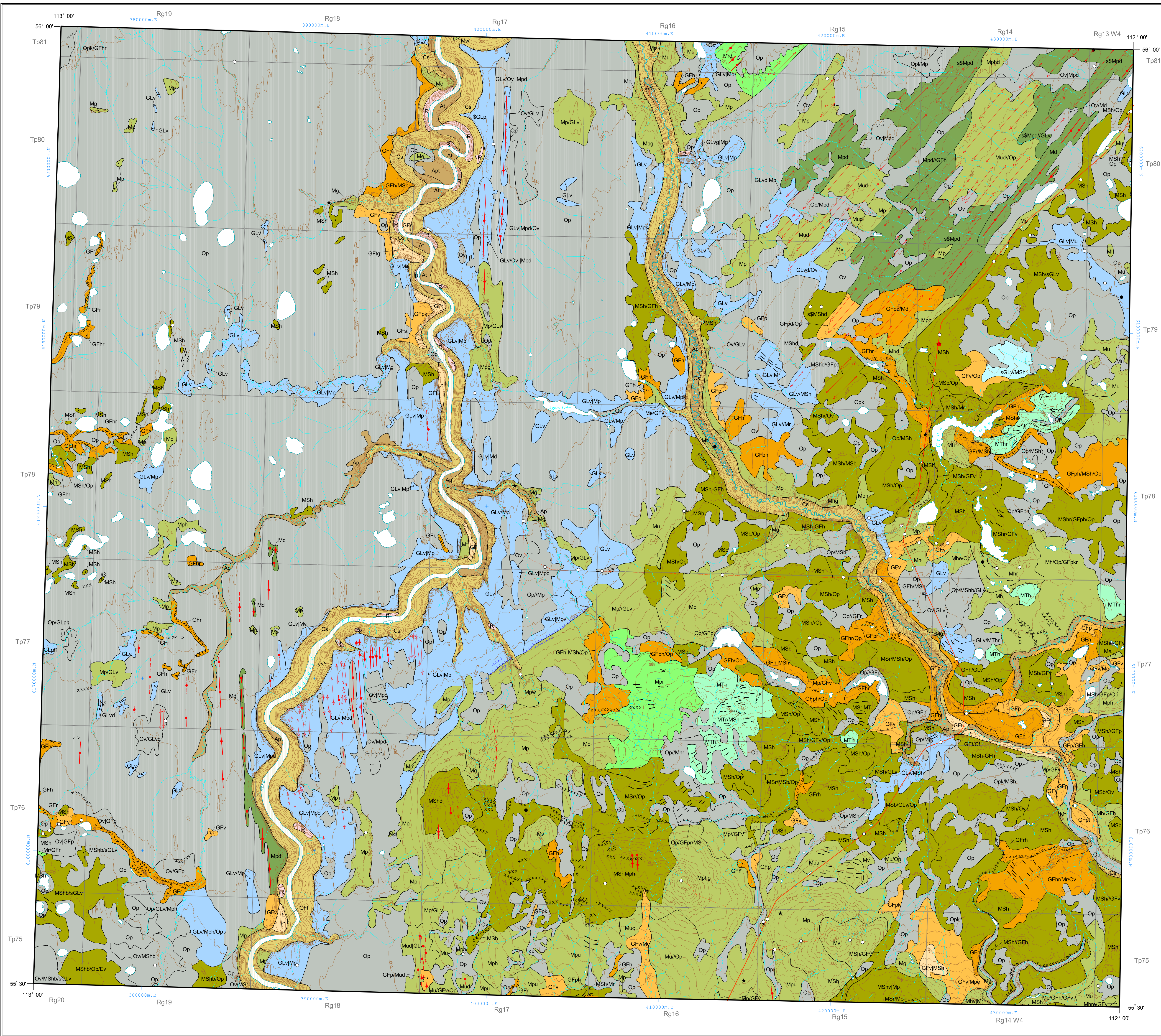


NTS 83P/NE  
SURFICIAL GEOLOGY

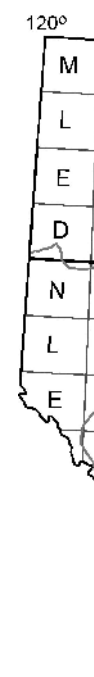
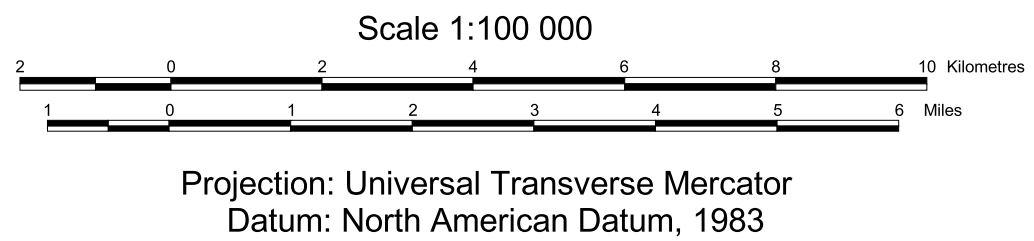


