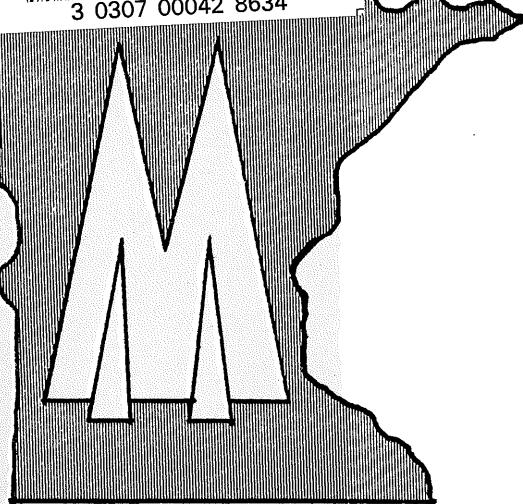


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- North Shore characterization study

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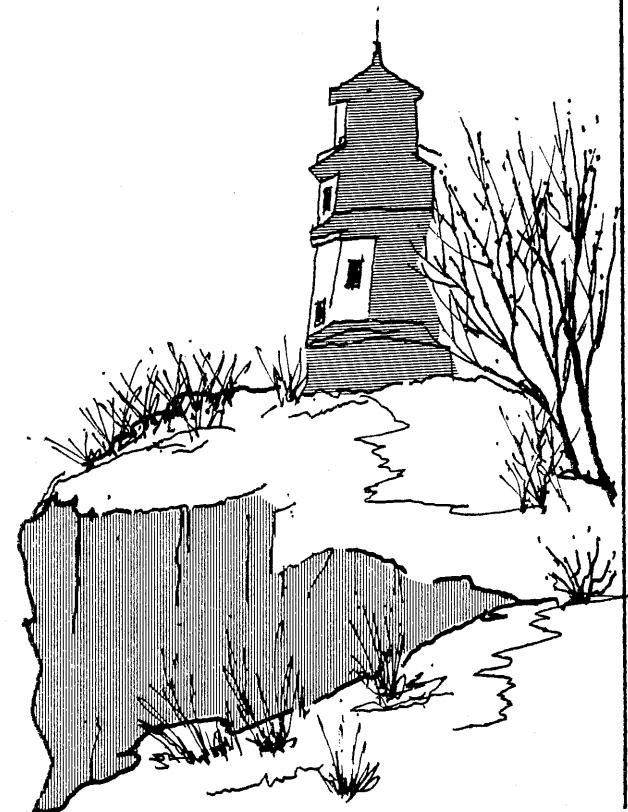
esota

DEPARTMENT OF NATURAL RESOURCES

NORTH SHORE characterization study

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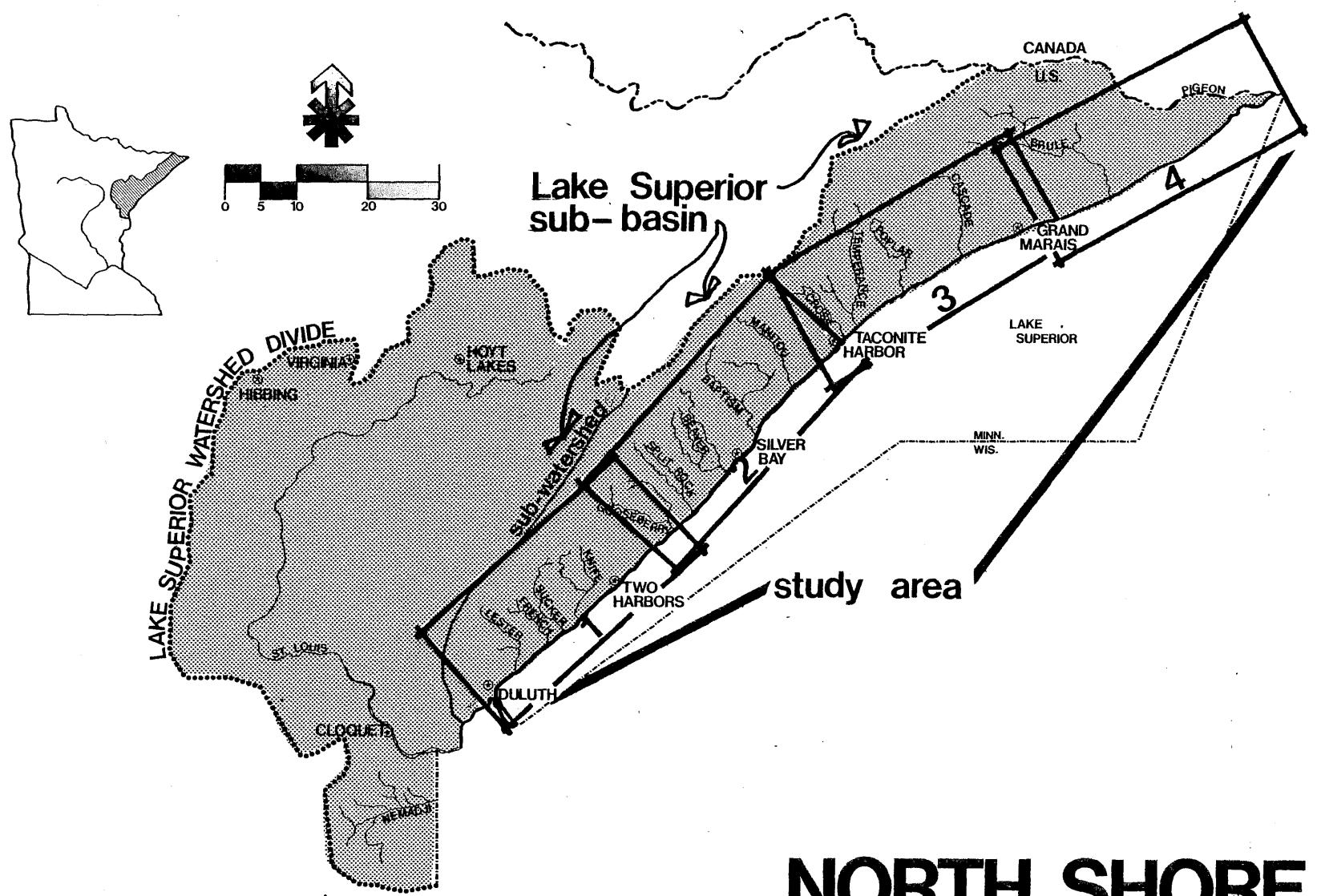
sion of Minerals and the Office of Planning and Research
September 10, 1979

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MINNESOTA NATURAL HERITAGE PROGRAM
DEPARTMENT OF NATURAL RESOURCES
RESEARCH AND POLICY SECTION
BOX 11 CENTENNIAL OFFICE BUILDING
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Figure 1



NORTH SHORE

LOCATION

NORTH SHORE CHARACTERIZATION STUDY

Introduction

The North Shore of Lake Superior is one of America's most beautiful coastlines. Its unique character is derived from the variety of land forms found there. The diverse terrain, lying alongside the world's largest fresh water lake, is dotted with small lakes and marshes and dissected by streams. This physically and culturally unique region has been included in numerous planning and management studies, which have indicated that the area will continue to be the focus of development pressures. From a planning and regulatory standpoint, it is apparent that a more rigorous definition of the extent of the North Shore area is necessary.

The Department of Natural Resources has developed a definition of the North Shore to promote consistency in future investigations of the area. This report is the result of a cooperative effort by personnel from the Division of Minerals and the Office of Planning and Research. The geographic scope of the research included approximately 2,371 square miles of the Lake Superior sub-basin between Duluth and Canada (Figure 1).

The extent of the North Shore was defined by determining the unique, continuous distribution of physical characteristics typical to the region. Two criteria, physiography and visibility, were used in the definition. For the purposes of this study, physiography is defined as unusually steep and varied topography adjacent to and sloping towards the Lake Superior shore. Visibility is defined as the area visible from numerous locations along major transportation corridors and from selected natural features.

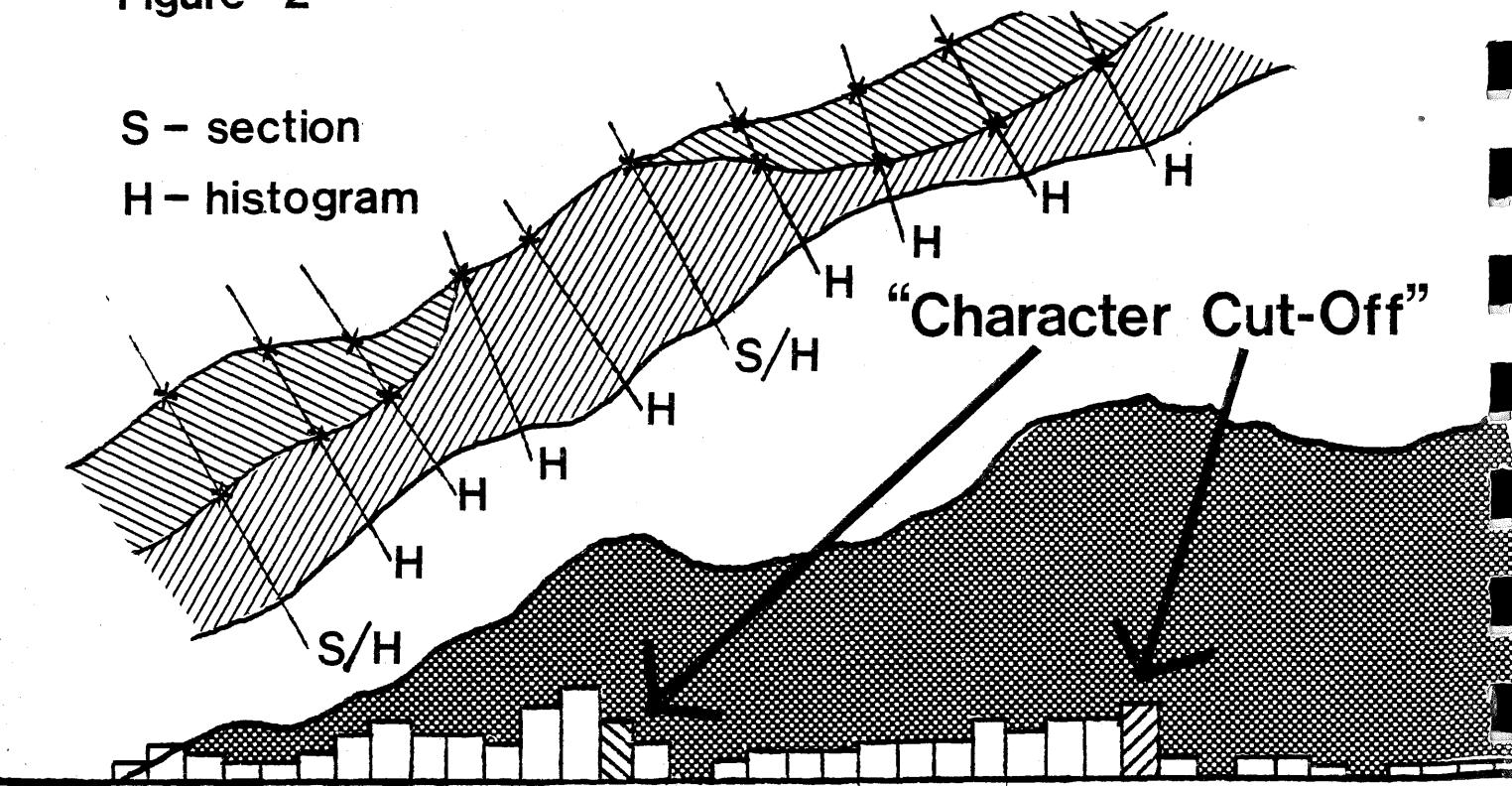
Methodology

PHYSIOGRAPHY OF THE NORTH SHORE LANDSCAPE

In the Lake Superior sub-basin there are two distinctly different landform classifications created by geological variations. These are rock topography and glacial topography. The areas classified as rock topography are more abundant near the shoreline and are characterized by bedrock outcrops such as dikes, sills, lava flows and occasional talus slopes. Local relief ranges from 80 to 600 feet, with extremes up to 1000 feet. Areas having glacial topography are more common inland from the lake and are characterized by various glacial moraines, peat bogs, less frequent bedrock outcrops and local relief on the order of 60 to 80 feet.

To determine a physical divide between landform areas associated with either the shore or inlands, the following procedure was followed. Using USGS 7 1/2 minute topographic quadrangles as base maps, cross-sections were drafted perpendicular to the shoreline at three mile intervals. Each cross-section was then divided into 2000 foot segments and the number of 20 foot contour lines intersecting each segment were counted. A histogram was then constructed for each of the cross-sections (Supplement A). The histograms provide a measure of the diversity of relief in the area.

Figure 2



In addition, a detailed topographic cross-section of the land was constructed at 15 mile intervals along the shore. The combination of these cross-sections, histograms, topographic maps, and a cumulative frequency distribution for all 50 histograms led to the development of two land ridge lines (Figure 2).

The first land ridge line was defined by connecting the series of high points nearest to the shore located on each histogram. Where possible, the land ridge line followed the height of land between these points, however, where local relief was ambiguous, data points were connected by a straight line.

The same analysis process also indicated a second ridge line further inland along a majority of the shore. In both cases, lines drawn on the map overlay were generalized to the nearest quarter-quarter section (i.e., approximately 40 acre parcels). Figure 3 diagrams the two land ridge lines developed.

The information developed through this procedure was compared with geologic maps of the area north and west of Grand Marais in order to further verify the procedure. The correlation between the ridges indicated on geologic maps and the land ridge lines in the area of comparison was nearly exact (figure 4).

VISIBILITY OF THE NORTH SHORE LANDSCAPE

The visibility analysis consisted of identifying "viewsheds" from various locations or viewpoints, along the North Shore. A viewshed can be defined as the entire area which is theoretically visible from a given viewpoint or a series of viewpoints. The viewsheds were constructed by the slope analysis method in which the basic assumption is simply that one can see only as far as the first landform that blocks the sight line. Sight lines from each viewpoint were constructed with reference only to ground elevations, since weather conditions, height, density, and type of vegetation are seasonally variable.

Using the slope analysis method, radial sight lines from each viewpoint were drawn on USGS 7 1/2 minute topographic quadrangle maps. Usually eight sight lines were drawn from each viewpoint. If, however, the distance from a viewpoint to the horizon varied frequently and irregularly between the sight

characterization

NORTH SHORE

PHYSIOGRAPHIC
Scale 1":2 miles
Land Line 1000' 2000'
Data Points
Land Line Break Zones
Land Line 40's Defn.
Road H.P.
Stream H.P.

Fig. 3

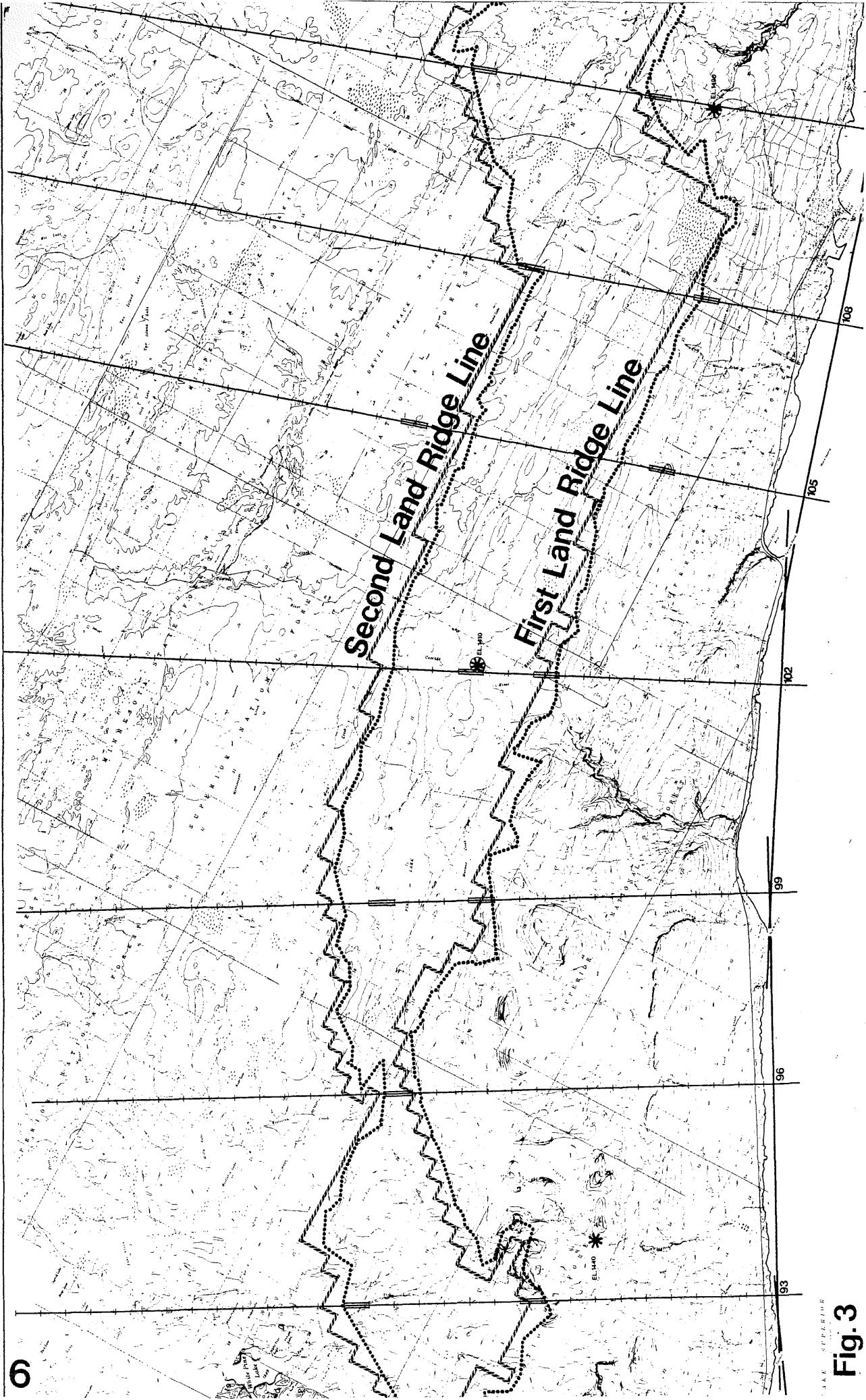




Fig. 4

7



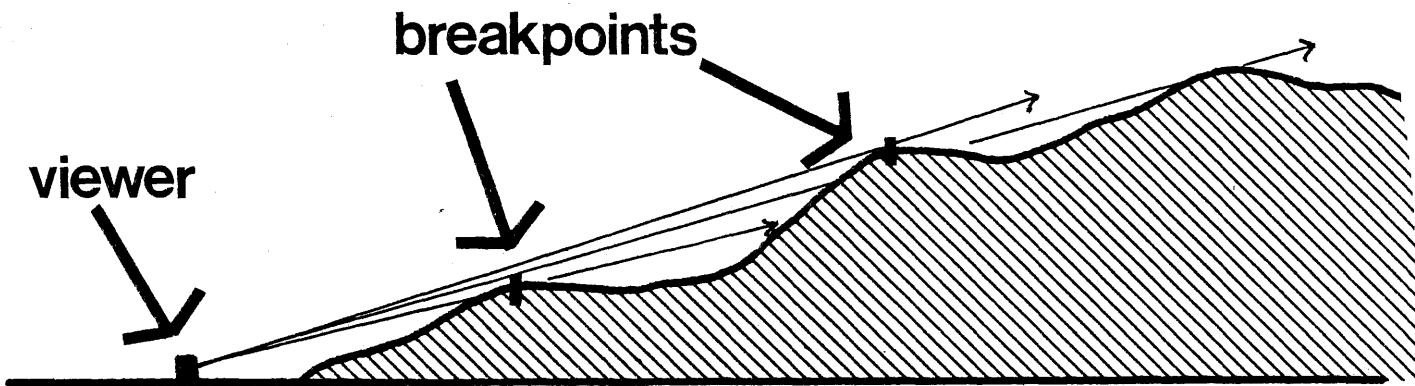
GEOLOGY SUPPLEMENT		ROCK OUTCROP	ROCK LANDFORM
GLACIAL LAKE SHORELINE (approx.)		SAND & GRAVEL DEPOSITS - Beach, Esker	P PEAT AL ALLUVIAL
Scale 1:2 miles		GROUND MORaine Lakewashed (GML)	GROUND MORaine Red Till (GMR)
		END MORaine - Red Till (EMR)	TALUS SLOPE

NORTH SHORE

characterization

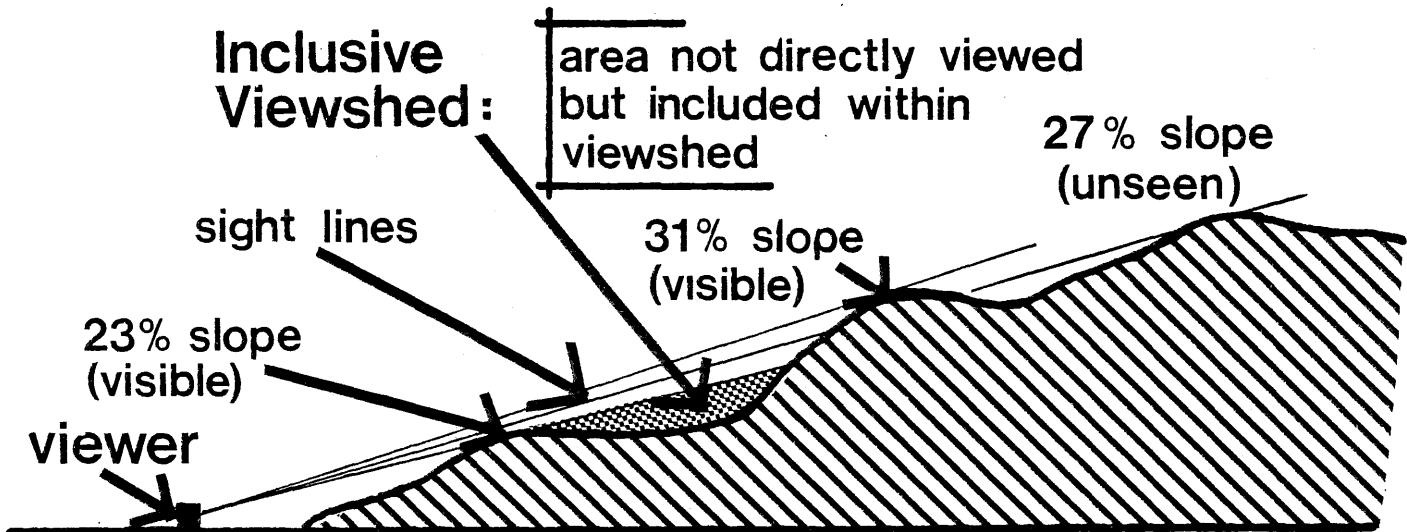
lines drawn, more sight lines were added. To determine if a point was visible from a viewpoint, the sight line was traced until an obstruction, or breakpoint, was reached (Figure 5). The difference in elevation between the viewpoint and the breakpoint was divided by the distance between the two points to determine the slope. The slope was noted at each breakpoint along the sight line until a maximum slope was determined. This indicated the last point visible from the viewpoint along the sight line.

Figure 5



The viewsheds so defined are inclusive, in that they include all land between the viewer and the horizon, and not just land that is actually visible. The procedure is illustrated in Figure 6.

Figure 6



Five different types of viewpoints were selected. Each is listed and described below:

- 1) Points along T.H. 61, spaced at one mile intervals;
- 2) Points 1/2 mile offshore in Lake Superior, spaced at one mile intervals equidistant between the viewpoints on T.H. 61;
- 3) Points spaced 1/2 mile apart, extending along the six North Shore "recreational roads" intersecting T.H. 61;
- 4) Points spaced at 1/2 mile intervals along the 15 most important tributary streams to Lake Superior;
- 5) Eleven sites designated as prominent points.

T.H. 61

The viewshed from T.H. 61 was constructed because of the highway's intensive use and the recreational value of the adjacent area. From Duluth to Canada, viewpoints were selected at one mile intervals corresponding to highway mile markers. The most distant points visible at each viewpoint were then connected to establish a viewshed from T.H. 61.

Lake Superior

The Lake Superior viewshed was determined from points 1/2 mile offshore, spaced at one mile intervals and equidistant between the viewpoints on T.H. 61. The half mile distance was chosen because according to the DNR Division of Enforcement, the majority of recreational boating occurs within one mile of the shore. In most cases, the Lake Superior viewshed extends further inland than does the T.H. 61 viewshed.

Major Recreational Roads

Six major recreational roads were determined, based on existing traffic flow and motorists' proposed destinations along these routes. In order of their occurrence from Duluth to Canada, they are as follows:

- 1) Co. Hwy. 2 out of Two Harbors
- 2) State Hwy. 1 out of Illgen City
- 3) Sawbill Trail out of Tofte (Co. 2)
- 4) Caribou Trail out of Lutsen (Co. 4)
- 5) Gunflint Trail out of Grand Marais (Co. 12)
- 6) Arrowhead Trail out of Hovland

Profiles of each road were constructed in order to determine their high points. These are included as supplement B. The high points mark where the roads stop climbing upward from the lake. From this high point, a viewshed was constructed along each road at 1/2 mile intervals moving toward Lake Superior.

Major Streams

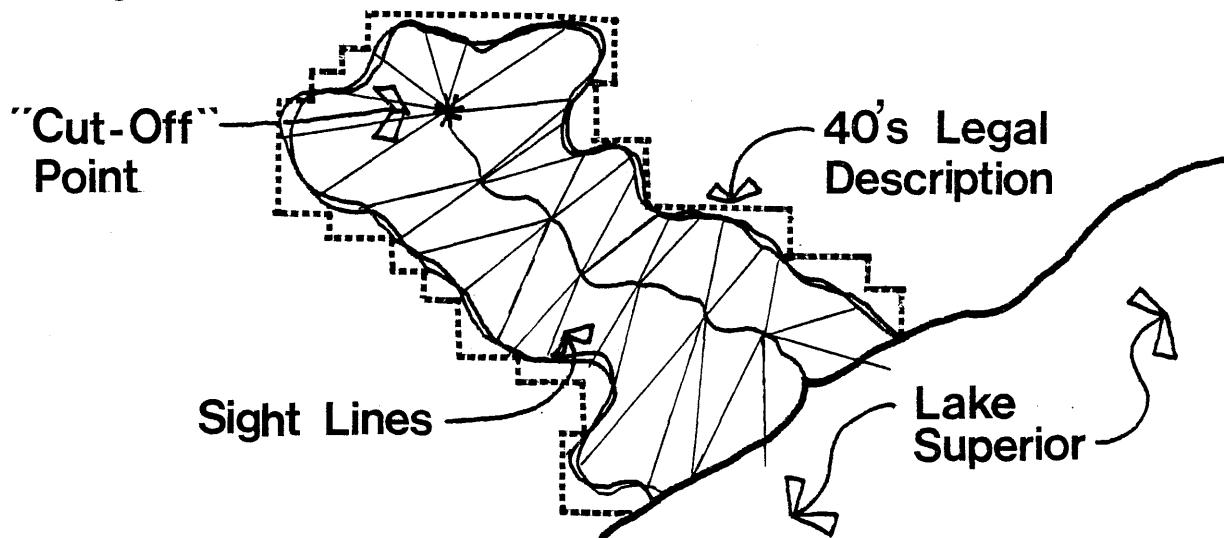
The watershed for Lake Superior as defined in this study includes the Lake Superior drainage basin but not the St. Louis, Cloquet and Nemadji Rivers and their tributaries. Within this watershed 15 streams were selected. The streams were chosen for their water quality, stream flow volume and existing recreational use. In order of their occurrence from Duluth to Canada, they are as follows:

- | | | |
|---------------|---------------|----------------|
| 1. Lester | 6. Split Rock | 11. Temperance |
| 2. French | 7. Beaver | 12. Poplar |
| 3. Sucker | 8. Baptism | 13. Cascade |
| 4. Knife | 9. Manitou | 14. Brule |
| 5. Gooseberry | 10. Cross | 15. Pigeon |

A profile was constructed along each stream. For each 1,000 foot interval the number of 10 foot contour lines crossed was counted and recorded on a histogram. The profiles and histograms are included as Supplement C. From the histograms, a "stream cut-off" point was identified. This point is where the stream character changes because of a distinct increased rate of drop

resulting in frequent cascades and waterfalls. Downstream from these physiographic cut-off points, a viewshed was constructed along the stream route at 1/2 mile intervals to Lake Superior. Figure 7 illustrates the viewshed developed for a sample stream and its delineation by the nearest forty acre parcel.

Figure 7



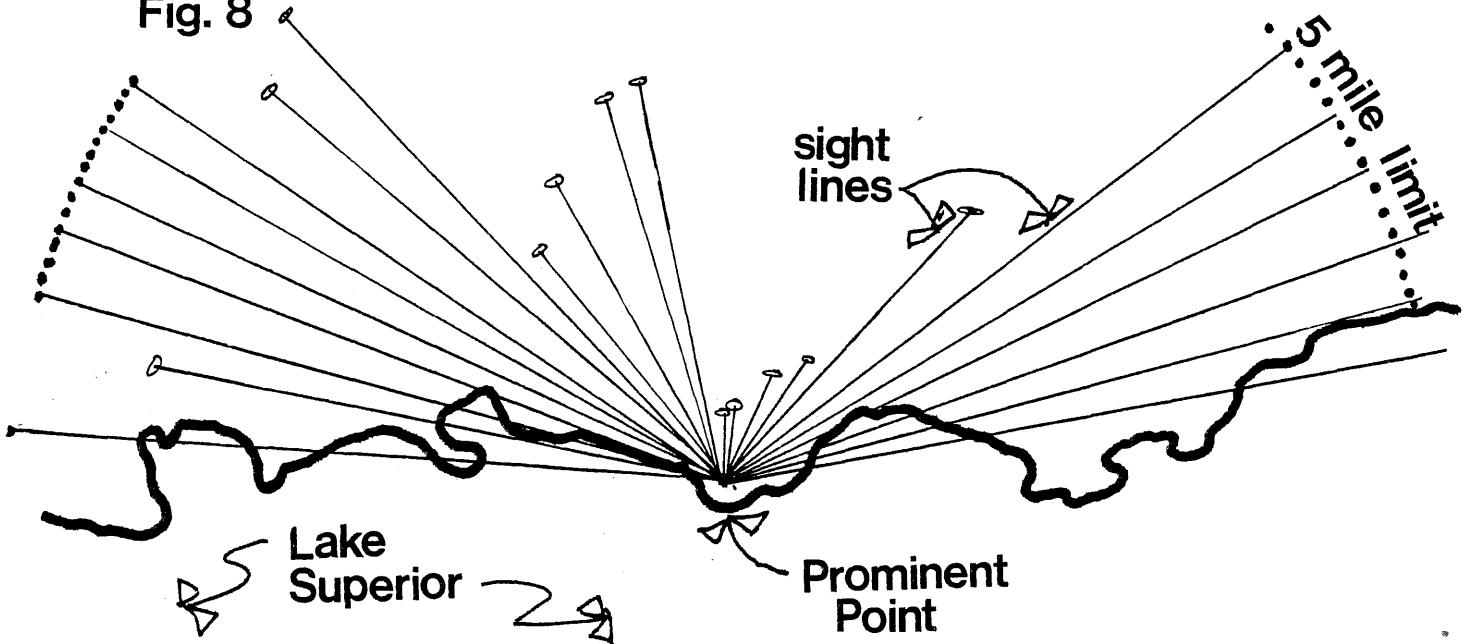
Prominent Points

The prominent points were selected for their topographic diversity, visitor appeal and visual potential. An initial list of areas of steep slopes, unique landforms, long vistas, and frequent use was made. From this selection process, 57 landforms and 10 lakes were identified as potential high amenity points. A further refinement using the criteria of present use, public ownership, and access narrowed the list down to 11 prominent points, including one lake. In order of their occurrence from Duluth to Canada, they are as follows:

- | | |
|---------------------------|--------------------------|
| 1. Moose Mountain | 7. Cascade Lookout Tower |
| 2. Split Rock Light House | 8. Hovland Lookout Tower |
| 3. Palisade Head | 9. Mt. Sophie |
| 4. Carlton Peak | 10. Mt. Maud |
| 5. Eagle Mountain | 11. Mt. Josephine |
| 6. Caribou Lake | |

A viewshed was constructed from each of these prominent points, as shown in Figure 8. If a viewshed extended for an infinite distance, a realistic visibility limit of 5 and 7 miles was drafted.

