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Reconnaissance Geologic Map of the Petersburg A-2 Quadrangle, Southeastern Alaska

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INTRODUCTION

This map and its accompanying information were prepared specifically as a U.S. Geological Survey part of the State of Alaska Division of Geological and Geophysical Surveys and the U.S. Department of Interior Bureau of Land Management Alaska Minerals Section (Juneau, Alaska) mineral-resource studies of part of the Petersburg, Alaska 1:250,000-scale quadrangle. Those studies are a direct follow-up to geological, geochemical, and geophysical studies (cited below) done in the region by the Alaskan Branch of the U.S. Geological Survey in the 1970's and 1980's.

The geologic information presented here has been released previously in generalized form (Brew and others, 1984); the information is based on reconnaissance field mapping and thus does not have the density of field-station control, samples, or field observations that are expected in published U.S. Geological Survey 1:63,360-scale geologic maps. This map is one of a series that share the same format and general information (Brew, 1997a-m; Brew and Koch, 1997). There are both a combined description and a combined correlation of the map units for this whole series of maps (Brew and Grybeck, 1997).

The available information on known mineral deposits in the whole Petersburg-Wrangell area was released previously (Grybeck and others, 1984) and Brew and others (1989, 1991). Bedrock, stream-sediment, and other geochemical data were released and interpreted by Karl and others (1985), Karl and Koch (1990), Cathrall and others (1983a-w), and Tripp and Cathrall (1984). Aeromagnetic and aeroradioactivity surveys information was released by the U.S. Geological Survey (1978, 1979) and Bouguer gravity information by Barnes and others (1989). Remotely-sensed features were described by LeCompte (1981). Burrell and others (1982) released a preliminary bibliography of Petersburg and Port Alexander quadrangles-related items.

Assessments of the undiscovered mineral resources for the whole Petersburg/Wrangell area are also available (Brew and others, 1989, 1991, 1996; Brew and Drinkwater, 1991). Some of the mineral-resource-assessment tract information in neighboring areas was revised by Brew and others (1996). Brew (1993) presented a generalized view of metallogenic belts that includes this area.

Detailed information on the Late Cretaceous plutonic rocks in the Petersburg 1:250,000-scale quadrangle is found in Burrell (1984abc); major-element chemical and other data for the area were reported by Douglass and others (1989), and relatively young volcanic features were described by Brew and others (1979, 1984) and by Brew (1990). McClelland and Gehrels (1990) reinterpreted some of the geology in and around the Duncan Canal area, which lies to the northwest of this quadrangle.

The index map on the over-size sheet shows the major geological elements of the Petersburg-Wrangell area. They are, from west to east, (1) the Alexander belt, consisting of generally unmetamorphosed Lower Paleozoic through Upper Triassic rocks intruded by scattered mid-Cretaceous plutons, (2) the Gravina belt, consisting of unmetamorphosed to highly metamorphosed, variably deformed Upper Jurassic(?) through mid-Cretaceous flysch and volcanic rocks intruded by both mid- and Upper Cretaceous plutons, and (3) the Mainland belt, consisting of metamorphic rocks intruded by Upper Cretaceous, lower Tertiary, and mid-Tertiary plutons. Younger than almost all parts of all of these belts, and extending from the Alexander belt across the Gravina and onto the mainland belt, is the lower to middle Tertiary Kuiu-Etolin belt that consists largely of varied volcanic rocks, associated plutons, and minor sedimentary rocks. The Alexander belt corresponds more or less to the Alexander terrane of Berg and others (1978), the Gravina belt is a refined interpretation of their Gravina belt. This quadrangle includes only rocks of the (1) Duncan Canal-Zarembo Island-Screen Islands sub-belt of the Gravina belt, (2) Gravina belt itself, and (3) Kuiu-Etolin belt (see Correlation of Map Units diagram on the oversize sheet).

