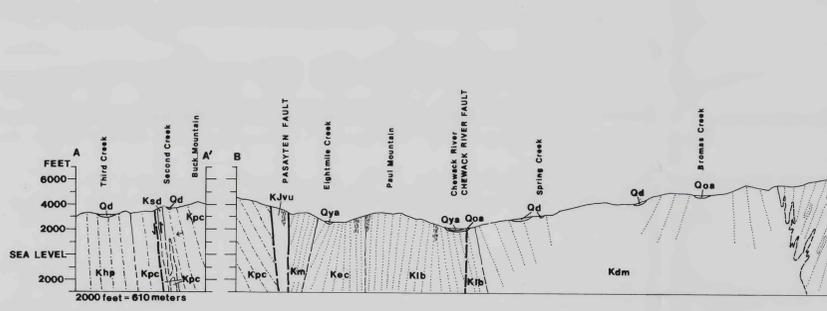
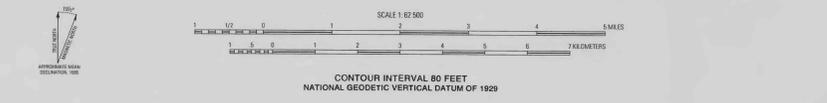


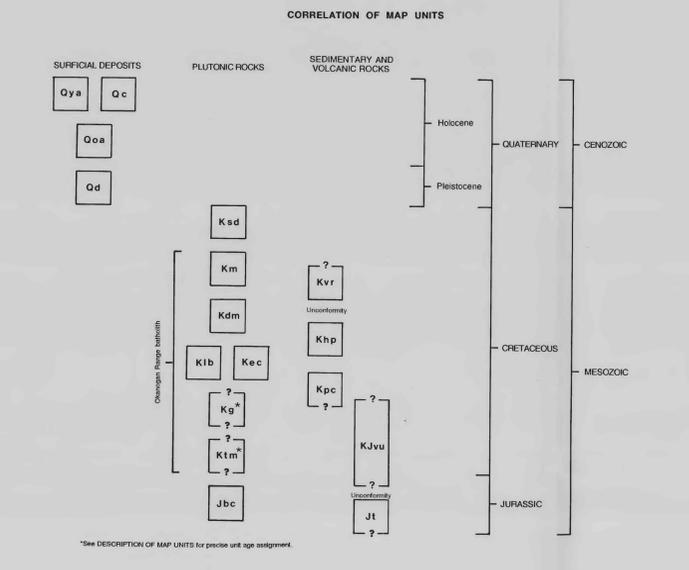
Geology mapped in 1961 and 1962  
Edited by Terry A. Lindquist; prepared by Lori Moore  
Geopline and Terry A. Lindquist  
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**GEOLOGIC MAP OF THE DOE MOUNTAIN 15' QUADRANGLE,  
OKANOGAN COUNTY, WASHINGTON**

By  
**Victoria R. Todd**

1995



- DESCRIPTION OF MAP UNITS**
- SURFICIAL DEPOSITS**
- Qya Younger alluvium (Holocene)—Undissected sand, silt, and gravel; in part reworked from Pleistocene glacial drift
  - Qc Colluvium (Holocene)—Slopewash and talus
  - Qoa Older alluvium (Holocene)—Dissected sand, silt, and gravel; in part reworked from Pleistocene glacial drift
  - Qd Glacial drift (Pleistocene)—Sand, silt, and gravel; includes rock flour and boulders
- PLUTONIC ROCKS**
- Ksd Porphyritic sills and dikes (Cretaceous)—Andesite and dacite sills and dikes. Age of unit is Late Cretaceous
  - Km Mylonitic rocks (Cretaceous)—Biotite trondhjemite and granodiorite gneiss and schist. Age of unit is late Early Cretaceous
  - Kdm Trondhjemite of Doe Mountain (Cretaceous)—Leucocratic muscovite-biotite trondhjemite and granodiorite. Age of unit is Early Cretaceous
  - Klb Trondhjemite of Lamb Butte (Cretaceous)—Gneissic biotite trondhjemite. Age of unit is Early Cretaceous
  - Kec Trondhjemite of Eightmile Creek (Cretaceous)—Foliated hornblende-biotite trondhjemite. Age of unit is Early Cretaceous
  - Kg Gabbrro (Cretaceous?)—Foliated hornblende gabbro. Age of unit is Early Cretaceous(?)
  - Ktm Gneissic trondhjemite of Tiffany Mountain (Cretaceous?)—Gneissic trondhjemite and quartz diorite interlayered with migmatitic prehnite-bearing rocks. Age of unit is Early Cretaceous(?)
  - Jbc Button Creek stock (Jurassic)—Biotite-hornblende tonalite. Age of unit is Late Jurassic
- SEDIMENTARY AND VOLCANIC ROCKS**
- Kvr Virginian Ridge Formation of Barkadale (1948, 1975) (Cretaceous)—Marine lithic sandstone, siltstone, and chert-pebble conglomerate. Age of unit is late Early and early Late Cretaceous
  - Khp Harts Pass Formation of Barkadale (1975) (Cretaceous)—Arkosic sandstone, shale, and minor conglomerate. Age of unit is late Early Cretaceous. As mapped, includes Goat Creek Formation of Barkadale (1975)
  - Kpc Panther Creek Formation of Barkadale (1975) (Cretaceous)—Granitoid-bearing conglomerate, shale, arkosic sandstone, and siltstone; contains minor volcanic sandstone and lapilli-tuff. Age of unit is late Early Cretaceous. As mapped, includes Buck Mountain Formation of Barkadale (1975)
  - Kjuv Volcanic rocks, undivided (Cretaceous and Jurassic)—Breccia, tuff, flows, and volcanic sandstone and conglomerate of andesitic composition. Age of unit is Jurassic and Cretaceous
  - Jt Twisp Formation of Barkadale (1975) (Jurassic)—Thin-bedded lithic sandstone, siltstone, black shale, and volcanic-pebble conglomerate

