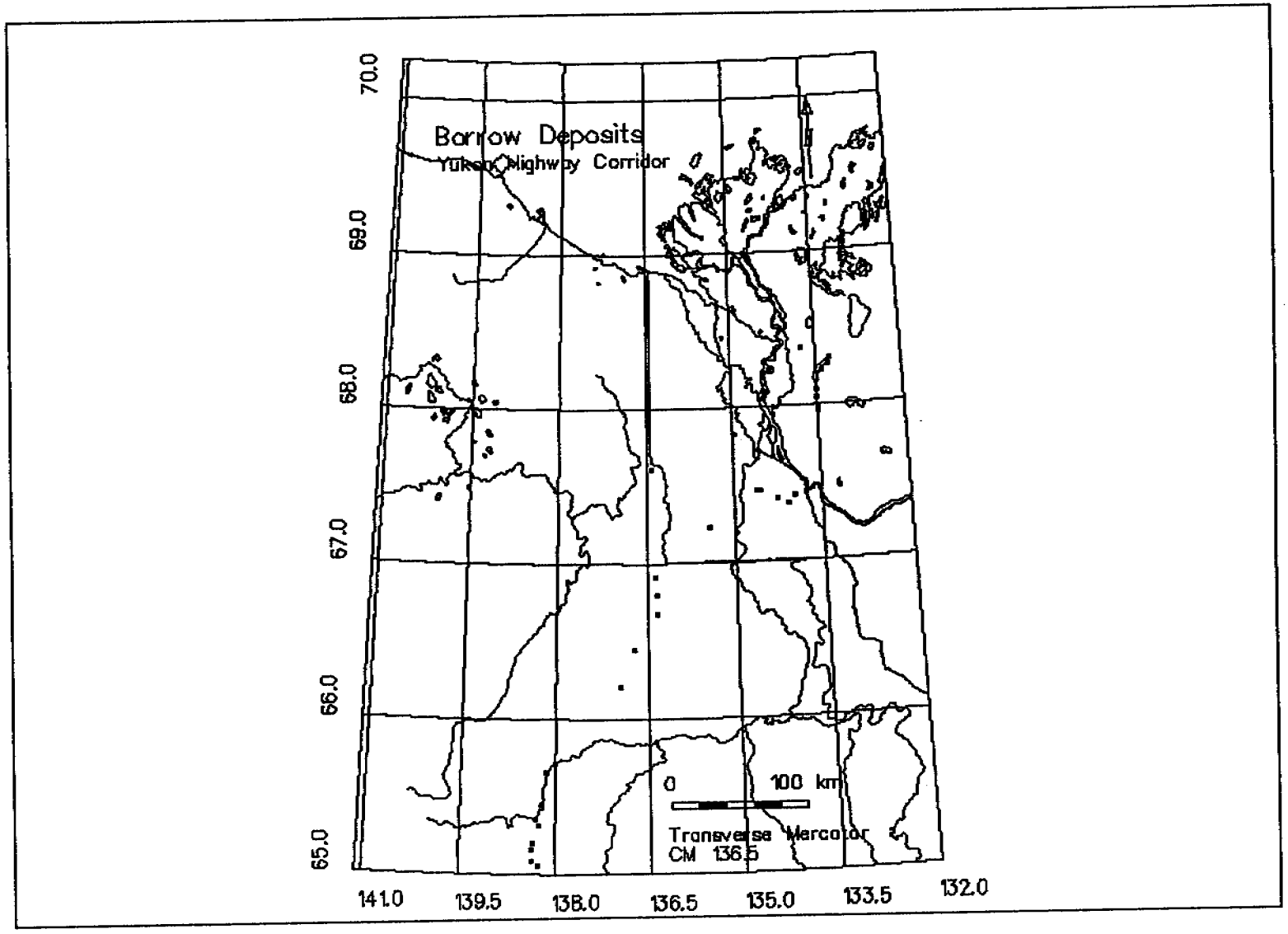
Map 2: **Granular resource studies data base catalogues. Areas include the Dempster Highway, Beaufort Sea, Inuvialuit Settlement Region and North Alaska.**



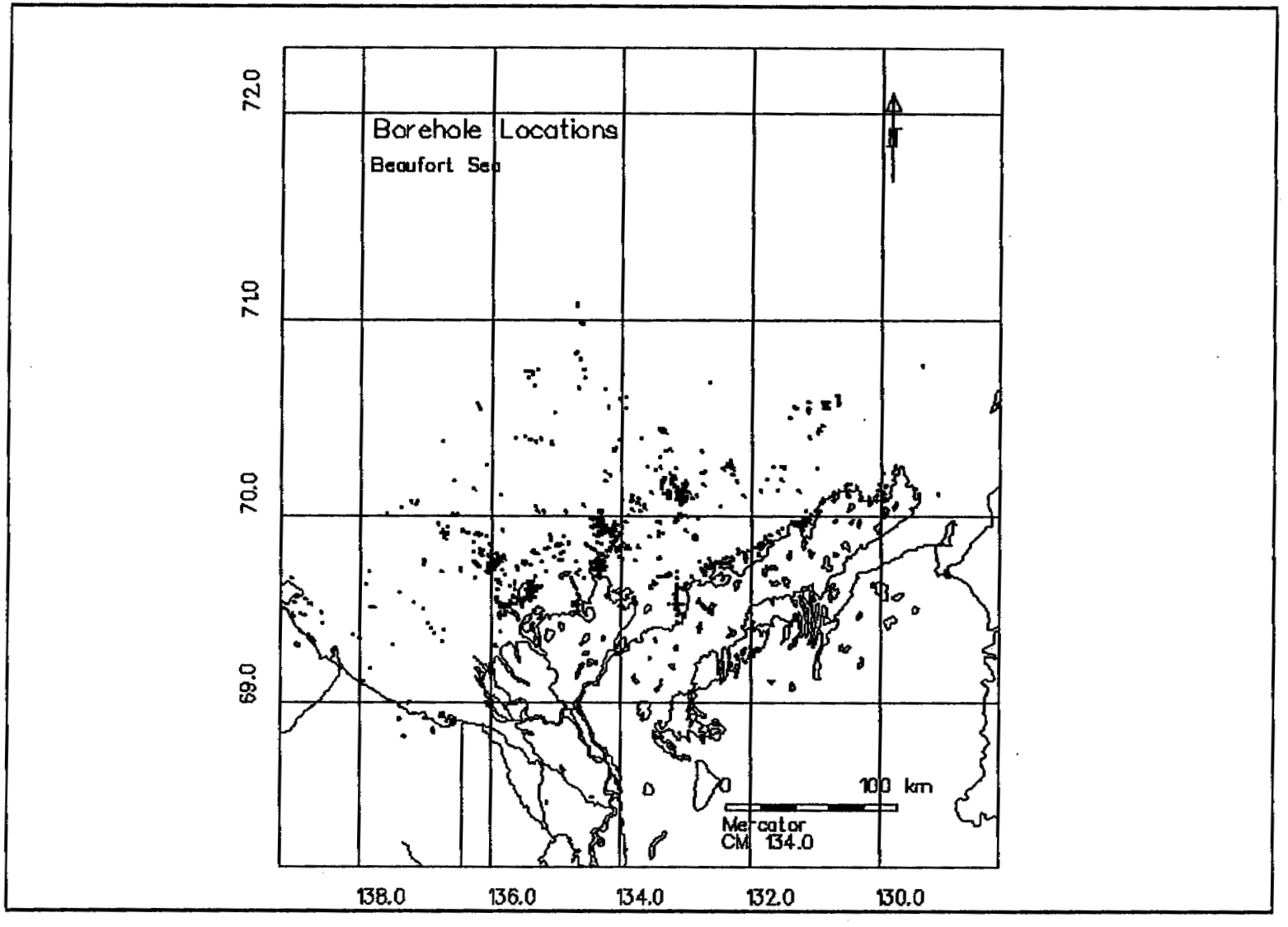
Map 3: **Borrow deposit information is available for much of Canada's North West Arctic region. Individual sample points are backed-up with data base information regarding the source reference, year, location in UTM and Lat/Long, granular type and USC classification.**



