

# Reconnaissance Geologic Map of the La Grande 30 x 60 Minute Quadrangle, Baker, Grant, Umatilla, and Union Counties, Oregon

2001

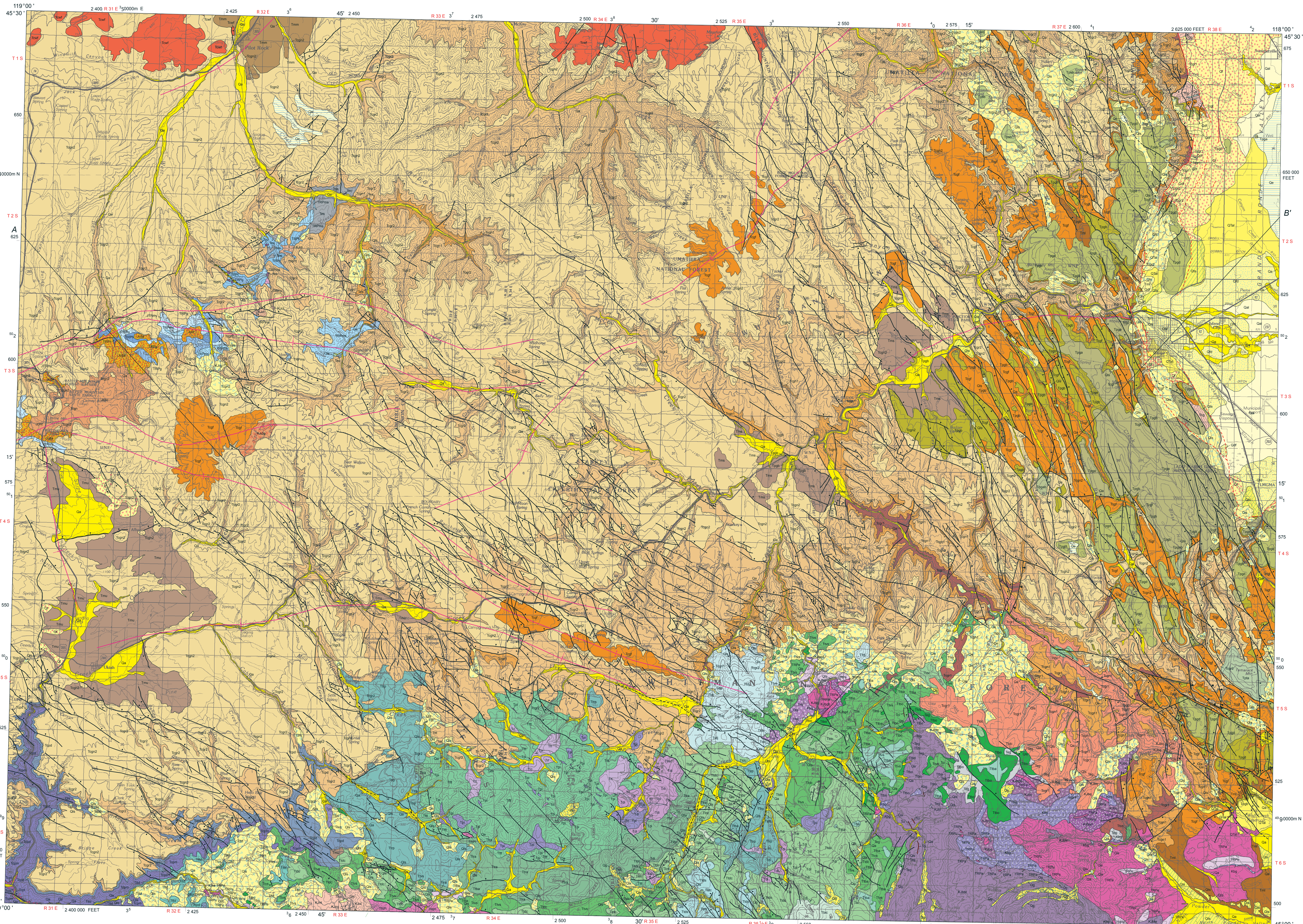
RMS-1

Reconnaissance Geologic Map of the La Grande 30 x 60 Minute Quadrangle  
Baker, Grant, Umatilla, and Union Counties, Oregon

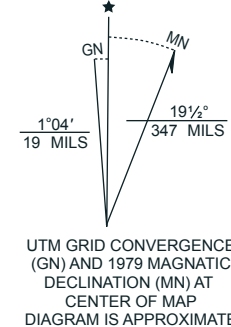
By M. L. Ferns, L.P. Madin, and W.H. Taubeneck

Supported by the U.S. Geological Survey, National Cooperative Geologic  
Mapping Program under assistance award #98HQ12017

The views and conclusions contained in this document are those of the  
authors and should not be interpreted as necessarily representing the official  
policies, either expressed or implied, of the U.S. Government.



