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

GEOLOGIC MAP OF THE RESTON QUADRANGLE, DOUGLAS COUNTY, OREGON

1990

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Geologic Map of the Reston Quadrangle, Douglas County, Oregon

By Gerald L. Black

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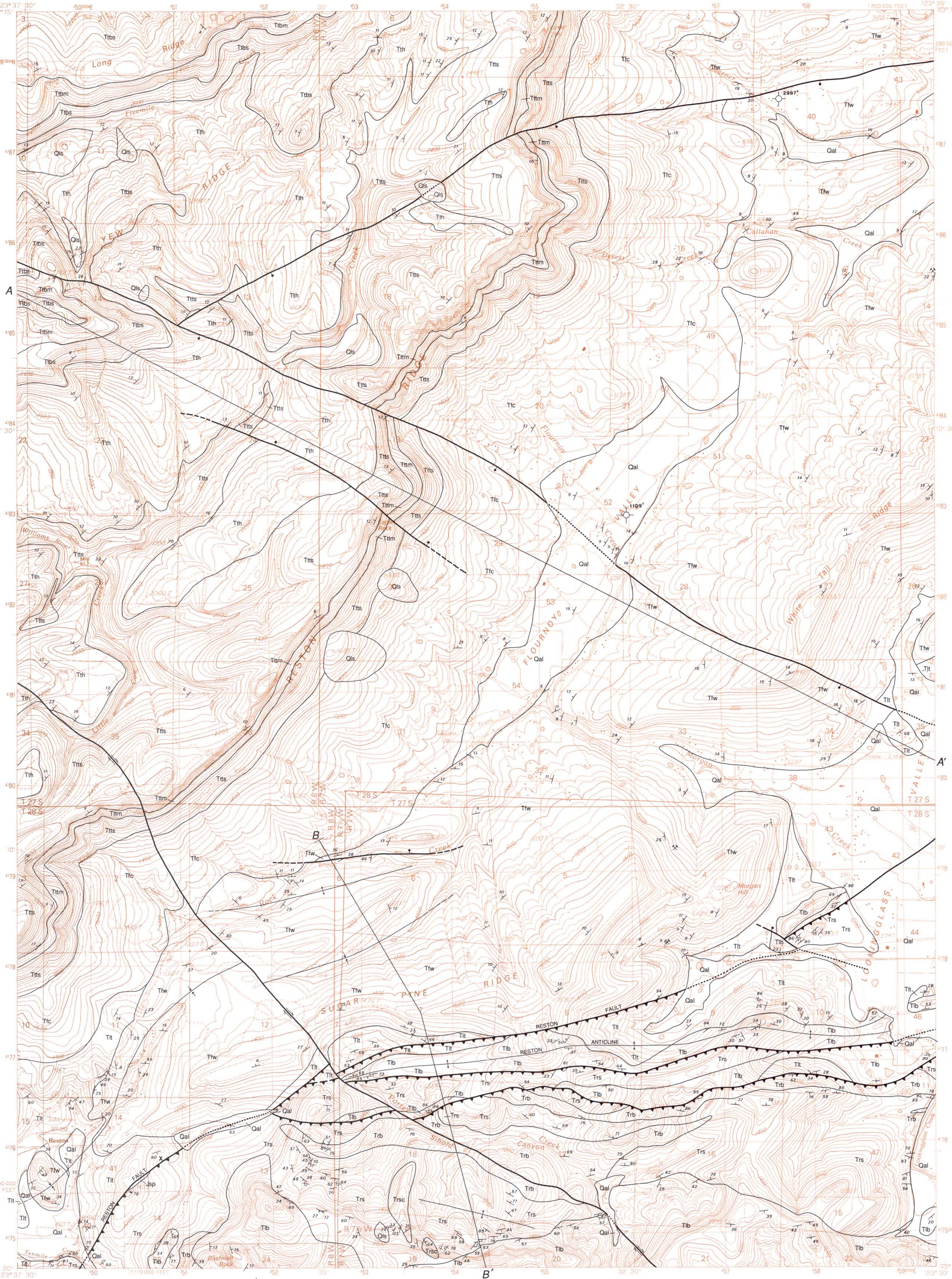


