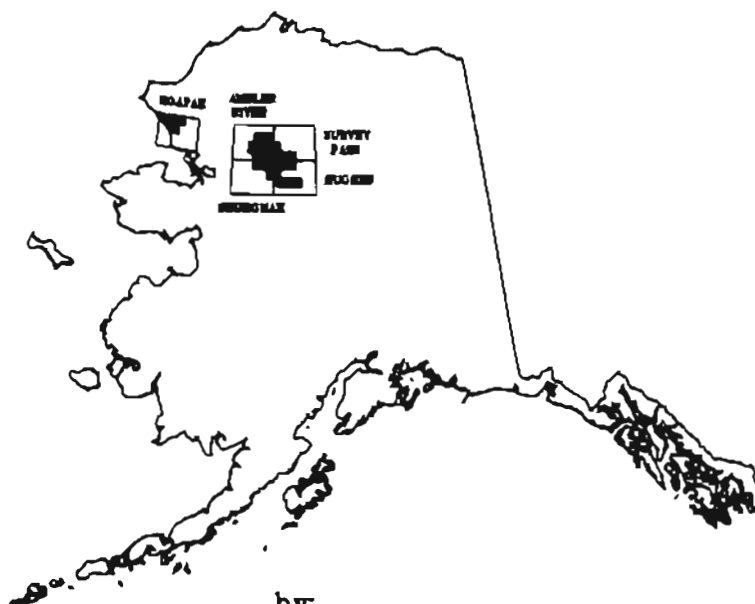


TECHNICAL GUIDE
FOR
VEGETATION/LANDCOVER MAPPING
OF
SELECTED PORTIONS OF NORTHWEST
ALASKA PLANNING AREA

PDF 85-42F



by:
Enzo E. Becia
Natural Resources Manager

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STATE OF ALASKA
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DIVISION OF MINING AND GEOLOGY
JUDITH M. BRADY, COMMISSIONER



State of Alaska
Department of Natural Resources
Division of Mining and Geology
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INTRODUCTION

Objectives

The Resources Analysis Section of the Division of Mining and Geology was asked to produce a vegetation and landcover map of those state land areas within the Northwest planning area not already covered by existing North Slope Borough maps or Soil Conservation Service maps. The area is located in the Ambler, Survey Pass, Shungnak, Hughes, and Noatak quadrangles (see Figure 1). The maps are intended for use in land use planning, natural resource policy development, and resource management decisions.

This report details the methodology and classification scheme used to produce the maps. Several examples are used to illustrate the procedure. Finally, a set of photographs is presented to compare the classification scheme with the actual "on ground" vegetation and landscape.

Data Sources

The maps were prepared using high altitude color infrared (CIR) photography, enhanced Landsat imagery, orthophotographic maps, topographic maps, reports, and field data collected by the U.S. Fish and Wildlife Service and the U.S. Forest Service. No field verification or aerial reconnaissance was done by this author to substantiate the mapping interpretations.

The aerial photography used included a complete coverage of the area by CIR photos at a scale of 1:60,000 (about 1 in. = 1 mi.). These were taken by NASA between 1978 and 1982. Additionally, two flight lines of black and white photos, at a scale of approximately 1:5,500 (11 in. = 1 mi.), were used. These were flown by the U.S. Forest Service in 1959.