Base map compiled from USGS 1:50,000-scale topographic maps dated 1963-1967.  
Projection and 10 000-meter grid, zone 11, Universal Transverse Mercator.  
25 000-foot grid ticks based on Oregon coordinate system, north zone.  
1927 North American Datum.



SCALE 1:100 000  
CONTOUR INTERVAL 50 METERS  
SUPPLEMENTARY CONTOURS AT 10-METER INTERVALS  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



ABBREVIATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

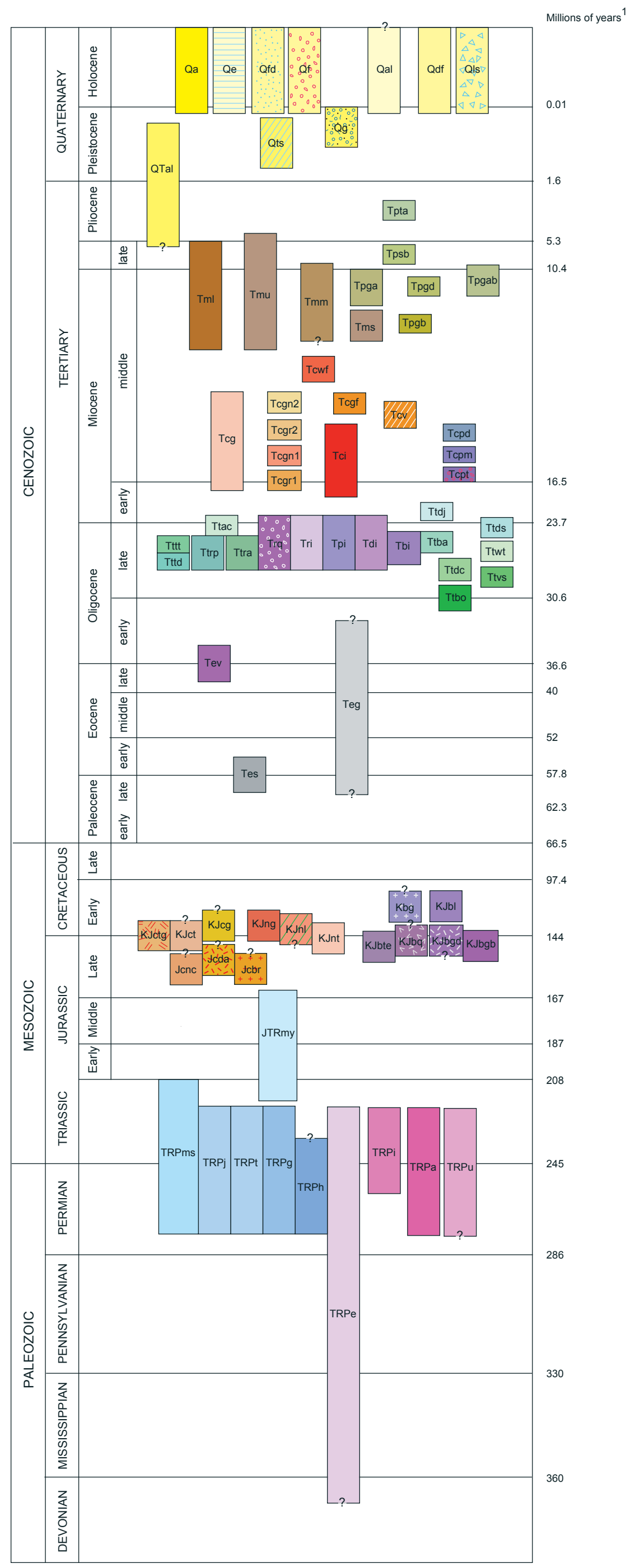
Geology by Mark L. Ferns and Ian P. Madin, Oregon Department  
of Geology and Mineral Industries, and William H. Taubeneck,  
Oregon State University

Field work conducted in 1996-98

Reviewed by James G. Evans, U.S. Geological Survey, Vicki McConnell, Oregon Department  
of Geology and Mineral Industries, and Kevin B. Pogue and Bob Carver, Whitman College.

