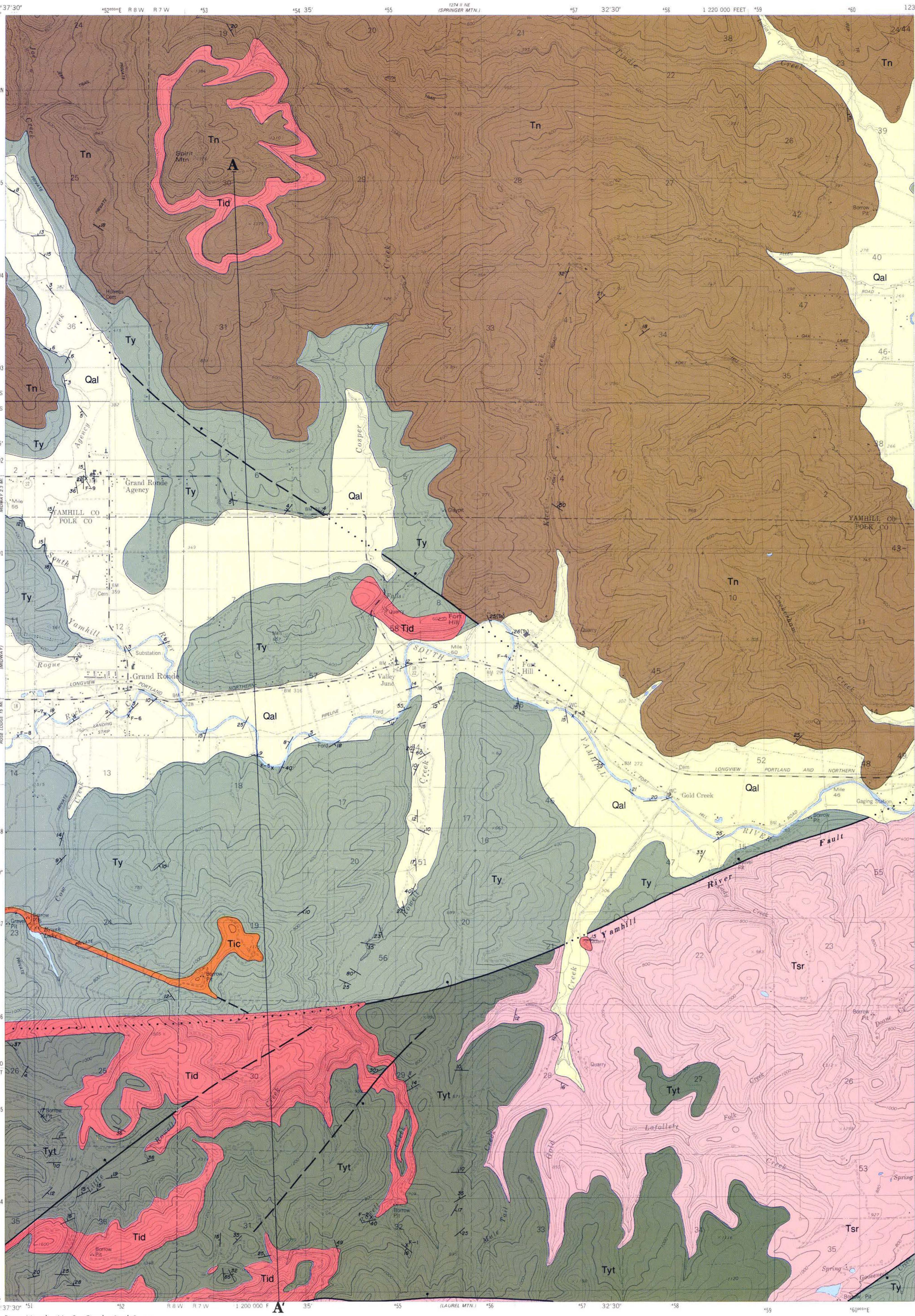
STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
DONALD A. HULL, STATE GEOLOGIST

Geologic Map of the Grand Ronde Quadrangle, Polk and Yamhill Counties, Oregon

1982

GMS - 24



Base Map by U. S. Geological Survey
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974
Map edited 1979

Projection and 10,000-foot grid ticks: Oregon coordinate system, north zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 10
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 23 meters north and 96 meters east as shown by dashed corner ticks

UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

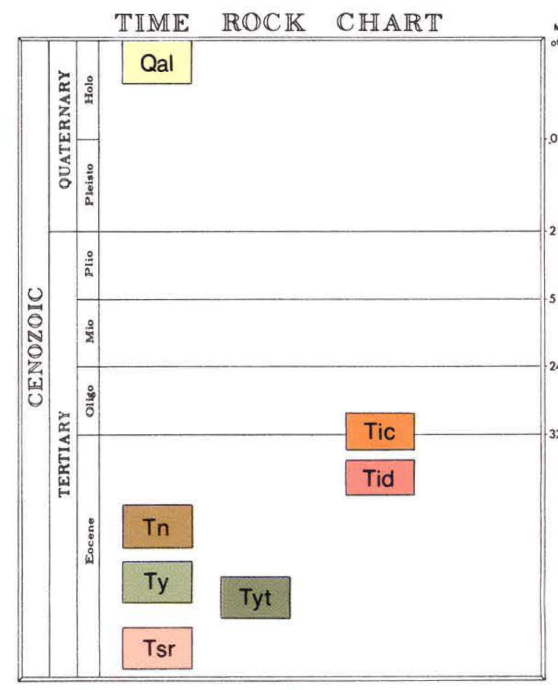
Geology by Michael E. Brownfield

Field work completed in 1981

Map prepared by
STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

Cartography by Paul E. Staub, 1982

TIME ROCK CHART



EXPLANATION

SURFICIAL DEPOSIT (Holocene)

Qal — **Alluvium** — *Mostly poorly sorted, unconsolidated deposits of clay, silt, sand, and fine to very coarse gravel; includes recent alluvial terrace deposits associated with the South Yamhill River and its tributaries. 0-50 ft thick*

BEDROCK GEOLOGIC UNITS

Tic — **Camptonite intrusive rocks (upper Eocene? or lower Oligocene?)** — *Dikes and sills of amphibole camptonite; porphyritic to aphanitic texture characterized by abundant small (0.01-0.04 in) equant amphibole (barkevikite or kaersutite) crystals. K-Ar ages of 32.6 ± 1 m.y. and 33.6 ± 1.7 m.y. were determined on biotite and hornblende (Snavely and others, 1976)*

Tid — **Diabase intrusive rocks (upper Eocene)** — *Dikes and sills of fine- to coarse-grained hypocrystalline to holocrystalline basalt and diabase, with subophitic to ophitic, porphyritic, or less commonly, intergranular and intersertal texture. Consists of 50-60 percent plagioclase; 10-30 percent pyroxene; and minor amounts of olivine, magnetite, apatite, and zeolites. The diabase is characterized by deuteric alteration. Mapped as Saddleback diabase by MacLeod (1969) in southwestern part of the quadrangle*

Tn — **Nestucca Formation (upper Eocene)** — *Light-brown to light-gray tuffaceous siltstone and shale, with minor light-gray, tuffaceous, feldspathic, cross-bedded sandstone near the base. Contains interbedded basaltic flows, pillows, pillow-breccia, breccia, and tuff; porphyritic basalt feeder dikes are locally present. Unconformable above the Yamhill Formation. Foraminiferal assemblages were assigned to the upper Narizian Stage of Mallory (1959) by McWilliams (1968, 1973) and MacLeod (1969). The molluscan faunas were referred to the upper Eocene (Tejon Stage) by Baldwin and others (1955) and McWilliams (1968). At least 2,000 ft thick*

Ty — **Yamhill Formation (middle and upper Eocene)** — *Medium- to dark-gray, massive to thin-bedded, micaceous, carbonaceous, tuffaceous shale and siltstone; occasional beds of medium-gray to greenish-gray, calcareous, fossiliferous, glauconitic, basaltic sandstone; minor limestone concretions. Foraminiferal assemblages were assigned to the Narizian Stages of Mallory (1959) by MacLeod (1969), McWilliams (1968, 1973), and McKeel (1980), and molluscan faunas were assigned to the late Eocene by Baldwin and others (1955). About 5,000 ft thick*

