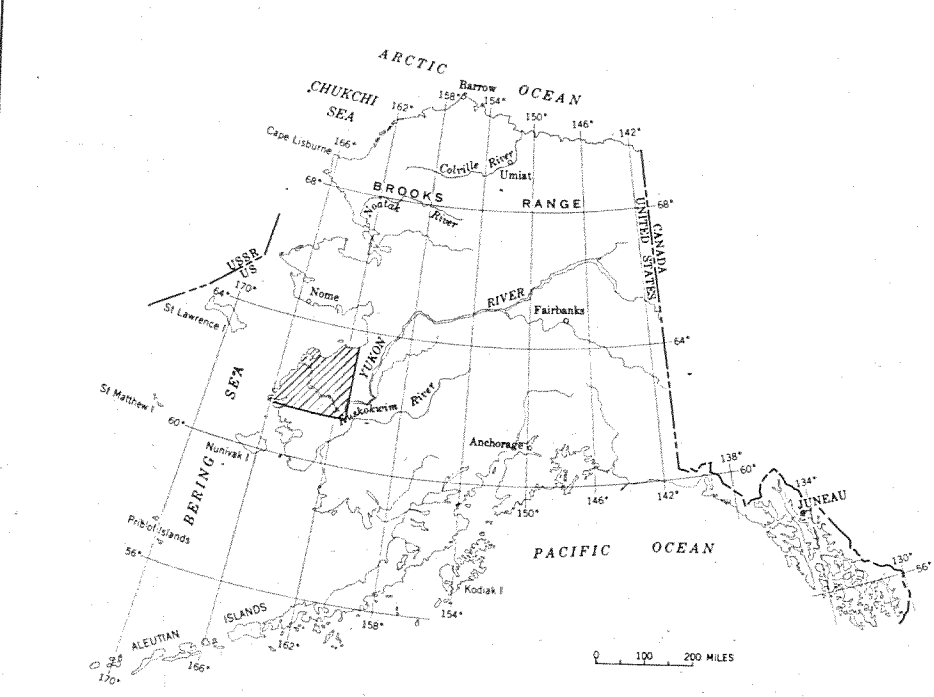
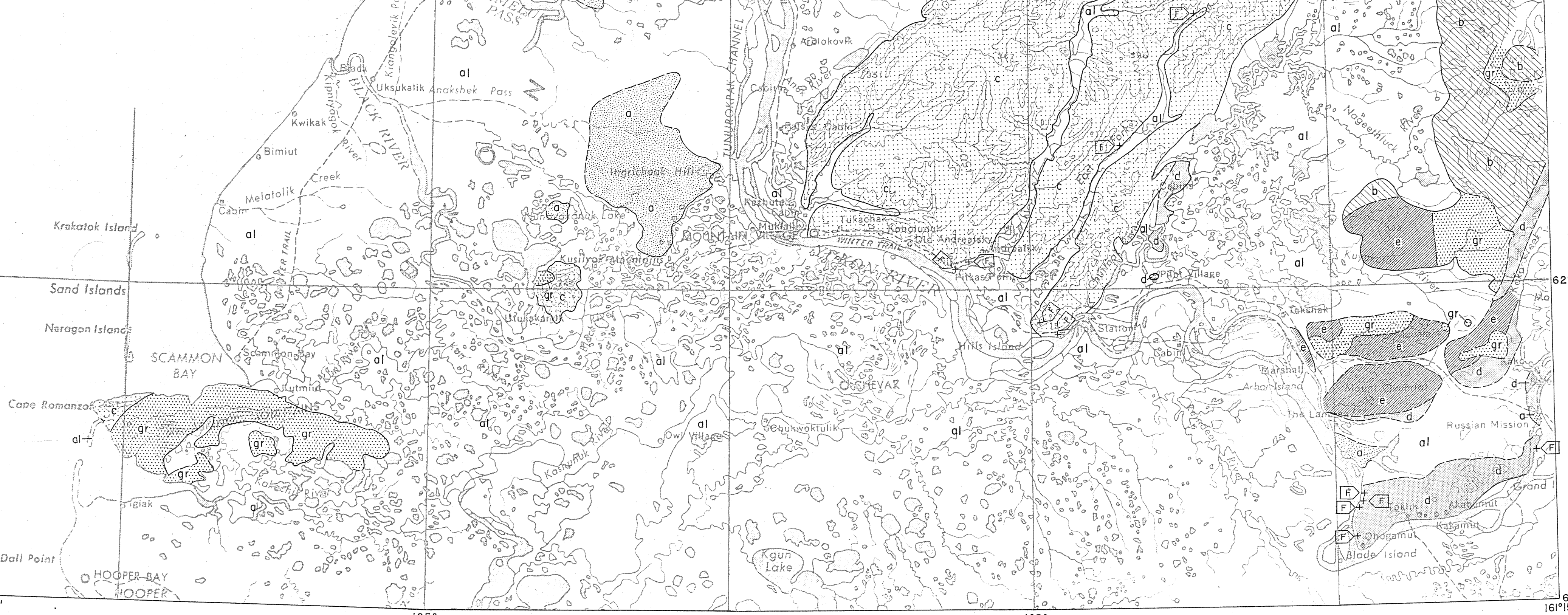


