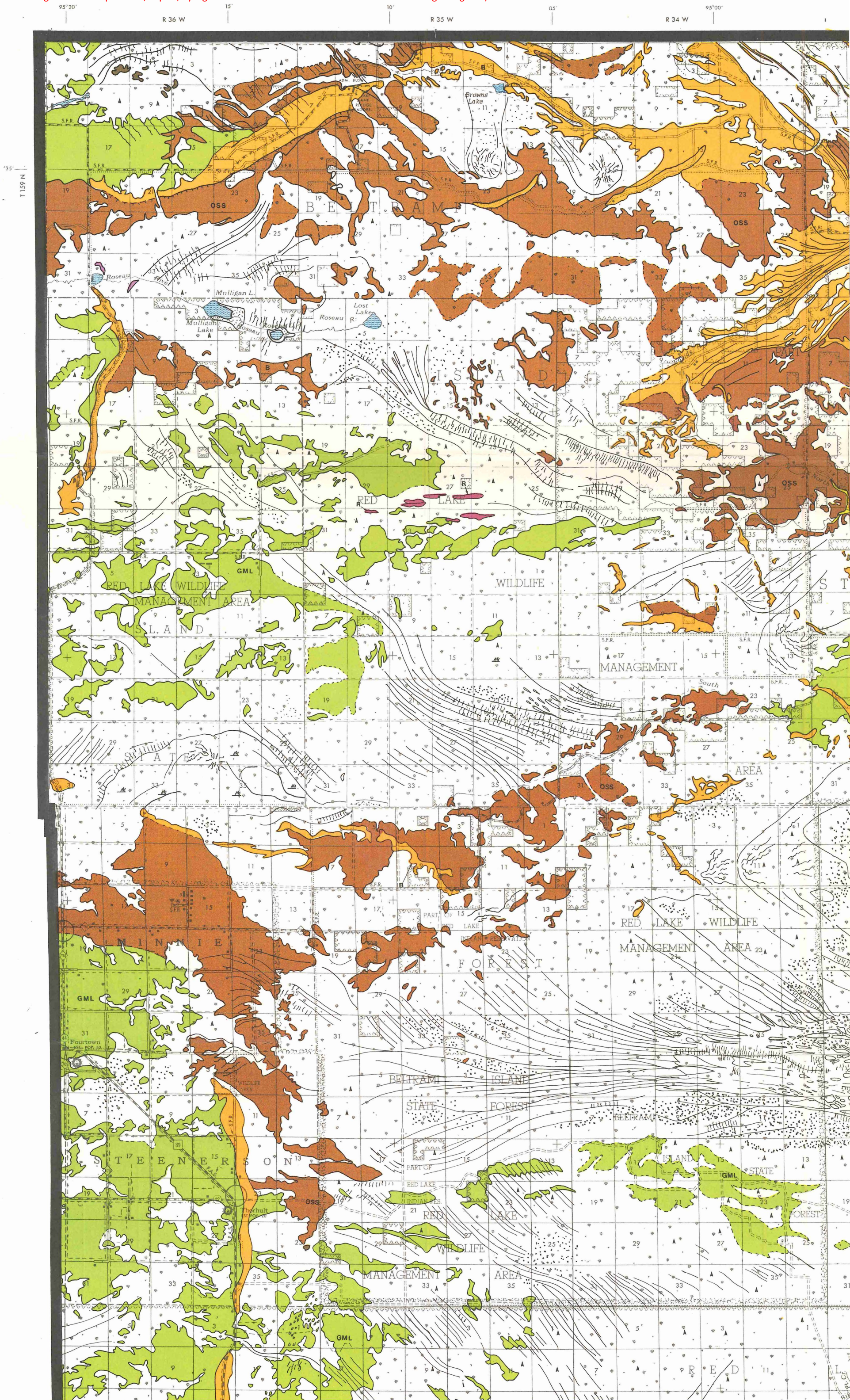


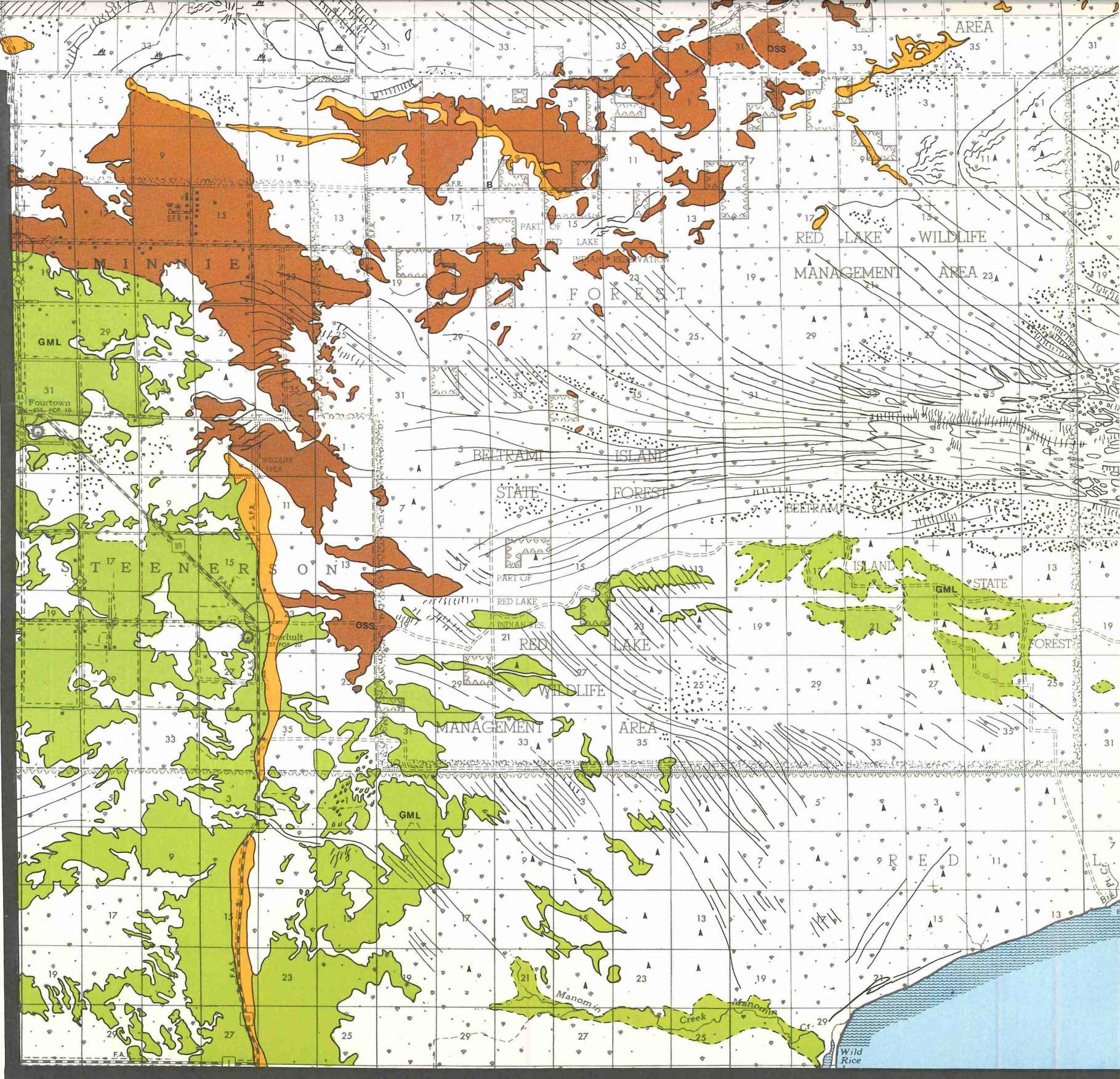
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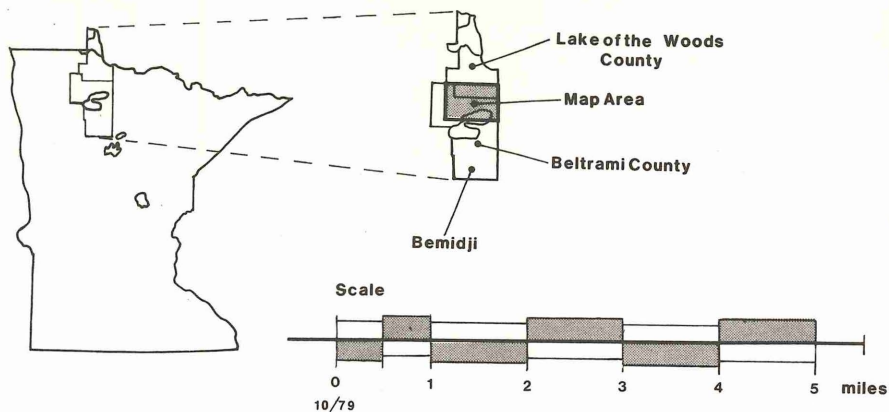
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AN EVALUATION OF THE SURFICIAL GEOLOGY AND BOG PATTERNS OF THE RED LAKE BOG BELTRAMI AND LAKE OF THE WOODS COUNTIES MINNESOTA