Cartography by Clark A. Niewandorp

## TIME ROCK CHART

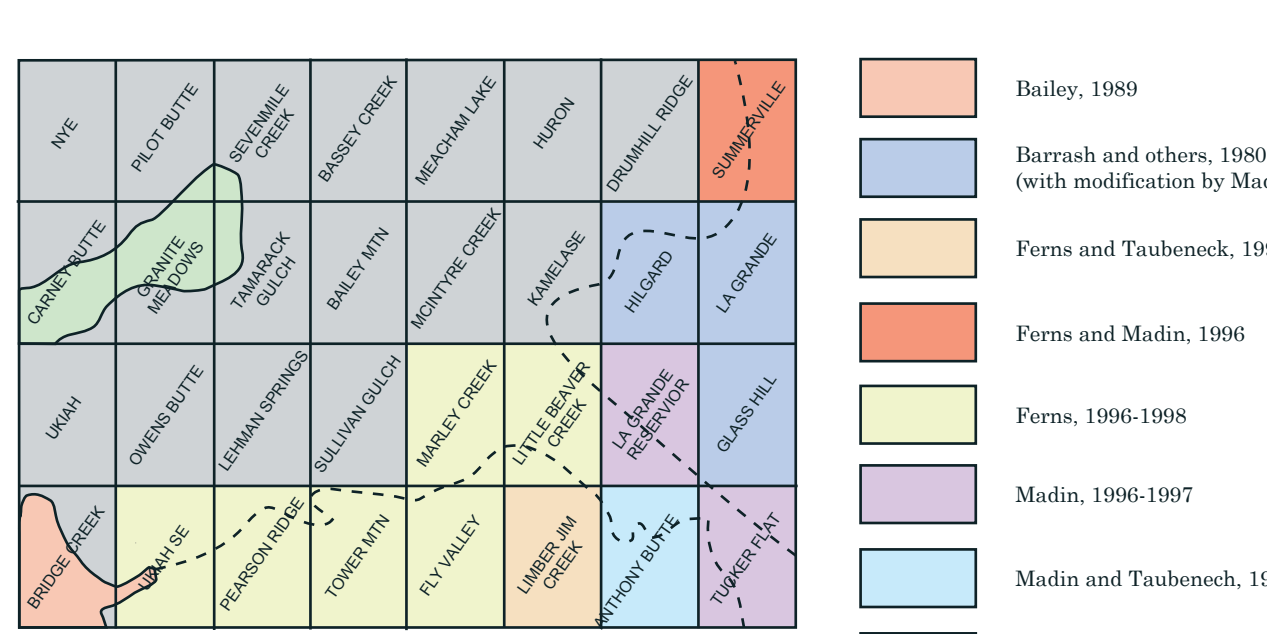


After Palmer (1985), Berggren and others (1985), and Hart Grabau (1965)

## MAP SYMBOLS

- Contacts - Approximately located
- Faults - Dashed where inferred; full and bar on downthrown block
- Quaternary fault - Dashed where inferred; full and bar on downthrown block
- Anticlinal fold axis - Approximately located
- Synclinal fold axis - Approximately located

## INDEX MAP OF LA GRANDE 30 x 60 QUADRANGLE SHOWING SOURCES OF GEOLOGIC INFORMATION



Modification by Ferns, 1997

## EXPLANATION OF MAP UNITS

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

### UPPER CENOZOIC SURFICIAL AND VALLEY-FILL DEPOSITS

- Qa Alluvium (Holocene and upper Pleistocene)
- Qs Ash, sand, and loess (Holocene and upper Pleistocene)
- Qd Fluvial fan-delta deposits (Holocene and upper Pleistocene)
- Qf Alluvial fan deposits (Holocene and upper Pleistocene)
- Ql Landslide deposits (Holocene and upper Pleistocene)
- Qd Debris-avalanche and debris-flow deposits (Holocene and upper Pleistocene)
- Qa Lacustrine and alluvial plain deposits (Holocene and upper Pleistocene)
- Qg Glacial deposits (upper and middle Pleistocene)
- Qs Terraces deposits (Pleistocene)
- Qla Lacustrine and fluvial sediments (Pleistocene, Pliocene, and upper Miocene)