DESCRIPTION OF MAP UNITS

[Note: All formational and descriptive map-unit names in the text of the following descriptions are set off with quotation marks to make them easier to identify.]

Qs SURFICIAL DEPOSITS (Holocene and(or) Pleistocene)--Includes alluvium, colluvium, tidal mudflat deposits, and some glaciofluvial deposits. The distribution of most large areas of surficial deposits was mapped in the field, but the deposits have not been studied in detail; many small areas are not shown.

KUIU-ETOLIN BELT

Belt informally named by Brew and others (1979), redefined by Brew and Morrell (1983), and the age revised by Brew and others (1985).

EXTRUSIVE AND INTRUSIVE VOLCANIC ROCKS OF KUIU-ETOLIN VOLCANIC-PLUTONIC BELT (Quaternary and Tertiary)--Diverse volcanic rocks exposed in a broad area extending from northeastern Kuiu southeastward through Kupreanof and Zarembo Islands; one unit mapped in this quadrangle:

QTr Rhyolite, Rhyodacite, and Related Siliceous Extrusive and Intrusive Rocks--
In general, aphanitic to finely crystalline, generally quartz and feldspar porphyritic; C.I. less than 1. Locally layered, spherulitic, and(or) miarolitic; light gray fresh; buff, white, green lavendar, maroon, or pink where altered; generally rusty weathering. Pyrite and zeolites common. Many exposures are texturally complicated mixtures of discontinuous mm scale flow layered, brecciated, spherulitic, and phenocrystic rocks. Heterogeneous stratigraphy includes lava flows, obsidian flows, lahars, welded and nonwelded ash, tuff, and lapilli, all cut locally by porphyritic rhyolite and rhyodacite dikes. Extreme alteration, brecciation, attitudes of layering, and abundance of dikes identify vents and domes; massive structureless isolated rhyolite bodies suggest plugs; columnar-jointed cliff exposures in excess of 100 m thick are interpreted as cooling units. Exposed along west boundary of quadrangle near Steamer Bay on northwest Etolin Island.

INTRUSIVE GRANITIC AND OTHER ROCKS OF KUIU-ETOLIN VOLCANIC PLUTONIC BELT (Miocene and(or) Oligocene--Preliminary K-Ar determinations of about 20-22 Ma obtained on rocks from the "Granite of Central and Northern Etolin Island" (Tmge) (M. A. Lanphere, U.S. Geological Survey, written communs., 1981, 1982); descriptions given by Hunt (1984). Divided into:

Tmae Alkali Granite Satellitic to Granite of Central Etolin Island--
Biotite-amphibole alkali granite, granite, and alkali quartz syenite with minor amounts of quartz syenite to syenite. Massive, nonfoliated; allotriomorphic to hypidiomorphic; equigranular to seriate; medium- to very coarse-grained; C.I. 01 to 13. Weathers a distinctive pale orange to white. Generally homogeneous at outcrop scale. Feldspar mineralogy consists of well developed perthitic alkali feldspar, commonly intergrown with quartz in a coarse graphic texture, and general absence of plagioclase as a separate feldspar phase; distinctive mafic mineralogy includes blue-green to blue (sodic) amphibole (hornblende and riebeckite), dark brown, often reddish-brown, biotite, and locally abundant green (iron-rich) pyroxene which may also be associated with rare iron-rich olivine (fayalite); accessory minerals are fresh and coarse-grained and include sphene, allanite, rare fluorite, and magnetite which is locally either rare or abundant. Unit is exposed in several bodies and numerous unmapped dikes and small plugs satellitic to the main bodies of the "Granite of Central Etolin Island" (Tmge). Similar to that same body in general appearance, but is coarser-grained, more granular, lacks miarolitic cavities, and has an unusual mafic mineralogy.

