

UNIT SYMBOL	UNIT NAME	DESCRIPTION AND GENESIS
QUATERNARY		
Holocene		
O	ORGANIC DEPOSITS:	Undifferentiated bog, fen, swamp and marsh deposits; woody to fibrous to mucky peat; commonly underlain by fine glacial lake deposits.
Op	patterned fen, string bogs	
Ob	peat bogs	
Oa	organic terrain with thermokarst features	
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.		
C	CL	talus cone, debris flow
Cl	colluvial line	
Cs	landslide blocks, slumps	
Eolian Deposits: Wind-deposited sediments; well-sorted medium- to fine-grained sand, and minor silt (boss); generally massive to locally cross-bedded or ripple laminated; includes both active and vegetated deposits.		
E	Er	blowout and remnant sand dune ridges
Ed	longitudinal and parabolic dunes	
Ar	alluvial fan	
Alluvial Deposits: Sand, silt, clay, gravel and organic sediments deposited by modern streams; commonly well sorted and stratified.		
A	L	modern beach deposits and lake ice push ridges
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.		
L	Lr	modern beach deposits and lake ice push ridges
Pleistocene		
GL	GLACIOLACUSTRINE DEPOSITS:	Sediments deposited in glacial lakes; massive to stratified clay, silt, sand, and minor gravel; thickness varies from <1 to >4 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 silt and clay, commonly flat to gently rolling plain.
GLA	glaciolacustrine sediments with irregular hummocky topography resulting from deposition in pooled water on stagnant ice (supraglacial); generally silt with minor sand, clay and diamict; moderate relief	
GLB	circular hummocks with a central depression, plateau mounds and/or irregular chaotic ridges composed of supraglacial lake silt and clays; low to moderate relief	
GLC	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.	
GLD	Nearshore and littoral: Sand, silt, silt and gravel, moderately well sorted and commonly horizontally bedded; composed of sand grading basement 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., sGL, sGLA).	
GLX	stratified, raised beaches; sand and minor gravel ridges marking paleoshorelines of glacial lakes; commonly <1 m to 3 m in height, includes cobble beaches	
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).		
GF	Distal (proglacial): Predominantly well-sorted sand with minor gravel and silt; deposited subparallel in front of the ice (outwash) or within meltwater channels in front of or beneath the glacier (i.e., GPF, GFL); flat to gently undulating plain that may be marked by channel scars and kettle holes (K).	
GFL	Proximal (ice-contact): Coarse-grained sediments (predominantly gravel and sand, locally silt) deposited in contact with the ice; irregular undulating to hummocky (bumps 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	
GFRh	stagnant ice hummocky stratified deposits	
GFRd	crevasse ridges composed of stratified drift; appear very similar to small-scale eskers	
GFRv	previously deposited sands and gravels overridden and removed into streamline features by glacial ice; landforms oriented parallel to ice flow	
GFRx	ice-contact delta, silt, sand, gravel and diamict deposited in contact with the ice by outflow of meltwater as the ice margin retreated	
GLACIAL DEPOSITS/MORAINES: Unsorted to poorly sorted diamicts 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 stratified drift and till. Moraine may also include beds of glaciolacustrine and 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.		
M	Md	drumlin, drumlinoid and/or landform composed of ground moraine
Md	Drumlin, drumlinoid and/or landform composed of ground moraine	
Mr	De Geer, Rogen, ribbed moraines; undivided moraine ridges including end moraine	
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.		
MS	MSh	commonly end and recessional moraines
MSh	crevasse fillings, subparallel to intersecting ridges believed to have formed under stagnant ice conditions by infilling of ice crevasses with glacial debris by either 'spawning' up from the base of the ice or flowing/slumping into open crevasses; till and stratified sediments, > 2 m high, low to moderate relief	
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 silt, stratified sand, and/or bedrock; topography generally moderate to high relief.		
MT	MTh	'hubbler' moraine; 'hollow plain'; high to moderate relief
MTh	glaciostatic moraine ridges; moderate to high relief	
PRE-QUATERNARY		
R	BEDROCK:	Undivided; may include crystalline (Shield), carbonates, clastic sediments and/or coal.
Rd	fluid or drumlinized bedrock; underformed if bedrock has been glacially eroded, transported, or deformed in situ	
Rw	feisemeer (frost-shattered bedrock)	
gRT	Tertiary gravels:	Predominantly quartzite and chert gravel and cobbles; preglacial age.
RK	Cretaceous:	Sandstone (S), siltstone (Si) and shale (c); minor coal; bedrock often glacially deformed with the bedding tilted and faulted.

