

GEOLOGIC MAP OF THE VALE 30 x 60 MINUTE QUADRANGLE, MALHEUR COUNTY, OREGON, AND OWYHEE COUNTY, IDAHO  
1993

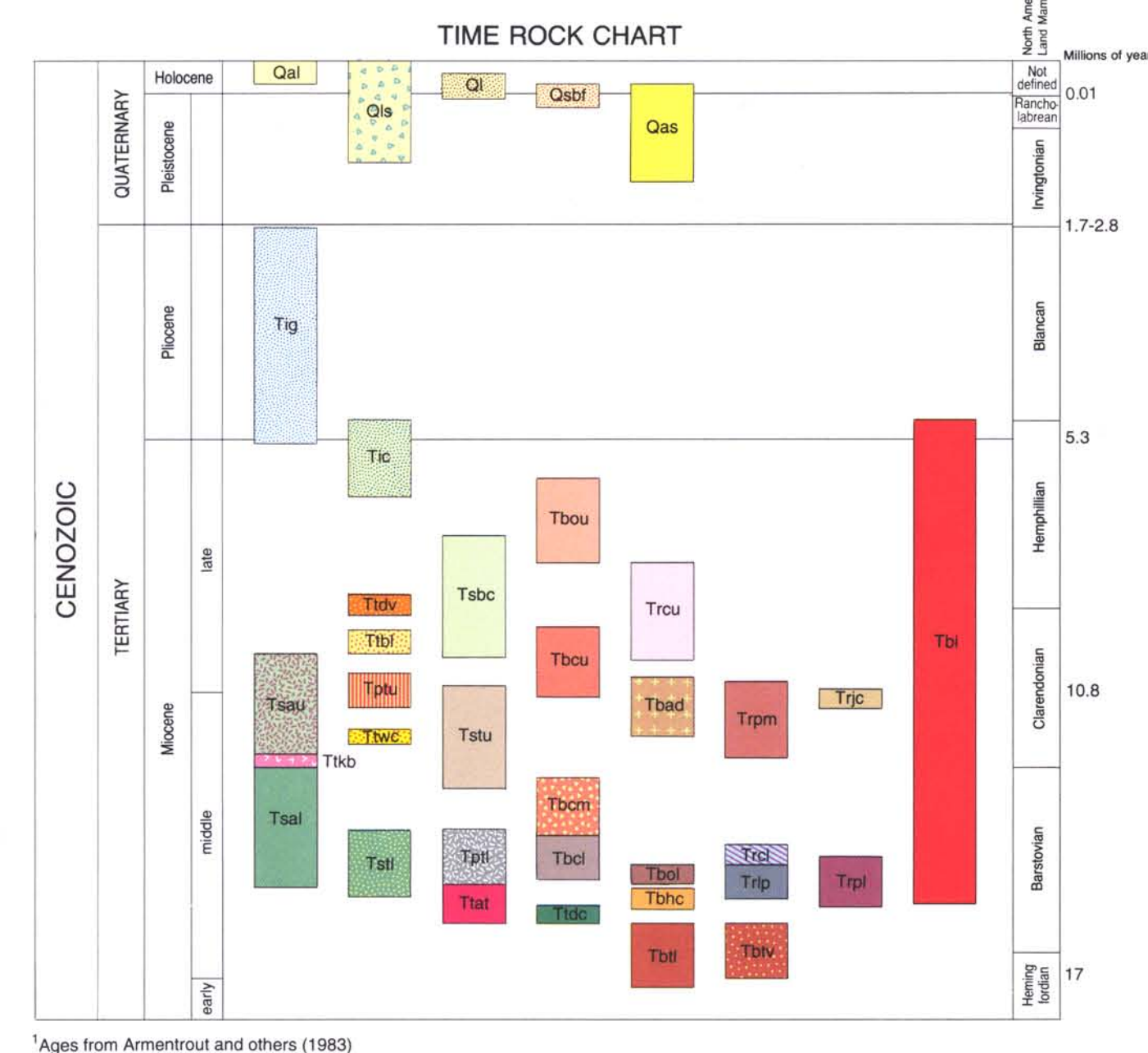


GMS-77

Geologic Map of the Vale 30 x 60 Minute Quadrangle, Malheur County, Oregon, and Owyhee County, Idaho

