MAP REPORT
FOR THE
YUKON/KUSKOKWIM RIVERS DELTA

DRAFT

NATIONAL WETLANDS INVENTORY
U.S. FISH AND WILDLIFE SERVICE
REGION 7, ALASKA

THE 1:250,000 MAP UNITS INCLUDED ARE;
BAIRD INLET, HOOPER BAY,
KUSKOKWIM BAY, MARSHALL

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I. INTRODUCTION

The U.S. Fish and Wildlife Service's (FWS) National Wetlands Inventory (NWI) is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. The Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) is the document used to define and classify wetlands. Photointerpretation conventions, digital mapping conventions, hydric soils lists, and wetland plant lists are also available to enhance the use and application of the classification system.

This report incorporates the following 1:63,360 scale wetlands maps that fall within the Yukon/Kuskokwim Delta project area:

Baird Inlet	Hooper Bay
(A) 1,2,3,4,5,6	(A) 1,2
(B) 1,2,3,6,7,8	
(C) 1,8	
Kuskokwim Bay	Marshall
(D) 1,2,3,4,5,6,7	(A) 7,8

II. PURPOSE

The purpose of the map report is threefold: (1) to describe local geography, climate, vegetation, and soils; (2) to provide a descriptive crosswalk from wetland codes on the map to wetland plant communities, representative plant species, and other ecological information, and (3) to provide information regarding production of NWI maps for the Yukon/Kuskokwim Delta, including specific imagery and interpretation discussions.

III. STUDY AREA

Geography

The Yukon-Kuskokwim River Delta is located in a western extension of the arctic coastal plain in west Central Alaska. The delta is part of the Bering Tundra (Northern) Province (Bailey) and is a vast plain which is mostly below 100 feet in elevation. The project work area contains numerous rivers and streams and is dotted with lakes, sloughs and ponds. Tidal amplitudes rapidly decrease with distance upriver from the coast.

Several low hills of basalt and a volcanic cinder cone are present in the study area. The major geographic features of the project areas are the Kuskokwim River, Kuskokwim Bay, Dall Lake, and Hazen Bay. A map showing the location of the project areas is displayed in Attachment A.

Climate

The Yukon-Kuskokwim Delta has cold winters and generally cool summers. The climate is moderated by the Bering Sea and there is a strong inland gradient in coastal temperature. Average summer temperature is 50 degrees Fahrenheit to an average low of -7 Fahrenheit in winter. Bethel is receives 17 inches of mean annual precipitation. Rainfall averages 10.6 inches per year. Snowfall averages 63 inches annually. Growing season is approximately from June 1st to September 15th. A short growing season is due to the presence of snow for over half the year and the predominance of permafrost.

Vegetation

Wet tundra communities consisting primarily of sedge mats, moss, and low growing shrubs predominate. Alder and willows grow along major streams. Peat ridges and polygonal features provide better drainage on which mosses (*Sphagnum* spp.), dwarf birch (*Betula nana*), and blueberry (*Vaccinium* spp.), labrador tea (*Ledum decumbens*), are found. Freshwater areas are dominated by canada bluejoint (*Calamagrostis canadensis*), sedges (*Carex* spp.), bluegrass (*Poa* spp.), alder (Alnus spp.), and sweet gale (*Myrica gale*). Flats along estuaries are dominated by sedges (*Carex* spp.).

Soils

Dominant soils are Histic Pergelic Cryaquepts and Pergelic Cryofibrists. Soils are shallow over permafrost and consistently wet. Soils are formed from stratified silty or sandy alluvial deposits, as well as volcanic ash and loess.

IV. WETLAND AND DEEPWATER HABITAT CODES

The following section describes the map codes used on the Yukon/Kuskokwim Delta 1:63,360-scale wetlands maps. A general description and/or community type, including dominant vegetation, is provided for each code.

Wetland and deepwater habitat data are displayed on overlays or maps by a series of letters and numbers (alphanumerics) with the first letter representing the system and subsequent alphanumerics representing, in a sequential manner, the subordinate level of detail. Where classes and subclasses have been mixed, they are separated by a diagonal line. When classes and subclasses have been mixed, the predominant life form represents 50% to 70% areal coverage while less dominant life form represents 30% to 50% areal coverage.

