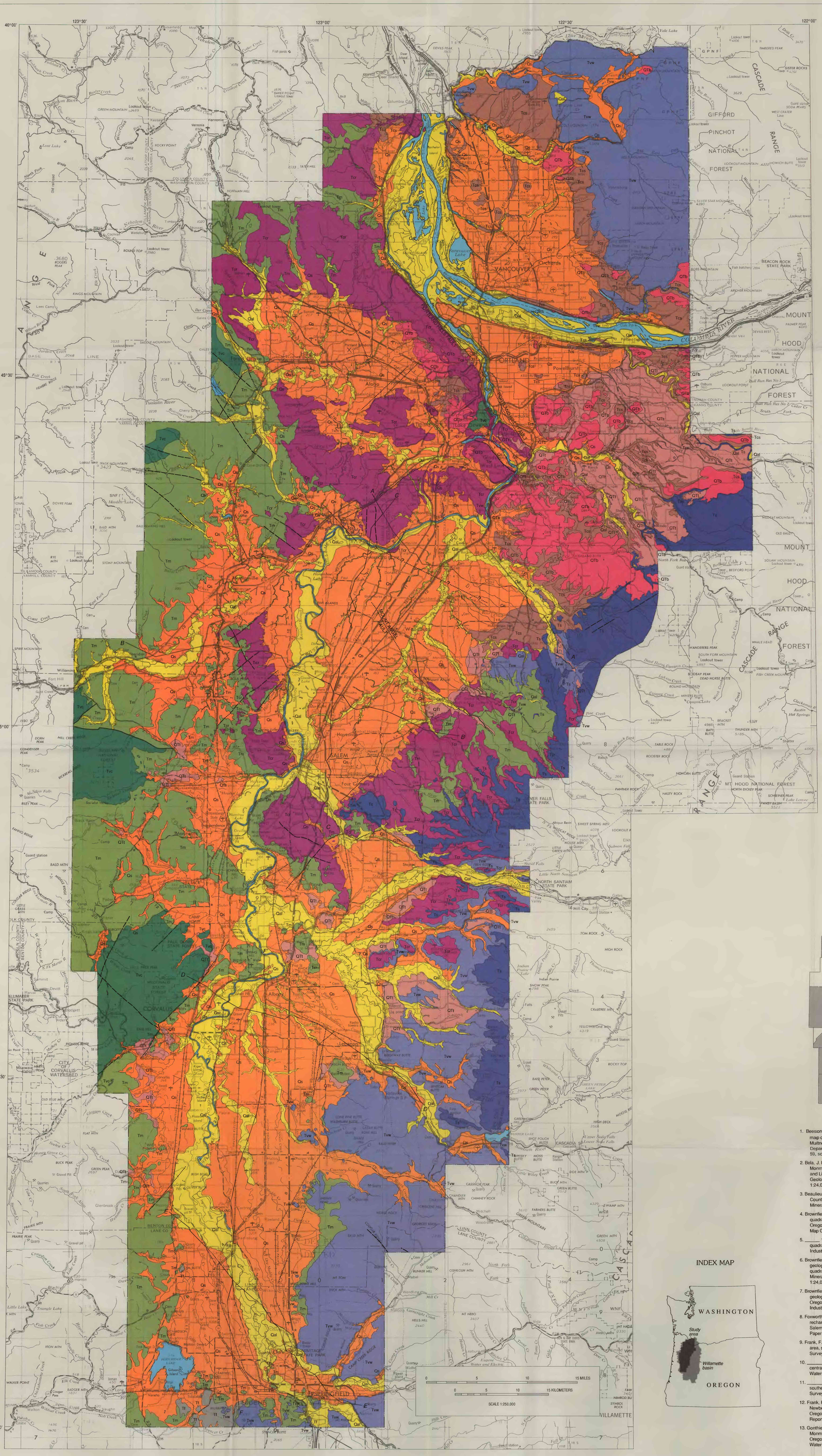
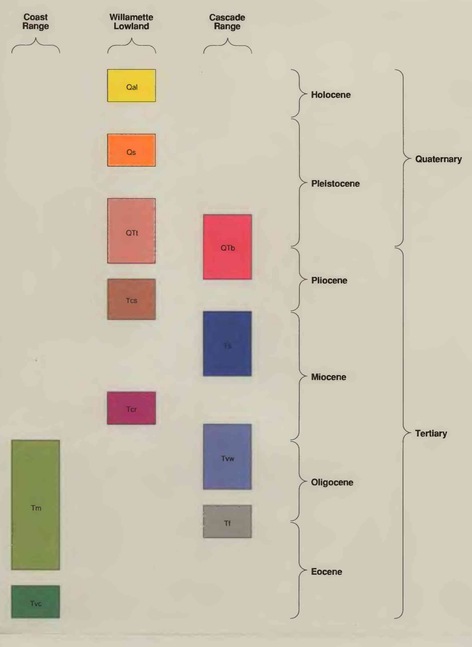


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal — **Alluvial deposits (Holocene)** — Sand, gravel, and silt deposits along channels and flood plains of the present-day drainage system.