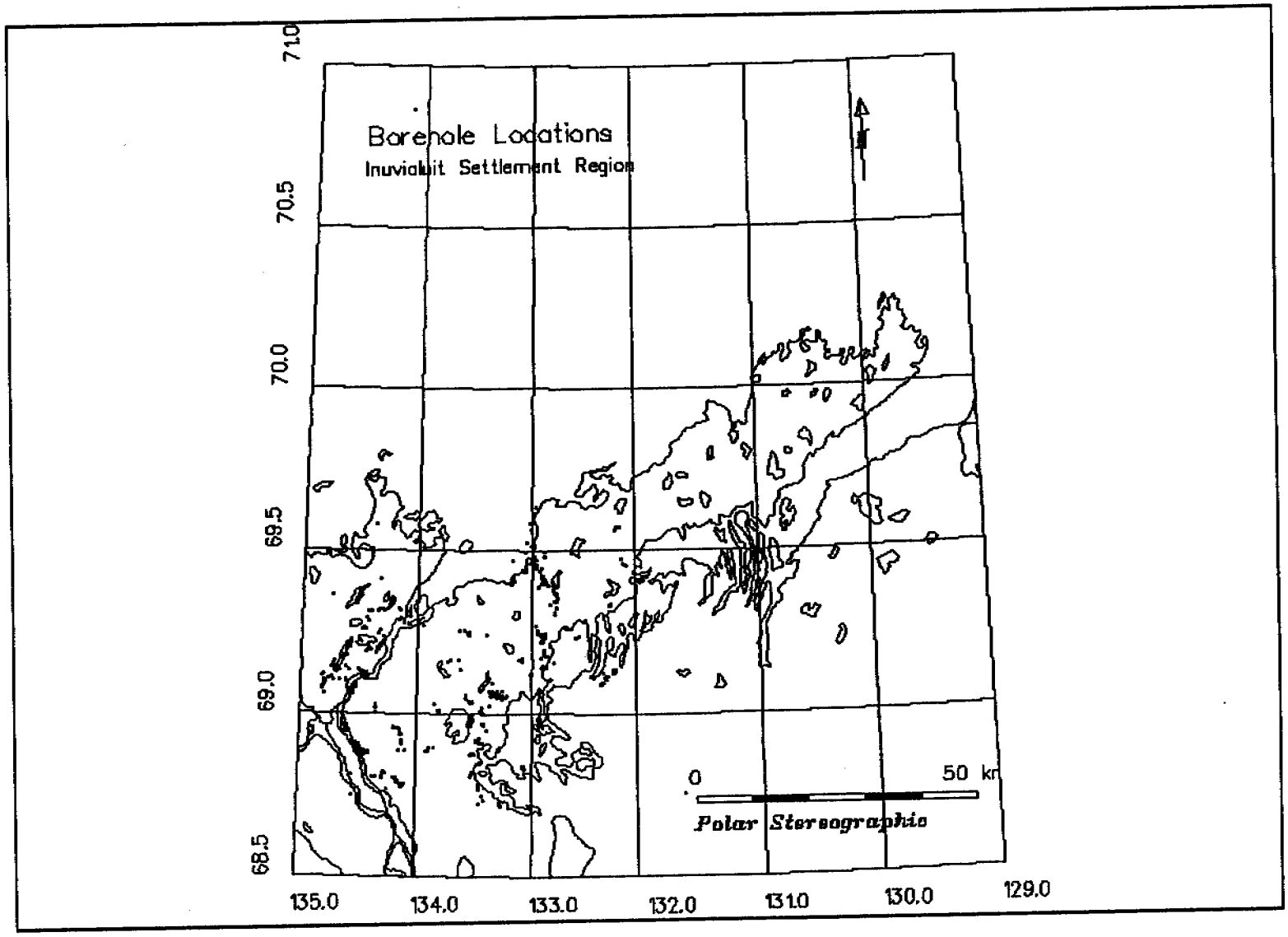
Map 4: **Each point represents a Borrow Deposit data base reference for the Mackenzie Valley Corridor region.**