Examples:

1. Classification of wetlands to the level of water regime: L2AB3H

L	System:	Lacustrine
2	Subsystem	Littoral
AB	Class	Aquatic Bed
3	Subclass:	Rooted Vascular
H	Water Regime	Permanently flooded

2. Mixing of classes and subclasses: PEM1/SS1B;

P	System:	Palustrine
	Subsystem:	none
EM	Class:	Emergent
1	Subclass:	Persistent
SS	Class:	Scrub/Shrub
1	Subclass:	Broad-leaved deciduous
B	Water Regime:	Saturated

Estuarine System

Consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and which ocean water is at least occasionally diluted by freshwater runoff from the land. There is appreciable dilution of seawater in the estuaries of the project area.

The Estuarine System extends (1) upstream and landward to where ocean-derived salts measure less than 0.50/00 during the period of average annual low flow; (2) to an imaginary line closing the mouth of a river, bay, or sound; and (3) to the seaward limit of wetland emergents, shrubs, or trees where they are not included in (2). The Estuarine System includes offshore areas of continuously diluted sea water.

Estuarine System in the project area includes all open water habitat along the coast or in the channels of rivers such as the Kuskokwim. The extent of Estuarine habitat correlated closely with surface drainage patterns and distinct changes in photosignature. Estuarine habitat extends from the limit of large "dendritic" drainage pattern in vegetated flats, are diminishing at freshwater tidal boundaries to areas with smaller, shorter, perpendicular drainage patterns, in mud flats. There is very little tidal fluctuation in the project area. It was observed that there is almost no tidal influence along the southern coast in the Kuskokwim Bay Quadrangle where wave-action is eroding thick layers of peat.

E1UBL- The substrate is continuously submerged and permanently flooded with tidal water. Generally, the water depth exceeds two meters. Vegetation is not present.

E2USN- These areas are mudflats and sandbars. Tidal water alternately floods and exposes the land surface at least once daily.

E2EM1N- These areas are vegetated mudflats and sandbars. Vegetation is characterized by erect, rooted, herbaceous hydrophytes. Sedge (*Carex lyngbei*) is dominant. Tidal water alternately floods and exposes the land surface at least once daily.

E2EM1P- These areas are vegetated mudflats. Vegetation is characterized by erect, rooted, herbaceous hydrophytes. Sedge (*Carex lyngbei*) is dominant. Tidal water alternately floods and exposes the land surface less often than daily.

E2EM/SS1P- These areas are vegetated mudflats. Vegetation is dominated by erect, rooted, herbaceous (Carex lyngbei) and broad-leaved deciduous shrubs (Alnus spp.). Tidal water alternately floods and exposes the land surface less often than daily.

Palustrine System

The Palustrine System includes all wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, and lichens that are not influenced by ocean-derived salinity. Wetland types commonly referred to as bogs, muskegs, fens, marshes, and swamps are grouped in the Palustrine System. Lakes and ponds less than 20 acres in size are also a part of the Palustrine System. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They also may occur as islands in lakes or rivers.

PEM1/SS1A- Temporarily flooded, persistent emergent vegetation mixed with shrub species. This habitat generally occurs on natural levees, floodplain terraces or riparian zones. Dominant herbaceous vegetation is bluegrass (*Poa* spp.) and sedge (*Carex* spp.). Dominant shrubby species are alder (*Alnus* spp.) and willow (*Salix* spp.).

PSS1A- Temporarily flooded, dense stands of broad-leaved deciduous shrubs on river and stream floodplains. This habitat generally occurs on natural levees, floodplain terraces or riparian zones. Dominant shrub is alder (*Alnus* spp.).

PEM1B- Braided drainage pattern located on slopes of Kaluyut Mountains. These areas are on saturated soils with sphagnum moss (Sphagnum spp.) covering the soil surface. Permafrost plays an important role in preventing the soil from draining for many of these wetland habitats.

