

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOLOGIC MAP OF THE MOUNT VERNON
7½' QUADRANGLE, SKAGIT COUNTY, WASHINGTON

By

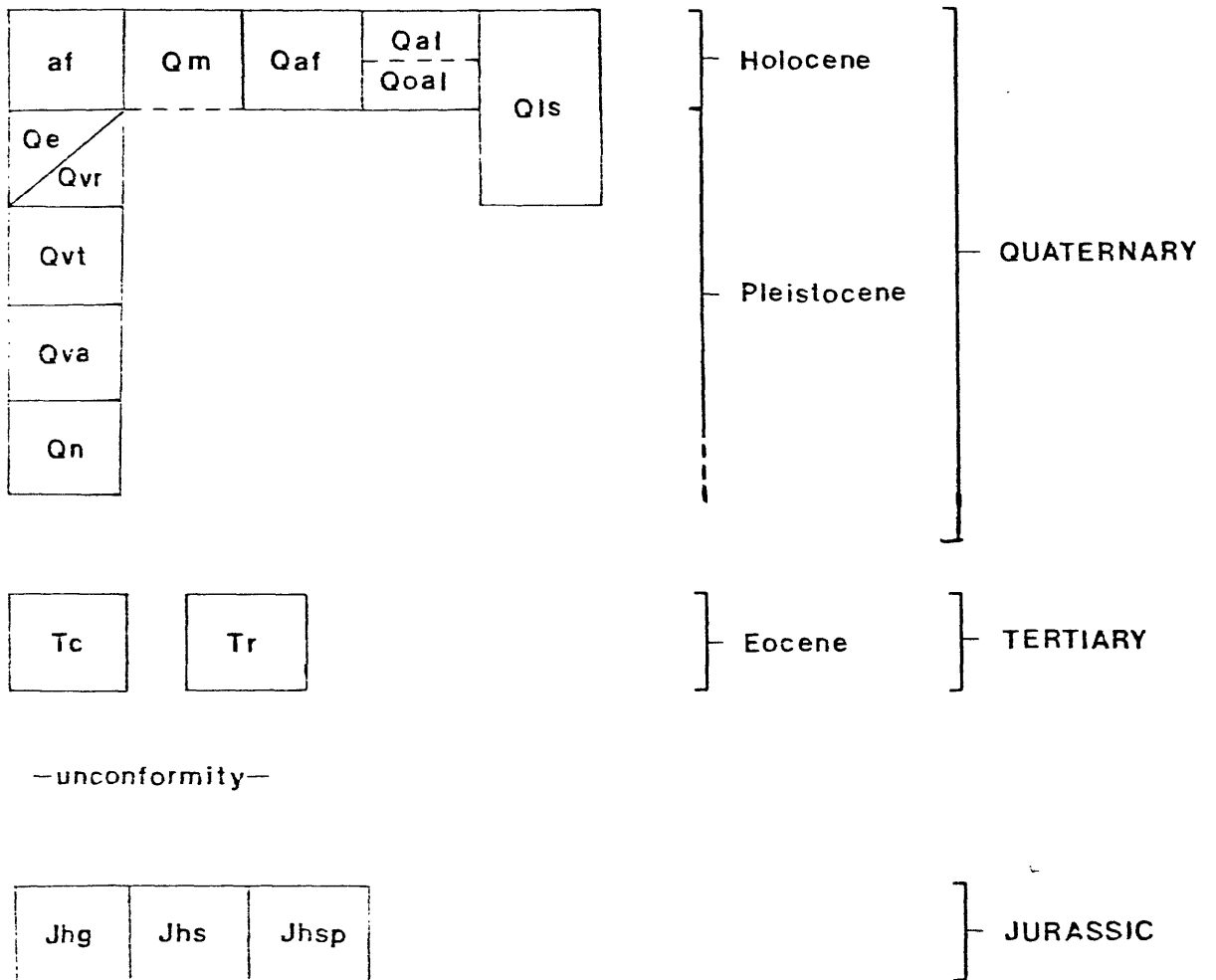
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This map is preliminary and has not
been reviewed for conformity with
U.S. Geological Survey editorial
standards and stratigraphic nomen-
clature

Seattle, Washington
January 1981

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- af ARTIFICIAL FILL - Distribution from J. C. Yount (written communication, 1979).
- Qa1 ALLUVIUM - Fluvial sand, silt, and gravel with minor lacustrine deposits exposed along the modern Skagit River and its former course north and northwest of Mount Vernon. Deposits of the Skagit River are well-sorted and stratified, generally with subrounded and rounded clasts derived largely from metamorphic and plutonic rocks found in the upper part of its drainage basin. Alluvium along tributaries, in contrast, is moderately to poorly sorted and contains abundant, locally derived, subangular clasts. Unit includes low terraces 2-5 meters above the modern flood plain.
- Qm PEAT - Fibrous to woody peat, and muck deposited in shallow ponds and bogs southeast of Little Mtn. and in other upland depressions. Locally includes tephra from Mount Mazama (~6900 yrs BP) as a layer 20 to 50 mm thick. Large areas of marsh, shallow oxbow lakes, and poorly drained soil near the Skagit River are mapped as alluvium.