- U Approximate contact—Dashed where inferred (in cross section only); queried where doubtful; dotted where concealed
- D High-angle fault—Dashed where located approximately or inferred; queried where doubtful; dotted where concealed. Arrows indicate sense of displacement. U, upthrown block; D, downthrown block
- Lineament—From aerial photographs. Dotted where concealed
- Approximate axial trace of major fold—Queried where uncertain
- Synform
- Overturned antiform—Showing direction of plunge
- Trace of fold limbs on ground surface—From aerial photographs
- Orientation of foliation—Shown in cross section only
- Orientation of bedding—Shown in cross section only. Arrow indicates direction of stratigraphic top
- Zone of brittle shear—Commonly displays hydrothermal alteration
- Zone of inferred ductile shear—Arrows show direction of relative movement
- Strike and dip of bedding in sedimentary and volcanic rocks
  - 82 Inclined
  - 85 Vertical
  - 76 Overturned
  - 53 Inclined, strike variable
- Strike and dip of small-scale fault—Arrow shows bearing of traction on fault plane
- Strike and dip of foliation in plutonic rocks—Query indicates variable dip
  - 83 Inclined
  - 84 Vertical
  - 84 Inclined, strike variable
  - 79 Vertical, strike variable
  - 79 Vertical, foliation weak
  - 85 Inclined, foliation weak, strike variable
  - 85 Foliation absent
- Strike and dip of compositional layering in gneissic rocks—From aerial photographs
- Moderately to steeply inclined
- Approximately vertical
- 75 Bearing of mineral lineation in plutonic rocks—Showing plunge where known. May be combined with other symbols
- Hydrothermal alteration
- Porphyritic sill or dike—Andesite or dacite. Too small to show at map scale
- Amphibolite inclusion
- 5 Sample locality for rock dated by potassium-argon method—Data given in table 1

Table 1. Potassium-argon ages from the Doe Mountain quadrangle (bio, biotite; hbl, hornblende; mus, muscovite; w.r., whole rock)

Map No.	Unit or rock type	Latitude Longitude	Material dated	Apparent age (Ma)	Sample No.
1	Volcanic rocks, undivided	48°31'30" 120°10'39"	w.r.	90.4±2.3	DM-25
2	Gneissic trondhjemite of Tiffany Mountain (leucosome)	48°36'18" 120°09'54"	bio	95.1±2.4	DM-84
3	Gneissic trondhjemite of Tiffany Mountain (melanosome)	do.	bio	95.3±2.4	DM-85
4	Amphibolite	48°31'28" 120°07'00"	hbl	105.2±2.6	DM-58
5	Trondhjemite of Eightmile Creek	48°34'48" 120°09'54"	hbl	104.9±2.6	DM-1
6	Trondhjemite of Lamb Butte	48°35'50" 120°09'41"	bio	102.5±2.6	DM-9
7	Trondhjemite of Doe Mountain	48°35'48" 120°09'16"	bio	96.3±2.4	DM-48
8	Trondhjemite dike	48°40'27" 120°06'14"	bio	95.7±2.4	DM-83
9	Mylonitic granodiorite	48°34'00" 120°10'18"	bio	101.4±2.5	DM-45