Qs — **Alluvium and glacial-outburst flood sediment (Pleistocene)** — Silt, sand, and gravel deposited primarily by late Pleistocene glacial-outburst floods, but also including glaciofluvial sediments from the Cascade Range. Includes the Willamette Silt and Linn Gravel of Allison (1953), lacustrine deposits of Trimble (1963), and older alluvium of Frank (1974, 1976)

QTt — **Terrace deposits (Pleistocene and Pliocene)** — Deeply weathered sand, gravel, and silt of older alluvial surfaces, including fans, generally along the periphery of the Willamette Lowland. Includes the Lacomb and Leffler gravels of Allison (1953), Gresham, Estacada, and Springwater formations of Trimble (1963), terrace deposits of Frank (1974, 1976), and terrace alluvium and undivided alluvial deposits of Hampton (1972).

QTb — **Boring Lavas (Pleistocene and Pliocene)** — Gray to light-gray, open-textured olivine basalt flows, minor pyroclastic material, and associated vent complexes. Found only in the northern part of the study area

Tcs — **Continental sedimentary rocks (Piocene and upper Miocene)** — Sand, gravel, sandstone, conglomerate, siltstone, and mudstone derived primarily from the Cascade Range and the Columbia River drainage. Includes the Troutdale Formation and Sandy River Mudstone of Trimble (1963). Found mainly in the subsurface, this is the main basin-filling unit in the Willamette Lowland

Ts — **Sardine Formation (middle and upper Miocene)** — Andesitic lava flows, ash-flow tuff, massive tuff breccia, and sparse basalt and dacite. Andesitic tuff breccia is the most common rock type from the North Santiam River north to the Columbia River (Sherrod and Smith, 1989).

Tcr — **Columbia River Basalt Group (Miocene)** — Accordantly layered flows of dark gray to black, locally porphyritic basalt. The unit locally includes tuffaceous sedimentary interbeds, is commonly jointed, and locally deeply weathered.

Tvw — **Volcanic rocks of the western Cascade Range (Miocene and Oligocene)** — Lava flows, tuff, breccia, pyroclastic material, and volcaniclastic sediments of variable composition. Composes much of the western Cascade Range in the study area. Includes the Little Butte Volcanics of Peck and others (1964) in Oregon, and part of the Skamania Volcanics of Trimble (1963) and Phillips (1987) in Washington. Locally intruded by small stocks, dikes, and sills.

Tm — **Marine sedimentary rocks, undivided (lower Miocene to Eocene)** — Marine sandstone, siltstone, shale and claystone with lesser conglomerate; locally tuffaceous. Includes the Tyee, Yamhill, Eugene, Spencer, and Nestucca formations, as well as unnamed marine sedimentary units. Map unit also includes mafic intrusions which are locally abundant within the sedimentary sequence.

Tf — **Fisher Formation (Oligocene and upper Eocene)** — Primarily andesitic lapilli tuff and breccia, basaltic and lesser rhyolitic fragmental debris, and conglomerate (Vokes and others, 1951). Oldest unit of Cascade Range volcanic origin exposed in the study area. Locally interfingers with marine sedimentary strata of unit Tm (Walker and MacLeod, 1992). Restricted to the southern part of the study area.

Tvc — **Volcanic rocks of the Coast Range (Eocene)** — Basaltic pillow lava, tuff breccia, subaerial basalt flows, and sills, with interbeds of basaltic sandstone, siltstone, and conglomerate. Consists primarily of the Siletz River Volcanics but includes part of the Tillamook Volcanics north of 45°15' North latitude.

Water

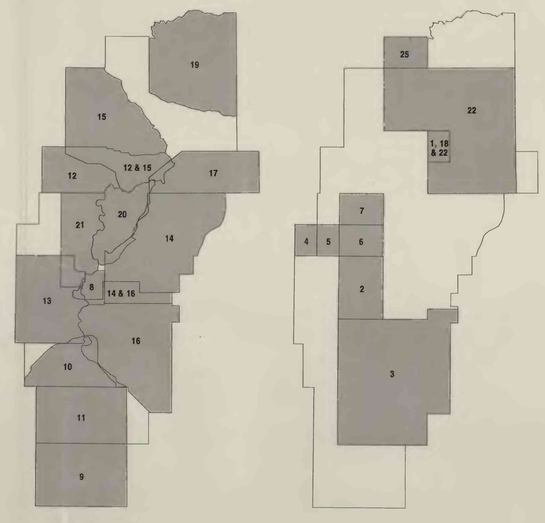
Contact — Approximately located

Fault — Dashed where approximately located, dotted where concealed, queried where uncertain

A——A' **Trace of hydrogeologic section shown on Plate 3**

Study area boundary

SOURCES OF GEOLOGIC MAPPING



1. Beeson, M. H., Tolan, T. L., and Madin, I. P., 1989, Geologic map of the Lake Oswego quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries Map GMS-59, scale 1:24,000.