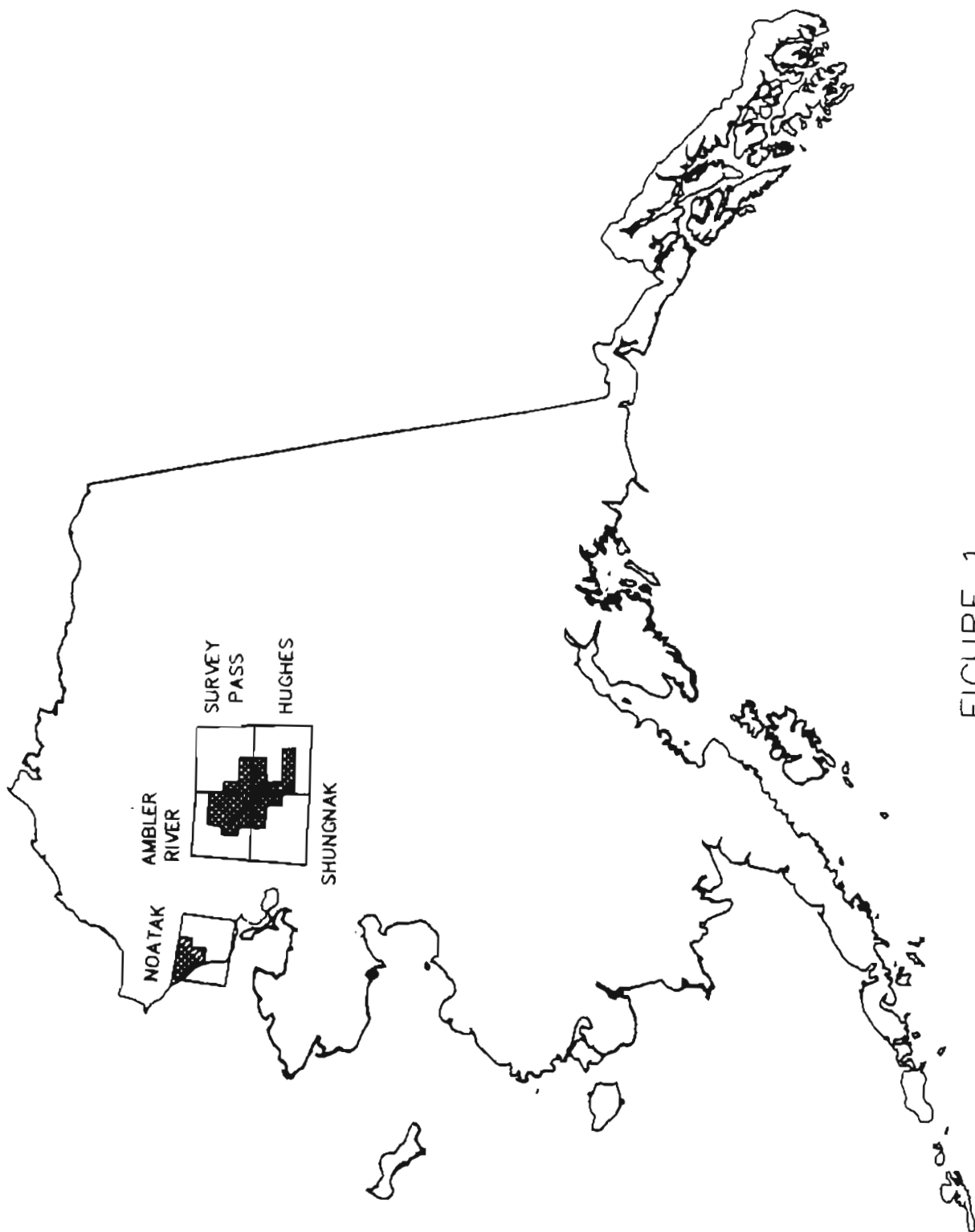


FIGURE 1

AREA MAPPED IN THIS REPORT

Noatak Quad Mapped at 1:250,000 Scale Using Landsat Map Base
Remaining Quads Mapped at 1:63,360 Scale Using Orthophoto Map Base

Existing information was studied, and where possible, supplemented by information supplied through interviews with other resource specialists who have direct experience in northwest Alaska. The orthophotographic maps (quads), at a scale of 1:63,360 (1 in. = 1 mi.), were used as the map base in all areas except for the Noatak quad where a Landsat image, at a scale of 1:250,000 (1/4 in. = 1 mi.), was used as the map base.

METHODS AND PROCEDURES

Both vegetated and nonvegetated landscapes have been mapped. As used here, vegetation is equivalent to plant cover. It included three cover types: forests, shrubs, and herbaceous. The latter being the nonwoody-type plants, such as, grasses, sedges, mosses, and grasslike plants. Nonvegetation cover types included water bodies, snow and ice, burned, and barren landscapes. They are collectively referred to here as landcover.

Mapping was done by drawing lines around areas with similar characteristics, forming discrete map types. Each was then tagged with an identification code using alphanumeric symbols.

