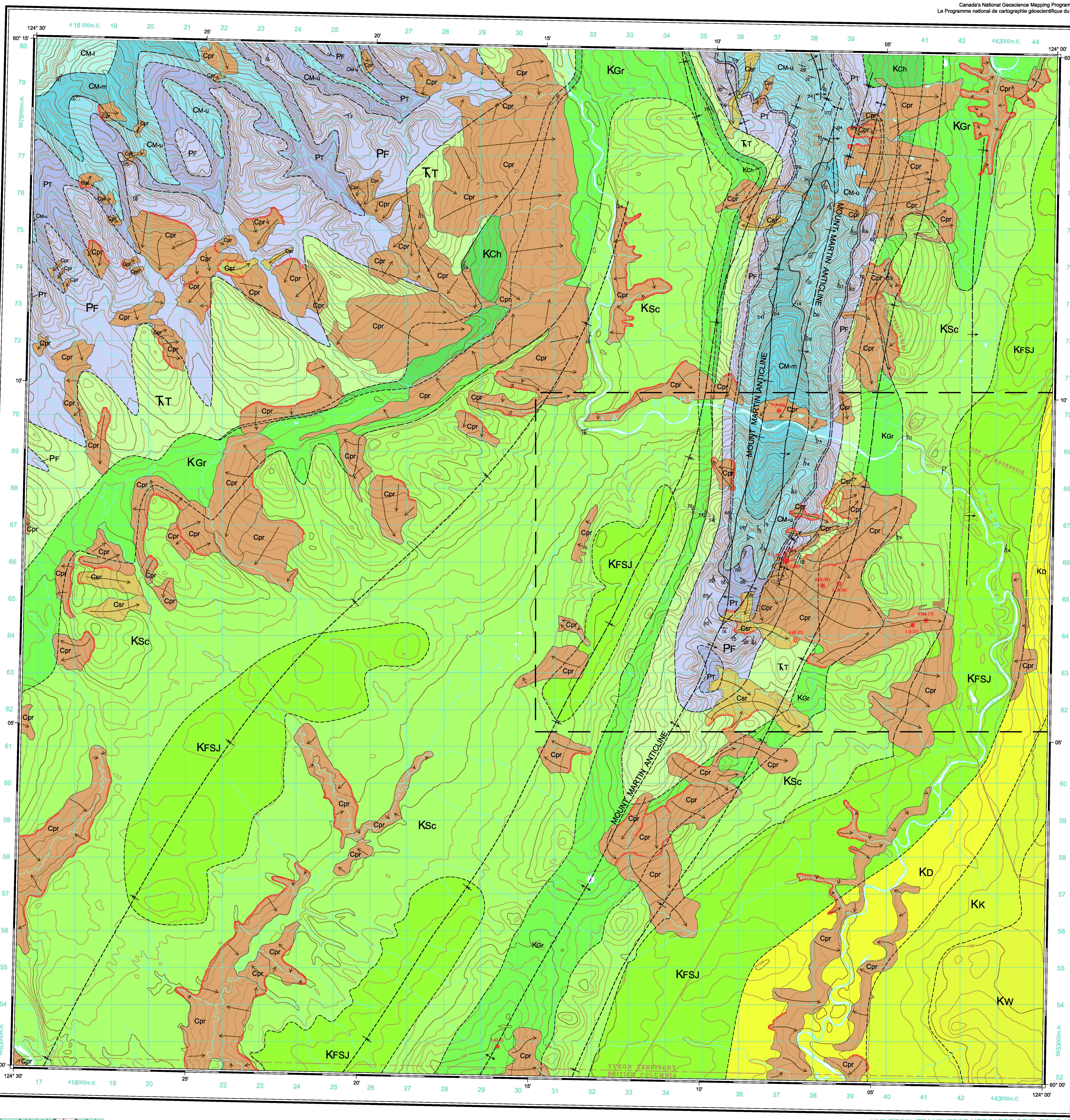
Natural Resources Canada | Ressources naturelles Canada
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA
NATMAP CARTNAT
Canada's National Geoscience Mapping Program
Le Programme national de cartographie géoscientifique du Canada