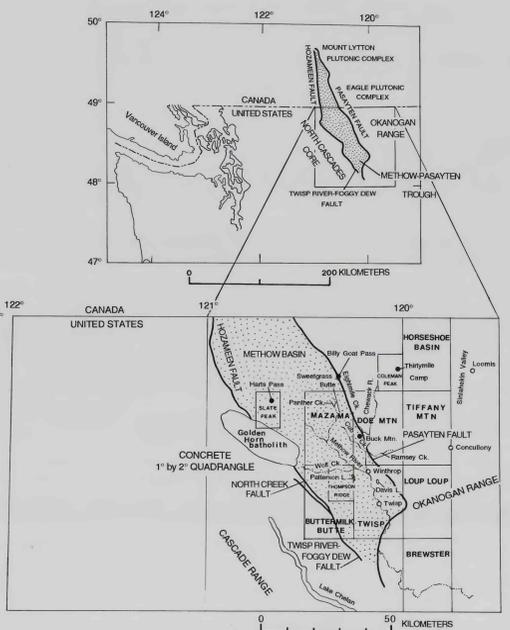
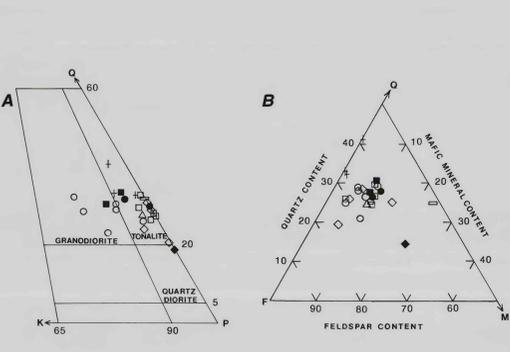


Figure 1. Regional geologic setting of Doe Mountain quadrangle (modified from Monger, 1985; Greig, 1988; Stoffel and others, 1991) and index map of geographic features and quadrangles mentioned in text. Outline of Methow-Pasayten trough (stippled area) from Tsunayama and Cole (1978). Map units: informally named Eagle plutonic complex of Greig (1988); Mount Lytton Plutonic Complex of Monger (1985).



- EXPLANATION**
- † Fine-grained granitic dikes in units Klb and Kdm
  - Summit-Frazier trondhjemite gneiss, tonalite
  - Kdm
  - Transitional gneissic rocks between units Klb and Kdm
  - Klb
  - △ Kec
  - ◇ Ktm (leucosome)
  - ◆ Ktm (melanosome)
  - ◻ Jbc

Figure 2. Modal data for plutonic rocks from Doe Mountain, Mazama, Tiffany Mountain, Loup Loup, and Brewster 15' quadrangles and Coleman Peak 7-1/2' quadrangle (see Fig. 1 for locations). Modes determined by point-counting stained rock slabs. Classification from Streckeisen (1973). Map units: Jbc—Jurassic Button Creek stock; Kdm—Cretaceous trondhjemite of Doe Mountain; Kec—Cretaceous trondhjemite of Eightmile Creek; Klb—Cretaceous trondhjemite of Lamb Butte; Ktm—Cretaceous(?) gneissic trondhjemite of Tiffany Mountain; Summit-Frazier trondhjemite gneiss, tonalite—unit is part of intrusive rocks phase of informally named Summit-Frazier complex of Gulick and Korosec (1990) and is approximately equivalent to unit Kdm. A, Modal quartz-K-feldspar-plagioclase (QKF); B, Modal quartz-feldspar-mafic minerals (QFM).

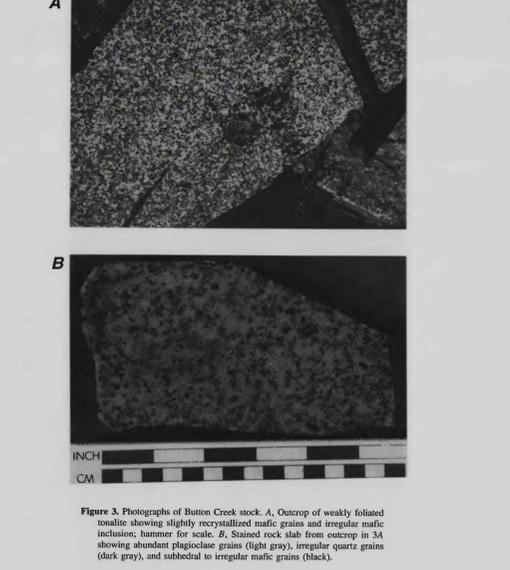


Figure 3. Photographs of Butte Creek stock. A, Outcrop of weakly foliated tonalite showing slightly recrystallized mafic grains and irregular mafic inclusion; hammer for scale. B, Stained rock slab from outcrop in 3A showing abundant plagioclase grains (light gray), irregular quartz grains (dark gray), and subtidal to irregular mafic grains (black).



Figure 4. Photograph of outcrop of gneissic trondhjemite of Tiffany Mountain showing concordant gneissic layering and trace of mineral foliation (upper left to lower right); penknife for scale. Layers consist of irregular, contorted biotite inclusions and heterogeneous granitic rocks, which include trondhjemite leucosomes, quartz diorite melanosomes, and slightly deformed, discordant granitic dike (under penknife).