PEM1/SS1B– Tundra plateau areas that are dominated by a mix of emergents and broad-leaved deciduous shrubs. Emergent species include caribou moss (*Sphagnum* spp.), sedge (*Carex* spp.). Shrub species are black crowberry (*Vaccinium oxycoccos*), tundra dwarf birch (*Betula nana*), blueberry (Vaccinium spp.), and currant (*Ribes* spp.). Broad-leaved evergreen shrubs, labrador tea (*Ledum decumbens*), are common.

PSS1B- Saturated soils located on slopes of Kaluyut mountains and drainage ways in Tern Mountain, and basalt hills. These areas are dominated by broad-leaved deciduous shrubs consisting mainly of alder (*Alnus* spp.), willow (*Salix* spp.), and sweet gale (*Myrica gale*).

PEM1C- Seasonally flooded, persistent emergent marshes found in drainage patterns in Tundra and on the floodplains of streams and rivers, on the edges of lakes or in basins of naturally drained lakes in the Yukon/Kuskokwim Delta. Standing water resulting from river or stream overflow or high water table is usually present for the first half of the growing season. Dominant species are typically canada bluejoint (*Calamagrostis canadensis*) and sedge (*carex* spp.)

PEM1/SS1C- Above PEM1C type mixed with broad-leaved deciduous shrubs. Dominant shrub species are alder (*Alnus* spp.), willow (*Salix* spp.), and sweet gale (*Myrica gale* sp.).

PSS1C- Seasonally flooded dense stands of broad-leaved deciduous shrubs on river and stream floodplains and drainages in the Tundra plateau. This wetland type often occurs on river bars that are at lower elevation than the PSS1A wetland type or in meander scars. Dominant species are willow (*Salix* spp.), alder (*Alnus* spp.), and sweet gale (Myrica gale).

PEM1F- Semipermanently flooded, emergent marshes. These are deep marshes that exhibit standing water usually through the entire growing season. Dominant species include four-leaf mare's tail (*Hippuris tetraphylla*), northern burreed (Sparganium hyperboreum), and sedge (*Carex aquatilis*). (Jorgenson, p.228)

PEM1R- Fresh water wetland areas that experience a periodic tidal influence. Soils are saturated or flooded for one-half of the growing season. Generally located between Estuaries and Tundra plateau landscapes. Dominant species include canada bluejoint (*Calamagrostis canadensis*), Fowl-Meadow Grass (*Poa palustris*), and sedge (*Carex* spp.)

PEM1/SS1R- Above PEM1R type with mixed broad-leaved deciduous shrubs. Dominant shrub species are alder (*Alnus* spp.), willow (*Salix* spp.), and sweet gale (*Myrica gale* sp.).

PUBT- Fresh water wetland areas that experience a tidal influence and for flooded during most growing seasons. Brackish water prevents establishment of aquatic bed.

PEM1/AB3T- Above PUBT type ponds located in an area that is classified as PEM1R.

PUBV- Fresh water wetland areas that experience a tidal influence and permanently flooded. Brackish water prevents establishment of aquatic bed.

PEM1/UBT- Above emergent and unconsolidated bottom dominated areas that are tidally influenced.

PAB3H- Permanently flooded, rooted vascular (*Potamogeton spp.*) aquatic beds. These habitats typically occur in pond basins, sloughs, shoreward of Lacustrine systems, and within the basins of naturally drained lakes within the Tundra Plateau.

L2UBV- (Lacustrine, Littoral, Unconsolidated Bottom, Permanently Flooded) - Are at least 20 acres or larger in area and do not exhibit any aquatic bed signature. These enclosed bodies of water are located in the freshwater tidal zone.

Riverine System

The Riverine System in the Yukon/Kuskokwim Delta includes all wetlands and deepwater habitats within a channel, with two exceptions; (1) wetlands dominated by trees, shrubs, persistent emergents, mosses or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.50/00.

Subsystems: The Riverine System, as mapped in the Yukon/Kuskokwim Delta is divided into three Subsystems: the Tidal, the Lower Perennial, and the Upper Perennial.