Fig. 8



The network of visible points along the shore and their related sight lines was mapped. Cumulative viewsheds were then approximated to the nearest in order to provide a describable line . Figure 9 illustrates the viewshed constructed for each of the five different types of viewpoints used. These cumulative viewsheds demonstrate that there is a vast area of the North Shore that is potentially visible from locations frequently visited by residents and tourists.

characterization

NORTH SHORE

Fig. 9 This map illustrates the cumulative viewsheds for each of the five different types of viewpoints



TH. 61
Lake Superior
Road H.R.
Major Thoroughfares
Major Streams

VIEWSHED AREAS
Scale 1:2 miles



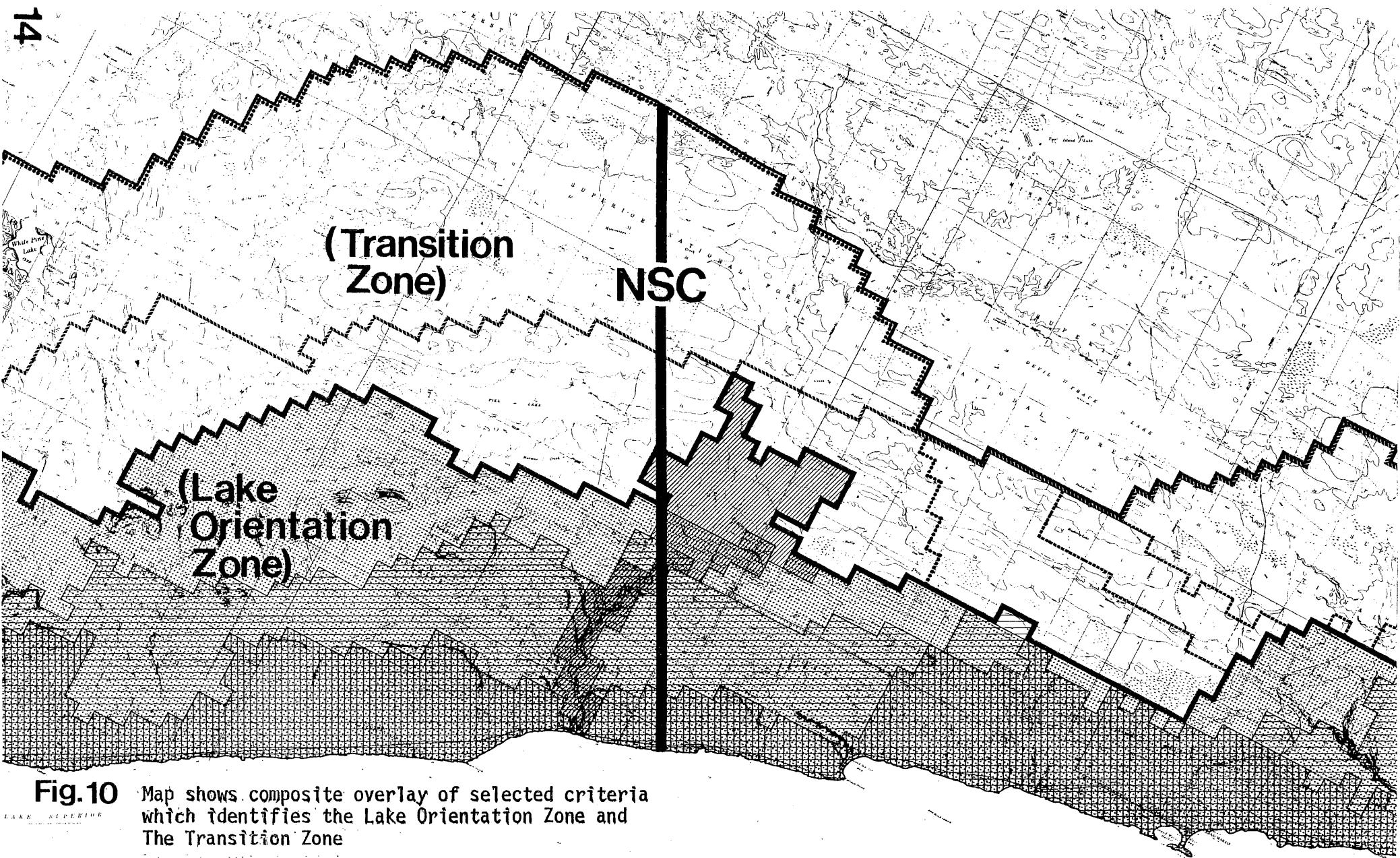


Fig. 10

Map shows composite overlay of selected criteria which identifies the Lake Orientation Zone and The Transition Zone



Analysis

Analysis of all the information helped identify two zones, the Lake Orientation Zone and the Transition Zone, which together make up the North Shore Corridor. Figure 10 outlines these two zones. It also illustrates, for a part of the shore, the spatial distribution of the physiographic and visibility variables used to develop the zones.

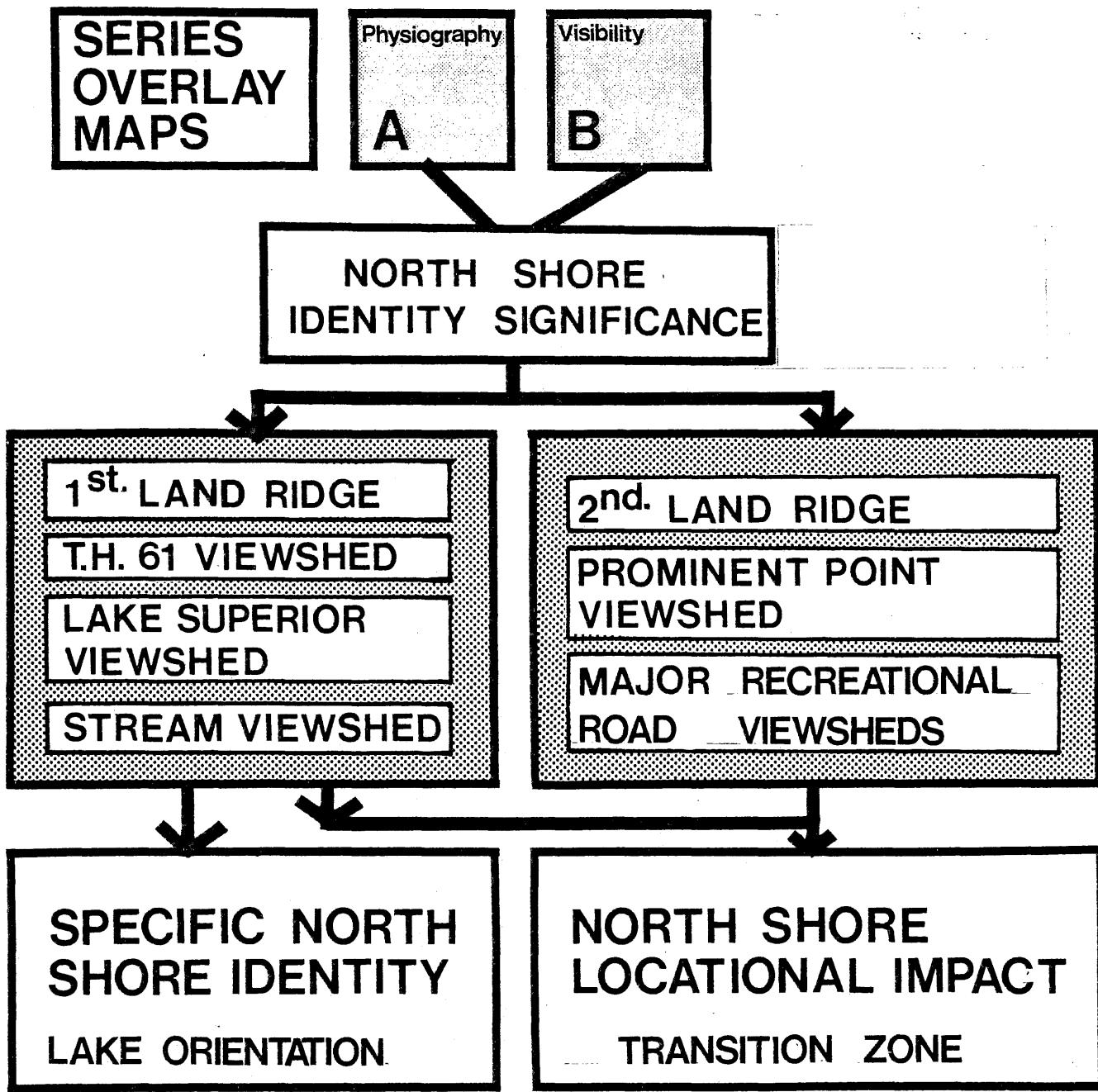
The articulation of these two zones can facilitate the development of common goals, policies and management objectives for the North Shore Corridor, or the development of separate goals, policies, and management objectives for each zone.

The Lake Orientation Zone encompasses all lands contained within the first ridge line, and those lands located within the T.H. 61 viewshed, Lake Superior viewshed, and a major stream viewshed.

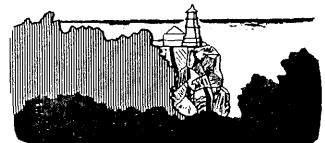
The Transition Zone encompasses lands between the first and second ridge line, and those lands within the viewshed of a prominent point or recreational road.

The procedure for selecting these two zones is illustrated in the flow chart on the following page. Additional criteria analysis can be found in Supplement D.

ANALYSIS

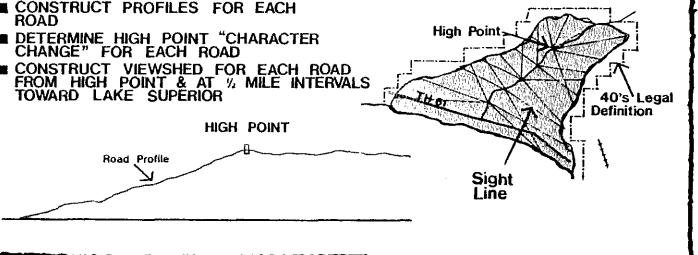


METHODOLOGY SUMMARY



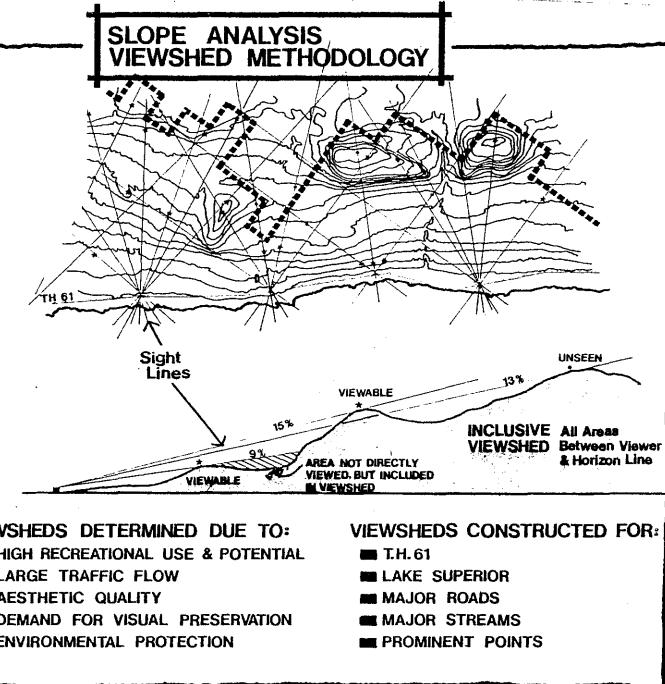
ROAD PROFILE HIGH POINT DETERMINATION

- DETERMINE MAJOR THOROUGHFARES OFF OF TH 61 (Due to recreational use & destination)
- CONSTRUCT PROFILES FOR EACH ROAD
- DETERMINE HIGH POINT "CHARACTER CHANGE" FOR EACH ROAD
- CONSTRUCT VIEWSHED FOR EACH ROAD FROM HIGH POINT & AT $\frac{1}{2}$ MILE INTERVALS TOWARD LAKE SUPERIOR



PROMINENT POINT DETERMINATION

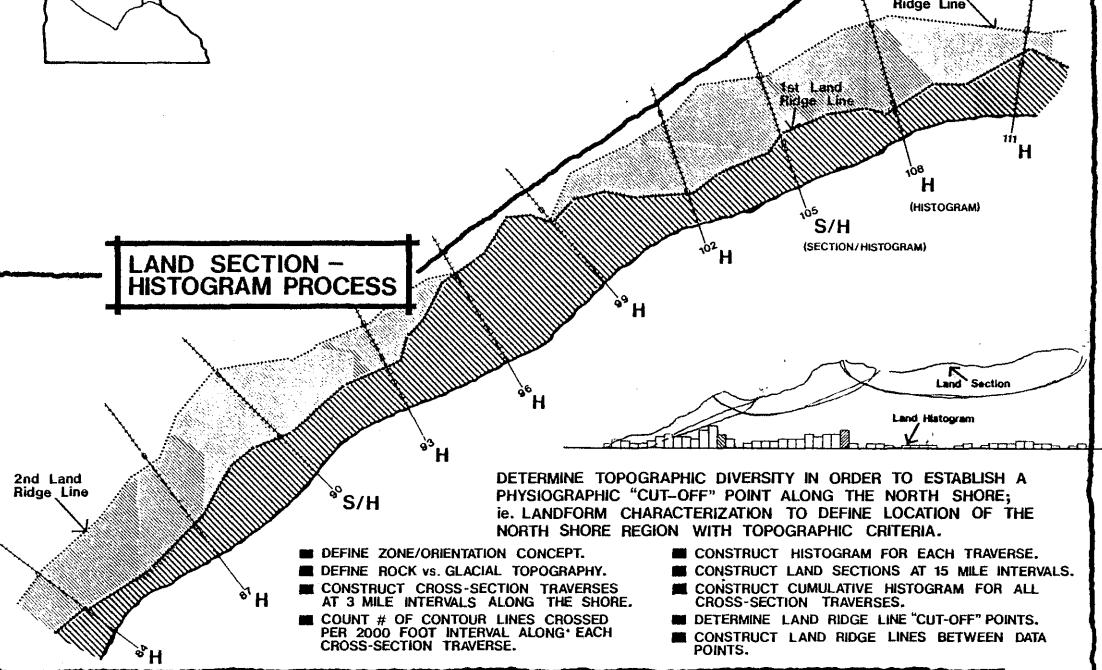
- SELECT AREAS OF PROMINENT RELIEF BASED ON FOLLOWING CRITERIA
 - STEEP SLOPES & HEIGHT OF LAND
 - LAND WITHIN PUBLIC OWNERSHIP
 - LAND WITH PUBLIC ACCESS
 - LAND WITH PRESENT HIGH INTENSITY USE
- CONSTRUCT VIEWSHED FROM PROMINENT POINTS (11)
- IF VIEWSHED EXTENDS CONSTRUCT 5 & 7 MILE LIMITS



STREAM PROFILE FREQUENCY CUT-OFF PROCESS

-
- DETERMINE AMOUNT OF DROP PER 1000 FOOT SEGMENT FOR EACH RIVER IN ORDER TO ESTABLISH STREAM UNIQUENESS & CHARACTER CUT-OFF POINT.
- CONSTRUCT PROFILES FOR EACH RIVER.
 - DIVIDE PROFILES INTO 1000 FOOT SEGMENTS.
 - CALCULATE RATE OF DROP PER SEGMENT.
 - CONSTRUCT HISTOGRAM FOR EACH RIVER.
 - CONSTRUCT CUMULATIVE HISTOGRAM FOR ALL RIVERS.
 - DETERMINE "CHARACTER CUT-OFF" FOR EACH RIVER.
 - CONSTRUCT VIEWSHED FOR EACH RIVER FROM CUT-OFF POINT & AT $\frac{1}{2}$ MILE INTERVALS TOWARDS LAKE SUPERIOR.

LAND SECTION - HISTOGRAM PROCESS



Conclusion

The North Shore of Lake Superior may be defined as an area comprised of two distinct zones, the Lake Orientation Zone and the Transition Zone. Together, these zones comprise the physiographically unique region called the North Shore Corridor.

Map reductions delineating the entire North Shore Corridor are shown on the eight final alignment maps in the following pages. In addition, a legal description listing the land parcels in both the Lake Orientation Zone and the Transition Zone can be found in supplement E at the end of this report. The original maps (1:24000 scale) and supplementary material may be studied at DNR and reproductions will likewise be made available to the public.

characterization study

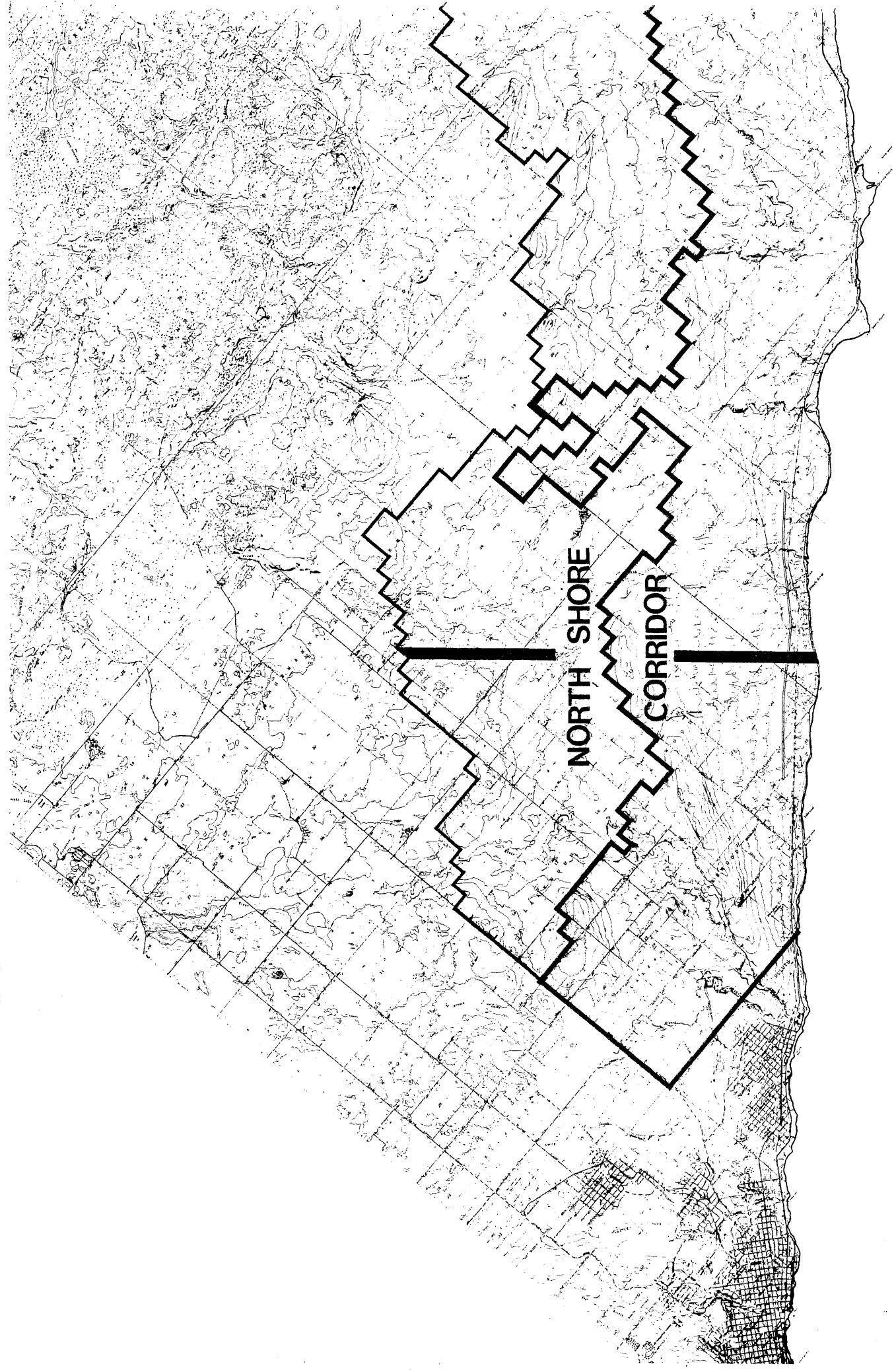
NORTH SHORE

scale 1"= 2 miles
— ALL AREAS LAKEWARD OF THIS LINE
— ALL LINES CONTAIN AT LEAST ONE CRITERIA DEFINED AS "NORTH SHORE LAKE ORIENTATION ZONE"

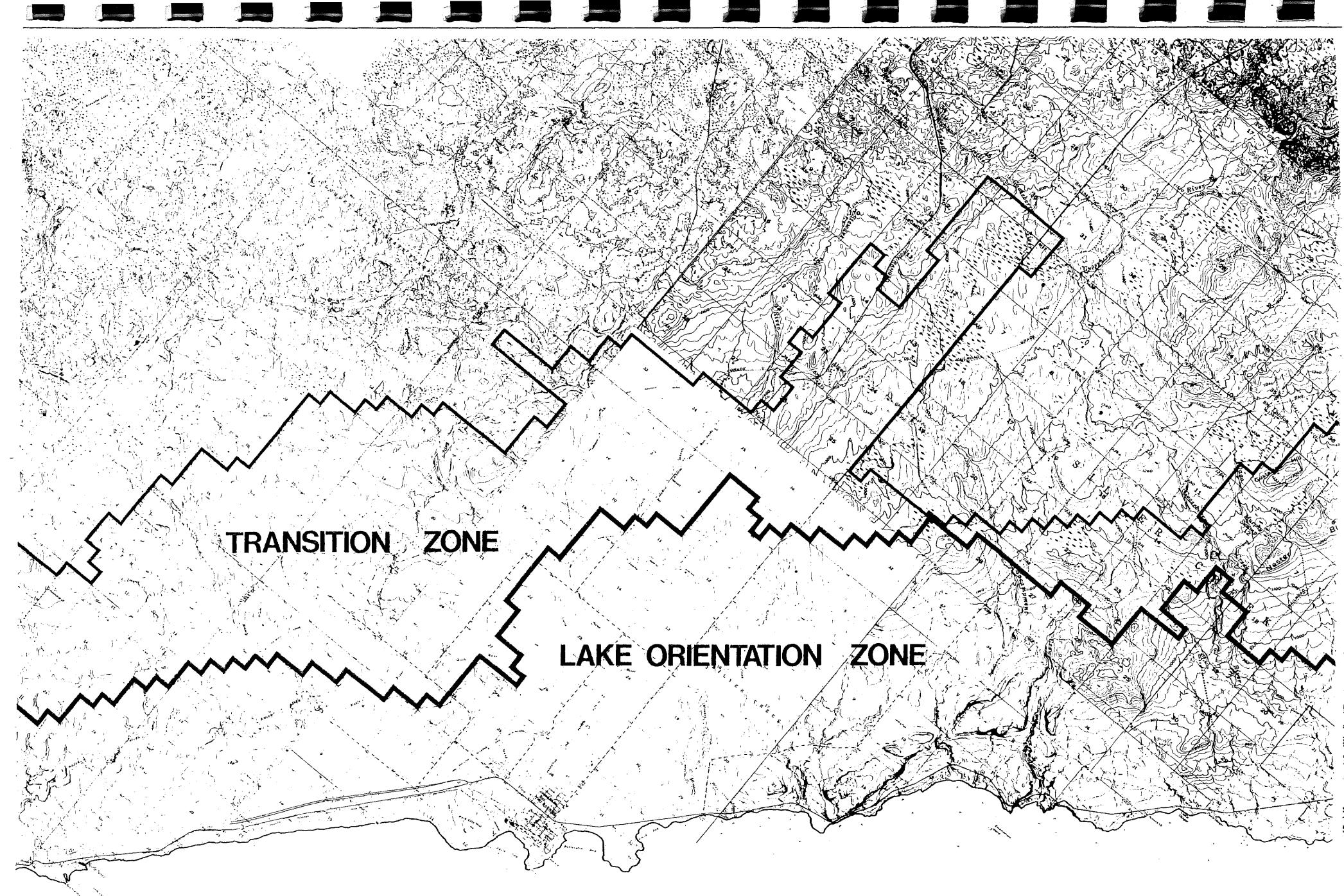
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FINAL ALIGNMENT

19







21

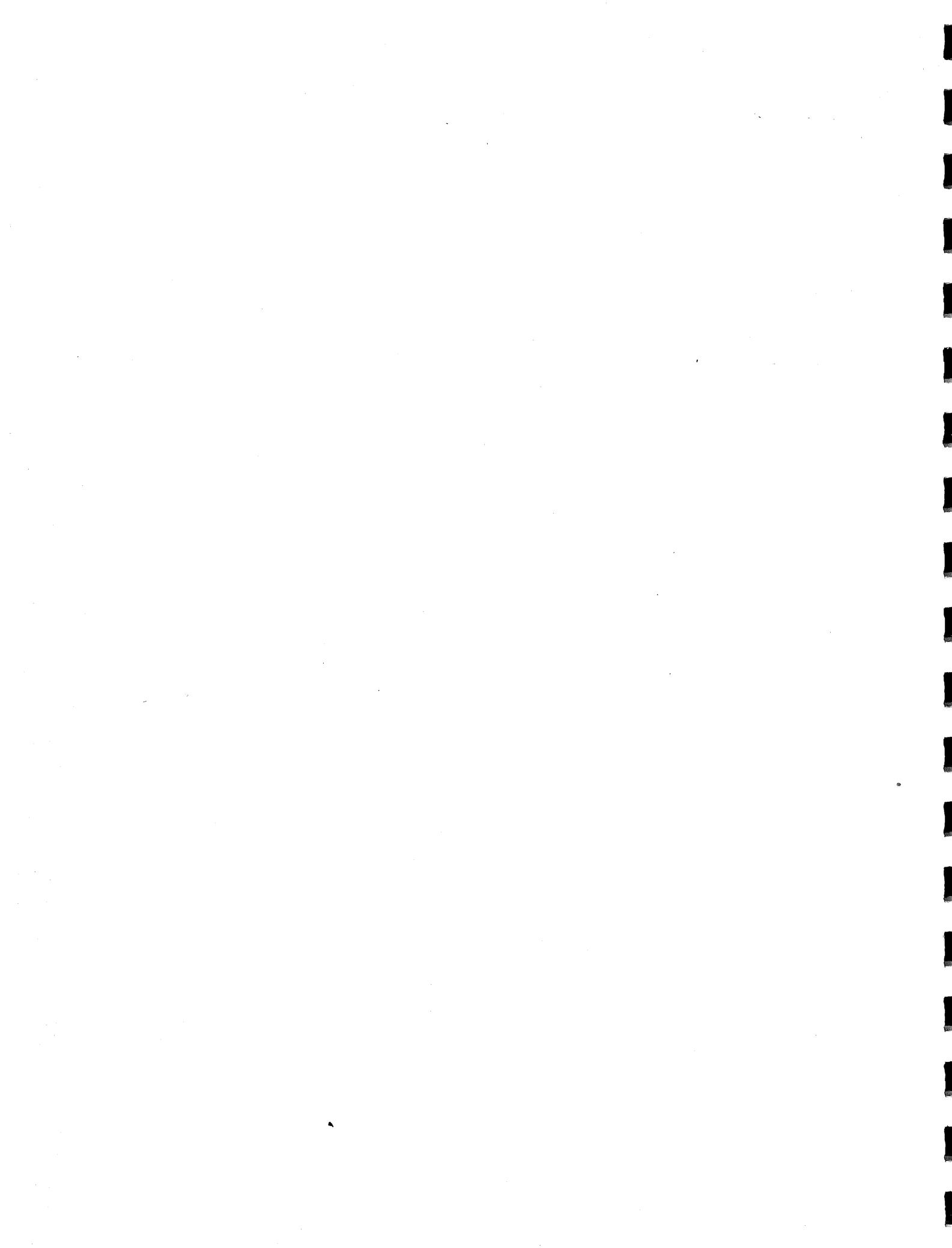
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CONTAIN THE MAJOR CATEGORIES OF
CRITERIA DEFINED AS NORTH SHORE
"LAKE ORIENTATION ZONE"

■ ALL AREAS LAKeward OF
THIS LINE CONTAIN AT LEAST
ONE CRITERION DEFINED AS
NORTH SHORE "TRANSITION"