The mapping units were drawn primarily from photointerpretation of the CIR photos. The larger scale black and white photographs were used to identify tree and shrub species, their height and density. Thirty-five millimeter color photographs were also used as an aid to plant identification. The actual map units were determined and delineated by stereoscopic interpretation of the CIR photographs.

All mapped units, or polygons, and their identification were placed on mylar overlays and then redrafted to ensure consistent line width and polygon closure. A legend containing symbol definitions was placed on, or adjacent to, each polygon. The final product was then edited.

USERS GUIDE

The following description, if used in conjunction with the alphanumeric codes and their definitions, will assist in understanding classification used in this report.

A set of alphanumeric codes, referred to as designators, are used to identify each polygon (see Tables 1 and 2). Each call (polygon classification) can have as few as one designator or as many as four. A call must consist of at least one designator which describes the polygon and is referred to as the primary or primary call. If only a single designator is given then it is the primary and represents between 90 and 100% of the area coverage.

The primary call will always be either one of three vegetation types (forest, shrub, or herbaceous) or one of six possible land cover types (lakes and ponds, rivers and streams, snow and ice, recent burn, barren, and airfield, mining area or urban area). Each primary call may have a unique set of designators that modify it. The two general categories of the primary are vegetation or land cover (nonvegetation), and each will be described in greater detail.

Vegetation refers to one of three subcategories: forests, shrubs, and herbaceous. For this region of Alaska, forests consist of five tree species or some combination of them. They are: white spruce, black

spruce, white birch, balsam poplar, and quaking aspen or some combination of these. Forests consisting of more than one major species are referred to as mixed forests. Undifferentiated tall and low shrubs are each treated as an individual species for the primary call. All forest types are given a two capital-letter designator, e.g., SW is white spruce, MB is black spruce and white birch, and BT is white birch and tall shrub.

When shrub species are used under the subcategory of shrub in the primary, they are differentiated by species. These can be alder, willow, dwarf birch or combination of these. Shrubs are further subdivided by height; greater than 5 ft. are tall shrub while 8 in. to 5 ft. are low shrubs. Tall shrubs are given a two capital-letter designator, e.g., GA is alder; and low shrubs are given a two small-letter designator, e.g., bd is dwarf birch.

Herbaceous vegetation can be sedges, tussock tundra, lichen, muskeg or a combination of these. They are given a two number designator when they are the primary, e.g., 62 is tussock tundra.

If the primary is of a forest type, then the next designator will refer to the diameter size of this type. Diameter cannot be obtained directly from the photographs but must be inferred from the tree height. Height is determined from the larger-scale, black and white photographs. The diameter is indicated by a number from 1 to 4. If only a single species is indicated for the primary, then the number refers to the average diameter of that species. However, in most cases when dealing with mixed forests, the number refers to the average diameter of the mixed species. There is an exception. When black spruce is part of the mixed forest. This will be described in the rules list which follows.

For shrubs and herbaceous vegetation, the second designator is not size, but is moisture content of the soil. It will be either d, m, or w for dry, moist, or wet.

For vegetation categories, the final designator could be a number from 1 to 9 which designates the remaining ground cover type. It could include alder, willow, tall shrub, low shrub, dwarf birch, lichen, old burns, grass and grasslike plants, or barren ground. It differs from land cover in that land cover contains little or no vegetation, and it is always used as a secondary call to better describe the landscape.

Finally, when either of the two water subdivisions (lakes and ponds or rivers and streams) are used, they were given an additional modifier to indicate the water clarity. The letters c, v, or t were used to designate clear, variable, or turbid.

This information is summarized in the following list of rules.

1. When a tree species comprised 10% or more of a mapping unit, it either became the primary or was included in the primary.
2. The tallest trees were indicated by the first letter of the primary except for the black spruce-balsam poplar call (MP). Here they were reversed.
3. Whether labeled or not, black spruce was always a tree size class 1 (diameter less than 5 in.).
4. If the primary contained calls for two or more tree species, with one of them being black spruce, and if the size modifier was size class 2 or greater, then that modifier referred to the non-black spruce species. See Rule 3.