GEOMORPHIC MODIFIER	DESCRIPTION
m	ridges and rings: circular hummocks with a central depression (doughnut ridges), plateau mounds and brain pattern ridges; low to moderate relief
g	gullied: channelled or dissected by former streams of glacial meltwater
c	channeled: glacial streamlines longitudinal elements parallel to ice flow; drumlins, isopatus, flutings, crag and tail, Roche Moutonnée
d	drumlinoid: planar surface eroded by glacial meltwater, often capped by a boulder lag deposit and/or thin deposit of sand and gravel
e	eroded: gently sloping fan-shaped mass of detrital debris
f	fan: slopes dissected by modern ravines created by intermittent relief
h	hummocky: assemblage of approximately equal-dimensional hills and hollows; moderate to high relief (commonly greater than 2 m)
k	collapse: kettles, gilled outwash, thermokarst depressions, kank anikholis
l	linear structures or features: soilification lines, meander scars, bedrock lineaments, patterned fen
r	ridged: one or more parallel or subparallel, convex, linear morphological elements with a width-to-length ratio greater than 2 m low to high relief
p	plain: low-relief rolling terrain; swell and swale topography
s	stumped: landslide blocks, slope failure debris
t	terrace: terrace bench cut by either meltwater or wave action; antiplation terrace, kame terrace
u	undulating: low-relief rolling terrain; swell and swale topography
v	veneer: thin deposit less than 2 m thick; may be discontinuous; commonly occurs as a drape revealing geomorphic pattern of underlying deposits
w	winnowed: sediments have been washed, winnowed and/or reworked by wave action; a boulder lag with associated sand and gravel may cap underlying sediments
x	delta: lake delta; ice-contact delta