- EXPLANATION**
- SURFICIAL DEPOSITS**
- al Floodplain, beach, and wind-blown silt deposits
- CONSOLIDATED DEPOSITS**
- a Undeformed basalt flows
  - g Porphyritic and nonporphyritic granitic rocks
  - c Moderately deformed andesite and basalt flows
  - d Interbedded sandstone, shale, and siltstone
  - e Interbedded volcanic and sedimentary rocks
- CRETACEOUS AND/OR TERTIARY**
- Upper Cretaceous and/or Tertiary
  - Lower Cretaceous and/or Tertiary
- JURASSIC AND CRETACEOUS**
- Chiefly greenstone, quartzite, chert, and limestone; includes many small intrusives in Mt. Okumiat area
- PERMIAN**
- Contact
  - Dashed where approximately located or inferred
  - F Fossil locality

# NORTON SOUND



INDEX MAP OF ALASKA, SHOWING LOCATION OF AREA DISCUSSED IN THIS REPORT



## PRELIMINARY GEOLOGIC MAP OF LOWER YUKON-NORTON SOUND REGION, ALASKA

By  
J. M. Hoare and W. H. Condon

SCALE 1:500,000  
0 10 20 30 40 MILES

1962 MAGNETIC DECLINATION OF SOUTH EDGE OF MAP RANGES FROM 16° TO 19° 45' EAST  
1962

**INTRODUCTION**

This is a preliminary report of geologic investigations in the lower Yukon-Norton Sound region, Alaska. It is based upon information obtained on a boat traverse of the lower Yukon in 1950 and by use of a helicopter in 1961. The study of vertical airphotos yielded much information which was useful in guiding the field work and compiling the geologic map.

Fossil identifications are by Ralph M. Inley, David L. Jones, and Jack A. Wolfe, of the U.S. Geological Survey.

**BEDDED ROCKS**

Bedded rocks ranging in age from Paleozoic to late Cenozoic crop out widely in the eastern half of the mapped area and at a few places farther west where thick unconsolidated deposits of Quaternary age cover most of the bedrock. For mapping purposes the bedded strata are divided into five units. These units are primarily lithologic rather than stratigraphic because at the present stage of investigation it is not possible to correlate some of the strata with much assurance. However, the probable age of most of the strata, based partly on fossil evidence and partly on apparent stratigraphic position, is indicated where known.

**UNIT a**

The rocks of unit a crop out in the vicinity of Marshall and extend eastward beyond the limits of the area mapped for this report. They consist of massive greenstone formed by the alteration of mafic volcanic rocks which is interbedded with chert, quartzite, pebble conglomerate, graywacke, dark argillitic rocks, and limestone. Between Marshall and the Yukon River and in the vicinity of Mt. Okumiat the unit is intruded by a large stock of biotite granite and numerous small bodies of diorite and rhyolite. In the vicinity of the intrusive bodies the rocks of unit a are metamorphosed to epidote-bearing amphibolite, quartz-biotite-muscovite schist, and chlorite-talc schist. The thickness and stratigraphic sequence of the unit is not known because the strata are compressed into tight folds and broken by many faults.

Fossils were found in these rocks in the area covered by this report but they are assumed to be Permian age because they are in part lithologically similar to and strike toward fossiliferous limestone of Permian age a few miles farther east. They were mapped as Carboniferous by Harrington (1918, p. 23-25, pl. 3) who also correlated them with the rocks of Permian age which crop out farther up the Yukon.

**UNIT b**

Unit b crops out near the east edge of the area mapped for this report from the Yukon River northward, in the valley of the Chulitna River, and north of Norton Sound in the vicinity of the Nobeck Village and extends northeast parallel to the Andreafsky and Chulitna Rivers. The unit also crops out on Cape Ronanoff and forms most of the Kusliak Mountains.

The rocks consist of medium- to dark-gray sandstone interbedded with equal or greater amounts of siltstone. The siltstone is quite shaly. Conglomeratic strata were noted in only one place.

Most of the sandstone is graywacke consisting of mixtures of angular and rounded clasts in a fine-grained matrix. It commonly contains carbonized plant trash and locally shows faint ripple marks, small-scale crossbedding, and other evidence of near-shore, shallow water deposition. Several collections of fossils consisting of molluscs and plants were obtained from these rocks. The fossil plants, which were obtained on the Yukon about a mile below Pilot Station and at three places on the East Fork of Andreafsky River, were examined by Jack A. Wolfe, who reports that they are late Early or early Late Cretaceous (Albanian or Cenomanian) age. Two collections of pelecypods were obtained near the mouth of the Andreafsky River, and three others on the East Fork of Andreafsky River. The collections were examined by David L. Jones who reports that the first two collections are late Early Cretaceous (Albanian) age; the remaining four collections consist of fresh water forms (Unit sp.) which are not diagnostic of age. However, the collection of fresh water forms were obtained from the same strata as the fossil plants identified by Wolfe as late Early Cretaceous or early late Cretaceous age. All fossil collections were obtained from the lower part of the unit, unit c may include rocks of Late Cretaceous age as well as Albanian age.

