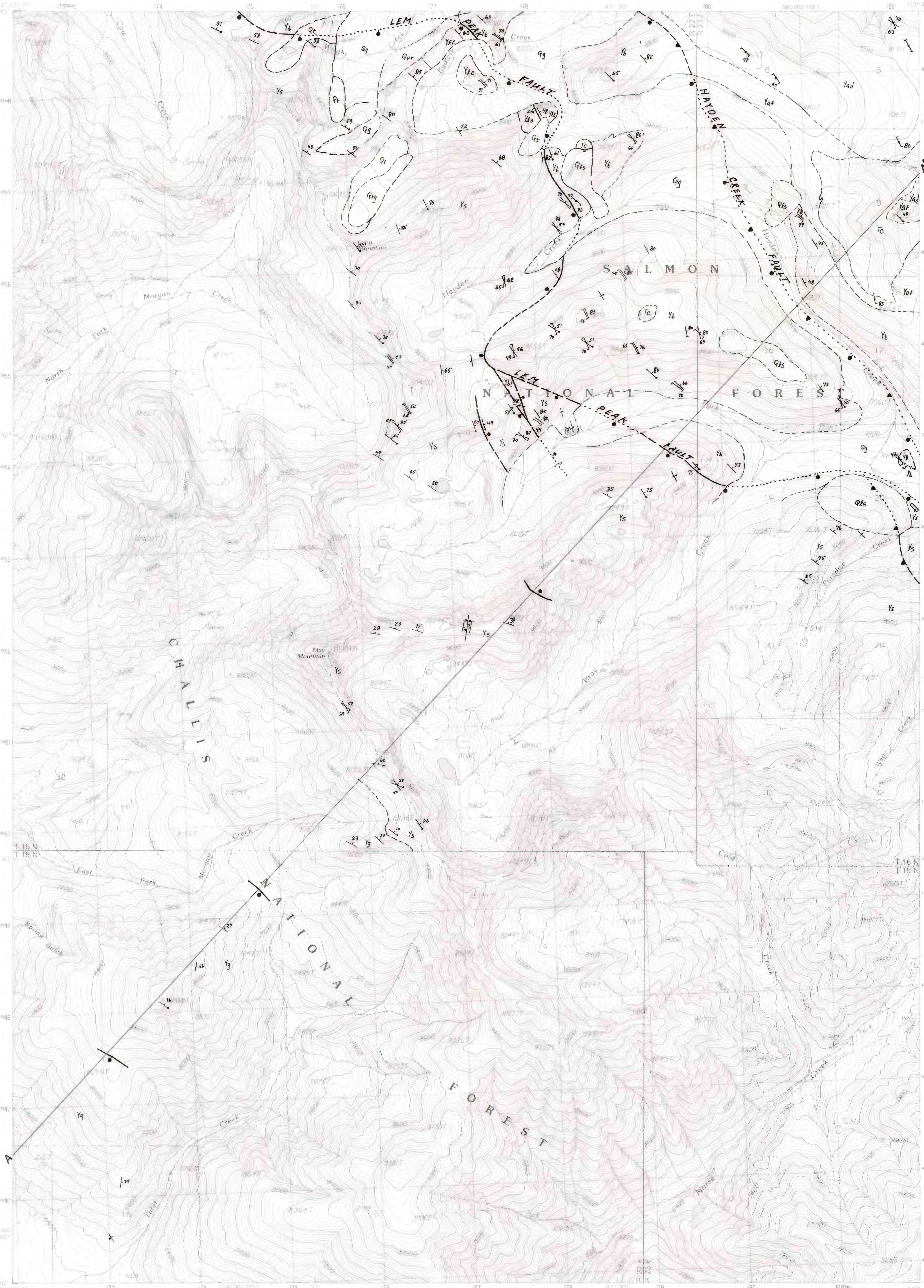


Base from U.S. Geological Survey provisional edition, 1989.
Polyconic projection. 1927 North American Datum

Geology mapped by R.G. Tysdal, 1990–96

SCALE 1:24 000

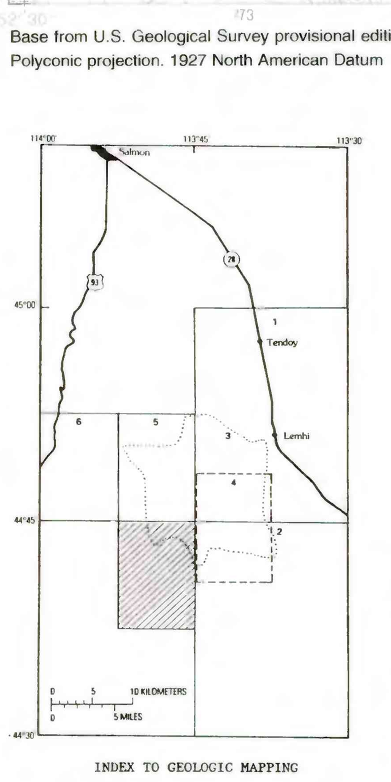
CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL FEET