5. If a forest type, the crown cover modifier represented the canopy cover of all tree species and tall shrubs listed, but not low shrubs.
6. A ground cover modifier was used only if it represented at least 10% of the area.
7. Lake and river types used a water modifier.
8. If no ground cover modifier was present, 90-100% of the area was covered by the primary cover type.
9. Polygon mapping size minimums: for the 1:63,360 scale, vegetation and land cover were 20 acres and water was 5 acres; for 1:250,000 scale, vegetation and land cover were 40 acres and water was 10 acres.

The following tables provide explanations of the identification codes used to produce the vegetation maps. The primary call for the 3 vegetation phases (forest, shrub, and herbaceous) are presented first, followed by the primary call for the nonvegetation covers. Following these, the secondary calls and modifiers that attach to the primary call are shown. These are followed by 2 examples of actual call with explanations.

The final attachment is a set of photographs showing the actual vegetation and ground cover found in that region. Each photograph is accompanied by a call which is used to identify the area represented, and by an explanation of the interpretation.

TABLE 1

VEGETATION/LANDCOVER

<u>Designator</u>	<u>Forest</u>
SW	White spruce
MA	Black spruce
WB	White birch
BP	Balsam poplar
QA	Quaking aspen
SM	White spruce & black spruce
SB	White spruce & white birch
SP	White spruce & balsam poplar
SA	White spruce & quaking aspen
MB	Black spruce & white birch
MP	Black spruce & balsam poplar
BA	White birch & quaking aspen
PB	White spruce, black spruce & white birch
PP	White spruce, black spruce & balsam poplar
ST	White spruce & tall shrub
MT	Black spruce & tall shrub
BT	White birch & tall shrub
PT	Balsam poplar & tall shrub
SL	White spruce & low shrub
ML	Black spruce & low shrub
BL	White birch & low shrub
<u>Tall Shrub (less than 5')</u>	
GA	Alder
WO	Willow
GW	Alder & willow
<u>Low Shrub (8" to 5')</u>	
ms	Mixed shrub (tundra)
al	Alder
bd	Dwarf birch
ws	Willow & shrub
ls	Lichen & shrub
sx	Willow
aw	Alder & willow
<u>Herbaceous</u>	
60	Undifferentiated herbaceous
61	Sedge (wet meadow)
62	Tussock tundra
63	Water sedge & muskeg (bog-fern)
70	Dwarf shrub & lichen (mat & cushion)
<u>Land Cover Type</u>	
80	Lakes & ponds
82	Rivers & streams
85	Snow & ice
88	Burns (recent)
90	Barren
95	Airfield, mining area, etc.

TABLE 2

MODIFIERS

FOREST

<u>Designator</u>	<u>Tree Size</u>	<u>D.B.H. * Range</u>
1	Seedlings & saplings	0.5-5.0"
2	Pole timber-conifer	5.0-9.0"
2	Pole timber-hardwood	5.0-11.0"
3	Saw timber-conifer	9.0-21.0"
3	Saw timber-hardwood	11.0-21.0"
4	Mixed pole & saw timber	5.0-21.0"

FOREST AND SHRUB

<u>Designator</u>	<u>Canopy Closure</u>
s	Sparse/woodland (10-24%)
o	Open (25-59%)
c	Closed (greater than 59%)

Ground Cover

1	Alder
2	Willow
3	Tall shrub
4	Low shrub
5	Dwarf birch
6	Lichen
7	Old burn
8	Grass & grasslike plants
9	Barren

Moisture

d	Dry
m	Moist
w	Wet

WATER

Turbidity

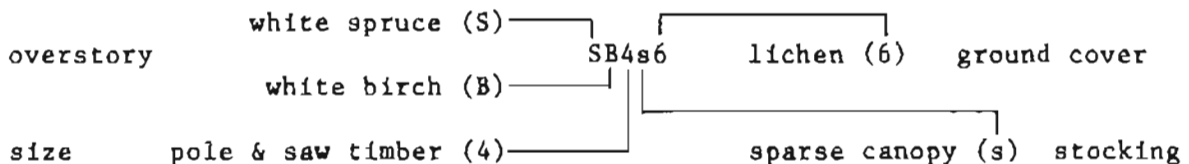
c	Clear
v	Variable
t	Turbid

* D.B.H. refers to the tree diameter at breast height (4 ½' above ground level) measured on the upslope side of the tree.