Tidal - The gradient is low and water velocity fluctuates under tidal influence. The streambed is mainly mud with occasional patches of sand. Oxygen deficits may sometimes occur and the fauna is similar to that in the Lower Perennial Subsystem.

Lower Perennial – The gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur, the fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of Upper Perennial Subsystem and the floodplain is well developed.

Upper Perennial – The gradient is high and velocity of water is fast. There is no tidal influence and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The fauna is characteristic of running water, and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem, and there is very little floodplain development.

R1UBV- Permanently flooded, freshwater river channel which is tidally influenced. Substrate is mostly mud and there vegetation is not present.

R2UBH- Permanently flooded, freshwater river channel which is not tidally influenced. Substrate is mostly mud and there vegetation is not present. Has a low gradient and well developed floodplain.

R3UBH- Permanently flooded, freshwater river channel which is not tidally influenced. Substrate is mostly mud and there vegetation is not present. Has a high gradient and narrow floodplain.

Lacustrine System

This system includes all lakes greater than 20 acres in size and consists of deepwater habitat lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage. The Lacustrine system is bounded by upland or wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Islands of Palustrine wetlands may lie within the boundaries of the Lacustrine system. A Lacustrine polygon will NOT be delineated ONLY when an area is overly complex. A Lacustrine polygon includes all enclosed bodies of water outside of the Estuarine system that are larger than 20 acres or deeper than two meters.

L1UBH (Lacustrine, Limonitic, Unconsolidated Bottom, Permanently Flooded) - Are at least 50 acres or larger in area and do not exhibit any aquatic bed signature. These "monster" size lakes often have lighter tone due to increased turbidity caused by wave action.

L2AB3H (Lacustrine, Littoral, Aquatic Bed, Rooted Vascular, Permanently Flooded) - Lacustrine bodies of water will be assigned the Aquatic Bed "AB" Class even if signature is feint or the lake is smaller 50 acres or less in area. Aquatic bed is dominated by *Potamogeton sp,.*, an obligate specie.

V. NATIONAL LIST OF WETLAND PLANT SPECIES

The Service has prepared a National List of Plant Species that Occur in Wetlands: Alaska (Reed 1988) which assigns an indicator to each plant species found in wetlands. This wetland indicator describes the frequency of occurrence of an individual species in wetlands versus non-wetlands within the State (similar plant lists are available for other Regions and states in the United States). Attachment B lists both the common name and scientific name, as well as the wetland indicator, for common wetland plants that occur in the Yukon Flats ecoregion. The following wetland indicators have been assigned to plants which occur in wetlands:

Obligate (OBL): Occur almost always (estimated probability >99%)
Under natural conditions in wetlands.

Facultative Wetland (FACW): Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

Facultative (FAC): Equally likely to occur in wetlands or non-wetlands (estimated probability 34% - 66%).

Facultative Upland (FACU): Usually occur in non-wetlands (estimated probability 67% - 99%), but occasionally found in wetlands (estimated probability 1% - 33%).

Non-wetland (UPL): Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the National List.

VI. MAP PREPARATION

The wetland classification that appears on the NWI maps for the Yukon/Kuskokwim Delta is in accordance with Cowardin et. Al. (1979). The delineations were produced through stereoscopic interpretation of 1:60,000 to 1:65,000 scale color infrared aerial photography. The photography was taken during July 1980 and August 1984.

Field examinations of wetlands were made prior to the actual delineations of wetlands on the photography. A field trip was conducted during August of 1989 to correlate the photo signatures with the actual wetland communities. Soils, plant communities, and hydrology, were examined at each of the representative field sites in order to determine wetland classification and boundary location.

Collateral data included USGS topographic maps and climate, vegetation, and ecoregion information.

VII. MAP ACQUISITION

To order NWI maps contact:

ESIC/USGS
4230 University Drive, Room 101
Anchorage, Alaska 99509-4664
(907) 786-7011

Maps are identified by the name of the corresponding USGS 1:63,360 topographic quadrangle names.

VII. BIBLIOGRAPHY

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