

Geologic Map of the Upper Grande Ronde River Basin, Union County, Oregon

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OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

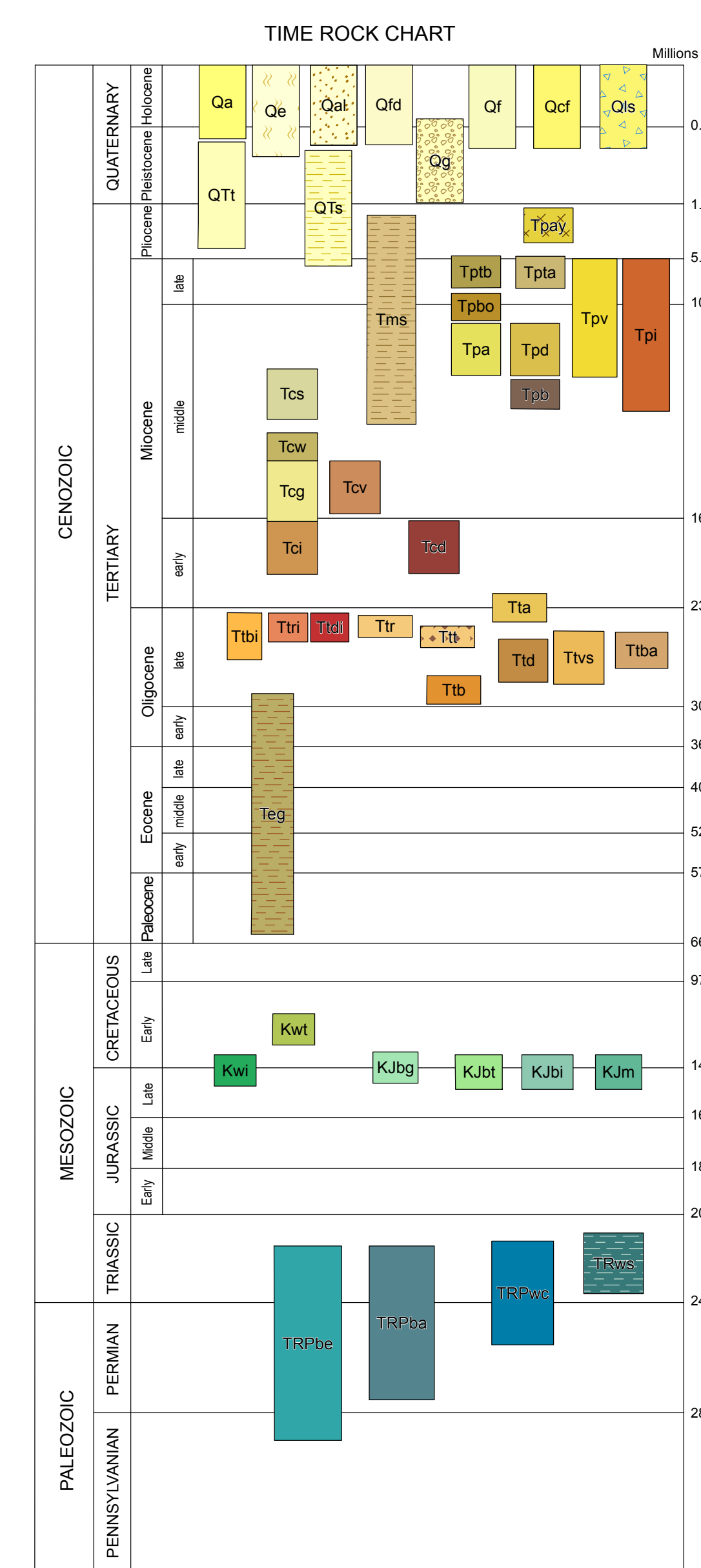
BULLETIN 107

Geology of the Upper Grande Ronde River Basin, Union County, Oregon
by Mark L. Ferns, Vicki S. McConnell, Ian P. Madin, and Jenda A. Johnson

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PLATE 1

These maps cannot serve as a substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from those shown on the maps.