- Qoa1 OLDER ALLUVIUM - Fluvial sand, silt, and minor gravel exposed northeast of Burlington. Deposits are generally well-sorted and stratified, and are largely composed of sand, fresh dacite clasts, and pumice derived from Glacier Peak lahars. Clasts are subrounded and rounded. Charcoal in these deposits near Sterling has been dated at 1790 ± 75 YBP (USGS-866). Locally forms slightly dissected terraces 5-10 meters above the present flood plain. Contacts with Qal are indistinct in the Burlington area, but east of Sterling a 3-5 m scarp separates the two deposits.
- Qaf ALLUVIAL FAN - Sand and gravel deposited by streams and debris flows in valleys east of Little Mountain and in other areas where upland streams spill onto valley floors. Deposits are poorly to moderately sorted, moderately stratified, with angular and subangular clasts. Apparently overlies recessional and glaciomarine deposits.
- Qls LANDSLIDE - Compact, poorly sorted, nonstratified aggregates of angular boulders and cobbles in a matrix of finer material, locally including blocks of locally derived bedrock. Generally found downslope from source-area scars which resemble cirques. The boundaries of the landslides with other bedrock and surficial units

are drawn principally from interpretation of aerial photographs. Unit includes isolated areas of bedrock, recessional fan deposits, and undisturbed glacial till.

Qe

EVERSON DEPOSITS, UNDIFFERENTIATED - A complex assemblage of (1) fossil-bearing, stony marine silt, sand, and clay with associated layers, lenses, and pods of other diamictos (glacio-marine drift of Easterbrook, 1968), (2) medium- to well-sorted, massive to laminated marine (?) sand, silt, and clay, and (3) thin (0.5 to 2.0 m), poorly stratified gravel deposits which discontinuously overlie massive silt, and locally contain shell fragments. Thickness of (1) and (2) typically range from 1 m to 8 m, but thicknesses of 8 to more than 15 m occur in the Mount Vernon area. Strandlines, raised beaches, and wave-cut terraces are associated with Everson deposits, and are particularly well-developed on the hills NE of Mount Vernon. In this area, shells of the bivalve Saxidomus from beach gravel at an elevation of 24 m gave a ^{14}C age of 12,500 \pm 125 YPB (Beta-1321). Everson deposits overlie recessional outwash (Qvr) or till (Qvt) in most places. Unit includes isolated areas of glacial till, particularly where erosion on steep slopes has locally removed the cover of Everson deposits.

- Qvr RECESSIONAL OUTWASH - Gravel, including local bodies of fine sand and silt. Deposits are poorly to well-sorted and stratified with subangular to rounded clasts. In Carpenter Creek drainage, recessional outwash underlies and interfingers with Qe, and overlies Vashon till. North of Mountain View, deposits exposed comprise poorly sorted ice-contact gravels on valley walls, whereas silt, fine sand, and clay occur in the valley bottom.
- Qvt VASHON TILL - Nonsorted, nonstratified, compact till consisting of angular to subrounded cobbles and boulders in a matrix of sand, silt, and clay. Till mantles much of the upland area in the southeastern part of the map area. A thin (<1 m) cover of silt and fine sand mantles small areas of till north and northeast of Big Rock, and in the southeast corner of the map area; the unit also includes isolated bedrock outcrops.
- Qva ADVANCE OUTWASH - Gravel and sand underlying till and exposed in bluffs along the east side of Interstate 5 in Mount Vernon, and in gravel pits near Big Rock. Well-sorted and moderately well-stratified deposits include rounded and subrounded clasts derived from northern sources

(Heller, 1980). Crossbeds in sand in Mount Vernon dip to the south, whereas crossbeds in gravel and sand in the Big Rock area generally dip south and east. Thickness near Big Rock is as much as 40 m. Advance outwash overlies silt and sand (Qn) west of Big Rock. Elsewhere the base of the unit generally is not exposed.

Qn

OLDER, FINE-GRAINED DEPOSITS, UNDIFFERENTIATED -





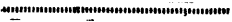


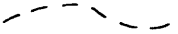

Dark gray, compact silt, fine sand, and clay, exposed 1 km west of Big Rock, and formerly exposed in road cuts along Interstate 5 in Mount Vernon. The deposit is more than 5 m thick at the Big Rock locality, where it directly underlies advance outwash deposits. Small, shallow landslides are associated with this contact.

Tr

RHYOLITE - Rhyolitic ash flows, lava flows, and intrusive rocks, locally brecciated, with minor andesitic lavas, apparently intruding and locally interbedded with Tc. Eocene age based on fission-track date of 41.5 ± 3.4 m.y. on zircon from rhyolite from the Hendricks quarry near Big Lake (3 km southeast of map area, Lovseth, 1975).

References cited

- Easterbrook, D. J., 1968, Pleistocene stratigraphy of Island County:
Washington State Water Supply Bulletin, no. 25, part 1, 31 p.
- Heller, P. L., 1980, Multiple ice flow directions during the Fraser
Glaciation in the lower Skagit drainage, northern Cascade Range,
Washington: Arctic and Alpine Research, v. 12(3), p. 299-308.
- Lovseth, T. P., 1975, The Devils Mountain fault, northwestern Washington
(M.S. thesis): Seattle, Washington, University of Washington, 29 p.
- Whetten, J. T., Dethier, D. P., and Carroll, P. R., 1979, Preliminary
geologic map of the Clear Lake NE quadrangle, Skagit County,
Washington: U.S. Geological Survey Open-File Report 79-3468,
scale 1:24,000.
- Whetten, J. T., Zartman, R. E., Blakely, R. J., and Jones, D. L., 1980,
Allochthonous Jurassic ophiolite in northwest Washington: Geological
Society of America Bulletin, v. 91, p. 359-368.

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Outcrop of non-bedded or non-foliated rock. Symbol denotes outcrops within mapped areas and isolated outcrops in areas of Quaternary sediments
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Contact, dotted where concealed
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Axis of anticline, inferred
- 
Fault, dip-slip or strike-slip. Dashed where location is approximate; dotted where concealed
- 
Photographic and topographic lineament; inferred fault
- 
Strike and dip of bedding
- 
Strike and dip of foliation
- 
Strandline
- 
Striation: observation point at tip of arrow