Base map by U.S. Geological Survey
CONTROL BY .... USGS, NOS/NOAA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1984
FIELD CHECKED .... 1987 MAP EDITED 1990
PROJECTION .... LAMBERT CONFORMAL CONIC
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR .... ZONE 10
10,000-FOOT STATE GRID TICKS .... OREGON, SOUTH ZONE
UTM GRID DECLINATION .... 0°23' WEST
1990 MAGNETIC NORTH DECLINATION .... 18° EAST
VERTICAL DATUM .... NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM .... 1927 NORTH AMERICAN DATUM

To place on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (21 meters north and 97 meters east)

There may be private inholdings within the boundaries of any Federal and State Reservations shown on this map

No distinction made between houses, barns, and other buildings

PROVISIONAL MAP
Produced from original manuscript drawings. Information shown as of date of photography. 1

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL 20 FEET
To convert feet to meters multiply by .3048
To convert meters to feet multiply by 3.2808

QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 Cedar Creek
2 Callahan
3 Garden Valley
4 Mount Gurney
5 Roseburg West
6 Camas Valley
7 Tenmile
8 Winston

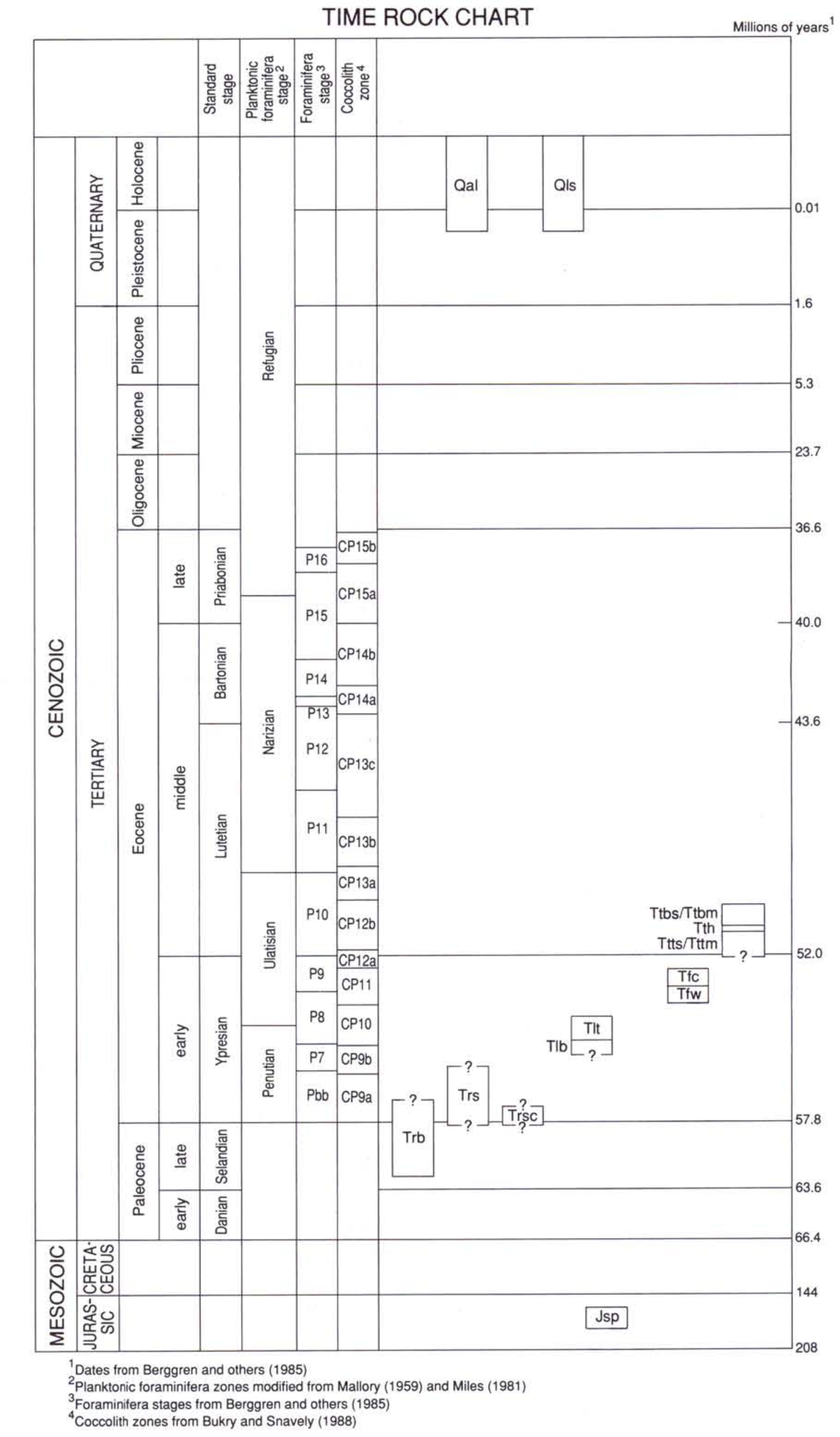
Geology by Gerald L. Black, Oregon Department of Geology and Mineral Industries