Geological Society of America Bulletin, v. 96, no. 11, p. 1407-1418.

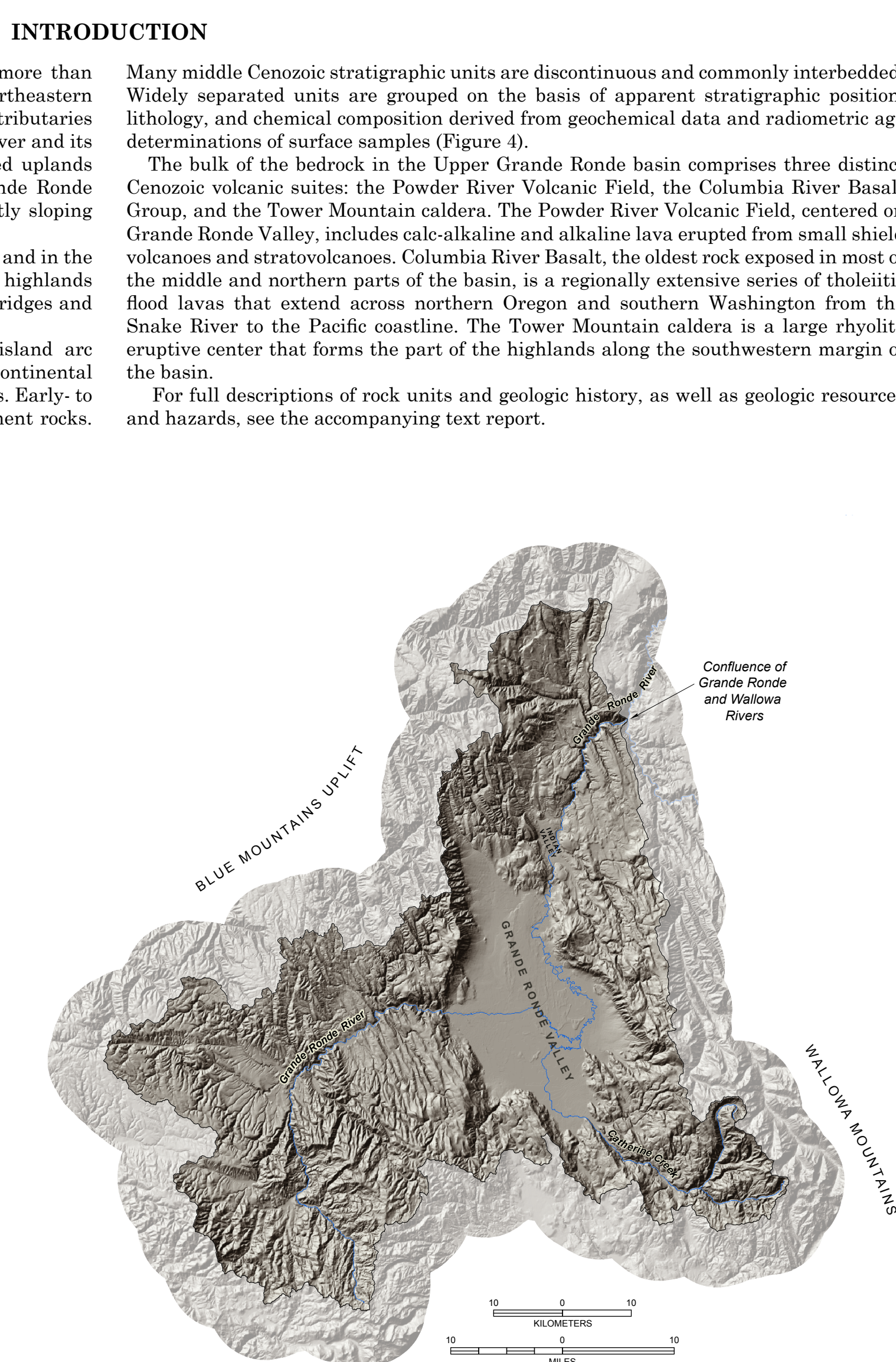


Figure 2. Geomorphology of the upper Grande Ronde River basin.

