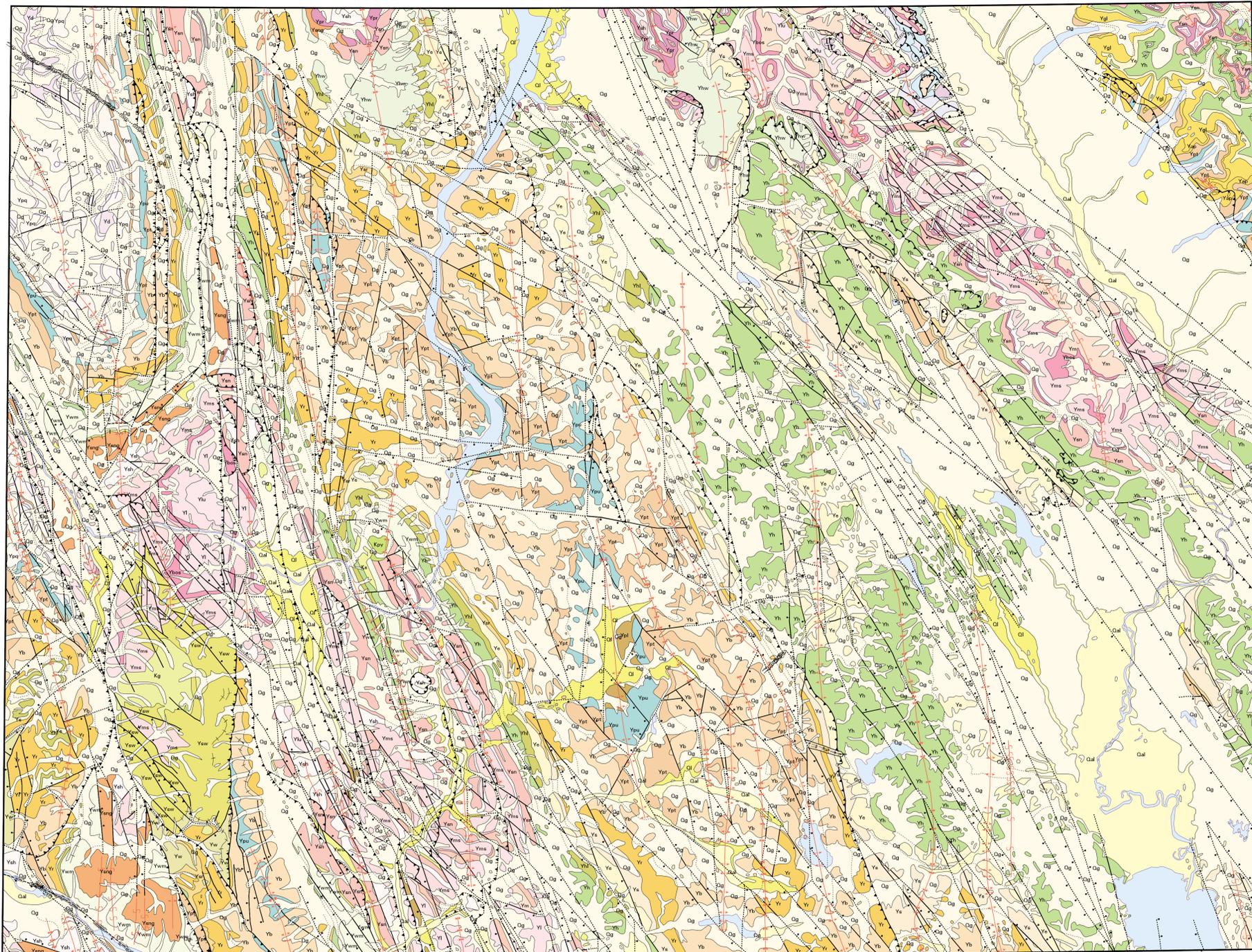




# **APPENDIX 1**

## **Geologic Map of the Kalispell Quadrangle**



map projection: Transverse Mercator

Geology by J.E. Harrison, J.E. Cressman, and J.W. Whipple (1992). Initial digitizing by EROS Data Center (pre-1994). Digital database by H.Z. Kayser (Information Systems Support, Inc.), P.D. Derkey (USGS), assisted by R.J. Miller (USGS). Database approved for publication October 5, 2000.