Tmge Granite of Central and Northern Etolin Island--

Hornblende-biotite granite, alkali granite, quartz syenite, and alkali quartz syenite. Massive, nonfoliated; allotriomorphic to hypidiomorphic; equigranular to seriate; medium- to coarse-grained; C.I. 01 to 07. Weathers a distinctive pale orange to white; miarolitic cavities common, often rusty weathering. Generally quite homogeneous at outcrop scale. Feldspar mineralogy consists of common, but only rarely pervasive, graphic and micrographic intergrowths of quartz and well-developed microperthitic alkali feldspar; mafic mineralogy consists of dark brown to greenish-brown biotite and generally subordinate green to blue-green hornblende, both of which are often partially altered to chlorite; accessories include sphene, allanite, and locally abundant magnetite; epidote fills miarolitic cavities in several places. Minor amounts of fine- to medium grained, porphyritic biotite-hornblende quartz monzonite, quartz syenite, and granite (C.I. 03-10), frequently containing up to 10 percent rounded, very fine grained mafic (about C.I. 40) inclusions are present, generally near the margins of larger bodies. Unit forms the core of the large composite pluton on central Etolin Island, and is best exposed there along Burnett Inlet; also exposed as small bodies on Brownson Island, near Fisherman's Chuck, in the Niblack Islands, and in numerous small unmapped plugs and dikes within the migmatitic rocks surrounding the core. On northern Etolin Island it forms the pluton at Bessie Peak just north of this quadrangle as well as several small plugs and dikes which invade the adjacent country rocks and the migmatite at Anita Bay. The body at Bessie Peak has a more homogeneous composition and carries more fine-grained mafic inclusions than does the body at Burnett Inlet.

Tmme Migmatitic Granitic Rocks of Central and Northern Etolin Island--
Hornblende-biotite-pyroxene quartz monzodiorite, quartz monzonite, granodiorite, quartz diorite, and diorite paleosomes invaded by neosomes of these same compositions as well as of granite, alkali granite, and quartz syenite. Massive, extremely heterogeneous, and generally nonfoliated; hypidiomorphic to allotriomorphic; equigranular to seriate to porphyritic; generally fine- to medium-grained; C.I. 10 to 50 (paleosomes), 03 to 25 (neosomes). Feldspar mineralogy consists of zoned plagioclase, in places rimmed by potassium feldspar, abundant "clots" of interstitial potassium feldspar, and generally rare micrographic intergrowths; highly intergrown and generally subophitic mafic minerals in the more dioritic phases consist of abundant pale clinopyroxene, local additional orthopyroxene, both occurring as cores in green-brown hornblende, associated pale-green fibrous secondary amphibole, brown biotite, and very rare olivine; accessories include sphene, apatite, magnetite, and rare allanite. Unit makes up the outer portion of the large composite pluton on central Etolin Island at Burnett Inlet, as well as a smaller body at Anita Bay associated with the granite at Bessie Peak just north of this quadrangle, and an irregular zone associated with the granite on the Niblack Islands in Ernest Sound. Dioritic phases resemble rocks within the outer portions of the pluton at Washington Bay on northwestern Kuiu Island, and rocks comparable to other phases can also be found associated with the granitic plutons on Zarembo, Kupreanof and northeastern Kuiu Islands.