BY MORRIS T. ENG



LEGEND: Surficial

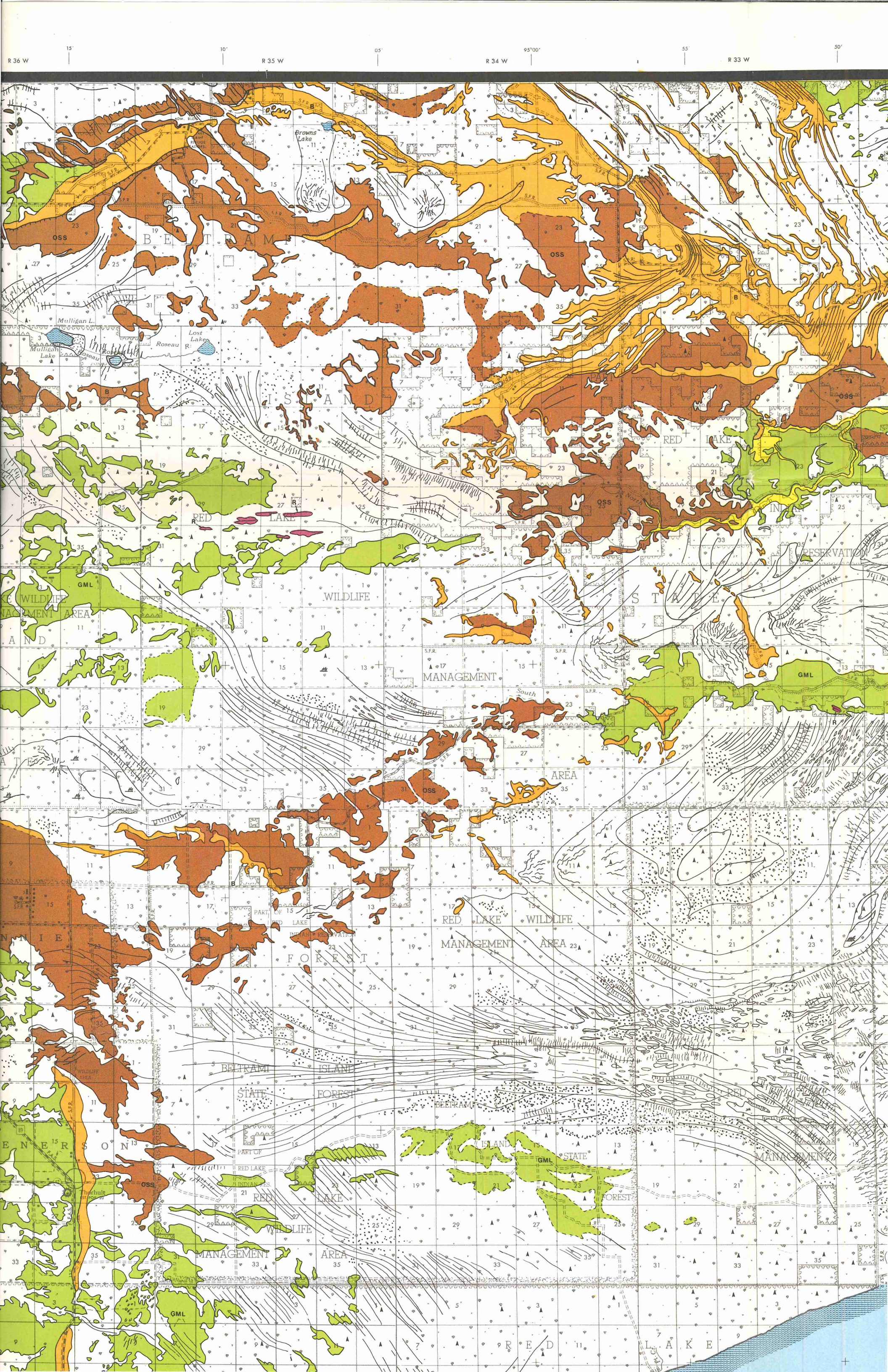
	R	Indicates a ro
	B	Beach sand ar
	OSS	Off shore sand deposited by that later was
	GML	A level ground to brownish g The surface o in places by
	AL	Indicates mix
		Uncolored are