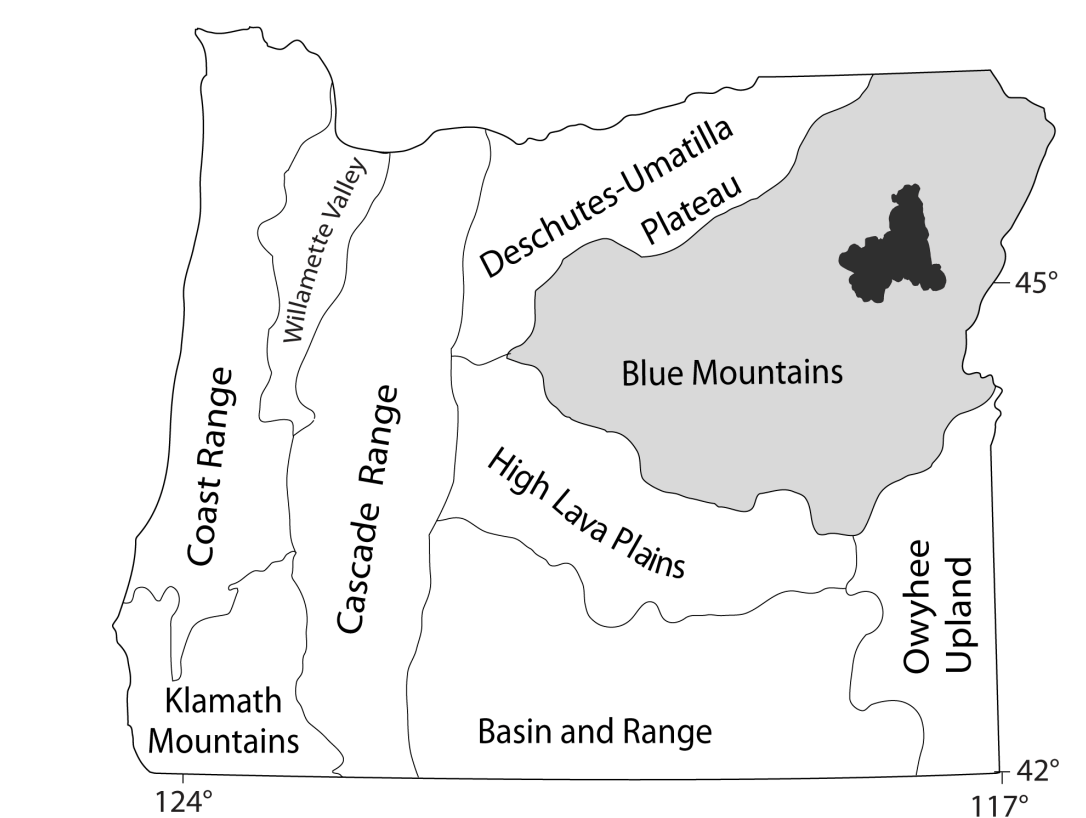


Figure 1. Regional context of the upper Grande Ronde River hydrologic basin in northeastern Oregon.