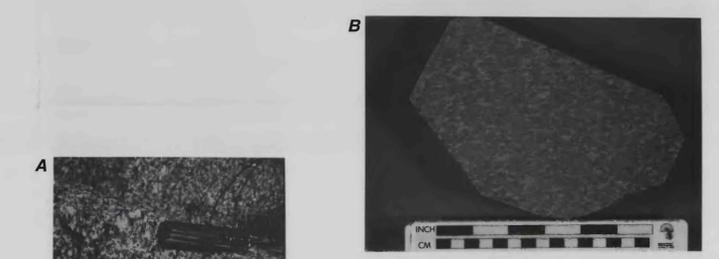


Figure 6. Photographs of trondhjemite of Lamb Butte. A, Outcrop of strongly foliated biotite trondhjemite; penknife for scale. Trace of nearly vertical foliation parallel to penknife. B, Stained rock slab from outcrop in 6A showing recrystallized plagioclase (dark gray), quartz (light gray), and biotite (black). Foliation in slab is parallel to scale.

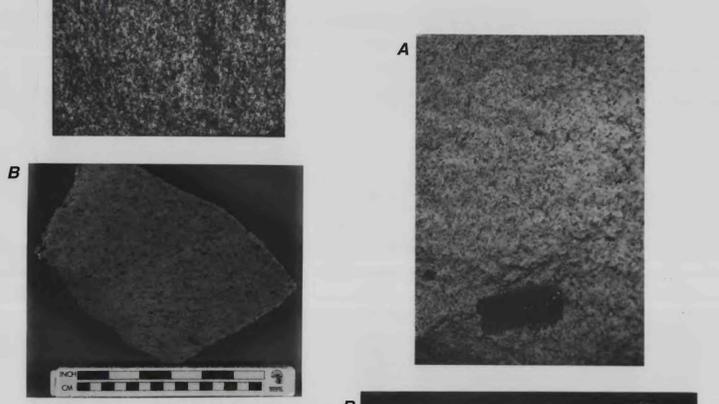


Figure 5. Photographs of trondhjemite of Eightmile Creek. A, Outcrop of moderately foliated hornblende-biotite trondhjemite showing stout, slightly recrystallized hornblende prisms oriented parallel to nearly vertical foliation; penknife for scale. B, Stained rock slab from outcrop in 5A showing abundant subtidal to ovoid plagioclase grains (gray), smaller interstitial quartz grains (white), and subtidal and recrystallized mafic grains (black). Foliation in slab is approximately parallel to scale.

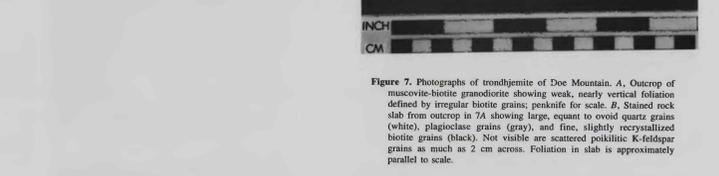


Figure 7. Photographs of trondhjemite of Doe Mountain. A, Outcrop of muscovite-biotite granodiorite showing weak, nearly vertical foliation defined by irregular biotite grains; penknife for scale. B, Stained rock slab from outcrop in 7A showing large, equant to ovoid quartz grains (white), plagioclase grains (gray), and fine, slightly recrystallized biotite grains (black). Not visible are scattered poikilitic K-feldspar grains as much as 2 cm across. Foliation in slab is approximately parallel to scale.

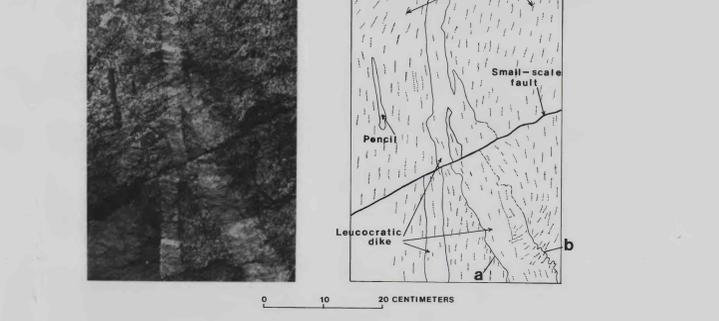


Figure 8. Structural relations between leucocratic dikes and foliated trondhjemite units in Doe Mountain quadrangle. A, Photograph of outcrop showing concordant (branching) leucocratic dike in trondhjemite of Eightmile Creek; pencil for scale. B, Sketch of outcrop in 8A. Bedders of, and foliation in, left branch of dike are parallel to foliation in host, while right branch both (a) crosscuts host foliation and (b) is partly crossed by and deformed into host foliation. Dashed line marks blurred contact between dike and host. Discordant dikes (not present in this outcrop) have foliation parallel to their walls.