

Description of Map Units

Map Unit	Description of materials	Distribution and thickness	Topography and drainage	Petroleum	Suitability for frost action	Suitability for construction	Special problems	Introduction
0b Marine beach	Chiefly coarse to fine sand, granule and pebble gravel. Cobble as large as 12 cm diameter occur as surface layer, but are in finer gravel deposits. Includes some silt and argillaceous layers and lenses, and some thin, shaly, argillaceous layers to 1 m in diameter. Gravel well rounded, smooth, locally polished. Contains quartzite, granite, and dolomite. Generally consists less than 5 percent silt, even in pit run samples. Contains marine shells.	Distributed along modern shore and at former shorelines. Deposits are characteristically thin and narrow, but may be laterally extensive where part of an offshore bar complex. Highest known beach gravel deposit is located on the Kiklovik River (Chapman and Sabh, 1960).	Forms subparallel ridges along and inland from the present shoreline. Surface drainage parallels ridges and is toward the west. Drains of ridges east.	Actively forming beaches have active layer as much as 2 m thick, but beach ridges away from shorelines are generally less than 1 m thick. Beach ridges are placed naturally by present-day currents and whether any further erosion would result.	Generally good, but requires binder stabilization for use as fill, base course, or surface course. Contains shell and coal fragments that are deleterious for use as concrete aggregate.	Generally good, but requires binder stabilization for use as fill, base course, or surface course. Contains shell and coal fragments that are deleterious for use as concrete aggregate.	Small volume at inland sites. Some exposure of surficial deposits, but no data to determine whether or not erosion would result.	This preliminary report consists of a map at 1:500,000 scale and a tabular explanation describing the surficial deposits, their landforms, and some of their physical characteristics. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.
0c Marine silt	Sandy silt containing scattered pebbles and some lenses of sand, clay, pebbly sand, and fine gravel. Contains fossil shells and some of marine mammals, organic bones and shells. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Exposed in lowlands bordering Elson Lagoon and Harrison and Smith Bays, and smaller marine sand in coastal bluffs and gully walls between Barrow and Kuparuk River near Barrow Bay. Also in the beneath marine sand between Kiklovik Bay and Harrison Bay. Thickness 10 to 15 m near Shull Cliff and about 25 m (locally below the east of Barrow), thence generally directly to within 20 m of present coast. Extensively reworked by thaw lake activity.	Forms flat, lake-dotted coastal plain. Drainage is toward the west. Drains of ridges east.	Most units are very high content of interstitial ice and silt ice lenses; deposits probably less ice in excess of volume of voids down to 6 or 8 m below surface. Deposits are generally well sorted, but some units contain large clasts of ice wedges, youngest part of unit consists of smaller ice lenses 10 m apart and lower overall ice content than older units. Ice lenses are of varying sizes, but most are of the order of 10 to 20 cm in diameter. Active layer less than 0.5 m thick.	Not suitable for foundations because of excessive differential settlement on thaw of permafrost. Construction materials not readily available.	High liquefaction potential when thawed. Easily eroded.	The information presented is based on previously published and unpublished reports (see list of sources of information), an extensive interpretation by the authors, and on fieldwork during the summer of 1957 by J. C. Williams in the northeastern part of the Barrow area. The map and tabular explanation were prepared by J. C. Williams in the northeastern part of the Barrow area. The map and tabular explanation were prepared by J. C. Williams in the northeastern part of the Barrow area. The map and tabular explanation were prepared by J. C. Williams in the northeastern part of the Barrow area.	