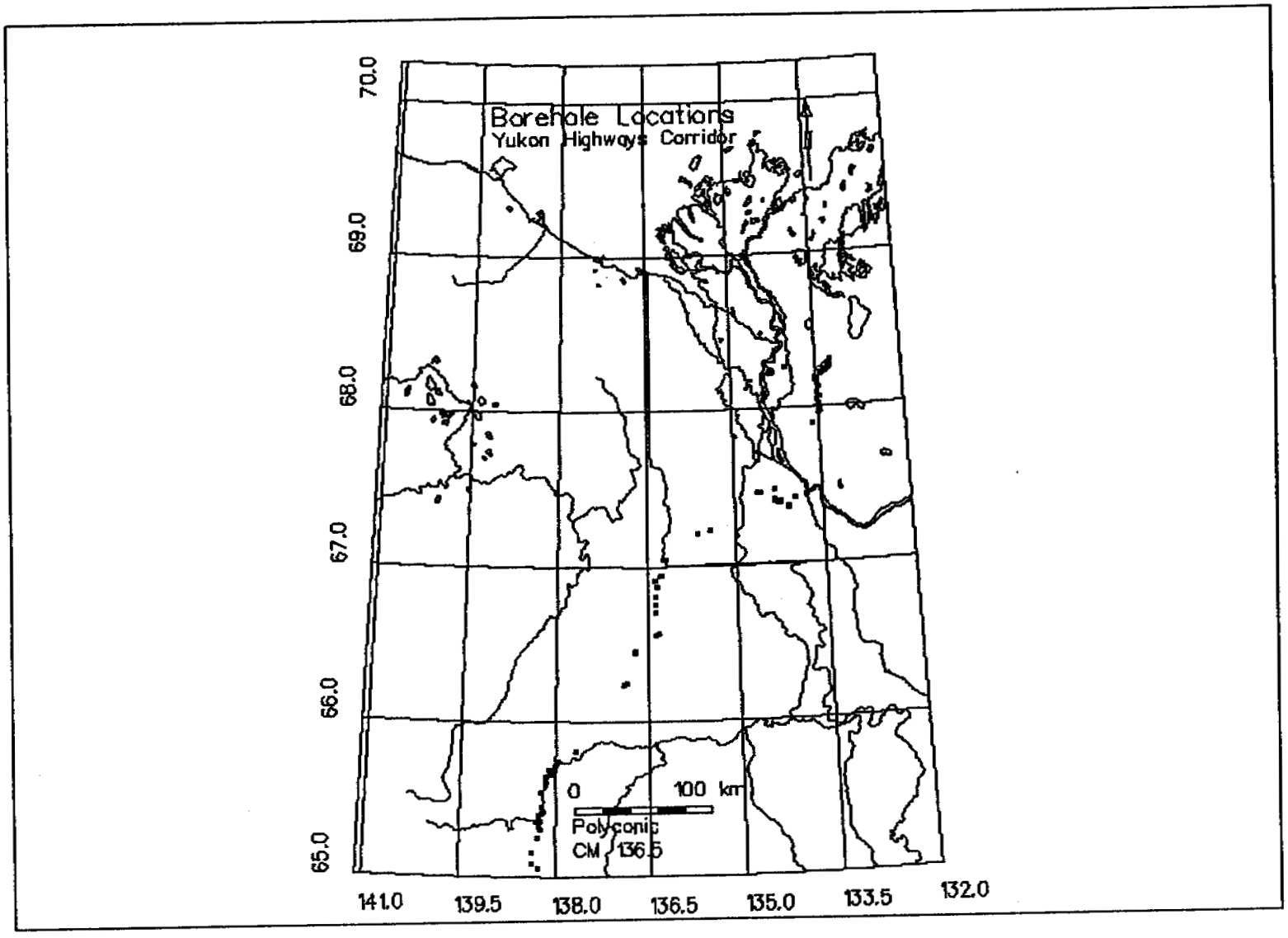
Map 5: **Borrow Deposit locations for the Yukon Highway Corridor.**



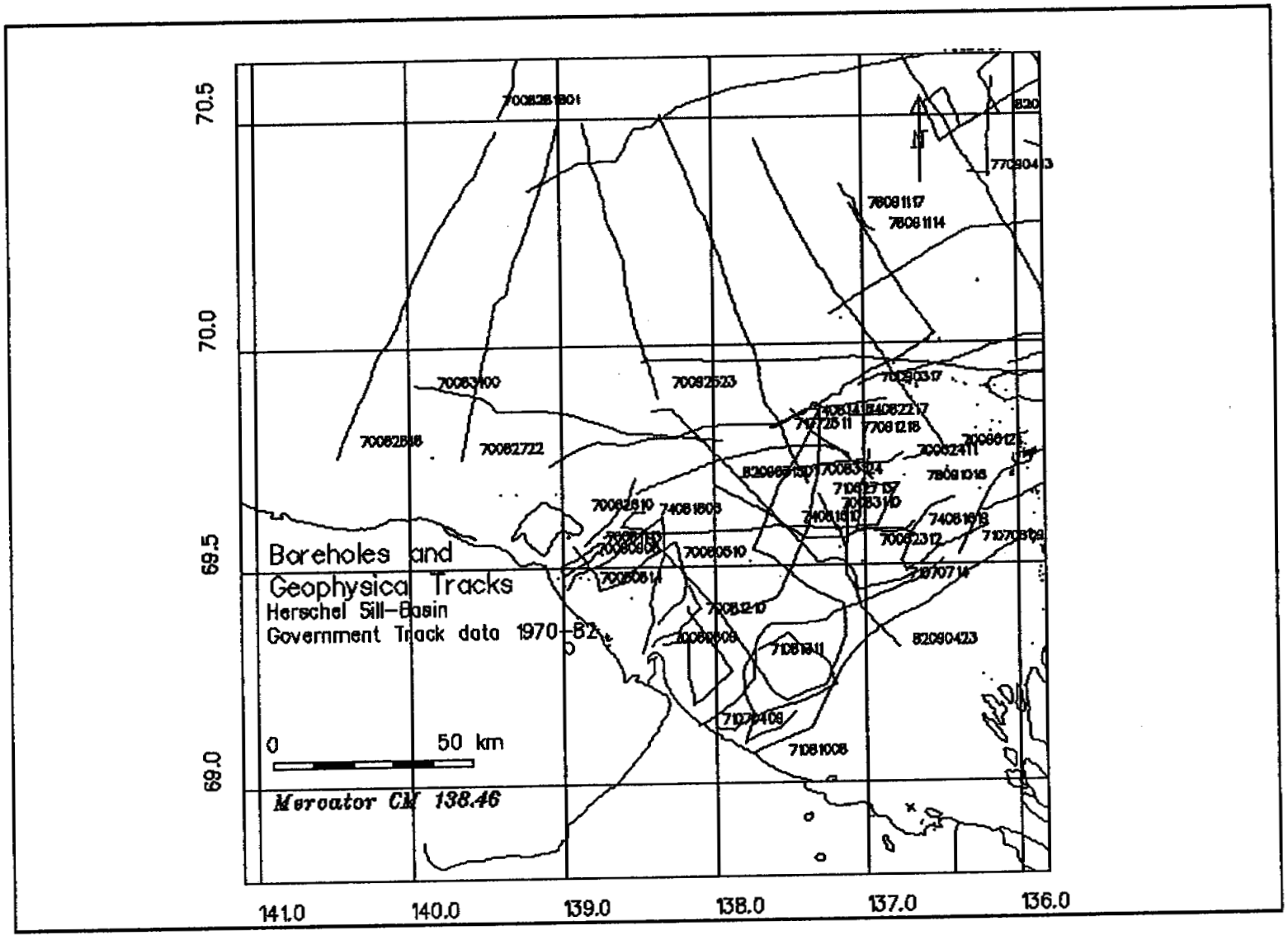
Map 6: **Borehole location points contain data base reference information such as the project number, date, client, location in UTM and Lat/Long, water depth and borehole termination depth.**