Tmaz Alkali Granite of Northwestern Etolin and Southeastern Zarembo Islands--
Amphibole-biotite alkali granite and subordinate granite. Massive, nonfoliated; allotriomorphic to hypidiomorphic; equigranular to seriate, some porphyritic; medium- to coarse-grained; C.I. averages 04. Miarolitic cavities common and locally abundant; quite homogeneous at outcrop scale, but with locally abundant hornfels inclusions. Feldspar mineralogy consists of perthitic alkali feldspar, a variety of exotic (and in places pervasive) graphic and micrographic textures, and rare occurrence of plagioclase as a separate feldspar phase; mafic mineralogy is distinctive and includes green, blue-green, and blue (sodic) amphibole (hornblende to riebeckite), dark brown to reddish-brown biotite, and locally abundant green (iron-rich) pyroxene; mafic minerals altered and partially replaced by chlorite; accessories include locally abundant sphene, allanite, apatite(?), magnetite, and minor hematite; epidote fills some miarolitic cavities. Unit on Zarembo Island includes minor coarse-grained, subophitic, hornblende-biotite-pyroxene diorite (C.I. 40-45) that resembles diorites within the "Migmatitic Granitic Rocks of Central and Northern Etolin Island" (Tmme) as well as the diorites associated with the granites on Kupreanof and Kuiu Islands. Unit exposed in two possibly interconnected bodies at Quiet Harbor on northwestern Etolin Island and at Round Point on southeastern Zarembo Island, as well as in several small plugs and dikes that invade the adjacent country rocks on Zarembo Island. Resembles the "Granite of Central and Northern Etolin Island" (Tmge) in composition and texture, while the mafic mineralogy is similar to the "Alkali Granite Satellitic to Granite of Central Etolin Island" (Tmae).

Tsh HORNFELSED SEYMOUR CANAL FORMATION ROCKS (Miocene and(or) Oligocene)--Albite-epidote hornfels facies rocks, generally preserving both original structures and textures and(or) the metamorphic effects of Cretaceous metamorphic events, in aureoles on Etolin Island. The limits are, as described under the heading "Metamorphosed Stephens Passage Rocks" in the section on the Gravina belt, poorly defined and the unit may not be as extensive as presently shown. Age of protoliths is Late Jurassic to middle Cretaceous, based on on an ammonite of Albian age (D. L. Jones, U.S. Geological Survey, written commun., 1979) collected on the northwest shore of Etolin Island and on obvious derivation from the Seymour Canal Formation (KJss). Unit is exposed throughout this quadrangle.

GRAVINA BELT

The term Gravina belt is used here to denote sedimentary and volcanic rocks of Late Jurassic and Early Cretaceous age, as well as the pre-Cenozoic granitic and other rocks intruded into them, in the east-central part of the Petersburg-Wrangell map area. As used here, the term also includes rocks of indeterminate Mesozoic age in a broad zone to the west of and adjoining the Jurassic and Cretaceous rocks. This zone is called the Duncan Canal-Zarembo Island-Screen Island sub-belt and it has within it blocks of Paleozoic and Mesozoic rocks unlike any elsewhere in the Gravina belt, but similar to some in the Alexander belt. The Gravina belt as used here more or less corresponds to the Gravina belt as defined by Berg and others (1978), but the map distribution does not correspond because of newer information and differing interpretations.

INTRUSIVE ROCKS OF ADMIRALTY-REVILLAGIGEDO PLUTONIC BELT AND ASSOCIATED MIGMATITE (Upper Cretaceous)--Belt informally named by Brew and Morrell (1983) and described by Burrell (1984abc); preliminary K-Ar determinations by M. A. Lanphere, U.S. Geological Survey, (written communs., 1981, 1982; reported in Brew and others, 1984) interpreted to be applicable to the whole suite, including the rocks in this quadrangle, are as follows:

Map unit	General location	Biotite age	Hornblende age
Ktif unit	Wrangell Is.	83.2 Ma	91.6 Ma
" "	Mitkof Is.	-	89.1 Ma
Ktef unit	Zarembo Is.	90.4 Ma	93.0 Ma

Somewhat similarly dated rocks occur in lithically correlative units to the east in the Bradfield Canal quadrangle (R. L. Elliott and R. D. Koch, U.S. Geological Survey, oral commun., 1982; Koch and Berg, 1996). Divided into:

Ktef Hornblende-Biotite Tonalite and Granodiorite, Quartz Monzodiorite, and Quartz Diorite--Foliated to massive equigranular; average grain size is medium, fine-grained near some margins; C.I. 17 to 50. Color is light to medium gray fresh; weathers brownish to dark gray. Foliation varies both in direction and development; it is moderately developed on the west side to very well developed on east side of Wrangell Island; locally semischistose and cataclastic. Contains aplite dikes, pegmatite dikes and veins, rounded very fine-grained hornblende diorite inclusions. Occurs as generally concordant intrusions as sills with country rock and screens of country rock in margin of body. Mineralogy includes zoned, complexly twinned plagioclase with minor alteration to sericite; mafic minerals usually biotite greater than hornblende; subhedral epidote; and local garnet and pyroxene. Accessory minerals are sphene, apatite, opaque minerals and allanite. Unit differs from "Hornblende-Biotite Tonalite, Granodiorite, etc." (Ktif) mapped in other quadrangles by presence of pyroxene and garnet, and biotite as the dominant mafic phase. Unit is exposed in the northeastern part of this quadrangle on Etolin Island.

Ktgp Biotite Tonalite, Quartz Diorite, and Granodiorite--Porphyritic and foliated; medium- to coarse-grained; C.I. 11 to 35. Cut by pegmatite and basalt dikes; local cataclastic texture; inclusions of country rock. Mineralogical features include zoned, complexly twinned plagioclase, quartz, interstitial K-feldspar, partly chloritized biotite, epidote, minor local hornblende; and garnet, sphene, apatite and allanite as accessories. The unit in this quadrangle on Etolin Island lacks K-feldspar and shows moderate to extreme alteration of plagioclase, biotite, and garnet. Unit differs from "Biotite-Epidote-Hornblende Quartz Monzonite" (Kqop) mapped to north of this quadrangle by lack of hornblende and presence of garnet.

METAMORPHOSED STEPHENS PASSAGE GROUP ROCKS (Upper Cretaceous)--In general, these units are associated with the Upper Cretaceous and Tertiary plutons (of the Kuiu-Etolin plutonic belt) in the Gravina Belt. The rocks have been rather arbitrarily assigned a Late Cretaceous age and are described here or assigned a Tertiary age and described elsewhere as "Hornfelsed Seymour Canal Formation Rocks" (Tsh) based on the known or inferred age of the pluton(s) nearby. This results in a potentially misleading map pattern, however, because the metamorphic rocks adjacent to Tertiary plutons may have undergone Upper Cretaceous metamorphism as well and the units that are based on Tertiary metamorphic effects alone are poorly defined. The Cretaceous age assignment used here is also not entirely satisfactory from either a field-mapping or petrographic-study viewpoint; this is due to both the complexity of spatial overlapping metamorphic effects and the apparent lack of an unmetamorphosed protolithic unit for one of the metamorphic units mapped outside of this quadrangle. Only one unit is mapped in this quadrangle:

Ksg Greenstone and Greenschist--

Subgreenschist to greenschist facies rocks mapped outside this quadrangle within the "Phyllite Unit" (Ksp) on Lindenberg Peninsula, Kupreanof Island. Dominantly fine- to medium-grained, relict pyroxene-phenocryst-bearing epidote-albite-chlorite greenstone; poorly foliated, weathers dark greenish gray, grayish-green fresh. Probably derived from intermediate composition volcanic breccias; forms poor rounded outcrops. Some greenschist and green phyllite, although most of the latter has been mapped with the "Phyllite Unit" (Ksp) in other parts of the Petersburg-Wrangell area. Age inferred from this units relation to that same unit. Exposed on the north side of Anita Inlet on Etolin Island in this quadrangle.

