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Remote Sensing Data Summary Mackenzie and Dempster Highways

Ecological Impact Appraisal and Control Division
Report EPS 3-EP-75-2

Federal Activities Environmental Branch
Environmental Conservation Directorate
Ottawa, January 1975

REMOTE
SENSING #B

**REMOTE SENSING DATA SUMMARY
MACKENZIE AND DEMPSTER HIGHWAYS**

compiled by
W. J. Aird

Ecological Impact Appraisal and Control Division
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ABSTRACT

The report documents the remote sensing data stored in the National Air Photo Library which has been obtained on the Mackenzie and Dempster highways from 1944 to 1974 and provides guidance on how this data may be retrieved. A set of maps is included to identify 2 and 10 mile wide highway corridors. The relationship between ground resolution and photographic scale is discussed in order to assist users in deciding if the photography available is of sufficient detail for their purposes. A worked example of the data retrieval procedure is given. Periodic report updating is anticipated so as to include data collected after 1974 and that held in depositories other than NAPL.

RÉSUMÉ

Le présent rapport décrit les données obtenues par télédétection sur les routes Mackenzie et Dempster, de 1944 à 1974, et emmagasinées à la Phototèque nationale de l'air. Il fournit aussi des indications sur la façon d'extraire ces données. Le rapport contient de plus une série de cartes permettant d'identifier des corridors routiers de deux et dix milles de largeur. On y discute de la relation entre la résolution au sol et l'échelle photographique afin d'aider les utilisateurs à décider si les photographies disponibles sont suffisamment détaillées pour eux. Un exemple complet de la méthode d'extraction des données y est exposé. On prévoit une mise à jour périodique d'un rapport permettant d'inclure les données recueillies après 1974 et celles qui sont emmagasinées à d'autres endroits.

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1.0 Purpose

This report has been prepared to assist in the retrieval of remotely sensed data for the examination of environmental effects of the Mackenzie and Dempster Highways. The data (from 1944 to 1974) is currently available from the National Air Photo Library (NAPL), Ottawa, and covers the highways as follows:

Mackenzie Highway	: Miles 297 to 970
Dempster Highway	: Miles 191 to 417

While this report includes only data held by NAPL, photography held in depositories other than those of the federal government could be included later. It is anticipated that the report will undergo periodic updating and that new sections will be published as additional information on remotely sensed data is obtained. For this purpose, a three-holed punched format has been chosen to facilitate the addition and removal of pages.

2.0 Report Organization

While aerial photography exists for the entire length of both highways, it was obtained by means of separate tasks over a span of several years. The requirements for these tasks varied, and as a result the imagery was taken at varying altitudes utilizing different film types. The data listed, being highly diverse with regard to film, scale of imagery, and data obtained, has been tabulated to facilitate the process of data retrieval.

Table 1 provides a summary of the major continuous image coverages available. It provides information for those tasks which produced similar imagery with regard to scale and film employed. Table 1 is a summary of Table 2; the latter provides detailed information on the imagery, while the former has been included for quick reference purposes only.

Table 2 documents all imagery currently available from NAPL. The data is presented in chronological order for contiguous sections of the two highways. For the purpose of this report, sections of the highways were chosen using stream crossings as end landmarks wherever possible. The choice of end points depended on:

1. The uniqueness of a section or the frequency of coverage.
2. The similarity of data or the absence of prominent landmarks.

Highway sections falling into the first category were generally short, while those in the second were much longer.

Appendix I provides a set of index maps showing the approximate location of the highways. For the purposes of this report two corridors were also identified:

1. Two miles wide – one mile on either side of the road right-of-way.
2. Ten miles wide – five miles on either side of the road right-of-way.

These maps are provided to assist researchers to determine whether an area of interest falls within the defined corridors.

Table 2 and Appendix I constitute the main working portions of this report.

3.0 Method of Use

Table 1 contains three columns of information: CODE, CORRIDOR, and HIGHWAY MILEAGES. For an explanation of CODE and CORRIDOR see the explanation of Table 2 below. The HIGHWAY MILEAGES column lists those portions of the highways for which the imagery exists.

Table 2 lists all the data available for the Mackenzie Highway (Miles 297 to 970) and the Dempster Highway (Miles 191 to 417) for the years 1944 to 1974 inclusive. Because the intent of this report is to summarize, details on roll or frame numbers are not provided; however some guidance on the procedure to be used in ordering imagery from NAPL is provided in Appendix II.

Table 2 has been divided into seven columns as follows:

SECTION - This column provides two pieces of information on the two end points of the highway section being considered:

- (i) the two end point mileages,
- (ii) the geographical names of the two end points.

MAP - This entry identifies the index maps which show (Appendix I) the highway section involved.

NTS - This column gives the National Topographic Series (NTS) 1:250,000 map numbers on which NAPL has indexed the data for the highway section being considered.

CODE - This column provides details on the available data, giving the type of film, acquisition date, and image scale. For example, the CODE for the first entry in Table 2 is:

B/W - 47 - 40,000

Scale of the photography, i.e. 1:40,000. For a discussion of ground resolution, i.e. the relationship of photographic scale to the smallest size of identifiable objects on the ground, refer to the section on ground resolution.

Year the data was acquired. In cases where tasks were flown over a number of years, two dates are given, e.g. the first entry in Table 1 B/W-47/52-40,000.

Type of film used:

- B/W - black and white
- BIR - black and white infrared
- COL - aerocolour
- CIR - false colour infrared
- RS - multisensor coverage by the Canada Center for Remote Sensing (CCRS). The films and sensors employed are listed in the comments column. For example RS-72-39 (M725-762 section.) The 72 refers to the year and the 39 is the CCRS Task Number for that year.

CORRIDOR In the two sub-columns provided, an 'X' indicates if the specific piece of data is available for the 2 mile and/or the 10 mile corridor.

COMMENTS This column is used to provide any additional information required. It might include:

1. Gaps in the coverage.
2. Duplicate coverage at the same scale in the same year.
3. Mileages where only a portion of the identified section was covered.

4.0 Ground Resolution

The relationship between the scale of a photograph and the size of the smallest object on the ground which can be observed and identified on the photograph is a complex one. It should be noted that unless an object is imaged on the film no amount of enlarging or image enhancing will make it visible. This scale/size relationship is referred to as ground resolution and can be affected by such factors as: film type, film processing, camera filter, camera lens, lens aperture, type of shutter, shutter speed, aircraft speed, lighting conditions, atmospheric conditions (visibility) and the amount of contrast between the object and its surroundings.

Laboratory tests of film resolution usually involve a test pattern of parallel black and white lines of varying size but this does not replicate real world conditions. The results of such a test are quoted as lines per mm which is a measure of the number of long parallel alternating black and white line pairs which can be identified and counted in a space 1 mm wide. For example, a resolution of 100 lines/mm means that 100 alternate pairs black and white lines of the same width per can be identified and counted in the space of 1 mm.

An alternate method employed by the military involves a series of doughnuts of varying size with a center of very similar grey tone to the outside ring. The test pattern is photographed from the air thus providing a test of the complete system (film, filter, lens, and camera) under operating conditions. The doughnut shape with small variation in grey tone better approximates real world conditions than a series of parallel black and white lines which are never encountered in aerial photographs. Using this method it has been determined that 25 lines/mm is the maximum resolution obtainable under operating conditions if there is minimum contrast between the object and its surroundings.

Using this resolution of 25 lines/MM, a value for ground resolution 'G' can be calculated. The value of G indicates the minimum size of an object on the ground which will be recorded and identified on the film. It is calculated as:

$$G = \frac{304.8 R}{S}$$

where G = ground resolution
S = scale number which is the second half of the standard method of denoting scale as a representative fraction; for example with scale of 1:10,000 the scale number is 10,000
R = object resolution

If for example S = 1000 and R = 25 lines/mm, then

$$G = \frac{1000 \times 25}{304.8} = 0.131 \text{ ft/line}$$

This means that objects 0.131 feet in diameter or larger will be imaged on the film, but are not necessarily identifiable. Figure 1 provides a graph of the relationship between photographic scale and ground resolution if the object resolution is assumed to be 25 lines/mm.

As a general rule, in order to identify and give any details about an object, the shortest dimension of the smallest component of the object must be resolved on the film. Consider for example, the gully represented in Figure 2, if the ground resolution of the photograph is 3.5 feet, the gully could be detected on the photograph but not recognized. At a ground resolution of 1.5 feet it could be recognized but no fine detail made out, whereas at a ground resolution of 0.4 feet all the features of the gully could be identified and described.

5.0 Ordering NAPL Index Maps

The NAPL index maps were the source of the data presented in this report. They were too numerous to be included; however, in order to obtain the imagery covering a specific area of interest, the detailed information contained on the index maps is required. Imagery is annotated with a roll number indicating the flight line and a frame number indicating the specific photograph on that flight line. NOTE: THE GENERAL INFORMATION CONTAINED IN THIS REPORT IS NOT SUFFICIENT TO ORDER IMAGERY DIRECTLY. The NAPL index maps must be viewed first to determine the roll and frame numbers of the imagery required.

Figure 1: Graph of Scale Number vs Ground Resolution

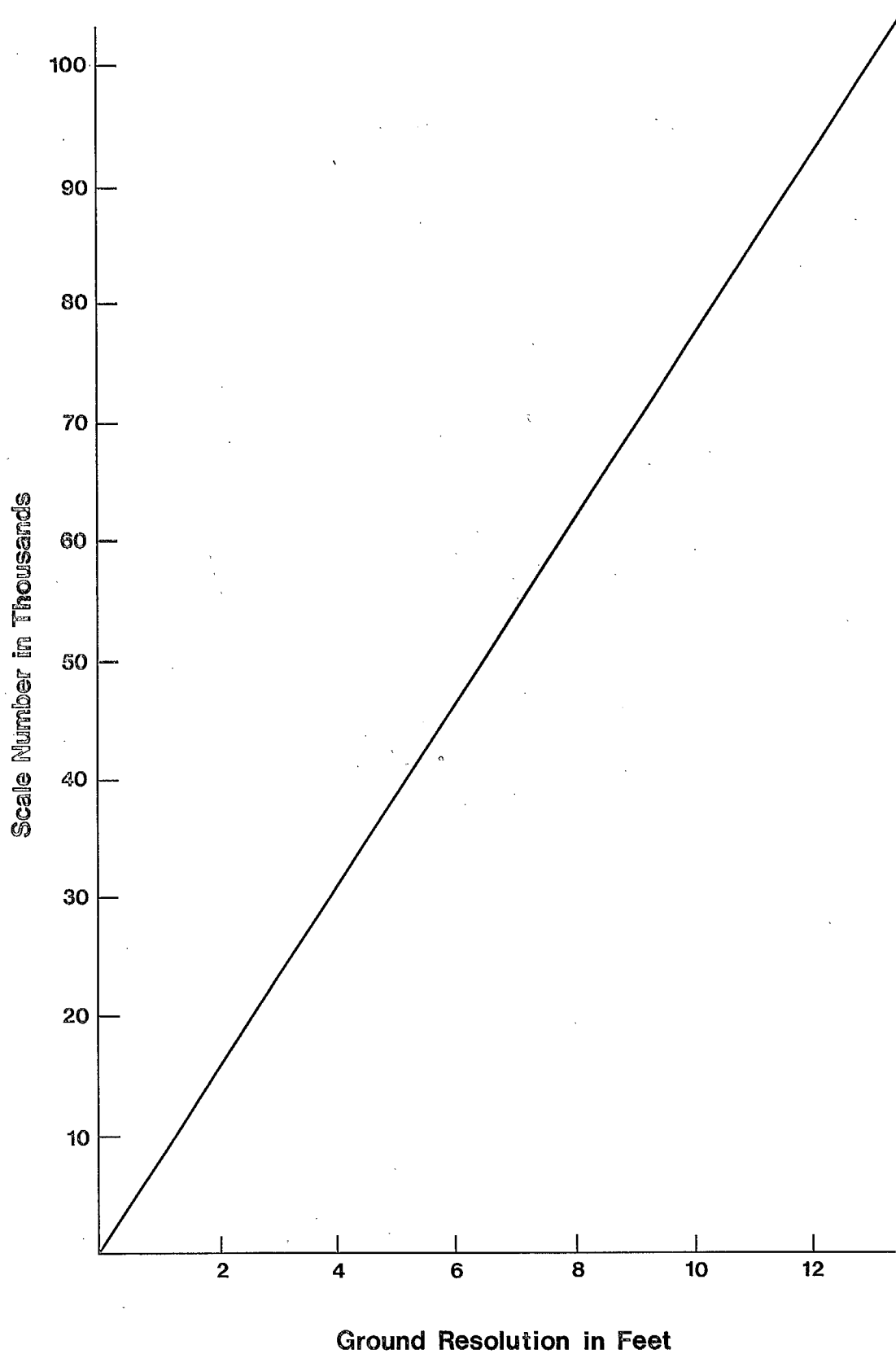
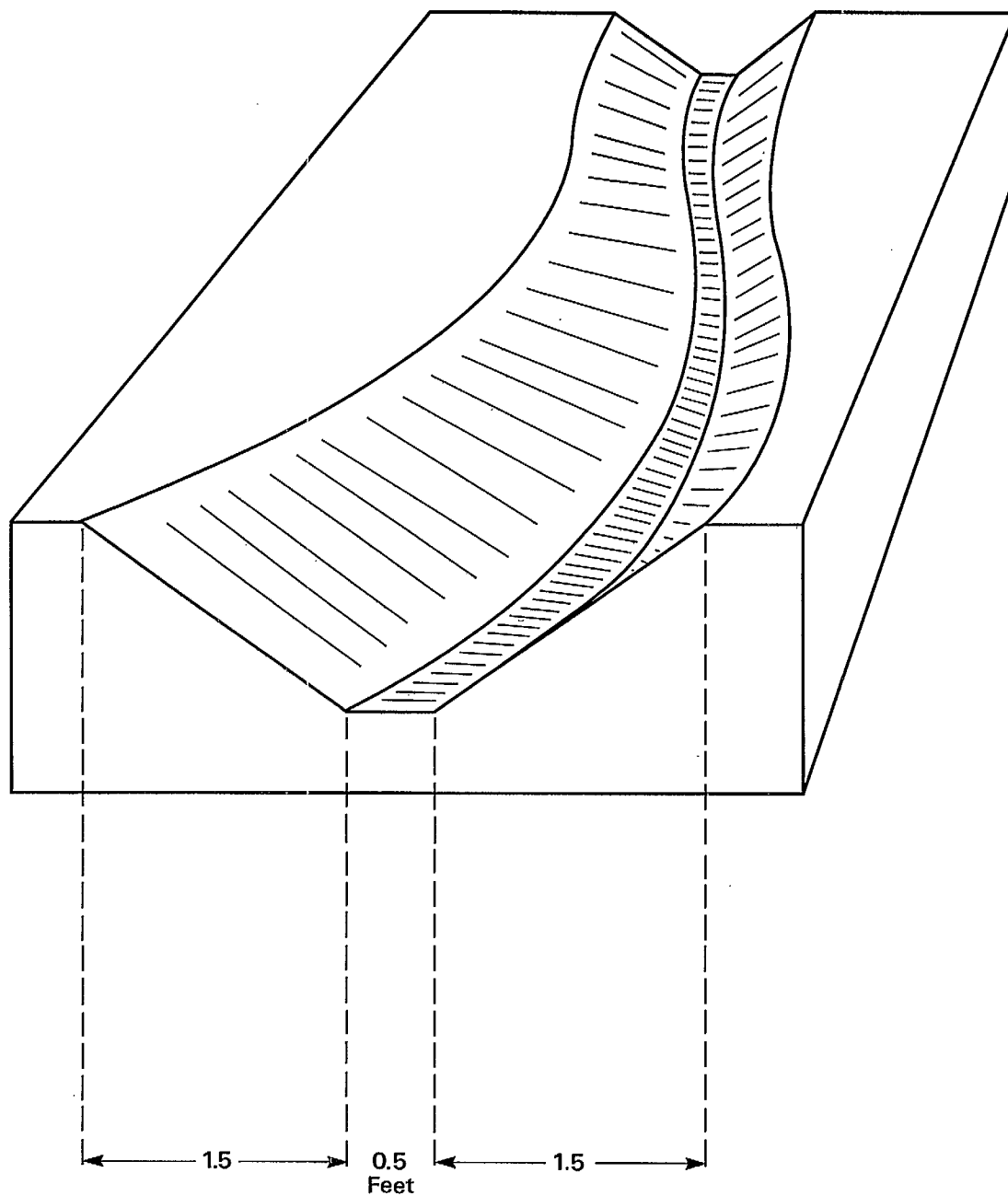