Field work conducted in August-November, 1989

Reviewed by Ewart M. Baldwin, University of Oregon; Peter Hales, Weyerhaeuser Corporation; Alan R. Niem and Wendy A. Niem, Oregon State University; C. M. Molenaar, U.S. Geological Survey; and Thomas J. Wiley, Oregon Department of Geology and Mineral Industries

Cartography by Mark E. Neuhaus

TIME ROCK CHART



[1]Dates from Berggren and others (1985)
[2]Planktonic foraminifera zones modified from Mallory (1959) and Miles (1981)
[3]Foraminifera stages from Berggren and others (1985)
[4]Coccolith zones from Bukry and Snavely (1988)

MAP SYMBOLS

Contact—Approximately located

Strike and dip of bedding

Strike and dip of overturned bedding

Horizontal bedding

Strike of vertical bedding

Normal fault—Arrow showing dip; bar and ball on downthrown side; dashed where approximate; dotted where concealed

Thrust fault—Teeth on upper plate; dashed where approximate; dotted where concealed

Strike-slip fault—Arrows indicate relative motion; dashed where approximate; dotted where concealed

Anticline axis—Dashed where approximate; dotted where concealed

Syncline axis—Dashed where approximate; dotted where concealed

Blueschist pod

Mine—Site of early twentieth-century coal mine

Hydrocarbon-exploration hole—Total depth shown in feet

Discussion of geology and hydrocarbon potential and references in accompanying text

ACKNOWLEDGMENTS
The author is grateful to the following people who contributed to this mapping project: George R. Priest, Oregon Department of Geology and Mineral Industries (DOGAMI), provided some detailed mapping in the northwest corner of the study area. Ewart M. Baldwin, University of Oregon; Peter Hales, Weyerhaeuser; C.M. Molenaar, U.S. Geological Survey; Alan R. Niem and Wendy A. Niem, Oregon State University; and Thomas J. Wiley, DOGAMI, provided critical reviews of the map. InChang Ryu provided access to measured sections completed as part of his doctoral dissertation at Oregon State University. Some strikes and dips were taken from Moore (1957) and Ryberg (1984). J.J. Carlson kindly provided access to private lands in the Porter Creek (Sibold Canyon) area, as did numerous other residents in other parts of the study area.

