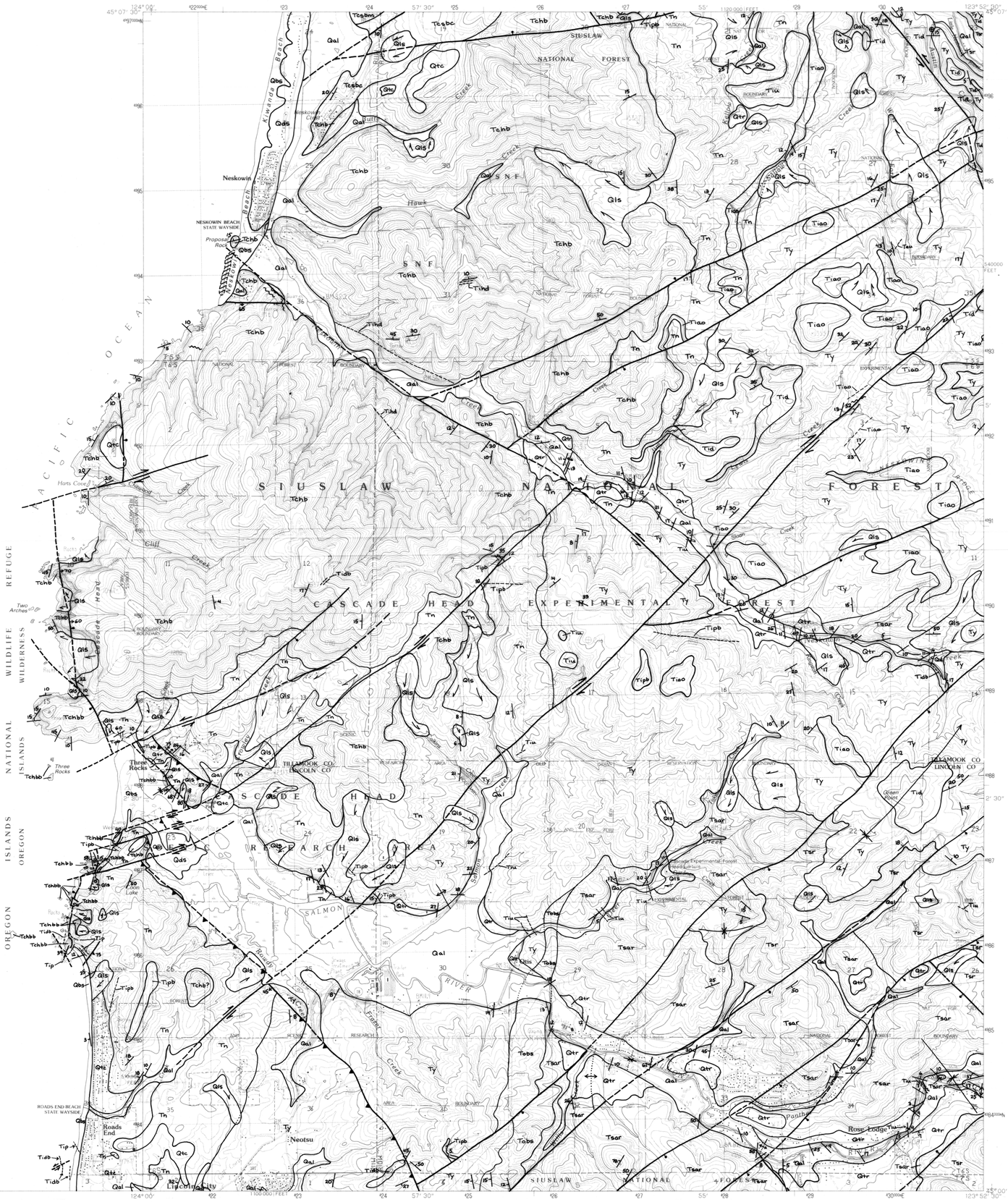
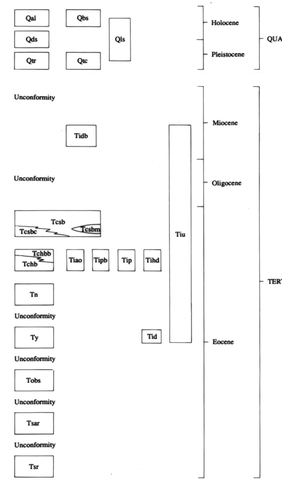


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qal **Alluvial deposits (Holocene)**—Silt, sand, and gravel along rivers and streams; locally includes low-lying river terrace gravels and thick colluvium; also includes estuarine and lagoonal mud, silt, and sand marginal to lower reaches of the Salmon River; unmapped Tertiary bedrock is exposed in places in river beds

