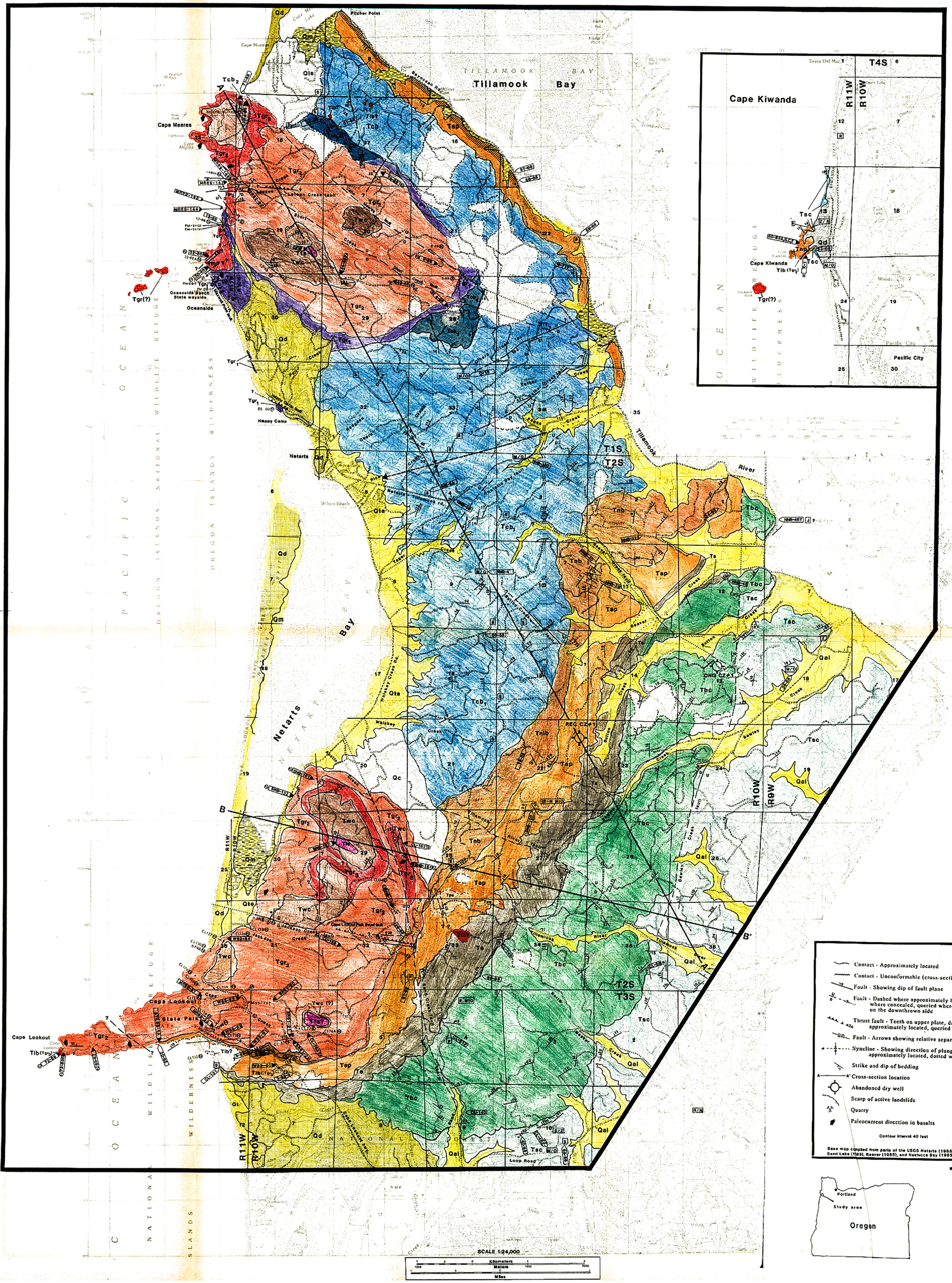
PLATE I: GEOLOGIC MAP OF THE TILLAMOOK EMBAYMENT, TILLAMOOK COUNTY, OREGON

by Michael J. Parker * 1990



DESCRIPTION OF MAP UNITS

Qal QUATERNARY ALLUVIUM DEPOSITS. Unconsolidated sand, silt, gravel, and organic detritus forming flood plains and filling stream valleys.