EXPLANATION

Qal — **Quaternary alluvium (Holocene and Pleistocene)**—Unconsolidated clay, silt, sand, and gravel deposited in channels and on the flood plains of modern streams. Attitudes depicted in alluvium are from exposures of underlying units that are too small to be shown at the map scale. Attitudes in the Flournoy Valley were taken on the Camas Valley Member of the Flournoy Formation. In the Lookingglass Valley, attitudes were taken on the Tenmile Member of the Lookingglass Formation. The attitude in sec. 26, T. 27 S., R. 7 W., is from the White Tail Ridge Member of the Flournoy Formation. In the southwest corner of the quadrangle (secs. 13 and 14, T. 28 S., R. 8 W.), the attitudes are from Roseburg Formation sedimentary rocks

Qls — **Landslide deposits (Holocene and Pleistocene)**—Clay, silt, sand, and gravel chaotically mixed with blocks of weathered bed rock

ANGULAR UNCONFORMITY

Tyee Formation (upper lower Eocene and middle Eocene; Ulatisian)

Ttbs / Ttbm — **Baughman Member of Baldwin (1974) (middle Eocene; Ulatisian)**—Unit **Ttbs** is bluish-gray, micaceous, lithic-arkosic wacke. Very thick-bedded to massive sandstone beds with lesser interbedded siltstone and minor shale. Sandstone is medium to coarse grained, poorly sorted, and well indurated. Porosity is very low due to the degree of induration and amount of matrix (typically 20-40 percent) present. Typically parallel bedded with minor basal scour and cross-bedding. Carbonized wood and plant debris common. Consists of two sandstone units separated by a mudstone dominated unit (unit **Ttbm**) in the northwest corner of the map. Coal occurs within upper unit **Ttbs** sandstone immediately west of the map area. Sandstones are cliff formers. Unit Ttbm is thin-bedded (1-3 cm), fine-grained sandstone, siltstone, and mudstone. Parallel bedding and cross-bedding are the main sedimentary structures. Total thickness of the Baughman Member in the map area is approximately 365 m (1,200 ft). Total thickness of the member is approximately 760 m (2,500 ft) at the type section at Baughman Lookout, just north of the quadrangle. Interpreted as a sand-rich prograding deltaic system by Chan and Dott (1983, 1986), Heller and Dickinson (1985), and Molenaar (1985)

Tth — **Hubbard Creek Member of Baldwin (1974) (middle Eocene; Ulatisian)**—Dark-gray mudstone interbedded with siltstone and lesser, very fine-grained micaceous sandstone. Beds range in thickness from 0.5 mm to 8-9 cm. Horizontal lamination is the dominant sedimentary structure, but ripples and small-scale cross-laminations are common in the sandstone and siltstones. The sandstones are the result of base-missing Bouma turbidite sequences (T_{bcde}). Small pelecypods are relatively common in the mudstone, but the strata are generally not bioturbated. Black carbonized plant debris, frequently concentrated along bedding planes, is common. This erosionally less resistant unit forms the main north-south-trending valleys and gentle slopes west of Reston Ridge and is frequently the site of recent small-scale landslides. Many of the dips measured in the unit are probably too steep as a result of downslope creep (e.g., SW¼ sec. 26 and NW¼ sec. 35, T. 27 S., R. 8 W.). The Hubbard Creek Member at its type section immediately north of the map area is approximately 120 m (400 ft) thick (Baldwin, 1974). Maximum thickness in the study area is 350 m (1,150 ft). The unit tends to thin to the south. Consists mainly of Mutti-Ricci Lucchi Facies G (Mutti and Ricci Lucchi, 1972, 1975) with lesser amounts of Facies F and minor amounts of Facies D. Interpreted as a slope facies (Molenaar, 1985)

