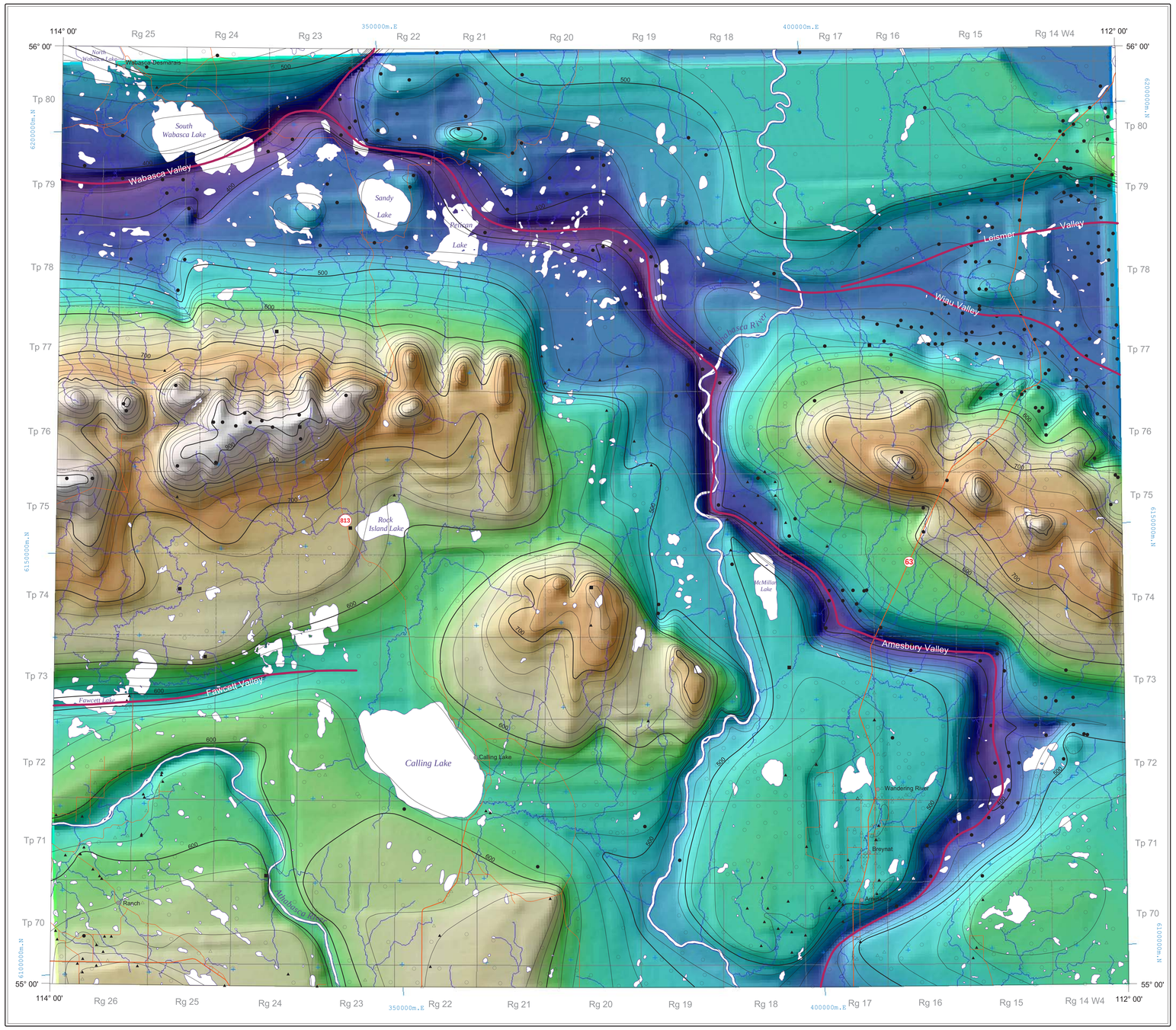
NTS 83P
Bedrock Topography



Data

Petrophysical logs were the primary source of information used for constructing the bedrock topography. A suite of the common well logs (gamma, resistivity, spontaneous potential, density, neutron, sonic and calliper) were useful in making the pick for top of bedrock; however, the gamma and resistivity logs proved to be the most useful. The drift typically displays a lower gamma response and higher resistivity response than the underlying bedrock. Other sources of data were water well lithologs, mineral exploration testholes and information on outcrop locations.

Picking the bedrock surface was difficult in some areas where data were sparse. Many of the log traces were absent from the upper part of the hole because of surface casing. The depth of surface casing set in bedrock was used for an estimate of maximum drift thickness in places with few data. Conversely, many water wells did not penetrate deep enough to intersect the bedrock, so only a minimum drift thickness value could be used.