By Mark L. Ferns and others

Funded in part by the Oregon State Lottery Fund for Economic Development and the U.S. Geological Survey (COGEMAP), Portland State University participation funded, in part, by contributions from the U.S. Bureau of Land Management, private mining interests, the Geological Society of the Oregon Country, student tuition and fees, and the Oregon Department of Geology and Mineral Industries

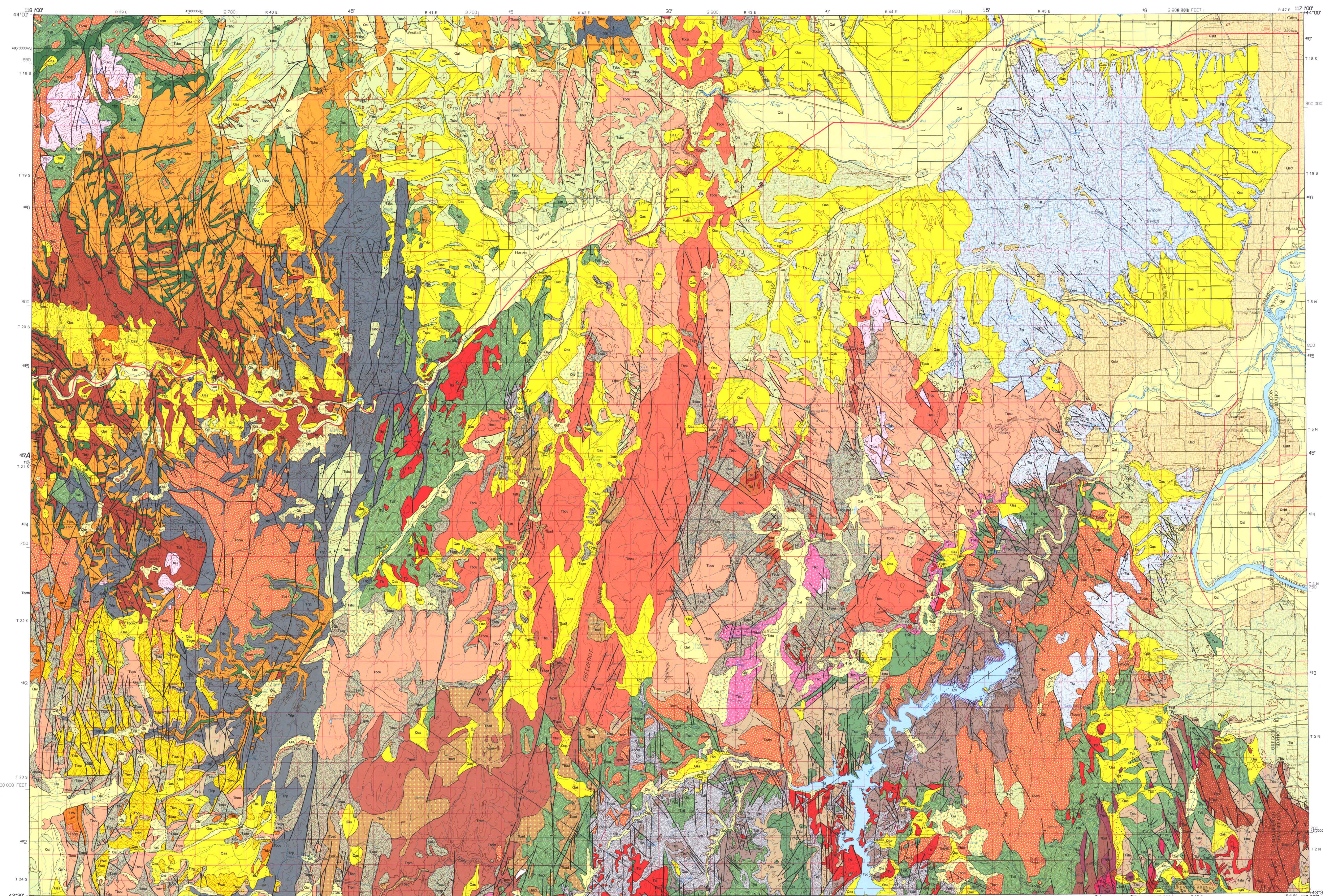


EXPLANATION  
*(Description of units and of geologic history, resources, and hazards in accompanying text)*