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Map 243

Surficial Geology of the House River Area, Alberta (NTS 83P/NE)

Geology by: J.E. Campbell, M.M. Fenton and J.G. Pawlowicz, 2001.



Published 2002

| UNIT SYMBOL       | UNIT NAME                                      | DESCRIPTION AND GENESIS   |
|-------------------|--|---|
| <b>QUATERNARY</b> |  |   |
| <b>HOLOCENE</b>   |  |   |
| O                 | ORGANIC DEPOSITS:                              | Undifferentiated bog, fen, swamp and marsh deposits; woody to fibrous to mucky peat; commonly underlain by fine glacial lake deposits.  |
| Ol                | patterned fen, string bogs                     |   |
| Oh                | peat   |   |
| Opk               | organic terrain with thermokarst features      |   |
| C                 | COLLUVIAL DEPOSITS:                            | Massive to stratified silt to clayey diamict and bedrock slabs; slope and slump deposits formed by gravity-induced movement; confined to valley slopes and floors.                                      |
| Cf                | talus cone, debris flow                        |   |
| Cl                | scufflation lines                              |   |
| Cs                | landslide blocks, slumps                       |   |
| E                 | EOLIAN DEPOSITS:                               | Wind-deposited sediments; well-sorted medium- to fine-grained sand, and minor silt (loess), generally massive to locally cross-bedded or ripple laminated; includes both active and vegetated deposits. |
| El                | blowout and remnant sand dune ridges           |   |
| Er                | longitudinal and parabolic dunes               |   |
| A                 | ALLUVIAL DEPOSITS:                             | Sand, silt, clay, gravel and organic sediments deposited by modern streams; commonly well sorted and stratified.  |
| Al                | alluvial fan                                   |   |
| L                 | LACUSTRINE DEPOSITS:                           | Sediments deposited in and adjacent to recent lakes; offshore sand, silt and clay, and minor organic deposits; littoral (nearshore) sand and silt, and minor gravel.                                    |
| Lr                | modern beach deposits and lake ice push ridges |   |

|                    |   |   |
|--------------------|---|---|
| <b>PLEISTOCENE</b> |   |   |
| GL                 | GLACIOLACUSTRINE DEPOSITS:  | Sediments deposited in glacial lakes; massive to stratified clay, silt, sand, and minor gravel; thickness varies from <1 to >5 m; lake sediments may form a discontinuous cover; sediments reworked by wave action of glacial lake or carried into the lake basin mainly by glacial meltwater and deposited offshore in deep water; predominantly silts and clays; commonly flat to gently rolling plain. |
| GLh                | glaciolacustrine sediments with irregular hummocky topography resulting from deposition in ponded water on stagnant ice (supraglacial); generally silt with minor sand, clay and diamict; composed of supraglacial lake silts and clays, low to moderate relief |   |
| GLb                | circular hummocks with a central depression, plateau mounds and/or irregular chaotic ridges composed of supraglacial lake silts and clays, low to moderate relief   |   |

|  |                         |  |
|--|-------------------------|--|
|  | Offshore (distal):      | Fine-grained sediments, predominantly clay and silt, minor sand and diamict, deposited in a deep water environment (i.e., GLV, GLP). May include ice-rafted dropstones and diamict inclusions.   |
|  | Nearshore and littoral: | Sand, silty sand and gravel, moderately well sorted and commonly horizontally bedded; occurs as a blanket of sand grading basinward into finer sediments, or as forested deltaic deposits (GLX), or as isolated or series of ridges including beaches, bars and spits. Sandy or gravelly nearshore and littoral lake sediments are prefixed with a textural modifier (i.e., sGLs, sGLX). |
|  | GLr                     | strandlines, raised beaches; sand and minor gravel ridges marking paleoshorelines of glacial lakes; commonly <1 m to 3 m in height, includes cobble beaches  |