NORTH SHORE

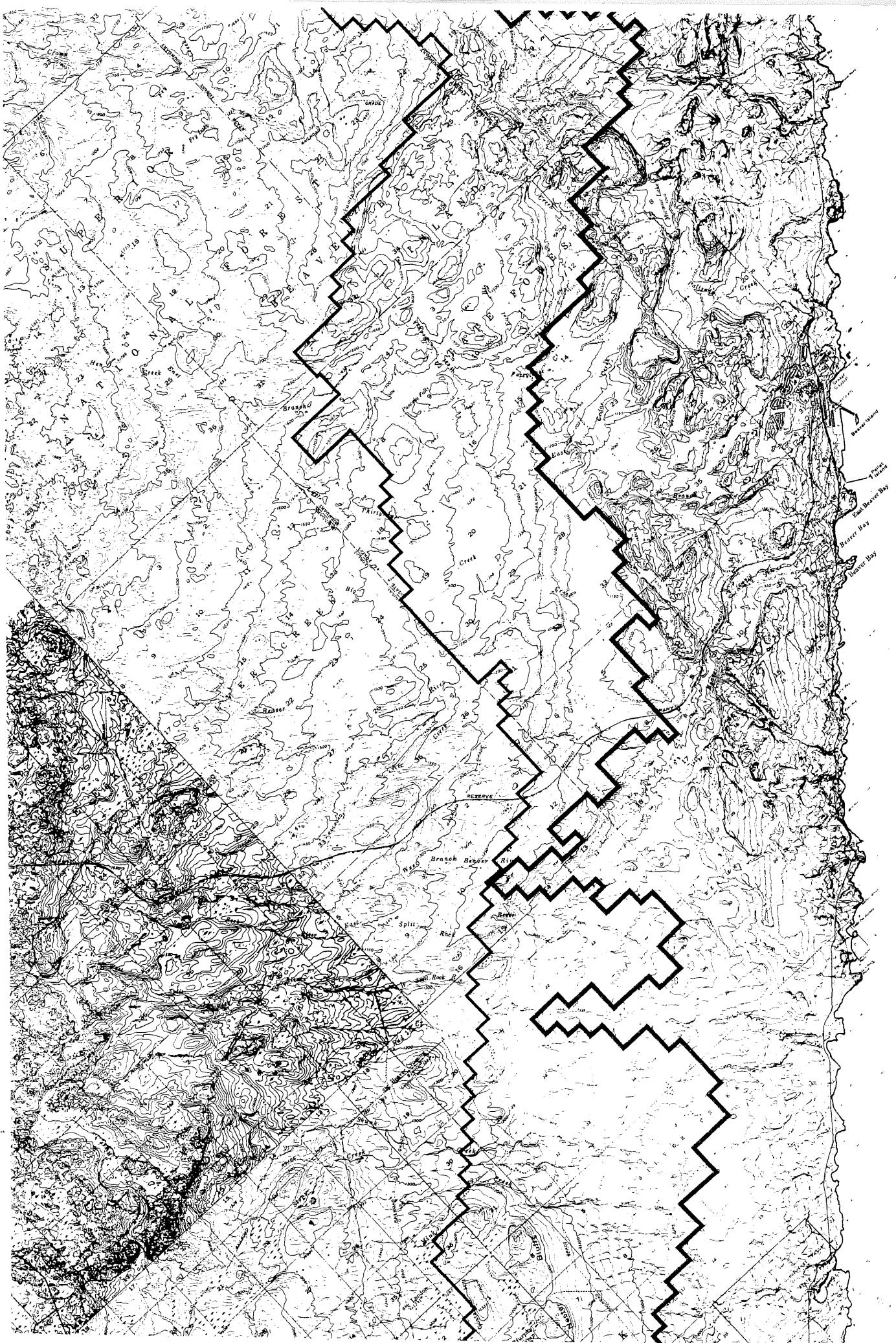
characterization study

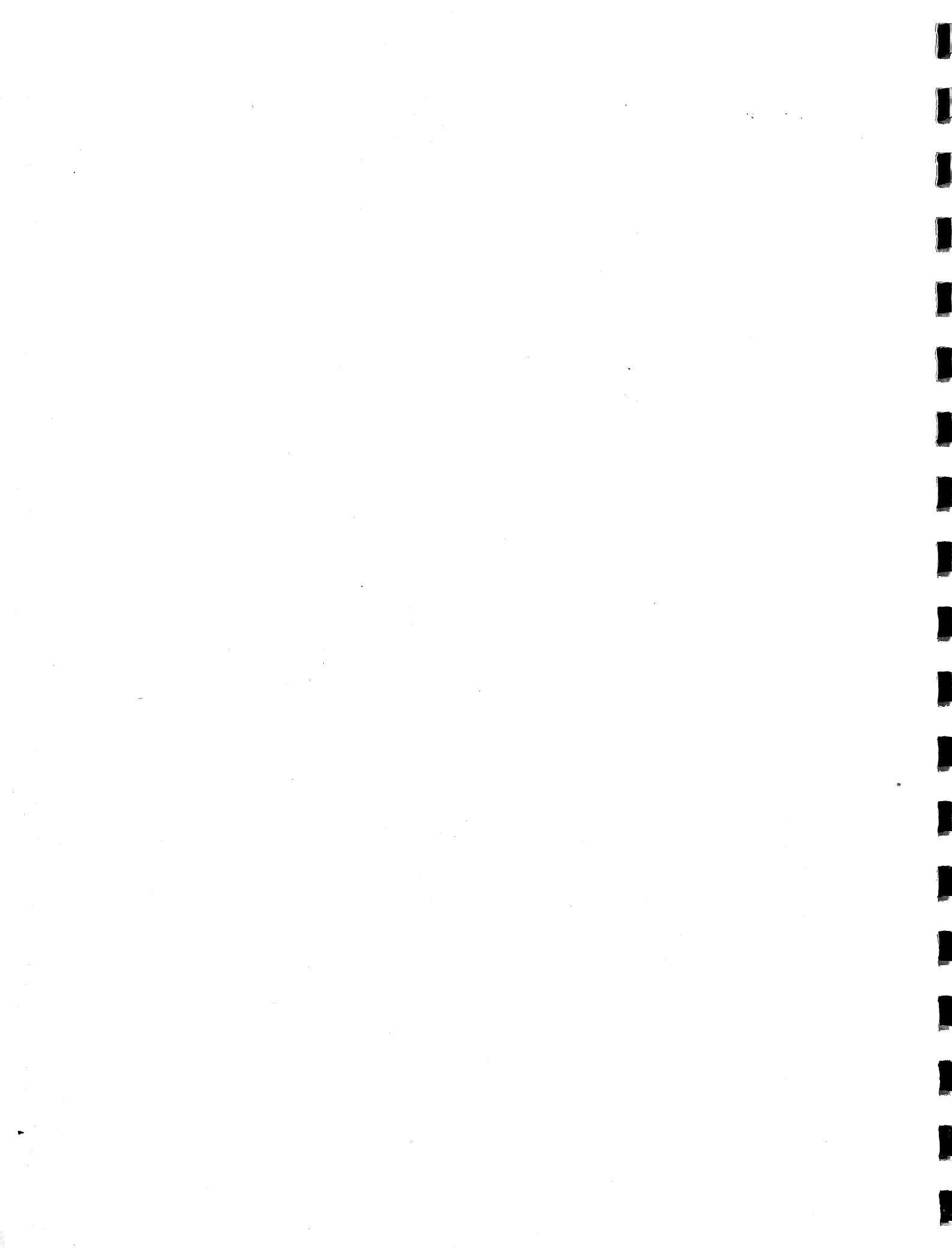


characterization study

NORTH SHORE

scale 1" = 2 miles
FINAL ALIGNMENT
■ ALL AREAS LAKeward OF THIS LINE
■ ALL AREAS LAKeward OF
THIS LINE CONTAIN AT LEAST
ONE CRITERION AS
DEFINED AS "NORTH SHORE"
"LAKE ORIENTATION" ZONE



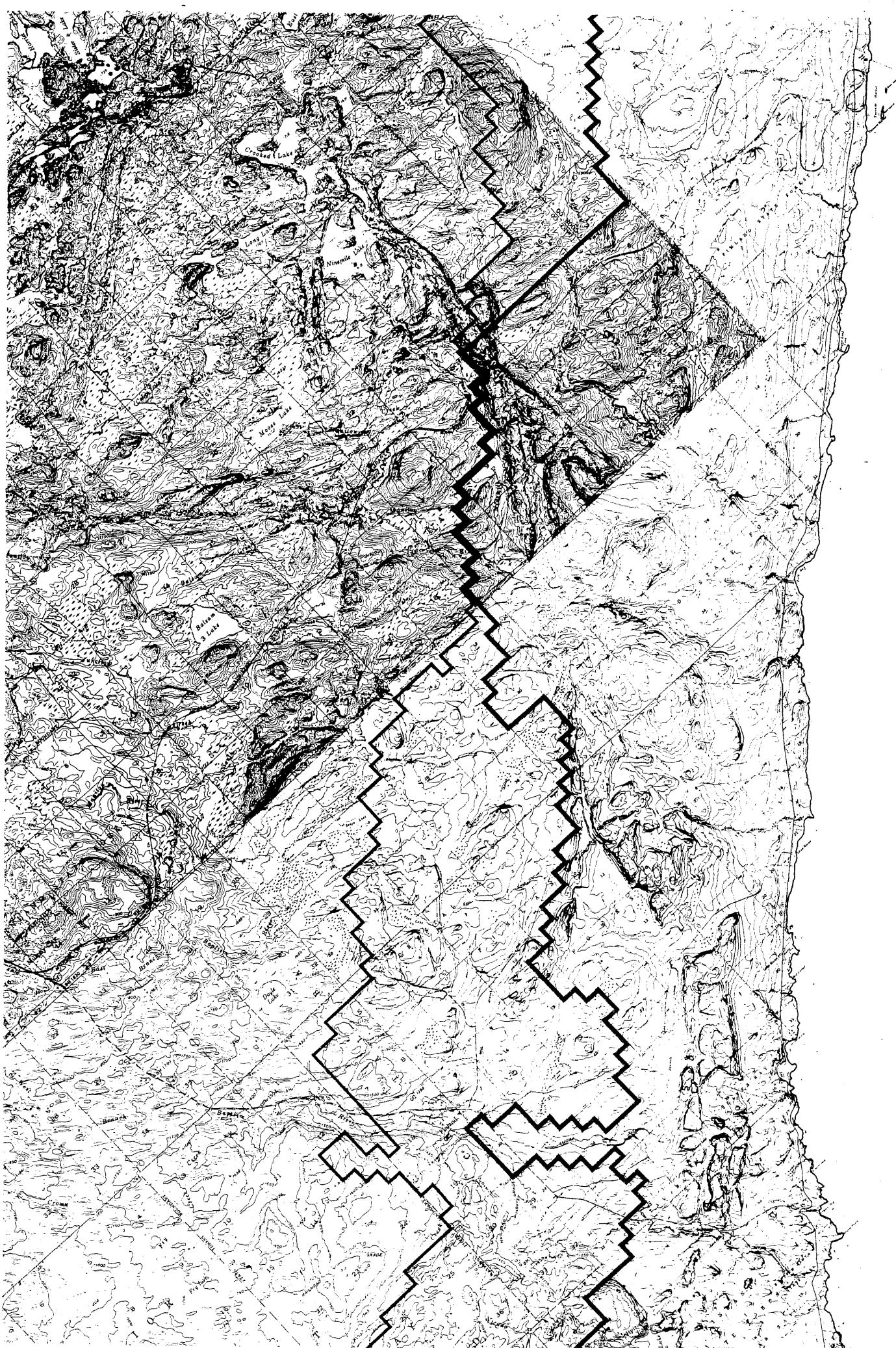


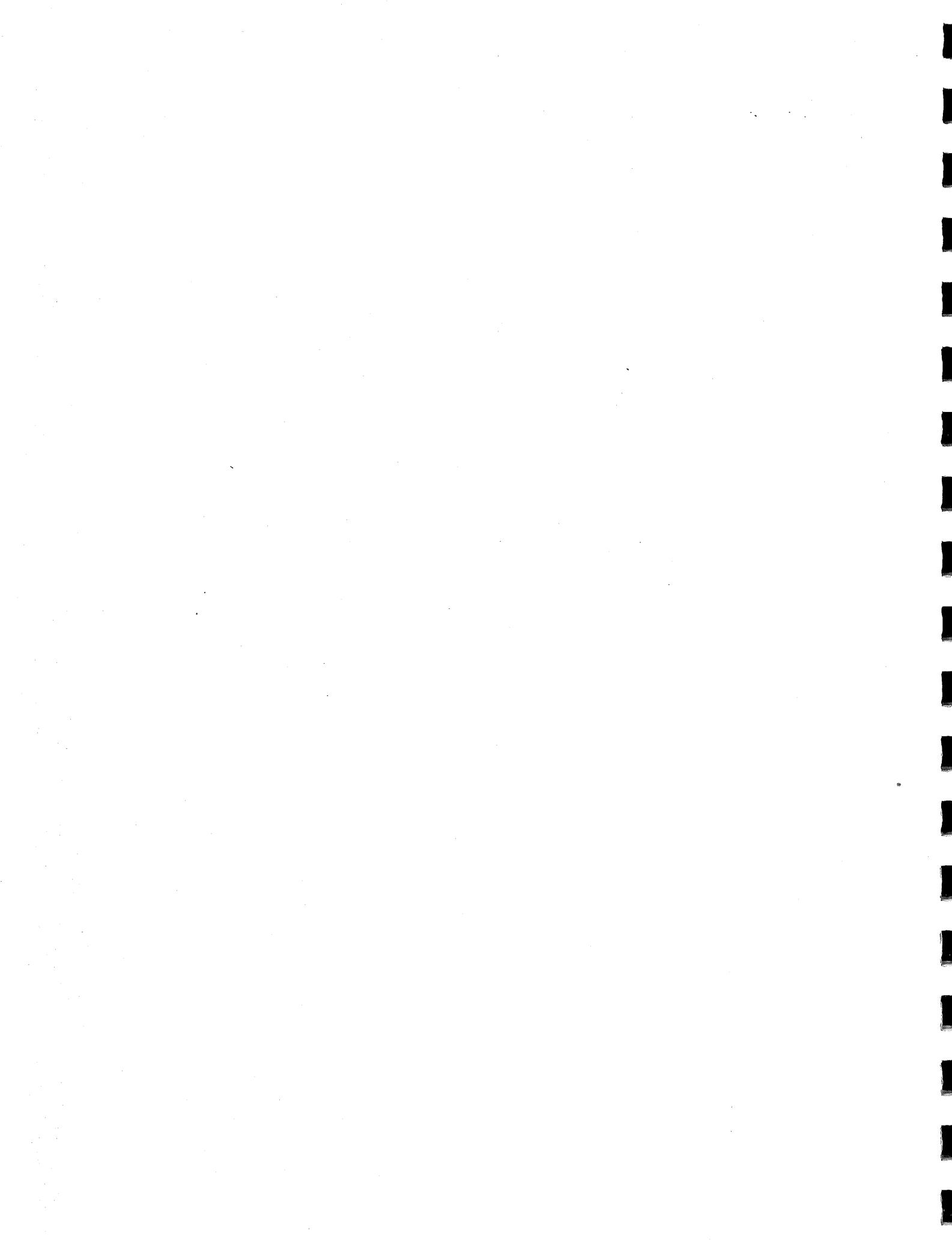
NORTH SHORE characterization study

FINAL ALIGNMENT

■ ALL AREAS LAKEWARD OF THIS LINE
CONTAIN THE MAJOR CATEGORIES OF
CRITERIA DEFINED AS "NORTH SHORE
LAKE ORIENTATION ZONE"

b







27



FINAL ALIGNMENT

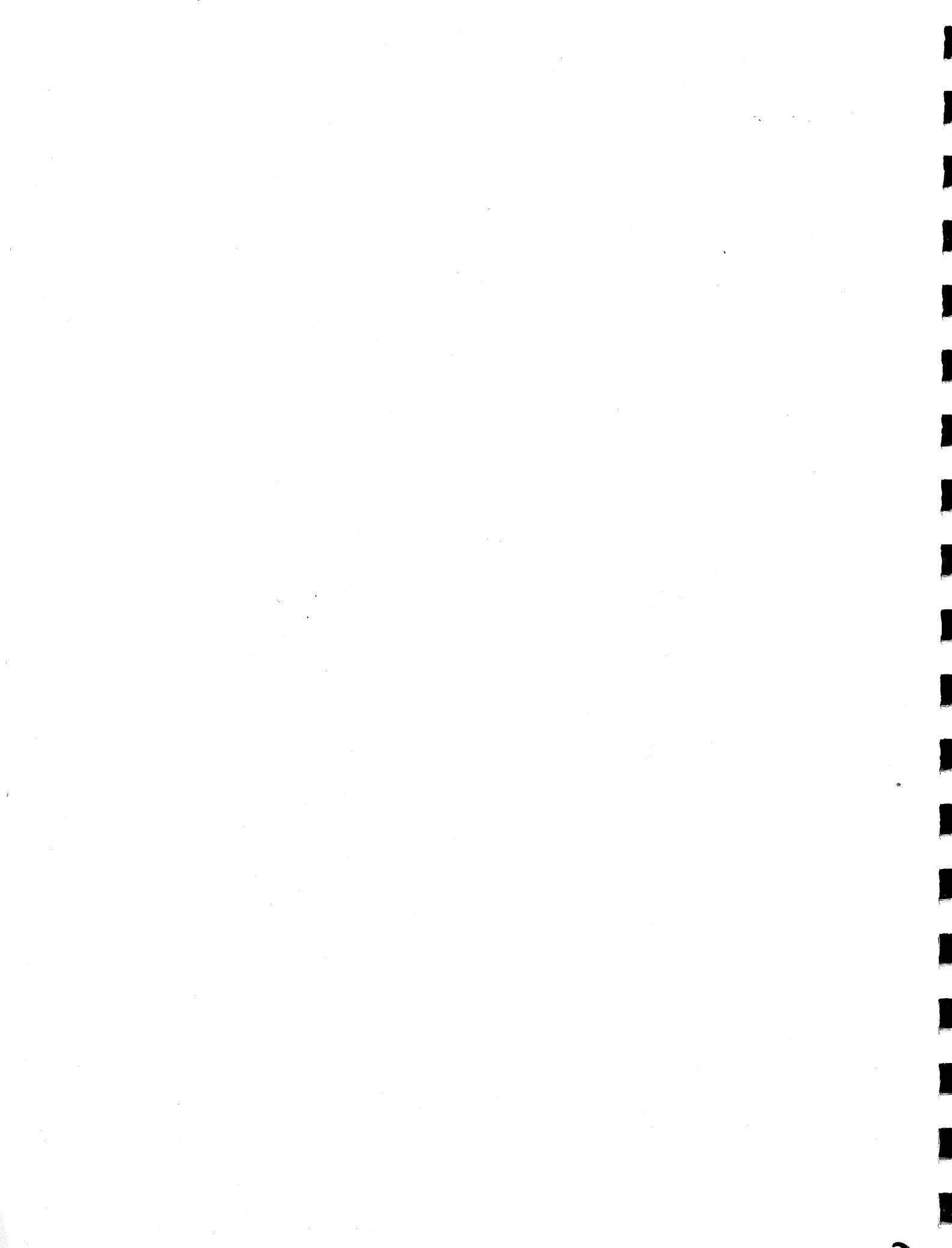
ALL AREAS LAKeward OF THIS LINE
CONTAIN THE MAJOR CATEGORIES OF
CRITERIA DEFINED AS NORTH SHORE
"LAKE ORIENTATION ZONE"

3a

scale 1" = 2 miles
ALL AREAS LAKeward OF
THIS LINE CONTAIN AT LEAST
ONE CRITERION DEFINED AS
NORTH SHORE "TRANSITION"

NORTH SHORE

LAKE SUPERIOR VIEWSHED	T.H. 61 VIEWSHED	STREAM VIEWSHED	1st LAND RIDGE AREA
2nd LAND RIDGE LINE	2nd LAND RIDGE LINE	2nd LAND RIDGE LINE	MISCELLANEOUS CRITERIA LINE ALTERATION
Scale 1":2 miles		VIEWED	
VIEWED		VIEWED	



characterization study

NORTH SHORE

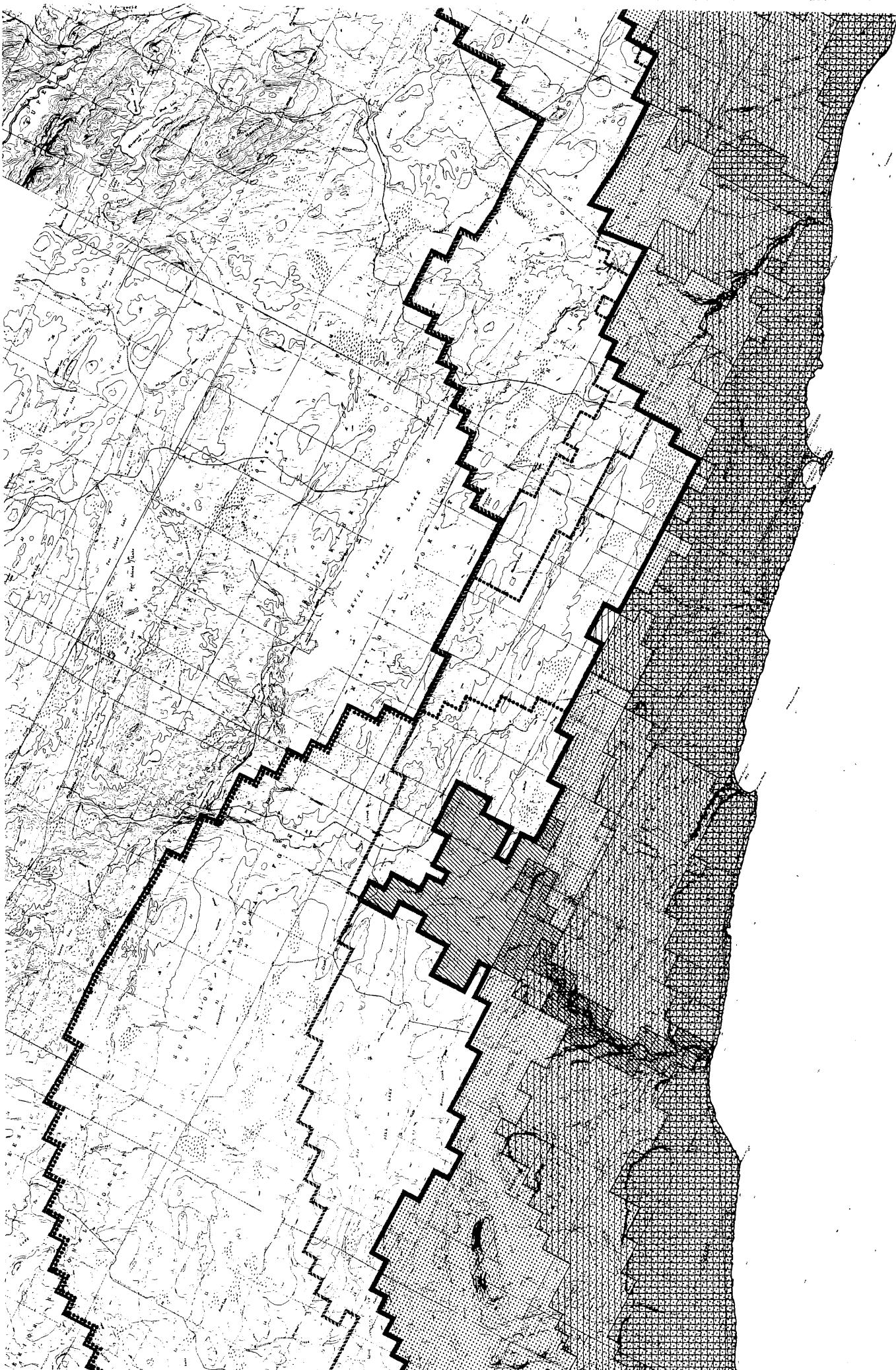
FINAL ALIGNMENT

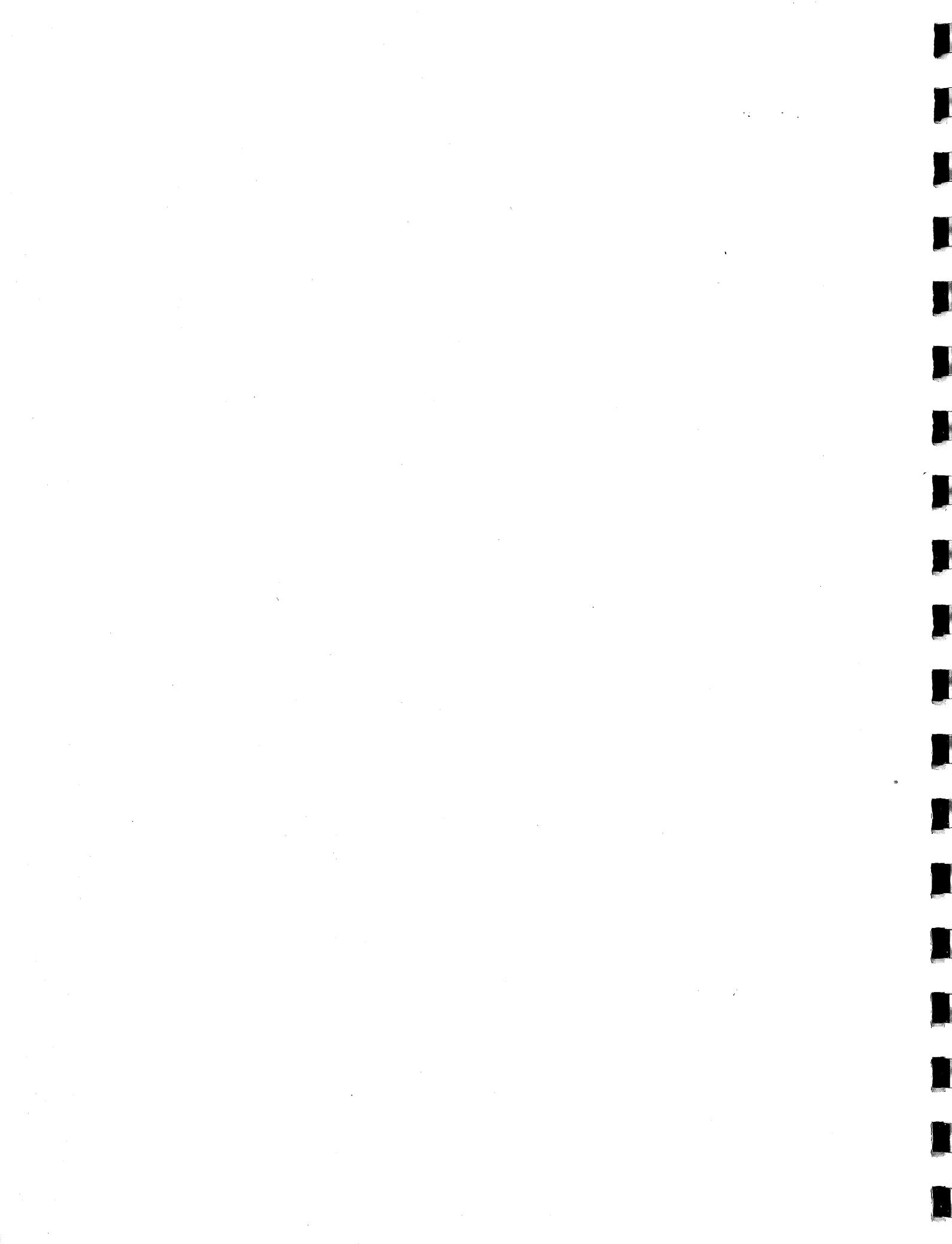
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THIS LINE CONTAIN AT LEAST
ONE CRITERION DEFINED AS
NORTH SHORE "TRANSITION"

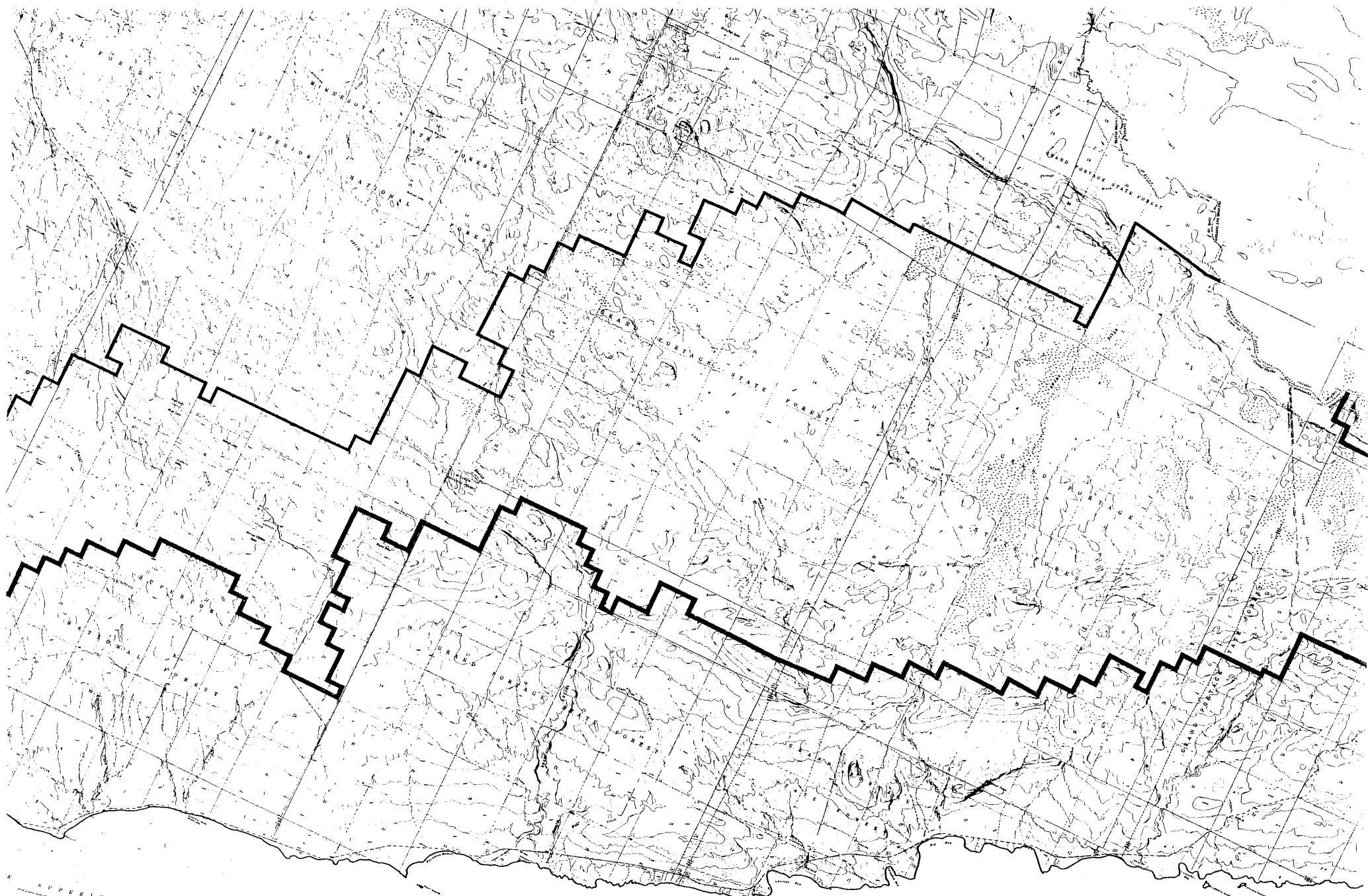
"LAKE ORIENTATION ZONE"

2C

3b







31

**FINAL ALIGNMENT**

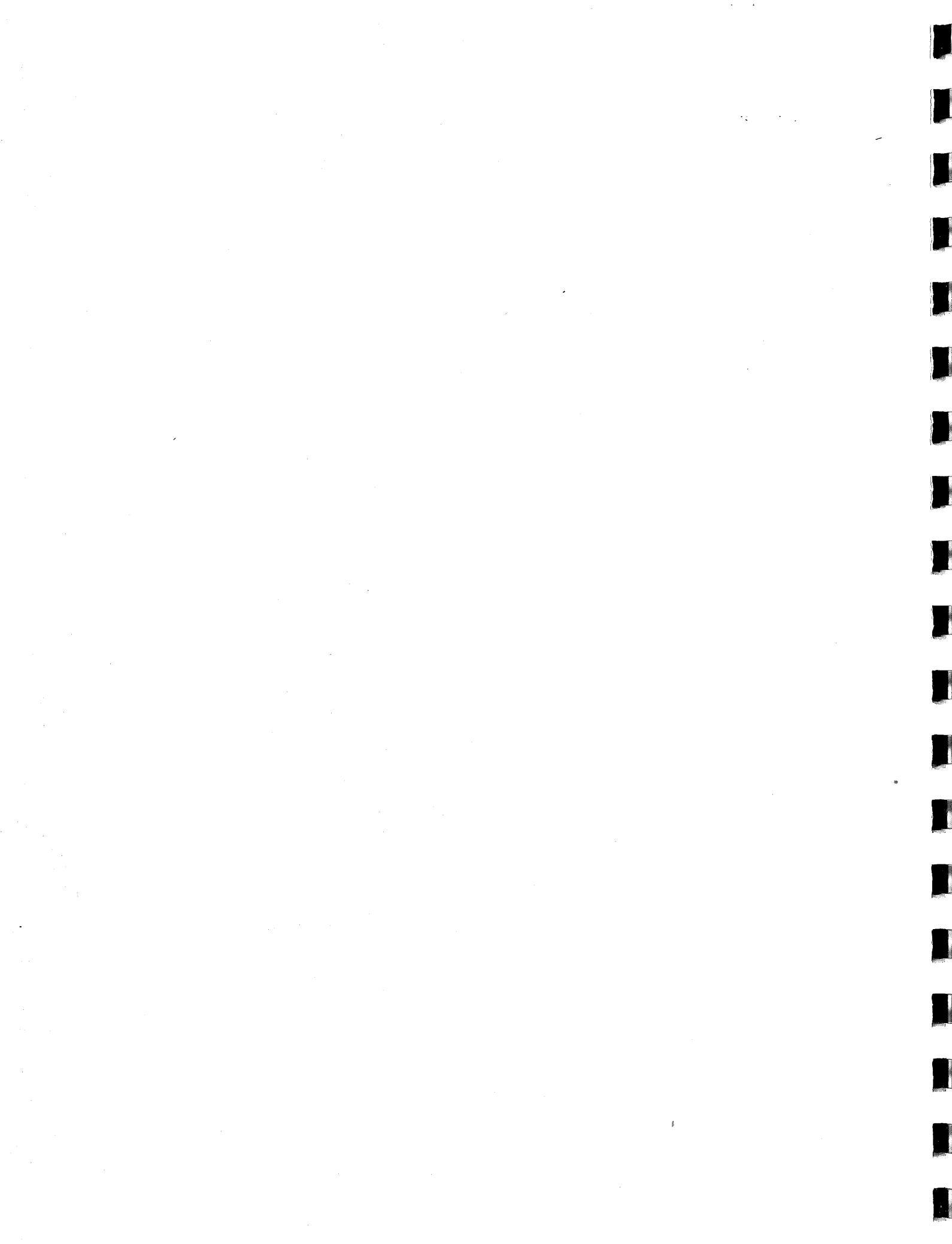
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CONTAIN THE MAJOR CATEGORIES OF
CRITERIA DEFINED AS NORTH SHORE
"LAKE ORIENTATION ZONE"