To convert feet to meters multiply by .3048
To convert meters to feet multiply by 3.2808

QUADRANGLE LOCATION

1	2	3	1 Allison Creek 2 Lem Peak 3 Hayden Creek 4 Ennis Gulch 5 Mogg Mountain 6 May 7 East of May 8 Patterson
4		5	
6	7	8	

ADJOINING 7.5' QUADRANGLE NAMES



INDEX TO GEOLOGIC MAPPING

- May Mountain map area
- 1 Anderson (1961)
- 2 Ruppel (1980)
- 3 Tietbohl (1981)
- 4 Tysdal (1996b)
- 5 Tysdal (1996a)
- 6 Tysdal and Moye (1996)

CONVERSION FACTORS

Multiply	By	To obtain
centimeters (cm)	0.3937	inches (in)
meters (m)	3.281	feet (ft)
kilometers (km)	0.6214	miles (mi)

CORRELATION OF MAP UNITS

Sedimentary rocks	Igneous rocks		
Qt, Qls, Qrg		Holocene	QUATERNARY
Qpr, Qg		Pleistocene	
Unconformity			
	Tc (Challis Volcanic Group)	Eocene	TERTIARY
Unconformity			
	Zm		LATE(?) PROTEROZOIC
Unconformity			
Ylc, Ys, Yg, Yad, Yaf, Yb			MIDDLE PROTEROZOIC

DESCRIPTION OF MAP UNITS

Qt **Talus deposits (Holocene)**—Unconsolidated angular rock fragments of widely varying fragment sizes at base of cliffs and on flanks of steep ridges

Qls **Landslide deposits (Holocene)**—Unconsolidated earthflow deposits that contain a mixture of materials in a wide range of sizes

Qrg **Rock glacier (Holocene)**—Tongue of angular rock fragments, commonly heading in glacial cirque. Characterized by crescentic ridges that are convex downslope

Qpr **Protalus rampart (Holocene and Pleistocene)**—Unconsolidated materials of angular boulders and smaller clasts that form linear to arcuate ridges at base of cliffs

Qg **Glacial deposits, undivided (Holocene and Pleistocene)**—Glacial till, lateral and locally terminal moraines, and glaciofluvial deposits. Shown only where extensive areas of bedrock concealed

Tc **Challis Volcanic Group, undivided (Eocene)**—Composite unit that includes flows of gray-brown and reddish-brown dacite and porphyritic dacite; medium-gray andesite, and porphyritic andesite with hornblende needles up to 2 mm long; local welded tuffs. Flow banding prominent locally. Autoclastic breccia flows and agglomerate common. Thickness ranges from 0 m to about 100 m

Zm **Mafic intrusive rock (Late? Proterozoic)**—Dark gray-green to grayish blue-green rock, cleaved; metamorphosed to lower greenschist facies. Forms sill about 6 m thick

Ylc **Lawson Creek Formation (Middle Proterozoic)**—Interbeds of argillaceous siltite, siltite, and metasandstone; metamorphosed to lower greenschist facies. Argillaceous siltite is medium to dark gray generally fine grained, and planar to ripple crosslaminated; rippled bedding planes present locally. This lithology commonly forms beds a few centimeters thick, in units about 0.5 m thick to, locally, 2-3 m. The siltite and metasandstone are medium gray, gray green, to blue green and finely laminated to ripple crosslaminated. The siltite is mainly coarse grained; the metasandstone fine to medium grained. The metasandstone is generally quartz rich, but ranges from about equal parts feldspar and quartz to locally orthoquartzite; the metasandstone commonly contains a fine-grained matrix, locally chloritized. Beds range from a few centimeters to about 1.5 m thick. Only lower 100-200 m of formation is present; lower contact is conformable

Ys **Swauger Formation (Middle Proterozoic)**—Light-gray, pale-green, to pale red-purple, medium- to coarse-grained orthoquartzite or quartzite up to 10 percent feldspar; metamorphosed to lower greenschist facies. Quartz is in fine, medium, and locally coarse grains that are well rounded, well sorted, tightly cemented, and glassy. Hematite spots 1-2 mm in diameter common. Beds are 1-2 m thick, commonly appear massive but locally display crossbedding. Partings of dark-gray siltite or argillite separate beds in some areas. Resistant to erosion, resulting in steep-sided ridges. Upper contact is conformable with overlying Lawson Creek Formation. Thickness to east in Lemhi Range estimated at 3100 m (Ruppel, 1980)