Ttts / Tttm — **Tyee Mountain Member of Baldwin (1974) (upper lower Eocene to middle Eocene; Ulatisian)**—Unit **Ttts** is bluish-gray, micaceous, lithic-arkosic wacke. Very thick amalgamated sandstone beds up to 20 m thick. Sandstone is fine to medium grained, poorly sorted, and well indurated and contains coarse sand-sized flakes of biotite and muscovite. Porosity is very low owing to the degree of induration and amount of matrix (typically 20-40 percent) present. Beds are locally graded. Flute and groove casts are present, and very large mudstone ripup clasts and fluid escape structures are abundant in the upper part of sandstone beds. Carbonized wood and plant debris is common. Occurs as two sandstone units separated by a thin mudstone (unit **Tttm**) unit. Unit **Tttm** is poorly exposed and consists of thinly laminated mudstone. The Tyee Mountain Member forms the north-south-trending cliffs of Reston Ridge in the west-central part of the map area. Total thickness in the map area is 300 m (1,000 ft). At the type section north of the map area, the Tyee Mountain Member is 760 m (2,500 ft) thick (Baldwin and Perttu, 1989). The contact with the underlying Camas Valley Member of the Flournoy Formation appears to be gradational. Baldwin (1974) and Baldwin and Perttu (1989) suggest that there is an unconformity between the Tyee Mountain and Camas Valley Members, while Molenaar (1985) interprets the relationship as conformable. Unit **Ttts** consists of Mutti-Ricci Lucchi Facies B. Unit **Tttm** consists of Facies G. At the type section at Tyee Mountain (north of the study area), unit is interpreted by Chan and Dott (1983) as an inner submarine fan facies. They noted, however, that the apparent source for the fan complex was an array of nested channels (representing a line source) rather than a single large submarine canyon. Called a submarine ramp turbidite complex by Heller and Dickinson (1985)

Flournoy Formation (upper lower Eocene; Ulatisian)

Tfc — **Camas Valley Member of Baldwin (1974) (upper lower early Eocene; Ulatisian)**—Interbedded dark-gray to gray-green thin-bedded mudstone, siltstone, and very fine-grained sandstone. Increasing amounts of fine-grained, micaceous, arkosic sandstone occur toward the top of the member. These sandstones represent the lower unit of incomplete (base missing) Bouma sequences. Horizontal lamination is the dominant sedimentary structure. Mudstones are commonly massive, with a tendency to spheroidal weathering. Calcareous concretions are abundant. Locally bioturbated and slump folded. Contains sparse molluscan fossils. Underlies Flournoy Valley and forms gentle slopes at the base of Reston Ridge. Total thickness is approximately 550 m (1,800 ft). The contact with the overlying Tyee Formation appears to be gradational, although Baldwin (1974) and Baldwin and Perttu (1989) suggest that there is an unconformity, or at least a disconformity (E.M. Baldwin, personal communication, 1990), between the two units. Molenaar (1985) interprets the contact between the Camas Valley Member and the Tyee Formation as conformable. The contact with the underlying White Tail Ridge Member of the Flournoy Formation appears conformable in the northern part of the quadrangle (beneath White Tail Ridge). Northeast of Reston, however, there is a local angular unconformity between the Camas Valley and White Tail Ridge Members. West of the southern end of Sugar Pine Ridge, the Camas Valley Member overlies the Tenmile Member of the Lookingglass Formation with angular unconformity. The lower part of the unit (underlying Flournoy Valley) consists of Mutti-Ricci Lucchi Facies G with minor Facies F and is interpreted as an upper slope facies. Toward the top of the unit, near the contact with the Tyee Formation, the amounts of Mutti-Ricci Lucchi Facies D and F increase. This part of the unit is interpreted as a lower slope facies

Tfw — **White Tail Ridge Member of Baldwin (1974) (upper lower Eocene; Ulatisian)**—In the Reston Quadrangle, facies representing a variety of depositional environments occur within the White Tail Ridge Member of the Flournoy Formation. These include fluvial, delta-swamp/marsh, distributory channel, lagoonal, and shallow-marine shelf facies.

In the northwest corner of the Lookingglass Valley (SW¼ sec. 26, T. 27 S., R. 7 W.) is an unnamed northeast-trending ridge that lies just east of White Tail Ridge. Only the southwestern end of the ridge lies within the boundaries of the Reston Quadrangle. Rocks exposed in the ridge include dark-gray to greenish-gray conglomerate, pebbly sandstone, arkosic wackes and arenites, siltstones, and mudstones that form a series of thinning- and fining-upward sequences. Clasts in conglomerates and pebbly sandstones have a reddish-brown oxidized coating and consist of approximately 65 percent chert and quartzite, 25 percent metamorphic rock fragments, and 10 percent graywacke. Normal grading and clast imbrication are common in the conglomerates. Channel sandstones are medium to coarse grained. The bases are deeply scoured surfaces. Both trough and tabular cross-bedding are present. Ripples are commonly present at the tops of fine-grained sandstone and siltstone beds. Current directions are to the north-northeast. Typical cross-sectional dimensions of the channels are 1-2 m deep by 10-20 m wide. Channel sequences are commonly encased in mudstone. Lateral accretion surfaces and crevasse-splay sandstones are present. Vertical to subvertical carbonized rootlets are present. Interpreted as a fluvial facies.