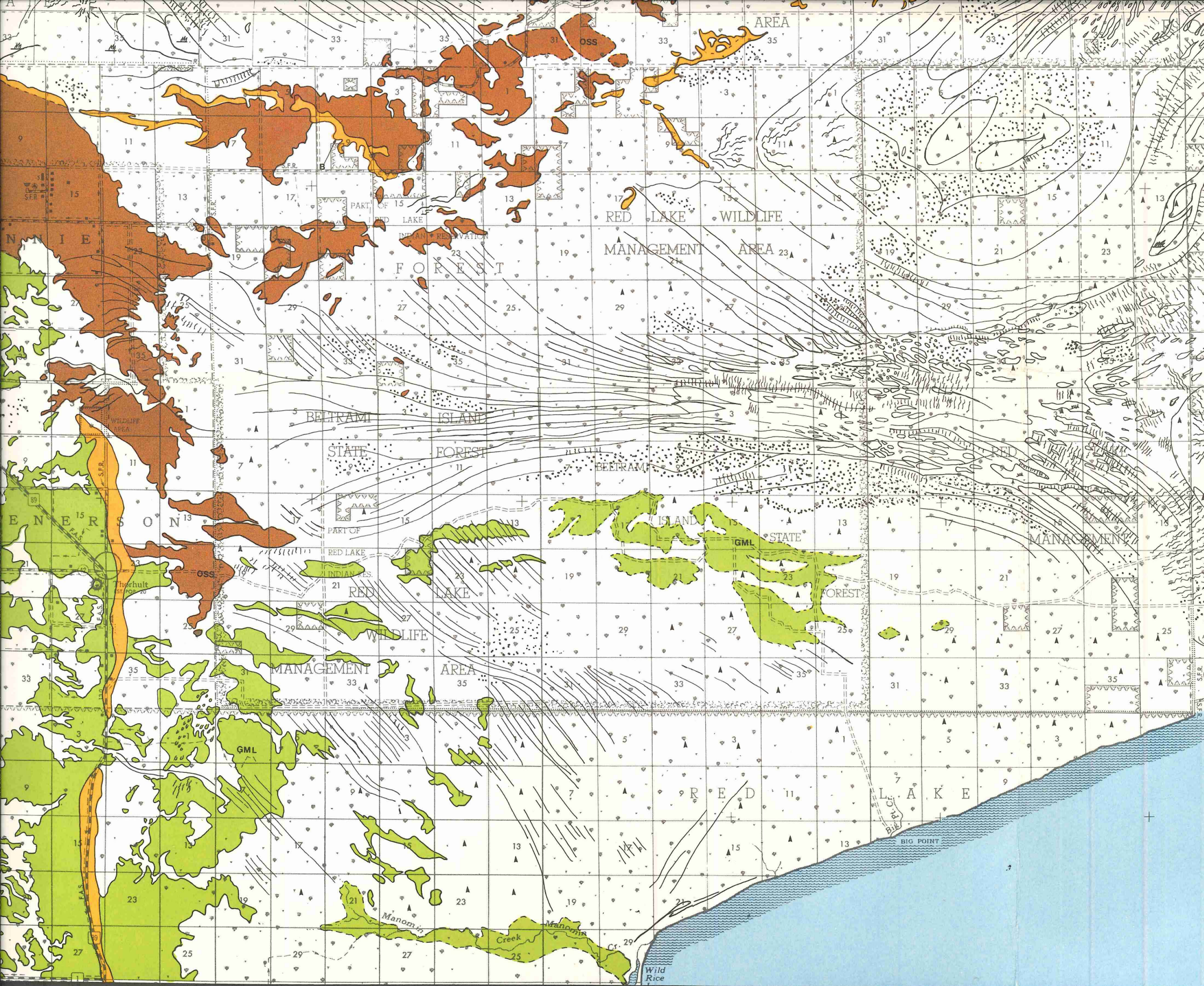
Produced by
Minnesota Department of Natural Resources
Division of Minerals
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Production Assistance & Cartography