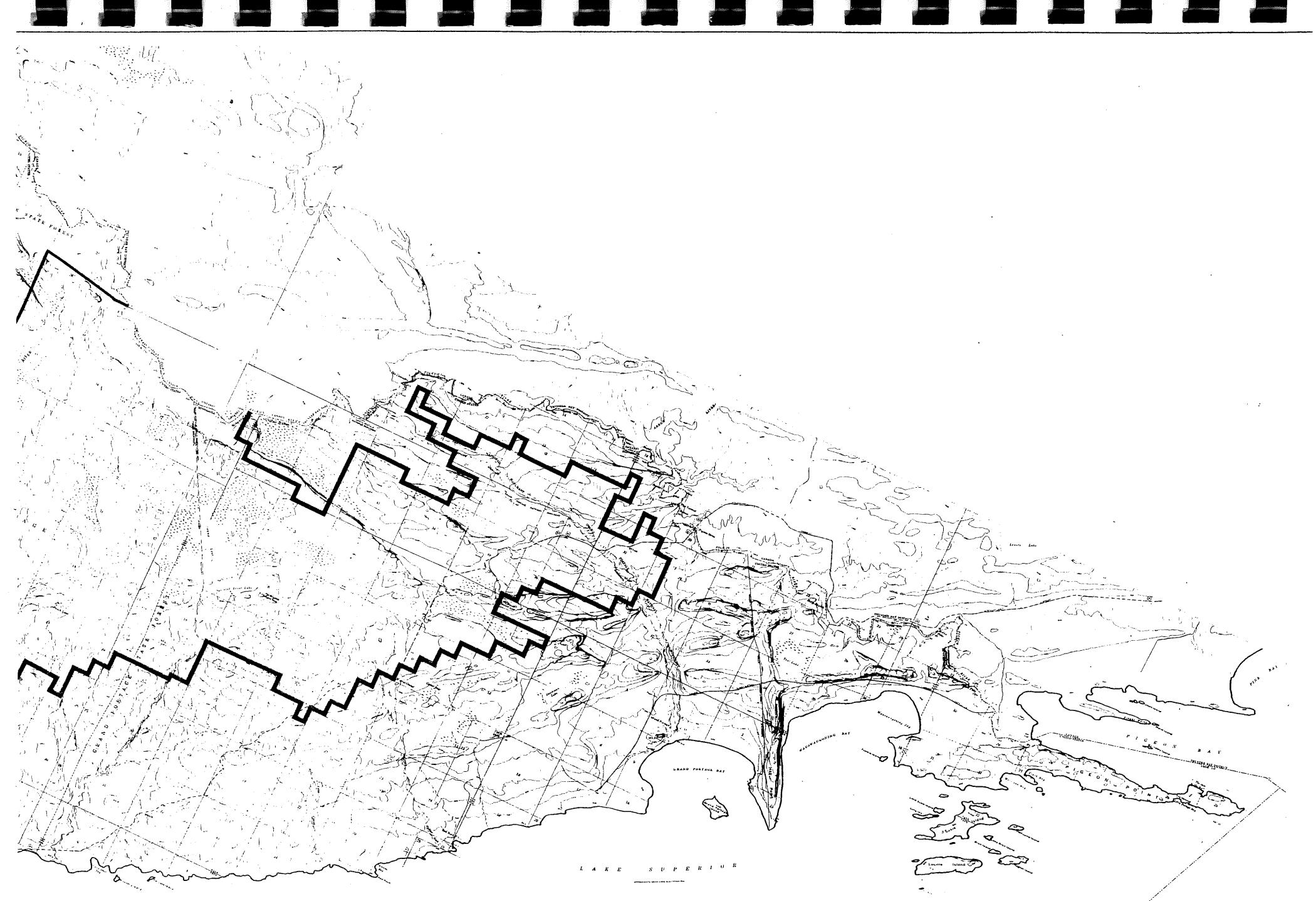
4a

scale 1" = 2 miles
ALL AREAS LAKeward OF
THIS LINE CONTAIN AT LEAST
ONE CRITERION DEFINED AS
NORTH SHORE "TRANSITION"

NORTH SHORE

characterization study





FINAL ALIGNMENT

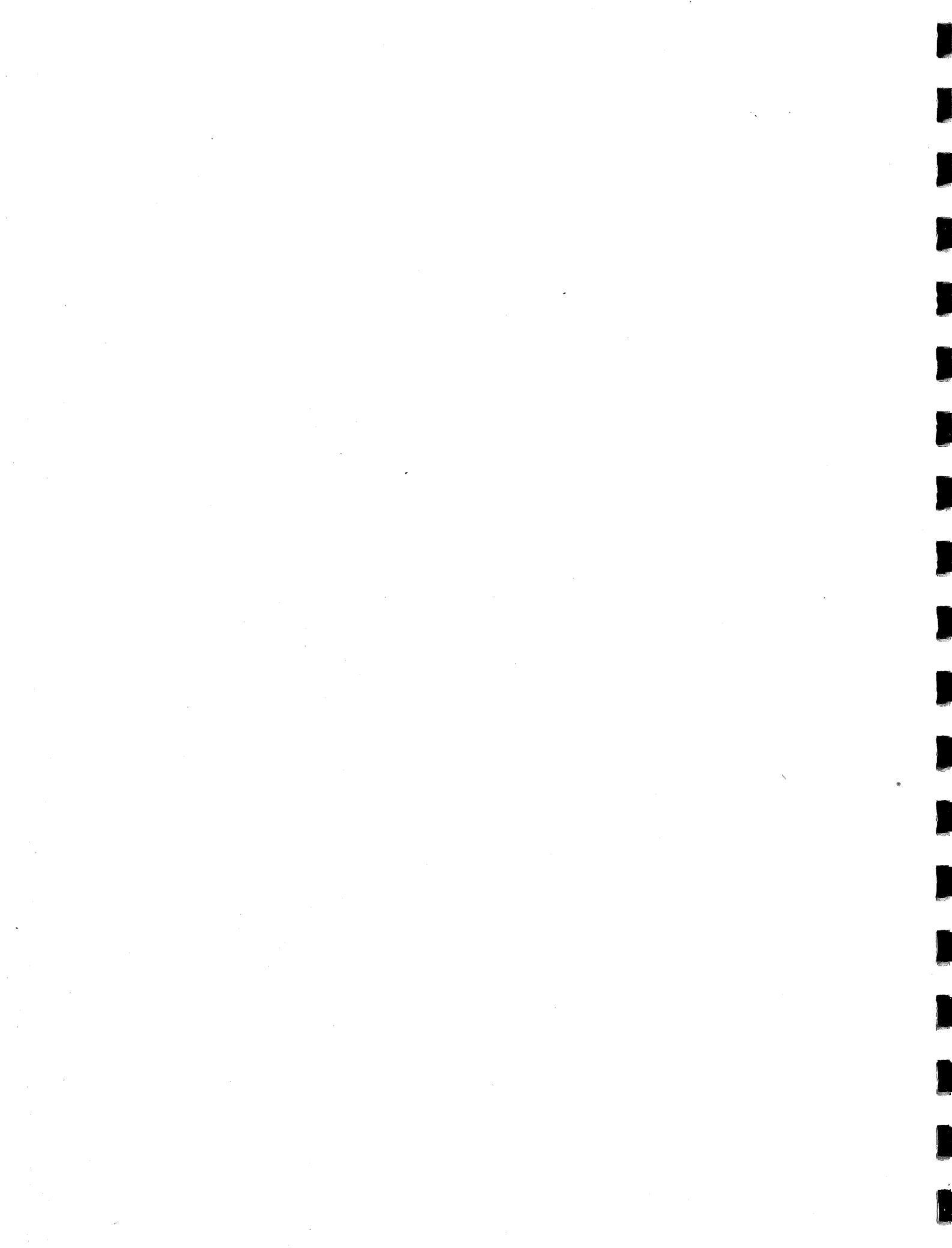
ALL AREAS LAKeward OF THIS LINE
CONTAIN THE MAJOR CATEGORIES OF
CRITERIA DEFINED AS NORTH SHORE
"LAKE ORIENTATION ZONE"

ALL AREAS LAKeward OF
THIS LINE CONTAIN AT LEAST
ONE CRITERION DEFINED AS
NORTH SHORE "TRANSITION"

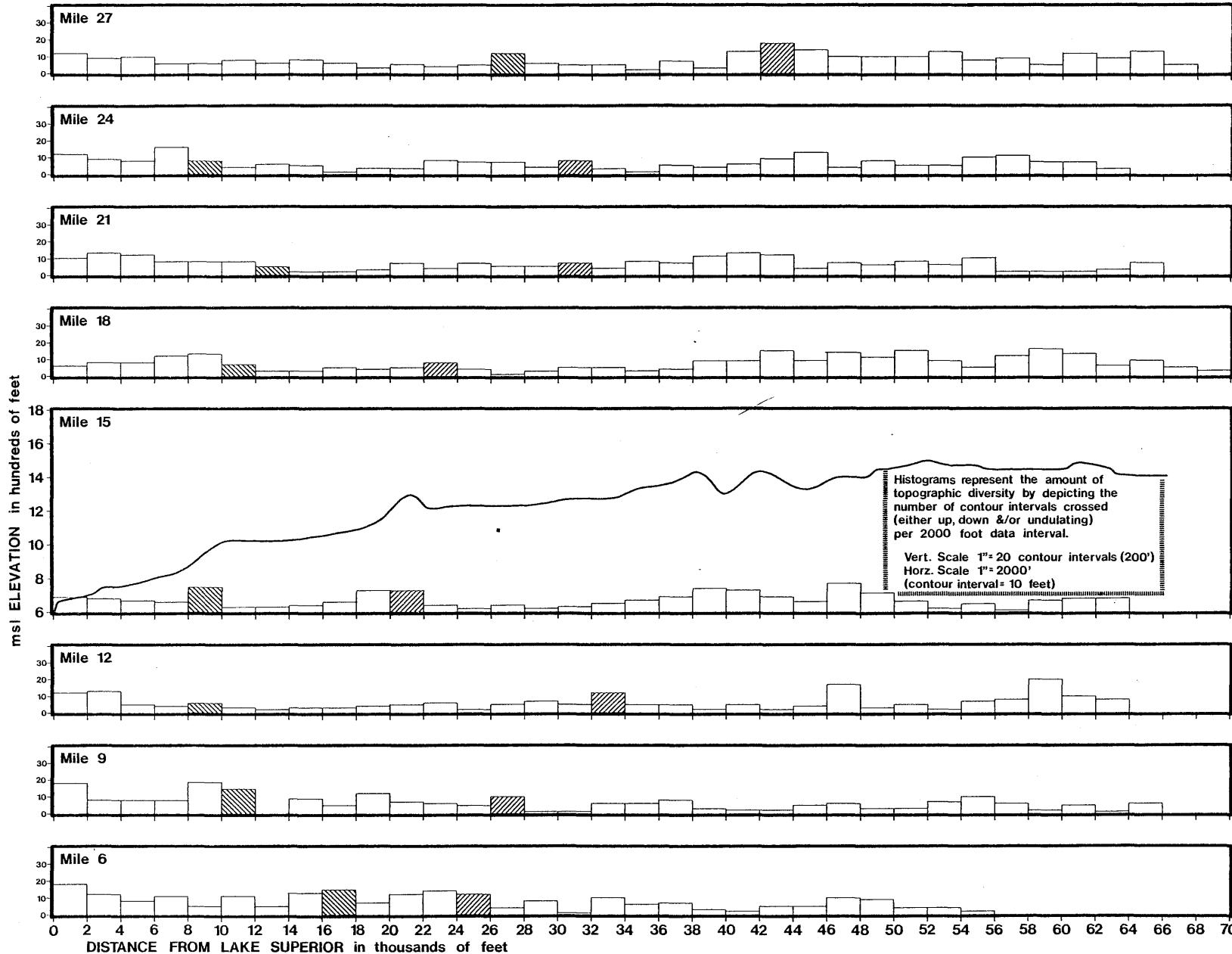
4b

NORTH SHORE

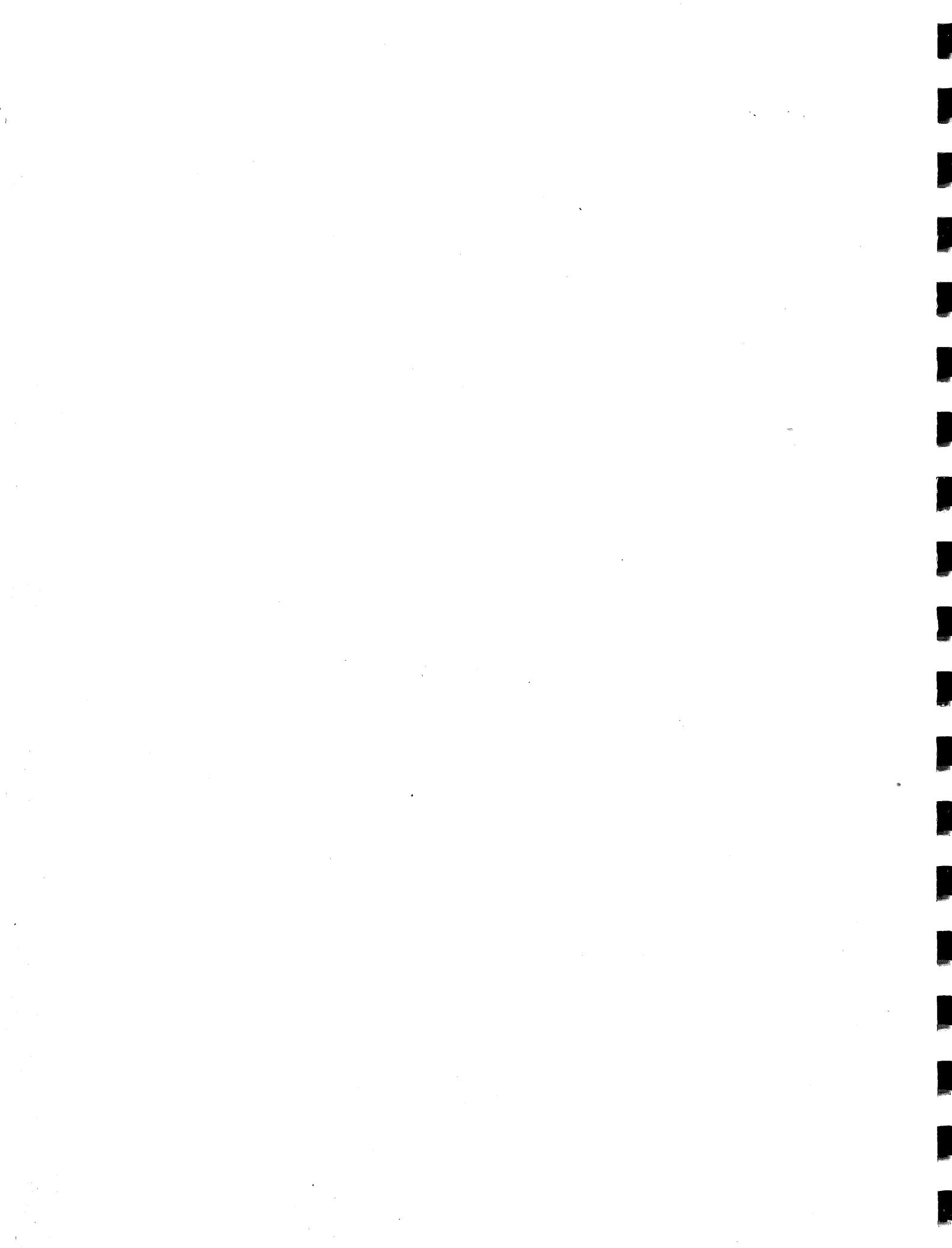
characterization study

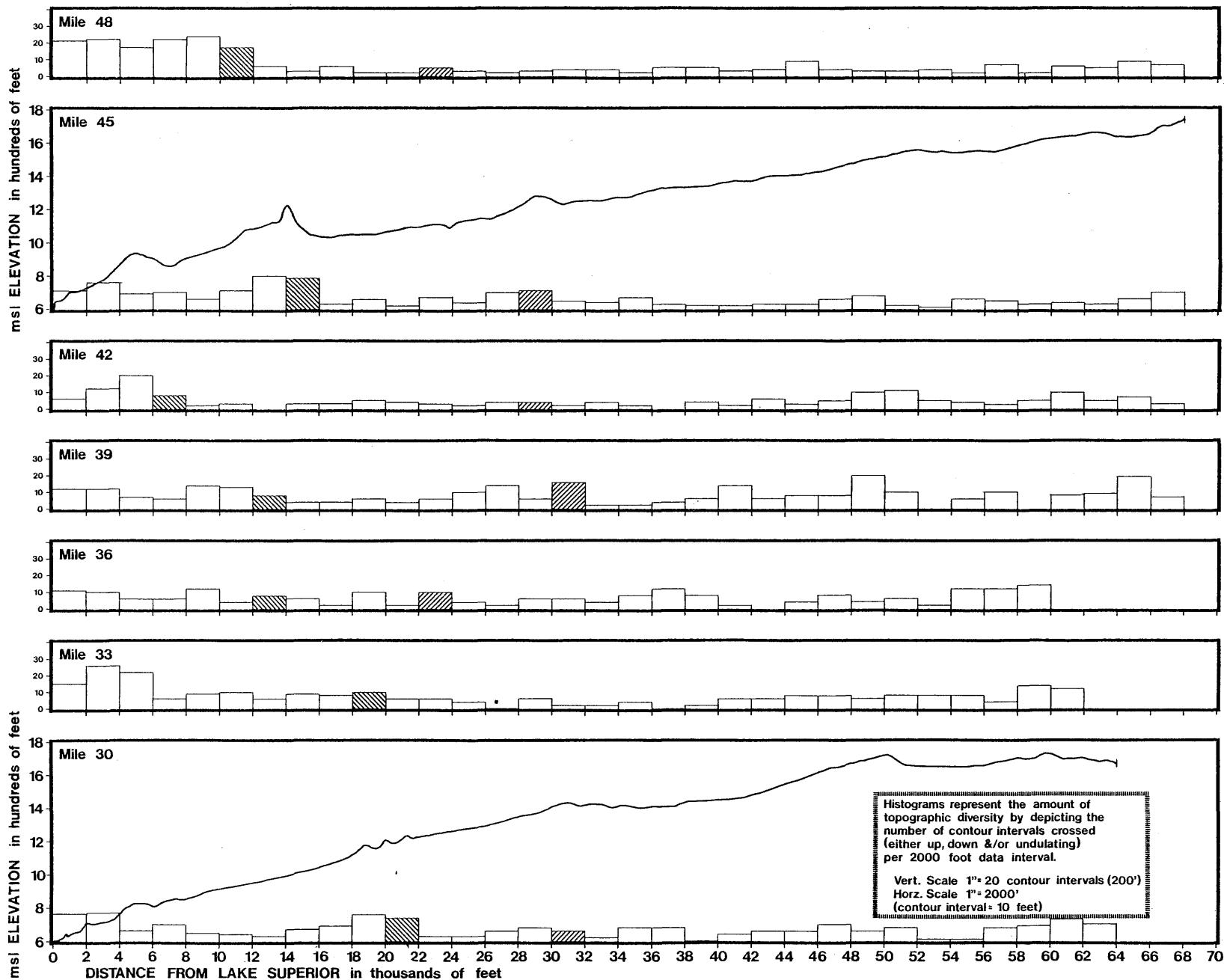


SUPPLEMENT A



**PHYSIOGRAPHIC SUPPLEMENTAL
Land Sections/Histograms - 1 of 7**
Sampling Rate: Sections drafted at 15 mile intervals with
topographic histogram counts taken at 3 mile intervals.
Intervals correspond to T.H. 61 mile markers.

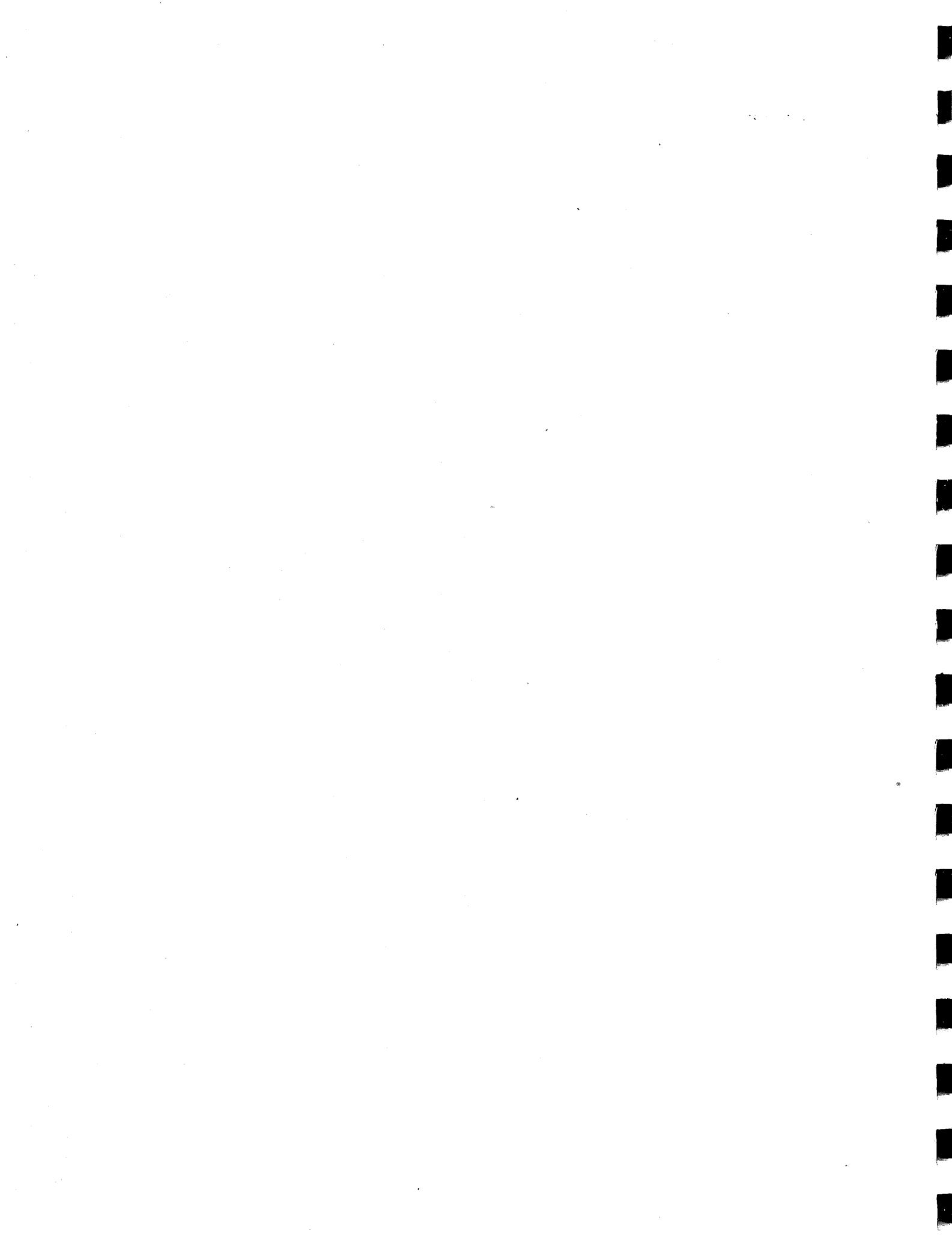


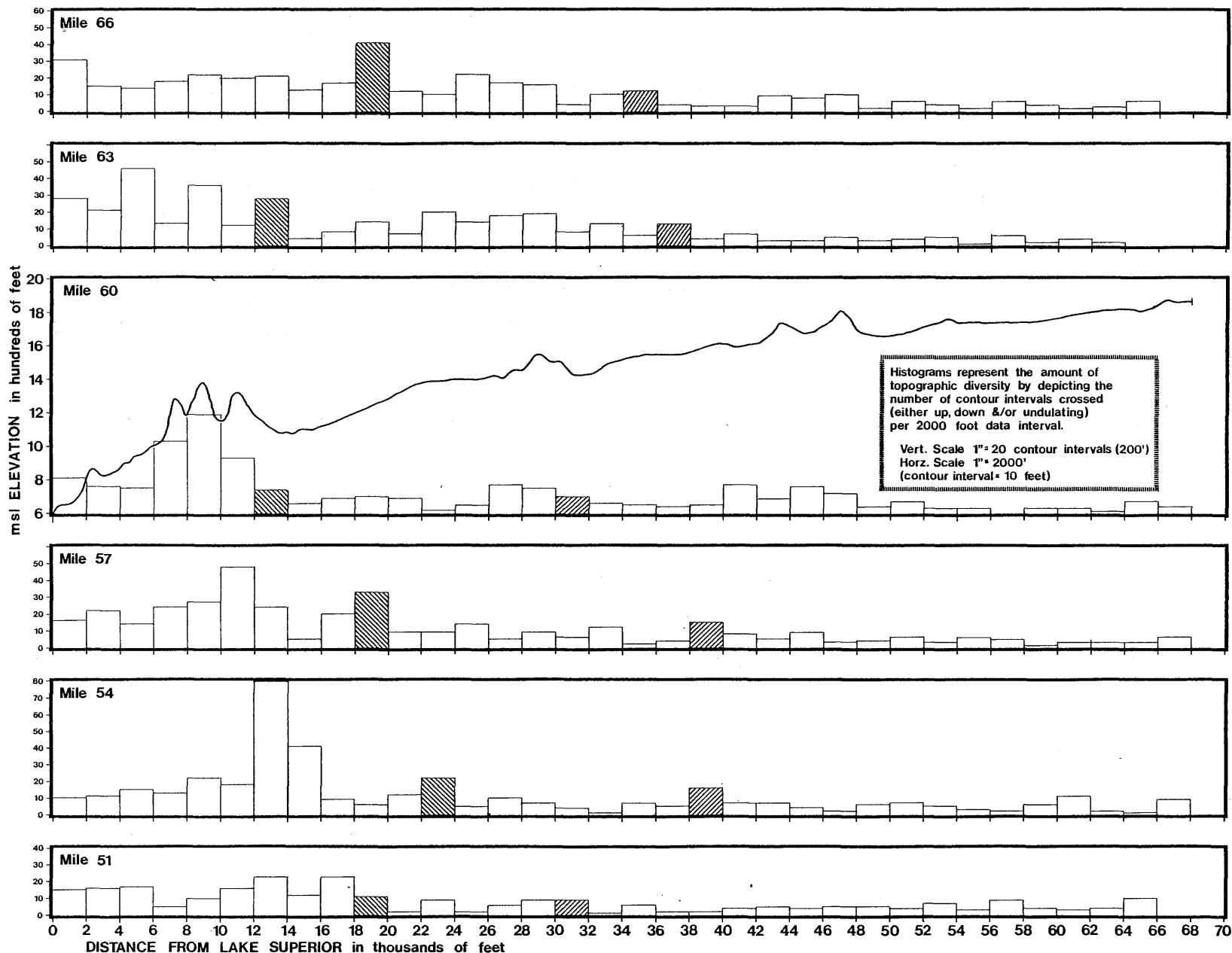


**PHYSIOGRAPHIC SUPPLEMENTAL
Land Sections/Histograms – 2 of 7**
 Topographic Histograms: Sections drafted at 15 mile intervals with topographic histogram counts taken at 3 mile intervals.
 Intervals correspond to T.H. 61 mile markers.