Rocks interpreted as deltaic facies are poorly exposed on the antidip-slope (east) side of White Tail and Sugar Pine Ridges. Relatively common is light-brown siltstone interbedded with dark-greenish-gray mudstone. Beds are locally parallel laminated and ripple cross-laminated with bedding thicknesses from 1 to 4 mm. Sedimentary structures are generally at least 70 percent destroyed by bioturbation. Calcareous concretions are present. Small mollusk fossils are common. Some thin (0.25-0.5 m) oyster shell-rich beds are present. Interpreted as a lagoonal facies.

Thinly laminated carbonaceous mudstones and lignitic coal beds from 0.25 to 1 m thick are interpreted as a swamp/marsh facies. The swamp/marsh facies rocks are generally overlain by thick channel sandstones.

Also common are light-brown pebbly sandstone and arkosic arenite forming thinning-upward sequences. The sandstones are medium to coarse grained, moderately well sorted, and well indurated. Mica is present as tiny flakes <0.5 mm comprising <1 percent of the rock. Sandstone beds are lenticular, vary from 0.25 to 2 m in thickness, and have scoured bases. They are typically cross-bedded and are interpreted as a deltaic distributary channel facies.

Capping the dip (western) slopes of White Tail and Sugar Pine Ridges are fine-grained arkosic arenites that are moderately well sorted and well indurated. Mica is present as tiny flakes <0.5 mm in diameter comprising <1 percent of the rock. Beds are slightly lenticular to tabular, from 0.25 to 1 m thick, and commonly amalgamated. Discontinuous mudstone interbeds generally <1 mm thick are present. Vertical burrows and local thin discontinuous broken molluscan shell hash layers are common. Hummocky cross-bedding is common. Interpreted as a shallow-marine shelf facies.

The White Tail Ridge Member of the Flournoy Formation has a total thickness of approximately 365 m (1,200 ft). It is generally conformable with the overlying Camas Valley Member. In the southern part of the map area northeast of Reston, however, there is a local angular unconformity between the two members. This unconformity is interpreted to have resulted from reactivation of a buried fault prior to deposition of the Camas Valley Member. The White Tail Ridge Member overlies the Tenmile Member of the Lookingglass Formation with a pronounced angular unconformity

ANGULAR UNCONFORMITY

Lookingglass Formation (lower Eocene)

Tlt — **Tenmile Member of Baldwin (1974) (lower Eocene; Penutian to lower Ulatisian)**—Rhythmically interbedded dark-gray lithic arkosic sandstone and mudstone forming incomplete (base-missing) Bouma sequences (T_{bcde}). Sandstones are fine grained, moderately well sorted, and well indurated. Bed thicknesses range from <1 to7 cm. The beds have sharp bases and gradational tops. Thicker beds tend to be graded. The Tenmile Member is 730-975 m (2,400-3,200 ft) thick in the type section south of the map area (Baldwin, 1974; Molenaar, 1985). Within the map area, only a small part of the member crops out in the Lookingglass Valley and near Reston. These rocks were mapped as Roseburg Formation by Baldwin (1974) and Baldwin and Perttu (1989). The two units are lithologically very similar and cannot be differentiated on the basis of planktonic foraminifers (Miles, 1977; 1981). They were assigned to the Tenmile Member in this map because of structural relationships along the imbricate thrust faults in the southern part of the quadrangle. Consists of Mutti-Ricci Lucchi Facies G with lesser Facies D. There is a steep local angular unconformity between the Tenmile Member and the units that overlie it in the Reston quadrangle. The relationship with the underlying Bushnell Rock Member is less clear. Along Tenmile Creek immediately south of the map area, there is a slight difference in strike (10°-15°) between the two units. The dips, however, are approximately the same. Interpreted by Heller and Ryberg (1983) and Ryberg (1984) as lower slope deposits and as an outer shelf/slope facies by Molenaar (1985)