**UNIT c**

Unit c is made up of sedimentary rocks that crop out at intervals along the Yukon from the vicinity of Pilot Station to the Kusliak Mountains. The rocks consist of medium- to dark-gray sandstone interbedded with equal or greater amounts of siltstone. The siltstone is quite shaly. Conglomeratic strata were noted in only one place.

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**UNIT d**

Unit d crops out near the east edge of the area mapped for this report from the Yukon River northward, in the valley of the Chulitna River, and north of Norton Sound in the vicinity of the Nobeck Village and extends northeast parallel to the Andreafsky and Chulitna Rivers. The unit also crops out on Cape Ronanoff and forms most of the Kusliak Mountains.

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**UNIT e**

Unit e consists of moderately deformed andesite and basalt flows that crop out near the headwaters of the Nobeck River. The rocks are mostly porphyritic dark gray or black and are commonly vesicular and amygdaloidal. Some of the flows are pyroclastic but they are less altered than the volcanic rocks in unit d. The olivine noted in one flow is partly altered to nepheline. The gray matrix in some of the flows is somewhat detritified. Many of the flows show a well-developed platy parting parallel to the flow planes, which commonly dip 10° to 20° northward, and locally dip as much as 50°.

The flows are thought to be of Tertiary or possibly late Cretaceous age because they are more deformed and altered than the Quaternary age and less deformed and altered than rocks mapped as unit d of Mesozoic age.

**UNIT g**

Intrusive igneous rocks are chiefly granitic and rhyolitic but include a few dikes and sills of mafic rocks. Strata ranging in age from late Paleozoic to late Mesozoic and possibly Tertiary (unit b) are intruded by the igneous rocks; so some of them, at least, are as young as late Cretaceous or Tertiary. The fact that granite pebbles are common in conglomerate of Cretaceous age further east suggests that some of the granitic bodies may be of pre-Cretaceous or very Early Cretaceous age. The chief areas of intrusive activity are the Kusliak Mountains, Kusliak Mountains, Mt. Okumiat, Filcher Mountain, north of the Yukon River, west of Koko Creek, the Wolf Creek Mountains, and near the headwaters of the East Fork of Andreafsky River. Several small bodies of intrusive rocks have been omitted from the geologic map owing to their size.

Preliminary study of the intrusive rocks indicates that they are of two general groups. The first group consists of gray, medium-grained biotite granite and hornblende gneiss. The second group consists of fine-grained, porphyritic gray rhyolite and dacite. The Kusliak Mountains and the slopes of Filcher Mountain are formed on granitic rocks of the first group. The top of Filcher Mountain consists of contact-metamorphosed greenstones. The Kusliak Mountains are formed chiefly on baked, slightly metamorphosed sedimentary rocks of unit c, which are intruded by fine-grained, porphyritic rhyolite and dacite dikes and sills. The porphyritic rocks are probably syenites from an underlying granite body, because the widespread baking of the sedimentary rocks cannot be attributed to the porphyritic rocks which crop out mostly near the north side of the mountains.

**UNIT al**

Surficial deposits comprise unconsolidated deposits of silt, sand, and gravel of Quaternary age. They include older terrace gravels and silt of Pleistocene age and recent flood-plain alluvium and beach deposits.

Unconsolidated deposits are most extensively developed along the south shore of Norton Sound from St. Michael southwestward and west and south of the Yukon River. North of the Yukon the deposits are best developed near the mouths of large tributary streams such as the Chulitna and Andreafsky Rivers.

The deposits contain quantities of brown peat in layers that are commonly several feet thick. Much of the peat and most of the older silt deposits are permanently frozen. The thickness of the deposit varies from a few inches on bedrock hills to many hundreds of feet far from the Yukon delta.

In some areas the finer grained deposits have been reworked by wind action. Extensive deposits of windblown silt occur a few miles south of the Yukon. South of the town of Russian Mission windblown silt blankets the hills and reaches to a height of at least 500 feet above the level of the Yukon River.

**REFERENCE**

Harrington, G. L., 1918, The Anvik-Andreafsky region, Alaska: U.S. Geol. Survey Bull. 683, 70 p.

Base map from U. S. Geological Survey, 1:1,000,000 International Map of the World, Bethel NP-3, 4 1956

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards

OPEN FILE MAP Alaska No. 134

One sheet only - no separate text

Geology mapped in 1960 and 1961