STEPHENS PASSAGE GROUP (Upper Cretaceous/Cenomanian to Upper Jurassic(?))--Name proposed by Lathram and others (1965) for the "...sequence of slate, graywacke, conglomerate, and augite-bearing volcanic flow breccia, Late Jurassic and Early Cretaceous in age, which forms a well-defined northwest-trending belt of rocks exposed along the eastern slopes and shores of Admiralty Island...". This sequence also occurs south and east of Admiralty Island (Souther and others, 1979) and extends southward into the map-area described here. Information presented by Brew and others (1984) showed that the Group is as young as Albian or Cenomanian, i.e., late Early and early Late Cretaceous, in this area. The "Brother's Volcanics"-"Douglas Island Volcanics" unit likely intertongues with the Seymour Canal Formation, probably near the top of the latter (Loney, 1964). Cohen and Lundberg (1993) reported on details of the Seymour Canal Formation north of this quadrangle. As mapped includes:

KJsv Brothers Volcanics/Douglas Island Volcanics--Augite-bearing flows, volcanic breccia, and intercalated tuff, volcanic graywacke, phyllite and slate

Andesitic to probably basaltic composition; weathers dark greenish-gray, gray, and green; generally lighter colored where fresh; relict augite phenocrysts conspicuous in most outcrops. Probably a few thousand meters thick; individual flow or breccia units as much as a few hundred meters thick and graywacke, tuff, and slate lenses may also be that thick. No fossils have been found in this unit in the Petersburg-Wrangell map area; its age is based on its close association with the locally fossiliferous Seymour Canal Formation. The "Brothers Volcanics" was named by Loney (1964) from exposures just north of this map area; the "Douglas Island Volcanics" was named by Lathram and others(1965) on Admiralty Island with the name taken Douglas Island to the north. Exposed in the western part of this quadrangle on Etolin Island; the best and least deformed and metamorphosed outcrops are on southwestern Mitkof Island and near Steamer Bay on Etolin Island. See also Berg and others (1972); Ford and Brew (1977, 1978) and Page and others (1977).

KJss Seymour Canal Formation--Graywacke, slate, and minor conglomerate. Composed largely of volcanic debris, except for the conglomerates, which are polymictic and contain granitic clasts; most are turbidites, but nothing more is known of the depositional environment. Generally weathers dark greenish-gray, brownish gray, and very dark gray; graywacke and slate/argillite are locally calcareous and lighter colored; sedimentary structures common, although few directional features have been noted. Probably a few thousand meters thick; some individual graywacke units are massive and 10's of meters thick, but most are 1 to 20 cm thick. Numerous fossil collections by Loney (1964) established a Late Jurassic and Early Cretaceous age for the unit on Admiralty Island; that age has been confirmed by subsequent collections (Berg and others, 1972), who collected an Albian ammonite, a Valanginian(?) pelecypod, and Berriasian pelecypods from the western Etolin Island area and by collections made by Brew and others (1984), including an Albian or Cenomanian ammonite (D. L. Jones and J. W. Miller, U.S. Geological Survey, written commun., 1979) from hornfelsed Seymour Canal Formation and by Kimmeridgian to Tithonian pelecypods from the western Etolin Island area (R. W. Imlay, U.S. Geological Survey, written commun., 1982). The "Seymour Canal Formation" was named by Loney (1964) from exposures at the mouth of Seymour Canal on Admiralty Island; the name was extended to the rest of Admiralty Island by Lathram and others (1965) and to northern Kupreanof Island by Muffler (1967). Probably grades into the more deformed and generally finer grained "Semischist and Phyllite, Etc." (Mzs) and the "Phyllite and Slate, Etc." (Mzp) to the west. Exposed in this quadrangle on western Etolin Island.

DUNCAN CANAL-ZAREMBO ISLAND-SCREEN ISLAND SUB-BELT OF THE GRAVINA BELT

See "Gravina belt" heading (above) for background information.