Tlb — **Bushnell Rock Member of Baldwin (1974) (lower Eocene; Penutian to lower Ulatisian)**—Very thick- to thick-bedded pebble and cobble conglomerate with minor interbedded coarse-grained lithic sandstone, pebbly sandstone, and siltstone. Bedding thicknesses vary from 0.5 to 6 m. Conglomerates are very poorly sorted, clast supported, and moderately well indurated. Porosity is generally poor. Clasts tend to be discoidal and subrounded to rounded. Compositions are dominantly graywacke (~50 percent). Metamorphic (~25 percent) and basaltic (~10 percent) clasts are also common. Matrix is greenish-gray, fine- to coarse-grained sand. Most beds are disorganized, but normal-, reverse-, and reverse- to normal-graded beds are present. Cross-bedding is relatively common. Forms cliffs capping the ridge south of Porter Creek in the southern part of the map area. The Bushnell Rock Member is approximately 250 m (800 ft) thick at the type section at Bushnell Rock (Baldwin, 1974) but is 1,189 m (3,900 ft) thick along and west of Porter Creek (Molenaar, 1985). A complete section is not exposed in the Reston Quadrangle. The Bushnell Rock Member has been interpreted as fan delta (Kugler, 1979) and as a braided stream deposit (Ryberg, 1984). The Bushnell Rock Member unconformably overlies the Roseburg Formation in the southern part of the map area

ANGULAR UNCONFORMITY

Trs / Trb / Trsc — **Roseburg Formation of Baldwin (1974) (Paleocene to lower Eocene)**—Interbedded turbidite sandstone and mudstone (unit **Trs**), pillow basalt and breccia (unit **Trb**), and conglomerate (unit **Trsc**) crop out in the southern third of the Reston Quadrangle along Porter Creek. The rocks are steeply folded along an east-northeast-trending series of thrust faults.

Tholeiitic pillow basalts (unit **Trb**) were assigned to the Roseburg Formation by Baldwin (1974). Baldwin (1974) recognized that the pillow basalts in the Roseburg area are at least partly equivalent to the Siltez River Volcanics of the central Oregon Coast Range (Snavely and Baldwin, 1948; Snavely and others, 1968) but preferred to include them with the Roseburg Formation because of the abundance of interbedded sedimentary rocks. Molenaar (1985) reassigned these basalts to the Siletz River Volcanics.

The sedimentary rocks (unit **Trs**) interbedded with and overlying the pillow basalts consist of highly deformed, well-indurated, dark-gray lithic arkosic sandstone, pebbly sandstone, siltstone, and mudstone. Both base-missing (T_{bcde}) and complete (T_{abcde}) Bouma turbidite sequences are common. The Roseburg sedimentary rocks consist of Mutti-Ricci Lucchi Facies C and D. Ryberg (1984) interpreted the sedimentary part of the Roseburg Formation overlying the basalts (which extends well to the north of the study area) as a submarine fan complex.

A sequence of very thick- to thick-bedded pebble-cobble conglomerate (unit **Trsc**) is interstratified in the Roseburg Formation south of Porter Creek. These rocks are not well exposed, but the amount of interbedded fine-grained sedimentary rock appears to be minor. These conglomerates consist of Mutti-Ricci Lucchi Facies A and may constitute a part of a large submarine canyon complex

ANGULAR UNCONFORMITY

Jsp — **Serpentinite (Jurassic?)**—Sheared serpentinite emplaced along the Reston thrust fault

LITHOLOGIC SYMBOLS

(Used in cross-sections)

Conglomerate

Massive amalgated sandstone with discontinuous shale partings

Cross-bedded sandstone

Bedded sandstone

Interbedded sandstone, siltstone, and shale (turbidite sequences)

Siltstone

Mudstone

Basalt

GEOLOGIC CROSS SECTIONS