Qbs **Beach and spit sands (Holocene)**—Beach sand and minor gravel, and spit sands; Tertiary bedrock is locally exposed at low tide along beach in winter and spring; patterned area on beach south of Neskowin is location of drowned Sitka spruce forest, C_{14} date 1,730 ± 160 years (Rubin and Alexander, 1958)

Qds **Dune sands (Holocene and Pleistocene)**—Active and stabilized dunes on Kiwanda Beach north of Neskowin and south of the mouth of the Salmon River; thin veneer of eolian sand on bedrock in coastal area not mapped

Qls **Landslide debris (Holocene and Pleistocene)**—Mapped where deposits are readily apparent or inferred from topographic expression on maps or aerial photographs; thin colluvial deposits and small soil or rock failures not shown; landslides are pervasive, but of greatest areal extent marginal to areas capped by basalt sills and areas underlain by siltstone along Salmon River

Qtr **River terrace deposits (Pleistocene)**—Sand and gravel; includes uplifted river deposits and estuarine deposits of carbonaceous sand and silt adjacent to Salmon River and Neskowin Creek; modified in places by landslide or colluvial deposits

Qtc **Coastal terrace deposits (Pleistocene)**—Thick- to thin-bedded planar to cross-bedded fine- to medium-grained nonmarine sand with minor interbeds of carbonaceous silt- and sand-filled channels; well rounded basalt cobble and pebble gravel and fossil wood occur locally at contact with Tertiary bedrock

BEDROCK UNITS

Tcsbc **Sedimentary rocks of Cannery Hill (upper Eocene)**—Cobble and boulder conglomerate overlain by massive to thick-bedded and cross- bedded fossiliferous very coarse- to medium-grained basaltic sandstone with red scoria fragments; includes minor tuff beds, a 2 to 5 cm-thick zone of shell hash, and a 2-5 m massive flow of amygdaloidal and zeolitic basalt; these basaltic sedimentary rocks were derived by erosion of underlying upper Eocene basalt of Cascade Head. Strata are included in conglomerate and sandstone member of the sedimentary rocks and basalt of the Cannery Hill unit in the adjacent Nestucca Bay quadrangle (Snavely and others, 1990)

Tchb **Basalt of Cascade Head (upper Eocene)**—Subaerial flows of massive to platy, spheroidal-weathering porphyritic olivine-augite basalt, plagioclase-phyric basalt and aphanitic basalt; most basalts are alkalic; flows commonly have red scoriaceous upper surfaces; locally basalt is very vesicular, rarely pillowed, and commonly veined with calcite; includes interbeds of fine to lapilli subaqueous tuff, tuffaceous siltstone, and flow breccia; intruded by numerous feeder dikes of basalt, porphyritic basalt and plagioclase-rich basalt (not differentiated on map), and several hornblende dacite dikes (mapped as Tihd); siltstone clasts and calcareous concretions derived from underlying Nestucca Formation are commonly associated with breccias in lower part of sequence. The basalt of Cascade Head thins northward and grades laterally into marine tuffaceous siltstone and sandstone with subaqueous lapilli tuff interbeds assigned to the Nestucca Formation (Tn); the basalt of Cascade Head correlates with the upper Eocene Yachats Basalt of Snavely and MacLeod (1974); unit yields anomously young (~30 Ma) K/AR ages, but is late Eocene age on basis of microfossils above and below unit

Tchbb **Basalt breccia member**—Mudflow breccia, massive to well-bedded poorly sorted subaqueous lapilli tuff with scattered volcanic bombs and siltstone clasts; also includes irregular pod-shaped masses of lapilli-tuff that have bed-loaded, intruded and penecontemporaneously deformed siltstone of the Nestucca Formation. Lapilli tuff represents basalt magma extruded into water-saturated sediments of the Nestucca Formation with attendant steam explosion and autobrecciation; includes mudflow breccias (lahars) with blocks of dense basalt up to 2 m in diameter set in a silty basaltic sandstone matrix; breccia commonly laced with calcite veins and in places intruded by comagmatic dense to vesicular basalt dikes. Tchbb member is differentiated only where well exposed along the coast from Roads End northward to the mouth of the Salmon River and in most places is in fault contact with siltstone of Nestucca Formation