Yg **Gunsight Formation (Middle Proterozoic)**—Light-gray, medium-gray, pale green, and pale red purple metasandstone and siltite; metamorphosed to lower greenschist facies. Uppermost part is light-gray to pale green medium- to coarse-grained metasandstone that mainly consists of quartz and 15-20 percent feldspar; quartz grains are well rounded. A few beds of orthoquartzite, composed of well-rounded quartz grains, are interbedded within these upper strata. Beds are 0.3-1 m thick and are crossbedded. On the one traverse across the formation, limited exposures characterized lower strata of the unit. These rocks are feldspar-rich fine-grained metasandstone and coarse-grained siltite in beds that locally display trough crossbedding. Dark-gray heavy mineral laminae are fairly common. Fine- to medium-grained siltite that is ripple crosslaminated caps some of the metasandstone beds. Mudcracks were observed in some siltite beds. The upper contact is gradational through about 100 m with the Swauger Formation. Thickness to the east in Lemhi Range was measured at 1,700+ m (McBean, 1983)

Apple Creek Formation (Middle Proterozoic)—Divided into three informal units, which in descending order are the coarse siltite unit, diamictite unit, and fine siltite unit (Tysdal, 1996a, b; Tysdal and Moye, 1996). Only the fine siltite unit and lower part of diamictite unit are present in area mapped, each is shown separately and described separately below. North of the May Mountain quadrangle, the package of three units is contiguous with the Apple Creek Formation that originally was named and mapped by Anderson (1961) and includes the diamictite unit of Tietbohl (1981, 1986).

Yad **Diamictite unit**—Gray-green argillite, argillaceous siltite, and fine- to medium-grained siltite; metamorphosed to lower greenschist facies. Graded beds observed locally. Contains pebbly strata in units a few meters thick that alternate with nonpebbly argillite and siltite. Pebbles are dispersed, matrix-supported, and typically 1-5 cm in diameter, but lower part in map area contains clasts as large as 25 cm. Clasts are composed of coarse siltite and fine-grained metasandstone. Beds generally a few centimeters thick and finely laminated. Only lowermost part of unit is present in map area and is conformable with underlying fine siltite unit. Unit is intensely cleaved. Total thickness of unit is uncertain due to deformation, but is estimated at 1000-1500 m (Tysdal, 1996b)

Yaf **Fine siltite unit**—Greenish-gray to olive-gray, locally rusty brown weathering, finely planar laminated and ripple crosslaminated fine-grained siltite and argillaceous siltite. Metamorphosed to lower greenschist facies. Unit not well exposed in mapped area. In some beds planar laminations grade upward to small-scale sets (1-3 cm) of ripple crosslaminated siltite. Water-escape structures present locally. Some beds are graded, with 1-2 cm thick strata of light-gray, medium- to fine-grained siltite grading upward into dark-gray fine-grained siltite. Upper contact is conformable, marked by abrupt appearance of beds of diamictite. Lower contact is marked by change in color and by abrupt appearance of coarser grained light-gray rocks of underlying Big Creek Formation. Lower contact is either an unconformity or a flooding surface. Thickness estimated at about 500 m in map area

Yb **Big Creek Formation (Middle Proterozoic)**—Generally light-gray coarse grained siltite to medium-grained and locally coarse-grained sandstone. Metamorphosed to lower greenschist facies. Composed of feldspar, quartz, white mica, and traces of tourmaline. Iron-bearing-carbonate laminae, oxidized to pale yellowish brown, are a distinguishing characteristic. Dark-gray heavy mineral laminae, typically only 1-2 grains thick, are common throughout the formation. Trough crossbeds are widespread. Contains sparse zones, a few meters thick, of dark-gray argillaceous siltite that displays current ripples, and flaser and lenticular bedding. Beds commonly about 1 m thick. Upper contact is described above; lower contact not exposed. Only upper part of formation is present in map area; lower strata are cut out by Lem Peak fault. Preserved thickness in adjacent Lem Peak quadrangle is about 2700 m (Tysdal, 1996a)

Contact—Dashed where approximately located

Normal fault—Dashed where approximately located; dotted where concealed; queried where uncertain. Bar-and-ball on downthrown side

Thrust fault—Dashed where approximately located; dotted where concealed; queried where uncertain. Teeth on upper plate

Thrust fault with later normal (extensional) displacement—Dashed where approximately located, dotted where concealed. Teeth on upper plate. Bar-and-ball indicate normal movement after thrust displacement

Syncline—Showing trace of axial plane. Dotted where concealed

Strike and dip of beds—Ball on strike line, or on dip line where bed is vertical, indicates top determined from sedimentary structures

- **Inclined**
- **Vertical**
- **Overturned**

Strike and dip of cleavage—Ball shows site of measurement, except where cleavage and bedding occur together. Then, site location is intersection of strike-and-dip lines of bedding, and cleavage symbol is placed on or adjacent to bedding symbol for clarity