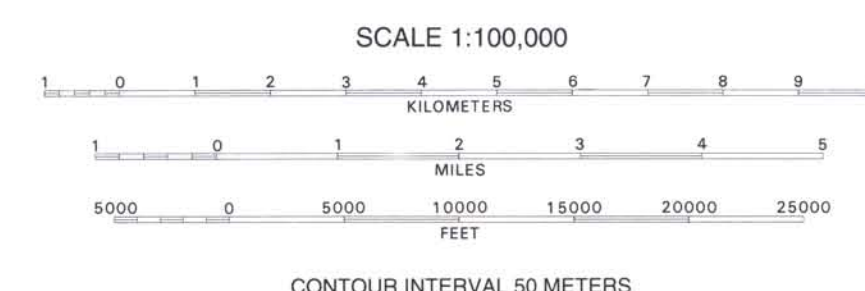
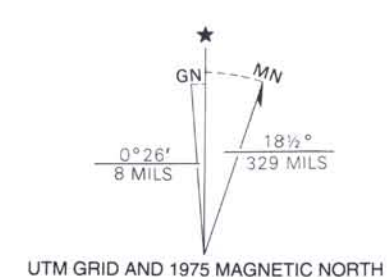
- Qal Alluvium (Holocene)
- Qls Landslides (Holocene and Pleistocene)
- Qs Windblown silt and sand (Holocene and upper Pleistocene)
- Qst Fluvial sand, gravel, and silt (Holocene and upper Pleistocene?)
- Qstb Terrace gravels and alluvial-fan deposits (Holocene? and Pleistocene)
- Qas WESTERN SNAKE RIVER PLAIN DEPOSITS  
Idaho Group (Pliocene and upper Miocene)—subdivided into the following units:  
Lacustrine sediments (Pliocene and upper Miocene?)  
Tig Lacustrine sediments (lower Pliocene? and upper Miocene)
- Tic Upper olive basalt flows (upper Miocene)
- Tbou Bully Creek Formation (upper Miocene)—subdivided into the following units:  
Lacustrine sedimentary deposits (upper Miocene)  
Tsbu Devine Canyon Ash-flow Tuff (upper Miocene)
- Tbu Tuff of Bully Creek (upper Miocene)
- OREGON-IDAHO GRABEN DEPOSITS  
Ttr Upper calc-alkaline rhyolite and dacite flows and domes (upper Miocene)
- Ttrc Upper calc-alkaline lava flows (upper and middle Miocene)
- Ttrd Upper arkosic sandstone, conglomerate, and tuffaceous siltstone (upper and middle Miocene)
- Ttrp Upper palagonite tephra deposits (upper and middle Miocene)
- Ttrf Tuffaceous siltstones, tuffs, and nonwelded ash-flow tuff (upper and middle Miocene)
- Ttrg Jump Creek Rhyolite (upper or middle Miocene)
- Ttrh Wildcat Creek Welded Ash-flow Tuff (middle Miocene)
- Ttrk Tuff of Kern Basin (middle Miocene)
- Ttrl Lower arkosic sandstone and conglomerate (middle Miocene)
- Ttrm Basalt, basaltic andesite, and andesite lava flows (upper and middle Miocene)
- Ttrn Rhyolite and rhyodacite of Dry Creek (upper and middle Miocene)
- Ttrp Middle calc-alkaline lava flows (middle Miocene)
- Ttrd Lower calc-alkaline lava flows (middle Miocene)
- Ttrf Lower calc-alkaline rhyodacite flows (middle Miocene)
- Ttrp Lower palagonite tephra deposits (middle Miocene)
- Ttrf Lower olive basalt flows (middle Miocene)
- Ttrf Lower tuffaceous sedimentary rocks (middle Miocene)
- EARLY BIMODAL VOLCANIC SUITE  
Ttrp High-silica rhyolite domes and shallow intrusions (middle Miocene)
- Ttrp Littlefield Rhyolite (middle Miocene)
- Ttrh Hunter Creek Basalt (middle Miocene)
- Ttrd Dinner Creek Welded Ash-flow Tuff (middle Miocene)
- Ttrk Welded Ash-flow Tuffs (middle Miocene)
- Ttrd Eastern tholeiitic lavas (middle Miocene)
- Ttrd Western tholeiitic lavas (middle and lower? Miocene)
- INTRUSIVE ROCKS  
Ttrd Basalt intrusions (Pliocene? and Miocene)