UNIT NOTATION
Example: GLACIOLACUSTRINE plain

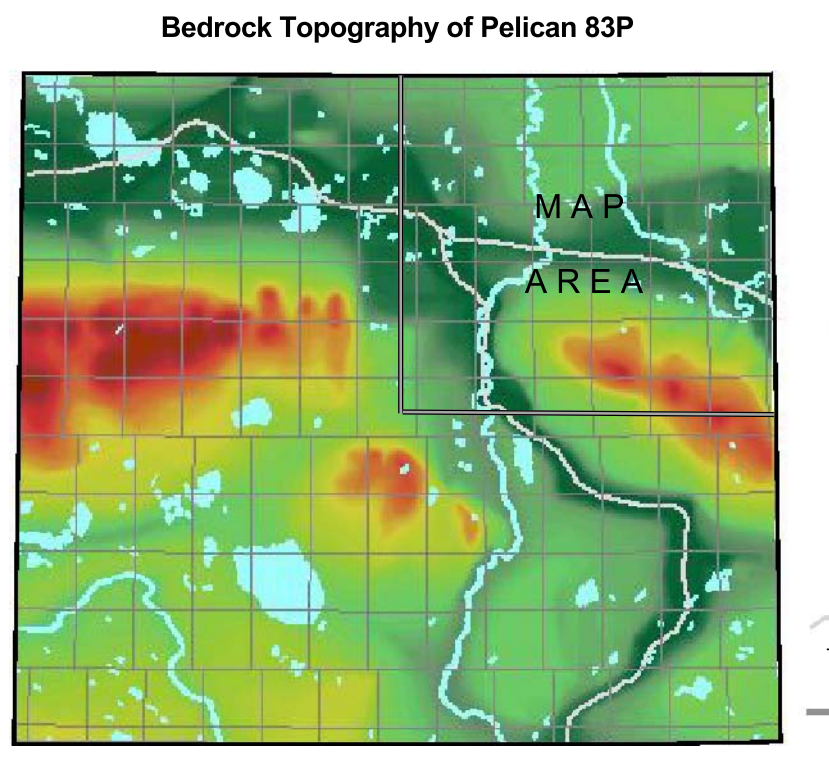
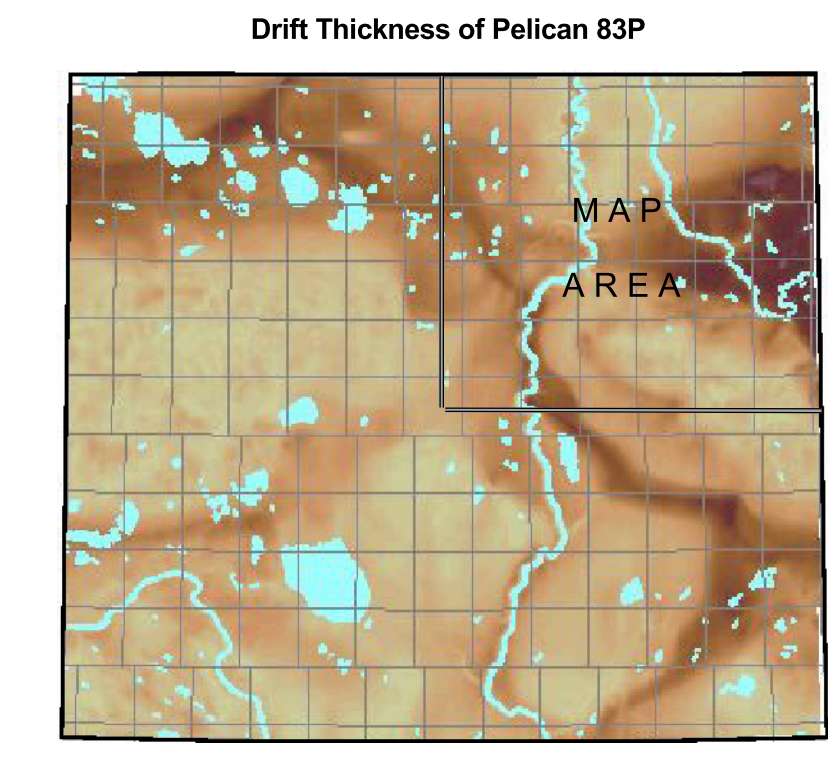
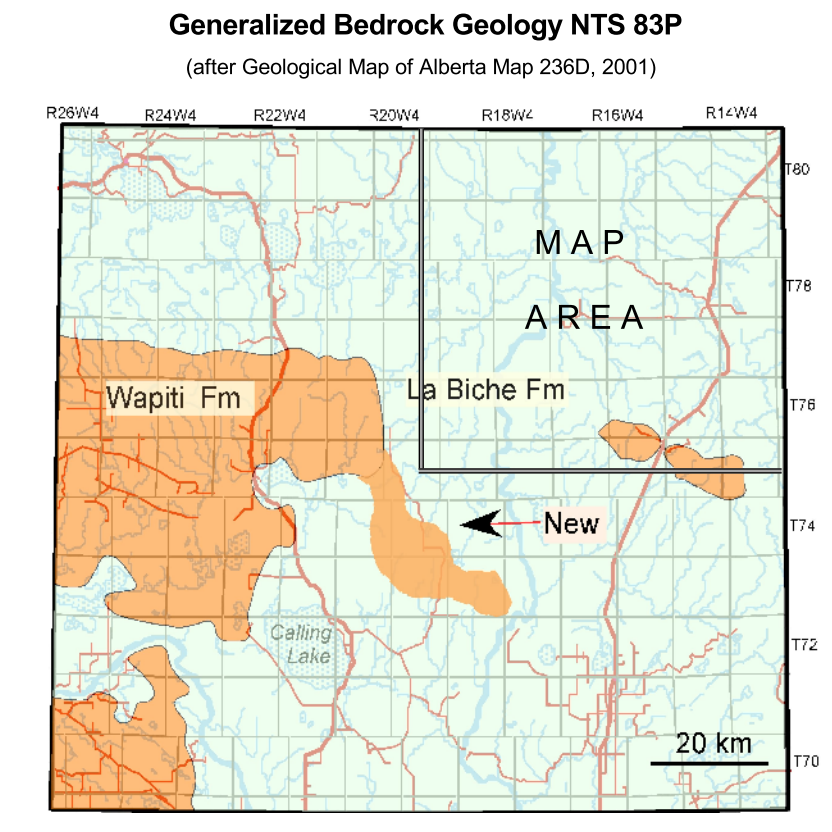
Textural Modifier
Textural characteristics may be applied to the terrain classification as a prefix based on field observations or by inference from distinctive genesis and/or morphology. When two modifiers are given, the second letter is the dominant texture, with the first letter indicating the secondary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