**Explanation**

- DESCRIPTION OF MAP UNITS**
- Qal - Alluvial deposits (Holocene)
  - Qs - Landslide deposits (Holocene)
  - Qg - Glacial and fluvioglacial deposits (Pleistocene)
  - Ql - Lake sediments (Pleistocene)
  - Tk - Kishenehn Formation (Oligocene)
  - Kg - Felsic plutons (Cretaceous)
  - Ke - Syenite (Cretaceous)
  - Kpy - Pyroxenite (Cretaceous)
  - Jf - Fernie Formation (Jurassic)
  - Mz - Mesozoic sedimentary rocks, undivided
  - Ppr - Rocky Mountain Formation (Permian and Pennsylvanian?)
  - Mu - Mississippian sedimentary rocks, undivided
  - Du - Devonian sedimentary rocks, undivided
  - Cu - Middle Cambrian sedimentary rocks, undivided
  - Dcu - Devonian and Middle Cambrian sedimentary rocks, undivided
  - ZVd - Mafic sills (Late and Middle Proterozoic)
  - Libby Formation (Middle Proterozoic)
  - Yiu - Upper part
  - Yl - Libby Formation, undivided
  - Ym - McNamara Formation (Middle Proterozoic)
  - Ybo - Bonner Quartzite (Middle Proterozoic)
  - Ybos - Siltite facies
  - Mount Shields Formation (Middle Proterozoic)
  - Ymsu - Upper part
  - Yms - Mount Shields Formation, undivided
  - Ysh - Shepard Formation (Middle Proterozoic)
  - Ypr - Purcell Lava (Middle Proterozoic)
  - Snowslip Formation (Middle Proterozoic)
  - Ysn - Red and green facies
  - Yang - Green facies
  - Wallace Formation (Middle Proterozoic)
  - Ywu - Upper member
  - Ywm - Middle member
  - Ywl - Lower member
  - Yw - Upper, middle, lower members, undivided
  - Ysw - Shepard, Snowslip, and Wallace Formations, undivided (Middle Proterozoic)
  - Yh - Main body of the Helena Formation (Middle Proterozoic)
  - Yhl - Lower member
  - Yhw - Main body of the Helena Formation and middle member of the Wallace Formation, undivided (Middle Proterozoic)
  - Ye - Empire Formation (Middle Proterozoic)
  - Ysr - St. Regis Formation (Middle Proterozoic)
  - Yr - Revett Formation (Middle Proterozoic)
  - Ys - Spokane Formation (Middle Proterozoic)
  - Ygl - Grinnell Formation (Middle Proterozoic)
  - Yb - Burke Formation (Middle Proterozoic)
  - Yu - Unnamed formation (Middle Proterozoic)
  - Yap - Appekunny Formation (Middle Proterozoic)
  - Yd - Mafic sills (Middle Proterozoic)
  - Prichard Formation (Middle Proterozoic)
  - Ypt - Transition member
  - Ypu - Upper member
  - Ypq - Quartzite member
  - Ypa - Argillite member
  - Ypl - Lower part
- Structural Features:**
- Contact: dotted where concealed.
  - Fault, unknown offset; dotted where concealed.
  - High-angle fault, known offset: dotted where concealed. Ball and bar on downthrown side.
  - Strike-slip fault: dotted where concealed. Arrows shown direction of apparent strike slip.
  - Right-lateral strike-slip fault with vertical motion: dotted where concealed. Ball and bar on downthrown side.
  - Thrust fault: dotted where concealed. Sawtooth on upper plate.
  - Backslid thrust fault: Thrust fault with later normal movement. Dotted where concealed. Sawtooth on upper plate; tics point in direction of backsliding.
  - Anticline
  - Syncline
  - Terrace or monocinal fold
  - Overtured anticline
  - Overtured syncline
  - Td - Dikes (Tertiary?); dotted where concealed.
  - ZVd - Mafic sills (Late and Middle Proterozoic); dotted where concealed.
  - Yla - Basalt; dotted where concealed.
  - Ypr - Purcell Lava (Middle Proterozoic); dotted where concealed.
  - Yd - Mafic sills (Middle Proterozoic); dotted where concealed.

**References**

Harrison, J.E., Cressman, E.R., and Whipple, J.W., 1992. Geologic and structure maps of the Kalispell 1- by 2-degree quadrangle, Montana, and Alberta and British Columbia: U.S. Geological Survey Miscellaneous Investigations Map I-2267.



Index map showing Kalispell quadrangle

This map was printed on an electronic plotter directly from digital files. Dimensional calibration may vary between electronic plotters and between X and Y directions on the same plotter, and paper may change size due to atmospheric conditions; therefore, scale and proportions may not be true on plots of this map. Color also varies between plotters and may need to be adjusted.

Digital files are available on World Wide Web at <http://geopubs.wr.usgs.gov/i-map/i-2267/>

The digital database is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000).

**Geologic and Structure Maps of the Kalispell 1° x 2° Quadrangle, Montana, and Alberta and British Columbia: A Digital Database**

By  
**Jack E. Harrison, Earle R. Cressman, and James W. Whipple**

Digital database by  
**Helen Z. Kayser, Pamela D. Derkey, and EROS Data Center**

**2000**  
**(map originally published in 1992)**