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| GF  | GLACIOLUVIAL DEPOSITS:   | Stratified gravel and sand, minor silt, clay deposited by glacial meltwater in contact with or near the glacier (colour indicates undifferentiated glacioluvial sediments).   |
|     | Distal (proglacial):   | Predominantly well-sorted sand with minor gravel and silt; deposited sublaterally in front of the ice (outwash) or within meltwater channels in front of or beneath the glacier (i.e., GFp, GFV); flat to gently undulating plain that may be marked by channel scars and kettle holes (K).   |
|     | Proximal (ice-contact):  | Coarse-grained sediments (predominantly gravel and sand, locally till) deposited in contact with the ice; irregular undulating to hummocky (kame and kettles) topography; may also have associated ice crevasse ridges and eskers; moderately to poorly sorted; stratified to massive; may exhibit features related to slumping and faulting. |
| GFr | eskers and esker systems   |   |
| GFr | glacial ice hummocky deposits  |   |
| GFr | crevasse ridges composed of stratified drift; appear very similar to small-scale eskers  |   |
| GFr | previously deposited sands and gravels overlain and remolded into streamline features by glacial ice; landforms oriented parallel to ice flow          |   |
| GFr | ice-contact delta; silt, sand, gravel and diamict deposited in contact with the ice by outflow of meltwater as the ice margin into a depositional lake |   |

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| M   | GLACIAL DEPOSITS/MORAINES:   | Unsorted to poorly sorted diamictites deposited as till (a mixture of clay, silt, sand, minor pebbles, cobbles and boulders) at the ice margin or beneath a glacier; locally may include blocks of shale, siltstone, sandstone, or silt-sandstone stratified drift and till. Moraine may also include beds of glaciolacustrine and/or glacioluvial sediments. The regional till is predominantly clay rich; locally the texture of the till may vary depending on the local source material. Thickness may exceed 150 m in buried valleys. |
| Md  | drumlin, drumlinoid and/or fluted terrain composed of ground moraine   |  |
| Mr  | De Geer, Rogen, ribbed moraines; undivided moraine ridges including end moraine  |  |
| MS  | Stagnant ice moraine:  | Terrain resulting from the collapse and lateral movement of englacial and supraglacial sediments in response to melting of buried stagnant ice at the ice margin; sediment is mainly till but locally includes stratified sediments of glaciolacustrine or glacioluvial origin. Characterized by low- to high-relief hummocky topography.  |
| MSr | common end and recessional moraines  |  |
| MSr | crevasse fillings, subparallel to intersecting ridges believed to have formed under stagnant ice conditions by filling of ice crevasses with glacial debris by either appearing up from the base of the ice or flowing/slumping into open crevasses; till and stratified sediments; > 2 m high, low to moderate relief |  |

|     |  |  |
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| MT  | Ice-thrust moraine:                    | Terrain resulting from glaciostatic transport of originally subglacial sediment and deposited by the glacier more or less intact; deposits may include syngenetic till as well as masses of pre-existing till, stratified drift, and/or bedrock; topography generally moderate to high relief. |
| MTb | 'rubber' moraine, 'hills-holes' plain: | high to moderate relief  |
| MTr | glaciostatic moraine ridges:           | moderate to high relief  |

|                       |  |   |
|-----------------------|--|---|
| <b>PRE-QUATERNARY</b> |  |   |
| R                     | BEDROCK:   | Undivided; may include crystalline (Shield), carbonates, clastic sediments and/or coal.                                       |
| Rd, sRkd              | fluted or drumlinized bedrock; undetermined if bedrock has been glacially eroded, transported, or deformed in situ |   |
| Rw                    | feislemoor (frost-shattered bedrock)   |   |
| gRt                   | Tertiary gravels:  | Predominantly quartzite and chert gravel and cobbles; proglacial age.   |
| RK                    | Cretaceous:  | Sandstone (s), siltstone (S) and shale (c), minor coal; bedrock often glacially deformed with the bedding folded and faulted. |