Tyt — **Yamhill and Tyee Formations, undivided (middle Eocene)** — *The upper part of the unit consists of medium- to dark-gray, massive to thin-bedded, concretionary, micaceous, carbonaceous, pelagic shale and siltstone, with thin interbeds of gray to greenish-gray, calcareous, arkosic, glauconitic, basaltic sandstone of the Yamhill Formation. The lower part of the unit consists of light- to medium-gray, medium- and fine-grained, micaceous, feldspathic, lithic or arkosic sandstone and siltstone in graded beds 1-10 ft thick of turbidite origin; mapped as Tyee Formation by MacLeod (1969) and redefined by Baldwin (1975) as Flournoy Formation. Separating the two formations is a gradational unit consisting of both pelagic and turbidite sediments. Foraminiferal assemblages were assigned to the Ulatisian and Narizian Stages of Mallory (1959) by McKeel (written communication, 1982). Disconformably overlies the Siletz River Volcanics. About 2,000-3,000 ft thick*

Tsr — **Siletz River Volcanics (lower and middle Eocene)** — *Dark-greenish-gray aphanitic to porphyritic, vesicular basalt flows and pillow basalt; flow breccia and tuff breccia, with interbedded red to green calcareous sandy tuff; contains medium- to dark-gray, calcareous, tuffaceous shale, siltstone, and sandstone at top of section. Foraminiferal assemblages were assigned to the Ulatisian and Penutian Stages of Mallory (1959) by McWilliams (1968, 1973), MacLeod (1969), and McKeel (1980). Megafossils were assigned to the Capay Stage of Weaver and others (1944), by Baldwin (1964) and MacLeod (1969). About 1,000 ft of flows and sediments exposed in the quadrangle. Total thickness unknown but may exceed 12,000 ft locally in the central Coast Range.*

GEOLOGIC SYMBOLS

Contact--Approximately located and inferred; contacts exposed only along streams and roads

Fault--Approximately located; dashed where inferred; dotted where concealed. Bar and ball on downthrown side

Strike and dip of beds--Attitudes along stream beds were measured on bedrock that is intermittently exposed or too small to show at the scale of the map. All units are the Yamhill Formation except where shown in parentheses

F-2 Fossil locality--References and age given in the table

STRATIGRAPHY, STRUCTURE, AND ECONOMIC GEOLOGY

Introduction

This geological investigation of the Grand Ronde quadrangle was conducted as part of a regional stratigraphic study in the northern Oregon Coast Range to assess the potential for oil and gas.

The Grand Ronde quadrangle was first investigated by Baldwin and Roberts (1952) as part of the U.S. Geological Survey oil and gas studies. MacLeod (1969) mapped the southwestern part of the quadrangle in his study of the geology and igneous petrology of the Saddleback Mountain area in the central Oregon Coast Range. McWilliams (1973) included the Grand Ronde area in his regional study on the Paleogene stratigraphy and biostratigraphy of the Oregon Coast Range. Baldwin and Roberts (1952), Baldwin and others (1955), Baldwin (1964), and Brownfield (1982b) mapped areas adjacent to the Grand Ronde quadrangle on the east, north, south, and west. Along the Oregon coast, Snavely and Vokes (1949) and Snavely and others (1976) studied areas containing the same stratigraphic units that were found in the Grand Ronde area.

Stratigraphy

The oldest rocks exposed in the Grand Ronde quadrangle are the Siletz River Volcanics, a thick sequence of basalt flows, pillow basalt, flow breccia, and massive to faintly bedded basaltic fragmental debris intercalated with volcaniclastic marine sedimentary rocks of early to early middle Eocene age. The unit was first described by Snavely and Baldwin (1948) and later redefined by Snavely, MacLeod, and Wagner (1968).

No fossils have been collected in the Siletz River Volcanics in the Grand Ronde quadrangle. Molluscan faunas collected by Baldwin (1964) and MacLeod (1969) south and west of the mapped area were assigned to the Capay Stage of Weaver and others (1944). Several foraminiferal assemblages were collected in the Siletz River Volcanics by MacLeod (1969) and McWilliams (1968, 1973) and were assigned to the Ulatisian and Penutian Stages of Mallory (1959). This unit is the oldest unit exposed in the Coast Range, and nowhere in the central or northern portions is its base exposed.

Regionally, the upper surface of the Siletz River Volcanics is irregular because of the nature of subsea volcanism that produced the unit and tectonism and erosion that occurred subsequently. The resulting subsea topography probably influenced the depositional patterns of middle to upper Eocene sediments which disconformably overlie the unit. The age of the base of these sediments varies, depending upon its relative position on the flanks of the Siletz River Volcanic high.