Complex
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 set off by slashes denoting arbitrary percentage limits. For example:
*MvGLv/ means that the area is underlain by approximately 60% moraine plain and up to 40% glaciolacustrine veneer
*MvGLvGFR/ 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
*GLvP/ means that more than 60% of the area is underlain by a glaciolacustrine plain, with less than 15% moraine

Stratigraphic Sequence
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 verticality. For example:
*MvGFR/ indicates thin hummocky moraine deposited on drumlinized moraine

Transitional Association
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: GFRxGLv/ indicating ice-contact delta indistinguishable from glaciolacustrine silt; GFRhMSh/ indicating ice-contact kame and wetland topography that blends with hummocky stagnant ice moraine

Morphologic Overprint
Where a sequence of geomorphic processes has produced a multi-aged or compound terrain fabric, the geomorphic modifier suffixes are appended in the inferred order of superposition. *MvGFR/ means that a veneer of silt has been moulded into a drumlinoid form and finally channelled by former meltwater streams. *GFRh/ means that a glacioluvial plain has been discontinuously covered by ice-contact hummocks and ridges.



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

FIELD SITES LEGEND	ROADS
o	Paved
o	Gravel
o	Unimproved
o	Truck-trail
o	UTM, Zone 12 Grid
o	Contour intervals 10 metres

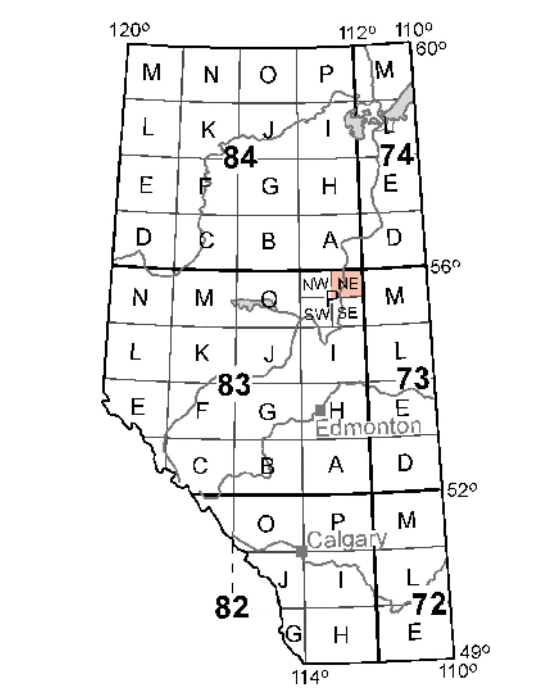
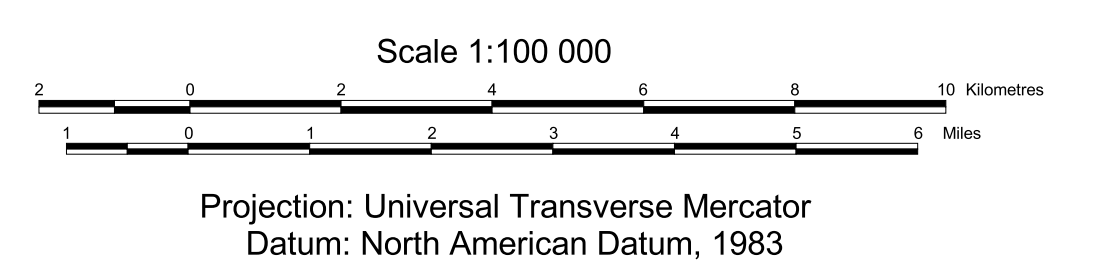
Acknowledgements:
J. Weiss and P. Gromak provided assistance with year-2000 inventory and compilation of the digital databases.
Fieldwork conducted during the summers of 1999 and 2000.
Digital cartography and GIS compilation was done by M. Price, J. Waters and J. Weiss.
Digital base produced by the Resource Data Division, Alberta Environment, supplied by Spatial Data Warehouse Ltd.

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

Copies of this map may be obtained from:
Information Sales Office
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Website: www.agr.gov.ab.ca
Head Office website: www.esb.gov.ab.ca

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.



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