Figure 2: Illustration for Ground Resolution Discussion



The NAPL index maps may be purchased or alternatively viewed at:

National Air Photo Library
615 Booth Street
Ottawa, Ontario K1A 0E9
(Telephone 618-994-5779)

The current (January 1975) price of index maps is \$1.50 per sheet.

Several index maps have been compiled for each NTS 1:250,000 sheet. NAPL has a complete record and copies on file of all imagery collected by CCRS, processed and annotated by the NAPL Reproduction Center, or arranged through the Interdepartmental Committee on Air Surveys. To obtain the specific index sheet, which lists the roll and frame numbers of the required imagery, the following details must be provided to NAPL:

1. The NTS 1:250,000 sheet numbers for the area of interest. (Alternatively an area could be defined by co-ordinates of longitude and latitude).
2. The type of imagery required (black and white, black and white infrared, aero-colour, or false colour infrared).
3. The year the task was flown to obtain the imagery.
4. The scale of the imagery in case the same type of imagery is available at different scales.

For an example of how to obtain an index map and subsequently to order imagery see Appendix II.

6.0 TABLE 1

**Summary of Remotely Sensed Data
for the
Mackenzie Highway (Miles 297 - 970)
and the
Dempster Highway (Miles 191 - 417)**

CODE

CORRIDOR

HIGHWAY MILEAGES

2 10

MILES

MACKENZIE HIGHWAY

B/W - 47/52 - 40000	x	x	M297 - 964
B/W - 72 - 13000	x	x	M297 - 964
B/W - 72 - 37000	x	x	M297 - 454.5, 483.5 - 597, 630 - 671, 700 - 725, 762 - 894
B/W - 72 - 60000	x	x	M297 - 343.5, 454.5 - 554
B/W - 73 - 12000	x		M297 - 899, 931 - 964
B/W - 73 - 60000	x	x	M297 - 554
BIR - 73 - 12000	x		M297 - 899, 931 - 964
COL - 73 - 20000	x		M306.5 - 886
B/W - 74 - 12000	x		M491.5 - 494, 503 - 511, 521 - 544, 622 - 634, 651 - 671, 685 - 695, 713 - 964.

DEMPSTER HIGHWAY

B/W - 49 - 31600	x	x	M191 - 300
B/W - 50/52 - 40000	x	x	M290 - 417
B/W - 51 - 70000	x	x	M191 - 286
B/W - 72 - 60000	x	x	M281 - 300
B/W - 72 - 70000	x	x	M191 - 283
B/W - 74 - 12000	x		M335.5 - 417

7.0 TABLE 2

**Details of Remotely Sensed Data
for the
Mackenzie Highway (Miles 297 - 970)
and the
Dempster Highway (Miles 191 - 417)**

SECTION	MAP	NTS	CODE	CORRIDOR	COMMENTS
				2 10 MILES	
MACKENZIE HIGHWAY					
M297 - 306.5 (Ft. Simpson to Martin R.)	1	96H	B/W - 47 - 40000	x x	
			B/W - 63 - 13200	x	
			BIR - 69 - 13000	x	
			B/W - 70 - 6000	x x	
			B/W - 71 - 60000	x x	
			B/W - 72 - 8400	x	
			B/W - 72 - 13400	x	
			B/W - 72 - 37000	x x	
			B/W - 72 - 60000	x x	
			B/W - 73 - 12000	x	
			B/W - 73 - 60000	x x	
			BIR - 73 - 12000	x	
			CIR - 73 - 21400	x	gap from M299 - 304
M306.5 - 343.5 (Martin R. to Mackenzie R. Crossing)	1&2	96G H, I & J	B/W - 47 - 40000	x x	
			B/W - 49 - 4000	x x	M326 - 343.5 only
			B/W - 63 - 60000	x x	M326 - 343.5 only
			B/W - 70 - 6000	x x	M306.5 - 316 only
			B/W - 71 - 60000	x x	M306.5 - 316 only
			B/W - 72 - 13400	x	
			B/W - 72 - 37000	x x	
			B/W - 72 - 57000	x x	M326 - 343.5 only
			B/W - 72 - 60000	x x	
			B/W - 73 - 12000	x	
			B/W - 73 - 60000	x x	
			BIR - 73 - 12000	x x	
			COL - 73 - 20400	x	
			CIR - 73 - 11000	x	
			CIR - 73 - 21400	x	

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M347 - 394.5	2&3	95J	B/W - 47/48 - 40000	x	x	
(Mackenzie R to			B/W - 61 - 60000	x	x	M362 - 394 only
Willowlake R)			B/W - 63 - 60000	x	x	
			B/W - 64 - 60000	x	x	M347 - 362 only
			B/W - 72 - 13200	x		
			B/W - 72 - 37000	x	x	
			B/W - 72 - 57000	x	x	M370 - 394.5 only
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20000	x		2 passes over Willowlake R. May & August
			CIR - 73 - 20000	x		
M394.5 - 411.5	3&4	95J	B/W - 47/48 - 40000	x	x	
(Willowlake R.			B/W - 61 - 40600	x		
to River between			B/W - 61 - 60000	x	x	
Two Mountains)			B/W - 72 - 13200	x	x	
			B/W - 72 - 37000	x	x	
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20000	x		
			CIR - 73 - 11000	x		M408 - 411.5 only
			CIR - 73 - 20000	x		

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M411.5 - 436.5 (River between Two Mountains to Hodgson Crk)	4&5	95J & O	B/W - 45 - 28000	x	x	
			B/W - 47/50 - 40000	x	x	
			B/W - 50 - 4000	x		
			B/W - 50 - 16000	x	x	
			B/W - 61 - 10600			M430 - 436.5 only
			B/W - 61 - 40600	x	x	M415 - 436.5 only
			B/W - 69 - 12800	x		M430 - 436.5 only
			B/W - 71 - 52000	x	x	
			B/W - 72 - 13000	x	x	
			B/W - 72 - 37000	x	x	
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20000	x		
			CIR - 73 - 11000	x		M411.5 - 413,
						M430 - 438 only
			CIR - 73 - 20400	x		
M436.5 - 454.5 (Hodgson Crk to Ochre R.)	5	950	B/W - 45 - 28000	x	x	
			B/W - 50 - 4000	x		
			B/W - 50 - 40000	x	x	
			B/W - 61 - 40600	x	x	
			B/W - 71 - 52000	x	x	
			B/W - 72 - 13000	x	x	
			B/W - 72 - 18400	x		
			B/W - 72 - 37000	x	x	
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20000	x		
			CIR - 73 - 20400	x		

SECTION	MAP	NTS	CODE	CORRIDOR	COMMENTS
				2 10	
				MILES	
M454.5 - 491.5	5&6	95N,	B/W - 45 - 28000	x x	
(Ochre R. to		& O	B/W - 48/50 - 40000	x x	
Blackwater R.)			B/W - 50 - 4000	x	
			B/W - 61 - 40600	x x	
			B/W - 61 - 60000	x	M483.5 - 491.5 only
			B/W - 71 - 52000	x x	
			B/W - 72 - 13000	x	
			B/W - 72 - 18400	x	
			B/W - 72 - 37000	x x	M483.5 - 491.5 only
			B/W - 72 - 60000	x	
			B/W - 73 - 12000	x x	
			B/W - 73 - 60000	x x	
			BIR - 73 - 12000	x	
			COL - 73 - 20400	x	
			CIR - 73 - 20000	x	
			B/W - 74 - 12000	x	M488 - 491.5 only
M491.5 - 521	6&7	95N	B/W - 44/45 - 28000	x x	
(Blackwater R.		&	B/W - 48/49 - 40000	x x	
to Saline Crk)		96C	B/W - 71 - 52000	x x	
			B/W - 72 - 13000	x x	
			B/W - 72 - 37000	x x	
			B/W - 72 - 52000	x x	
			B/W - 73 - 12000	x	
			B/W - 73 - 60000	x x	
			BIR - 73 - 12000	x	
			COL - 73 - 20400	x	
			CIR - 73 - 20000	x	
			B/W - 74 - 12000	x	M491.5 - 494, M503 - 511 only

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M521 - 544 (Saline Crk to Big Smith Crk)	7&8	96C	B/W - 44/45 - 28000	x	x	M534 - 544 only
			B/W - 49 - 40000	x	x	
			B/W - 70 - 70000	x	x	
			B/W - 71 - 52000	x	x	
			B/W - 72 - 13000	x	x	
			B/W - 72 - 37600	x	x	
			B/W - 72 - 52000	x	x	
			B/W - 72 - 60000	x	x	
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20400	x		
			CIR - 73 - 20000	x		
			B/W - 74 - 12000	x		
M544 - 581.5 (Big Smith Crk to Great Bear R)	8	96C	B/W - 44/45 - 48000	x	x	only at mouth of Great Bear River M571 - M581.5 only
			B/W - 49 - 40000	x	x	
			B/W - 61 - 10600	x		
			B/W - 69 - 12600	x		M544 - 562 only M544 - 554 only
			B/W - 70 - 70000	x	x	
			B/W - 71 - 52000	x	x	
			B/W - 72 - 13000	x	x	M544 - 554 only
			B/W - 72 - 37600	x	x	
			B/W - 72 - 52000	x	x	
			B/W - 72 - 60000	x	x	M578 - 581.5 only 2 passes at mouth of Big Smith Creek May & August
			B/W - 73 - 12000	x		
			B/W - 73 - 60000	x	x	
			BIR - 73 - 12000	x		
			COL - 73 - 20400	x		
			CIR - 73 - 11000	x		
			CIR - 73 - 20100	x		

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M581.5 - 630	8,9	96C	B/W - 44/45 - 48000	x	x	
(Great Bear R.	&10	D,E	B/W - 49/50 - 40000	x	x	M620.5 - 630 repeated
to Norman Wells)	& F		B/W - 61 - 10400	x		M628 - 630 only
			BIR - 69 - 12600	x		M628 - 630 only
			B/W - 70 - 70000	x	x	M581.5 - 597 only
			B/W - 71 - 52000	x	x	
			B/W - 72 - 13000	x	x	
			B/W - 72 - 20600	x		M620.5 - 630 only
			B/W - 72 - 38000	x	x	M581.5 - 597 only
			B/W - 73 - 12000	x		
			BIR - 73 - 12000	x		M612.5 - 630 repeated
			COL - 73 - 20800	x		
			CIR - 73 - 11000	x		M581.5 - 584 only
			CIR - 73 - 20000	x		M581.5 - 591 repeated
			B/W - 74 - 12000	x		M622 - 630 only
M630 - 651	10	96E	B/W - 50 - 40000	x	x	M630 - 636 repeated
(Norman Wells			B/W - 69 - 12600	x		M630 - 633 only
to Oscar Crk)			B/W - 71 - 52000	x	x	
			B/W - 72 - 12700	x		
			B/W - 72 - 20600	x		M630 - 636 only
			B/W - 72 - 37000	x	x	
			B/W - 73 - 12000	x		
			BIR - 73 - 13200	x		M630 - 633 repeated
			CIR - 73 - 20000	x		
			COL - 73 - 20800	x		
			B/W - 74 - 12000	x		M630 - 634 only
M651 - 671	10	96E	B/W - 50 - 40000	x	x	
(Oscar Crk	&		B/W - 71 - 52000	x	x	
to Hanna R.)	11		B/W - 72 - 12700	x	x	
			B/W - 72 - 37000	x	x	
			B/W - 73 - 12000	x		
			BIR - 73 - 12000	x		
			CIR - 73 - 20000	x		
			COL - 73 - 20800	x		
			B/W - 74 - 12000	x		