A sequence of marine clastic sedimentary rocks of early to early late Eocene age disconformably overlies the Siletz River Volcanics. This sequence is divisible into a lower and upper part. The lower part, of early middle Eocene age, consists predominately of rhythmically bedded, micaceous, lithic or arkosic sandstone and siltstone turbidites in the southwestern part of the mapped area and pelagic siltstone in the northern and eastern parts of the area. The turbidites correlate with the Tyee Formation (Diller, 1898; Snavely and others, 1964), and the pelagic siltstone correlates with the lower part of the Yamhill Formation (Baldwin and others, 1955). Baldwin (1975) restricted the regional extent of the Tyee Formation and redefined the turbidite sedimentary rocks in the central Coast Range as Flournoy Formation. The southwestern part of the mapped area is a transitional zone, where turbidites interfinger with pelagic siltstones.

The upper part of this sedimentary sequence consists of carbonaceous, micaceous shale and siltstone with local interbeds of basaltic glauconitic sandstone. The middle to early late Eocene age sediments correlate with the Yamhill Formation. The Tyee and Yamhill were mapped as one unit south of the Yamhill River fault, because of interfingering lithologies and limited access to good exposures. North of the fault, the Yamhill Formation was mapped as separate unit.

No marine fossils were found in the Tyee Formation in the Grand Ronde quadrangle. In other parts of the Coast Range, the Tyee is early middle Eocene in age. The foraminiferal assemblages were assigned to the Ulatisian Stage of Mallory (1959) by Snavely and others (1964) and Bird (1967).

Megafossils are rare in the Yamhill Formation, but most of the unit contains abundant Foraminifera. Foraminiferal assemblages were collected by Baldwin and Roberts (1952), MacLeod (1969), and McWilliams (1973) within the quadrangle. Fossil assemblages collected by the author were identified and assigned by McKeel (1982, written communication) to the upper Ulatisian to Narizian Stages of Mallory (1959).

Tuffaceous siltstone and shale; lithic, arkosic sandstone with intercalated basalt flows; pillow basalt; pillow breccia; and tuff of the late Eocene Nestucca Formation (Snavely and Vokes, 1949) unconformably overlie the Yamhill Formation. The middle late Eocene unconformity represents a major period of deformation and erosion in the central Oregon Coast Range.

Several foraminiferal assemblages were collected in the Nestucca Formation in the Grand Ronde area (Baldwin and Roberts, 1952; MacLeod, 1969) and were assigned to the upper Narizian Stage of Mallory (1959). Along the Oregon coast, the foraminiferal assemblages within the Nestucca Formation are indicative of the lower Refugian (Schenck and Kleinpell, 1936; Kleinpell, 1938) and upper Narizian Stages (Snavely and others, 1969).

Intrusive rocks within the Grand Ronde quadrangle can be separated into two types. The oldest intrusive rocks, diabases of late Eocene age (MacLeod, 1969), form large dike and sill complexes. The younger camptonite dike and sill complex (33-34 m.y.; Snavely and others, 1976) is late Eocene or early Oligocene. In his Saddleback Mountain study, MacLeod (1969) interpreted the camptonite as intruding the diabase intrusives. The two intrusive suites were observed to intrude the Tyee, Yamhill, and Nestucca Formations and were not seen in the underlying Siletz River Volcanics.

Structure

The central part of the Oregon Coast Range has a northward-trending anticlinal form; the Grand Ronde quadrangle is located on the crest of the Coast Range. A broad east-west downwarp in the Grand Ronde area crosses the Coast Range just north of latitude 45° N. and forms a broad eastward-plunging fold transverse to the Coast Range anticlinal high. This major downwarp is bounded by the Siletz River Volcanics on the north and south. Lower to upper Eocene marine sedimentary rocks are exposed within the downwarp. Small folds are common along streams where the sedimentary rocks are well exposed, but due to limited exposures they cannot be traced beyond the stream exposures.