Qm QUATERNARY MARSH DEPOSITS. Heavily vegetated swampy areas adjacent to Netarts and Tillamook bays with thick peat layers.

Qd QUATERNARY DUNE DEPOSITS. Unconsolidated coastal sand dune deposits with buried soil horizons. Predominantly stabilized by vegetation, but active on the north side of Cape Kiwanda and the south side of Cape Lookout.

Qc QUATERNARY COLLUVIUM DEPOSITS. Unconsolidated talus at the base of steep slopes in Columbia River Basalt. Predominantly composed of basalt boulders that range in size from 0.5 m to > 5 m in diameter.

Qls QUATERNARY LANDSLIDE DEPOSITS. Debris flows and slumps often associated with headwall scarps.

Qte QUATERNARY TERRACE ESTUARINE DEPOSITS. Elevated Netarts Bay estuarine sediments composed of unconsolidated laminated mudstones bearing rootlets and rare channel-fill strata.

Tpu PLIOCENE (?) DEPOSITS. Possible fluvial deposit composed of friable unconsolidated siltstone and poorly sorted arkosic and basalt-lithic medium- to coarse-grained sandstone. Parallel-and ripple-laminated to trough cross-stratified. Contains angular cobbles and pebbles of Columbia RIver Group (?) basalt.

Tfs GINKGO UNIT (INFORMAL) OF THE FRENCHMAN SPRINGS MEMBER OF THE WANAPUM BASALT, COLUMBIA RIVER BASALT GROUP (MIDDLE MIOCENE). Moderate brown (5YR 3/4) to light brown (5YR 5/6) in weathered exposure, medium gray (N5) where fresh.. Non vesicular, horizontally and vertically jointed subaerial (?) flow. Exposed in only one location in section 19, T. 1 S., R. 10 W. Medium- to coarse-grained and plagioclase-phyric with translucent yellow plagioclase phenocrysts up to 2 cm in length. Normal polarity.

Twc SANDSTONE OF WHALE COVE (INFORMAL)-(MIDDLE MIOCENE). Dark yellowish orange (10YR 6/6) in weathered exposures to light gray (N8) where fresh. Parallel-laminated mica-rich arkosic silty fine-grained sandstone at base, grading upward to friable amalgamated hummocky cross-stratified fine- to medium-grained micaceous-arkosic sandstone with rare convolute laminae.

Tgr$_3$ SENTINEL BLUFFS UNIT (INFORMAL) N_2 HIIGH MgO FLOWS OF THE GRANDE RONDE BASALT, COLUMBIA RIVER BIASALT GROUP (MIDDLE MIOCENE). Brownish gray (5YR 4/1) where weathered and medium gray (N5) where fresh in subaerial portions; palagonitiic breccias range from dusky yellow green (5GY 7/2) to grayish olive green (5GY 3/2). Two to three intracanyon (?) flows. Pillowed flows and foreset-bedded palagonite breccias are common and locally overlain by subaerial flows with crudde colonnade. Large filled lava tubes are radially and vertically jointed. Generallly medium- to coarse-grained and aphyric. Includes 10 m thick arkosic sandstone interbed (colored yellow with dashed contacts). Normal polarity.

Tgr$_2$ WINTERWATER UNIT (INFORMAL) N_2 LOW MgO-LOW TiO_2 FLOWS OF THE GRANDE RONDE BASALT, COLUMBIA IRIVER BASALT GROUP (MIDDLE MIOCENE). Dark reddish brown (10R 3/4) where weathered and dark gray (N3) where fresh. Two to three flows. Columnar-jointing is crudely developed in most subaerial flows, but well developed in some large filled lava tubes. Predominantly pillowed in the western part of the study area.. Includes several thick (1 to 2 m) sedimentary interbeds (colored yellow with dlashed contacts) composed of arkosic fine-grained sandstone with one basalt cobble conglomerate bed. Sparsely to moderately vesicular, fine- to medium-grained, aphyric to microphyric with some blocky glomerocrysts of plagioclase. Normall polarity.