MAP SYMBOLS

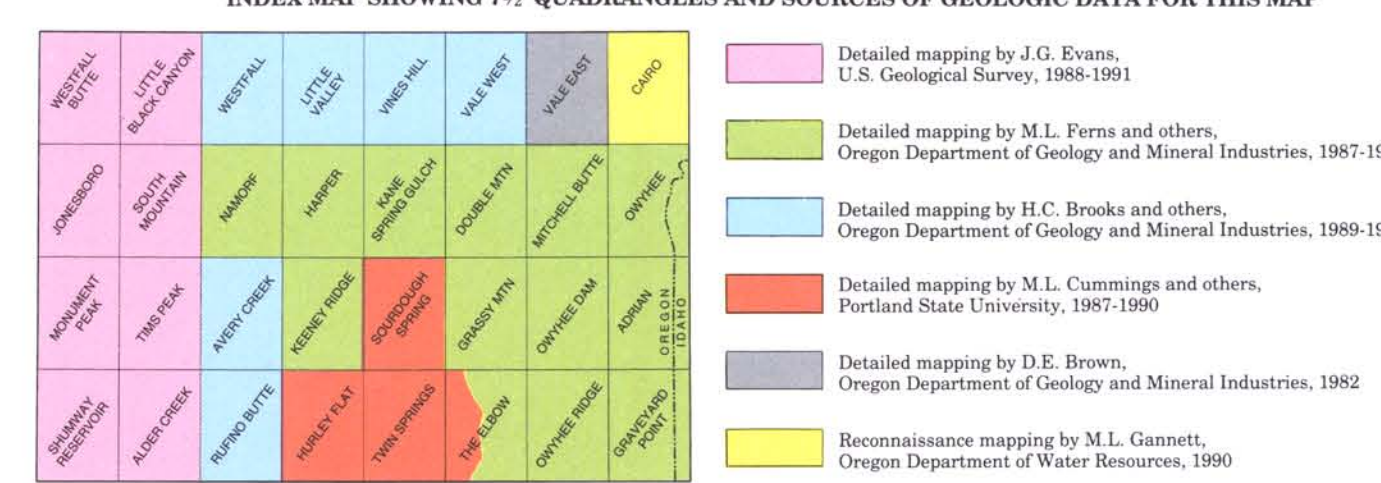
- Contact—Approximately located
- Fault—Dashed where approximately located; dotted where concealed; ball and bar on downthrown side
- Thrust Fault—Sawtooth on upper plate
- Strike and dip of beds
- Dike
- Anticlinal fold axis
- Synclinal fold axis



Base map from U.S. Bureau of Land Management and U.S. Geological Survey  
Compiled in 1975 from BLM 1:63,360-scale planimetric maps dated 1971-1972  
Planimetry revised by USGS from aerial photographs taken 1974-1975 and other  
source data. Revised information not field checked  
Elevation contours produced through joint funding agreement between U.S. Geological  
Survey and Oregon Department of Geology and Mineral Industries, 1992  
National geodetic vertical datum of 1929  
Projection and 10,000-meter grid, zone 11, Transverse Mercator  
1927 North American Datum



INDEX MAP SHOWING 7 1/2 QUADRANGLES AND SOURCES OF GEOLOGIC DATA FOR THIS MAP



Geology by Mark L. Ferns and Howard C. Brooks,  
Oregon Department of Geology and Mineral Industries;  
James G. Evans, U.S. Geological Survey;  
and Michael L. Cummings, Portland State University  
Reviewed by Margaret D. Jenks, Idaho Geological Survey,  
and Spencer H. Wood, Boise State University  
Cartography by Paul E. Staub

GEOLOGIC CROSS SECTION

*(Thickness of some units exaggerated)*