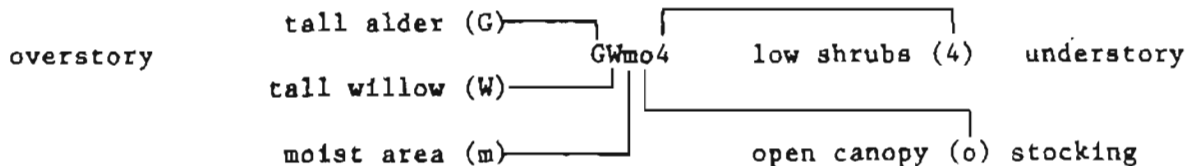
EXAMPLES

The classification scheme used to make the calls on these maps is based on the species and relative height of the vegetation present in the canopy. The vegetative ground canopy generally consists of 3 layers: the overstory, understory and the intermediates. The overstory is the tallest growth form present, the understory is next to the ground surface and the intermediates are between those in height. All layers are not necessarily always present. The growth forms found are forests, shrubs and herbaceous. Depending on the canopy present, any combination of these forms may be found and is indicated in the calling sequence.

Mixed forest stand by species, size and ground cover:



Tall shrub stand by species, moisture, stocking and ground cover:



APPENDIX

Photographs of Vegetation/Landcover Types and Their Classification Codes

The intent in using color photographs is to give users a picture of what this interpreter imagined the actual ground cover would look like if an on-site inspection of the polygon containing the code, was made. Each picture is the transformation of a mental picture the interpreter had during the photo interpretation and classification of the represented polygon.

No ground truthing was obtained for this project whereby on-site pictures were taken to clearly identify the average groundcover of the polygon. Therefore, each of the following pictures may or may not represent the average groundcover within a polygon. However, the picture does represent the groundcover somewhere within the spectrum of the classification.



Map Code - SW4c4

A pure white spruce (SW) type, containing trees ranging in diameter from 5 to 21 in. (4). The spruce canopy closure ranges from 60 to 90 percent (c) with 10 to 40 percent ground cover of low shrubs (4). Tree heights range from 35 to 60 ft. This type occurs on floodplains and low terraces of major streams. The soils on this site are moderately deep or deep to permafrost and are moderately well drained to well drained.



Map Code - SW4c3

A pure white spruce (SW) type, containing trees ranging in diameter from 5 to 21 in. (4). The spruce canopy closure ranges from 25 to 59 percent (o) with 40 to 75 percent ground cover of tall shrubs (3) comprised mostly of alder with some willow. Tree heights range from 35 to 60 ft. This type occurs on backslope and footslope positions of hills and low mountains. The soils on this site are somewhat poorly drained to well drained.



Map Code - SW4c6

A pure stand of white spruce (SW) type containing tree diameters of 5 to 21 in. (4). The spruce canopy closure ranges from 60 to 90 percent (c). Ground cover is lichen (6). Low shrubs are not mentioned because they are not visible from above to any great extent. Tree heights range from 35 to 60 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. It most commonly is found on well drained soils on south and west facing aspects.