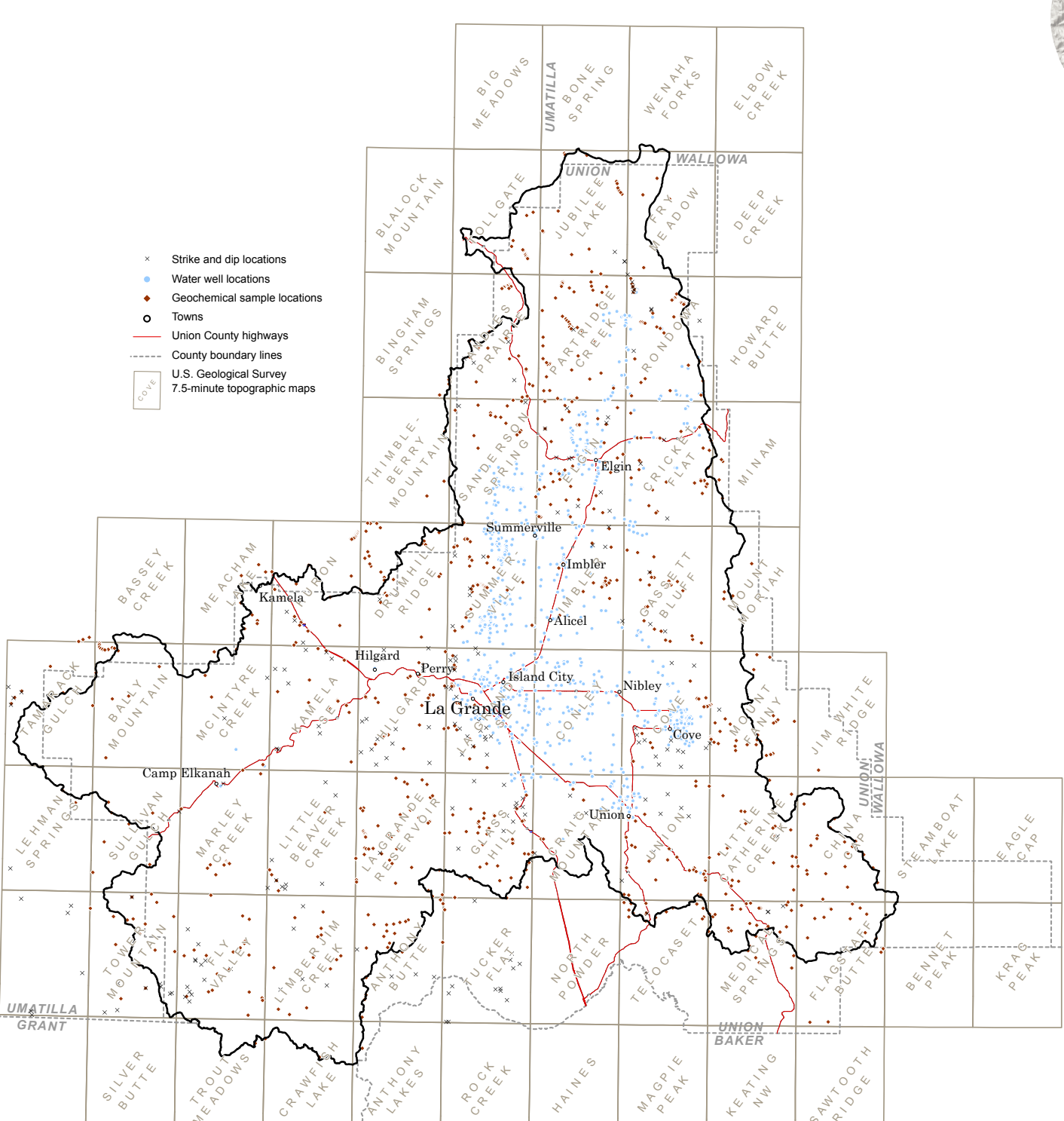