A NORTH SHORE characterization study



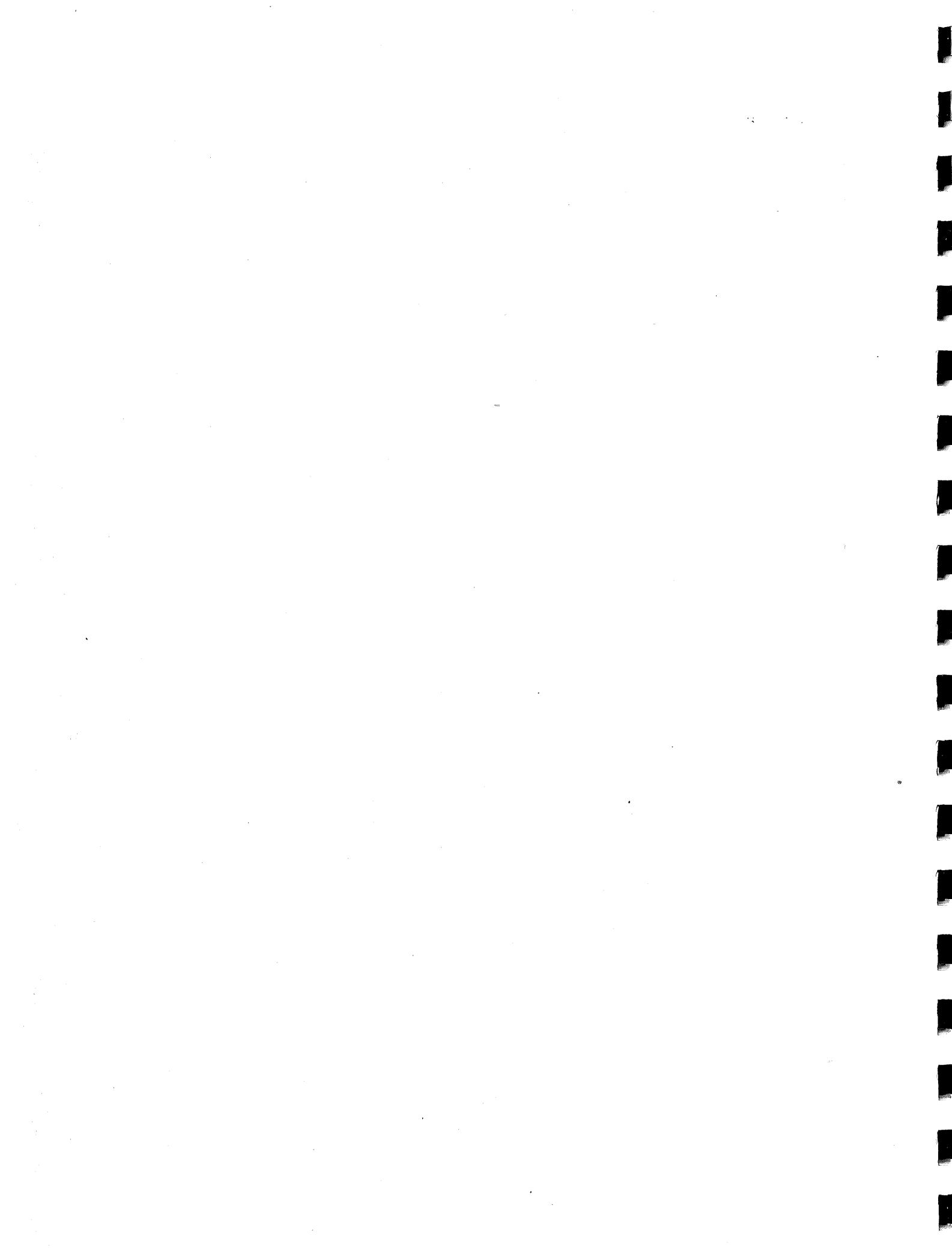


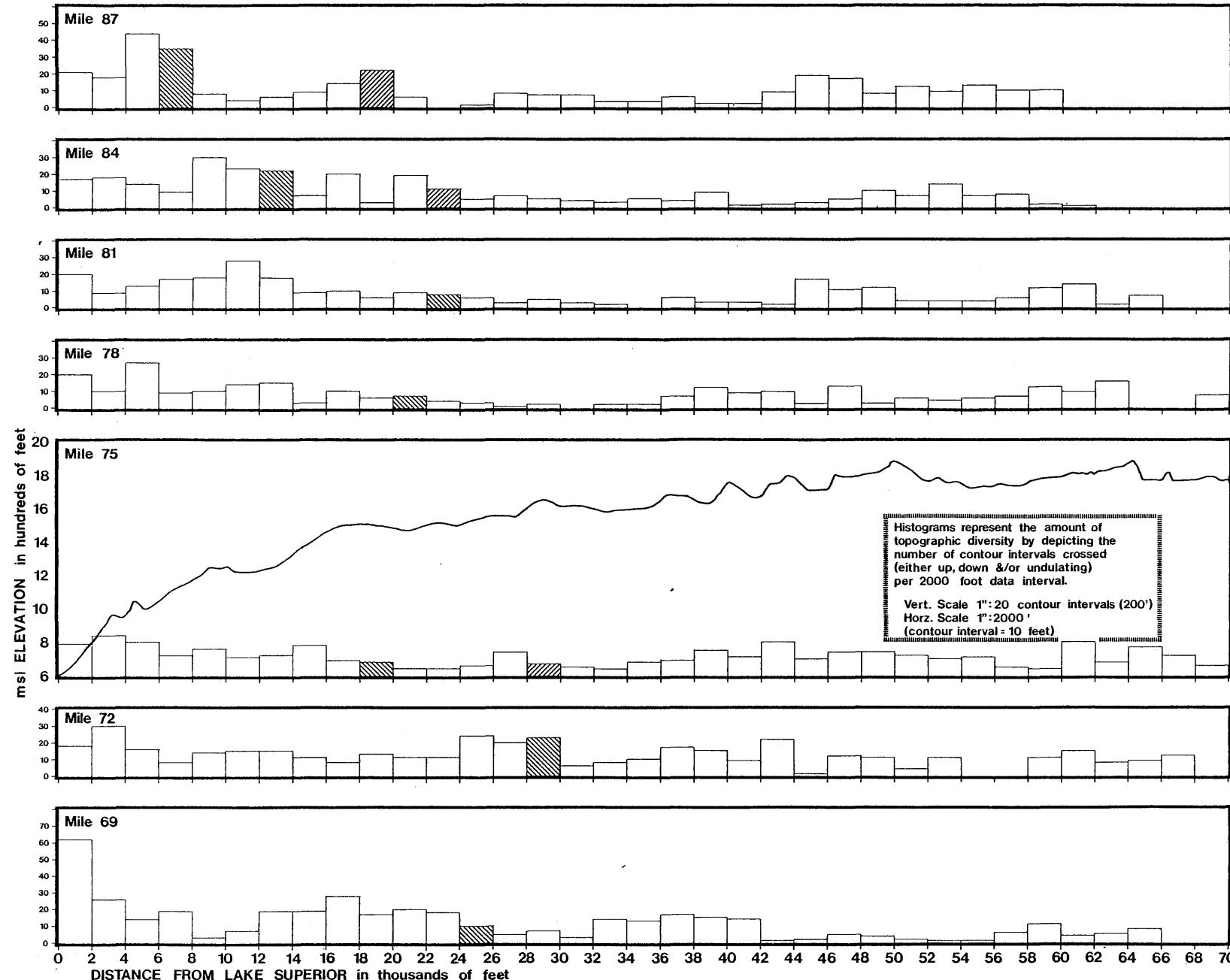
63
**PHYSIOGRAPHIC SUPPLEMENTAL
 Land Sections / Histograms - 3 of 7**

Sampling Rate: Sections drafted at 15 mile intervals with topographic histogram counts taken at 3 mile intervals. Intervals correspond to T.H. 61 mile markers.



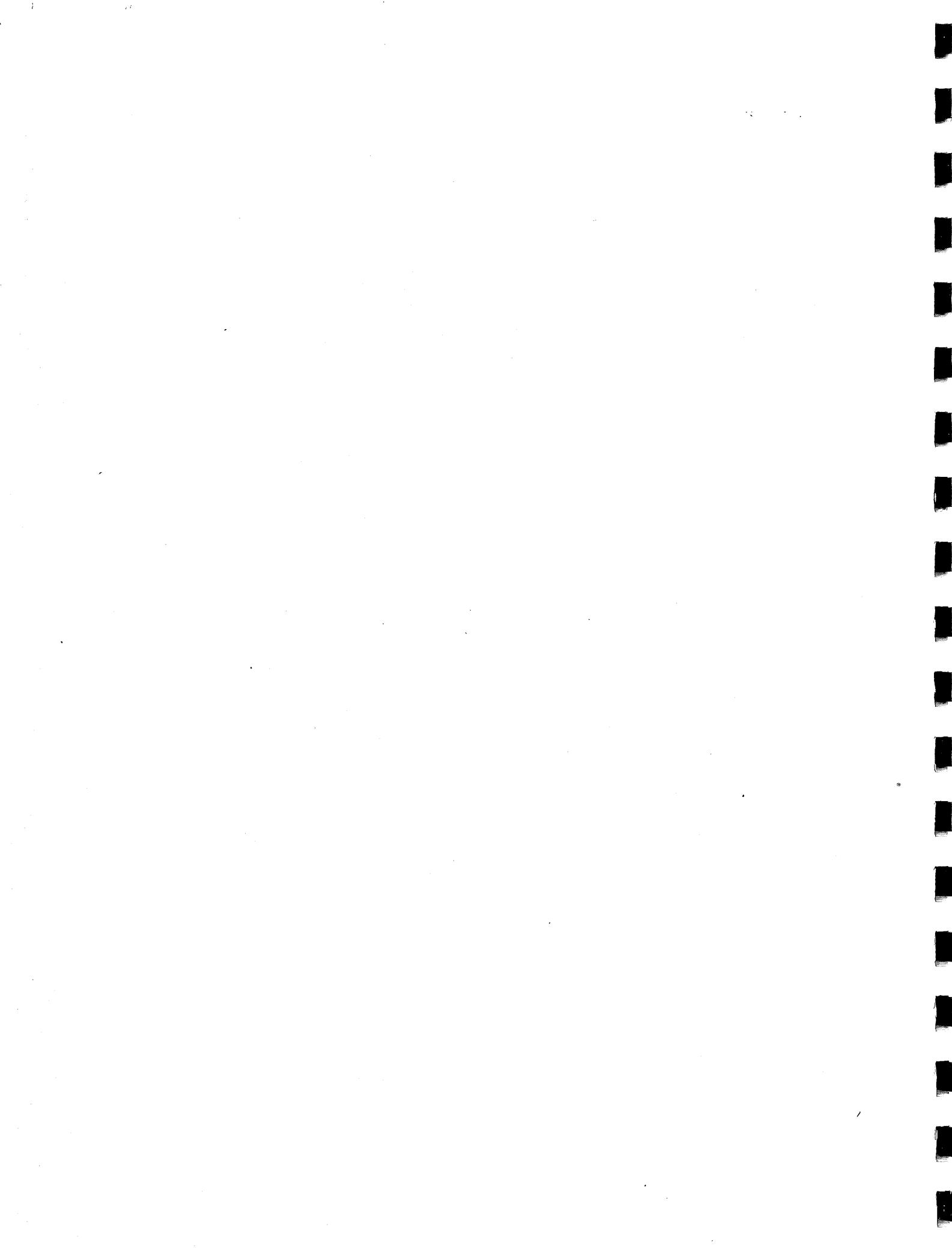
A **NORTH SHORE** characterization study

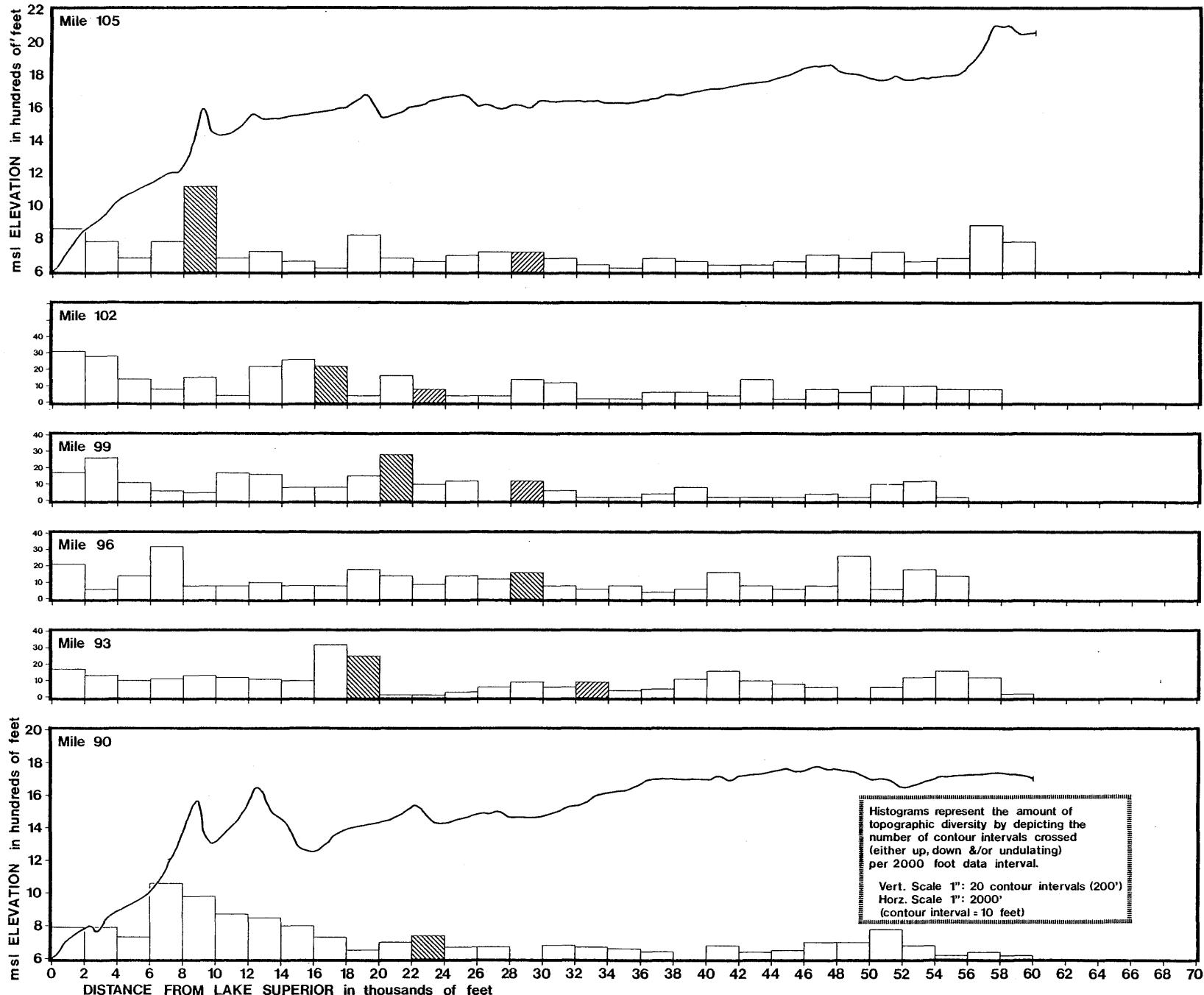




**PHYSIOGRAPHIC SUPPLEMENTAL
Land Sections/Histograms - 4 of 7**

Sampling Rate: Sections drafted at 15 mile intervals. Topographic histogram counts taken at 3 mile intervals. Intervals correspond to T.H. 61 mile markers.



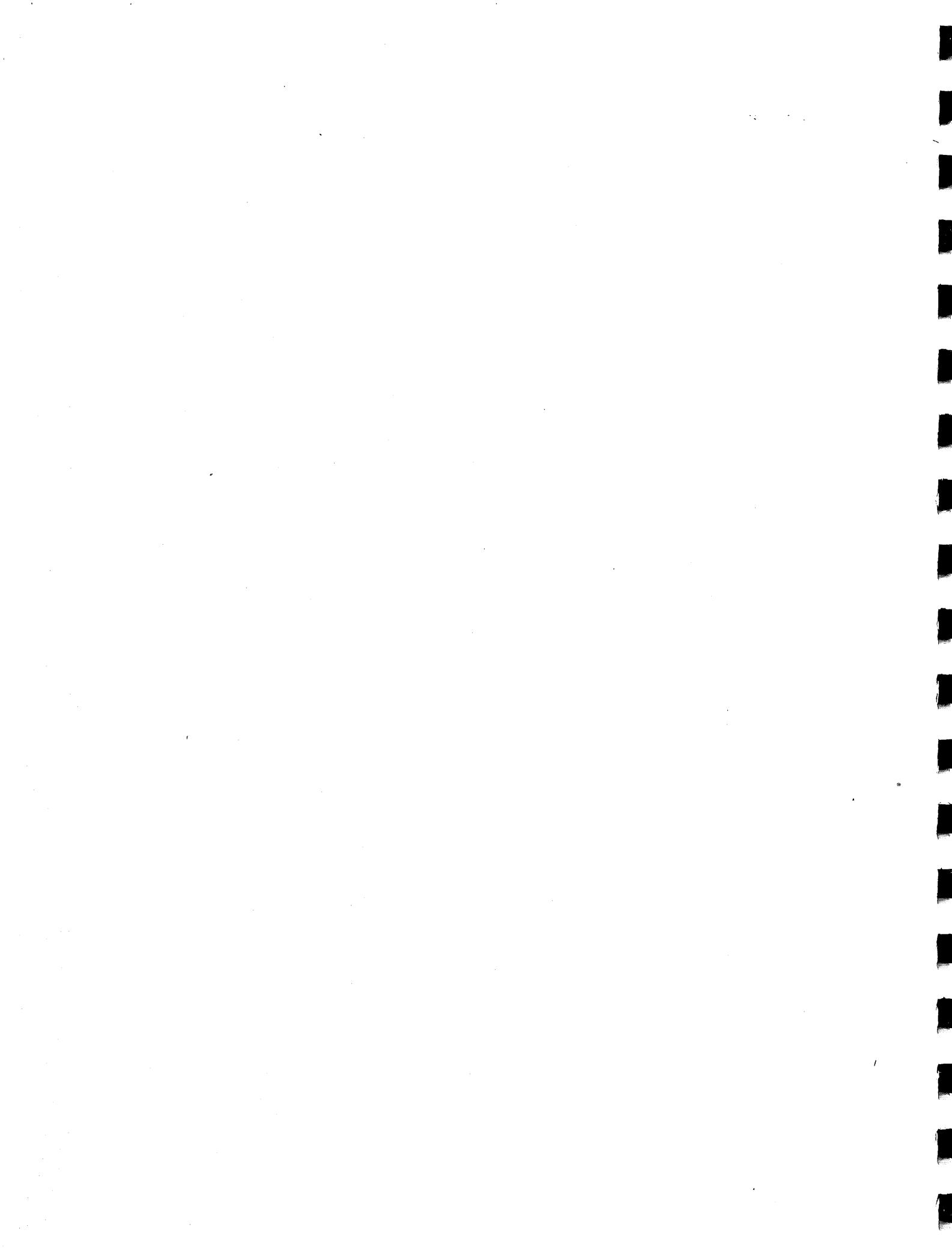


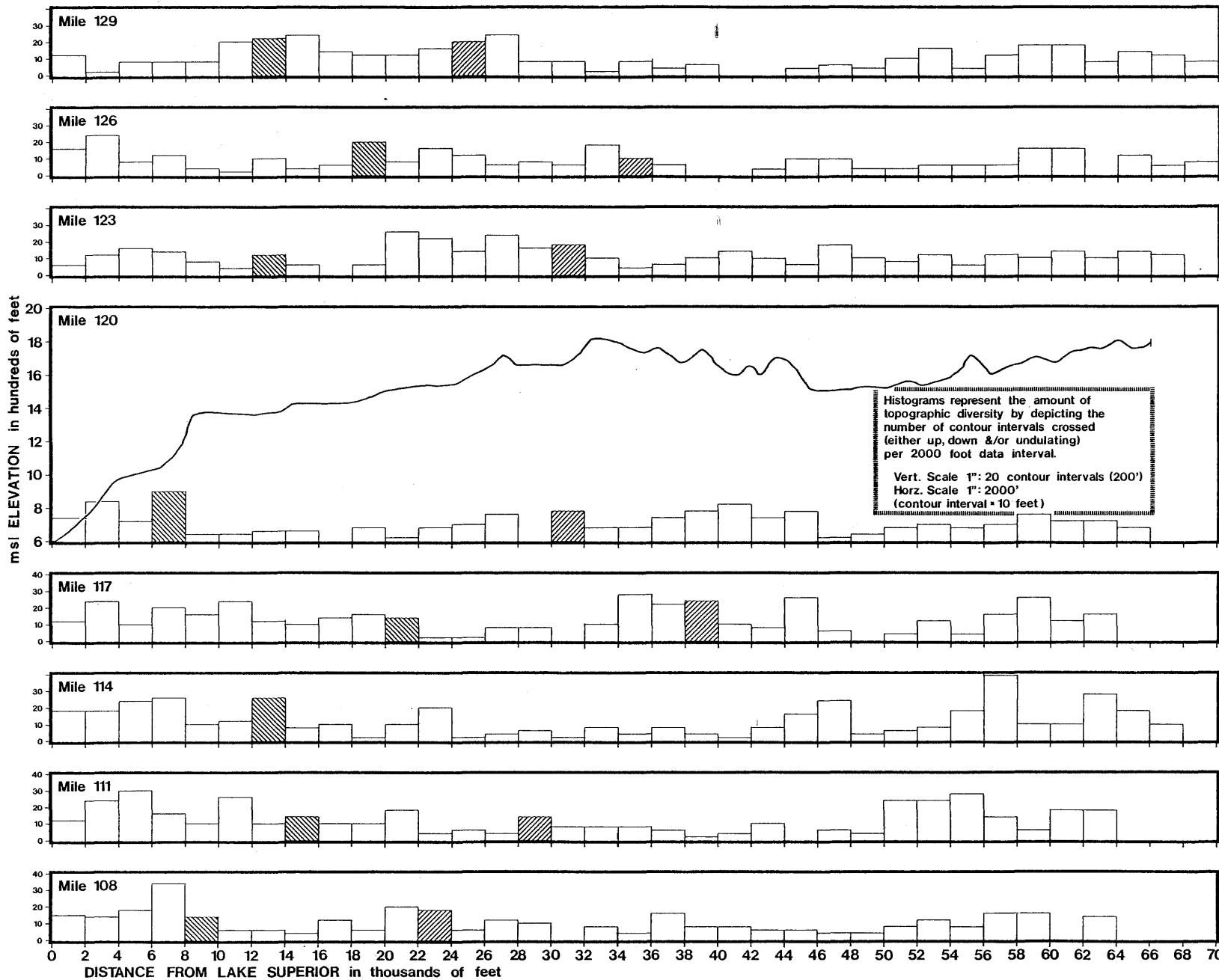
**PHYSIOGRAPHIC SUPPLEMENTAL
 Land Sections/Histograms - 5 of 7**

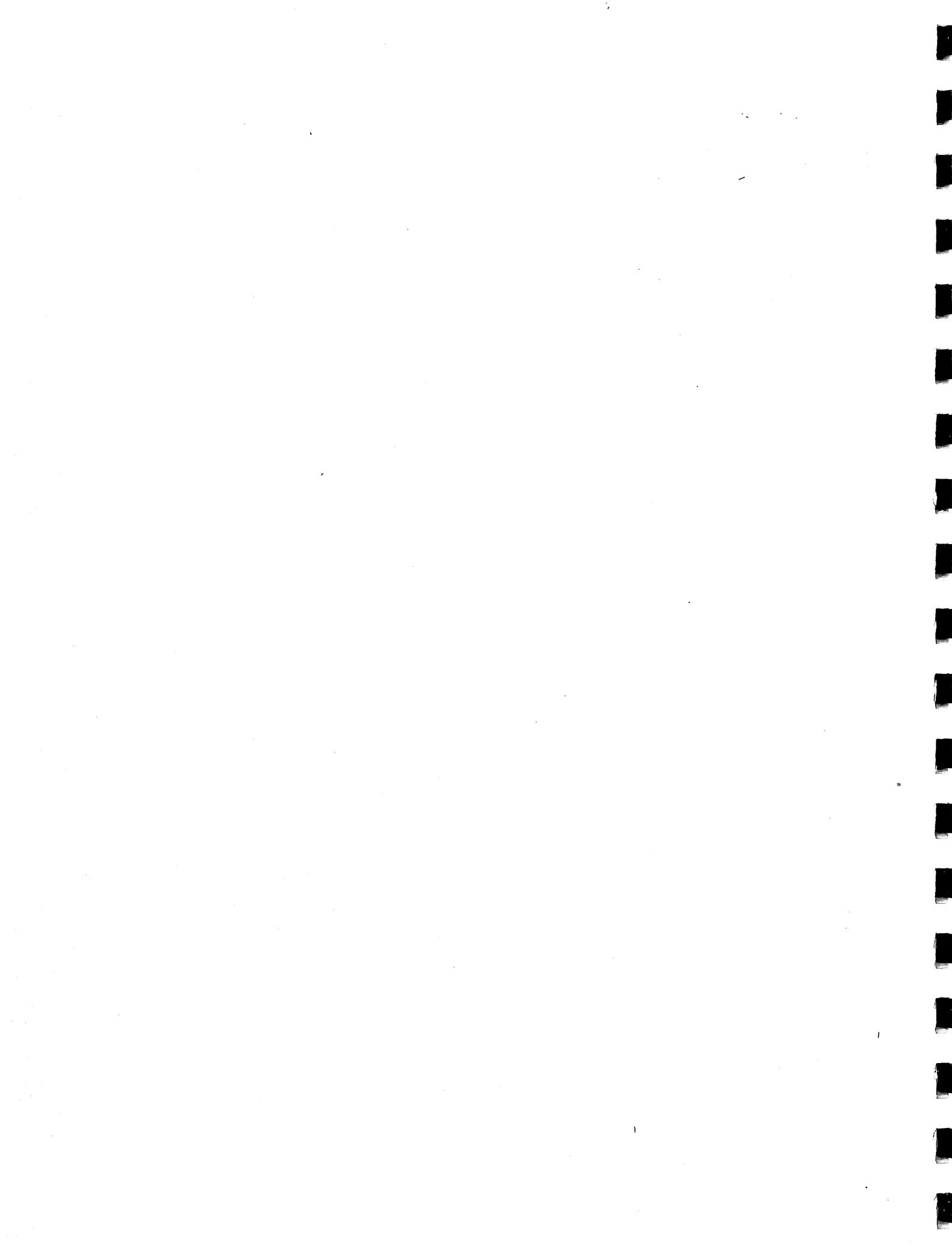
Sampling Rate: Sections dated at 15 mile intervals with topographic histogram counts taken at 3 mile intervals. Intervals correspond to T.H. 61 mile markers.

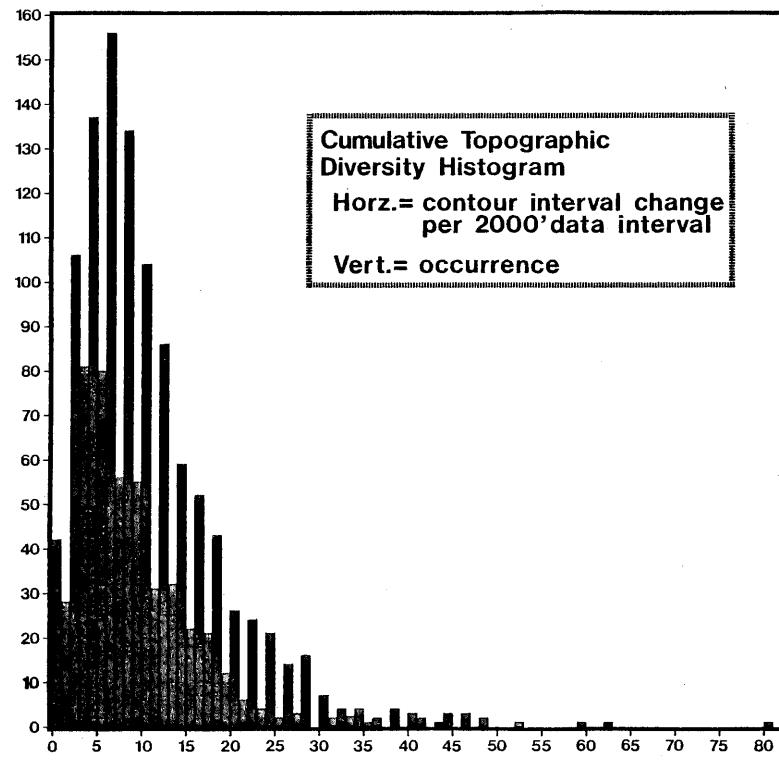
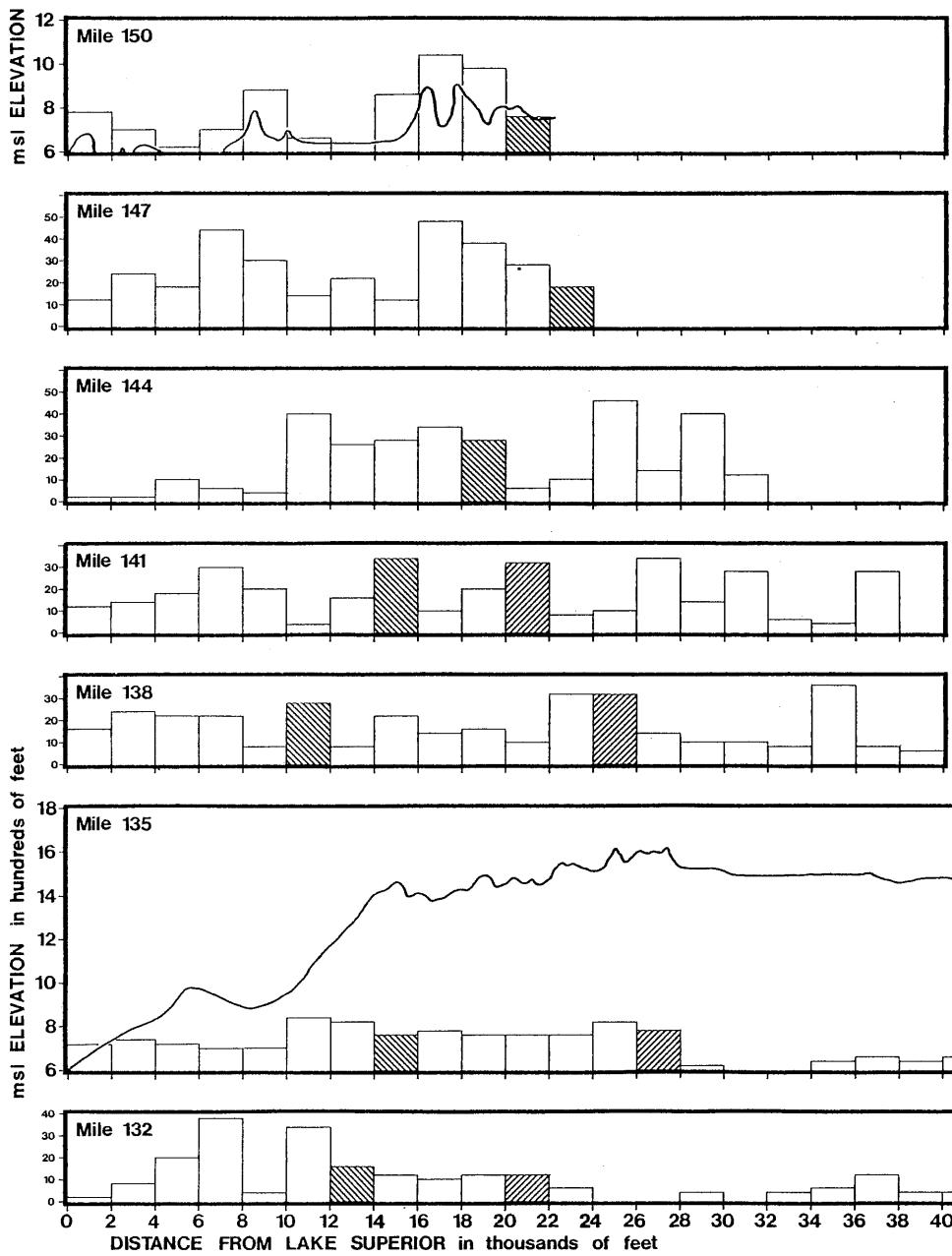
Land Line
 Cut-off