LEGEND

Coloured legend blocks indicate map units that appear on this map

QUATERNARY

SURFICIAL DEPOSITS

- **Csr** — *Rock slide deposits: chaotic landscape of irregular and stacked bedrock blocks.*
- **Cpr** — *Rock slump deposits: large rotational blocks in bedrock, shallow to 10's of metres thick; internal structure of material may be retained; often traceable upslope to active scarps; where sufficient moisture is present the slump may produce a flow at its base, forming a characteristic spatulate form.*

MESOZOIC

CRETACEOUS

UPPER CRETACEOUS

- **KW** — ***WAPITI FORMATION**: Buff weathering, medium- to coarse-grained, calcareous, feldspathic sandstone; minor conglomerate and coal.*
- **KK** — ***KOTANEELEE FORMATION:** Dark grey shale and mudstone with concretions; minor grey sandstone and conglomerate.*
- **KD** — ***DUNVEGAN FORMATION:** Light grey to buff sandstone, massive or cross-bedded; subordinate pebble conglomerate, dark grey silty shale, and coal.*

LOWER CRETACEOUS

FORT ST JOHN GROUP

- **KFSJ** — *undivided shale (Ft. St. John Gp): Dark grey shale with concretions; locally gypsiferous; locally interbedded with fine-grained greenish-grey sandstone.*
- **KSc** — ***SCATTER FORMATION**: Resistant, greenish-grey, glauconitic, laminated sandstone; medium- to thick-bedded; silty, concretionary mudstone common in middle part of unit.*
- **KGr** — ***GARBUTT FORMATION:** Grey shale and siltstone with sideritic concretions; minor thin-bedded, finely laminated sandstone; may include the Chinkeh Formation if present in the map area.*
- **KCh** / KCh — ***CHINKEH FORMATION**: Chert pebble conglomerate overlain by bioturbated quartz arenite with variable chert content, and argillaceous siltstone; woody or plant debris common.*

TRIASSIC

DIABER GROUP

- **TRT** — ***TOAD FORMATION:** Grey, red, and green shale interbedded with thin- to thick-bedded brown sandstone; locally calcareous or phosphatic; may include Grayling Formation if present in the map area.*

PALEOZOIC

PERMIAN

ISHBEL GROUP

- **PF** — ***FANTASQUE FORMATION:** Dark grey to white, well bedded, spiculitic chert; rhythmically interbedded with minor shale and siliceous siltstone; basal phosphatic breccia or sandstone.*
- **PT** — *Tika map unit: Buff weathering, light to medium brown, silty or sandy limestone or dolostone grading into calcareous siltstone and sandstone; subordinate lithoclast breccia and shale; medium-bedded, massive to crosslaminated; sparsely fossiliferous; rectilinear fracture pattern characteristic.*

LOWER CARBONIFEROUS

MATTSON FORMATION

- **CM-u** — ***UPPER MEMBER:** Light to medium grey, fine- to coarse-grained, locally calcareous or dolomitic quartz arenite and sub-chert-arenite; subordinate fossiliferous limestone, and grey to green shale; sandstone commonly shows large-scale crossbedding; fossils in the limestone are commonly silicified; may include Tika map unit.*
- **CM-m** — ***MIDDLE MEMBER:** Grey to buff to brown, poorly- to well-indurated, fine-grained quartz arenite with subordinate siltstone and dark shale; minor coal and sandy dolostone; sandstone shows fine- to large-scale crossbedding; typically forms sharp-based, thick-bedded, fining-up sequences.*
- **CM-l** — ***LOWER MEMBER:** Greyish orange weathering, light grey or buff, well-indurated, fine- to very fine-grained quartz arenite interbedded with siltstone and dark grey shale; minor coal, dolostone, and lithoclast breccia; crosslaminae and trace fossils common, typically thin- to medium-bedded with coarsening-up sequences.*

MAP SYMBOLS

- Landslide boundary
- Scarp
- Flowline
- Geological boundary (defined, approximate, assumed)
- Road
- Airstrip
- Pipeline
- Building
- Bedding (inclined) 60
- Cleavage 60
- Anticline (defined, approximate, assumed)
- Syncline (defined, approximate, assumed)
- Anticlinal kink fold - (defined, approximate, assumed) (See diagram below)
- Synclinal kink fold- (defined, approximate, assumed) (See diagram below)
- Well (Gas, Suspended)
- Gas field boundary