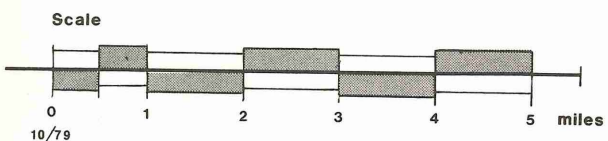
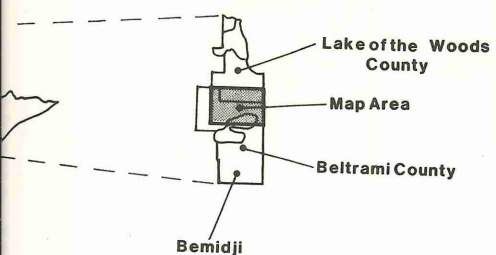
Paul Hedlund





DISTRIBUTION OF THE SURFICIAL GEOLOGY PATTERNS OF THE RED LAKE BOG BELTRAMI AND LAKE OF THE WOODS COUNTIES MINNESOTA

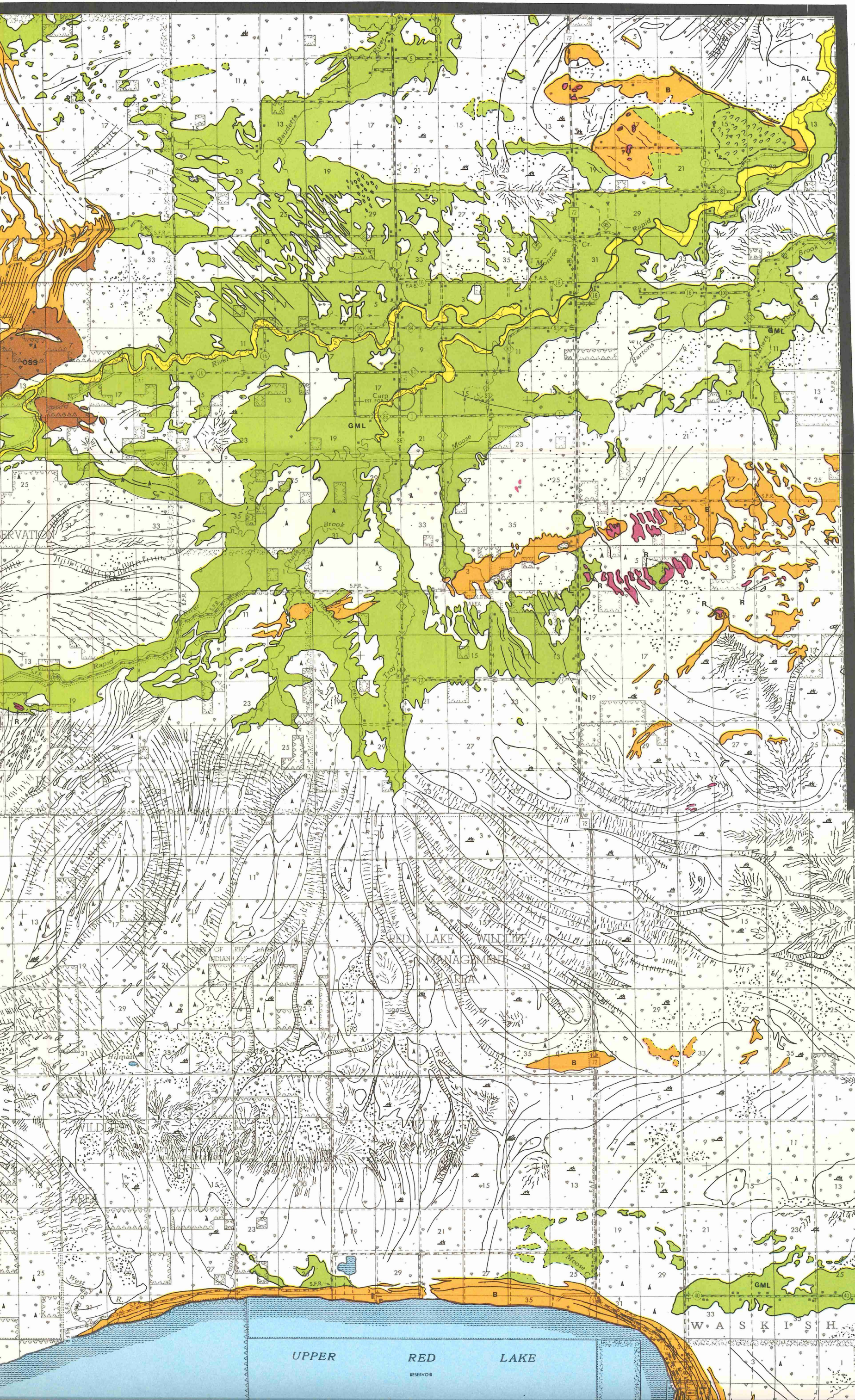
BY MORRIS T. ENG



LEGEND: Surficial Geology

- R** Indicates a rock exposure or land forms reflecting near surface rock.
- B** Beach sand and gravel related to former shorelines of Lake Agassiz.
- OSS** Off shore sand - represents light buff to light brown colored sand deposited by the St. Louis Sublobe into the littoral zone of Glacial Lake Agassiz that later was reworked by wind erosion when the lake receded.
- GML** A level ground moraine that is lakewashed, composed of light buff to brownish gray till, rich in carbonate rocks. The surface contains pebbles or may be capped in places by lake silt or fine sand.
- AL** Indicates mixed alluvial soils deposited by existing streams.
- Uncolored areas represent peat deposited in the former bed of Lake Agassiz.





T 159 N 48°35'

T 158 N 30'

48°25'

T 157 N

48°20'

T 156 N

48°15'

T 155 N

UPPER RED LAKE
RESERVOIR

W A S K I S H



Bog Patterns

near surface rock.

of Lake Agassiz.

colored sand

one of Glacial Lake Agassiz

receded.

d of light buff

streams.

mer bed of Lake Agassiz.



Raised bog patterns are formed by wavy lines of black spruce radiating outward from a central point. It is representative of sphagnum peat deposits and local watershed divides in the bog.



Ribbed fen patterns are formed by the selective growth of trees and grasses on the peat bog into sweeping lines crossed at right angles by delicate transverse lines. The major lines reflect the drainage from the bog to streams. This pattern usually contains reed-sedge peat.



Ovoid tear patterns occur in a wide range of sizes and stages of development of black spruce cover. The surface run off drains around the margin in the direction pointed by the tail.



Mottled patterns represent a wet bog environment dominated by lower story vegetation intermixed with tamarack.



Arterial drain patterns consist of narrow wet channels with concentrated transverse ribbing. This pattern is tributary to broader ribbed fen patterns and represents the uppermost extension of small watersheds into the bogs interior.



Denotes fire scars that have scarred and modified the original bog patterns.



Denotes a heavily forested bog area that usually contains uniform deposits of reed sedge or woody-fibrous peat.



Trace of a wave cut shoreline or an indistinct geologic boundary.