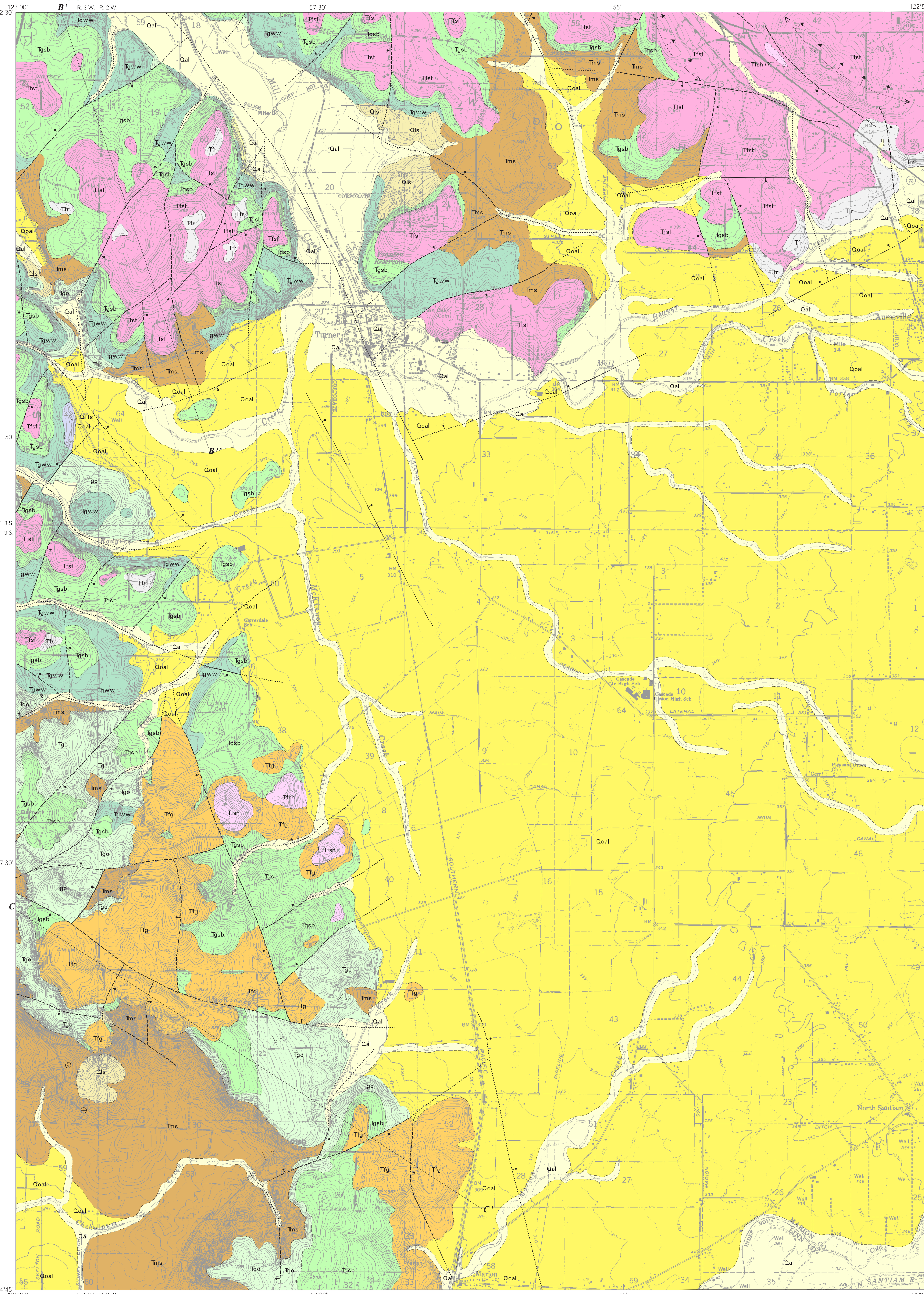
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT 00–351
Sheet 2 of 2, Version 1.0