0d Marine sand	Fine to medium sand containing pebbles and granules of chert; also includes silt or clayey sand, sandy silt, and inner beds, and some of organic material. Massive to poorly stratified; coarse and organic components commonly cemented and deformed by burrows. Contains fossil shells.	Forms the relatively flat part of the coastal plain formerly occupied by shallow seas, barrier islands, bars, and spits; exposed in coastal bluffs along Kuparuk and Chukchi Seas. Deposits of more than one marine transgression are present. Deposits are extensively reworked by thaw lake activity.	Forms lake-capped coastal plain. Drainage locally good in residual sand, but poor in those lake basins that contain reworked marine sand, silt, and organic deposits.	Contains ice wedges and very high volume of ice as small interstitial lenses and lenses. Interstitial ice lenses of upper 5 m of deposits are generally well sorted, but some units contain large clasts of ice wedges, youngest part of unit consists of smaller ice lenses 10 m apart and lower overall ice content than older units. Ice lenses are of varying sizes, but most are of the order of 10 to 20 cm in diameter. Active layer less than 0.5 m thick.	Not suitable for foundations because of excessive differential settlement on thaw of permafrost. Construction materials not readily available.	Easily eroded by water and wind when surface vegetation removed.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0e Upland silt	Silt, silty sand, and fine sand, including clay and organic material. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Lies between 45 and 140 m above sea level in an east-west belt at the boundary between the coastal plain and the upland. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Forms flat to gently rolling terrain broken by ripples, stream valleys, and low ridges. Drainage generally poor, except on steep slopes and hill crests.	Contains ice wedges and a very high volume of ice as small interstitial lenses and lenses. Interstitial ice lenses of upper 5 m of deposits are generally well sorted, but some units contain large clasts of ice wedges, youngest part of unit consists of smaller ice lenses 10 m apart and lower overall ice content than older units. Ice lenses are of varying sizes, but most are of the order of 10 to 20 cm in diameter. Active layer less than 0.5 m thick.	Not suitable for foundations because of excessive differential settlement on thaw of permafrost. Construction materials not readily available.	Easily eroded by running water when water channelled by construction activity or when surface vegetation is removed.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0f Gull sand	Fine to medium sand containing abundant quartz with minor interstitial chert in locally common, well sorted. Stratified to massive with lenticular coarse bedded lenses. Nonhorizontal. High porosity. Contains fossil shells.	Widespread distribution as a mantle overlying the coastal plain and other upland areas. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Generally well drained dune ridges as much as 20 m high. Also contains poorly drained to undrained depressions that are not part of the terrace drainage system. Area of reworked silt and sand is present in the coastal plain and in the upland. Active layer less than 0.5 m thick.	Petroleum underlies entire unit; active layer less than 0.5 m thick. In well-drained sands and less than 0.5 m in thickness, the permafrost is generally well sorted, but some units contain large clasts of ice wedges, youngest part of unit consists of smaller ice lenses 10 m apart and lower overall ice content than older units. Ice lenses are of varying sizes, but most are of the order of 10 to 20 cm in diameter. Active layer less than 0.5 m thick.	Adequate for natural foundations but requires stabilization for addition of binder for use as surfacing and construction material. Not suitable for foundations because of excessive differential settlement on thaw of permafrost. Construction materials not readily available.	Extremely susceptible to wind erosion (deflation) once sand is placed at surface in construction project or when protective vegetation is stripped away. Very sensitive to surface disturbance.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0g Silt and mud	Silt, clay, and some sand; contains abundant organic material. Stratified.	Occurs in topographic low points scattered throughout the coastal plain. Generally 1 to 10 m thick.	Flat to very gently sloping surface having poor drainage.	Well developed ice wedges as shown by polygonal patterns in contact poorly sorted, but probably composed of silt and clay. Active layer less than 0.5 m thick.	Not suitable for foundations because of excessive differential settlement on thaw of permafrost. Construction materials not readily available.	Easily eroded by running water when water channelled by construction activity or when surface vegetation is removed.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0h Alluvium	Mixed sand, silt, clay, and boulders derived from upland sources by sudden or slow glacial movements and to some extent by water transport. Poorly sorted; crudely bedded to massive. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	The fine deposits large enough to map include talus at the base of steep slopes, and some of the debris of hill washes, and pits of debris at base are characteristic. Drainage good to poor, depending on slope.	