2. Bela, J. L., 1981, Geology of the Rickreall, Salem West, Monmouth, and Sidney 7 1/2' quadrangles, Marion, Polk, and Linn Counties, Oregon: Oregon Department of Geology and Mineral Industries, Map GMS-18, scale 1:24,000.

3. Beaulieu, J. D., 1974, Environmental geology of western Linn County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 84, 117 p.

4. Brownfield, M. E., 1982a, Geologic map of the Sheridan quadrangle, Polk and Yamhill Counties, Oregon: State of Oregon Department of Geology and Mineral Industries, Map GMS-23, scale 1:24,000.

5. _____ 1982b, Preliminary geologic map of the Ballston quadrangle: Oregon Department of Geology and Mineral Industries Open-File Report O-82-2, scale 1:24,000.

6. Brownfield, M. E., and Schlicker, H. G., 1981a, Preliminary geologic map of the Amity and Mission Bottom quadrangles, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-81-05, scale 1:24,000.

7. Brownfield, M. E., and Schlicker, H. G., 1981b, Preliminary geologic map of the McMinnville and Dayton quadrangles, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-81-06, scale 1:24,000.

8. Foxworthy, B. L., 1970, Hydrologic conditions and artificial recharge through a well in the Salem Heights area of Salem, Oregon: U.S. Geological Survey Water-Supply Paper 1594-F, 56p.

9. Frank, F. J., 1973, Ground water in the Eugene-Springfield area, southern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 2018, 65 p.

10. _____ 1974, Ground water in the Corvallis-Albany area, central Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 2032, 48 p.

11. _____ 1976, Ground water in the Harrisburg-Halsey area, southern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 2040, 45 p.

12. Frank, F.J., and Collins, C. A., 1978, Ground water in the Newberg area, northern Willamette Valley, Oregon: Oregon Water Resources Department Ground Water Report 27, 77 p.

13. Gonthier, J. B., 1983, Ground-water resources of the Dallas-Monmouth area, Polk, Benton, and Marion Counties, Oregon: Oregon Water Resources Department Ground Water Report 28, 50 p.

14. Hampton, E. R., 1972, Geology and ground water of the Molalla-Salem Slope area, northern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1997, 83 p.

15. Hart, D. H., and Newcomb, R. C., 1965, Geology and ground water of the Tualatin Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1697, 172 p.

16. Helm, D. C., and Leonard, A. R., 1977, Ground-water resources of the lower Santiam River basin, middle Willamette Valley, Oregon: Oregon Water Resources Department Ground Water Report 25, 75 p.

17. Leonard, A. R., and Collins, C. A., 1983, Ground water in the northern part of Clackamas County, Oregon: Oregon Water Resources Department Ground Water Report 29, 85 p.

18. Madin, I. P., 1990, Earthquake-hazard geology maps of the Portland Metropolitan Area, Oregon: Oregon Department of Geology and Mineral Industries, Open File Report O-90-2, 21 p.

19. Mundorff, M. J., 1964, Geology and ground-water conditions of Clark County, Washington: U.S. Geological Survey Water-Supply Paper 1600, 168 p.

20. Price, Don., 1967a, Geology and water resources in the French Prairie area, northern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1833, 98p.

21. _____ 1967b, Ground water in the Eola-Amity hills area, northern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1847, 66 p.

22. Trimble, D. E., 1963, Geology of Portland, Oregon and adjacent areas: A study of Tertiary and Quaternary deposits, lateritic weathering profiles, and of Quaternary history of part of the Pacific Northwest: U.S. Geological Survey Bulletin 1119, 119 p.

23. *Vokes, H. E., Myers, D. A., and Hoover, Linn, 1954, Geology of the west-central border area of the Willamette Valley, Oregon: U.S. Geological Survey Oil and Gas Investigations Map OM-150, scale 1:62,500.

24. *Walker, G.W., and MacLeod, N.S., 1991, Geologic Map of Oregon: U.S. Geological Survey, scale 1:500,000.

25. *Wells, R. E., Niem, A. R., MacLeod, N. S., Snavely, P. D., Jr., and Niem, W. A., 1983, Preliminary geologic map of the west half of the Vancouver (Wa.-Ore.) one degree by two degree quadrangle, Oregon: U.S. Geological Survey Open-File Report 83-591, scale 1:250,000.

26. Wilkinson, W. D., Lowry, W. D., and Baldwin, E. M., 1946, Geology of the St. Helens quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 31, 39 p.

Note: * For references 23,24 and 25, only minor mapping was used; the study area outline is not shown.

INDEX MAP

Base from U.S. Geological Survey 1:250,000 maps: Roseburg, 1970, Salem, 1977, and Vancouver, 1974.

GENERALIZED GEOLOGIC MAP OF THE WILLAMETTE LOWLAND

By
Marshall W. Gannett and Rodney R. Caldwell
1998