### CENOZOIC VOLCANIC AND SEDIMENTARY ROCKS

- Upper Cenozoic Volcanic and Sedimentary Rocks (middle Miocene to Pliocene)
- Andesite of Tamarack Mountain (Pliocene)
- Lava of Sugarloaf Mountain (upper Miocene)
- Lava of Glass Hill (upper or middle Miocene)
- Basaltic and trachybasalt (upper or middle Miocene)
- Dacite (middle Miocene)
- Andesite and basaltic andesite (middle Miocene)
- Olivine basalt (middle Miocene)

### Neogene sedimentary rocks (Pliocene to middle Miocene)

- Sedimentary rocks of Ukiah (Pliocene to middle Miocene)
- McKay Formation (upper to middle Miocene)
- Sedimentary rocks of La Grande (upper and middle Miocene)
- Sedimentary rocks of Starkey (middle Miocene)

### Columbia River Basalt Group (middle and lower Miocene)

- Wanapum Basalt (middle Miocene)
- Frenchman Springs Member (middle Miocene)
- Picture Gorge Basalt (middle Miocene)
- Dayville Basalt (middle Miocene)
- Monument Mountain Basalt (middle Miocene)
- Twickenham Basalt (middle Miocene)

### Grande Ronde Basalt (middle and lower Miocene)

- Grande Ronde Basalt, undivided (middle and lower Miocene)
- N2 Grande Ronde Basalt (middle Miocene)
- Ferruginous of Fiddlers Hill (middle Miocene)
- Pyroclastic vent deposits (middle Miocene)
- R2 Grande Ronde Basalt (middle Miocene)
- N1 Grande Ronde Basalt (middle Miocene)
- R1 Grande Ronde Basalt (middle and lower Miocene)

### Columbia River Basalt Group dikes (middle and lower Miocene)

- Dike of Johnson Rock (lower Miocene)
- Andesite of Chicken Hill (lower Miocene or upper Oligocene)
- Rhyolite of Sheep Creek (lower Miocene or upper Oligocene)
- Basalt, basaltic andesite, and andesite (upper Oligocene)
- Welded ash-flow tuff (upper Oligocene)
- Welded ash-flow tuff of Dale (upper Oligocene)
- Caldara-fill tuff of Tower Mountain caldera (upper Oligocene)
- Porphyritic rhyolite (upper Oligocene)
- Aphyric rhyolite (upper Oligocene)
- Porphyritic lava of Chicken Creek (upper Oligocene)
- Volcaniclastic deposits of Limber Jim Creek (upper Oligocene)
- Basalt and basaltic andesite (Oligocene)

### Tower Mountain volcanic field (Oligocene and early Miocene)

- Dike of Johnson Rock (lower Miocene)
- Andesite of Chicken Hill (lower Miocene or upper Oligocene)
- Rhyolite of Sheep Creek (lower Miocene or upper Oligocene)
- Basalt, basaltic andesite, and andesite (upper Oligocene)
- Welded ash-flow tuff (upper Oligocene)
- Welded ash-flow tuff of Dale (upper Oligocene)
- Caldara-fill tuff of Tower Mountain caldera (upper Oligocene)
- Porphyritic rhyolite (upper Oligocene)
- Aphyric rhyolite (upper Oligocene)
- Porphyritic lava of Chicken Creek (upper Oligocene)
- Volcaniclastic deposits of Limber Jim Creek (upper Oligocene)
- Basalt and basaltic andesite (Oligocene)

### Tertiary subvolcanic intrusions

- Rhyolite intrusions (lower Miocene to upper Oligocene)
- Dacite and andesite intrusions (lower Miocene to upper Oligocene)
- Rhyolite porphyry intrusion (lower Miocene to upper Oligocene)
- Porphyritic dacite and rhyolite intrusions (lower Miocene to upper Oligocene)
- Mafic intrusions (upper Oligocene)
- Dacite and rhyolite porphyry (lower Oligocene or upper Eocene)

### Lower Cenozoic sedimentary rocks

- Conglomerate, sandstone, and siltstone (lower Oligocene?, Eocene, or Paleocene?)
- Heron Formation (lower Eocene and upper Paleocene)

### MESOZOIC INTRUSIVE ROCKS

#### Bald Mountain batholith (Lower Cretaceous and Upper Jurassic)

- Granitic intrusion (Lower Cretaceous?)
- Lamprophyre (Lower Cretaceous)
- Elkhorn pluton (Lower Cretaceous and Upper Jurassic)
- Granodiorite (Lower Cretaceous and Upper Jurassic?)
- Quartz diorite (Lower Cretaceous and Upper Jurassic)
- Quartz gabbro (Lower Cretaceous and Upper Jurassic)

#### North Fork Stock (Lower Cretaceous and Upper Jurassic)

- North Fork tonalite (Lower Cretaceous and Upper Jurassic)
- Lamprophyre (Lower Cretaceous or Upper Jurassic?)
- Granite (Lower Cretaceous or Upper Jurassic?)