The Yamhill River fault of Baldwin and others (1955), a major east-west-trending fault, roughly parallels the South Yamhill River and juxtaposes the Siletz River Volcanics, Tyee Formation, and Yamhill Formation. This fault, which is apparently down on the north side, was first mapped by Baldwin and Roberts (1952) in the southern part of the Grand Ronde (Spirit Mountain) quadrangle. MacLeod (1969) indicates the fault extends at least 10 mi west of the Grand Ronde quadrangle. A second subparallel fault along the southern boundary of the quadrangle also juxtaposes the Siletz River Volcanics and the Tyee and Yamhill Formations and has the same apparent displacement as the Yamhill River fault. This fault has been mapped by Baldwin (1964) at least 10 mi east of the Grand Ronde quadrangle; he considers the lack of apparent offset of the late Eocene Spencer Formation as an indication of a pre-late Eocene age for the displacement on the fault. A pre-latest Eocene age for the Yamhill River fault is consistent with the structural relationships in the Grand Ronde quadrangle, where undisturbed late Eocene diabase is intruded along the Yamhill River fault. Regional studies indicate the possibility of right-lateral motion along this fault. Several northeast-trending faults in the southern part of the quadrangle may be related to stress adjustments between the two east-west-trending faults. A northwest-trending fault which juxtaposes the Yamhill and Nestucca Formations was mapped in the central part of the quadrangle. Numerous, apparently small faults are seen cutting sedimentary rocks along streams, and large changes in attitudes of strata may relate to nearby faults that are now buried by alluvium or are not identifiable in the poor exposures typical of much of the area.

Economic Geology

The Yamhill Formation contains abundant organic matter and could be considered a possible source rock for petroleum. Most of the sandstone interbeds have low porosity resulting from the presence of clay-altered volcaniclastic material. These beds would not be satisfactory reservoir rocks. The overlying tuffaceous Nestucca Formation lacks the necessary qualities for both petroleum generation and accumulation. No oil and gas holes have been drilled within the quadrangle to test oil and gas potential. Stratigraphic relationships evident in the quadrangle, however, should aid regional hydrocarbon assessments.

Quarry rock is abundant within the Grand Ronde quadrangle. Intrusive rocks, intercalated basalts in the Nestucca Formation, and the Siletz River Volcanics are good sources for crushed rock. Gravels that occur near the bases of the river terrace deposits have been used for road construction.

There are known clay deposits in the quadrangle. A small deposit occurs north of Valley Junction along the contact between the Nestucca and Yamhill Formations. In 1981, the Klamath Brick and Tile Company was granted a permit to extract clay from a deposit north of Valley Junction. A similar deposit, at least 50 ft thick (Wilcox, 1935), was mined near the town of Willamina by the Willamina Clay Products Company until 1976. The unfired clay in this deposit varies in color from light gray to black. The black-colored clay contains a large amount of carbon which, when oxidized during firing, produces a nearly white brick.

The clays are developed within the Yamhill Formation on the erosional surface below the unconformity with the overlying Nestucca Formation. Similar deposits may be found in the area along this contact.

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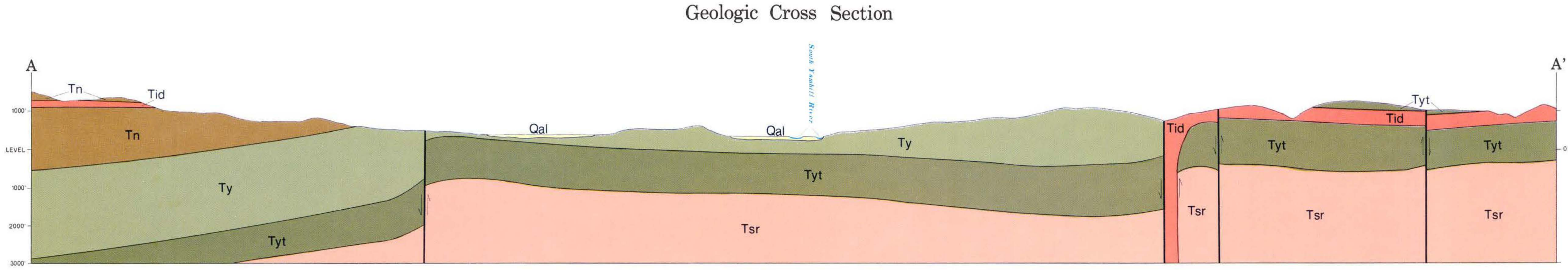
Fossil locations — Grand Ronde quadrangle

Location number (as shown on map)	Source of data				Age	Unit
	This report	Baldwin & Roberts (1952)	MacLeod (1969)	McWilliams (1973)		
F-1	X				Late Ulatisian, Narizian	Yamhill and Tyee, undivided
F-2				36	Narizian	Yamhill
F-3				39	Narizian	Yamhill
F-4				38	Narizian	Yamhill
F-5				36	Narizian	Yamhill
F-6		F-4	MSB67-221		Late Narizian	Yamhill
F-7			MR68-94	49	Late Narizian	Yamhill
F-8				48	Narizian	Yamhill
F-9				50	Narizian	Yamhill

Geologic Cross Section



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