Tgr$_1$ GROUSE CREEK UNIT (INFORMAL) R_2 LOW MgO-LOW TiO_2 FLOW OF THE GRANDE RONDE BASALT, COLUMBIA RIVER BASALT GROUP (MIDDLE MIOCENE). Grayish olive (10Y 3/4) in palagonitic breccias, to dark gray in fresh pillow cores and subaerial flows. One to three flows. Predominantly composed of pillowed flows with local foreset-bedded palagonitic breccias and inclined filled lava tubes. Includes local 3 m thick interbed of fossiliferous mudstone and basaltic sandstone (colored yellow with dashed contacts). Subaerial flows have poorly developed colonnade. Sparsely to moderately vesicular, fine- to medium-grained, aphyric. Reversed polarity.

Tgr GRANDE RONDE BASALT, UNDIFFERENTIATED, COLUMBIA RIVER BASALT GROUP (MIDDLE MIOCENE). Generally aphyric to microphyric pillowed and columnar-jointed flows.

Tlb GRANDE RONDE BASALT, COLUMBIA RIVER IBASALT GROUP INVASIVE SILLS AND DIKES (MIDDLE MIOCENE). Locallly intrudes units Tap, Tcb, and Tgr$_2$. Sedimentary host rocks are locally fluidized by intruded basalt forming peperite sills and dikes.

Tcb$_2$ Tcb$_1$ CANNON BEACH MEMBER (INFORMAL) OF THIE ASTORIA FORMATION (SAUCESIAN: LOWER TO MIDDLE MIOCENE). Siltstone and claystone range from light olive gray (5Y 6/1) to dark gray (N3). Sandstone ranges from pinkish gray (5YR 8/1) to light bluish gray (5B 7/1). Tcb$_2$ (upper Cannon Beach member): Interbedded parallel-laminated mudstone and thin-bedded fine- to medium-grained turbidite sandstone grade upward through channelized medium- to coarse-grained amalgamated turbidite sandstone interval to bioturbated and parallel laminated, and locally trough cross-stratified arkosic medium-grained sandstone. Tcb$_1$ (lower Cannon Beach member): Predominantly parallel-laminated micaceous siltstone with some thin- to medium-bedded, arkosic, fine- to coarse-grained, graded turbidite sandstone interbeds. Unit contains small penecontemporaneous slumps.

Tnb NETARTS BAY MEMBER (INFORMAL) OF THE ASTORIA FORMATION (SAUCESIAN: LOWER TO MIDDLE MIOCENE). Moderate orange pink (5YR 8/4) in weathered exposures to light gray (N8)) where fresh. Friable to locally hematite and calcite cemented, fine- to coarse-grained, pebbly, arkosic and locally volcaniclastic-rich sandstone with some thin- to thick-bedded parallel-laminated mudstone interbeds. Predominantly composed of amalgamated to interbedded turbidite sandstone beds that include common siltstone rip-ups. Thick (> 3 m) grainflow deposits are common and locally comtain large (>10 m diameter) penecontemporaneously emplaced sandstone blocks. Abrupt lithology change at contact with laminated mudstones of the Cannon Beach member.

Tap ANGORA PEAK MEMBER (INFORMAL) OF THE ASTORIA FORMATION (PILLARIAN TO NEWPORTIAN STAGE: LOWER TO MIDDLE MIOCENE). Very pale orange (10YR 8/2) where weathered to very light gray (N8) where fresh. Unit is characterized by common fossiliferous, fine- to medium-grained, amalgamated hummocky cross-stratified micaceous-arkosic sandstone locally cut by large channel-fill sequences (cross-hatched) composed of medium-to large-scale trough cross-stratified, fossiliferous, coarse-grained, pebbly volcaniclastic and arkosic sandstone. Locally hematite and calcite cemented. Cape Kiwanda section includes carbonaceous bioturbated Asterosomma and Rosselia trace fossil-bearing sandstone and planar and trough cross-stratified sandstone that bear basalt, sedimentary quartzite, and two-mica granite cobbles and boulders. Unit is stippled where suspected of containing Scappoose fm.,- equivalent strata.

