DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATION SERIES
MAP I–1813

VEGETATION AND LAND COVER TETLIN NATIONAL WILDLIFE REFUGE, ALASKA

Introduction

This map was produced as part of a cooperative project between the U.S. Geological Survey and the U.S. Fish and Wildlife Service (Talbot and others, 1984) for refuge planning in the Tetlin National Wildlife Refuge, one of nine new refuges in Alaska established by the Alaska National Interest Lands Conservation Act of 1980. The Act contains requirements for the identification and description of wildlife habitats in these new refuges. Since existing vegetation maps of Alaska were too general for meeting this requirement, a mapping approach based on classified digital Landsat and elevation data supplemented with aerial photographic interpretation and field reconnaissance was selected as the most practical means for producing a current land cover map. This method had been used successfully for other refuges in Alaska, and the resulting digital data base could be manipulated by refuge planners for modeling wildlife habitat suitability as well as other refuge planning activities. The Tetlin National Wildlife Refuge lies at the east-central edge of Alaska, along the Canadian border, north of the Nutzotin Mountains. Two broad glacial meltwater rivers, the Nabesna and Chisana, traverse the Refuge and are tributaries of the Tanana River. The Refuge encompasses 925,262 acres of forest, scrub, and herbaceous vegetation.

The land cover classification was derived from digital processing of Landsat multispectral scanner (MSS) data and 1:250,000-scale digital elevation model (DEM) data. Only one Landsat scene (ID 2958–19453, acquired on September 6, 1977) was required for complete coverage of the Refuge. Both the MSS and DEM data sets were resampled to a 50-m grid cell format and geometrically registered to the Universal Transverse Mercator projection. The Landsat data were classified using a maximum likelihood algorithm with training statistics developed using a modified clustering approach (Fleming and others, 1975) for nine 9- by 9-mile subsample areas. Ancillary data acquired from three sources (interpretation of color-infrared aerial photographs at a scale of 1:60,000, fixed-wing aircraft aerial reconnaissance, and a ground survey by helicopter of the sample plots) were used to assist in characterizing the vegetation. The final classification includes 7 general and 16 detailed land cover classes, as shown in the legend.

Slope and aspect data derived from the DEM data were used to improve the classification of certain land cover categories that could not be separated based only on their spectral characteristics. For example, slope and aspect were used to distinguish mountain shadows from clear water and to differentiate vegetation types that occurred on shaded mountain slopes. Elevation differences were also used to separate lowland from alpine and subalpine scrub types.

References Cited

Fleming, M. D., Berkebile, J. S., and Hoffer, R. M., 1975, Computer-aided analysis of LANDSAT-1 MSS data: A comparison of three approaches, including a "modified clustering" approach: West Lafayette, Ind., Purdue University, The Laboratory for Applications of Remote Sensing, LARS Information Note 072475, 9 p.

Talbot, S. S., Markon, C. J., and Shasby, M. B., 1984, Landsat-facilitated vegetation classification of Tetlin National Wildlife Refuge, Alaska, *in* International Symposium on Inventorying Forest and Other Vegetation of the High Latitude and High Altitude Regions, Fairbanks, Alaska, 1984, Proceedings: Bethesda, Maryland, Society of American Foresters, p. 143–151.

Land cover class, dominant vegetation, and area in acres

	Acres
FOREST	
Closed Needleleaf—Dominated by white spruce; 60–100% forest cover	89,800
Open Needleleaf—Dominated by black spruce; 25–60% forest cover	197,924
Needleleaf Woodland—Open forest type, black spruce dominates; dwarf shrubs dominate the understory; 10–25% forest cover	264,050
Mixed—Principal species include white spruce, white birch, and aspen; 25–100% forest cover	31,975
Deciduous—Dominated by white birch, aspen, and balsam poplar; 25–100% forest cover	16,187
DECIDUOUS SCRUB	
Lowland—Dominant overstory cover is willow and other deciduous shrubs	6,200
Alpine and Subalpine—Dominant overstory cover is willow and dwarf birch	37,030
DWARF SCRUB	
Prostrate Dwarf Scrub—Dominated by matted dwarf shrubs, especially white mountain-avens; occurs on alpine slopes	4,380
Dwarf Scrub/Graminoid Tussock—Dominated by dwarf shrubs and cottongrass on poorly drained organic peatland soils	190,286
HERBACEOUS	
Graminoid Marsh/Alluvial Scrub—A periodically inundated wetland type dominated by sedges, reedgrass, and various forbs	15,891
SPARSELY VEGETATED/BARREN	
Screes—Steep stony upland slopes with sparse cover of prostrate dwarf scrub and lichens	14,327
Floodplains—Recently formed alluvial deposits with sparse vegetative cover, including balsam poplar, yellow dryas, fireweed, other forbs and grasses	12,439
WATER	
Clear—Contains little particulate matter	28,941
Low Sediment or Shallow Water/Aquatic Vegetation—Water with visible sediment and aquatic plants such as yellow pond lily and pondweed	8,737
Medium to High Sediment—Contains considerable particulate matter and appears opaque or milky	6,404
SNOW	
Snow— Alpine snowfields	691
TOTAL	925,262

Produced by the United States Geological Survey

Base map from USGS 1:250,000-scale topographic maps; Nabesna, dated 1960, revised 1982, and Tanacross, dated 1956, revised 1981

Projection and 25,000-meter grid, Universal Transverse Mercator, zone 7
100,000-foot grid ticks based on Alaska coordinate system, zone 2
1927 North American Datum
To place on the predicted North American Datum 1983, move the projection lines 44 meters north and 111 meters east

Gray land lines represent unsurveyed and unmarked locations predetermined by the Bureau of Land Management
Red land lines represent marked locations
1986 magnetic declination from true north varies from 29° (516 mils) easterly for the center of the west edge, to 30° (533 mils) easterly for the center of the east edge

There may be private inholdings within the boundaries of the National or State reservations shown on this map

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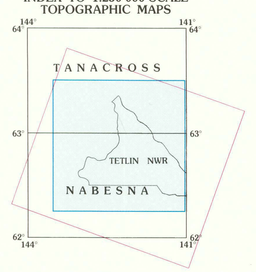
LOCATION DIAGRAM

INDEX TO 1:250 000-SCALE TOPOGRAPHIC MAPS



LANDSAT IMAGE IDENTIFICATION #2958–19453
6 SEPTEMBER 1977

SCALE 1:250 000
1 CENTIMETER ON THE MAP REPRESENTS 2.5 KILOMETERS ON THE GROUND
CONTOUR INTERVAL 200 FEET

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1987