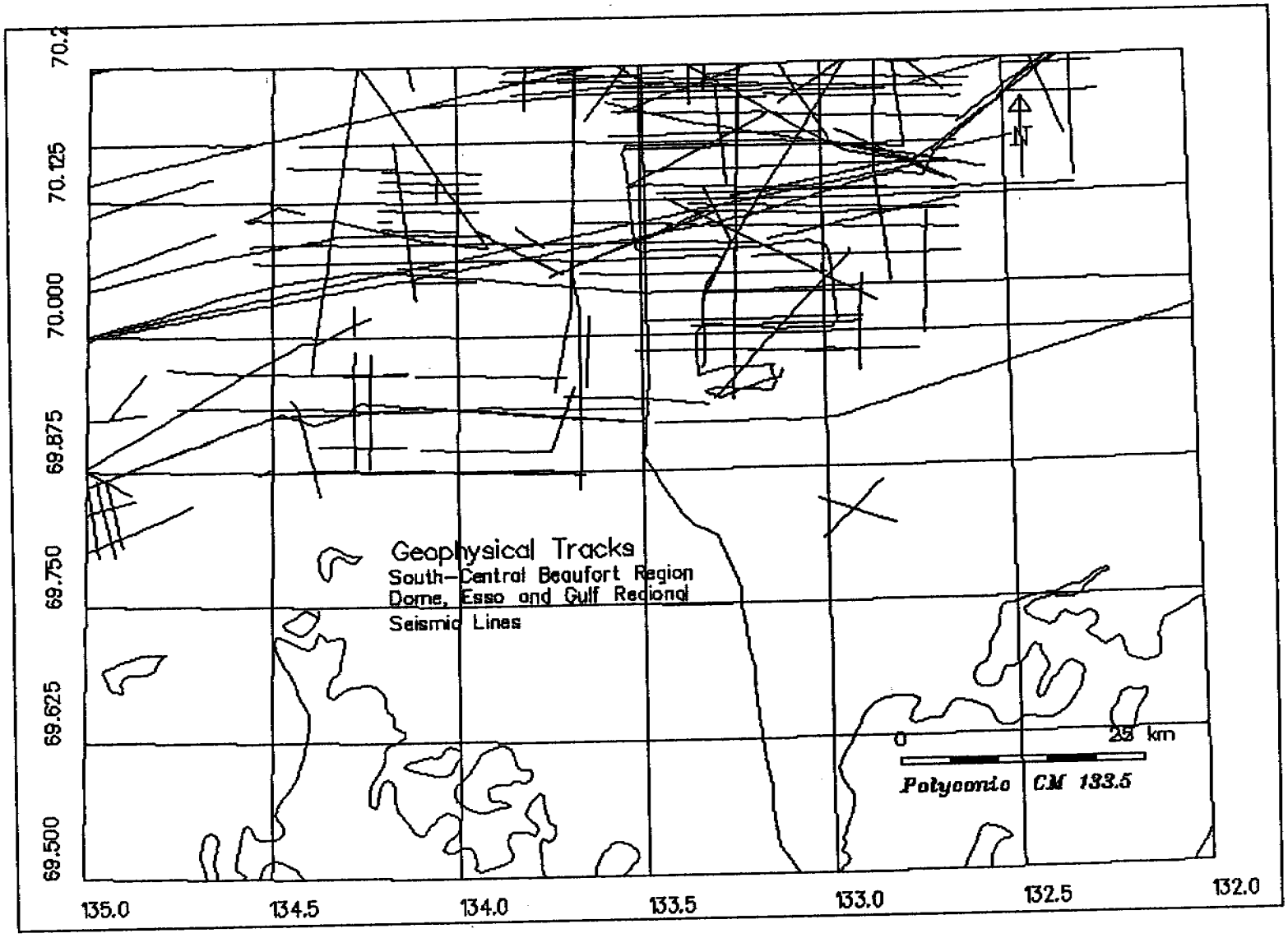
Map 7: **Borehole database locations for the Inuvialuit Settlement Region.**



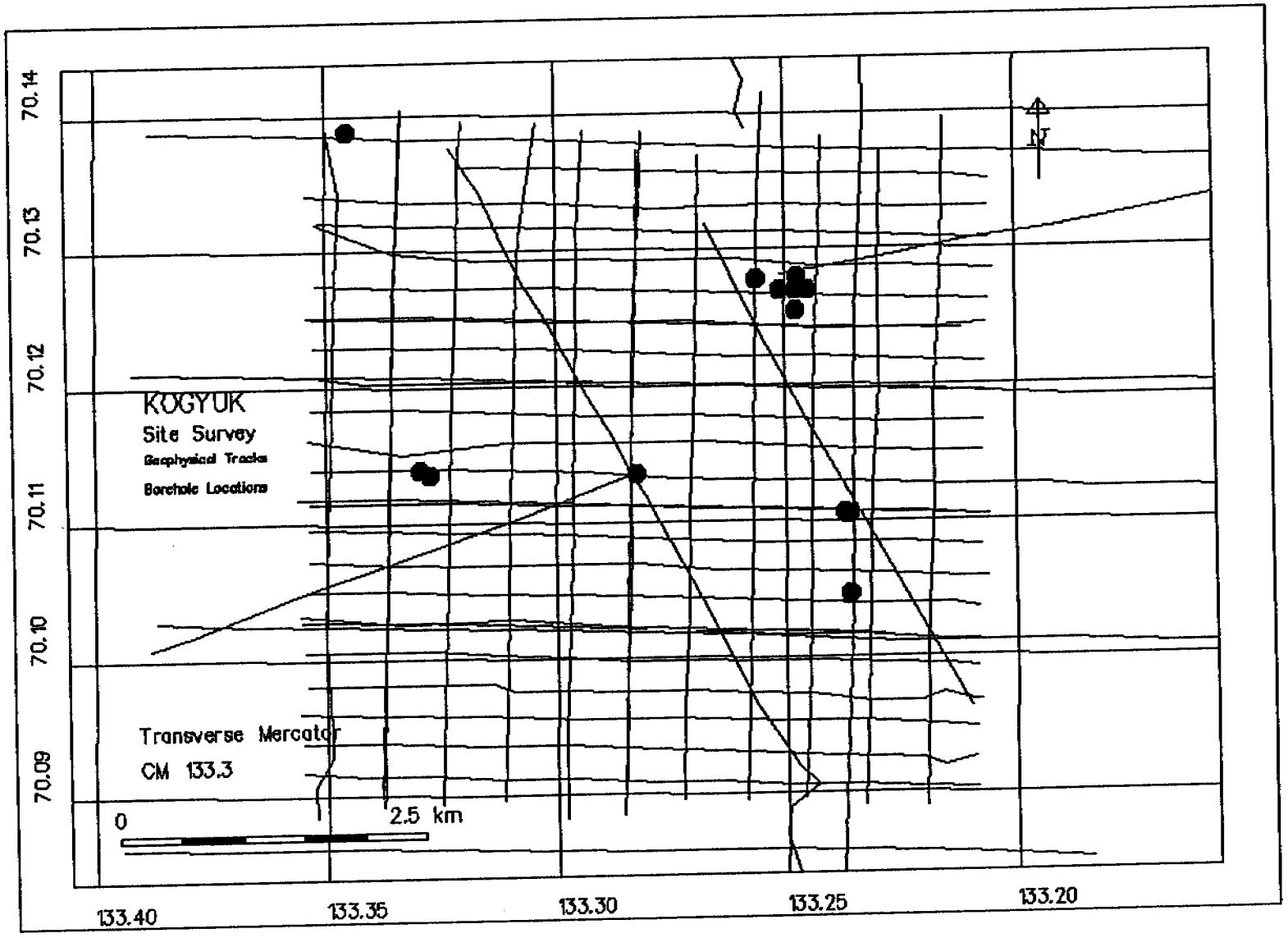
Map 8: **Borehole database locations for the Yukon Highway Corridor.**