A NORTH SHORE characterization study



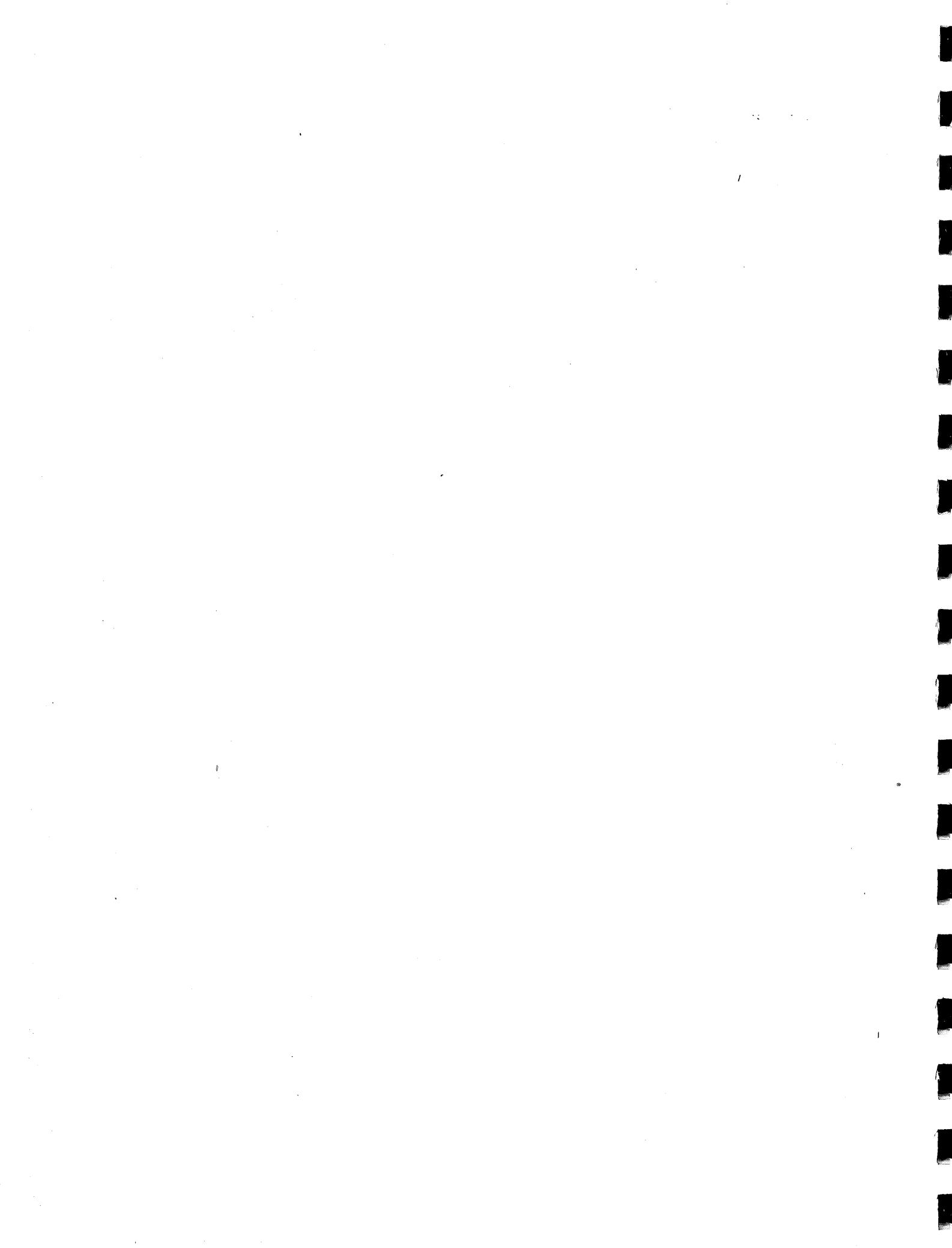


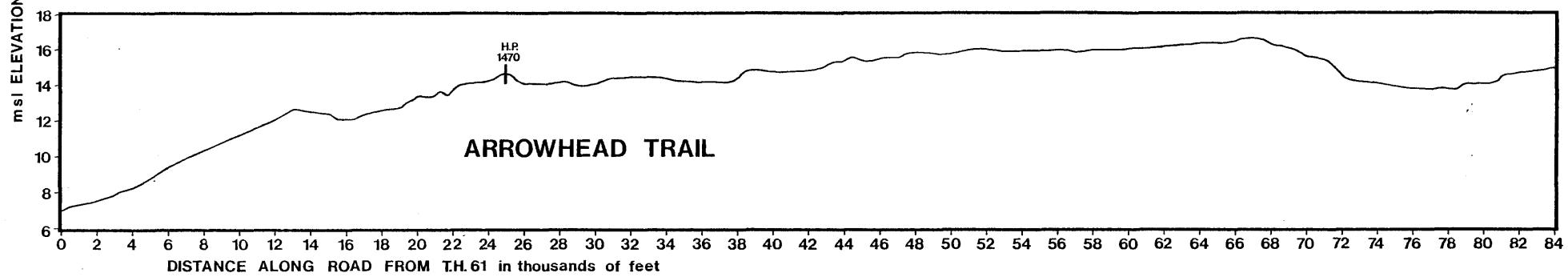
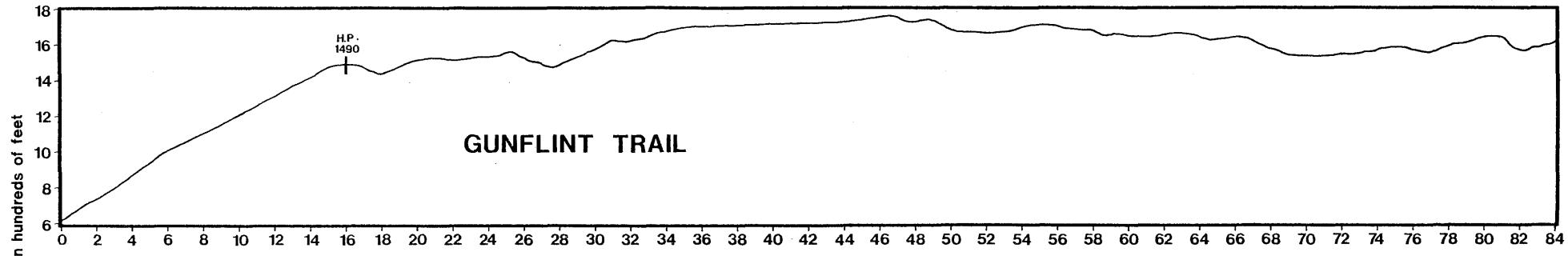
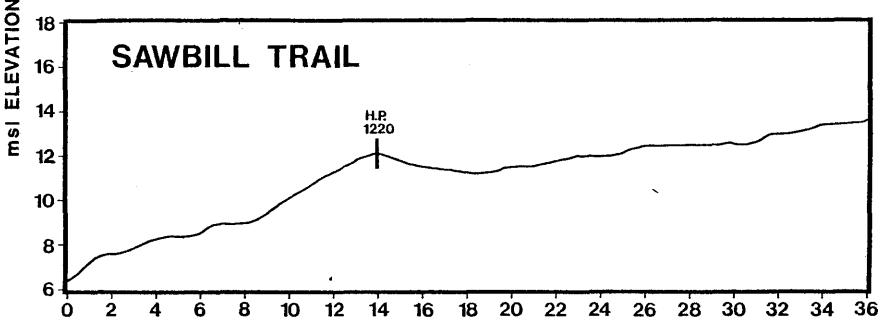
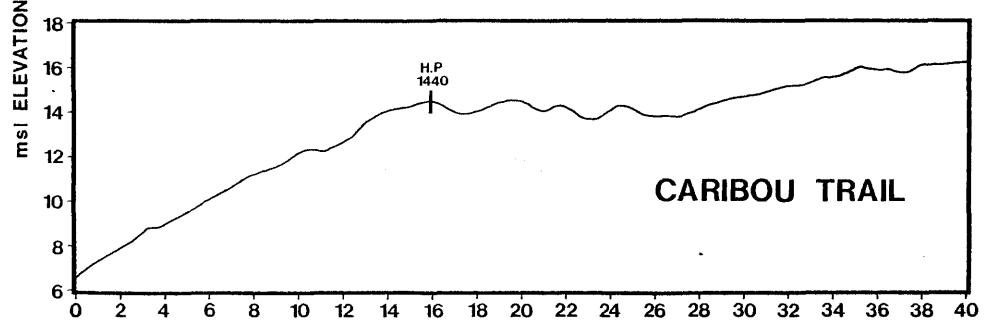
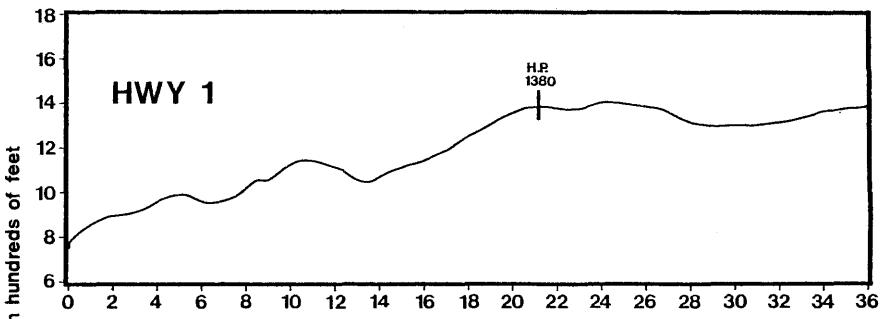
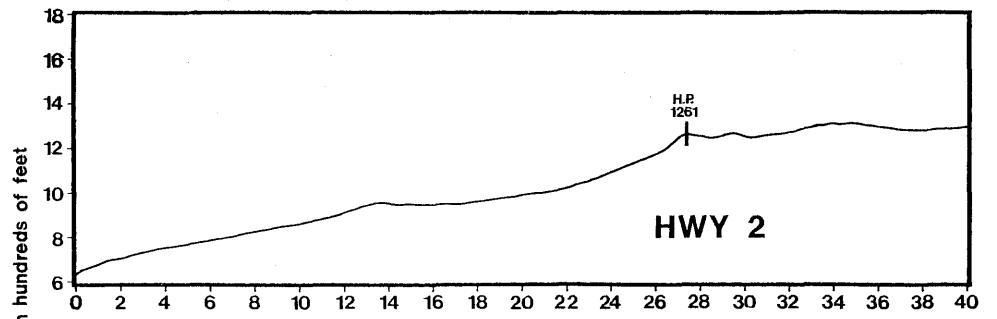


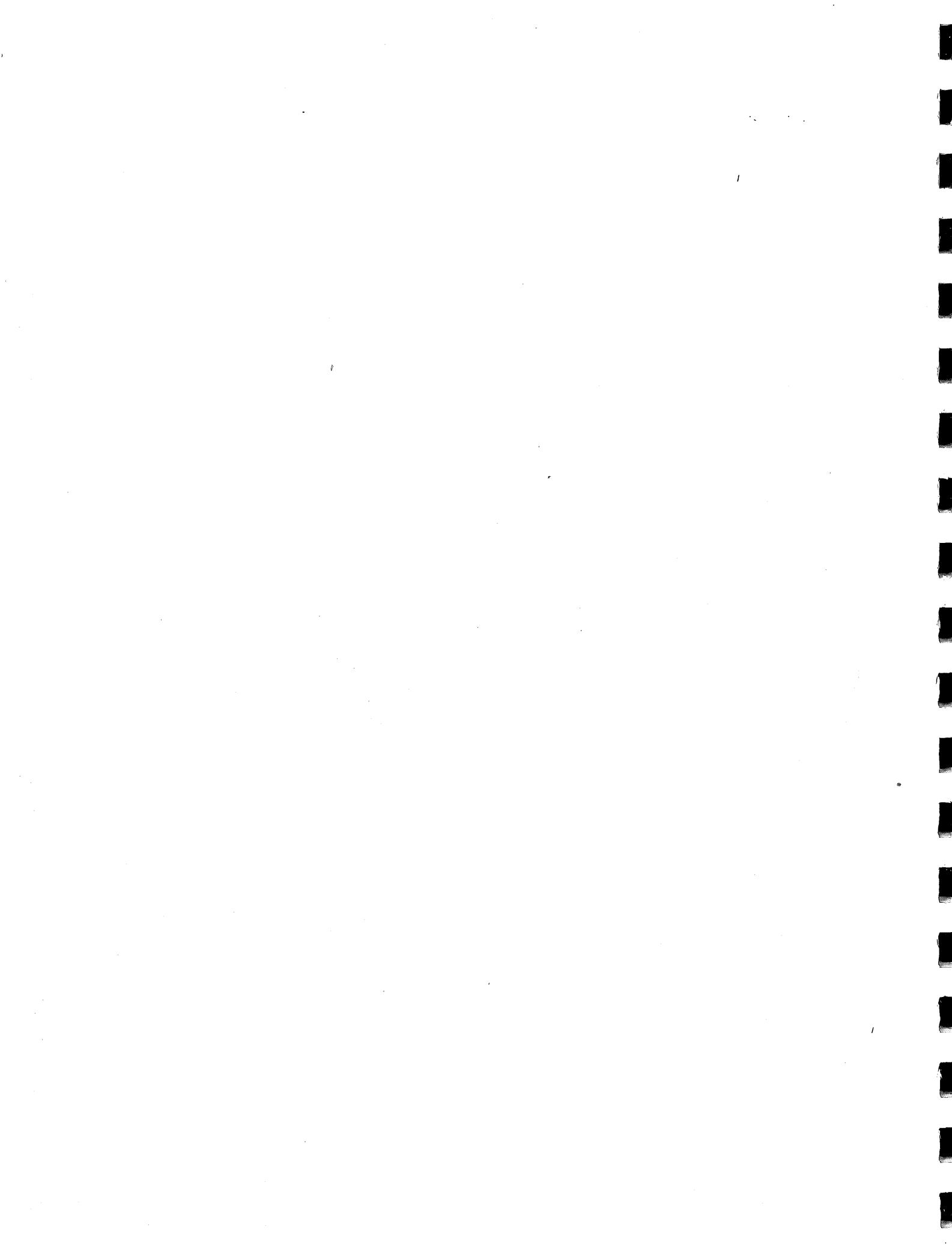


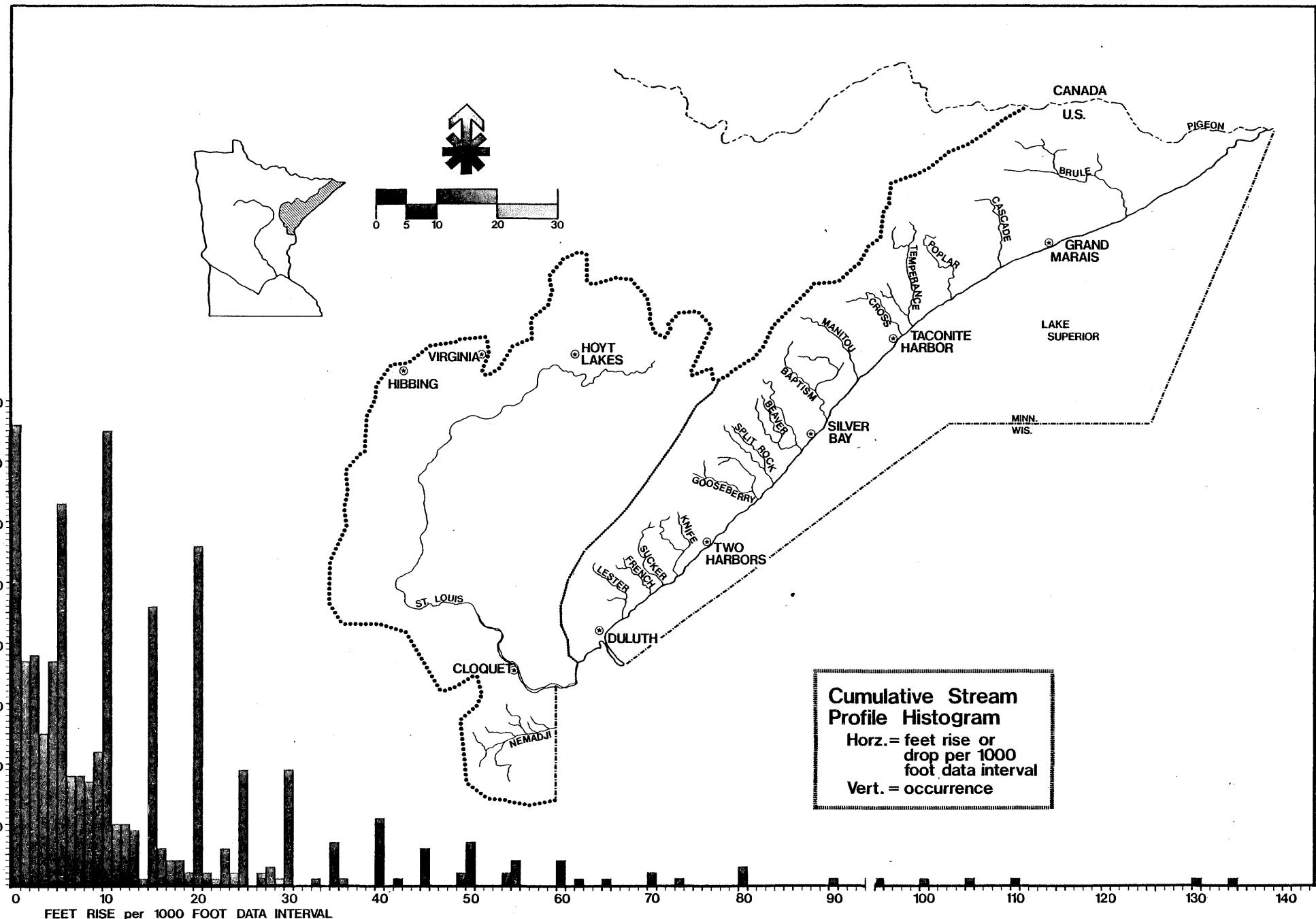
Histograms represent the amount of topographic diversity by depicting the number of contour intervals crossed (either up, down &/or undulating) per 2000 foot data interval.

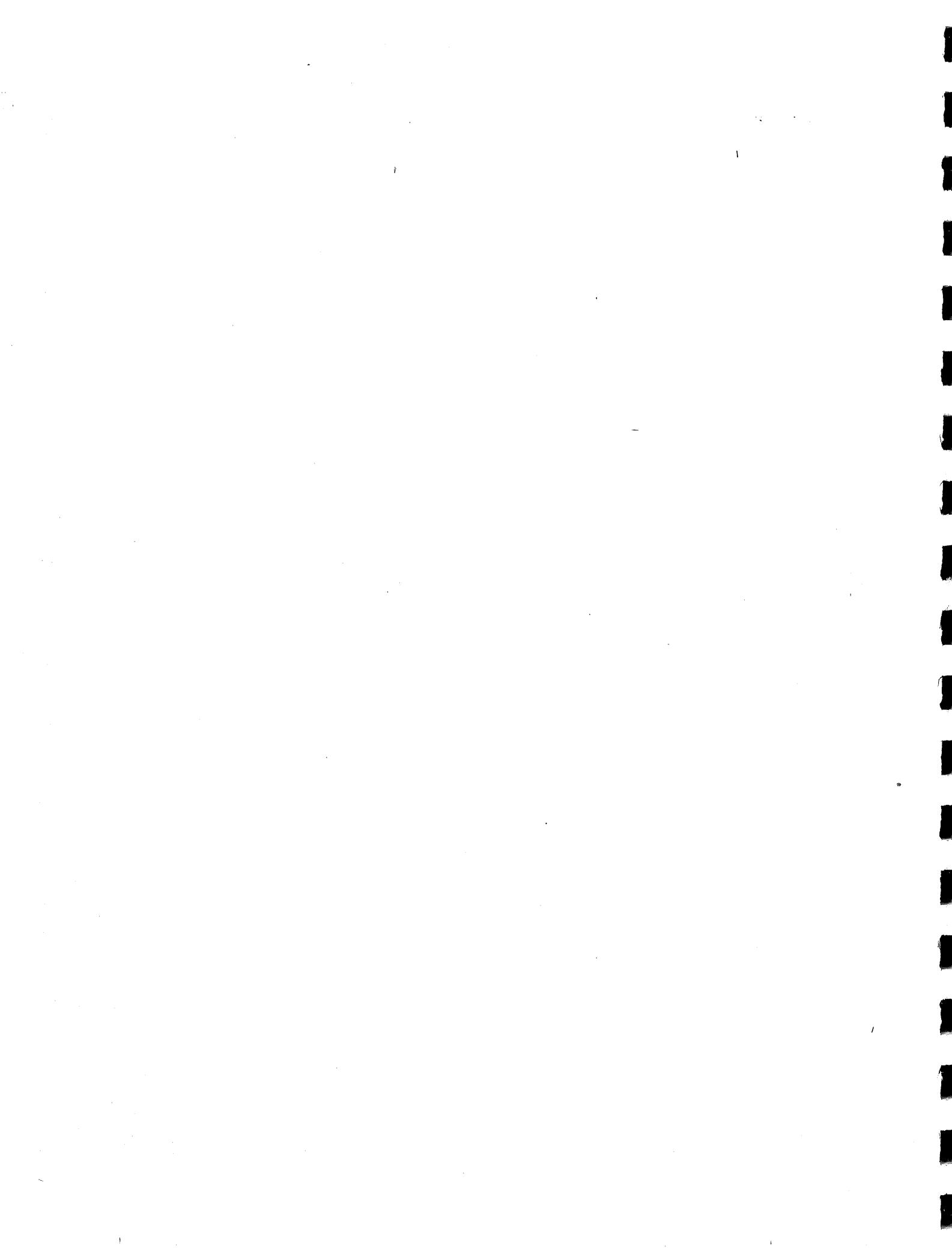
Vert. Scale 1": 20 contour intervals (200')
Horz. Scale 1": 2000'
(contour interval = 10 feet)

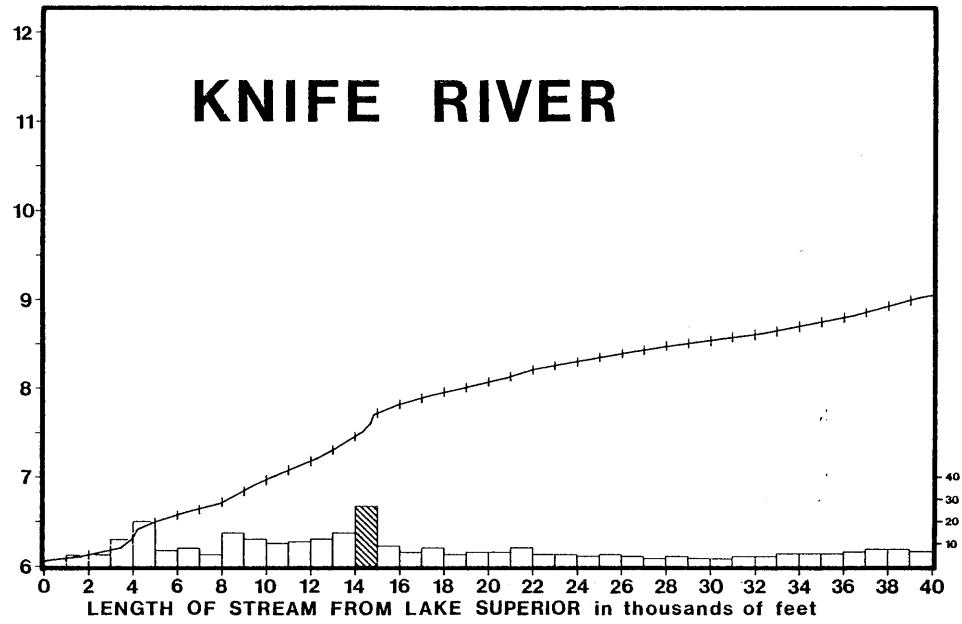
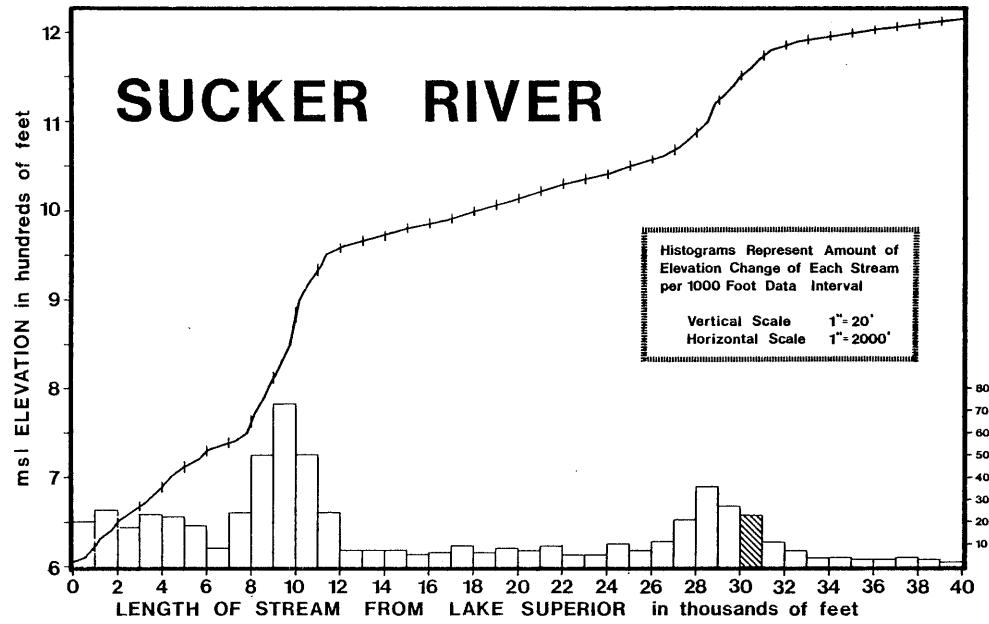
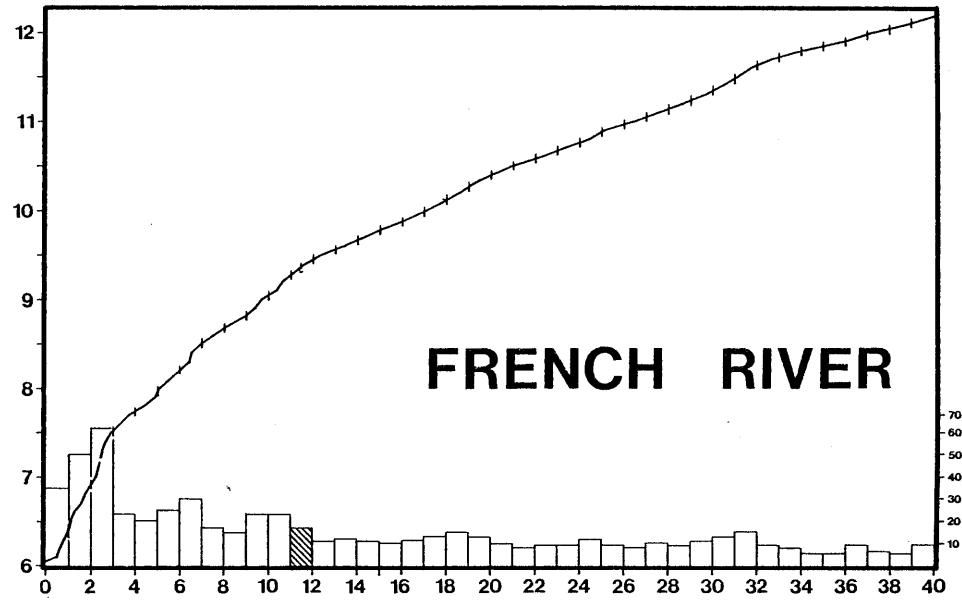
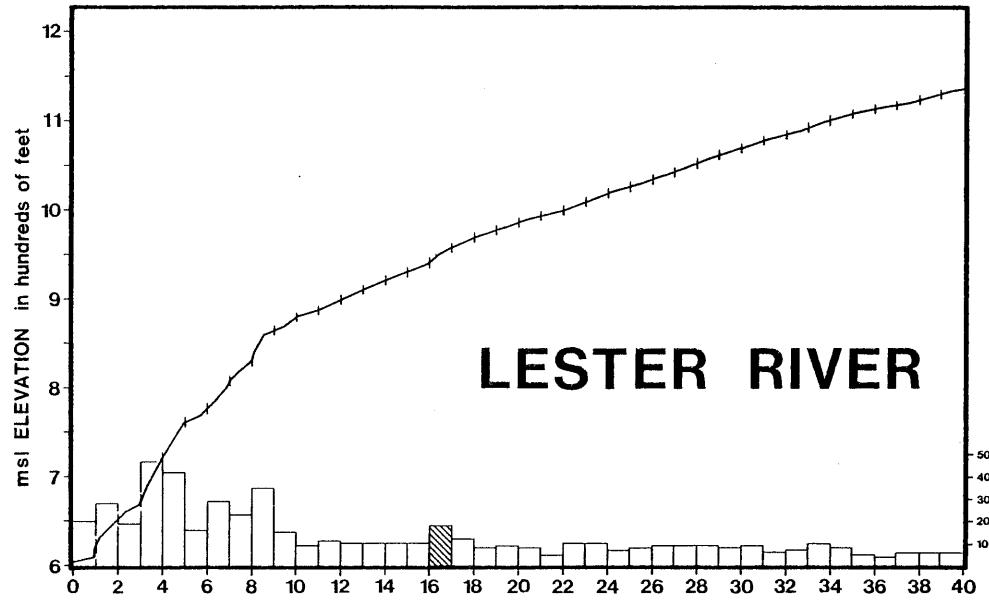