#### Carney Butte Stock (Lower Cretaceous? and Upper Jurassic)

- Granodiorite of Table Mountain (Lower Cretaceous? and Upper Jurassic)
- Trochiliform of Johnson Creek (Lower Cretaceous? and Upper Jurassic)
- Tonalite of Granite Meadows (Lower Cretaceous and Upper Jurassic)
- Diorite of Alexander Creek (Upper Jurassic?)
- Gabbro of Carney Butte (Upper Jurassic?)
- Gabbro of Rubeau Canyon (Upper Jurassic?)

### MESOZOIC AND PALEOZOIC ROCKS

#### Mountain Home metamorphic complex

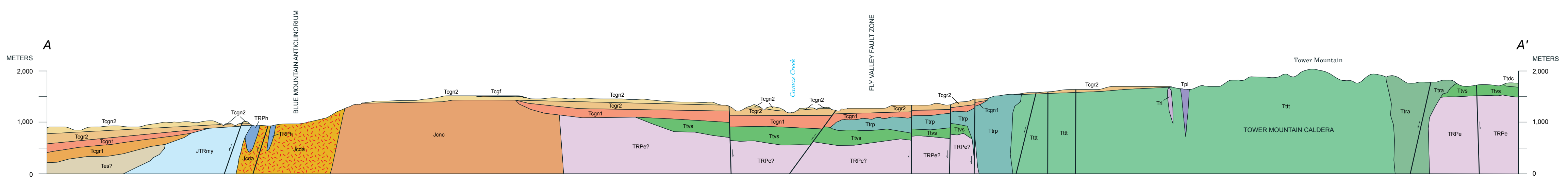
- Biinite schists of Yellow Jacket Road (Jurassic to Triassic)
- Chlorite-mica schists of Pearson Creek (Jurassic to Triassic)
- Metarhyolite (Triassic or Permian)
- Metasiltstone (Triassic or Permian)
- Metagabbro (Triassic or Permian)
- Hornblende and hornblende gabbro (Triassic? or Permian)

#### Baker terrane (Triassic to Devonian?)

- Elkhorn Ridge Agillite (Triassic, Permian, Pennsylvanian, and Devonian?)
- Ultramafic rocks (Triassic and Permian?)
- Quartz diorite, trondhjemite, and diorite (Triassic and upper Permian)
- Amphibolite, metagabbro, and metadiorite (Triassic and Permian)

## GEOLOGIC CROSS SECTION A-A'

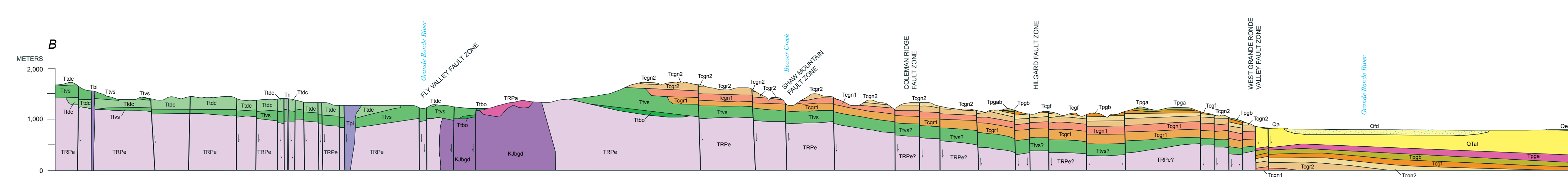
Selecting Quaternary units not shown in cross section  
(Thickness of units not exaggerated)



VERTICAL EXAGGERATION 2X

## GEOLOGIC CROSS SECTION B-B'

Selecting Quaternary units not shown in cross section  
(Thickness of units not exaggerated)



VERTICAL EXAGGERATION 2X