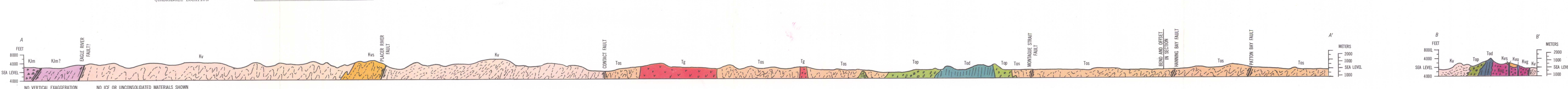
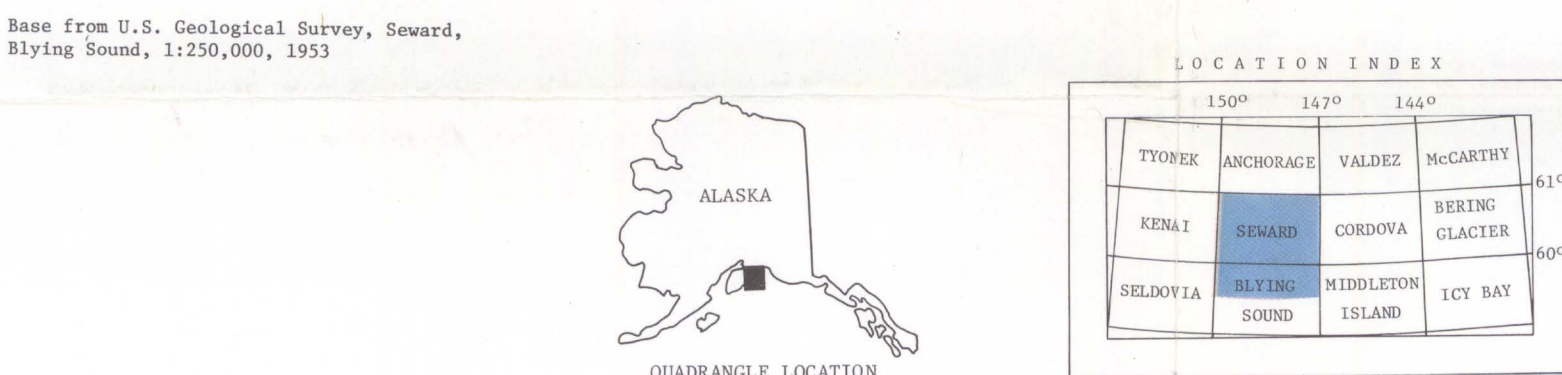


- DESCRIPTION OF MAP UNITS
- Qa Beach deposits (Holocene)—sand, gravel, and cobbles of present and former beaches, beach ridges, spits, and tidal flats.
- Qb UNCONSOLIDATED SURFICIAL DEPOSITS (Holocene)—Undifferentiated boulders, cobbles, gravel, sand, silt, and clay of present streams; angular clasts of talus and, locally, landslide deposits; stratified sand, silt, and clay of alluvial fan and floodplain deposits; well-sorted stratified sand and gravel of glacioluvial origin, including deltaic deposits; unsorted material of moraine deposits; glacial lake silt, clay, and musk deposits; and locally interstratified beach gravel, sand, and clay.
- Qc GRANODIORITE AND GRANITE (Oligocene)—Light-gray medium- to coarse-grained biotite (hornblende) granodiorite and granite stocks of central part of map area; larger stocks commonly grade from marginal zones containing more biotite (and locally hornblende) inward to more leucocratic zones; large parts of intrusions are porphyritic and contain orthoclase phenocrysts in a medium-grained groundmass; plagioclase ranges from oligoclase to andesine in composition, and biotite constitutes between and 15 percent.
- Qd CABRO (Oligocene, Eocene, or Paleocene)—Dark-gray fine- to medium-grained locally porphyritic gabbro composed of subequal amounts of labradorite and clinopyroxene; locally contains olivine on Fisher Island; pyroxene largely altered to hornblende north of Pelly Bay.