|   |      |  |
|---|------|--|
| <b>FEATURES LEGEND</b>  |      |  |
| Bedrock outcrop   | x    |  |
| Kettle hole/lake  | o    |  |
| Thermokarst depression  | ~    |  |
| Drumlin, drumlinoid, ispatrow   | •    |  |
| Drumlin, drumlinoid, ispatrow, weakly defined                               | •    |  |
| Flutings  | ~    |  |
| Flutings, weakly defined  | ~    |  |
| Esker ridge, direction known  | >>>> |  |
| Esker ridge, direction unknown  | <<<< |  |
| Dunes, singular ridges  | < >  |  |
| Dunes; hummocky, blowouts, dune field, wind direction indicated             | ~    |  |
| Shoreline; raised beaches, terraces   | ~    |  |
| Meltwater channel, major  | ~    |  |
| Meltwater channel, minor  | ~    |  |
| Ice-walled channel, depression, buried valley                               | ~    |  |
| Escarpment-ice contact, bedrock   | ~    |  |
| Ice thrust ridge  | ~    |  |
| Glacial thrust quarry depression boundary; direction of transport indicated | ~    |  |
| Ribbed, De Geer (washboard) or Rogen, moraine                               | ~    |  |
| Major moraine ridge; end moraine, recessional moraine                       | ~    |  |
| Minor moraine ridge undefined   | ~    |  |
| Crevasse filling  | ~    |  |
| Surface lineament; source unknown   | ~    |  |

NOTE: Where necessary genetic specific geomorphic landform notations are given under unit description.

|  |          |                             |            |
|--|----------|-----------------------------|------------|
| <b>FIELD SITES LEGEND</b>              |          | <b>ROADS</b>                |            |
| Observation only                       | o        | Paved                       | —          |
| Observation + sample taken             | •        | Gravel                      | —          |
| Observation + diamond indicator sample | +        | Unimproved                  | —          |
| Borehole, sugar                        | +        | Truck-trail                 | —          |
| Borehole, rotary                       | +        |                             |            |
| Site/Borehole Name                     | J200-041 | UTM, Zone 12 Grid           | + 430000.E |
|  |          | Contour intervals 10 metres |            |

|                            |                               |
|----------------------------|-------------------------------|
| <b>GEOMORPHIC MODIFIER</b> |                               |
| m                          | ridges and rings              |
| c                          | channeled                     |
| d                          | drumlinoid                    |
| e                          | eroded                        |
| f                          | fan                           |
| g                          | gullied                       |
| h                          | hummocky                      |
| k                          | collapse                      |
| l                          | linear structures or features |
| r                          | ridged                        |
| p                          | plain                         |
| s                          | slumped                       |
| t                          | terrace                       |
| u                          | undulating                    |
| v                          | veneer                        |
| w                          | winnowed                      |
| x                          | delta                         |

|                                 |       |
|---------------------------------|-------|
| <b>UNIT NOTATION</b>            |       |
| Example: GLACIOLACUSTRINE plain |       |
| Textural modifier               | s GLp |
| Genetic class                   | GLp   |
| Geomorphic modifier             | GLp   |