LIST OF WELLS

	UWID	FULL NAME	RIG RELEASE	SURFACE LOCATION (Easting, Northing)
1	300I276010124000	CANADA SOUTHERN ET AL N BEAVER R I-27	24-Mar-63	440713, 6664283
2	300B386010124000	COLUMBIA GAS ET AL KOTANEELEE B-38	06-Apr-77	438728, 6665411
3	300G016010124153	PAN AM BEAVER RIVER G-01	11-Jun-77	429454, 6652859
4	300E376010124000	COLUMBIA GAS ET AL KOTANEELEE YT E-37	21-Jan-78	437576, 6663914
5	300I486010124000	COLUMBIA ET AL KOTANEELEE YT I-48	18-Apr-79	437303, 6666023
6	300B386010124001	COLUMBIA ET AL KOTANEELEE B-38	22-Sep-90	438276, 6665359
7	300P506010124001	PAN AM HOME SIGNAL CSP KOTANEELEE P-50	30-Sep-90	437095, 6670104
8	300M176010124001	COLUMBIA ET AL KOTANEELEE M-17	10-Nov-90	441073, 6664413
9	300I486010124004	COLUMBIA ET AL KOTANEELEE I-48	02-May-91	437295, 6666051

NOTE:

***Mass Wasting** is the collective term given to the range of processes and resultant landforms that relate to the gravitational downslope movement of rock and/or unconsolidated material without the direct conveyance by water, air or ice. Water and ice are, however, often key components in initiating and perpetuating mass wasting by reducing the strength of materials and enhancing their plastic and fluid behaviour.*

Different types of mass wasting are distinguished by the type of materials involved (e.g., bedrock, talus, till), the mode of deformation (e.g., creep, slide, slump, flow), speed of movement, morphology of the moving mass, and water content.

While different earth surface materials and geological settings are often strongly associated with various types of mass wasting, predicting their occurrence, magnitude and rate of deformation is often not possible. Areas that are prone to mass wasting in the Mount Martin region include poorly indurated and shale-rich bedrock, and steeply dipping bedrock along the eastern margin of the Mount Martin box anticline. Mass wasting is also prominent along meandering rivers (Beaver, La Biche and Kotaneelee) and along smaller regional stream courses. Human activities such as road building, pipeline trenching, logging and seismic exploration can also initiate mass wasting, particularly where they undercut slopes, or act to destabilize surficial materials. It is important to stress the latter point, as even though the majority of slumps in the map area are considered relict, they, or parts of them, can be easily reactivated. This was the tragic case associated with the P-50 well north of Mount Martin, in which the combination of cutting a road across the slump and heavy rains, triggered a landslide that killed an individual.

***Rock Slides** are the rapid, downslope movement of detached bedrock. Failure occurs along bedding and/or joint planes. Slides can be initiated at shallow or considerable depths. Rock slides cover only **6.7 km²** (~0.9% of the total map area). They are found in the Fantasque, Scatter and upper Mattson formations, and the Tika group. Their occurrence does not reflect any single structural control, and they form both perpendicular and oblique to strike.*

***Rock Slumps** involve the rotational movement of bedrock along failure planes. Slumps may occur as individual blocks or amorphous masses (reflecting water content and structural integrity of the failing material). Retrogressive slumps often extend progressively up-slope through time, and can be associated with active scarp or headwall retreat. Slumps can be initiated by failure along bedding or joint planes, by infiltration of surface water, through lateral incision and undercutting of slopes by streams, or excavation activities. Rock slumps cover **147.4 km²** (~19.0% of the total map area) and are the most extensive form of mass wasting in the map area (Smith, 2002). Found in all of the different rock formations (except Wapiti) present in the 95C/01 map, they are particularly prominent in the Fantasque, Garbutt and Toad formation strata, and to lesser degrees in the Chinkeh, Dunvegan, and Scatter formation strata. Many slumps are clearly aligned perpendicular to strike, suggesting that they are generated by failure along bedding planes, possibly within shale or other poorly indurated beds. Elsewhere, slumps have, and continue to be generated by the undercutting of slopes by meandering rivers. This is particularly evident along the La Biche River where many relict and active slumps are found. Diversion and/or temporary damming of the La Biche River by large slumps generated along the valley sides represents a considerable, albeit rare, hazard in this region. Slumping along smaller stream courses is also widespread in the map area. In many valley bottom sites, slumping extends well up tributary valleys. This suggests that headward erosion of streams, relating to changes in discharge or alterations of the stream course, is likely to cause further slumping. Consideration of these factors should be undertaken when constructing roads, pipelines, and other features which traverse regional streams.*