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M671 - 725	11	96E	B/W - 45 - 21000	x	x	M700 - 725 only
(Hanna R to	12	106	B/W - 45 - 40000	x	x	M671 - 700 only
Hare Indian R)	&	H&I	B/W - 45/46 - 28000	x	x	M682 - 700 only
	13		B/W - 50 - 40000	x	x	
			B/W - 53 - 70000	x	x	M682 - 700 only
			B/W - 71 - 52000	x	x	M671 - 682 only
			B/W - 71 - 70000	x	x	M682 - 725 only
			B/W - 72 - 12700	x	x	
			B/W - 72 - 37000	x	x	
			B/W - 73 - 13000	x		repeated at
						Hare Indian River
			BIR - 73 - 12000	x		M700 - 725 only
			COL - 73 - 20000	x		
			CIR - 73 - 20000	x		
			B/W - 74 - 12000	x		M685 - 695
						M713 - 725 only
M725 - 762	13	106I	B/W - 45 - 21000	x	x	
(Hare Indian R	&		B/W - 50 - 40000	x	x	
to Tieda R)	14		B/W - 69 - 12200	x		M725 - 729 only
			B/W - 71 - 70000	x	x	
			B/W - 72 - 12800	x	x	
			B/W - 73 - 13400	x	x	M725 - 733 repeated
			B/W - 73 - 37000	x	x	
			BIR - 73 - 12800	x	x	
			COL - 73 - 20400	x		
			RS - 72-39	x		FILMS - CIR - 127953
						CIR - 148000
						BIR - 148000
						B/W - 148000
						SCANNER
						RS14 (Thermal Scan)
			B/W - 74 - 12000	x		

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS	
				2	10		
				MILES			
M762 - 862	14,	106I	B/W - 45	- 21000	x	x	M762 - 768 only
(Tieda R to	15,	O&P	B/W - 47	- 40000	x	x	M793 - 805 only
Thunder R)	&16		B/W - 50	- 40000	x	x	
			B/W - 70/71	- 70000	x	x	
			B/W - 72	- 13000	x	x	
			B/W - 72/73	- 37000	x	x	
			RS - 72-39		x		(see M725 - 762 section)
			B/W - 73	- 13400	x	x	M837 - 862 repeated
			BIR - 73	- 14000	x	x	
			COL - 73	- 21000	x		
			CIR - 73	- 20100	x		
			B/W - 74	- 12000	x		
M862 - 886	16	106O	B/W - 50	- 40000	x	x	
(Thunder R. to			B/W - 71	- 70000	x	x	
Travaillant R.)			B/W - 72	- 13000	x	x	M856 - 862 repeated
			B/W - 72	- 14000	x	x	
			B/W - 72	- 37000	x	x	
			RS - 72-39		x		(see M725 - 762 section)
			COL - 73	- 21000	x		
			CIR - 73	- 20100	x		
			B/W - 74	- 12000	x		
M886 - 899	16	106N	B/W - 50	- 40000	x	x	
(Travaillant R.	&	& O	B/W - 71	- 70000	x	x	
to Wounded	17		B/W - 72	- 13000	x	x	
Bear Lake)			B/W - 72	- 37000	x	x	M886 - 894 only
			CIR - 73	- 20100	x		M886 - 894 only
			B/W - 74	- 12000	x		
M899 - 931	17	106N	B/W - 50	- 40000	x	x	
(Wounded Bear	&		B/W - 69	- 12400	x	x	
Lake to	18		B/W - 71	- 70000	x	x	
Dempster Hwy.			B/W - 72	- 13000	x		
Junction)			B/W - 74	- 12000	x		

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M931 - 964	18	106N	B/W - 50 - 40000	x	x	
(Dempster Hwy.	&	107B	B/W - 69 - 12400	x	x	
Junction to	19		B/W - 72 - 12600	x		M956 - 964 only
Inuvik Airport			B/W - 72 - 13200	x		M956 - 964 only
Road)			B/W - 72 - 37000	x	x	M956 - 964 only
			CIR - 73 - 15000	x		M931 - 956 only
			CIR - 73 - 20000	x		M956 - 964 only
			B/W - 74 - 12000	x		
M964 - 970	19	107B	B/W - 50/52 - 40000	x	x	
(road into			B/W - 55 - 16800	x		
Inuvik from			B/W - 64 - 12000	x		
Airport)			B/W - 68 - 6000	x		
			B/W - 68 - 24000	x		
			B/W - 69 - 12400	x		
			B/W - 70 - 48000	x	x	
			B/W - 71 - 12800	x		
			B/W - 72 - 12600	x		
			B/W - 72 - 13200	x		
			B/W - 72 - 20000	x		M967 - 970 only
			B/W - 72 - 37000	x	x	
			CIR - 72 - 20000	x		

DEMPSTER HIGHWAY

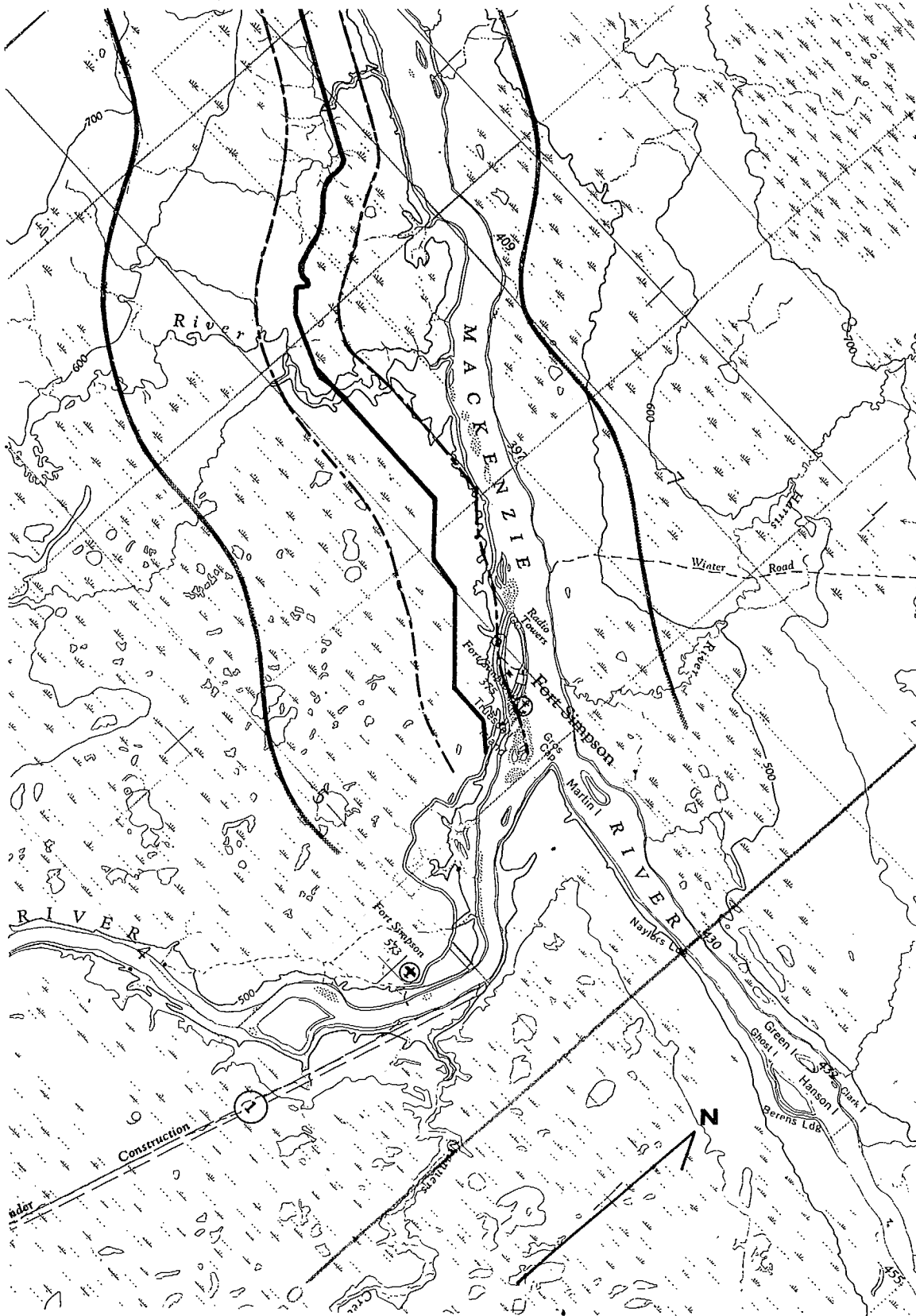
M417 - 399.3	18	106N	B/W - 50 - 40000	x	x	
(Mackenzie Valley			B/W - 71 - 12600	x	x	
Highway Jctn			B/W - 74 - 12000	x		
to Rengleng R.)						
M399.3 - 378	18	106N	B/W - 50 - 40000	x	x	
(Rengleng R. to	&		B/W - 74 - 12000	x		
Arctic Red R.)	20					

SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M378 - 343 (Arctic Red R. to Ft MacPherson)	20	106M & N	B/W - 50/52 - 40000	x	x	
			B/W - 69 - 12400	x		
			B/W - 71 - 7400	x		M343 - 353 only
			B/W - 71 - 70000	x	x	M345 - 378 only
			B/W - 72 - 37000	x		M355 - 378 only
			B/W - 74 - 12000	x		
M343 - 289.8 (Ft MacPherson to Yukon Boundary)	20, 21 & 22	106M & 116P	B/W - 49 - 31600	x		M289.8 - 300 only
			B/W - 50/52 - 40000	x	x	
			B/W - 65 - 16000	x		M335.5 - 343 only
			B/W - 67 - 16000	x		M289.8 - 300 only
			B/W - 69 - 12400	x		M335.5 - 343 only
			B/W - 70 - 14000	x	x	M325 - 335.5 only
			B/W - 70 - 15000	x	x	M315 - 325 only
			B/W - 70 - 18000	x	x	
			B/W - 70 - 19000	x	x	M289.8 - 311 only
			B/W - 71 - 7300	x	x	M335.5 - 343 only
			B/W - 72 - 7400	x		M338 - 343 only
			B/W - 72 - 12200	x		M328 - 335.5 only
			B/W - 72 - 17000	x		M289.8 - 335.5 only
			B/W - 72 - 60000	x	x	M289.8 - 300 only
			B/W - 74 - 12000	x		M335.5 - 343 only
M289.8 - 270.5 (Yukon Boundary to Rock R.)	22	116I & P	B/W - 49 - 31600	x	x	
			B/W - 51 - 70000	x	x	M270.5 - 286 only
			B/W - 67 - 16000	x		M286 - 289.8 only
			B/W - 67/68 - 14000	x	x	M270.5 - 286 only
			B/W - 71 - 70000	x	x	M270.5 - 286 only
			B/W - 72 - 9500	x		M286 - 289.8 only
			B/W - 72 - 9300	x		M270.5 - 286 only
			B/W - 72 - 60000	x	x	M281 - 289.8 only
			B/W - 72 - 70000	x	x	M270.5 - 283 only
M270.5 - M236.8 (Rock R. to Eagle R.)	22 & 23	116I	B/W - 49 - 31600	x	x	
			B/W - 51 - 70000	x	x	
			B/W - 67/68 - 14000	x	x	
			B/W - 72 - 9300	x		
			B/W - 72 - 70000	x	x	

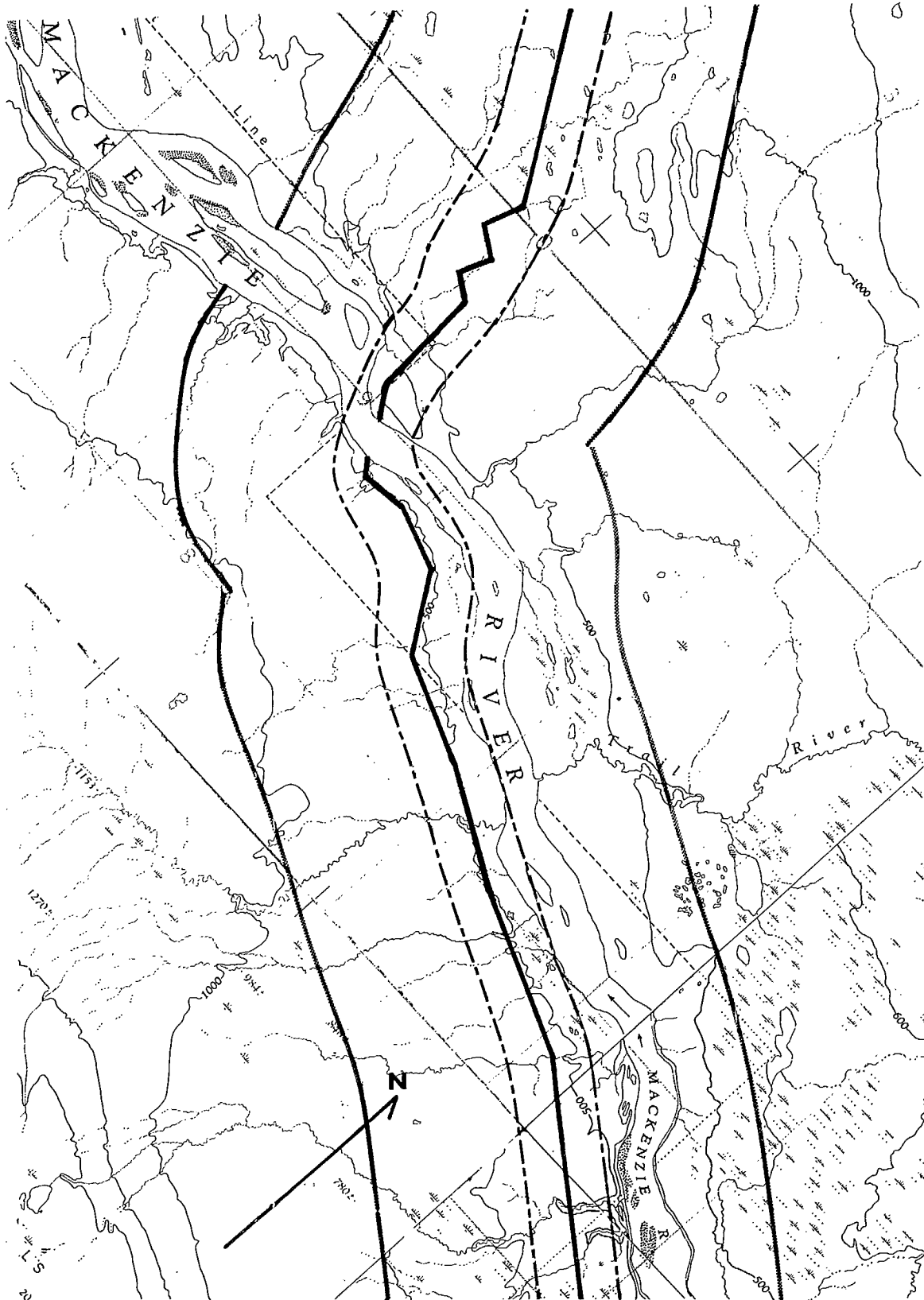
SECTION	MAP	NTS	CODE	CORRIDOR		COMMENTS
				2	10	
				MILES		
M236.8 - 191	23	116I	B/W - 49 - 31600	x	x	
(Eagle R. to	&		B/W - 51 - 70000	x	x	
S. edge of	24		B/W - 67/68 - 14000	x	x	
NTS Sheet 116I)			B/W - 72 - 70000	x	x	