Ts SUTTON CREEK MEMBER (INFORMAL) OF THIE NYE MUDSTONE (SAUCESIAN: LOWER TO MIDDLE MIOCENE). Siltstone ranges from very pale orange (10YR 8/2) where weathered, to medium bluish gray (5B 5/1) where fresh. Lower part of the unit is composed of parallel laminated micaceous and carbonaceous mudstone with rare thin-bedded tuff and arkosic turbidite sandstone interbeds. Includes rare clastic dikes of fine- to medium-grained sandstone. The uppermost part of the unit is characterized by amalgamated and interbedded volcaniclastic-rich arkosic turbidite sandstones incised by nested channels filled with thin- to medium-bedded turbidite sandstone and mudstone.

Tbc BEWLEY CREEK FORMATION (INFORMAL) (PIILLARIAN STAGE: LOWER MIOCENE). Sandstone ranges from moderate orange pink (5YR 8/4) where weathered to light gray (N7) where fresh. Basse of the unit coarsens upward from bioturbated fossiliferous silty arkosic sandstone to fine-grained hummocky cross-stratified fine- to medium-grained sandstone, locally channelized by pumiceous volcaniclastic-arkosic, coarse-grained to pebbly, trough cross-stratified hematite cemented sandstone. This grades upward to parallel-laminated tuffaceous sandy siltstone overlain by fossiliferous bioturbated ssilty sandstone and hummocky cross-stratified fine-grained arkosic sandstone. Fineres upward to parallel-laminated mudstones of the Sutton Creek member.

Tsc SMUGGLER COVE FORMATION (INFORMAL) (RREFUGIAN (?)-ZEMORRIAN TO SAUCESIAN: UPPER EOCENE (?)-OLIGOCENE TO LOWER TO MIDDLE MIOCENE). Very pale orange (10YR 8/2) where weathered, to dark gray (N9) where fresh. Predominantly tuffaceous mudstone with rare thin-bedded turbidite sandstone and tuff interbeds. Grades upward mear the upper contact through amalgamated arkosic and volcaniclastic-rich medium- to coarse-grained turbidite sandstone, to bioturbated silty sandstone.

Map Symbols

- Contact - Approximately located
- Contact - Unconformable (cross-section)
- Fault - Showing dip of fault plane
- Fault - Dashed where approximately located, dotted where concealed, queried where uncertain, "D" on the downthrown side
- Thrust fault - Teeth on upper plate, dashed where approximately located, queried where uncertain
- Fault - Arrows showing relative separation
- Syncline - Showing direction of plunge. Dashed where approximately located, dotted where concealed
- Strike and dip of bedding
- A A' Cross-section location
- Abandoned dry well
- Scarp of active landslide
- Quarry
- Paleocurrent direction in basalts

Contour interval 40 feet

Base map compiled from parts of the USGS Netarts (1986), Tillamook (1985), Sand Lake (1185), Beaver (1985), and Nestucca Bay (1985) 7 1/2 quadrangles

Outcrop locality or siample location

- CL-135 Fossil sample
- 76-89 Geochemistry sample
- Normal, reverse magnetic polarity (fluxgate magnetometer site)
- PM-DB 1 Paleomagnetic core siample (unpublished data from Wells of the USGS)

Age assignments (where unaccompanied by a site locality number fossil age assignments from unpublished data of Wells and Snavely of the USGS)

- M Miocene
- O Oligocene

Foraminiferal stage

- S Saucesian
- Z Zemorrian
- R Refugian

Molluscan stage

- N Newportian
- P Pillarian
- J Juanian

* With contributions from R. Wells, P.D. Snavely, Jr., and N. MacLeod of the USGS