Base From U.S. Geological Survey Turner, 1969
Universal Transverse Mercator projection, zone 10

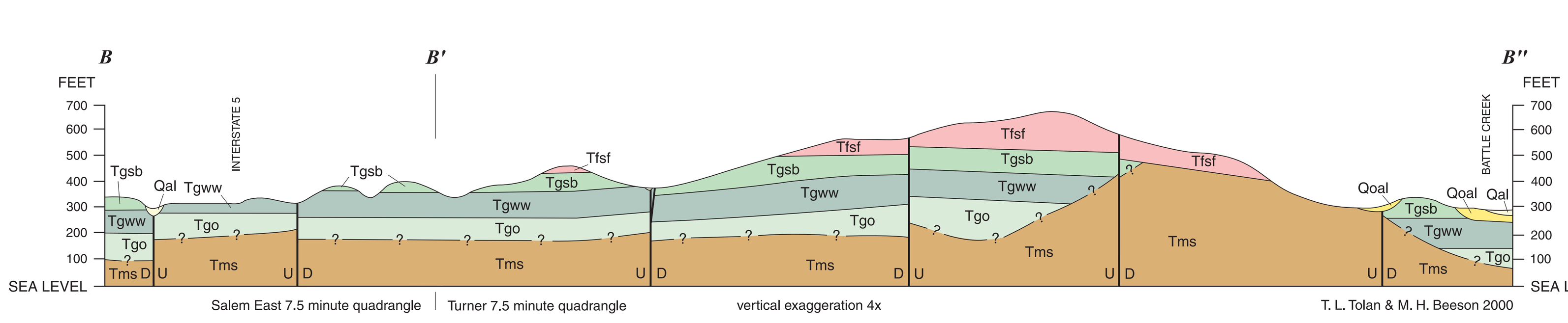
APPROXIMATE MEAN DECLINATION, 1995

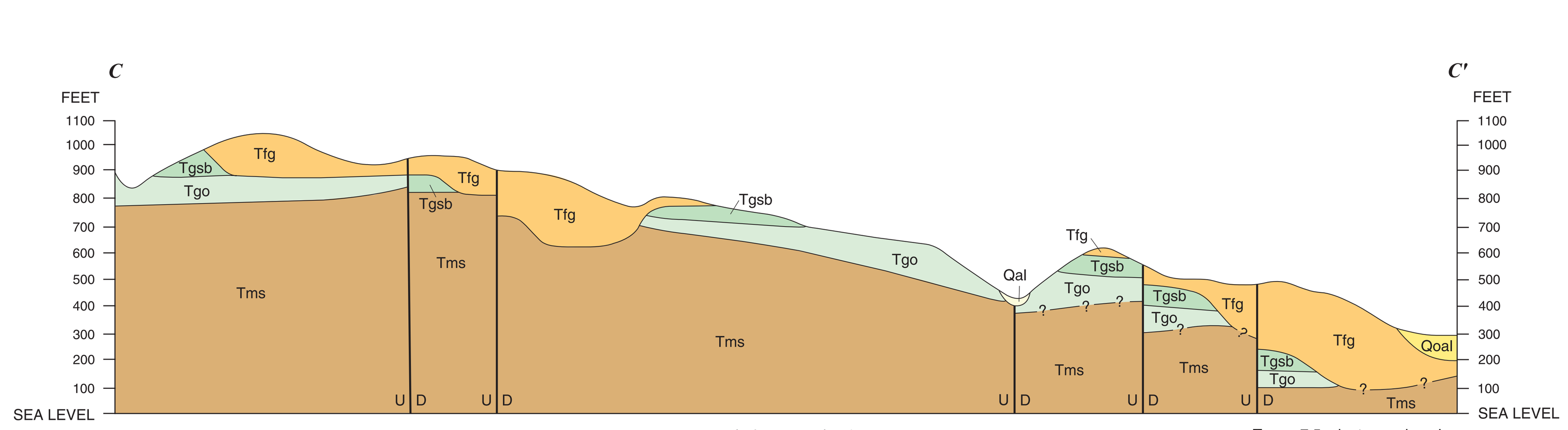
SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