In attempting to discern exactly where slumps were initiated, it is important to recognize that the location of scarps does not neccessarily coincide with the geological/structural failure surface. Many of the slumps seen in this map involve considerable depths of material, indicating that the slumps are being triggered in strata underlying that exposed at the surface.

REFERENCES

Fallas, K.M.
2001: Preliminary Geology - Mount Martin (95C/01), Yukon Territory, British Columbia, and the Northwest Territories; Geological Survey of Canada, Open File map 3402, scale 1:50 000.

Smith, I.R.
2002: Surficial Geology, Mount Martin (95C/01), Yukon Territory - Northwest Territories - British Columbia; Geological Survey of Canada, Open File 4260, 1 map, scale 1:50 000.

Compilation by I.R. Smith and K.M. Fallas based on fieldwork and studies of vertical air photographs 2000, 2001.
THIS IS A PRODUCT OF THE CENTRAL FORELAND NATMAP PROJECT

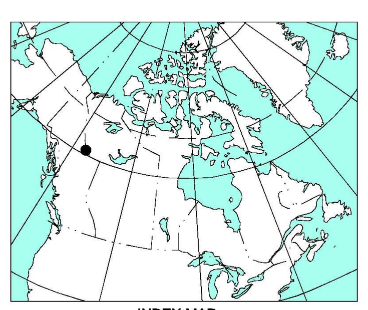
Surficial geology from field work by I.R. Smith 2000, 2001.

Bedrock geology from field work by K.M. Fallas 2000, with contributions from: R. MacNaughton, R. Aquilini, and R. Moore. Additional data from 1995-1996 fieldwork by M.C. McDonough (Husky Oil Operations Ltd.)

Digital cartography by I.R. Smith, K.M. Fallas and S.J. Hinds

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Base map at the same scale published by Surveys and Mapping Branch in 1971



INDEX MAP

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1983

OPEN FILE 4335

LANDSLIDES AND BEDROCK GEOLOGY ASSOCIATIONS

MOUNT MARTIN

YUKON TERRITORY - NORTHWEST TERRITORIES - BRITISH COLUMBIA

Scale 1:50 000/Échelle 1/50 000

Kilometres 1 0 1 2 3 Kilomètres

Universal Transverse Mercator Projection | Projection transverse universelle de Mercator

OPEN FILE
DOSSIER PUBLIC
4335
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2002

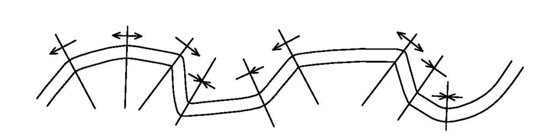
Open files are products that have not gone through the GSC formal publication process.

Les dossiers publics sont des produits qui n'ont pas été soumis au processus officiel de publication de la CGC.

95C/07 Brown Lake	95C/08 Babiche Mountain	95B/05 Fisherman Lake
95C/02 Mount Merrill GSC OF 4328	95C/01 Mount Martin GSC OF 4335	95B/04 Betalamea Lake
94N/15 Crow River	94N/16 Beaver River	94O/13 Sandy Creek

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA OPEN FILE MAPS

FOLD SYMBOLOGY



Double arrows are used to indicate folds where the dip direction changes across the hinge, and single arrows are used where the dip direction remains the same across a hinge

Recommended citation:
Smith, I.R. and Fallas, K.M.
2002: Landslides and Bedrock Geology Associations, Mount Martin (95C/01), Yukon Territory - Northwest Territories - British Columbia; Geological Survey of Canada, Open File 4335, 1 map, scale 1:50 000 .

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