Interpretation

The physiography of the Pelican map area has been defined by Pettapiece (1986) and a modified version of these subdivisions is shown on the accompanying digital elevation model (Figure 1). The east-west trending uplands of the Pelican Mountains, the Amadou Hills and May Hills extend across the central portion of the area. The Wabasca Plain is located to the north. The Wandering River Plain is situated in the southeast and to the southwest are three plains: the Fawcett Plain, the Thorhild Plain and the Cross Lake Plain. The Athabasca River Valley forms a major north-trending feature in the eastern half of the area and a small segment of the river is also present in the southwest forming the northern boundary of the Cross Lake Plain. The subcropping bedrock in this region consists of the Cretaceous Wapiti and Labiche formations (Hamilton et al., 1999; Campbell et al., 2002). Figure 2 shows the drift thickness of the Pelican area, from Alberta Geological Survey Map 255 (Pawlowicz and Fenton, 2004).

The bedrock topography contours were initially generated from bedrock surface picks using a computer-contouring program with some subsequent modifications by hand. Preliminary versions of this map were released as Alberta Geological Survey publications by Pawlowicz and Fenton (2001) and Andriashek et al. (2001).

The bedrock topography map shows the elevation of the bedrock surface. In general, the surface topography reflects the bedrock topography: bedrock highs underlie the Pelican, Amadou and May Hills highlands, and the buried valleys lie within the Wabasca and Wandering River plains. The elevation of the bedrock surface ranges from 360 metres above sea level (masl) in the Wabasca Plain to slightly more than 920 masl in the Pelican Mountains. Segments of three major buried valleys are present: the Wiau Valley and the Leismer Valley in the northeast, and the south to northwest trending Amesbury Valley in the central portion of the area. The Fawcett Valley is a smaller valley extending westward from Calling Lake. The exact shape of these bedrock valleys and their relationship to each other in the areas where they appear to meet is uncertain. This is the consequence of the drillholes being too widely spaced to provide detailed control in most areas.

The gradient of the Leismer Valley suggests westward flow, whereas the Wiau Valley flows to the east (Andriashek et al., 2001; Andriashek, 2003). The Amesbury Valley has eroded much more deeply than the Wiau Valley, with the Amesbury thalweg lying about 60 metres below the Wiau, indicating the Amesbury is younger. The Wiau, Leismer and Amesbury valleys are discussed in more detail by Andriashek (2003). The gradient of the Amesbury Valley is toward the northwest, and the Fawcett Valley is toward the west.

The bedrock surface under the uplands, particularly the eastern portion of the Pelican Mountains, the Amadou Hills and, to a lesser extent, May Hills, shows north-south trending ridges. These are the result of glacial erosion by the southward-flowing ice, which formed a streamlined, fluted surface (Campbell et al., 2002). This map shows the regional variations in bedrock topography and these complement those presented in the regional bedrock topography of Alberta (Pawlowicz and Fenton, 1995). Experience from more detailed investigations to the east (Andriashek and Fenton, 1989; Andriashek et al., 2001; Andriashek, 2003) show that in addition to the valleys shown, narrow deep buried valleys are to be expected.

FEATURES LEGEND

Data sources

- Petroleum well, bedrock surface picked
- Petroleum well, bedrock surface above logged interval
- Water well, bedock surface picked
- Water well, bedrock surface below bottom of well
- Section, bedrock exposed
- Section, bedrock not exposed
- Bedrock valley thalweg
- Elevation contour (masl) contour interval - 20m

Bedrock elevation (masl)

920 m
800
680
560
440
360 m

BASEMAP LEGEND

- City/Town
- Road - gravel
- Road - paved
- Township/range - surveyed
- Township/range - unsurveyed
- UTM, Zone 12 Grid (450000m.E)
- River
- Lake

Figure 1. Present day surface topography and physiography

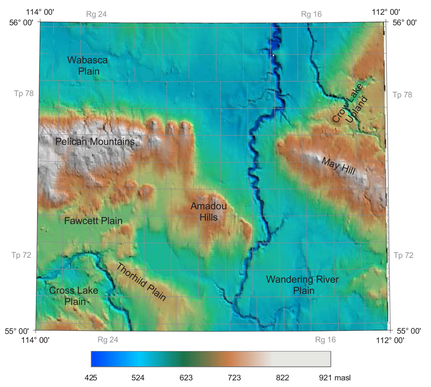
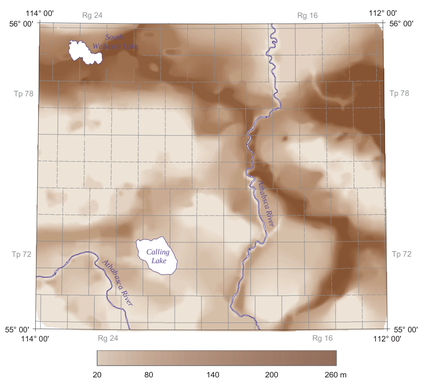


Figure 2. Drift thickness



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Copies of this map may be obtained from:
Information Sales
Alberta Geological Survey
Telephone: (780) 422-3767
Web site: www.ags.gov.ab.ca

Map 254

Bedrock Topography of Pelican River Area, Alberta (NTS 83P)

Geology by: J.G. Pawlowicz and M.M. Fenton

Scale 1:250 000

0 3.75 7.5 15 22.5 30 Kilometres
0 2.5 5 10 15 20 25 Miles

Projection: Universal Transverse Mercator, Zone 12
Datum: North American Datum, 1983

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