METAMORPHOSED STEPHENS PASSAGE GROUP AND OTHER ROCKS (Upper(?) Mesozoic)--Currently interpreted to be mostly metamorphic equivalents of the Stephens Passage Group, but some may be derived from Cannery Formation (Muffler, 1967; Brew and others, 1984), some from a different facies of the Stephens Passage Group, and some from a previously unrecognized facies of Triassic rocks. As mapped in this quadrangle includes:

Mzs Semischist and phyllite--

Metamorphosed From Graywacke and Siltstone; now low grade (probably sub-greenschist facies) metamorphic rocks; locally highly folded; generally poorly foliated but finer-grained phases have good cleavage. Brownish-gray fresh, gray to brown weathered; relict textures and sedimentary structures indicate derivation from a graywacke and siltstone or mudstone turbidite sequence. Unit in some places encloses several large lenses of the "Fossiliferous Limestone" (Dls) of Devonian age, but there is no direct indication of the age. Proximity to "Seymour Canal Formation" (KJss) outcrops and compatibility of the protoliths with that formation suggest that this unit is a metamorphic and deformed equivalent of that formation. Unit contrasts with the "Phyllite and Slate Metamorphosed From Mudstone and Minor Graywacke" (Mzp) (mapped elsewhere in the Petersburg-Wrangell area) in the proportion of originally coarse-grained sediments, and in the general absence of volcanic(?) protolith phyllite in this unit. The two units probably intertongue much more complexly than is shown on the maps. Exposed in the Mosman Inlet area on Etolin Island.

Mzl Massive Limestone--

Limestone and minor shale; weathers light to medium gray, light gray fresh; poorly bedded at 10-50 cm scale in a few places Most is fine- to medium-grained and much may be recrystallized. No fossils (including conodonts) found, so age assigned is Upper(?) Mesozoic based on association with the enclosing units; it is equally likely that (as predicted from analogy with the other limestone lenses) these lenses are somehow related to the "Fossiliferous Limestone" (Dls) of Devonian age exposed elsewhere in the quadrangle. Unit crops out at Mosman Inlet on Etolin Island, where it is medium-grained marble.

Mzv Greenschist and Greenstone Metamorphosed From Intermediate to Mafic Volcanic Rocks--

Greenschist, greenstone, phyllite, minor semischist; weathers light to dark green, locally brownish pillow breccia, agglomerate flows, and possible tuffs; appears less deformed and less metamorphosed than other nearby rock units; probably several thousand meters thick. Locally abundant relict pyroxene phenocrysts suggest a close link to the "Douglas Island Volcanics" (KJsv). Inferred upper Mesozoic age based on association with other units. Unit contrasts with the "Phyllite and Slate Metamorphosed From Mudstone and Minor Graywacke" (Mzp) mapped elsewhere in the Petersburg-Wrangell area in its apparent lesser metatuff and its higher proportion of rocks of volcanic origin. Exposed along and near Duncan Canal and on Woewodski and Zarembo Islands, on Key Reef in Clarence Strait, and, in this quadrangle, beneath the waters of Clarence Strait in the southwestern corner of the map area.

Dls FOSSILIFEROUS LIMESTONE (Lower and Middle Devonian)--

Medium-bedded to massive, fine- to medium-grained; light to medium gray fresh and weathered; locally fetid. Individual lenses up to several hundred m thick; contains brachiopods, corals, crinoids, and (locally) fusulinids. Northwesternmost exposures in the region (mapped by Muffler, 1967, as part of the Gambier Bay Formation) contain corals or stromatoporoids of Middle Devonian or possibly Late Silurian age (Muffler, 1967). Abundant old and new collections from the several fossiliferous lenses at and near the head of Duncan Canal northwest of this quadrangle contain Lower and Middle Devonian corals, brachiopods, and conodonts (Buddington and Chapin, 1929); A. G. Harris, U.S. Geological Survey, written communs., 1979, 1980, 1983; W. A. Oliver, Jr., U.S. Geological Survey, written commun., 1979; J. T. Dutro, Jr., U.S. Geological Survey, written communs., 1979, 1980) and the smaller lenses in Clarence Strait (Key Reef and Abraham Island) contain Lower(?) Devonian corals (W. A. Oliver, Jr., U.S. Geological Survey, written communs., 1978, 1983). All of the above fossil and age information reported previously by Brew and others (1984).

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