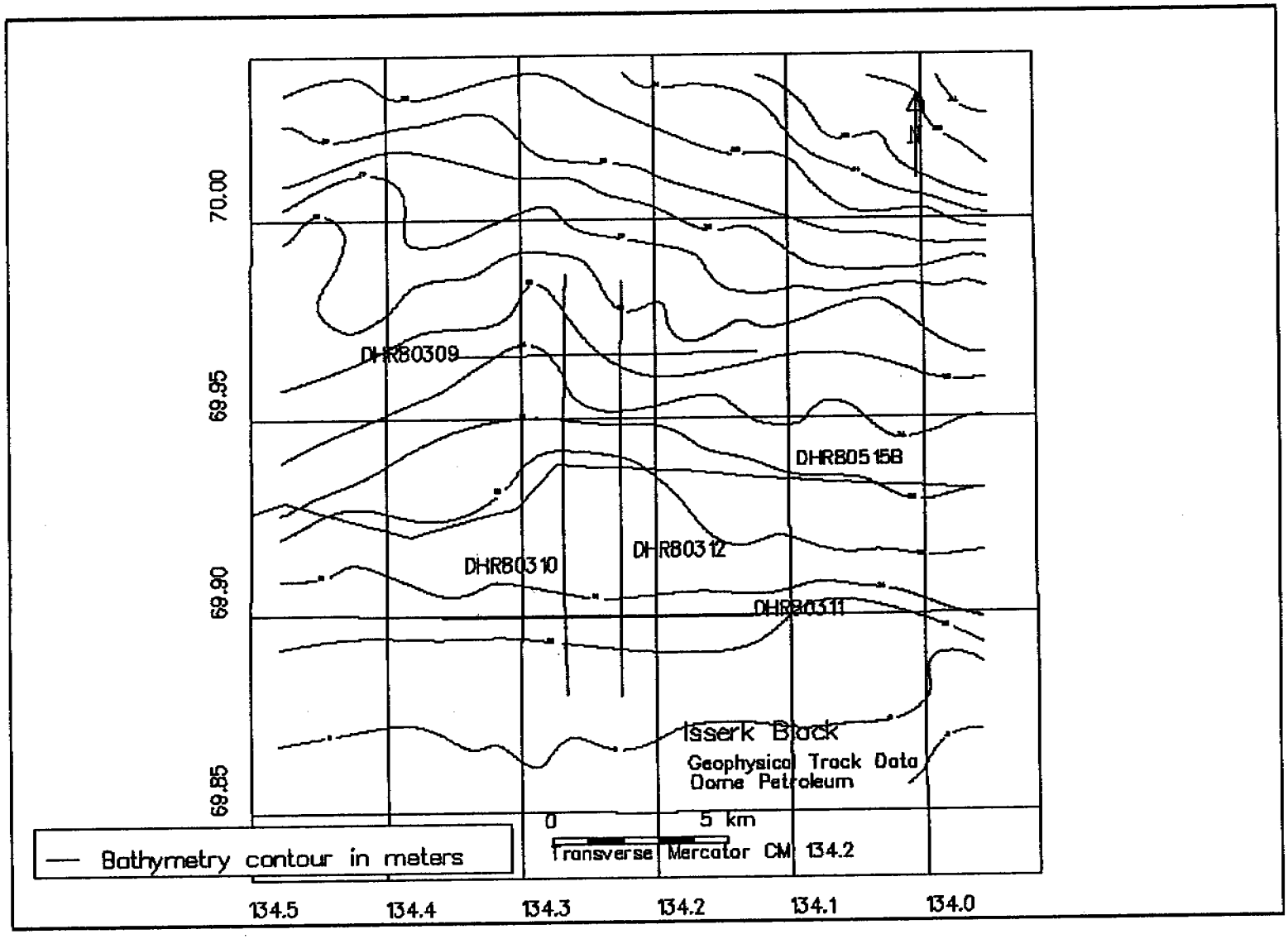
Map 9: **Extensive geophysical track data is available for the Beaufort Sea. Shown above is Government track data from the period 1970 to 1982 together with the boreholes located in the Herschel Island region.**