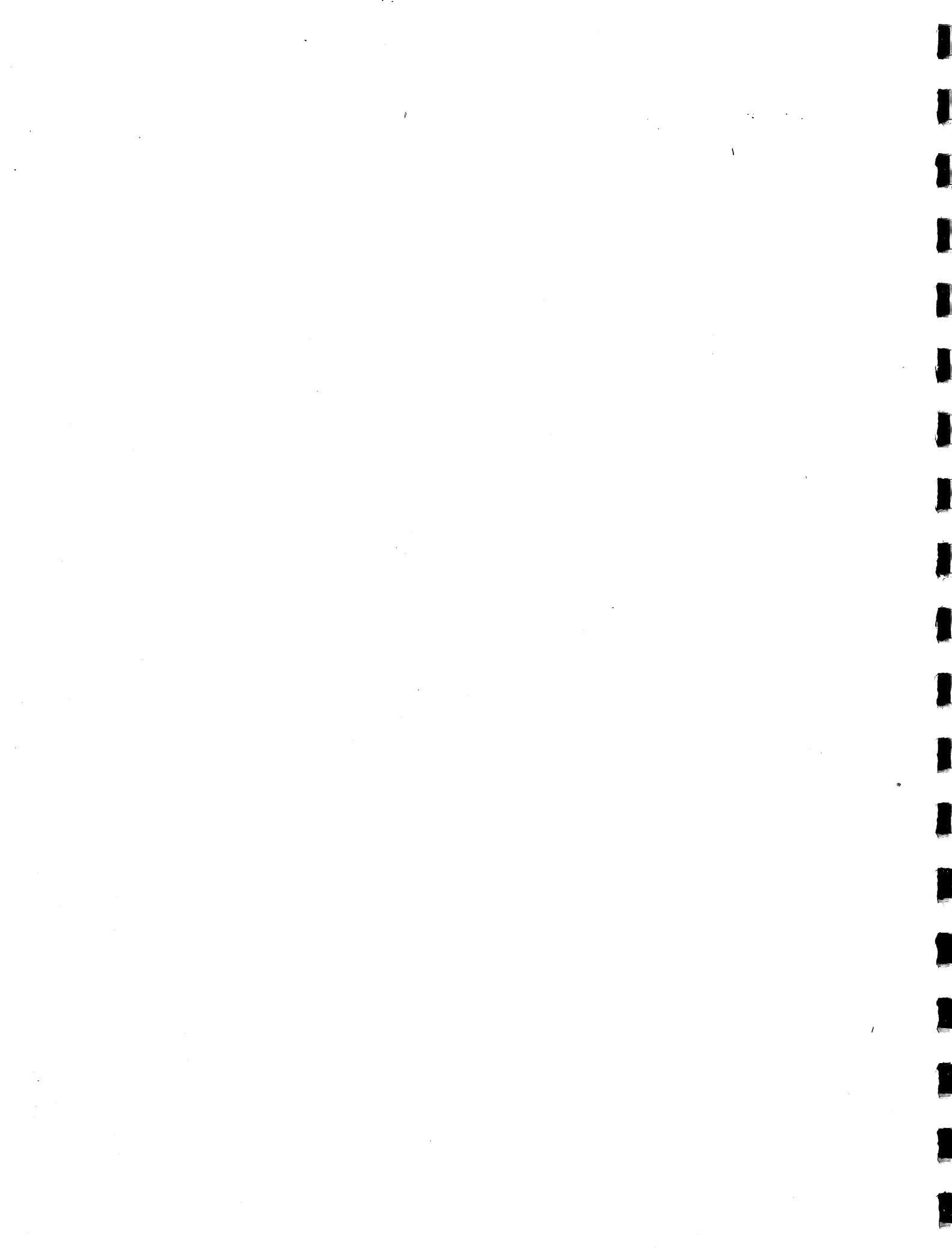




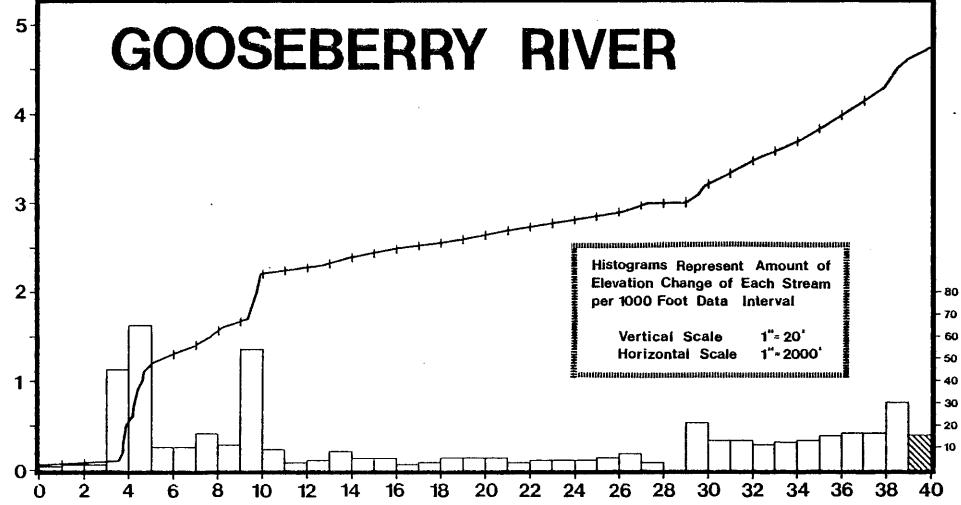




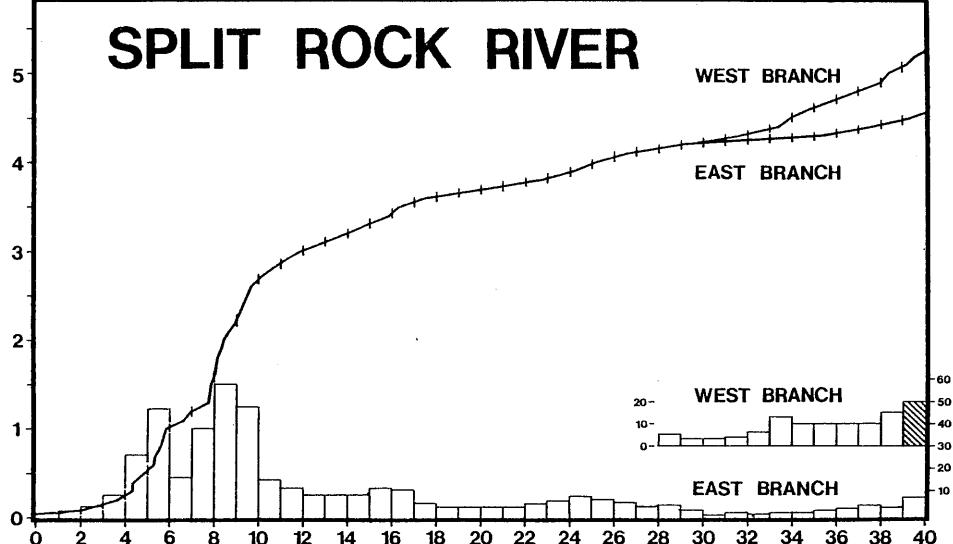




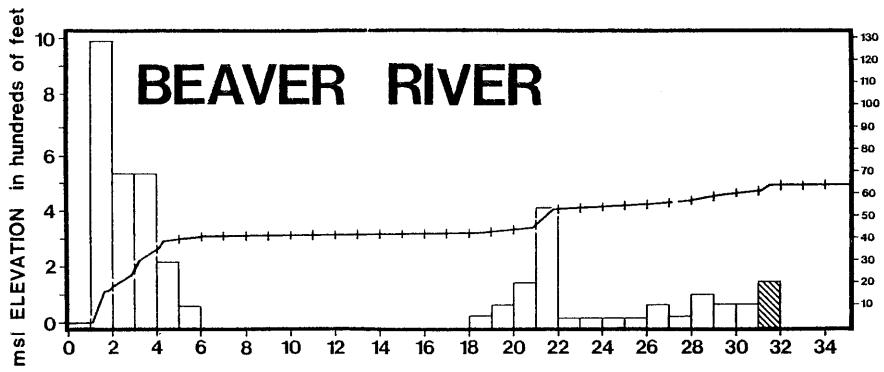
GOOSEBERRY RIVER



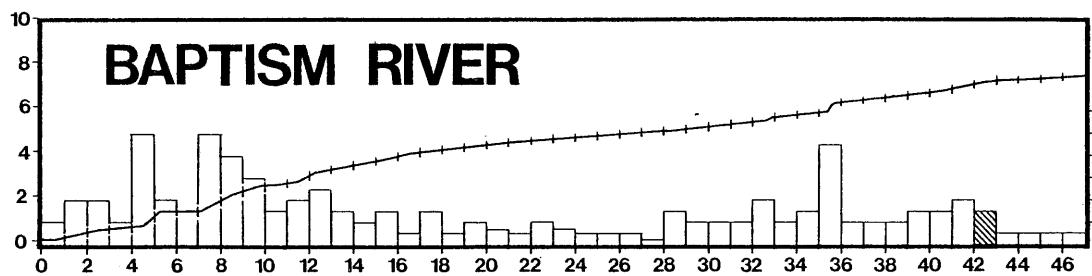
SPLIT ROCK RIVER



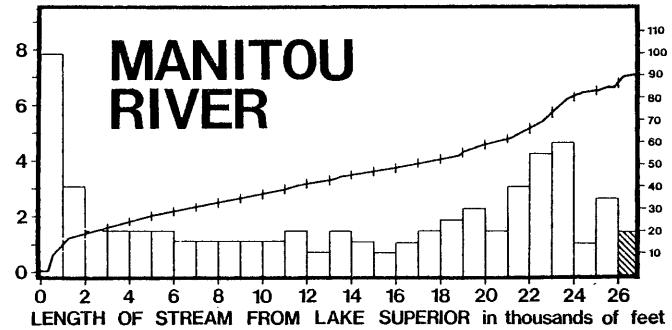
BEAVER RIVER



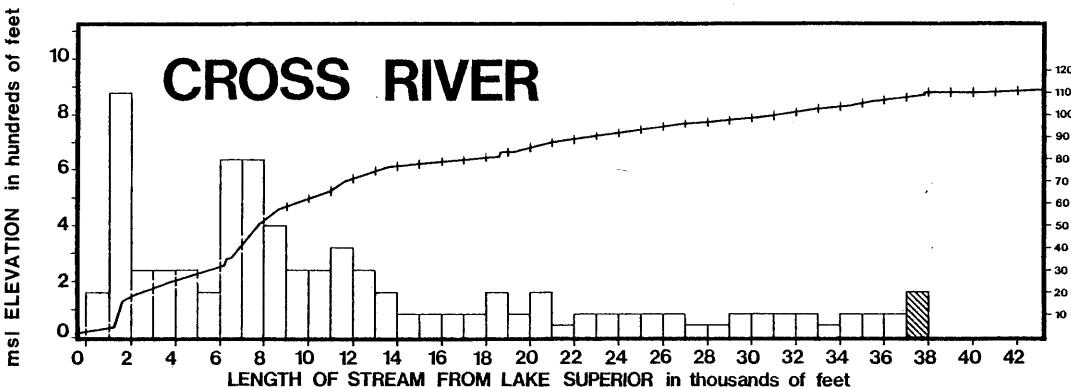
BAPTISM RIVER

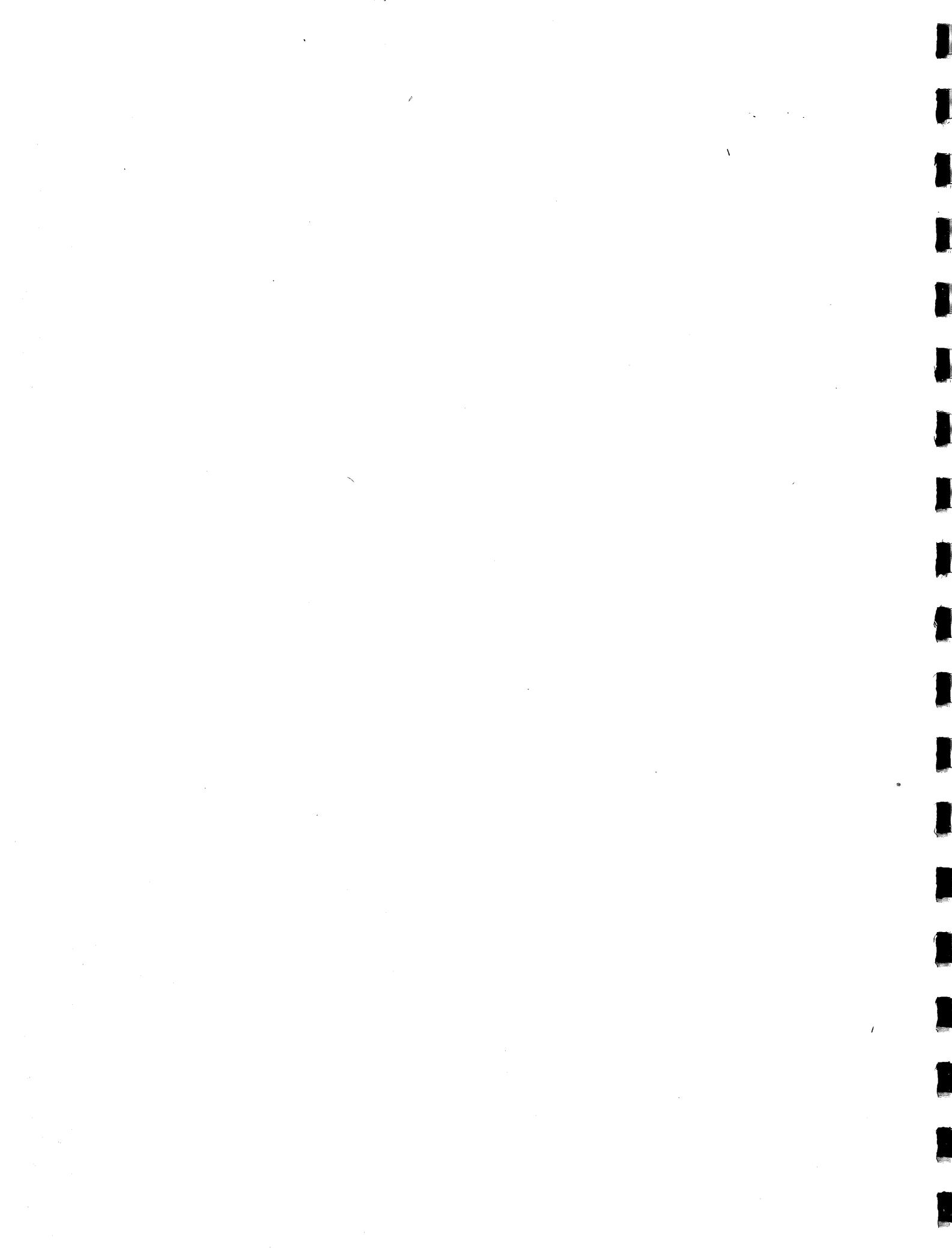


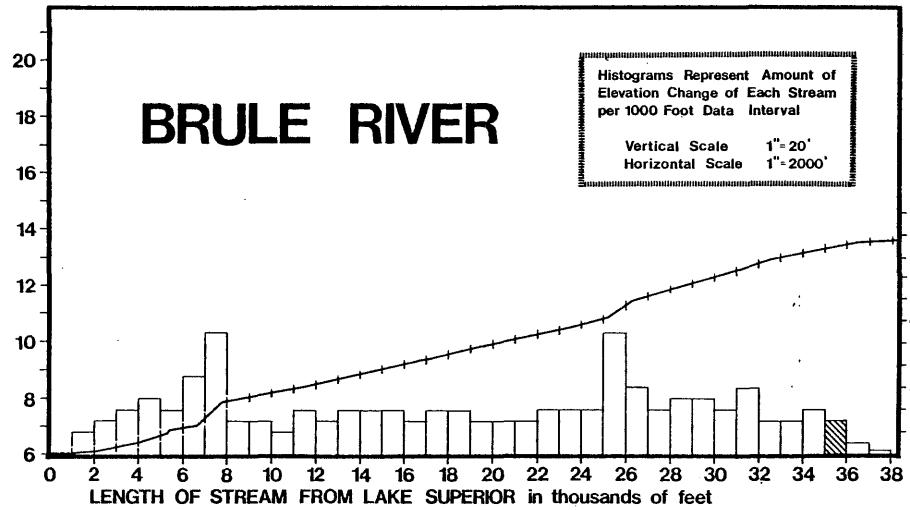
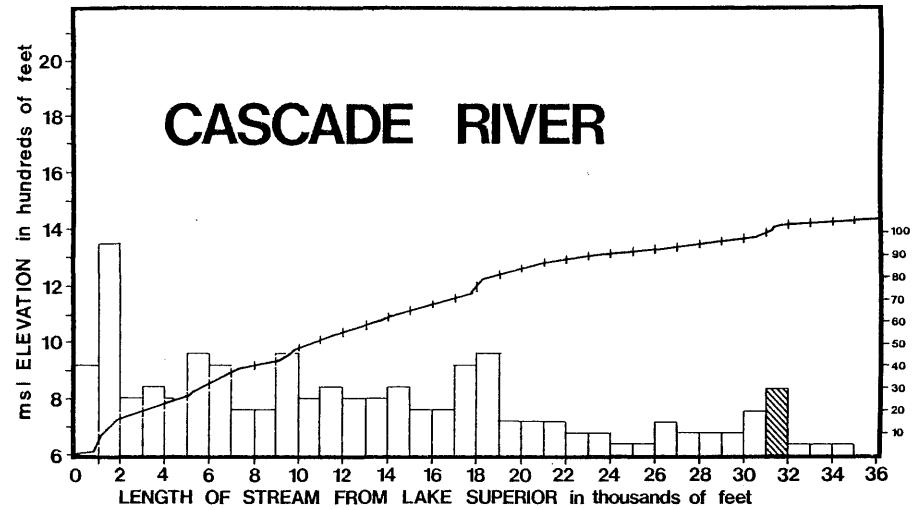
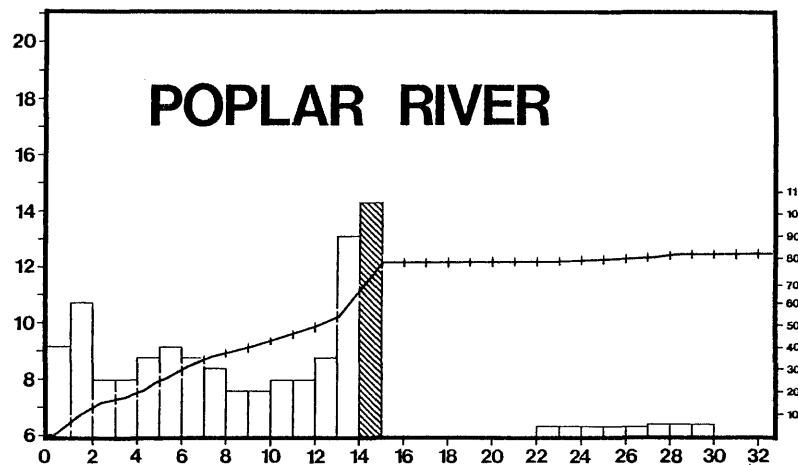
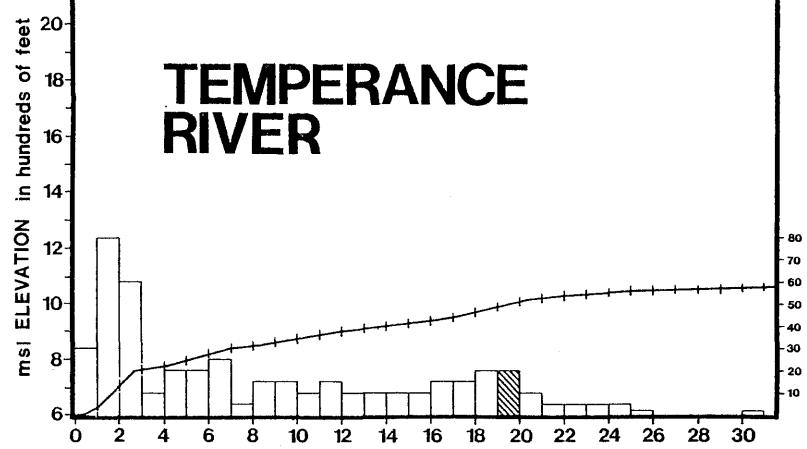
MANITOU RIVER

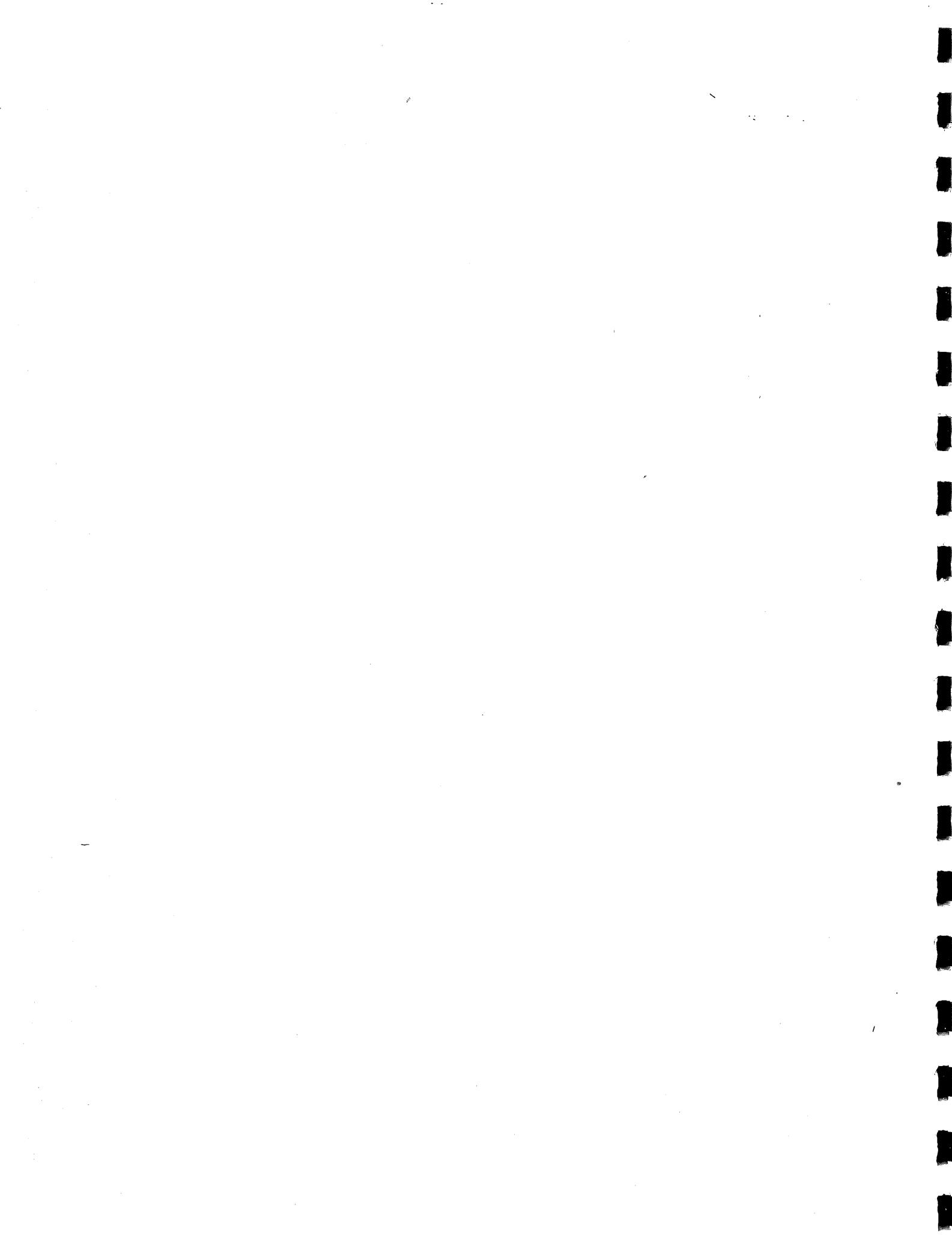


CROSS RIVER





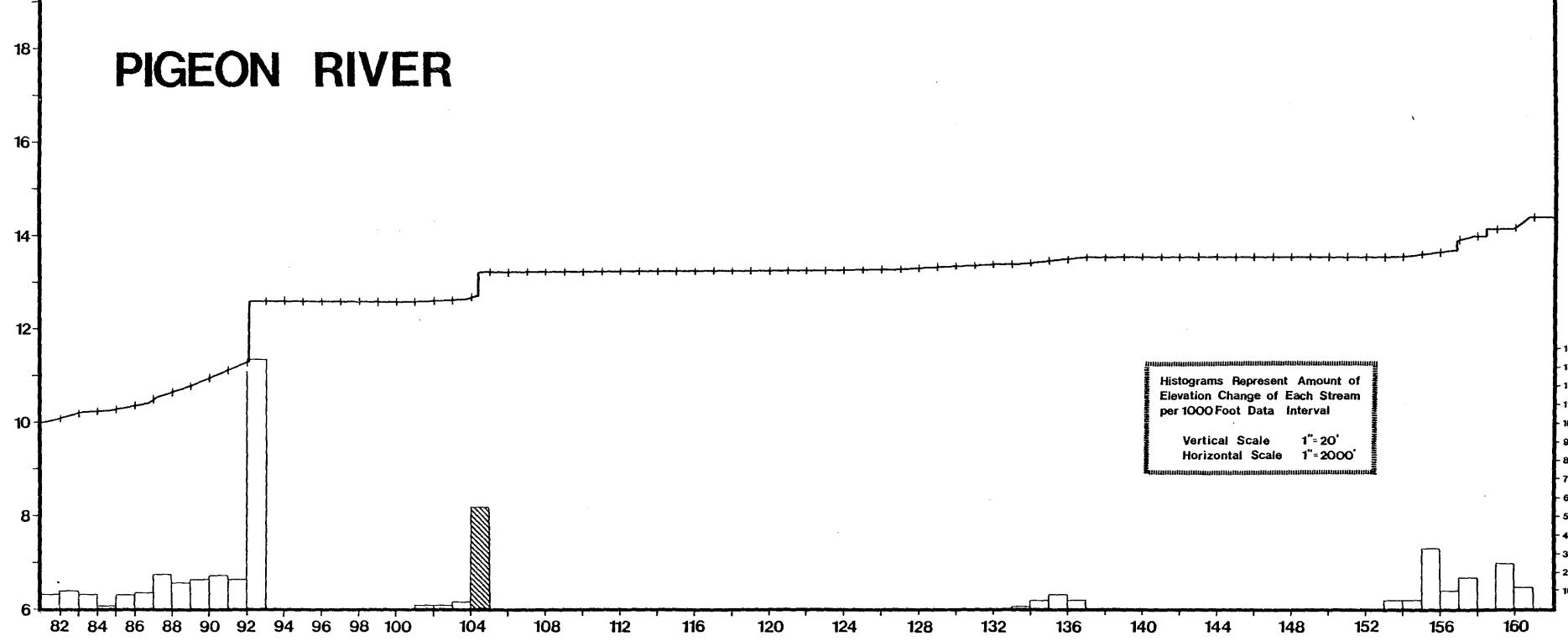




A'

A"

PIGEON RIVER



A

A'

miles ELEVATION in hundreds of feet



VIEWSHED SUPPLEMENTAL
Stream Profiles - 5 of 5

Sampling Rate: 15 major streams along the North Shore from Duluth to Canada.
Stream "cut-off" point determined from profiles and topographic histogram counts.
Site lines taken at half mile intervals from "cut-off" point to Lake Superior.

C

NORTH SHORE characterization study

NORTH SHORE CORRIDOR CRITERIA ANALYSIS

SUPPLEMENT D
LAKE ORIENTATION ZONE

ST = Stream Viewshed
 LK = Lake Superior Viewshed
 T.H. 61 Viewshed

PP = Prominent Point Viewshed
 RR = Recreational Road 61 =

Required Criteria	Other Criteria	Total Occurrance No. of 40 Acre Parcels	% of Zone
1st Ridge		1136	14.45
1st Ridge	PP	699	8.88
1st Ridge	RR	559	7.12
1st Ridge	PP, RR	482	6.12
	SUB-TOTAL	2876	36.56
ST	2nd Ridge	115	1.37
ST	2nd Ridge, PP	78	.93
ST	2nd Ridge, RR	33	.39
ST	PP	134	1.60
	SUB-TOTAL	360	4.29
LK	2nd Ridge	29	.35
LK	2nd Ridge, PP	55	.65
	SUB-TOTAL	84	1.00
61	2nd Ridge, PP	SUB-TOTAL 10	.12
1st Ridge, LK		295	3.75
1st Ridge, LK	PP	771	9.80
1st Ridge, LK	RR	307	3.91
1st Ridge, LK	PP, RR	232	2.95
	SUB-TOTAL	1605	20.41
1st Ridge, ST		154	1.95
1st Ridge, ST	PP	771	1.07
1st Ridge, ST	RR	307	.34
1st Ridge, ST	PP, RR	232	.17
	SUB-TOTAL	227	3.53

Required Criteria	Other Criteria		Total Occurance No. of 40 Acre Parcels	% of Zone
LK, 61	2nd Ridge		10	.12
LK, 61	2nd Ridge, PP		48	.58
	SUB-TOTAL		58	.70
LK, ST	2nd Ridge	SUB-TOTAL	2	.02
1st Ridge ST, 61,	PP		3	.04
1st Ridge ST, 61,	RR		3	.04
	SUB-TOTAL		6	.08
1st Ridge, LK, 61			444	5.65
1st Ridge, LK, 61	PP		1226	15.59
1st Ridge, LK, 61	RR		536	6.82
1st Ridge, LK, 61	PP, RR		511	6.50
	SUB-TOTAL		2717	34.56
1st Ridge, ST, LK			58	.73
1st Ridge, ST, LK	RR		24	.30
	PP, RR		64	.80
	SUB-TOTAL		146	1.83
1st Ridge, LK, 61, ST	116		116	1.48
	PP		88	1.13
	RR		4	.06
	PP, RR		28	.36
	SUB-TOTAL		236	3.03
LAKE ORIENTATION ZONE	TOTAL		8377	100%
8377 40 ACRE PARCELS				
335,080 ACRES				
56.72% OF NORTH SHORE CORRIDOR				

TRANSITION ZONE

Required Criteria	Other Criteria	Total Occurrance No. of 40 Acre Parcels	% of Zone
2nd Ridge		2500	39.13
PP		1914	29.94
RR		68	1.06
PP, RR		202	3.16
2nd Ridge, PP		860	13.45
2nd Ridge, RR		608	9.52
2nd Ridge, PP, RR		239	3.74
	TOTAL	6391	100%

TRANSITION ZONE

6391 40 ACRE PARCELS

255,640 ACRES

43.28% of TOTAL NORTH SHORE CORRIDOR

NORTH SHORE CORRIDOR

TOTAL AREA	14,768	40 ACRE CELLS
	590,720	ACRES
	923	SQUARE MILES

**NSC — LEGAL DESCRIPTION (LAKE
ORIENTATION)**

Supplement E

(List of Land Parcels Located Within Lake Orientation Zone)

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>or portions thereof</u>
T 51 N R 13 W	1	SE SW			
	2	SE	SE		
	11	NE SE NW SW SW SW	SE NE SE SW		
	12 - 14	(A11)			
	15	SE SE SW	SE NE SW		
	16	SE	SE		
	19	SW SE NE	SE		
	20	(A11)			
	21	SE SW NE NW NW NW	SE SW NE		
	22 - 35	(A11)			
T 50 N R 13 W	(Entire Township)				
T 51 N R 12 W	1 - 4	(A11)			
	5	NE SE SW NW NW NW	NE SE SW		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	or portions thereof
T 51 N R 12 W	6	SE NE SW SW	SE SW SW SE	
	7	(Remainder of Township)		
	19	SE	SE	
	20	SW	SW	
	23	SE	SE	
	24	NE SE SW NW NW NW	NE SE SW	
	25	(All)		
	26	NE SE SW NW NW NW	NE SE SW	
	27	SE NE NE NE NW SW SW SW	SE SW NE SE SW	
	29	SW SE SE SE NW NW NW	NW SW SE NW SW SE	
	30	SW NW SE SE	SW SW SE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof	
T 51 N R 12 W	31	NW	NW		
		NW	NE		
		NE	NE		
T 52 N R 12 W	32	NW	NW		
		NW	NE		
		NE	NE		
		NE	SE		
		SE	NE		
T 52 N R 13 W	32	SE	SE		
		NE			
T 52 N R 11 W	33	SE			
		SW			
		NW	NW		
		NW	SW		
		NW	SE		
34 - 36		(All)			
T 52N R 13 W	25	NE			
		NE			
T 52 N R 11 W	1 - 3	(All)			
		SW			
T 52 N R 10 W	4	SE			
		SE			
		NE	NE		
		NE	SE		
		NE	SW		
T 53 N R 11 W	5	NW	SE		
		NW	SW		
		NW	SW		
T 52 N R 10 W	7	SE			
		NE	SE		
		SW	SE		
8		(Remainder of township)			
T 52 N R 10 W		(Entire Township)			
T 53 N R 11 W	1	SE			
		SW			
		NE	SE		
		NW	NW		
		NW	SW		
		NW	SE		

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	or portions thereof
T 53 N R 11 W	2	NE NE SE SE	NE SE NE SE		
	10	SE SE	SE SW		
	11	SE SW NW NE NE NE	SE NE SE SW		
	12 - 14	(All)			
	15	NE SE SW		SE	
	22	NE SE NW NW SW	NE SE NE SE NE		
	23 - 25	(All)			
	26	NW NE SE SW SW SW		NE SE SW	
	27	SE SE	SE SW		
	34	NE SE SW		SE	
	35, 36	(All)			
T 53 N R 10 W		(Entire Township)			
T 54 N R 10 W	13	SE SW NE		SE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}\frac{1}{4}$	or portions therof
T 54 N R 10 W	24	SW SE NW NE NE NE	NE NW NE SE	
	25	(All)		
	26	SE SW NE NE NW NW NW	SW SE NW SW SE	
	27	SE SW NW NW NE NE NE	SE SW NE SE SW	
	28	SE SW NW NE NE	SE SW SE	
	29	SE		
	31	SW SE SE SE	SE NE SE SW	
	32	NE SE SW NE NE NE	NE SE SW	
	33 - 36	(All)		

T 53 N (Entire Township)
R 9 W

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 54 N R 9 W	1	(All)		
	2	NE SE SW SW	NE SE	
	9	SE SE	NE SE	
	10	NE SE SW		
	11 - 15	(All)		
	16	NE SE SW NW NW NW	NE SE SW	
	17	SW NE SE SE SE	SE NE SE SW	
	18	SW SW	NW SW	
	19 - 33	(All)		
T 55 N R 9 W	11	SW SW	SW SE	
	12	SE SE SW	SE SW SE	
	13	NE SE NW NW SW SW SW	SW SE NW NE SE	
	14	NE NW	NE	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	or portions thereof
T 55 N R 9 W	22	SW SW	SW SE	
	24	NE SE SE NW NW	NE SE SE NW NE	
	25	SE NE NE NE NW SW SW SW	NE SE SW SE NE SE SW	
	26	SW SE SE SE	NW SW SE	
	27	NE NW SE SE	NE NE SE SE	
	35	NE SE NW NW		NE SE
	36	(All)		
T 54 N R 8 W		(Entire Township)		
T 55 N R 8 W	1 - 3	(All)		
	4	SE SW NW NW NE NE	SW SE NE SE	
	7	SE		
	8	NE NE SE	NE SE NE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 55 N R 8 W	8 cont'd	SE SW SW SW	SE SE SW NW	
	9 - 33	(All)		
T 56 N R 8 W	12	Lot 6		
		Lot 7		
	13	(All)		
	14	Lot 2, Lot 3		
		SE		
		SW		
		NW	SE	
		NW	SW	
	15	SE	NE	
		SE	SE	
		SE	SW	
	22	NE		
		SE		
		SW		
		NW	NE	
		NW	SE	
	23 - 26	(All)		
	27	NE		
		SE		
		NW		
		SW	NE	
		SW	SE	
	33	SE	NE	
		Lot 1		
	34	NE		
		SE		
		SW	NW	
		SW	NE	
		SW	SE	
		Lot 1		
		NW	NE	
		NW	SE	
		NW	SW	
	35, 36	(All)		