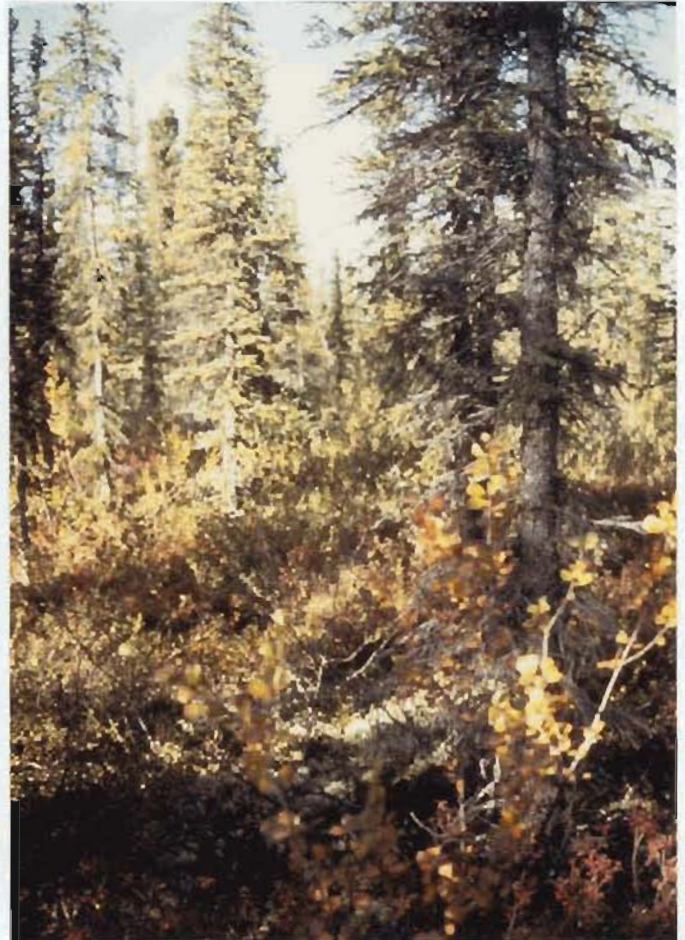


Map Code - SW2o8

A pure white spruce (SW) type, containing trees ranging in diameter from 5 to 9 in. (2). The spruce canopy closure ranges from 25 to 59 percent (o) with 40 to 75 percent ground cover of shrubs, grass and grasslike plants (8). Tree heights range from 35 to 50 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. It most commonly is found on well drained soils on south and west facing aspects.

Map Code - SM206 (left photo)

A mixed white spruce-black spruce, lichen (SM) type, containing spruce trees ranging in diameter from 5 to 9 in. The spruce canopy closure ranges from 25 to 59 percent (o). A ground cover of lichens (6) cover from 40 to 75 percent of the area. Tree heights range from 25 to 40 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. It most commonly is found on well drained soils of terraces and broad alluvial fans having south or west facing aspects. The soils on this site are deep to permafrost and moderately well drained to well drained.



Map Code - SM204 (right photo)

A mixed white spruce-black spruce, low shrub (SM) type, containing spruce trees ranging in diameter from 5 to 9 in. (1). The spruce canopy closure ranges from 25 to 60 percent (0). Low shrubs (4) cover 40 to 75 percent of the area. Tree heights range from 25 to 40 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. It most commonly is found on well drained soils of terraces and broad alluvial fans having south or west facing aspects. The soils on this site are deep to permafrost and moderately well drained to well drained.



Map Code - SM4o3

White and black spruce (SM) type containing white spruce tree diameters ranging from 5 to 21 in. (4). Black spruce diameters if not shown in the code are always .5 to 5 in. The canopy closure of both spruce ranges from 25 to 60 percent (o). An understory of tall shrub (3) representing from 40 to 75 percent of the cover is made up of alder and willows. The tree heights for the white spruce range from 25 to 60 ft., black spruce ranging from 10 to 25 ft. This type occurs on backslope and footslope positions of hills and low mountains. The soils on this site are somewhat poorly drained to well drained.



Map Code - SM1s6

A mixed white and black spruce (SM) type contain spruce trees ranging in diameter from .5 to 5 in. (1). The spruce canopy closure ranges from 10 to 25 percent (s). Lichens (6) cover from 75 to 90 percent of the area. Low shrubs which cover more than 10 percent of the area are not included in the code because the classification system allows for only one ground cover modifier. Tree heights range from 10 to 25 ft. This type occurs on mountain toeslopes, rivers and stream terraces and broad alluvial fans. The soils on this site are deep to permafrost and moderately well drained to well drained.



Map type - ST2o8

A white spruce-tall shrub (ST) type. The white spruce (s) have a diameter of 5 to 9 in. (2). The closure of the spruce and tall shrub is 25 to 60 percent (o). Forty to 75 percent of the ground is covered with grass and grasslikes (8). Tree heights range from 35 to 50 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. The soils on this site are poorly drained to well drained.



Map Code - SL2o8

A white spruce-low shrub (SL) type. The white spruce (s) ranges in diameter from 5 to 9 in. and a canopy closure of 25 to 60 percent (o). Low shrubs and grasses cover 40 to 75 percent of the area with low shrubs (willow in this instance) covering the majority of the area. Tree heights range from 35 to 50 ft. This type occurs on mountain toeslopes, river and stream terraces and broad alluvial fans. The soils on this site are poorly drained to well drained.