APPENDIX I

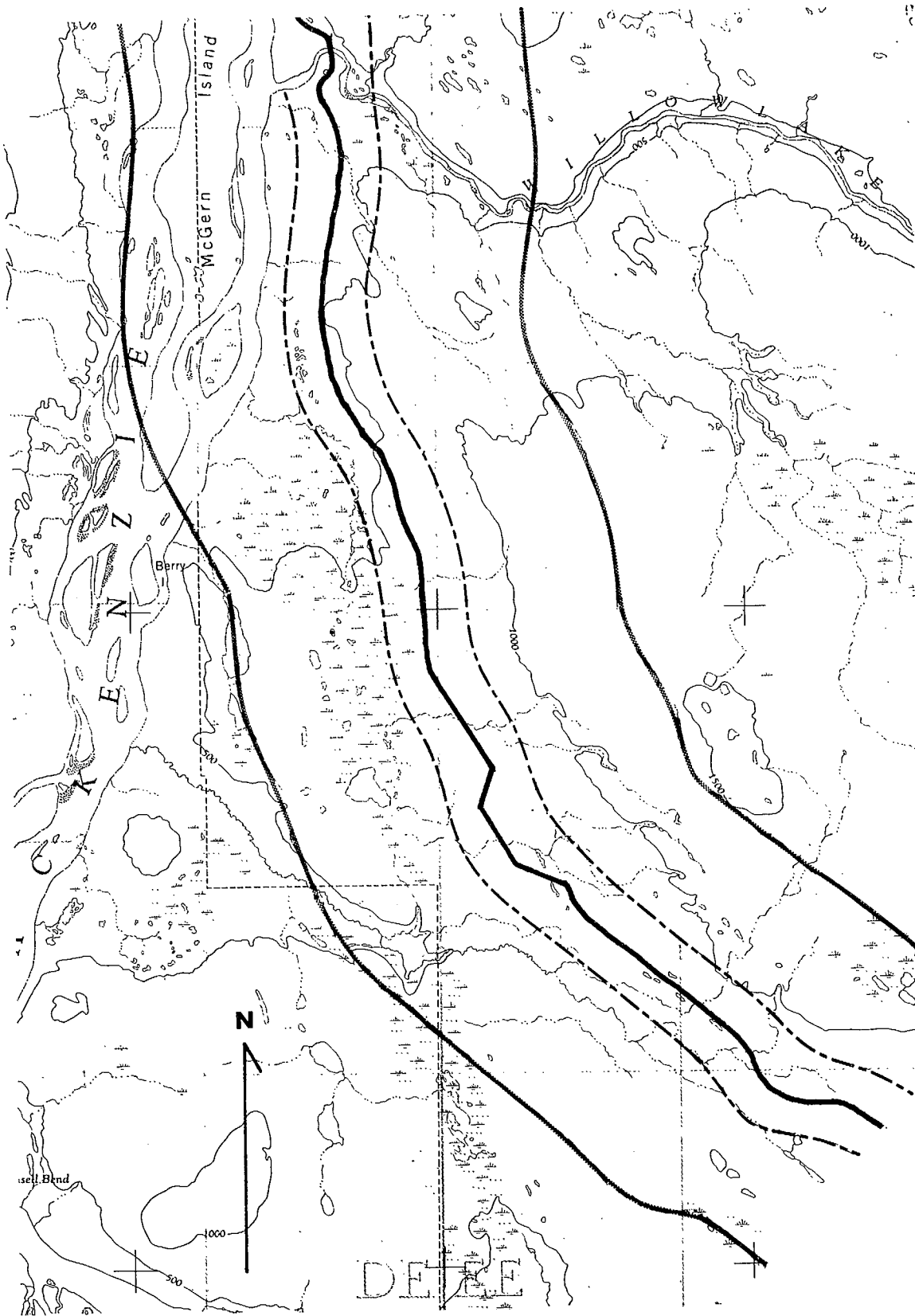
REPORT INDEX MAPS



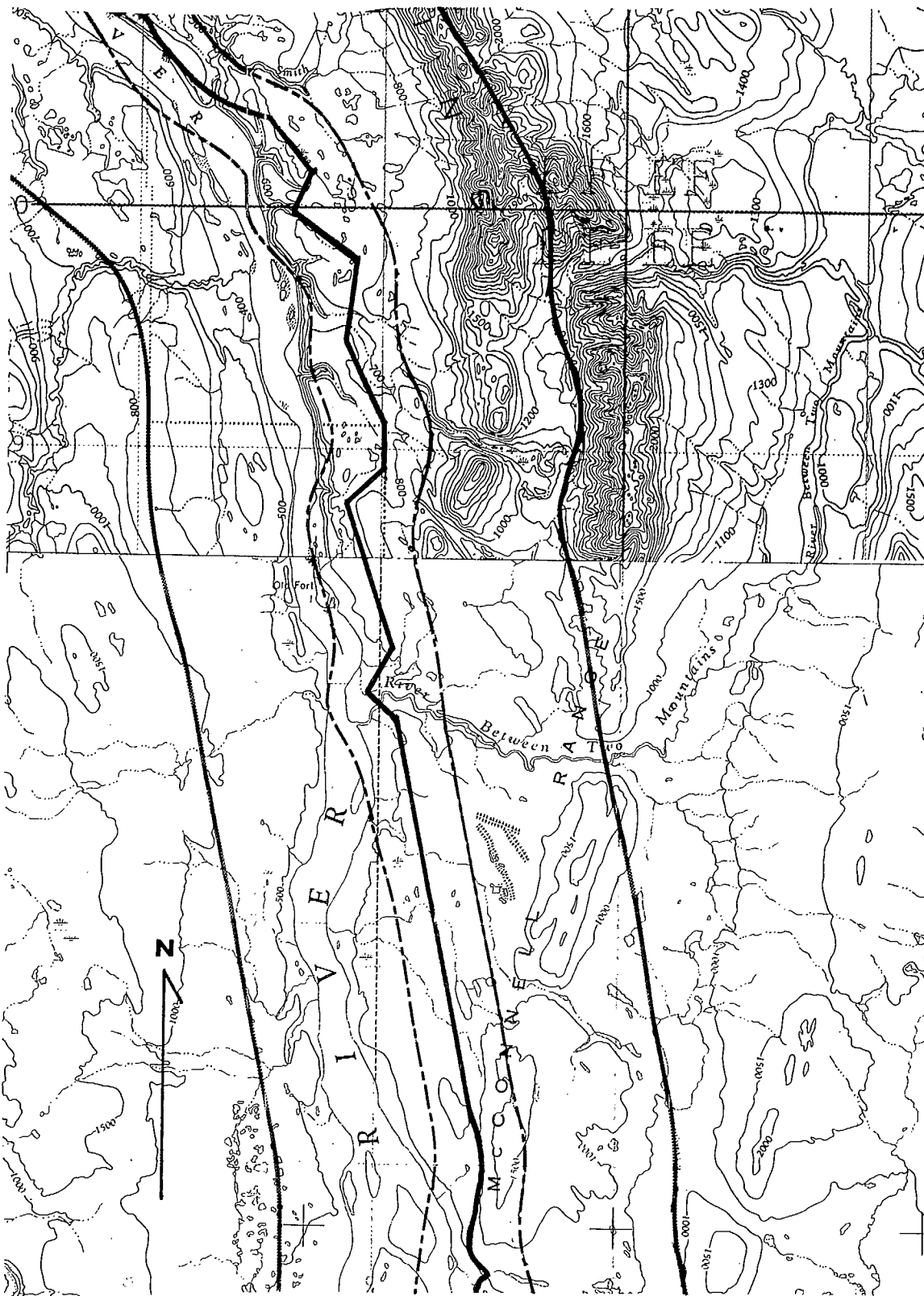
MAP 1



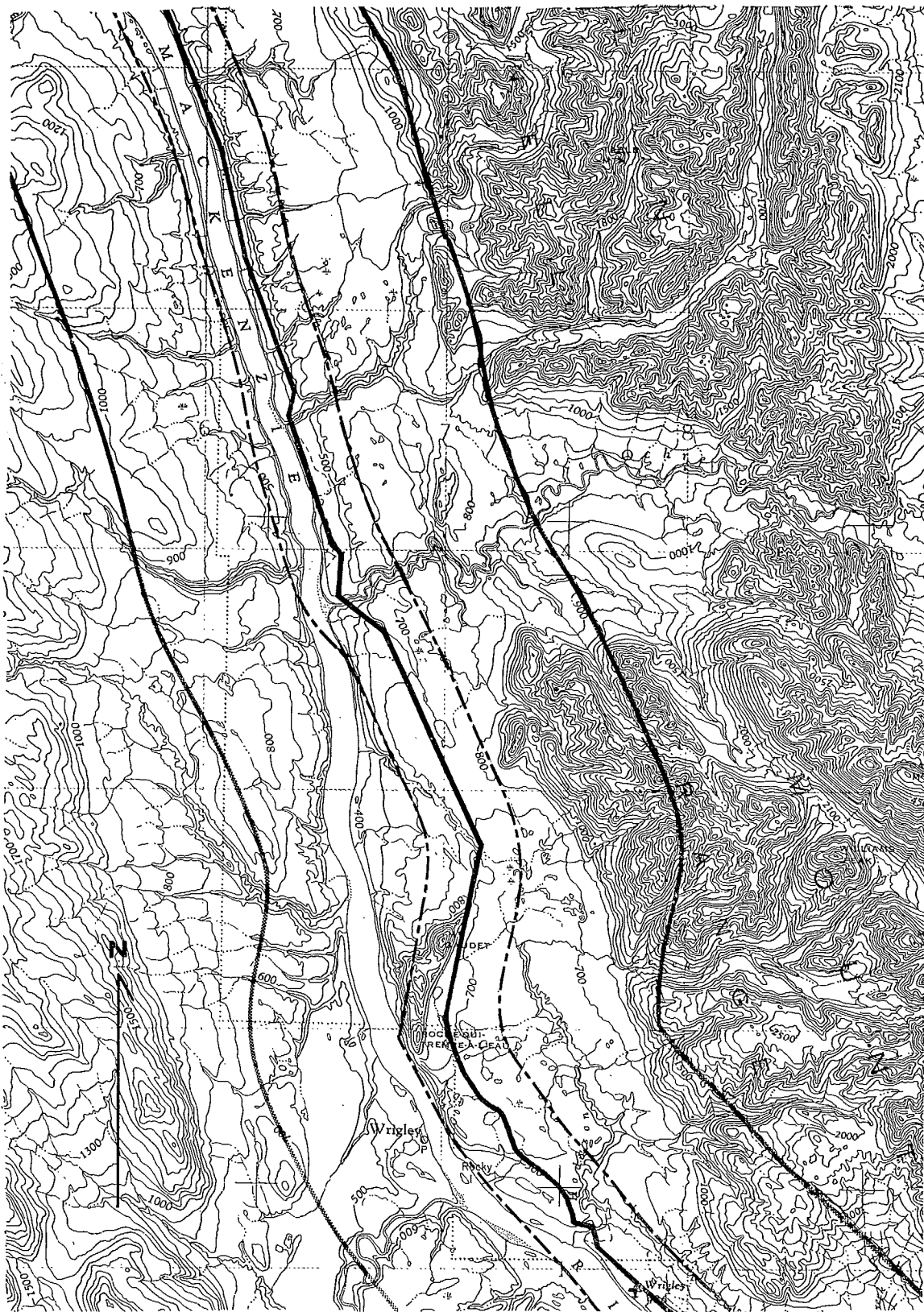
MAP 2



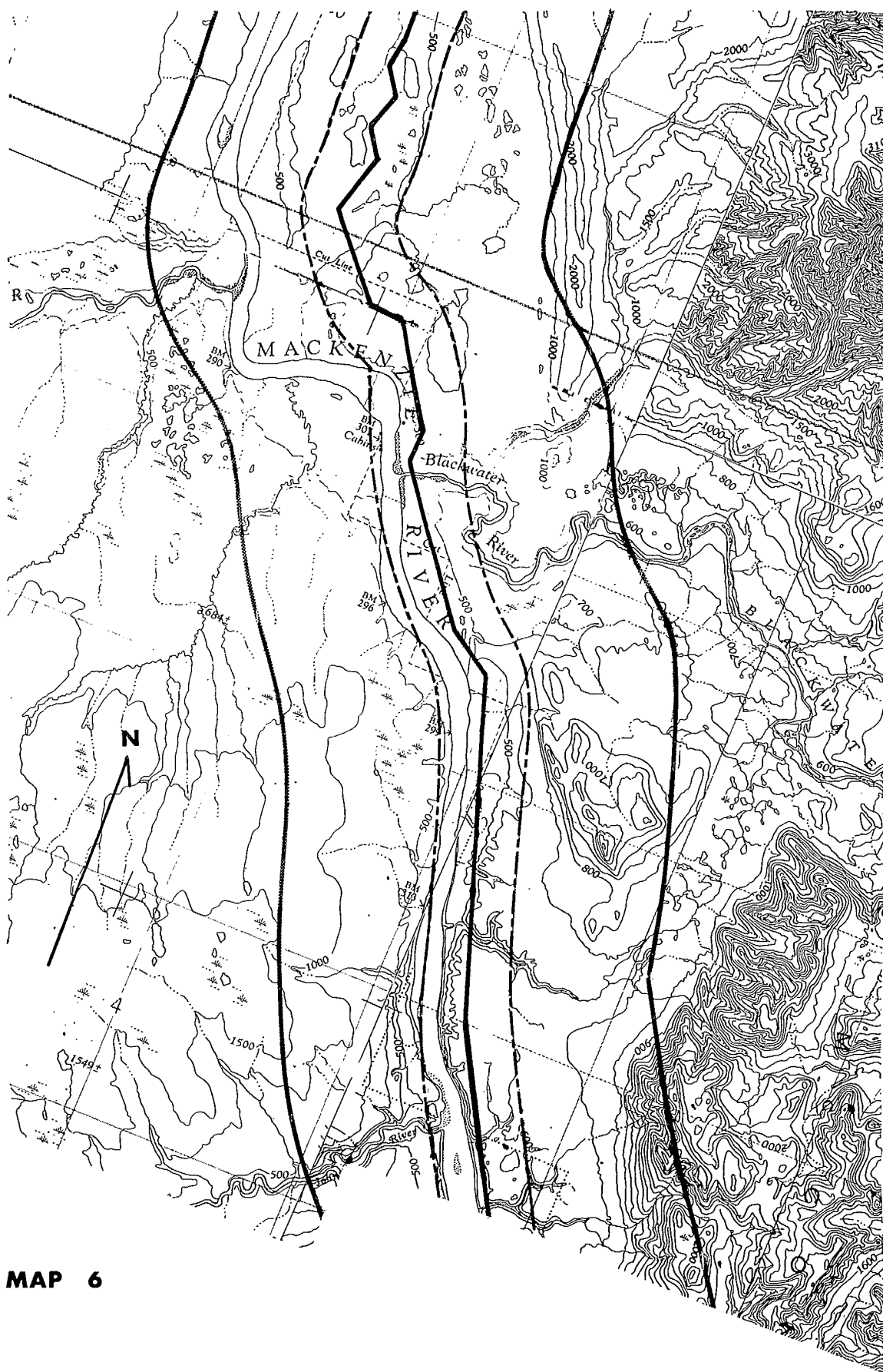
MAP 3



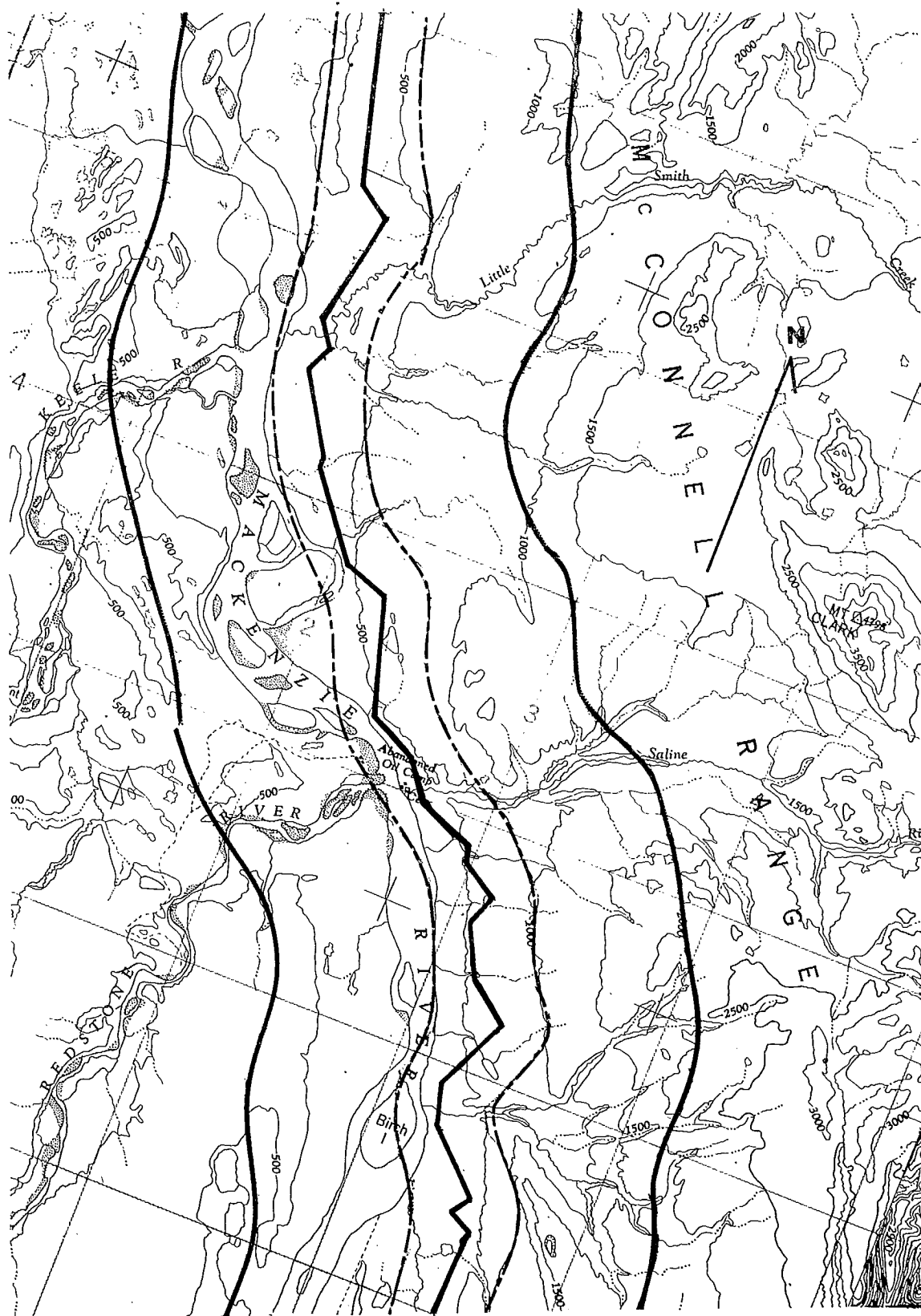
MAP 4



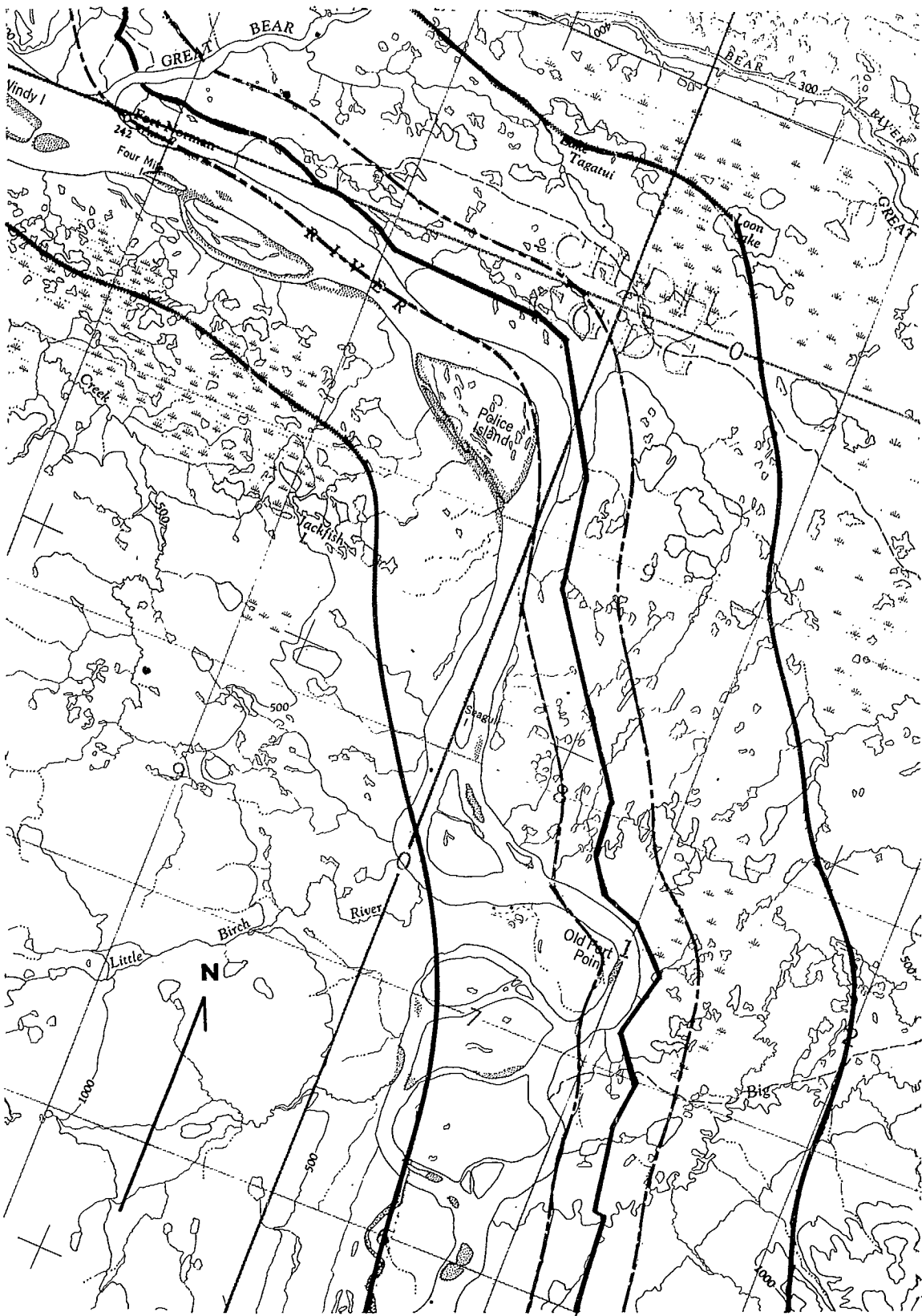
MAP 5



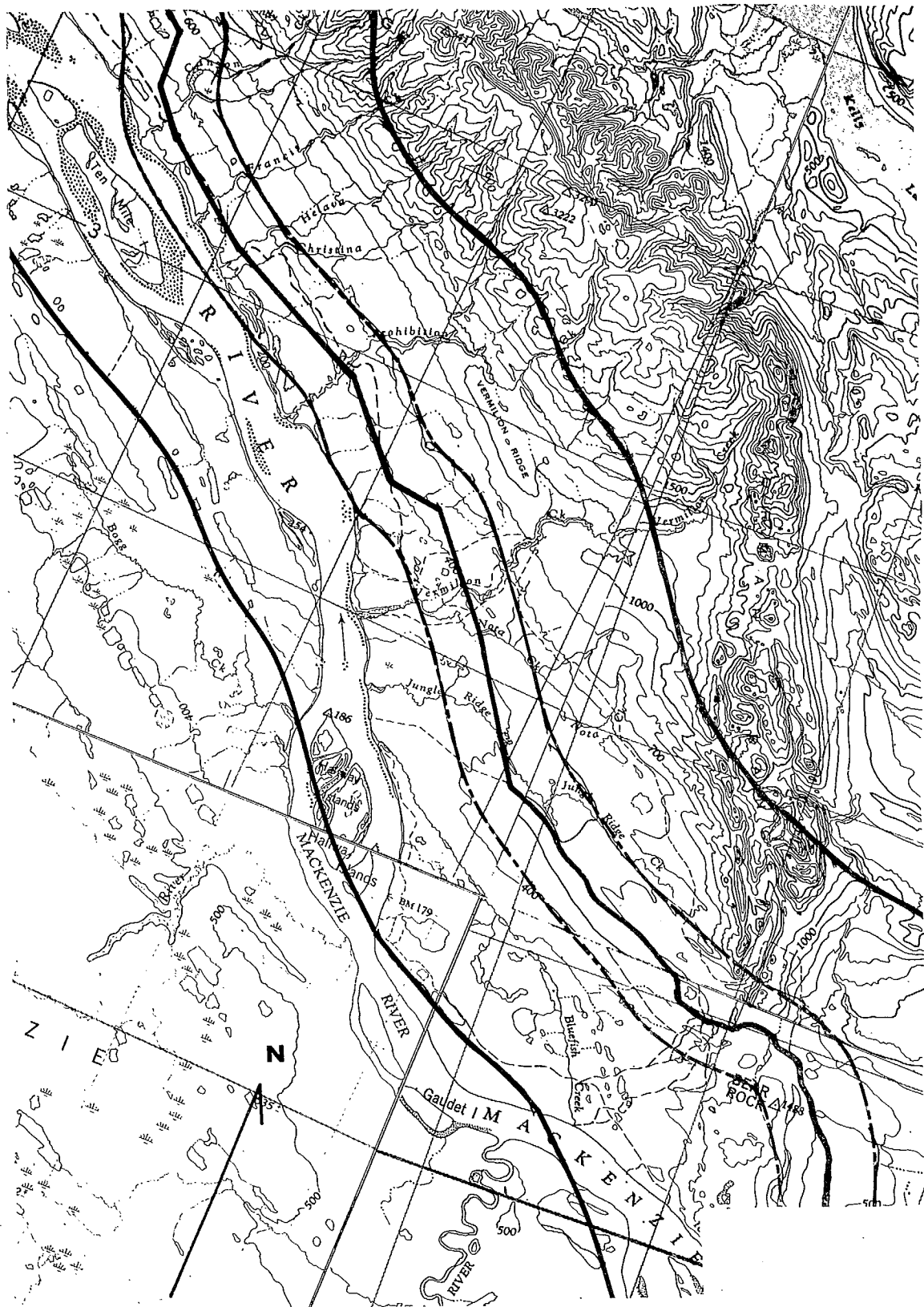
MAP 6



MAP 7



MAP 8



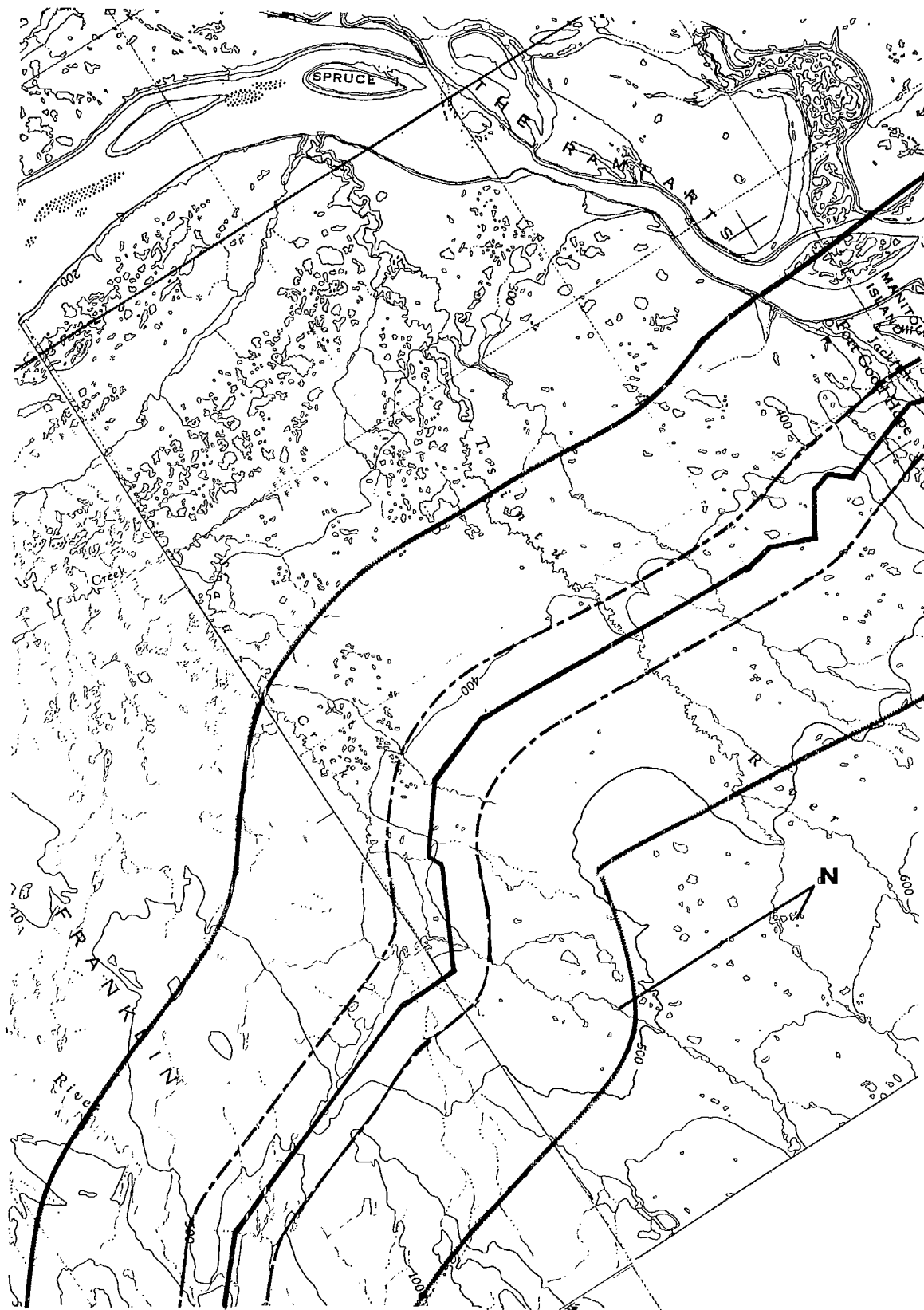
MAP 9



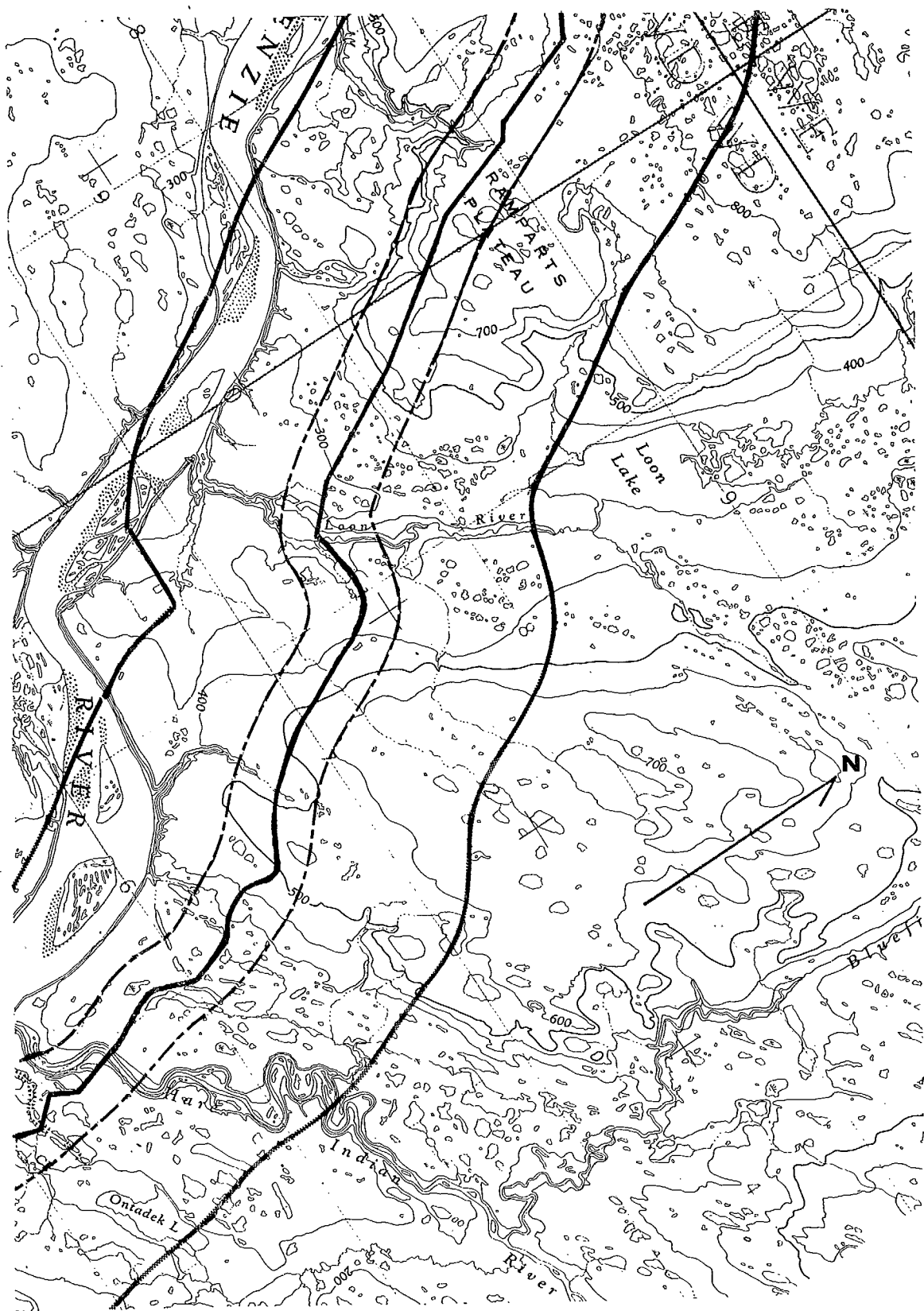
MAP 10



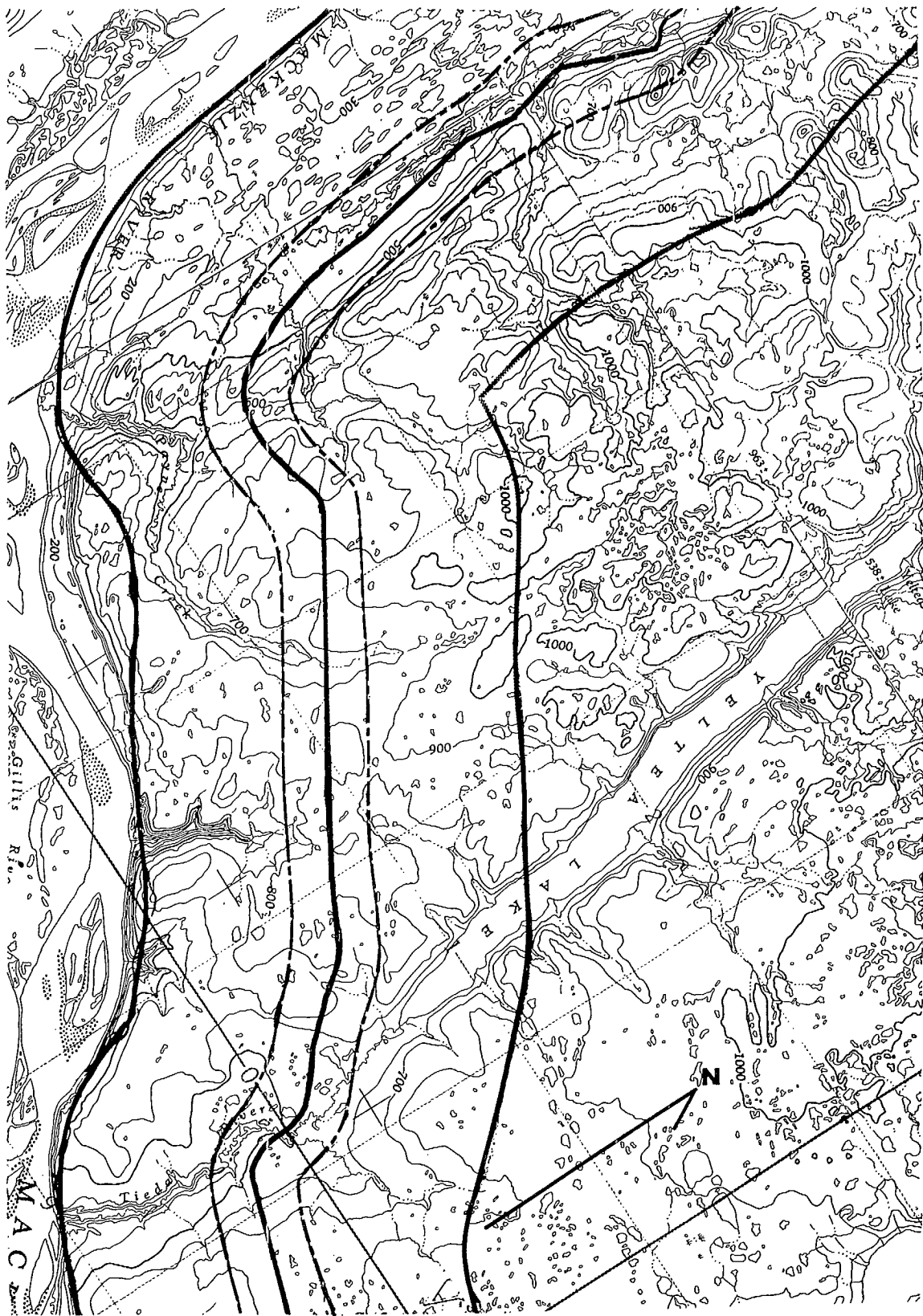
MAP 11



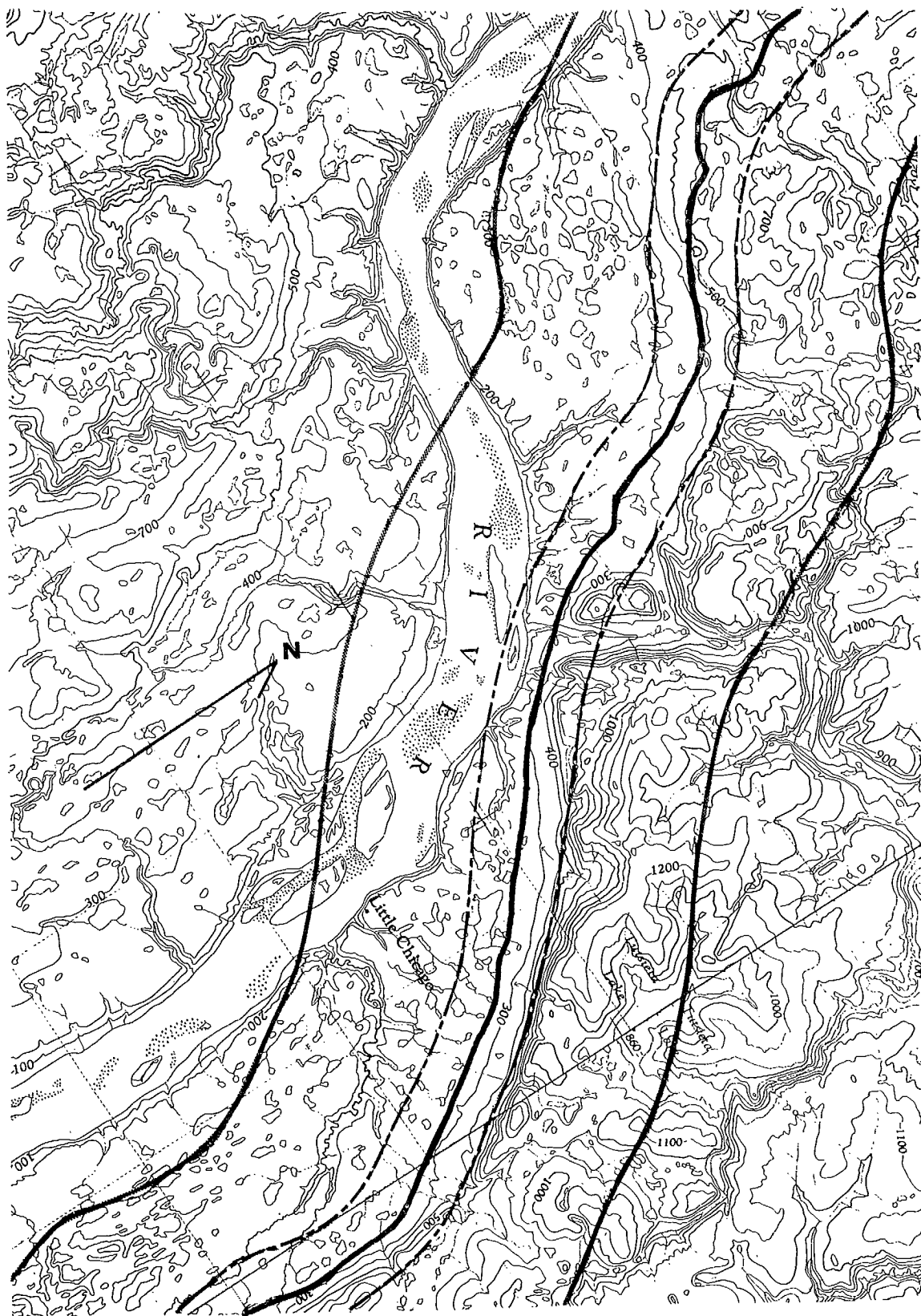
MAP 12



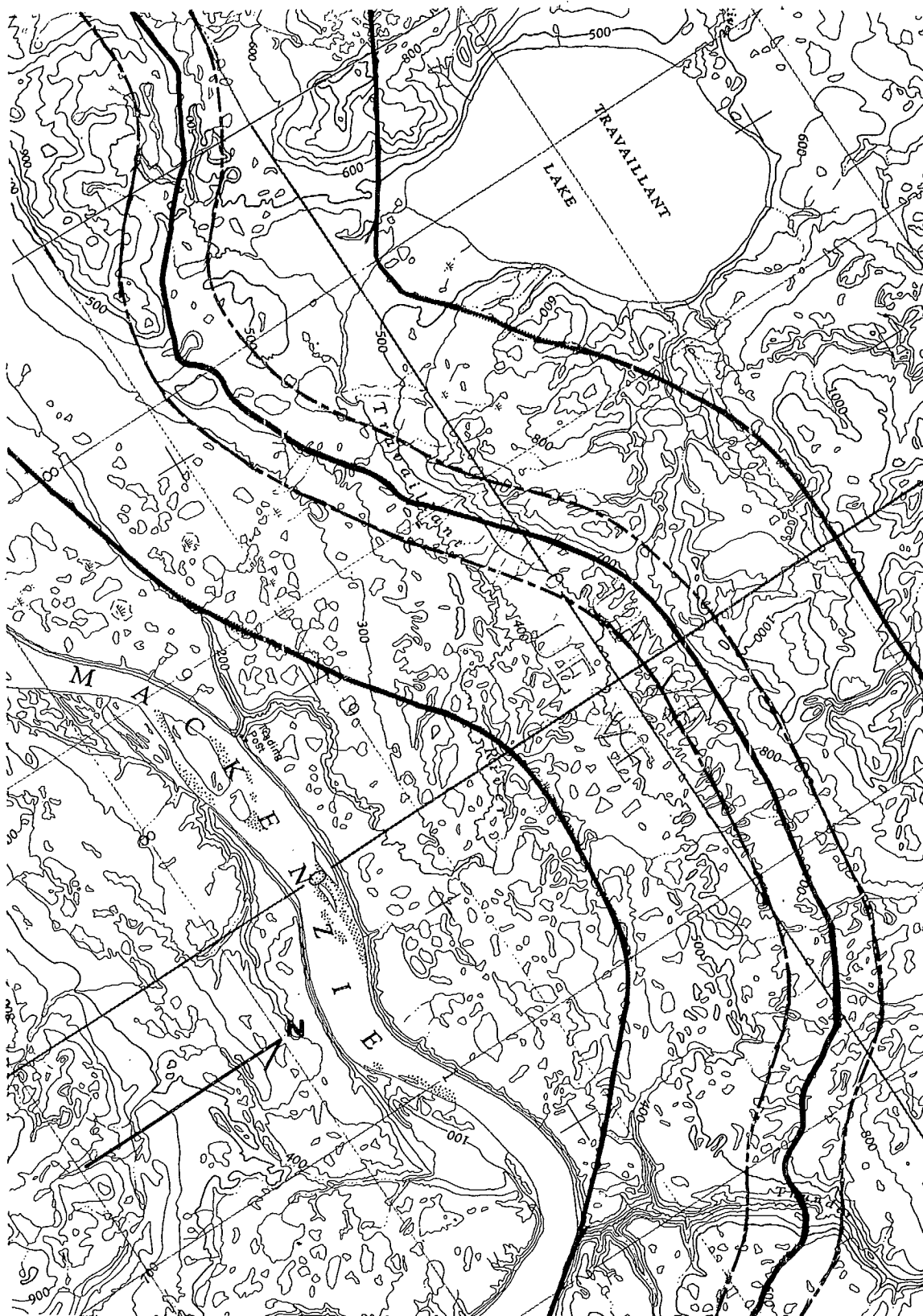
MAP 13



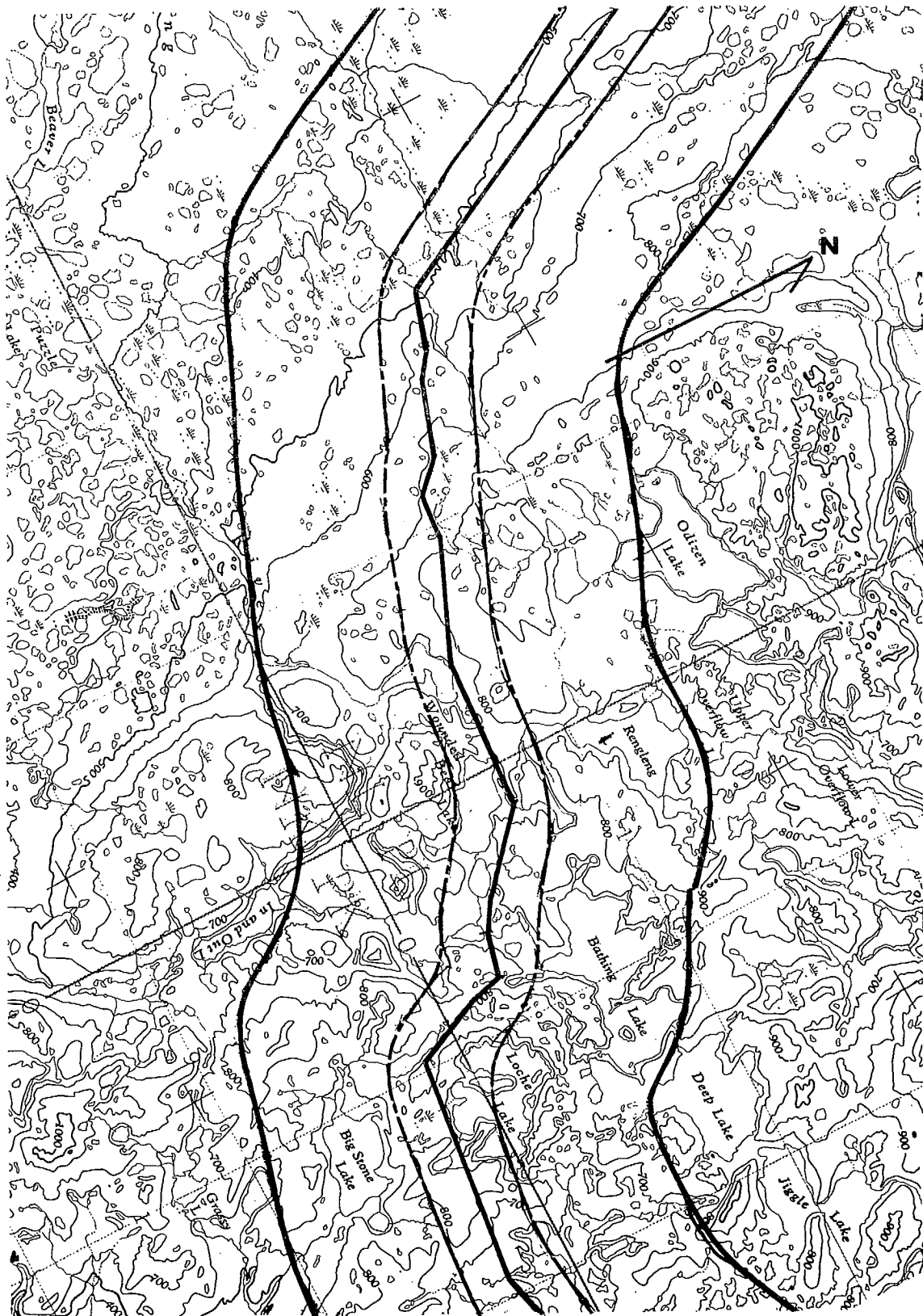
MAP 14



MAP 15



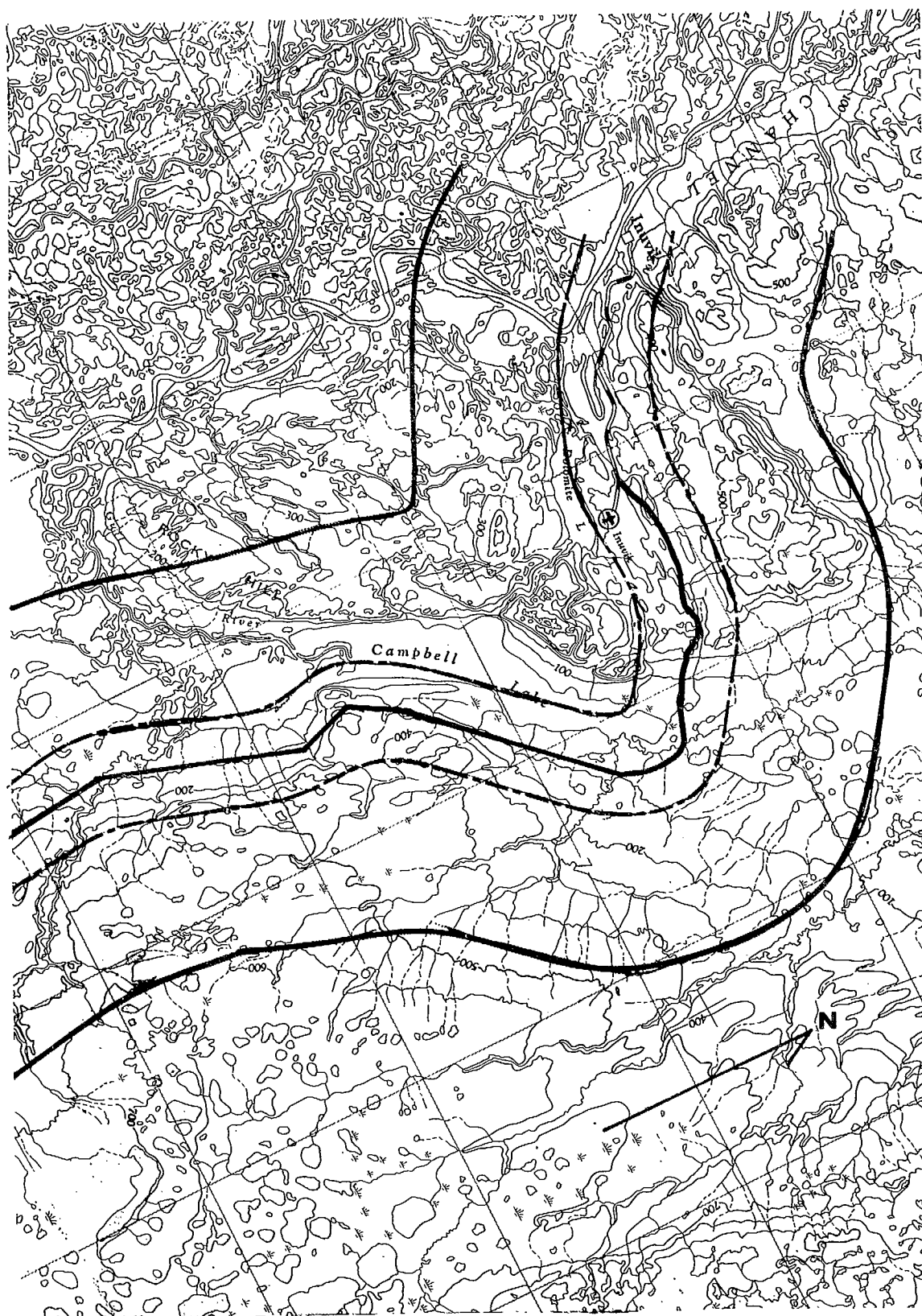
MAP 16



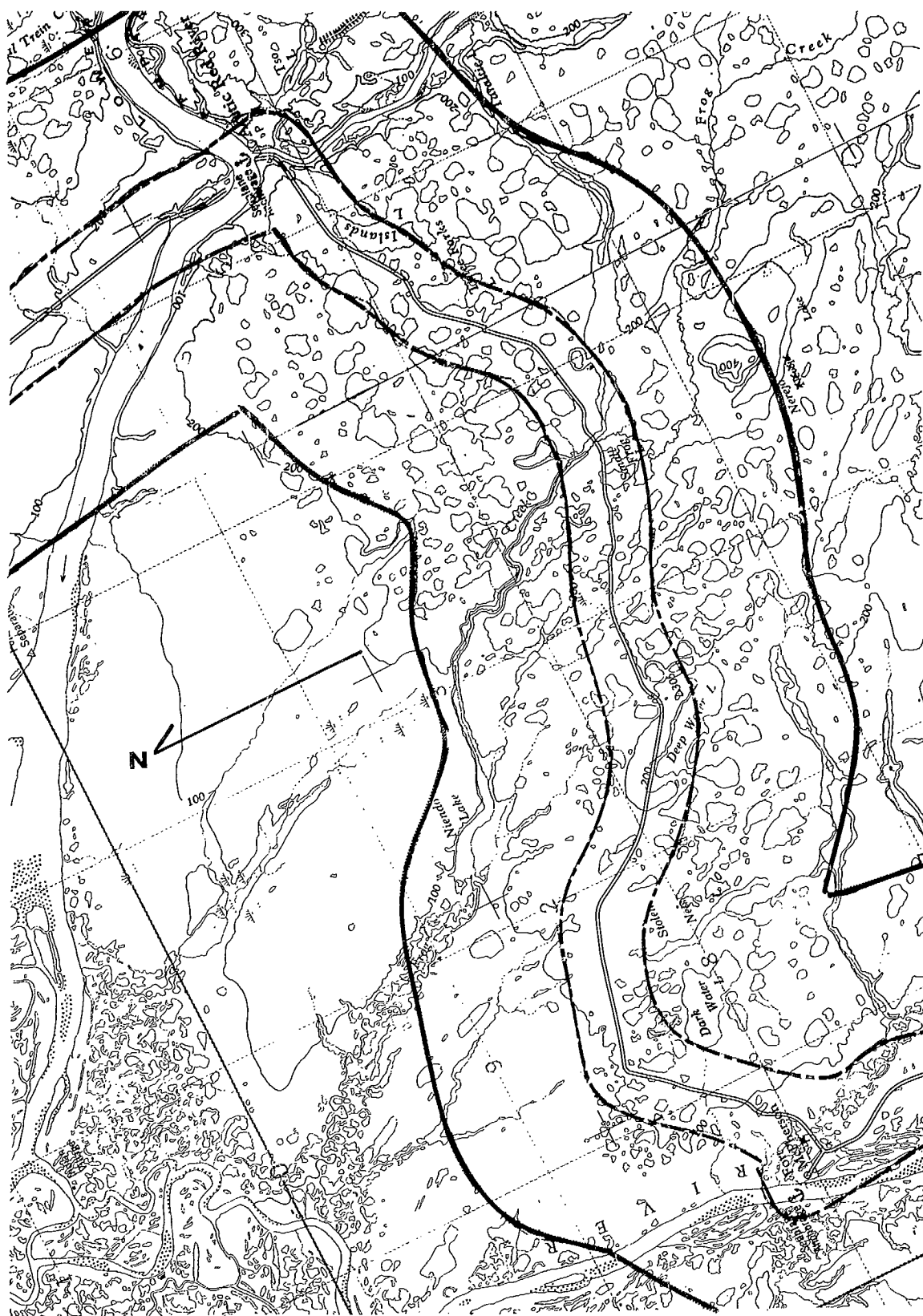
MAP 17



MAP 18

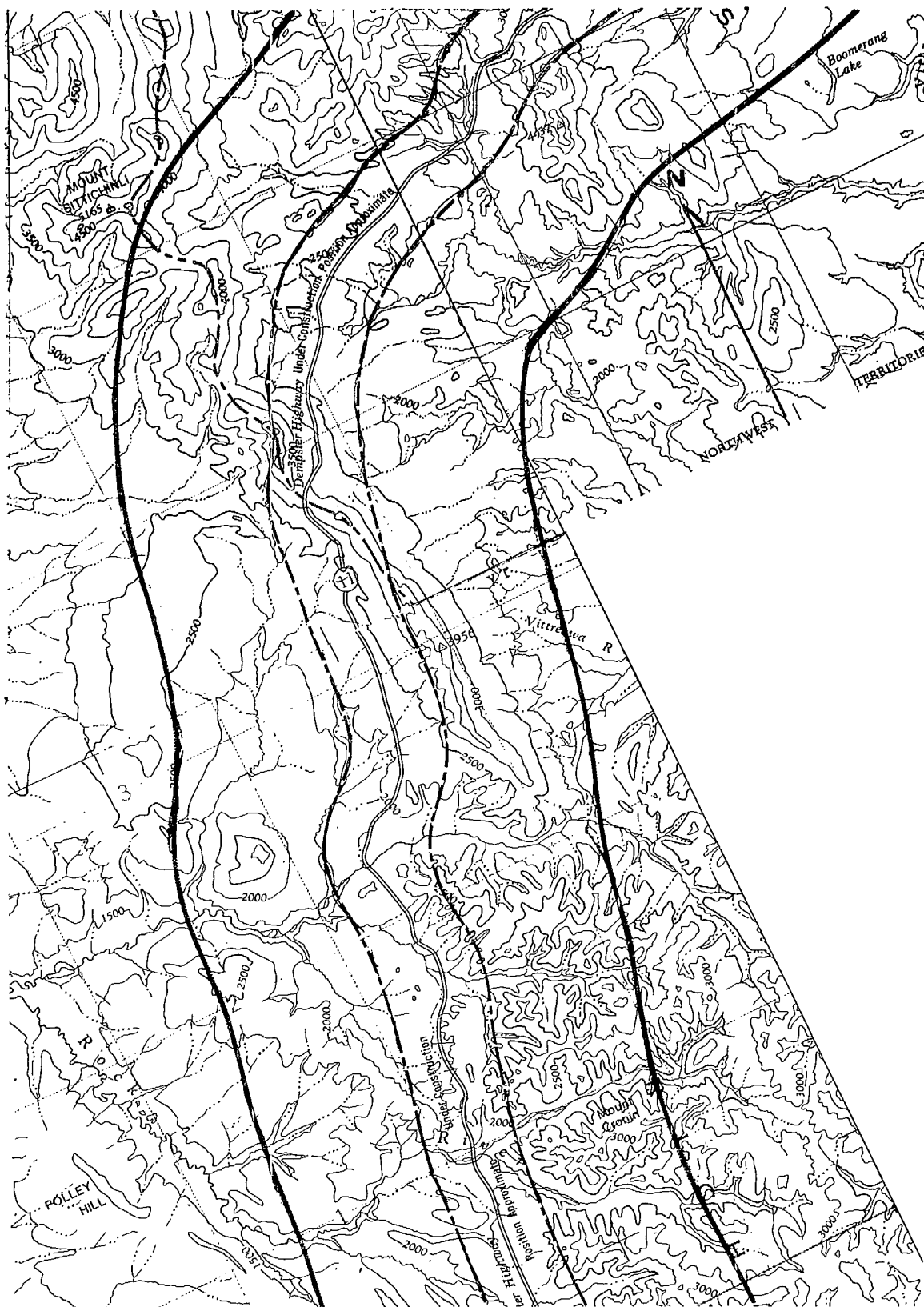