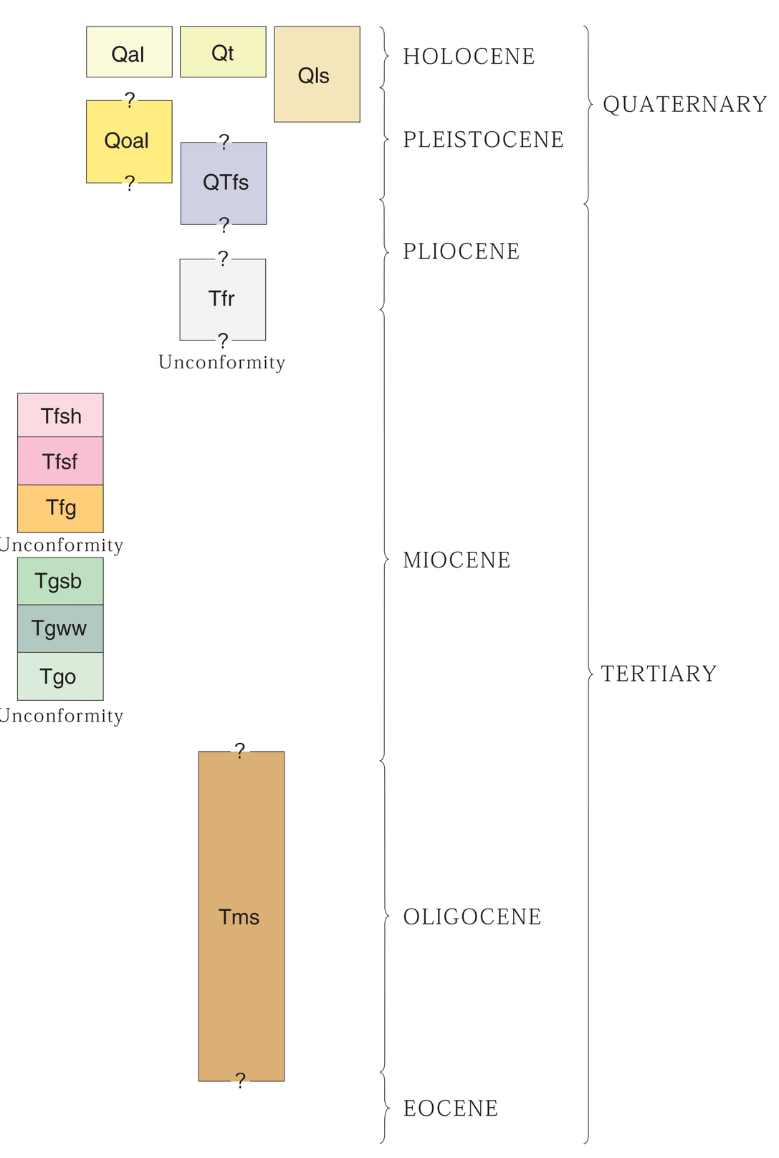
QUADRANGLE LOCATION

Geology mapped by Terry L. Tolan and Marvin H. Beeson, 1998
Reviewed by Ray E. Wells and Karen L. Wheeler
G.I.S. by Christopher B. DuRoss





CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

(Note: applies to sheets 1 and 2)

Qal — **Alluvial deposits (Holocene)**—Unconsolidated silt, sand, and gravel largely confined to stream bottoms and adjacent flood plains. May include local lacustrine and paludal deposits. Unit ranges from 0 to 5 m-thick

Qt — **Talus deposits (Holocene)**—Angular rock debris at base of steep slopes, composed entirely of Columbia River basalt