Tn **Nestucca Formation (upper Eocene)**—Medium- to thin-bedded tuffaceous siltstone with interbeds of fine-grained arkosic and basaltic sandstone up to 0.5 m thick; contains 0.2 to 0.8 cm-thick tuff beds and calcareous concretions; in places sandstone is irregularly bedded, glauconitic, and fossiliferous; locally the siltstone beds are bioturbated and fissile; foraminifers are assigned to the upper Eocene Narizian Stage by W.W. Rau (written commun., 1979); coccoliths in the Nestucca Formation that crop out near the contact with the overlying Basalt of Cascade Head are assigned to the late Eocene CP15a Subzone (Bukry and Snavely, 1988)

Ty **Yamhill Formation (middle Eocene)**—Massive to thin-bedded concretionary finely micaceous siltstone with minor interbeds of thin- to medium-bedded micaceous arkosic and lithic sandstone; filled channel deposits of micaceous arkosic sandstone commonly occur near the base of the formation; contains thick- to medium-bedded basaltic sandstone with thin siltstone interbeds and siltstone rip-ups; basaltic sandstone is flaggy and contains red scoria fragments and shell hash; tuff beds as thick as 0.5 m occur locally; foraminiferal assemblages assigned to upper part of the Ulatisian Stage and to the lower part of the Narizian Stage by W.W. Rau (written commun., 1986); coccolith flora assigned to the middle Eocene Subzone CP14a (Bukry and Snavely, 1988). North of the Neskowin quadrangle the Yamhill Formation intertongues with tuff-breccia, basaltic sandstone and siltstone, and basalt flows of the Tillamook Volcanics. A regional unconformity is present at the base of the Yamhill Formation which locally onlaps rocks as old as the early Eocene Siletz River Volcanics

Tobs **Basaltic sandstone of Otis Junction (middle Eocene)**—Medium- to thin-bedded basaltic sandstone and siltstone with beds rich in shell debris, calcareous algae, and carbonaceous material; includes several punky limy beds rich in weathered *Discocyclina*; unit onlaps a pillow basalt flow in the Salmon River Formation with low angle unconformity; coccoliths from calcareous siltstone beds assigned to Subzone CP12b of lower middle Eocene age (Bukry and Snavely, 1988). Unit is unconformably overlapped by the Yamhill Formation north of Salmon River. Unit Tobs correlates in age with the Tyee Formation and probably is present only west of oceanic islands of the Siletz River Volcanics

Tsar **Salmon River Formation (lower Eocene)**—Thick- to medium-bedded, coarse- to fine-grained basaltic sandstone with calcareous ledges and concretions; thin- to medium-bedded siltstone and sandstone and platy siltstone with shell hash occur locally; contains a few interbeds of basalt conglomerate and breccia and pillow lava; pyrite-rich calcareous nodules occur in siltstone; massive to thick-bedded channel-fill deposits of boulder and cobble conglomerate occur near, or at, the base of sequence; they are composed of well-rounded zeolitized basalt clasts, pillow rims, and diabase set in a matrix of coarse-grained basaltic sandstone; irregular basalt dikes less than 0.5 m thick cut unit in a few places and are probably feeders to sparse flows in sequence; unit represents basaltic debris eroded off Siletz River oceanic islands; coccoliths assigned to Subzone CP11 of early Eocene age (Bukry and Snavely, 1988); formation is well exposed to the south in the Euchre Mountain quadrangle (Snavely, 1990)

Tsr **Siletz River Volcanics (lower Eocene)**—Pillow lava, flow-breccia, tuff-breccia, and lapilli-tuff of tholeiitic basalt with minor thin interbeds of marine basaltic siltstone, sandstone, and conglomerate; close-packed pillows range in diameter from 1/2 to 2 m (averaging 1 m), have radiating columnar joints, are pervasively zeolitized, are veined with calcite, and commonly are amygdaloidal; basalt is aphanitic to porphyritic with phenocrysts of plagioclase and augite; coccolith flora from siltstone interbed in pillow lavas on Little Nestucca River are assigned to Zone CP10 of early Eocene age (Bukry and Snavely, 1988); pillow lavas and breccia are considered to be ocean ridge basalts and oceanic islands formed during the rifting of the continental margin (Snavely and others, 1968; Snavely, 1987); exposed more extensively to south and southeast in the Euchre Mountain quadrangle (Snavely and others, 1976)

INTRUSIVE ROCKS

Tidb **Depoe Bay Basalt (middle Miocene)**—Dikes and sills of massive fine-grained equigranular basalt; a K/Ar age of 15.1 ± 0.4 was obtained from the basalt dike on Cascade Head (LedaBeth Pickthorn, written commun., 1983); petrochemically similar to the Grande Ronde Basalt of the Columbia River Basalt Group and the Depoe Bay Basalt in the central Oregon Coast Range (Snavely and others, 1973)