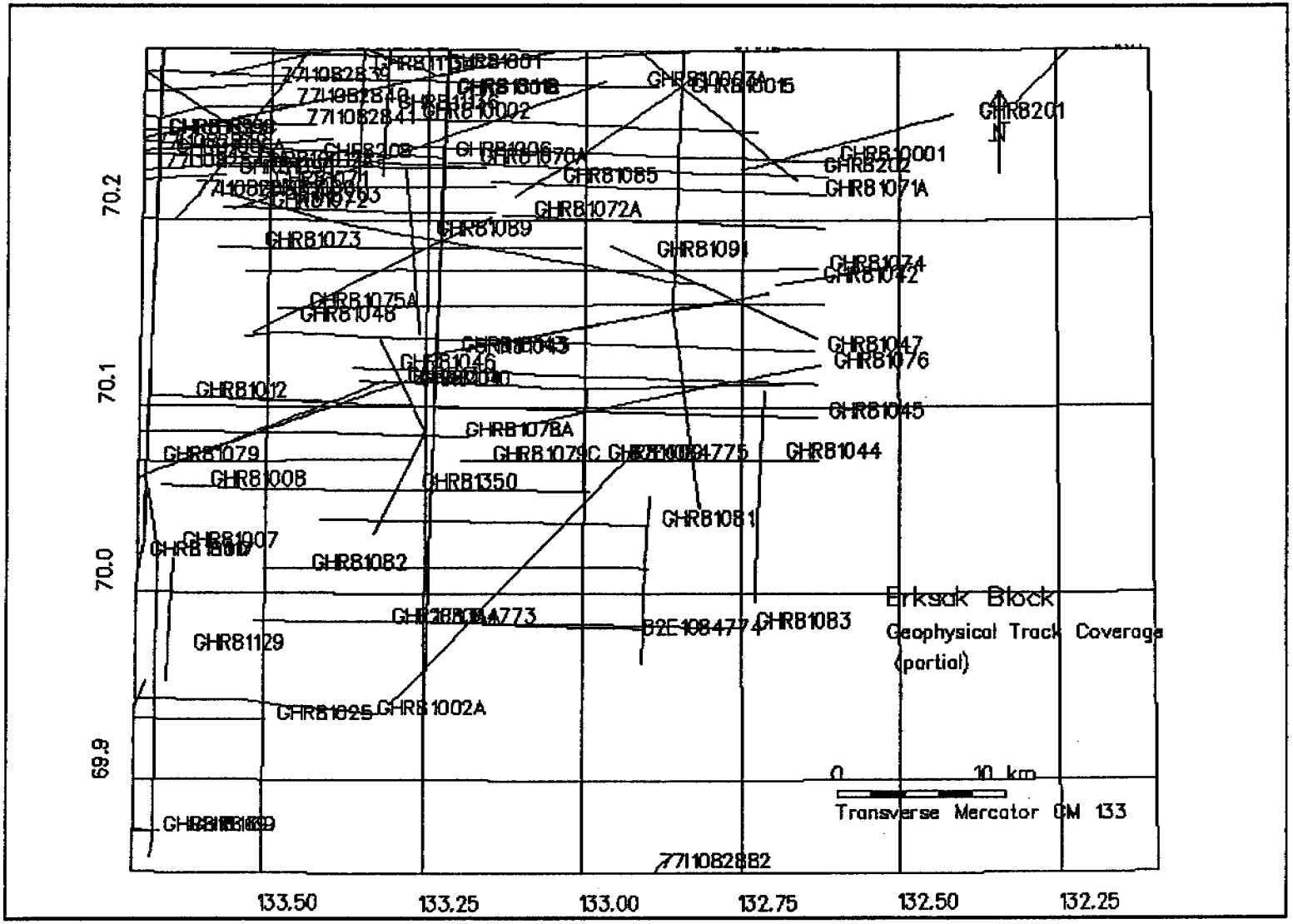
Map 10: **Regional geophysical track data for the South-Central Beaufort Sea collected by Dome, Esso and Gulf. Line labeling has been turned off due to the density of data in this region.**



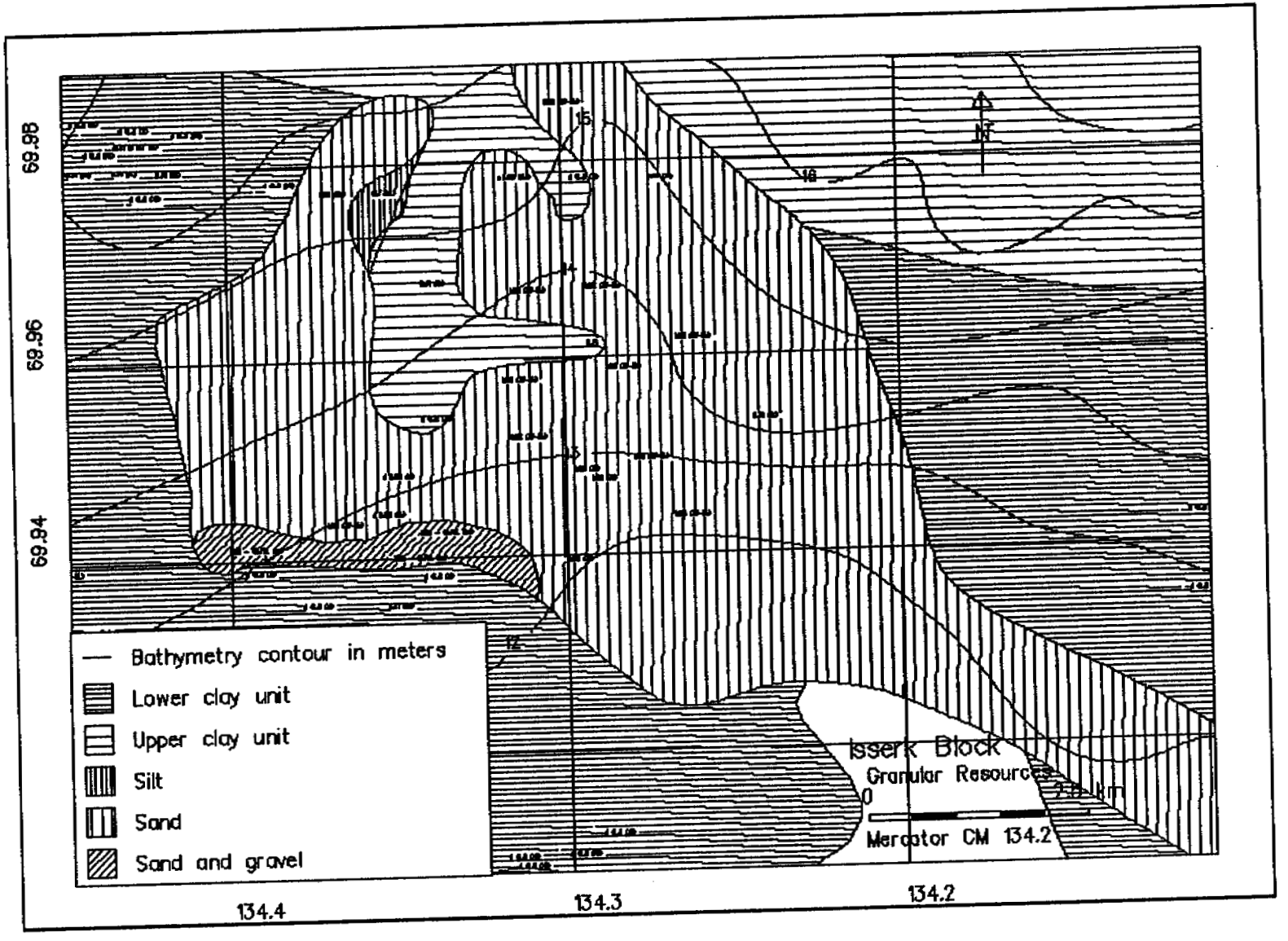
Map 11: **The Kogyuk Site Survey is one of several detailed geophysical and geotechnical site survey programs accessible within the existing data base.**