Qls — **Landslide deposits (Holocene to Pleistocene)**—Mainly Columbia River basalt and lesser pre-Columbia River basalt (Eocent- to early Miocene-age) marine sediments displaced by gravity movement

Qoal — **Older alluvial deposits (Pleistocene)**—Includes poorly to moderately indurated siltstones, sandstones, and conglomerates that comprise older alluvial terrace/fan deposits and poorly indurated glaciofluvial clays and silts deposited by the catastrophic (Missoula) Floods. Units ranges from 0 to > 30 m thick

QTfs — **Fluvial sediments (Pleistocene to late Pliocene)**—Deeply weathered Cascadian sands and gravels; majority of clasts is andesite with lesser amounts of Cascadian basalt. This unit occurs as a stream terrace remnant above Battle Creek on the Turner 7.5 minute quadrangle. This deposit is believed to be correlative with stream terrace deposits found along the North Santiam River on the Stayton 7.5-minute quadrangle (Tolan and Beeson, unpublished mapping)

Tfr — **Fern Ridge Formation (Pliocene? to late Miocene)**—Within the map boundaries dominantly consists of silicic Cascadian-derived, moderately to deeply weathered, interbedded, volcaniclastic fluvial deposits, with lesser debris flow deposits and tuffs. This unit conformably overlies units of the Columbia River Basalt Group. Thayer (1933, 1939) originally named this unit the "Fern Ridge Tuffs" for fluvial conglomerates, debris flows, tuffs and breccias that conformably overlie the "Stayton Lavas" (Columbia River basalt) in this region. These same deposits were later renamed the "Sardine Formation" by Peck and others (1964) and mapped by the authors as Sardine Formation on the Stayton NE 7.5 minute quadrangle (Tolan and others, 1999). We now reassign these deposits to the Fern Ridge Formation

Columbia River Basalt Group

Frenchman Springs Member, Wanapum Basalt

Tfsh — **Basalt of Sand Hollow (middle Miocene)**—Consists of a single entablature/colonnade-jointed flow within the map area. Fresh exposures are dark gray to black; weathered entablature typically forms rounded outcrops that are hackly in appearance. In hand sample, it is commonly glassy to fine-grained, occasionally diktytaxitic, and sparsely plagioclase phyric with glomerocrysts < 2 cm in size. Sand Hollow flow can be distinguished from the older Basalt of Silver Falls on the combined basis of stratigraphic position, lithology, and geochemical composition (see Beeson and others, 1985; 1989). Unit thickness is highly variable, ranging from 0 to > 20 m. Areal extent of this unit is limited and represents the distal-most ends of this flood basalt flow in western Oregon

Tfsf — **Basalt of Silver Falls (middle Miocene)**—Consists of a single flow within the map area. This flow typically displays a blocky to columnar jointing style. Fresh exposures are dark gray to black; weathered surfaces are commonly reddish brown to black. The flow is typically coarse-grained, abundantly microphyric, diktytaxitic, and sparsely plagioclase phyric with phenocrysts < 3 cm in size. This unit can be distinguished from the younger Sand Hollow flow on the combined basis of stratigraphic position, lithology and geochemical composition (see Beeson and others, 1985; 1989). Unit thickness is highly variable, ranging from < 20 m- to > 30 m-thick. This Silver Falls flow commonly overlies a sedimentary interbed that consists of fluvial sandstones/siltstones. This interbed ranges from < 0.3 m to > 3 m in thickness; it is not shown here as a separate map unit due to its relative thinness. Numerous springs emanate from the Silver Falls/ Sentinel Bluffs contact in the map area