- Qe CEDAR BAY GRANITE (Eocene?)—Light-gray and pink medium- and coarse-grained muscovite (biotite) granite; plagioclase ranges from oligoclase to andesine in composition, and biotite is commonly less than 1 percent.
- Qf GRANITE OF HARBING ICEFIELD REGION (Eocene)—Medium- to dark-green foliated medium- to coarse-grained biotite-muscovite (hornblende) granite and granodiorite; marginal phases are locally biotite-muscovite (hornblende) tonalite; mafic minerals, almost wholly biotite, constitute 20 to 30 percent of minerals in tonalitic rocks, 15 to 20 percent of granodiorite, and 5 to 10 percent of granite; muscovite, a late but primary mineral, commonly makes up less than 5 percent.
- Qg ORCA GROUP (Paleocene and lower Eocene(?))—Includes:
- Qh SEDIMENTARY ROCKS, UNDIVIDED—Dark-gray flysch of thin- to thick-bedded sandstone, pebbly sandstone, siltstone, mudstone, and locally conglomerate and limestone; sandstone is composed chiefly of quartz and plagioclase; conglomerate clasts are mainly felsic porphyry and granite.
- Qi SILTSTONE—Dark-gray to black siltstone, mudstone, and minor fine-grained sandstone that is tightly folded and metamorphosed to siliceous medium- to green limestone; micritic limestone as much as 2 m thick present locally in slate; oolitic sandstone of siltstone present locally; some sedimentary rock types are included in sedimentary rocks; greenstone map units containing basalt sills (Top) and pillow basalt (Top).
- Qj PILLOW BASALT—Pale- to dark-green aphyric to porphyritic, commonly amygdaloidal, pillow basalt composed of plagioclase and clinopyroxene; plagioclase is generally replaced by albite and/or epidote, and clinopyroxene by hornblende, actinolite, and/or chlorite; vesicles mostly filled with chlorite; pillow basalt in some areas grades into subordinate pillow breccia and tuff.
- Qk PILLOW BASALT AND SEDIMENTARY ROCKS—Areas composed of about equal amounts of pillow basalt and interbedded sedimentary rocks of sandstone and subordinate siltstone. Present chiefly on Hurlingham, Borne, and Hurlingham Islands; basalt sills and dikes in slate and sandstone on Knight Island.
- Ql SHEETED BASALT DIKES—Dark-green, gray, and brown aphyric to porphyritic and gabbroic dikes composed mainly of plagioclase and clinopyroxene; felsic plagioclase-quartz dikes occur locally; plagioclase-clinopyroxene-olivine dikes are present but not common; plagioclase generally is replaced by albite; clinopyroxene largely is replaced by hornblende with fringes of actinolite; olivine is partly altered to serpentine; fine-grained basalt is commonly altered to an aggregate of chlorite, epidote, and actinolite; gabbroic dikes contain a few percent of opaque minerals.
- Qm GREENSTONE AND SEDIMENTARY ROCKS—Basalt sills intrude metasedimentary rocks, chiefly slate, on Hurlingham, Borne, and Hurlingham Islands; basalt sills and dikes in slate and sandstone on Knight Island.
- Qn CABRO AND DIKES—Medium- and dark-gray to green coarse-grained chiefly clinopyroxene-plagioclase rocks with ophitic to subophitic texture and locally distinct composition; locally pegmatitic with clinopyroxene crystals as much as 5 cm long; clinopyroxene commonly is partly replaced by albite and/or epidote; plagioclase is partly replaced by albite, epidote, and minor opaque minerals are common.
- Qo GREENSTONE, UNDIVIDED—Probably pillow basalt, basaltic tuff, and silt. Few small areas of mafic igneous rock were also included in this map unit because classification of rocks is uncertain; they include an outcrop on Outcrop Island not visited by authors, rocks with uncertain contact relation near Whiskey, Johnston, and Jacket Bays, and sheeted greenstone along Johnston Bay fault.