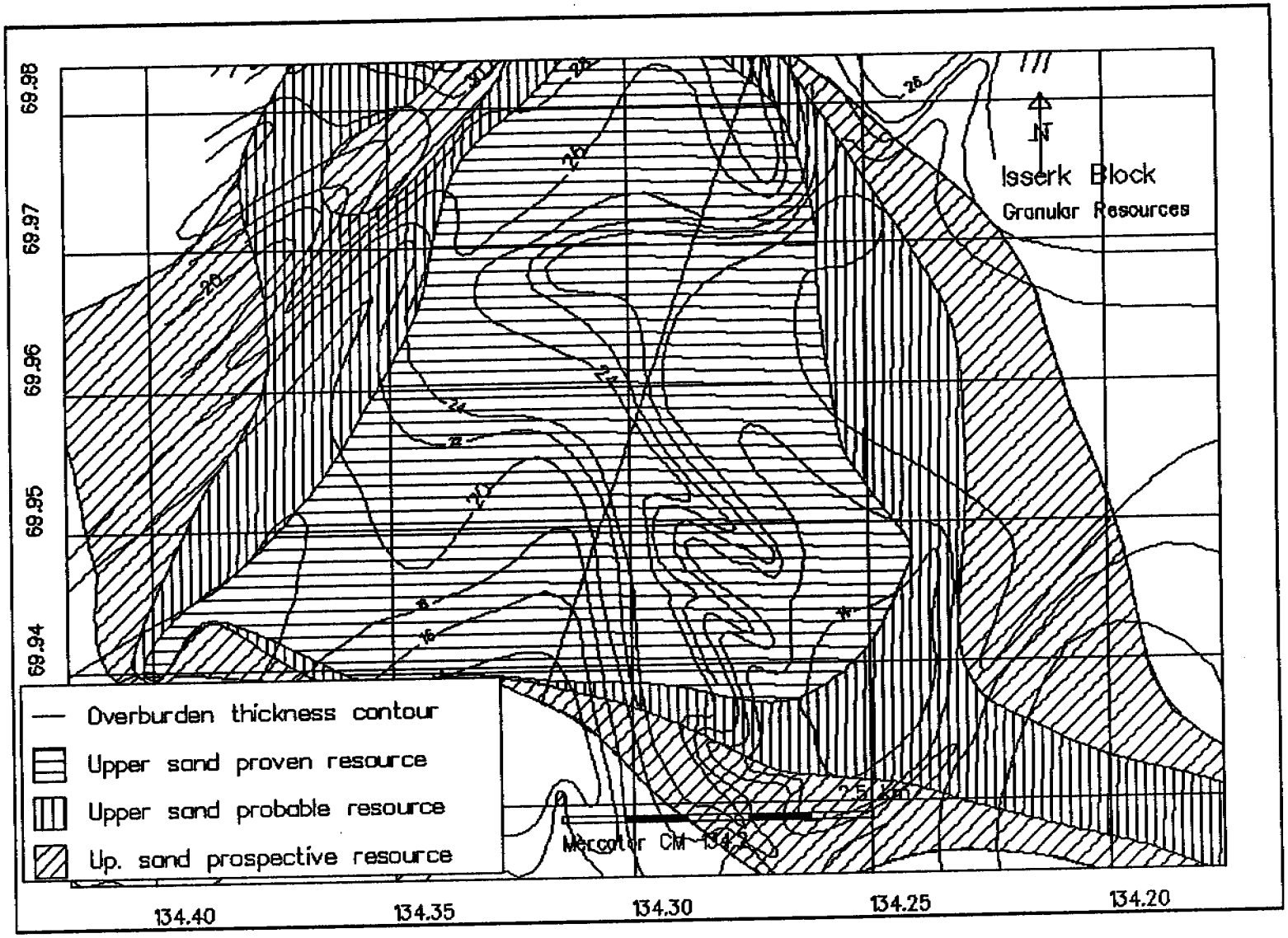
Map 12: **The Isserk Block showing geophysical track collected by Dome Petroleum overlayed on bathymetry data.**