Tfg — **Basalt of Ginkgo (middle Miocene)**—One flow is present in the map area. This flow occurs both as an intracanyon flow and as a sheet flow along the margins of the ancestral Columbia River channel. Where it occurs as a sheet flow it typically displays blocky to columnar jointing, whereas, the intracanyon portion typically displays entablature/ colonnade-jointing pattern. Fresh exposures are dark gray to black; weathered surfaces are brownish-red to dark gray (sheet flow) to gray-black to black (intracanyon flow). Hand samples from blocky to columnar jointed sheet flow are medium grained, sparsely plagioclase microphyric and abundantly phyric with large (0.5 to > 2 cm in size) plagioclase glomerocrysts. Hand samples from entablature/colonnade jointed intracanyon flow are glassy to fine grained, sparsely plagioclase microphyric and abundantly phyric with large (0.5 to > 2 cm in size) plagioclase glomerocrysts. The Ginkgo flow is distinguished from both younger Frenchman Springs flows and older Grande Ronde Basalt flows on the combined basis of stratigraphic position, geochemical composition, lithology, and paleomagnetic polarity. Thickness of this flow is highly variable, ranging from < 10 m to > 60 m thick. In the Marion area and south (Turner Quadrangle), a 5 to > 20 m-thick pillow lava/hyaloclastite complex is found associated with the Ginkgo flow. This pillow lava/hyaloclastite complex is interpreted to have been formed when the Ginkgo intracanyon flow (ancestral Columbia River channel) dammed and advanced up a major tributary (ancestral Willamette River) to the ancestral Columbia River (Beeson and Tolan, 1996)

Grande Ronde Basalt

Tgsb — **Sentinel Bluffs member (middle Miocene)**—This unit is represented by a single flow in the map area. This flow typically displays blocky to columnar jointing and rarely displays an entablature/ colonnade jointing pattern. Fresh exposures are light to dark gray; weathered surfaces are greenish gray to dark gray. Hand samples are fine- to medium-grained, very sparsely plagioclase microphyric, and rarely plagioclase phyric with small (< 0.5 cm in size) tabular pagioclase phenocrysts. The Sentinel Bluffs flow is distinguished from both the younger Frenchman Springs flows and older Grande Ronde units on the combinded basis of stratigraphic position, geochemical composition, lithology, and paleomagnetic polarity (see Reidel and others, 1989; Beeson and others,1989). Unit thickness within the map area is variable, ranging from < 10 m to > 25 m in thickness

Tgww — **Winter Water member (middle Miocene)**—This unit consists of up to two flows within the map area. Both flows typically display entablature/colonnade jointing style. Fresh exposures are dark gray to black; weathered surfaces are greenish gray to grayish black. Both flows are commonly glassy to fine-grained, microphyric, phyric to abundantly phyric with small (< 0.3 cm) plagioclase glomerocrysts that often display a distinctive radial or spoke-shaped habit. Distribution of plagioclase gomerocrysts is often uneven and they tends to be less abundant in the basal portion of the flows. Winter Water flows are distinguished from other Grande Ronde units on the combined basis of stratigraphic position, lithology, geochemical compostion, and paleomagnetic polarity (see Reidel and others, 1989 and Beeson and others, 1989). Unit thickness within the map area is variable, ranging from 0 to > 40 m-thick

Tgo — **Ortley Member (middle Miocene)**—Oldest Columbia River Basalt Group unit exposed at the surface in the map area. Unit consists of at least three flows that typically display entablature/colonnade jointing and rarely a columnar jointing pattern. Fresh exposures are dark gray to black; weathered surfaces are greenish gray to dark gray. Ortley flows are commonly glassy to very fine-grained and aphyric. This unit is distinguished from other Grande Ronde units on the combined basis of stratigraphic position, lithology, geochemical composition, and paleomagnetic polarity. Unit thickness is variable, ranging from 0 to > 60 m-thick

Tms — **Marine sediments, undifferentiated (lower Miocene? to Eocene?)**—Poorly to moderately indurated, variably fossiliferous, bedded marine sandstones, siltstones, shales, and claystones with lesser conglomerates. Inferred to be Scott Mills Formation by Miller and Orr (1986, 1988). Identified as Eugene Formation on a compilation map by Walker and Duncan (1989). This unit is > 200 m -thick within the map area