- Qp VALDEZ GROUP (Upper Cretaceous)—Includes:
- Qq SEDIMENTARY ROCKS, UNDIVIDED—Dark-gray thin- to thick-bedded sandstone, siltstone, and mudstone flysch; sandstone is fine to coarse grained and mainly is composed of plagioclase, quartz, and igneous rock fragments, the third ranging from a few percent to as much as 40 percent of rock; conglomeratic sandstone with clasts of sedimentary rocks are widely distributed, occurring in some sandstone beds; conglomerate composed of well-rounded pebbles and cobbles of felsic porphyry was observed in a few places; dense limestone concretions occur locally; unit is metamorphosed largely to chlorite zone of greenschist facies.
- Qr TUFF—Green to dark-gray fine-grained finely laminated tuff with plagioclase phenocrysts; metamorphosed to chlorite and biotite zones of greenschist facies; chlorite, epidote, and locally actinolite are abundant; remnants of olivine shards are present.
- Qs PILLOW BASALT—Pale- to dark-green aphyric to porphyritic, frequently amygdaloidal, pillow basalt composed of plagioclase and clinopyroxene; plagioclase commonly replaced by albite and/or epidote, and clinopyroxene by hornblende, actinolite, and/or chlorite; vesicles mostly filled with chlorite; pillow basalt in some areas is interlayered with subordinate pillow breccia and tuff.
- Qt SHEETED BASALT DIKES—Dark-green, gray, and brown aphyric to porphyritic and locally gabbroic dikes composed mainly of plagioclase and clinopyroxene; olivine present in a few dikes; plagioclase generally is replaced by albite, and clinopyroxene commonly replaced by hornblende with fringes of actinolite; olivine partly altered to serpentine; fine-grained basalt is commonly altered to an aggregate of chlorite, epidote, and actinolite; gabbroic dikes contain a few percent of opaque minerals.
- Qu CABRO—Green massive medium- to coarse-grained and locally pegmatitic gabbro composed chiefly of labradorite and clinopyroxene; commonly altered to varying degrees; pyroxene altered to green hornblende which is partly replaced by actinolite and/or chlorite; plagioclase commonly replaced by albite and epidote group minerals, and white mica; accessory minerals include magnetite, apatite, and quartz.
- Qv ULTRAMAFIC ROCKS—Dunite, locally with layers of chromite, moderately to mostly altered to serpentine, serpentine-talc, and talc schist; lustrous pale- to dark-green and black, locally reddish weathering rock that forms dike-like and irregularly shaped intrusive bodies.
- Qw SCHIST—Schistose, interbedded siltstone, graywacke, and less abundant tuff, tuffaceous sandstone, and basalt (pillow basalt); igneous rocks are typically dark green, meta-siltstone is shaly steel gray, and metasandstone is dark gray; metamorphosed chiefly to biotite zone of greenschist facies, but locally to chlorite zone; typical metamorphic mineral assemblages of biotite zone are biotite-muscovite-chlorite-quartz-wadite-calcite-albite; actinolite is present in some metavolcanic rocks; chlorite zone assemblages are similar but lack biotite.
- Qx MCHUGH COMPLEX (Upper Jurassic and/or Cretaceous)—Recognized in two areas:
- Qy Between Border Ranges fault and unnamed fault: melange of siltstone, sandstone, mud-chip sandstone, conglomeratic sandstone, tuff, and less abundant gabbro, serpentinite, bedded chert, and pillow basalt; fine-grained sedimentary strata commonly stretched out sedimentary and igneous rocks are broken and discontinuous; metamorphic minerals include muscovite, epidote, calcite, chlorite, albite, and veinlets of prehnite.
- Qz Between unnamed fault and Eagle River thrust fault(?): massive sandstone that is brown, tan, and gray-green thick-bedded ridge-forming medium- and coarse-grained locally conglomeratic sandstone; abundant mud chips give rock a distinct spotted appearance; sand grains are quartz, plagioclase, basalt fragments, sandstone fragments, clinopyroxene, and chert; conglomeratic phases contain clasts of sandstone, siltstone, limestone, granitic rock, chert, and basalt; unit locally contains thin beds of chert and siltstone; metamorphism of unit has produced albite, epidote, calcite, and chlorite; prehnite forms veins in some rocks.



## GEOLOGIC MAP OF THE SEWARD AND BLYING SOUND QUADRANGLES, ALASKA

By  
R. G. Tydal and J. E. Case  
1979

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