Map Code - SP4o2 (left photo)

A mixed white spruce-balsam poplar (SP) type. The tree diameters range from 5 to 21 in. (4). Canopy closure ranges from 25 to 60 percent (o). Tall willows (2) cover from 40 to 75 percent of the area. Tree heights range from 50 to 60 ft. This site occurs on floodplains and low terraces of major streams. River gradient is usually slight. Oxbows and meanders are common. The soils on this site are well drained and deep to permafrost.



Map Code - WB1c (right photo)

A pure white birch (WB) type composed of at least 80 percent white birch. The diameters range from .5 to 5 in. (1). Canopy closure ranges from 60 to 100 percent (c). Tree heights range from 10 to 25 ft.

No ground cover is represented in the code because the canopy density is over 90 percent and would not allow visual interpretation of such from aerial photographs. This site occurs on hill and mountainslopes. The soils on this site are moderately deep to deep to permafrost and are moderately well to well drained.



Map Code - SB1o6

A mixed white spruce-white birch (SB) type, containing spruce and birch trees ranging in diameter from .5 to 5 in. (1). The combined spruce and birch canopy closure is from 25 to 60 percent (o). The lichen (6) ground cover ranges from 40 to 75 percent. Low shrubs of 10 percent or more ground cover is not represented in the code because the classification system allows for only one ground modifier. Tree heights range from 10 to 25 ft. This type occurs on hilltops. The soils on this site are deep to permafrost and are well drained.



Map type - WB1s6

A white birch (WB) type containing trees ranging from .5 to 5 in. (1) in diameter. The white birch canopy closure ranges between 10 and 25 percent (s). Lichens, mosses and dwarf shrubs (6) make up 75 to 90 percent of the ground cover. Tree heights range from 10 to 25 ft. This type occurs on hill tops and terraces. The soils on this site are moderately deep to deep to permafrost and are well drained. Animal damage is the probable cause of the shaggy looking trees.



Map Code - ML1s8

A black spruce-low shrub (ML) type. The black spruce (M) ranges in diameter from .5 to 5 in. (1) with a canopy closure of 10 to 25 percent (s). Low shrubs (L) of willow and alder make up a large portion of the understory with the remaining area covered with grasses and grasslike plants (8). The low shrubs and grass cover from 75 to 90 percent of the area. Tree heights range from 10 to 25 ft. Some white spruce may be found in this type but it does not make up 20 percent of the total tree stocking of the type. This type occurs on valley bottoms and footslopes affected by seepage. The soils on this site are shallow to moderately deep to permafrost and are poorly to very poorly drained.



Map Code - PB1o6

A mixed white spruce, black spruce, and white birch type (PB). The tree diameters range from .5 to 5 in. (1). Tree canopy cover ranges from 25 to 60 percent (o). The ground cover is lichen (6). Tree heights range from 10 to 25 ft. Also found in this type are small clumps of aspen and low shrubs. This type occurs on hilltops and terraces. The soils on this site are moderately deep to deep to permafrost and are moderately to well drained.



Map Code - QA1c

A pure quaking aspen (QA) type, composed of at least 80 percent aspen. The tree diameters range from .5 to 5 in. (1). Canopy closure ranges from 60 to 100 percent (c). Tree heights range from 10 to 25 ft. No ground cover is represented in the code because canopy density is over 90 percent and would not allow visual interpretations of such from aerial photographs. This type occurs on south and west facing slopes and on terraces. The soils on this site are deep to permafrost and well drained.



Map Code - MAlo3

A black spruce (MA) type. The tree diameters range from .5 to 5 in. (1). Canopy closure ranges from 25 to 60 percent (o). Tall shrubs (3) composed mostly of willows and alders are in the understory. This site occurs on low hills, alluvial fans and footslopes affected by seepage. Frequently this site occupies a zone around wet bogs where due to excessive soil moisture and low soil fertility the black spruce are often stunted as compared to upland sites. Tree heights range from 5 to 20 ft. It is found on all aspects but more frequently found on north and northwest facing slopes.