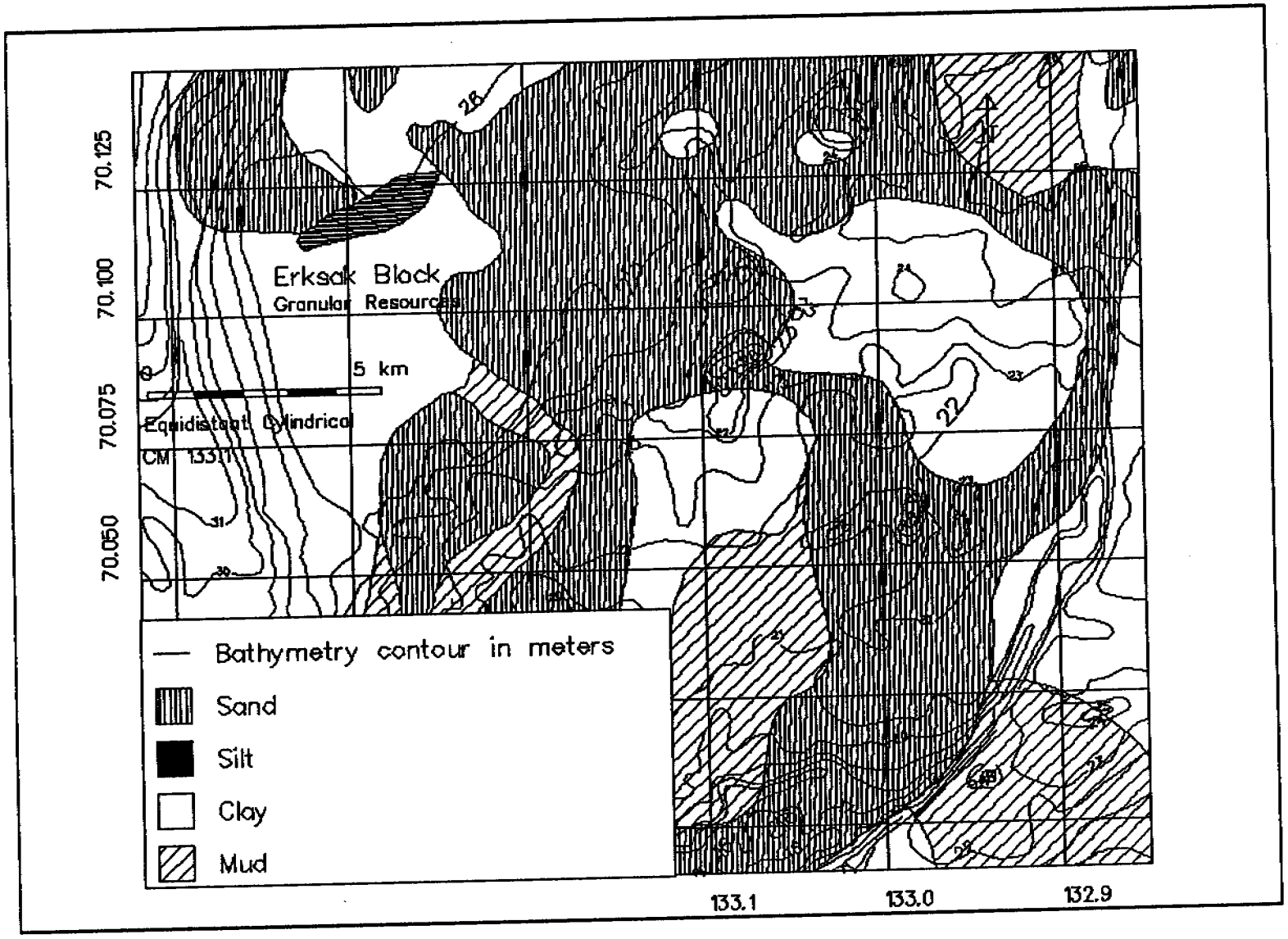
Map 13: **The Erksak Block showing a portion of the geophysical track data available in this region.**



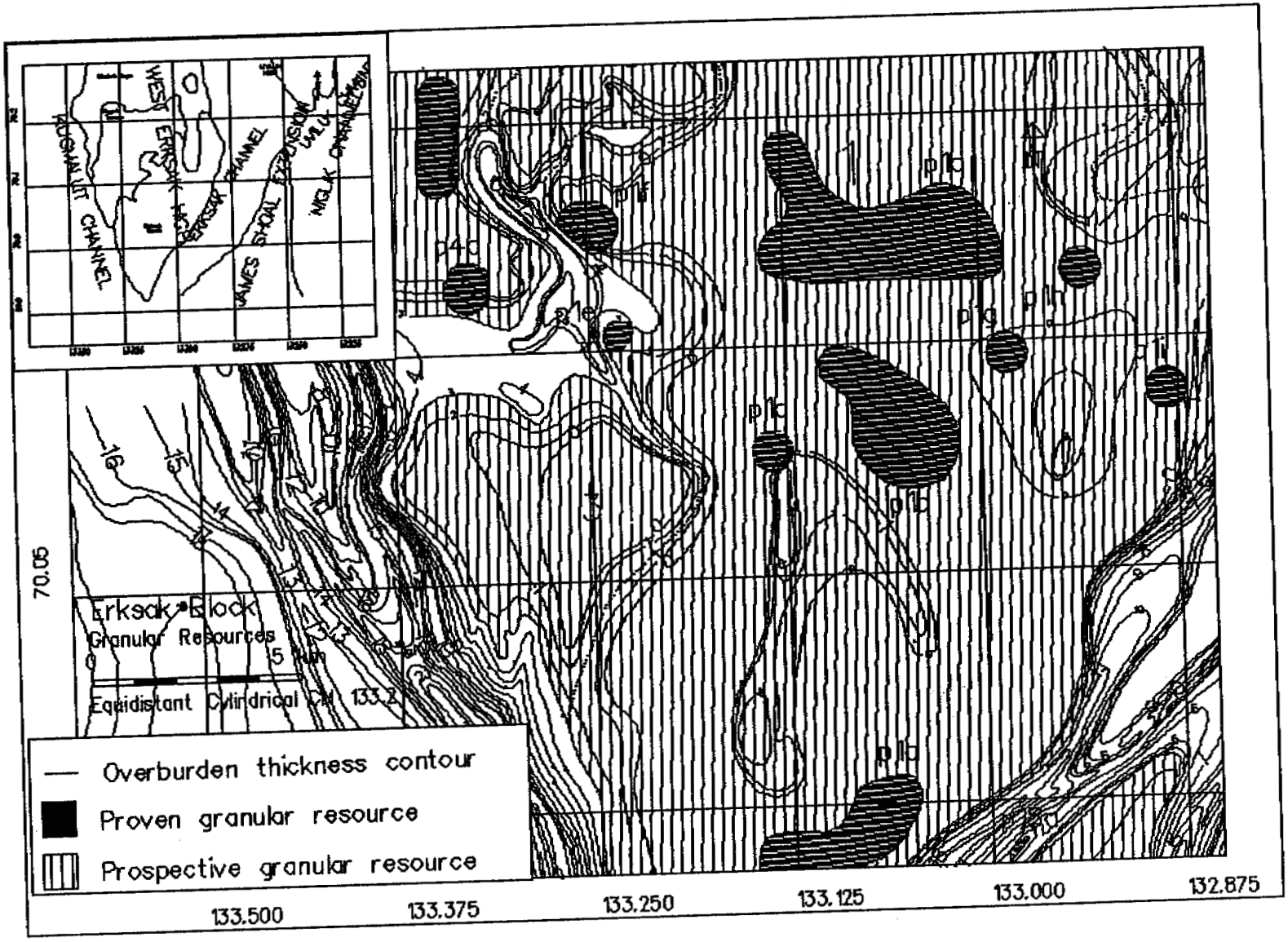
Map 14: **The Isserk Block surficial sediment types overlain on bathymetry data.**



Map 15: **The Isserk Block resource potential displayed with depth to deposit surface from mean sea level.**



Map 16: **The Erksak Block surficial sediment with material type overlain on bathymetry data.**



Map 17: **The Erksak Block resource potential displayed with overburden thickness.**