MAP 19

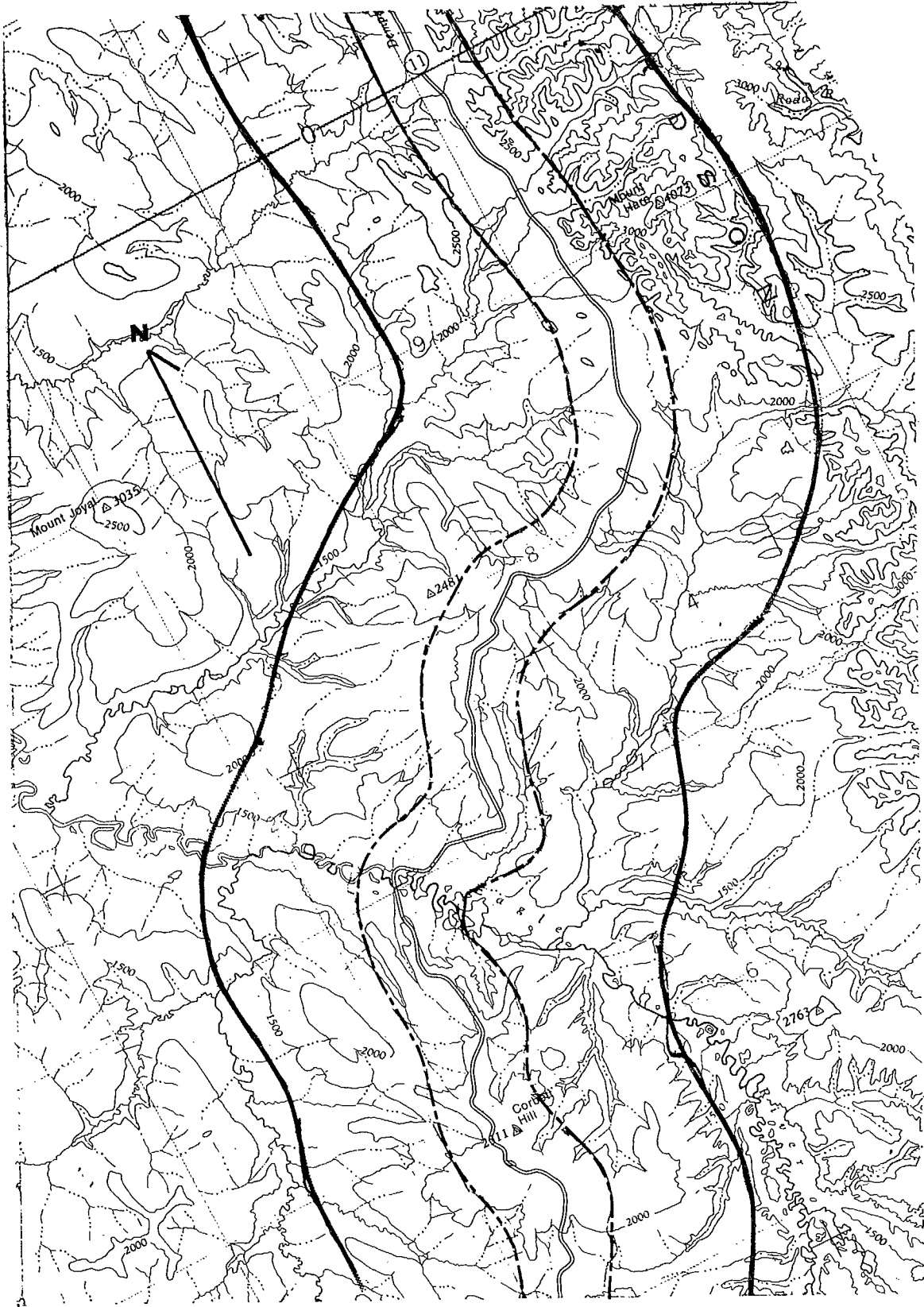
**MAP 20**



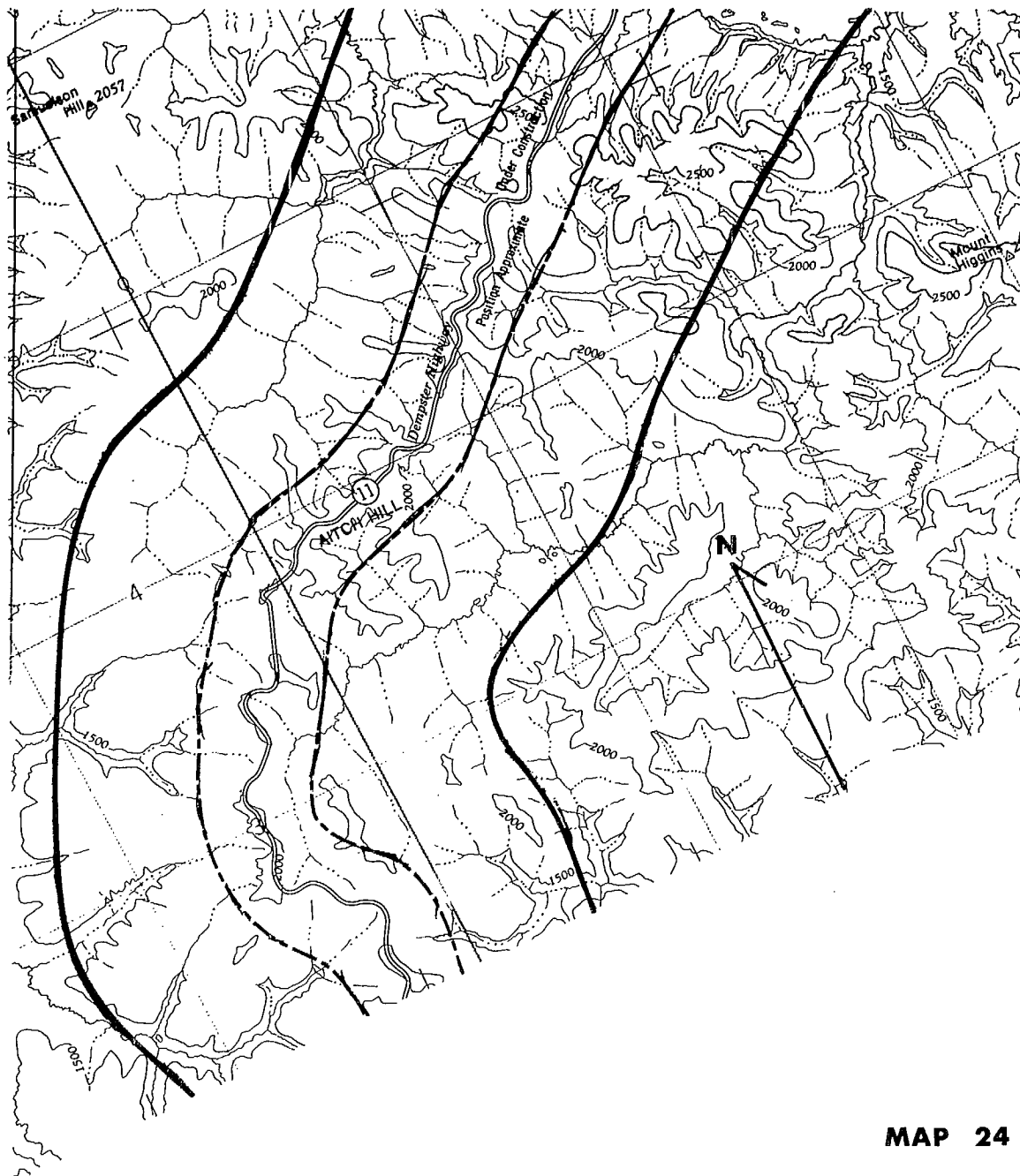
MAP 21



MAP 22



MAP 23



MAP 24

APPENDIX II

EXAMPLE OF ORDERING AN NAPL INDEX MAP

It has been decided to obtain imagery for Loon River (M742). A project is being undertaken to study stream bank stability and the meandering of the stream. The following requirements have been placed on the study:

- A. An up-to-date map is to be produced to an accuracy of ± 4 feet for 2 miles upstream from where the highway crosses the stream to 10 miles below the stream crossing.
- B. Annual maps of streambank morphology must be produced for the period 1969 to 1974 at an accuracy of ± 2 foot for 2 miles up and downstream.

The procedure for first ordering index maps and subsequently air photos would be as follows:

1. Consult the M725-762 section of Table 2 to determine what photography is available remembering the constraints listed above. The photography must have a minimum scale of 1:31000 (see Figure 1) for requirement (a) and 1:15000 for requirement (b).
2. Make a list of the photography which covers the study area:
 - Requirement A: B/W-73-13400 10 mile corridor
 - Requirement B: B/W-69-12200 2 mile corridor
 - B/W-72-12800 10 mile corridor
 - B/W-73-13400 10 mile corridor
 - B/W-74-12000 10 mile corridor

Note: The other photographic coverages have been rejected because they either duplicate the examples listed or are of too small scale. The B/W-73-13400 imagery was chosen for requirement A as it is already required for requirement B and duplicate coverage would simply be an additional cost. Also, maps cannot be produced for 1970 or 1971 because imagery does not exist.

3. Requisition four index maps from NAPL, one for each task coverage. The following information should be sent in a covering letter along with the requisition:

Index maps of the 106I sheet are required for the following black and white photographic coverages:

- 1969 at a scale of 1:12200
- 1972 at a scale of 1:12800
- 1973 at a scale of 1:13400
- 1974 at a scale of 1:12000

It is possible that two coverages may have been plotted on the same map, in which case too many maps have been ordered. It is safer to assume that each coverage is on a separate map than to assume that all photography from a given year is on one map, since it may have been indexed separately. Request an up-to-date price list of photography at the time of ordering the index maps.

4. Review the index maps and determine the roll and frame numbers for those images which provide coverage for the study area. The frames plotted and numbered on the flight line indicate frame centers and not all frames are shown. In order to derive as much information as possible from the photography stereo coverage should be obtained for the study area and caution must be taken to ensure that total coverage is obtained. A portion of the map for the B/W-74-12000 imagery has been included; for the example project the following imagery would have to be requisitioned:

Roll # A30852 Frames 129, 130, 131

5. Requisition the required imagery from NAPL.

NOTE - The imagery on file with NAPL can be viewed at 615 Booth Street. If researchers do not wish to purchase the imagery which they require for small

projects, it can be examined and interpreted there. But for extensive projects it is better to purchase the photography and to analyse it in a well-equipped air photo lab.