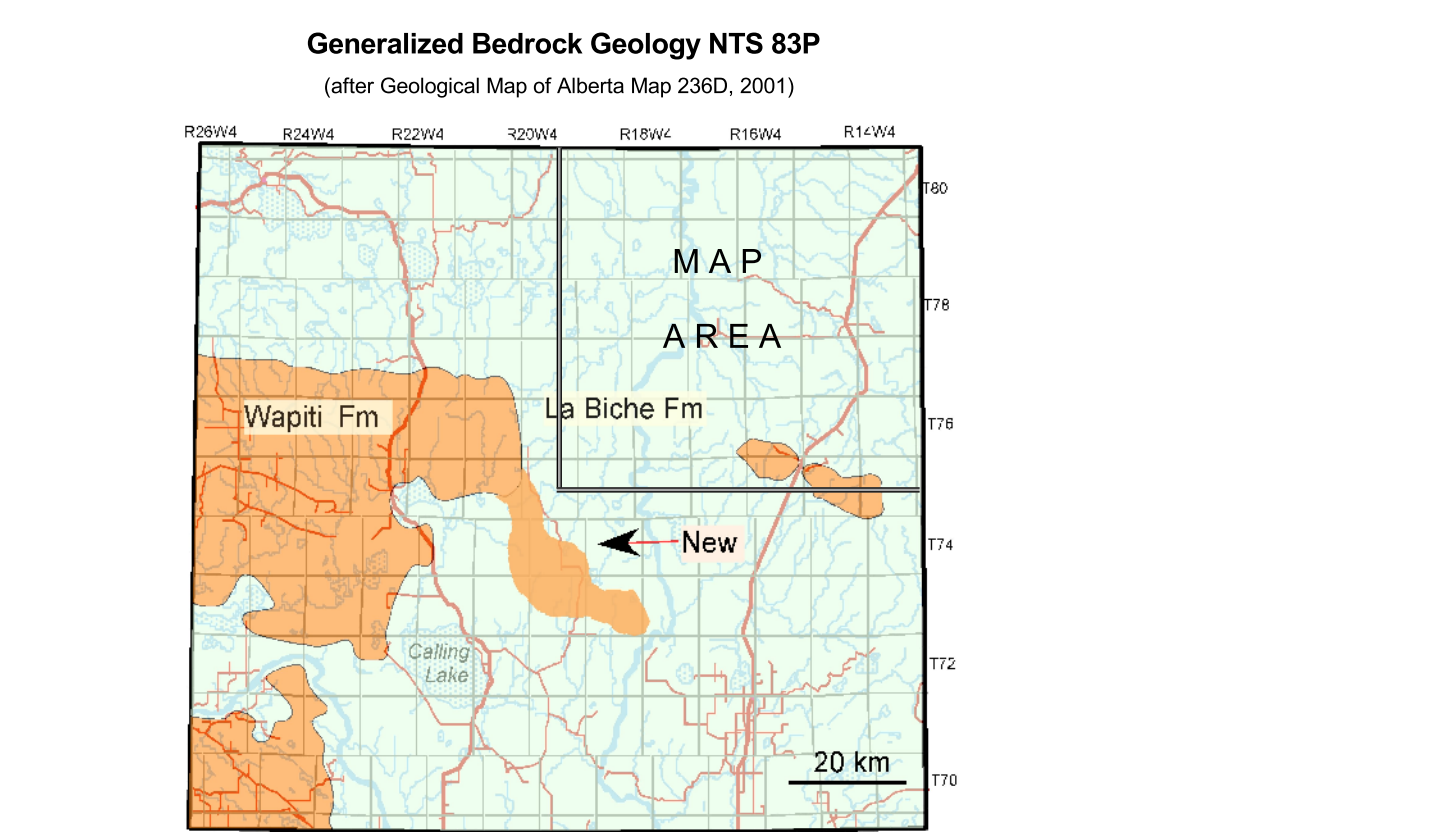
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| <b>Textural Modifier</b>   |        |
| Textural characteristics may be applied to the terrain classification as a prefix based on field observations or by inference from distinctive genesis and/or morphology. When two modifiers are given, the second letter is the dominant texture, with the first letter indicating the secondary texture, i.e., sc for sandy clay |        |
| s  | sand   |
| g  | gravel |
| s  | silt   |
| c  | clay   |

|  |   |
|--|---|
| <b>Complex</b>   |   |
| Where two or more classes of terrain are interspersed in a mosaic or repeating pattern on a scale too small to warrant meaningful differentiation, the proportion of each component in the combination is given in a two or three position designation with a percentage. For example: |   |
| *MGLV  | means that the area is underlain by approximately 60% moraine plain and up to 40% glaciolacustrine veneer                                       |
| *MGLVGFp   | means that at least 60% of the area is underlain by moraine veneer, with up to 40% glaciolacustrine veneer and less than 15% glacioluvial plain |
| *MGLVp   | means that more than 60% of the area is underlain by a glaciolacustrine plain, with less than 15% moraine                                       |