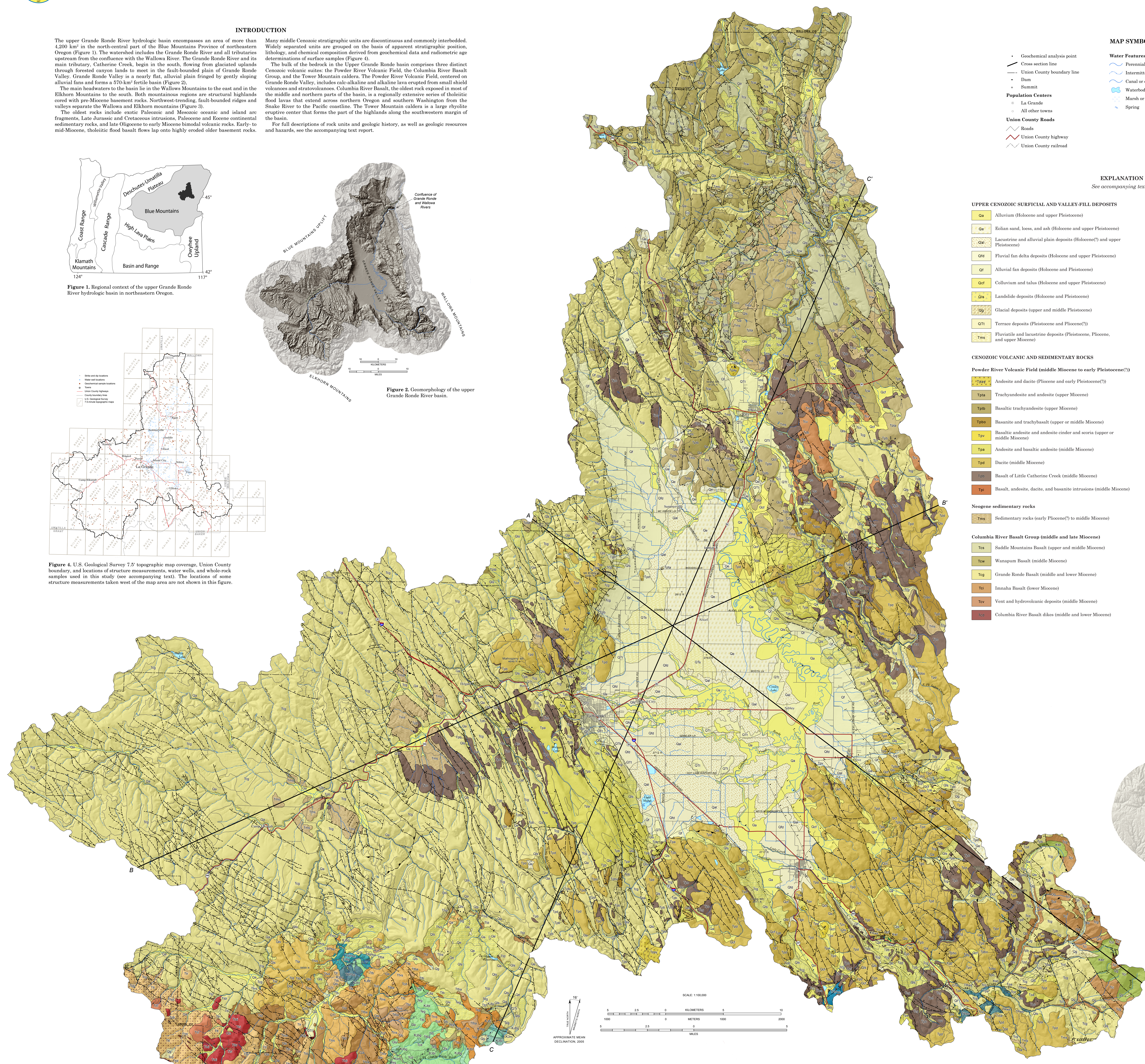