- **Inclined**
- **Vertical**

SUMMARY

The area mapped in the northern part of the May Mountain quadrangle was completed as part of a geologic mapping effort in support of a mineral resource assessment of the Salmon National Forest. This map of only part of a quadrangle is here released as an Open-File Report because no plans currently exist to map the remainder of the quadrangle, most of which lies outside the Salmon Forest, and the geology shown in the northwestern half of the quadrangle links structures in the Lem Peak quadrangle to the north (Tysdal, 1996a) with contiguous structures in the Mogg Mountain quadrangle to the east (Tysdal, 1996b) (see Index to Mapping). Abrupt changes in trend of the Lem Peak normal fault produced a pattern of linear fault segments separated by sharp, angular corners. This segmented pattern is displayed better on this map than on the adjacent maps. In addition, the cross section is contiguous with that shown in Tysdal (1996b) across the northwest part of the Mogg Mountain quadrangle and the southern half of the Hayden Creek quadrangle; the two sections combined provide a structural transect across most of the range.

Proterozoic and Paleozoic strata in the general region of the quadrangle underwent compressional deformation, probably in the Late Cretaceous, creating a series of thrust faults and related folds. Subsequent extension in the region was accompanied by formation of normal faults, some with major displacement. The compressional deformation and at least some of the extensional movement pre-date deposition of the Challis Volcanic Group. This probable Cretaceous to Tertiary deformation is in addition to (1) Middle Proterozoic compressional deformation reported for local areas of the general region (for example, Evans, 1986; Evans and Zartman, 1990), and (2) Late Proterozoic extension, both of which may have affected rocks of the quadrangle.

The Hayden Creek fault, in the northeastern part of the map, is interpreted as a thrust fault that later underwent normal displacement. The steeply dipping Lem Peak fault is a normal fault that underwent a large amount of displacement (several thousand meters are implied by stratigraphic separation). Swauger Formation strata and a sliver of the overlying Lawson Creek Formation are in fault contact with the older Big Creek Formation. Northwest of the May Mountain quadrangle, tight folds occur in strata northeast of the Lem Peak fault and formed during compressional deformation prior to development of the normal fault. Abrupt changes in trend of the Lem Peak fault are dramatically illustrataed in the May Mountain quadrangle in the area from Kadletz Creek to the West Fork of Hayden Creek. Directly north of the West Fork of Hayden Creek, steeply dipping beds of the Big Creek Formation are on strike with steeply dipping beds of the orthoquartzite of the Swauger Formation. A fault is required between the two formations: there is no mistaking the contrast in compositions of these two formations.

Geology along the southwestern extent of the cross section, southwest of the contact of the Swauger Formation with the underlying Gunsight Formation near May Mountain, was determined from only one traverse. Hence, interpretation of this southwestern extent is speculative: the strata are Gunsight, but the differing strike and dip directions along the transect indicate structural complications. In addition, the Gunsight is exposed over a much larger area than is consistent with the 1700+ m thickness of the formation (based on the thickness measured by McBean [1983] in the type area). In the southwestern part of the cross section, this extensive area of outcrop may be accounted for by the two down-to-the-west normal faults shown, which are interpreted from outcrop patterns and from repetition of upper strata of the formation.

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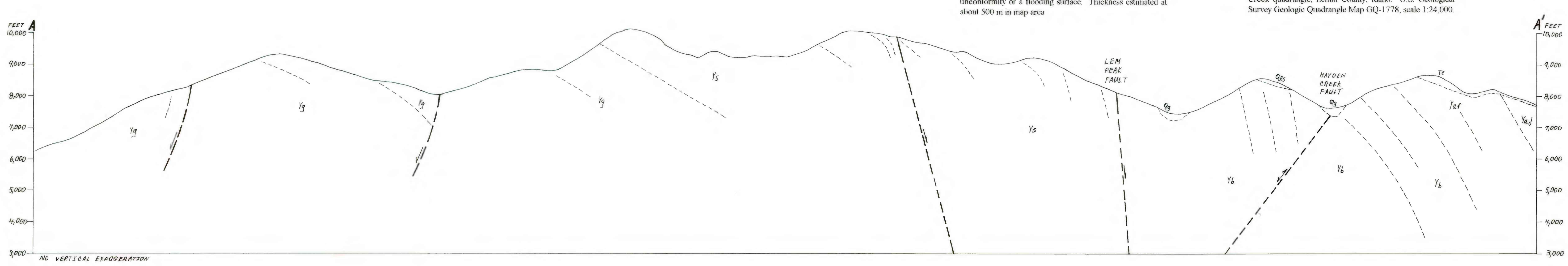

GEOLOGIC MAP OF PART OF MAY MOUNTAIN QUADRANGLE, LEMHI COUNTY, IDAHO

By

R.G. Tysdal

1996