Contact—Approximately located; dotted where concealed

Fault—Dashed where approximately located; dotted where concealed. Ball and bar on the downthrown side

Syncline—Dashed where approximately located. Showing crestline and direction of plunge

Monocline—Dashed where approximately located. Showing crestline and direction of plunge

70 **Strike and dip of beds**

REFERENCES CITED

Beeson, M.H., and Tolan, T.L., 1996, Columbia River basalt intracanyon flows in western Oregon and Washington; Ginkgo, Rosalia, and Pomona flows: Portland, Oregon, Geologic Society of America Cordilleran Section Meeting Field Trip Guide, 35 p.

Beeson, M.H., Fecht, K.R., Reidel, S.P., and Tolan, T.L., 1985, Regional correlations within the Frenchman Springs Member of the Columbia River Basalt Group; new insights into the middle Miocene tectonics of northwestern Oregon: Oregon Geology, v. 47, no. 8, p. 87-96.

Beeson, M.H., Tolan, T.L., and Anderson, J.L., 1989, The Columbia River Basalt Group in western Oregon; geologic structures and other factors that controlled flow emplacement patterns, in Reidel, S.P., and Hooper, P.R., eds., Volcanism and tectonism in the Columbia River flood-basalt province: Boulder, Colorado, Geological Society of America Special Paper 239, p. 223-246.

Miller, P.R., and Orr, W.N., 1986, The Scotts Mills Formation; mid-Tertiary geologic history and paleogeography of the central Western Cascade Range, Oregon: Oregon Geology, v. 48, p. 139-151.

Miller, P.R., and Orr, W.N., 1988, Mid-Tertiary transgressive rocky coast sedimentation; central Western Cascade Range, Oregon: Journal of Sedimentary Petrology, v. 58, no.6, p. 959-968.

Peck, D.L., Griggs, A.B., Schlicker, H.G., Wells, F. G., and Dole, H.M., 1964, Geology of the central and northern parts of the Western Cascades, Oregon: U.S. Geological Survey Professional Paper 449, 56 p.

Reidel, S.P., Tolan, T.L., Beeson, M.H., Fecht, K.R., Bentley, R.D., and Anderson, J.L., 1989, The Grande Ronde Basalt, Columbia River Basalt Group; stratigraphic desctriptions and correlations within Washington, Oregon, and Idaho, in Reidel, S.P., and Hooper, P.R., eds., Volcanism and tectonism in the Columbia River flood-basalt province: Boulder, Colorado, Geological Society of America Special Paper 239, p. 21-53.

Thayer, T.P., 1933, Structural relations of central Willamette Valley to Cascade Mountains: Pan American Geologist, 59(4), 317 p.

Thayer, T.P., 1939, Geology of the Salem Hills and the North Santiam River basin, Oregon: Bulletin - Oregon, Department of Geology and Mineral Industries, 40 p.

Tolan, T.L., Beeson, M.H., and Wheeler, K.W., 1999, Geologic map of the Scotts Mills, Silverton, and Stayton 7.5 minute quadrangles, northwest Oregon: A digital database: U.S. Geological Survey Open-File Report 99-141, scale 1:24,000.

Walker, G.W., and Duncan, R.A., 1989, Geologic map of the Salem 1˚ by 2˚ Quadrangle, western Oregon: U. S. Geological Survey, Miscellaneous Investigations Series Map - I-1893, scale 1:250,000.

GEOLOGIC MAP OF THE TURNER 7.5 MINUTE QUADRANGLE

GEOLOGIC MAP AND DATABASE OF THE SALEM EAST AND TURNER 7.5 MINUTE QUADRANGLES, MARION COUNTY, OREGON: A DIGITAL DATABASE

By
Terry L. Tolan and Marvin H. Beeson
Digital database by Christopher B. DuRoss

2000

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