Deposits are tabular to irregular in plan and have wavy surface. Some units are in contact with hill washes, and pits of debris at base are characteristic. Drainage good to poor, depending on slope.	Petroleum throughout unit; ice content variable. Ice content, if in contact with hill washes, and pits of debris at base are characteristic. Drainage good to poor, depending on slope.	Frost susceptible.	Subject to slow or sudden movement, during summer when active layer is thickest and saturated with water.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0i High-level gravel	Chiefly sandy silt and pebbly gravel to 10 cm in diameter and sand and lenses. Contains fossil shells. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Over the high terrace south of West Mountain, and occupies the broad valley extending southward to the Kiklovik River. Thickness 2 to 10 m.	Flat to gently sloping terrace bounded by scarps. Would normally be well drained if not for permafrost.	Petroleum present throughout unit to within 0.5 m of surface. Ice content variable. Active layer less than 0.5 m thick.	Silt matrix and beds and lenses of silt with alluvium are frost susceptible; granular material is not frost susceptible.	Subject locally to stream erosion.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0j Younger silt	Sandy silt containing scattered pebbles and some lenses of sand, clay, pebbly sand, and fine gravel. Contains fossil shells and some of marine mammals, organic bones and shells. Deposits are generally to approximately 1 m in thickness. Locally polished. Contains marine shells.	Over the high terrace south of West Mountain, and occupies the broad valley extending southward to the Kiklovik River. Thickness 2 to 10 m.	Flat to gently sloping terrace bounded by scarps. Would normally be well drained if not for permafrost.	Petroleum present throughout unit to within 0.5 m of surface. Ice content variable. Active layer less than 0.5 m thick.	Silt matrix and beds and lenses of silt with alluvium are frost susceptible; granular material is not frost susceptible.	Subject locally to stream erosion.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0k Older silt	As mapped shows the extent of a glacial deposit of which only a few remnants of weathered drift. Strata rarely sorted, but commonly faceted; range from 0.5 to 2.0 m in diameter.	Commonly present as isolated boulders and discontinuous deposits. Eroded along contact of modern soil layers.	Glaciation formed broad valley surfaces and dissection resistant bedrock ridges. Former glacial surface has been dissected as much as 230 m.	Petroleum present throughout unit to within 0.5 m of surface. Ice content variable. Active layer less than 0.5 m thick.	Silt matrix and beds and lenses of silt with alluvium are frost susceptible; granular material is not frost susceptible.	Subject locally to stream erosion.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	
0l Bedrock under-ferretated	Includes conglomerate, sandstone, siltstone, shale, and conglomerate. Contains fossil shells, chert, limestone, dolomite, quartzite, granite, and sandstone in the mountains, and quartzite, siltstone, chert, quartz, and coal in the coastal plain.	Ubiquitous in foothills and mountains. Exposed in river beds and banks, and in coastal bluffs.	Exposed on summits and steep mountain slopes. In river beds and banks, and in coastal bluffs.	Petroleum present throughout unit to within 0.5 m of surface. Ice content variable. Active layer less than 0.5 m thick.	Silt matrix and beds and lenses of silt with alluvium are frost susceptible; granular material is not frost susceptible.	Subject locally to stream erosion.	Office compilation and laboratory results based on the 1977 season and additional field work in 1978 are planned to improve reliability by completing coverage of the area, or to obtain more precise with the use of a penetrometer. The purpose of the map and tabular explanation is to provide a general characterization of the nature, location, and distribution of the surficial deposits, and to indicate the special problems that may be encountered in the construction of roads, bridges, etc., and the special problems of such of the major types of deposits. Further, a tabular explanation of some map units by geologic age is shown unarranged by the date available at this time.	

TO ACCOMPANY

PRELIMINARY SURFICIAL DEPOSITS MAP OF NATIONAL PETROLEUM RESERVE-ALASKA

By

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This report is preliminary and has not been reviewed by the Geological Survey and is not to be used for any purpose other than that for which it was prepared.