Figure 4. U.S. Geological Survey 7.5' topographic map coverage, Union County boundary, and locations of structure measurements, water wells, and whole-rock samples used in this study (see accompanying text). The locations of some structure measurements taken west of the map area are not shown in this figure.



MAP SYMBOLS

- Water Features
 - Perennial stream or river
 - Intermittent stream or river
 - Canal or ditch
 - Waterbody
 - Marsh or wetland
 - Spring
- Population Centers
 - La Grande
 - All other towns
- Union County Roads
 - Roads
 - Union County highway
 - Union County railroad

- Fault Certainty and Style
 - Approximate, normal
 - Approximate, reverse
 - Approximate, unknown
 - Inferred, normal
 - Inferred, reverse
 - Inferred, unknown
 - Consolidated, normal
 - Consolidated, unknown

EXPLANATION OF MAP UNITS

See accompanying text for full descriptions.

UPPER CENOZOIC SURFICIAL AND VALLEY-FILL DEPOSITS

- Qa Alluvium (Holocene and upper Pleistocene)
- Qe Eolian sand, loess, and ash (Holocene and upper Pleistocene)
- Qal Lacustrine and alluvial plain deposits (Holocene?) and upper Pleistocene
- Qm Fluvial fan delta deposits (Holocene and upper Pleistocene)
- Qr Alluvial fan deposits (Holocene and Pleistocene)
- Qst Collicium and talus (Holocene and upper Pleistocene)
- Qs Landslide deposits (Holocene and Pleistocene)
- Qg Glacial deposits (upper and middle Pleistocene)
- Qt Terrace deposits (Pleistocene and Pliocene?)
- Qp Fluvial and lacustrine deposits (Pleistocene, Pliocene, and upper Miocene)

CENOZOIC VOLCANIC AND SEDIMENTARY ROCKS

- Powder River Volcanic Field (middle Miocene to early Pleistocene?)
 - Qp Andesite and dacite (Pliocene and early Pleistocene?)
 - Tpa Trachyandesite and andesite (upper Miocene)
 - Tpb Basaltic trachyandesite (upper Miocene)
 - Tba Basaltic and trachybasalt (upper or middle Miocene)
 - Tbs Basaltic andesite and andesite cinder and scoria (upper or middle Miocene)
 - Tpa Andesite and basaltic andesite (middle Miocene)
 - Tpd Dacite (middle Miocene)
 - Tpl Basalt of Little Catherine Creek (middle Miocene)
 - Tpi Basalt, andesite, dacite, and basaltic intrusions (middle Miocene)
- Neogene sedimentary rocks
 - Tm Sedimentary rocks (early Pliocene?) to middle Miocene
- Columbia River Basalt Group (middle and late Miocene)
 - Tca Saddle Mountains Basalt (upper and middle Miocene)
 - Tcw Wapum Basalt (middle Miocene)
 - Tcg Grande Ronde Basalt (middle and lower Miocene)
 - Tci Imnaha Basalt (lower Miocene)
 - Tve Vent and hydrovolcanic deposits (middle Miocene)
 - Tcb Columbia River Basalt dikes (middle and lower Miocene)

Tower Mountain caldera (lower Miocene and Oligocene)

- Tca Andesite and dacite flows (lower Miocene)
- Tv Rhyolite (upper Oligocene)
- Td Welded ash-flow tuff (upper Oligocene)
- Tp Porphyritic lava of Chicken Creek (upper Oligocene)
- Tba Basalt, basaltic andesite, and andesite (upper Oligocene)
- Tba Volcaniclastic deposits of Limber Jim Creek (upper Oligocene)
- Tb Basalt and basaltic andesite (Oligocene)

Tertiary subvolcanic intrusions

- Tba Mafic intrusions (lower Miocene to upper Oligocene)
- Tba Rhyolite intrusions (lower Miocene to upper Oligocene)
- Tba Dacite and andesite intrusions (lower Miocene to upper Oligocene)

Lower Cenozoic sedimentary rocks

- Tca Conglomerate, sandstone, and siltstone (lower Oligocene?), Eocene, or Paleocene(?)

MESOZOIC INTRUSIVE ROCKS

- Wallawa batholith (Early Cretaceous and Late Jurassic?)
 - Tca Tonalite and granodiorite of the Wallawa Batholith (Early Cretaceous)
 - Tca Tondemite of Catherine Creek (Early Cretaceous or Late Jurassic)
- Bald Mountain batholith (Early Cretaceous and Late Jurassic)
 - Tca Granodiorite and tonalite (Early Cretaceous and Late Jurassic)
 - Tca Granite (Early Cretaceous or Late Jurassic)
- Tca Mafic and intermediate intrusions (Early Cretaceous and Late Jurassic)
- Tca Metamorphosed intrusions (Early Cretaceous and Late Jurassic)