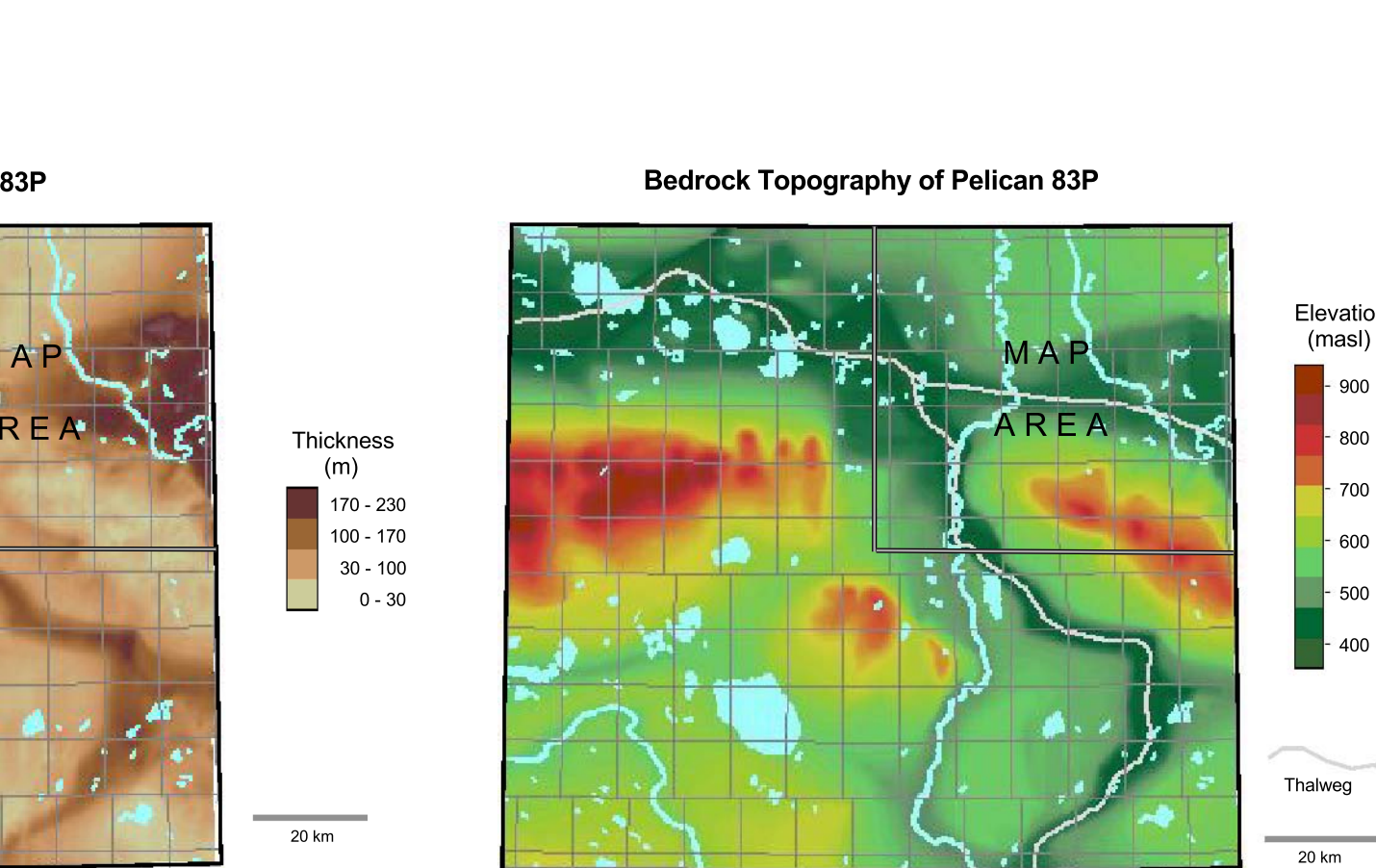
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|--|---|
| <b>Stratigraphic Sequence</b>  |   |
| Where materials of different origin or texture are known to be superimposed or can be reasonably confidently inferred, the sequence is indicated in conventional order using vertical sequencing. For example: |   |
| *MGLVp   | indicates this hummocky moraine deposited on drumlinoid moraine |

|  |  |
|--|--|
| <b>Transitional Association</b>  |  |
| Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence, or ambiguous geomorphic distinction. In the case of the latter, both components may or may not be present. Such situations are identified by a compound designation marked by a hyphen. Examples are: GFp-GLV indicating ice-contact delta ridging/valleys from glaciolacustrine delta; GFp-MSH indicating ice-contact kame and kettle topography that blends with hummocky stagnant ice moraine |  |

|  |  |
|--|--|
| <b>Morphologic Overprint</b>   |  |
| Where a sequence of geomorphic processes has produced a multi-aspect or compound terrain fabric, the geomorphic modifier suffixes are appended in the inferred order of super position. MGLVp means that a veneer of till has been moulded into a drumlinoid form and finally channelled by former meltwater streams. GFp-r means that a glacioluvial plain has been discontinuously covered by ice-contact hummocks and ridges. |  |



|             |   |
|-------------|---|
| Wapiti Fm   | gray, felspathic, stony sandstone, gray bentonitic mudstone and siltstone, weathered sandstone, mudstone                |
| La Biche Fm | dark gray shale and silty shale, sandstone pebbles and concretions, silty fish-scale bearing beds in lower part, marine |



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Digital base produced by the Resource Data Division, Alberta Environment, supplied by Spatial Data Warehouse Ltd.

**References:**  
Scale, D.W., Edwards, W.A.D., and Bisset, D.R., 1989. Sand and gravel resources of the Wandering River Area, Alberta. Alberta Research Council Open File Report 87-01.  
Scale, D.W., Sham, P.C., and Ray, C.M., 1987. Sand and gravel resources of the Pelican (west central portion of 83P) map area, Alberta. Alberta Research Council Open File Report 87-02.

This is a common map legend. Not all units may be present on this map.