Tiao **Olivine-augite-phyric basalt (upper Eocene)**—Sills and minor dikes that intrude the Nestucca and Yamhill Formations; characterized by abundant olivine, augite, and plagioclase phenocrysts commonly 2 to 10 mm in diameter; rocks with similar composition and age occur as flows in the basalt of Cascade Head (unit Tchb); similar thick sills are widespread to the east in the Dolph quadrangle

Tip **Peperite dikes (upper Eocene)**—Peperite dikes consisting of sedimentary and juvenile volcanic grains and sandstone dikes; grains range from medium- to pebble-size; intrudes siltstone and sandstone of the Nestucca Formation near contacts with basalt breccia member of the basalt of Cascade Head (Tchbb); probably a consequence of steam-injection

Tipb **Plagioclase-phyric basalt and basaltic andesite dikes (upper Eocene)**—Plagioclase-phenocryst-bearing basalt dikes 1/2 to 3 m in width and less common small sills that intrude the Nestucca and Yamhill Formations and the basalt of Cascade Head; dikes are not mapped in basalt of Cascade Head

Tihd **Hornblende dacite dikes (upper Eocene?)**—Porphyritic hornblende dacite dikes 1 to 2 m thick, intrudes basalt of Cascade Head east of the village of Neskowin; contains prismatic hornblende phenocrysts 1.5 cm to 3 cm in length together with zoned plagioclase; K/Ar ages of 33.6 ± 1.3 and 34.0 ± 1.0 Ma determined on hornblende and whole rock respectively (LedaBeth Pickthorn, written commun., 1986); however, this is probably a minimum age as the stratigraphic position of basalt of Cascade Head indicates these rocks are of late Eocene age

Tid **Diabase sills (middle Eocene)**—Sills of fine- to coarse-grained equigranular to porphyritic diabase; commonly albitized and laumontized; basalt at chilled margins has pilotaxitic texture and in places is vesicular or amygdaloidal; the lower sill exposed in Little Nestucca River is about 100 m thick and contains large columnar joints up to 1 m in width; the upper sill is about 60 m thick; a sill correlative with the lower coarse-grained sill in the adjacent Hebo quadrangle has a K/Ar plagioclase age of 43.2 ± 1.8 Ma (LedaBeth Pickthorn, written commun., 1987)

Tiu **Basaltic intrusive rocks, undivided (middle Miocene and Eocene)**—Sills and dikes of basalt, diabase, and fine-grained gabbro

ACKNOWLEDGMENTS

The authors gratefully acknowledge age assignments based upon foraminifers by W.W. Rau and upon coccoliths by D. Bukry. Their biostratigraphic studies improved the quality of both the stratigraphic and tectonic framework of the area. Rau's assignments of the foraminiferal assemblages are to the Eocene Stages of Mallory (1959). We thank A.D. Callender, Jr. for making available his detailed geologic traverse along Neskowin Creek. The authors also thank Daniel Hafley, Alan Niem, and Erik Villas who assisted in geologic field studies. Holly C. Wagner's careful review of the map and explanation is gratefully acknowledged.

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EXPLANATION OF MAP SYMBOLS

Geologic contact - Approximately located or inferred; dotted where concealed. Contacts exposed only in a few places along riverbeds, seacliffs, or major logging roads; elsewhere contacts are based on topographic expression of rock units

Fault - Approximately located or inferred; dip shown where known; dashed where concealed; ball and bar on apparent downthrown side. Faults located on basis of shear zones, juxtaposition of strata with differing attitudes, anomalously steep attitudes, and (or) topographic lineations

Strike-slip fault - Arrows show relative horizontal movement.

Thrust fault - Sawteeth on upper plate. Includes detachment thrusts and bedding plane thrusts with minor stratigraphic separation.

Folds - Show inferred trace of axial plane and direction of plunge where known; dotted where concealed.

Anticline

Syncline

Minor folds or drag folds. Strike and dip shown on representative folds of a single fold axis; direction of plunge shown where known

Anticline

Syncline

Overturned anticline

Strike and dip of beds[1]

Inclined--Direction and amount of dip shown where measured

Direction of mass transport in landslide deposits

Tectonic or Igneous Features

Sheared sedimentary or igneous rocks

Dike or sill of basalt or diabase generally 1-3 m thick; letter symbol indicates rock type listed in description of igneous map units

[1]Strike and dip symbols in areas shown as Quaternary deposits along coast and streams are dipping Tertiary rocks in outcrops too small to map

PRELIMINARY GEOLOGIC MAP OF THE NESKOWIN QUADRANGLE, LINCOLN AND TILLAMOOK COUNTIES, OREGON

By,

Parke D. Snavely, Jr., Norman S. MacLeod, and Diane L. Minasian

1990