MESOZOIC AND PALEOZOIC ROCKS

- Wallawa terrane (Early Jurassic, Triassic, and Permian)
 - Tca Undifferentiated volcaniclastic and clastic sedimentary rocks (Triassic?)
 - Tca Lower Creek Gneiss (Triassic or Permian)
- Baker terrane (Triassic, Permian, Pennsylvanian, and Devonian?)
 - Tca Elkhorn Ridge Argillite (Triassic, Permian, Pennsylvanian and Devonian?)
 - Tca Amphibolite and metamorphosed intrusive rocks (Triassic and Permian)

GEOLOGIC CROSS SECTIONS

24° vertical exaggeration

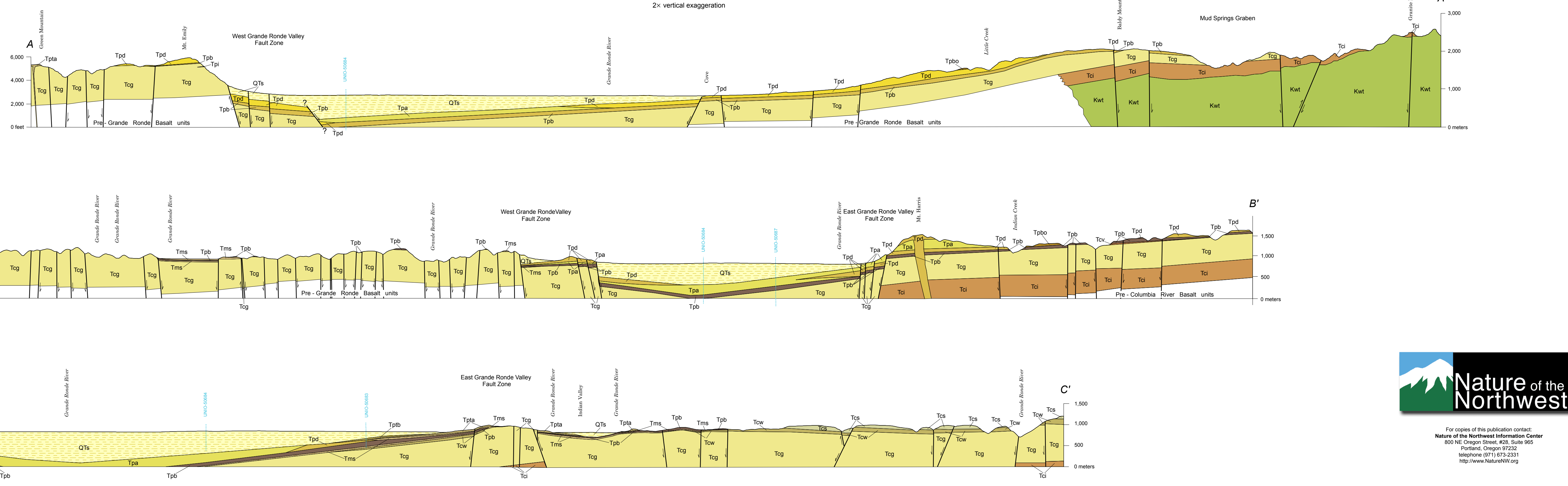


Figure 3. Grande Ronde Valley is bordered to the east and west by steep, northwest-trending, fault-bounded escarpments.

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Field work conducted 1993-2001.
Cartography by Sarah A. Robinson, 2010.
Geologic map reviewed by Jim Evans, U.S. Geological Survey, Bob Carson, Whitman University, and Jay Van Tassel, Eastern Oregon University.
Software used: MapInfo Professional 8.0, ArcGIS 9.3, Adobe Illustrator CS5, Adobe Acrobat 9.3.4. Source file: "Publications" Bulletin 107.
Base map by Oregon Department of Geology and Mineral Industries (DOGMI) from 10-m USGS DEM.
Map projection: Universal Transverse Mercator, North American Datum 1983, Zone 11.
Latitude and longitude ticks at 15-minute intervals apply to main map only.