<u>Township</u>	<u>Section</u>	<u>1</u>	<u>1/4</u>	<u>1/4</u>	or portions thereof
T 55 N R 7 W	(Entire Township)				
T 56 N R 7 W	1 - 4	(All)			
	5	SW SE NW NW NE NE	SW SE SW SE		
	6	SE SE SW	SW SE SE		
	7	NE SE SW NW NW NW	NE SE SW		
	8 - 32	(All)			
T 57 N R 7 W	1	SE SE SE NE SW	NE SE SW SE SE		
	10	SE	SE		
	11	SE NE NE SW SW SW	SE SW NE SE SW		
	12, 13	(All)			
	14	NW NE SE SW SW SW	NW NE SE		
	15	NE NE	NE SE		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 57 N R 7 W	20	SE NE NE SW SW NW NW	SE SW NE SE NE SE	
	21	SW	SW	
	22	SE	SE	
	23	NE SE SW NW NW NW		NE SE SW
	24 - 26	(All)		
	27	NE SE SW		
	28	SW NW NE SE SE SE		NE SW NW NE SE
	29	NE	NE	
	33	SE SW SW NE NE NE		SW SE NW NE SE
	34 - 36	(All)		

T 57 N (Entire Township)
R 6 W

T 58 N 1, 2 (All)
R 6 W

3	NE SE SW SW SW	NE SE SW
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<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	or portions thereof
T 58 N R 6 W	8	SE	SE	
	9	SE SW NE	SE	
	10 - 16	(All)		
	17	NE SE SW SW SW	NE SE SW	
	19	SE SE	NE SE	
	20 - 29	(All)		
	30	NE NW NW NW SW SW SE SE SE	NE SE SW NW NE NW NE SE	
	31	SE NE NE SW	NE SE SE	
	32 - 36	(All)		
T 58 N R 5 W		(Entire Township)		
T 59 N R 5 W	1	SE SE SW SW SW	NW SW NE SE SW	
	9	SE		
	10	SW	SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 59 N R 5 W	11	SE NE NE NE SW SW	SE SW NE NE SE SE	
	12 - 14	(All)		
	15	SE SW NE NW NW	SE NW SW	
	16	NE NE	NE SE	
	21	SE NE SW	SE SE SE	
	22 - 28	(All)		
	29	SE NE SW	SE SE	
	32	NE SE SW NW NW NW	NE SE SW	
	33 - 36	(All)		
T 59 N R 4 W	1	(All)		
	2	SE SW NE NW NW	SE SW SE	
	3	SE SE SW	SE SW SE	
	4	SW	SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	or portions thereof
T 59 N R 4 W	5	SE	SE	SW	
		SE	SW	SE	
		SW	SE		
	7 - 31	(All)			
T 59 N R 3 W		(Entire Township)			
T 60 N R 4 W	13	SE	SE		
	23	NE	SE		
	24	NW			
		NE			
		SE	NW		
		SE	NE		
		SE	SE		
		SW	NE		
	25	NE			
		SE			
		SW	SE		
	35	SE	SE		
	36	NE			
		SE			
		SW			
		NW	NE		
		NW	SE		
		NW	SW		
T 60 N R 3 W	1	(All)			
	2	NW			
		NE			
		SE			
		SW	NE		
		SW	SE		
		SW	SW		
	3	NE			
		SE	SE		
	7	SW	SE		
		Lot 6			
		SE	SE		
		SE	SW		
	8	SW			
		SE			
		NE	NE		
		NE	SE		
		NE	SW		

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	or portions thereof
T 60 N R 3 W	9	SE SW NE NE NW NW	SE SW NW NW	
	10	SW SE NE NW NW	SW SE SW SE	
	11 - 35	(All)		
T 61 N R 3 W	24	SE	SE	
	25	NE SE SW NW	SE	
	26	SE	SE	
	34	SE	SE	
	35	NE SE SW NW	SE	
	36	(All)		
T 60 N R 2 W		(Entire Township)		
T 61 N R 2 W	1	SW	SW	
	12	NW NW NW SW SW SW SE SE SE	NW NE SE NE SE SW NW SW SE	
	13	(All)		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	or portions thereof
T 61 N R 2 W	14	NE NE SE SE	SW SE NW NE		
	19	SE SW SW SW	NE SE SW		
	20	SW SW SW SE	NW SW SE SW		
	21	SE SE SE SW	NE SE SW SE		
	22	SW SE NE		SE	
	23	SE SW NE NW NW		SE SW	
	24 - 36	(All)			

T 60 N
R 1 W (Entire Township)

T 61 N R 1 W	7	SW SE NE NE		SW SE
	8	NW SW		SW NW
	13	SE SW NE NE NW NW		SE SW SE SW

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 61 N R 1 W	14	SE		
		SW		
		NE	NW	
		NE	SW	
		NE	SE	
		NW	NE	
		NW	SE	
		NW	SW	
	15	SE		
		SW		
16	NE	SW		
	NE	SE		
	NW	SE		
	NW	SW		
	SE			
	SW			
	NE	SE		
17	SE	SE		
	SE	SW		
	SW	SE		
	SW	SW		
18	NW			
	SW			
	SE			
	NE	NW		
	NE	NE		
19 - 34 (All)				
T 61 N R 1 E	1 - 3	NE		
		SE		
		SW		
		NW	SE	
	8	NE	NE	
NE		SE		
SE		NE		
SE		SE		
SE		SW		
9 - 16 (All)				
17	NE			
	SE			
	SW			
	NW	SE		
	NW	SW		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 61 N R 1 E	18	SE SW NE NE NW NW	SE SW SE SW	
	19 - 23	(All)		
T 62 N R 1 E	35	SW SE NE NW NW NW	SW SE NE	
	36	(All)		
T 61 N R 2 E		(Entire Township)		
T 62 N R 2 E	12	SW SE NW NW	SW SE	
	13	NE SE NW NW SW	NE SE SE	
	20	SE SW	SE	
	21	NE SE SW NW NW	SE SW	
	22	NW SW SE NE NE NE	NW SW SE	
	23	SW SE SE	SE SW	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	or portions thereof
T 62 N R 2 E	24	NE	NW		
		NE	NE		
		NE	SE		
		SE	NE		
	25 - 29	(All)			
	30	NE	SE		
		SE	NE		
		SE	SE		
		SE	SW		
		SW	SE		
		SW	SW		
	31 - 36	(All)			
T 62 N R 3 E	1	SE			
		SW			
	2	SE			
		SW			
		NW	SW		
	3	NE	SE		
		SE	NE		
		SE	SE		
		SE	SW		
		SW	SE		
	4	SW			
		SE	SE		
		SE	SW		
		SE	NW		
		NW	NW		
		NW	SW		
		NW	SE		
T 62 N R 3 E	5	NE			
		SE			
		SW			
		NW	NE		
		NW	SE		
		NW	SW		
	7 - 34	(All)			
T 62 N R 4 E	1 - 4	(All)			
	5	NE			
		SE			
		SW			
		NW	NE		
		NW	SE		
		NW	SW		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	or portions thereof
T 62 N R 4 E	6	SE SW NE	SE	
	7 - 30	(All)		
T 63 N R 4 E	24	SE SE SE	NE SE SW	
	25		NE SE SW NW NW	NE SE
	26		SE NE NE SW	SE SW SE
	32	SE	SE	
	33	SE SW SW SW	SE NE SE SW	
	34	SE SW NE NE NE NW	NE SE SW SE	
	35, 36	(All)		
T 62 N R 5 E		(Entire Township)		
T 63 N R 5 E	1	SE SE SE SW	NE SE SW SE	
		Lot 1 Lot 2 Lot 3 Lot 4		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	or portions thereof
T 63 N R 5 E	11	SE NE NE NE SW SW SW	NE SE SW NE SE SW	
	12 - 14	(All)		
	15	SE NE NE NE SW	NE SE SW SE	
	16	SW	SW	
	17	SE SE SW SW	SE SW SE SW	
	19	SE SW		
	20	(All)		
	21	NW SW SE NE NE NE	NW SW SE	
	22 - 35	(All)		
T 64 N R 4 E	36	NE	NE	
	25	Lot 1 Lot 2		
T 64 N R 5 E	13, 14, 20	(All)		
	21	NE NW SE SE Lot 4 Lot 5 SW	NW NE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	or portions thereof
T 64 N R 5 E	22	NE NW SW SE SE		NW NE	
	23	NE NW SE SE SW		NE NW NE	
	24	NE NW			
	27	SW SE NW		NW SW	
	28	NW NE NE SE SE SE SW SW		NW SW SE NW NE SE NW NE	
	29	NW NE SW SE SE SE		NE NW SW	
	30	(All)			
	31	NE Lot 1 Lot 2 SE SE Lot 3		NW NE	

T 63 N (Entire Township)
R 6 E

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	or portions thereof
T 64 N R 6 E	19	NE Lot 1 Lot 5 NW SE SE NW Lot 9 SE SE SW NE SW SE Lot 4		
	20 - 28	(All)		
	29	NE SE SW NE SW SE NW NW NW NE NW SE		
	31	SE SW NE SE		
	32 - 36	(All)		
T 64 N R 7 E		(Entire Township)		
T 63 N R 7 E		(Entire Township)		
PIGEON POINT				

NSC — LEGAL DESCRIPTION (TRANSITION ZONE)

(List of Land Parcels Located Within NSC Transition)

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$ $\frac{1}{4}$</u>	<u>or portions thereof</u>
T 51 N	1	NW NE		
	2	NW NE SW SE SE SE	NW NE SW	
	3,4		(A11)	
	5	SW SW SE SE SE	SW SE SW SE NE	
	6	SE	SE	
	7	SE NE NE NE SW SW SW	SE NE SE SW NE SE SW	
	8,9,10		(A11)	
	11	NW NW NW SW	NW NE SW NW	
	15	NW NE SE SE SW SW SW	NW SW NW NE SE	
	16	NW NE SW SE SE SE	NW NE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	<u>or portions thereof</u>
T 51 N R 13 W	17, 18	(All)		
	19	NW NE NE NE	NW NE SW	
	21	NW	NE	
T 52 N R 13 W	22	NE SE SW SW	NE SE SW	
	23	SE SW NW NW NE NE	SE SW SE SW	
	24	SE SW		
	25	NW SW SE		
	26, 27	(All)		
	28	SE NE SW	SE SE	
	33, 34, 35, 36	(All)		
T 51 N R 12 W	5	NW	NW	
	6	NW SW SW NE NE NE	NW NE NW NE SW	
T 52 N R 12 W	1, 2	(All)		
	3	NE NE SE SE SE	NE SE NE SE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 52 N R 12 W	10	NE NE NE SE SE	NE NW SE SW SE	
	11, 12	(All)		
	13	NW SW NE NE NE		NW NE SW
	14, 15	(All)		
	16	NE SE SW NW NW		SW SE
	19	SW		SW
	20	NE SE SW SW SW NW		NE NW SE SE
	21, 22	(All)		
	23	NE NW SW SE SE SE		SW NW NE
	24	NW		NW
	26	NW		NW
	27	SW NW NW NW NE		NW SW NW NE NW
	28	(All)		
	29	NE SE NW		NE NE

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 52 N R 12 W	30	NW	NW	
		NW	NE	
		NW	SE	
		NE	NW	
		NE	SW	
		NE	SE	
		SE	NW	
		SE	NE	
	33	NW	NE	
T 53 N R 12 W	13	SE	NE	
		SE	SW	
		SE	SE	
	23	NE	SE	
		SE	NE	
		SE	SE	
	24, 25	(All)		
	26	NE	NE	
		NE	SE	
		SE	NE	
		SE	SE	
		SE	SW	
	34	SE	SE	
	35, 36	(All)		
T 52 N R 11 W	4	NW	NW	
		NW	NE	
		NE	NW	
	5	NW		
		NE		
		SW	NW	
		SW	NE	
	6	(All)		
	7	NW		
		SW	NW	
		NE	NW	
T 53 N R 11 W	1	NE	NE	
		NE	NW	
		NE	SW	
		NW	NE	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>or portions thereof</u>
T 53 N R 11 W	2	NW SW NE NE SE SE	NW SW NW SW	
	3, 4	(All)		
	5	NE SW SW SE SE	NW NE NW NE	
	6	SE SE	NE NW	
	8	NE SE SE	SE NE SE	
	9	(All)		
	10	NE NW SW SE SE	NW NE	
	11	NW NW NW	NW NE SW	
	15	NW SW SW SW	NW NE SW	
	16, 17	(All)		
	18	NE SE SW NW	SE	
	19, 20, 21	(All)		
	22	NW NW SW SW SW	NW SW NW SW SE	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 53 N R 11 W	26	SW	NW	
	27	NW SW NE NE SE SE	SW SE NW NE	
	28 - 33	(All)		
	34	NW SW SW SW	NW NE SW	
T 54 N R 11 W	1	(All)		
	2	NE NE SE SE	NE SE NE SE	
	11	NE SW	NE SW	
	12, 13	(All)		
	14	NW SE NE NE SW SW SW	SW SE NW NE SE	
	23	NE SE NW NW SW SW SW	NE SE NW NE SE	
	24, 25	(All)		
	26	NE SE NW SW	NE SE	
	32	SE SE	NE SE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	<u>or portions thereof</u>
T 54 N R 11 W	33	SW SE NW NW NE NE	SW SE SW SE	
	34	NE SE SW NW NW NW		NE SE SW
	35, 36	(All)		
T 55 N R 11 W	35	SE	SE	
	36	SE SE SW SW	SE SW SE SW	
T 54 N R 10 W	1	NW NW	NW SW	
	2	SE	SE	
	6	NW NW	NW SW	
	11	NE NE SE	NE SE NE	
	12	(All)		
	13	NW SW SW NE NE NE	NE NW SW NE NW SE	
	14	SW SE NW NW NE NE NE	SW SE SW SE NE	
	15	SE SE SE	NE SE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	<u>or portions thereof</u>
T 54 N R 10 W	21	SE SE SE	NE SE SW	
	6	NW NW	NW NW	
	22	NE SE SW NW NW NW	NE SE SW	
	23	(All)		
	24	NW NW NW NE	NW SW SE SW	
	26	NE NE NW	NE NW NE	
	27	NE NW NW	NW NW NE	
	28	NE NE NW NW NW	NE NW NE NW SW	
	29	NE SW	SE	
	30	SE SW SW SW	NE SE SW	
	31	NW NE SE SW SW SW	NW NE NW SW	
	32	NW	NW	
T 55 N R 10 W	31	Lot 4		
	36	SE NE	SE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	<u>or portions thereof</u>
T 55 N		NE		SW
R 10 W		SW		NE
		SW		SE
T 54 N	2	NW		
R 9 N		NW		NW
		SW		SW
3 - 8		(A11)		
	9	NE		
		NW		
		SW		
		SE		NW
		SE		SW
10		NW		
16		NW		NW
17		NW		
		SW		NW
		NE		NE
		NE		NW
		NE		SW
18		NE		
		SE		
		NW		
		SW		NE
		SW		SE
T 55 N	1	NE		NE
R 9 W		NE		SE
		SE		NE
		SE		SE
10		SE		SE
11		SE		
		NE		SE
		SW		NE
12		NE		
		SE		NW
		SE		NE
		SW		NW
		SW		NE
		SW		SW
		NW		NE
		NW		SE
		NW		SW
13		NW		NW
		NW		NE
		SW		SW

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4} \frac{1}{4}$	<u>or portions thereof</u>
T 55 N R 9 W	14	SE SW NW NW NW	NW SW SE	
	15	NE SE SW NW NW	NE SE	
	16	SE SE SE	NE SE SW	
	20	SE SE SE	NE SE SW	
	21	NE SE SW NW		SE
	22	NW NE SE SW SW		NW NE
	23	(All)		
	24	SW NW NW SE SE	SW SE NW SW	
	25	NE NW NW NW SW	NW NE NW SW NW	
	26	NW NE SE		NE
	27	SW SE SE NW NW NW	NW SW NW SW SE	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 55 N R 9 W	28	(All)		
	29	NE SE SW NW NW NW	NE SE SW	
	30	SE SE SE	NE SE SW	
	31	SE SW NE NW NW NW	SE SW NE	
	32 - 34	(All)		
	35	SW NW NW	NW SW	
T 55 N R 8 W	4	NW NW NE NE	NW NE NW SW	
	5, 6	(All)		
	7	NE NW SW		
	8	NW NE NE SE SE SW	NW SW NW SW NE	
T 56 N R 8 W	1 - 4	(All)		
	5	NE SE SW		
	6	SE		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 56 N R 8 W	8	NE SE NW NW SW SW	NE SE NE SE	
	9 - 11	(All)		
	12	NE NW SW Lot 6 Lot 7		
	14	NW Lot 1	NW	
	15	NE NW SW SE	NW	
	16, 17	(All)		
	18	NE SE SE SE	SE NE SE SW	
	19	NE SE SW NW NW	NE SE	
	20, 21	(All)		
	22	NW NW	NW SW	
	27	SW SW	NW SW	
	28 - 30	(All)		
	31	NE SE NW NW SW SW SW	NW NE NE SE SW	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 56 N R 8 W	32	(All)		
	33	NE NW SW SE SE	NW SW	
	34	NW	NW	
T 57 N R 8 W	12	SE SW	SW SE	
	13	NW NE NE Lot 2 SE	NE NW SW NE	
	25	(All)		
	26	SE SW NE NW	SE SE	
	27	SE SW SW SW	NE SE SW	
	32	SE SW Lot 2	NE	
	33	NE SE SW NW		SE
	34 - 36	(All)		
T 56 N R 7 W	5	NE NE NW NW	NE NW NE NW	
	6	NE NW SE SE SW SW SW	NE NW NE NE SW	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>or portions thereof</u>
T 56 N R 7 W	7	NW	NW	
T 57 N R 7 W	1	NW	NE	NE
		NE	NE	NW
		NE	SE	SW
		SE	NW	NW
		SW	NE	NW
		SW	NW	SW
		SW		
2 - 4	(All)			
	5	SE		
		SW		
		NE	NE	NE
		NE	SE	SE
		NE	SW	
		NW	SE	
		NW	SW	
6	SE			
	NE	SE	SE	
	SW	NE	NE	
	SW	SE	SE	
7	NE			
	SE			
	NW	SE	SE	
	NW	NE	NE	
	SW	NE	NE	
	SW	SE	SE	
8, 9	(All)			
10	NE			
	NW			
	SW			
	SE	NE	NE	
	SE	NW	NW	
	SE	SW	SW	
11	NW			
	SW	NW	NW	
	NE	NE	NE	
	NE	NW	NW	
14	SW		SW	
15	NW			
	SW			
	SE			
	NE	NW	NW	
	NE	SW	SW	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>or portions thereof</u>
T 57 N R 7 W	16, 17	(All)			
	18	NE SE SW NW NW		NE SE	
	19	NE SE SW SW SW NW NW NW		NE SE SW NW NE SE	
	20	NE NE NW NW SW SW		NE NW NW SW NW SW	
	21	NE SE NW SW SW SW		NE NW SE	
	22	NE NW SW SE SE SE		NE NW SW	
	23	NW		NW	
	27	NW			
	28	NE NE NE SW SW SW SE		NE NW SE NW SW SE SW	
	29	NW SW SE NE NE NE		NW SW SE	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 57 N R 7 W	30 - 32	(All)		
	33	NW NE SW SW	SW NW NE	
T 58 N R 7 W	23	SE SW SW SW	NE SE SW	
	24	SE SW NE NW NW	SW NW NE	
	25, 26	(All)		
	27	NE SE SW SW SW	NE SE SW	
	28	SE SE	SE SW	
	33	NE SE SW NW NW	NE SE	
	34, 35, 36	(All)		
T 58 N R 6 W	19	SW SE SE NW NW NE NE NE	NW SW SE SW SW SE NE	
	30	NW SW SW SE	NW SW SE SW	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 58 N R 6 W	31	NW		
		NE	NW	
		NE	SW	
		SW	SW	
		SW	NW	
		SW	NE	
T 59 N R 6 W	25	SE		
		NE	NE	
		NE	SE	
		NE	SW	
		SW	SE	
34		SE	SE	
		SE	SW	
		SW		
		SE		
35		NE		
		NE	SE	
		NE	SW	
		NW	SE	
36		NE		
		SE		
		SW		
		NW	NE	
		NW	SE	
		NW	SW	
T 59 N R 5 W	1	NE		
		NW		
		SW	NW	
		SE	NE	
		SE	SE	
2	(All)			
3		NW		
		NE		
		SE		
		SW	NE	
		SW	SE	
4		NE	NE	
		NE	NW	
		NE	SE	
5		SE	SW	
		SE	SE	
		SW	SW	
		SW	SE	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 59 N R 5 W	6	SE	SE	
	7	NE NE SE SE SE	NE SE NE SE SW	
	8	(All)		
	9	NW SW NE NE NE	NW SW SE	
	10	NE SE NW NW NW SW SW SW	NE SE SW NE SE NW	
	11	NW NE SW SW	NW NW SW	
	15	NE NE NE NW NW	NE NW SW NE SE	
	16	NW SW SE NE NE	NW SW	
	17	(All)		
	18	NE SE		
	19	NE SE SW SW SW	NE SE SW	
	20	(All)		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>or portions thereof</u>
T 59 N R 5 W	21	NW NE NE NE SW SW SW		NE NW SW NE NW SW	
	29	NW NE NE NE SW SW SW		NE NW SW NE NW SW	
	30, 31	(All)			
	32	NW		NW	
T 60 N R 5 W	13	SE SE		SE SW	
	21	SE		SE	
	22	SE NE NE Lot 6 Lot 5		NE SE	
		SW SW		SE SW	
	23	SE SW			
		NE NE NE NW NW		NE SE SW SE SW	
	24 - 27	(All)			
	28	NE SE SW NW		SE	
	29	SE		SE	
	32	NE		NE	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>or portions thereof</u>
T 60 N R 5 W	33	NE SE SW SW NW NW NW	NE SE NE SE NW	
	34 - 36	(All)		
T 59 N R 4 W	2	NW NW	NW NE	
	3	NE NW SW SW SW SE SE	NE NW SW NE NW	
	4	NE NW SE SW SW SW	NE SE NW	
	5	NE NW SW SW SW SE SE	NE NW SW NE NW	
	6	(All)		
T 60 N R 4 W	1 - 3	(All)		
	4	NE SE	NE	
	8	SE SE	NE SE	
	9	SW NW NW NE SE SE	SW SE SW NW SW	
	10	NE NE	NE NW	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 60 N R 4 W	11, 12	(All)		
	13	NW NE SW SE SE SE	NE NW SW	
	14	NE NW NW NW	NW NE SE	
	15	NE NW SW SW	NE SW NW SW	
	16 - 17	(All)		
	18	NE NE SE SE SE SW SW Lot 4 NW	NE SE NE SE SW NE SE SE	
	19 - 21	(All)		
	22	NW SW	NW SW	
	23	SE SW	SE	
	24	SW SW SW SE	NW SW SE SW	
	25	NW SW SW SW	NE NW SW	
	26 - 34	(All)		

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u>	<u>or portions thereof</u>
T 60 N R 4 W	35	NE NW SW SE SE SE	NE NW SW	
	36	NW	NW	
T 61 N R 4 W	24	SW SE NE NE NE NW	NE SE SW SE	
	25	NE SE SW NW NW NW	NW NE SE	
	26	SE SW NW NW NE	SW SE SW	
	27	NE SE SE SE	SE NE SE SW	
	33	SE SE SE	NE SE SW	
	34 - 36	(All)		
T 60 N R 3 W	2	SW	NW	
	3	NW SW SE SE SE	NE NW SW	
	4 - 6	(All)		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 60 N R 3 W	7	NE NW Lot 4 SW SW	NW SW	
		Lot 5		
	8	NW NE	NW	
	9	NE NE NW NW	NE NW NE SE	
	10	NW NW	NE NW	
T 61 N R 3 W	1, 2	(All)		
	3	NE SE SW Lot 3 NW Lot 5		SE
	4	Lot 9		
	9	NE SE SW NW NW	NE SE	
	10 - 16	(All)		
	17	SE NE NE SW SW SW	NE SE NE SE SW	
	18	SE SE	SE SW	
	19 - 23	(All)		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4}$</u>	<u>or portions thereof</u>
T 61 N R 3 W	24	NE NW SW SE SE SE	NE NW SW	NE NW SW	
	25	NW NW NW	NE NW SW		
	26	NE NW SW SE SE SE	NE NW SW		
	27 - 33	(All)			
	34	NE NW SW SE SE SE	NE NW SW		
	35	NW NW NW	NE NW SW		
T 62 N R 3 W	25	SE SW NE NE	SE SW		
	26	SE SE	SE SW		
	34	SE Lot 2 SW	SE		
	35	NE SE SW Lot 1 NW Lot 3	SE		
	36	(All)			

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 61 N R 2 W	1	NE NW SE SW SW SW	NW NE SE	
	2 - 11	(All)		
	12	NW SW	SW NW	
	14	NW SW SE SE NE NE	SW SE NW NE	
	15 - 18	(All)		
	19	NE NW SW		NW
	20	NW NE SE SE SE SW	NW NE SE NE	
	21	NW NE SE SW SW SW	NW NE NW SW	
	22	NW NE NE NE		NE NW SW
	23	NW NW		NE NW
T 62 N R 2 W	20	SW SW SE SE	SW SE SW SE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 62 N R 2 W	21	SW SW SE SE	SW SE SW SE	
	22	SW SW SE SE	SW SE SW SE	
	23	SW	SW	
	25	SE SW NW NW NE		SE SW SW
	26 - 36	(All)		
T 61 N R 1 W	1 - 3	(All)		
	4	SE SW NE NE NW NW		SE SW SE SW
	5	SE SW NW NE NE NE		SE SW NW
	6	(All)		
	7	NW NE NE		NE NW
	8	NE SE SW SW SW NW NW NW		NE SE SW NW NE SE
	9 - 12	(All)		

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 61 N R 1 W	13	NE NE NW NW	NW NE NW NE	
	14	NE NW	NE NW	
	15	NE NE NW NW	NE NW NE NW	
	16	NW NE NE NE	NE NW SW	
	17	NE NW SE SE SW SW	NE NW NE NW	
	18	NE NE	SE SW	
T 62 N R 1 W	30	SW Lot 4	SE	
	31	NW SW SE NE NE NE	NW SW SE	
	32	SW NW NW SE	SW SE SW	
	36	SE SW SW NE NE NE	NE SE NE SE SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 61 N R 1 E	4	NW NW NW	NE NW SW	
	5 - 7	(All)		
	8	NW SW SE NE NE	NW NW SW	
	17	NW NW	NE NW	
	18	NE NE NW NW	NE NW NE NW	
T 62 N R 1 E	12	SE SE	NE SE	
	13	NE SE SW		SE
	20	SE		
	21	SE SW		
	22	SE SE SW SW	SE SW SE SW	
	23	SE SE SW SW	SE SW SE SW	
	24 - 28	(All)		
	29	NE SE SW NW NW NW	NE SE SW	

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 62 N R 1 E	30	SE SE	NE SE	Lots 4, 5, 6, 7, 8
	31 - 34	(All)		
	35	NW	NW	
T 62 N R 2 E	1	(All)		
	2	SW SE NE NE NE	NE SE SW	
	3	SE SW		
	4	SE SW SW SW	NE SE SW	
	5	SE SW NW	SW	
	6	NE NE SE SE SE	SE SW NW NE SE	
	7 - 11	(All)		
	12	NE NW NW	NE NW	
	13	NW NW SW SW SW	NW SW NE NW SW	
	14 - 19	(All)		
	20	NE NW SW SW SW	NE NW SW	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4 1/4</u>	<u>or portions thereof</u>
T 62 N R 2 E	21	NW NW	NE NW	
	22	NE	NE	
	23	NW NE SE SE	NE NW	
	24	NW SW NE SE SE SE	SW NW SW SE	
	30	NW NE NE NE SE SW SW	NE NW SW NW NE NW	
T 63N R 2 E	27	SW SE SE	SE SW	
	35	NE NE SE SE	NE SE NE SE	
	36	(All)		
T 62 N R 3 E	1	NE NW		
	2	NE NW NW NW	NW NE SE	
	3	NW NE NE SE SW SW SW	NE NW SW NW NE NW SW	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 62 N R 3 E	4	NE NW SE	NE NE	
	5	NW	NW	
	6	(All)		
T 63 N R 3 E	1 - 3	(All)		
	4	SE NE NE SW SW SW	SE SW NE SE SW	
	5	SE	SE	
	8	SW SE SE SE NW NE	NW SW SE SW NE	
	9 - 17	(All)		
	18	NE SE SW NW NW	NE SE	
		Lot 2		
	19 - 29	(All)		
	30	NE SE NW NW SW SW	NE SE NE SE	
	31 - 36	Lot 1 Lot 4 (All)		
T 64 N R 3 E	34	SE SE	SE SW	
	35	SE SW SW	SE SW	
	36	SE SW		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 62 N R 4 E	5		Lot 4	
	6	NW NE		SW
		Lots 1, 2		
T 63 N R 4 E	1 - 23	(All)		
	24	NE NW SW SE		NW
	25	NW NW	NW SW	
	26	NW NE NE SW SW SW	NE NW NE NW SW	
	27 - 31	(All)		
	32	NE NW SW SE SE SE		NE NW SW
	33	NE NW SW		NW
	34	NE NW NW NW	NW NE NW SW	
T 64 N R 4 E	25 - 28	(All)		
	31	Lot 3 Lot 4		
	32	SW SE SE SE		NW SW SE
	33 - 35	(All)		

<u>Township</u>	<u>Section</u>	<u>$\frac{1}{4}$</u>	<u>$\frac{1}{4} \frac{1}{4}$</u>	<u>or portions thereof</u>
T 64 N R 4 E	36	NW SE SW NE NE Lot 4	SW SE	
T 63 N R 5 E	1	NE NE NW NW SW SW SW SE	SE SW SE SW NE NW SW NW	
	2 - 10	(All)		
	11	NW NE SW	NW NW	
	15	NW NE SW SW SW	NW NE NW SW	
	16	SE NE NW SW SW SW	SE NE NW	
	17	NE NW SE SE SW SW	NE NW NE NW	
	18	(All)		
	19	NE NW		
	21	NE	NE	
T 64 N R 5 E	21	SE SE SW SW	SE SW NE SE	

<u>Township</u>	<u>Section</u>	$\frac{1}{4}$	$\frac{1}{4}$	<u>or portions thereof</u>
T 64 N R 5 E	22	SE SE	SE SW	
	23	SE SE SW SW SW	SE SW SE SW NW	
	24	SE SW		
	25 - 26	(All)		
	27	NE NW NW NW SE SE SE	NW NE SE NE SE SW	
	28	SE SW SW	SW SE SW	
	29	SE	SE	
	31	SE SE	SE SW	
		Lot 4		
	32	NE NE SE SE	NE SE NE SE	
	33 - 35	(All)		
	36	NE NW SW SW SW		NE NW SW
T 64 N R 6 E	19	Lot 2 Lot 3 Lot 4		
	29	NW SW SW	SW NW SW	

<u>Township</u>	<u>Section</u>	<u>1/4</u>	<u>1/4</u> or portions thereof
T 64 N R 6 E	30	SE SW NW NE Lot 2	SE
	31	NW NE NE NE	NE NW SW