Map type - MAIs4

A black spruce (MA) type containing trees ranging from .5 to 5 in. (1) in diameter. The black spruce canopy closure ranges from 10 to 25 percent (s). Dwarf shrubs, mosses and lichens (4) make up 75 to 90 percent of the ground cover. Tree heights range from 2 to 10 ft. This type occurs at timberline on all aspects. The soils on this site are shallow to moderately deep and are well drained.



Map type - alms8 (alder and willow in background not part of call)

A low shrub alder (al) type on a moist site. The alder has a canopy closure of 10 to 25 percent (s). Grass and grasslike (8) cover from 75 to 90 percent of the remaining area. This type occurs on mountainous footslopes, foothills and broad depressions on all aspects. The soils on this site are shallow to moderately deep over permafrost and are poor to moderately well drained.



Map Code - sxmc8

A low willow (sx) type that has a moisture regime of moist (m) and a canopy closure of 60 to 90 percent (c). Grass and grasslike plants (8) cover from 10 to 40 percent of the area. This type occurs in broad depressions, abandoned floodplains and low terraces. The soils on this site are moderately deep to permafrost and are moderately drained.



Map type - msm

A mixed shrub tundra (ms) type on a moist (m) site. The vegetation found on this type is shrubs, grass and grasslikes, moss and lichens. The type occurs on foothills, footslopes, alluvial fans and moraines adjacent to mountainous areas and in broad depressions. The soils on this site are shallow to moderately deep to permafrost and are poorly to moderately drained.



Map type - lsdo9

The type described above is located in the center of the picture.

A lichen-shrub (ls) type growing on a dry site (d) covering from 25 to 60 percent (o) of the area. Barren ground (9) comprises 40 to 75 percent of the area. This type is found mostly on mountain slopes. It is the transition zone between tall shrubs and mat and cushion tundra, and at times contains small areas of both types. The shrubs in this type are usually from 1 to 5 feet tall. The soils on this site are shallow and well drained.



Map type - 70dc

A dwarf shrub and lichen (70) type growing on a dry site (d) covering from 60 to 100 percent (c) of the ground. This type is found mostly on mountain ridges and slopes above the brush line. The soils on this site are shallow and well drained.



Map type - 70do9

A dwarf shrub and lichen (70) type growing on a dry site (d) covering from 25-60 percent (o) of the ground. The barren (9) ground comprises from 40 to 75 percent of the area. This type is found mostly on mountain ridges and slopes above the brush line. The soils on this site are shallow and well drained.



Map type - 70ds9

A dwarf shrub and lichen (70) type growing on a dry site (d) covering from 10-25 percent (s) of the ground. The barren (9) ground comprises from 75 to 90 percent of the area. This type is found mostly on mountain ridges and slopes above the brush line. The soils on this site are shallow and well drained.



Map code - 61 (wet meadow center of photo)
 - sxmc (around edge of meadow)

A sedge (61) type that occurs on wet lake beds, oxbows and along the coastal plains. The plant community is usually over 90 percent grass and grasslikes. Few shrubs are found in this type due to their low tolerance for extreme wetness. Around the edge of the meadow is a willow (sx) type on a moist (m) site that has a 60 to 90 (c) percent canopy closure.



Map type - 62

A tussock tundra (62) type found on broad valley bottoms and the coastal plain where the drainage is poor. Site may be either moist or wet. The vegetation consists of shrubs, grass and grasslikes, moss, and lichens. Permafrost is very near the surface.



Map type - 64

A low shrub-water sedge (64) type. This type is a combination of many different poorly drained types too small to map, such as tussock tundra, shrub willow, dwarf birch, water sedge, etc.



Map type - 82

This type occurs on narrow overflow areas bordering rivers and streams. It is in the flood plain and is usually flooded at least once a year. The most common vegetation found on these types are willows, alders, balsam poplar, and dwarf fireweed. Because of the mapping scale, these sites are included as part of the river and streams classification.



Map type - Many and varied

These types are found on the well drained south slopes along the Kobuk River. Beginning at the river banks you find a tall shrub type (alder-willow) blending into a balsam poplar type with varying amounts of white spruce. From the toe of the slope, halfway to two-thirds up are white spruce, white spruce-white birch, white spruce-alder types. These types blend into a white birch type followed by a white birch-black spruce type then black spruce type. Balsam poplar and white spruce generally attain saw-timber size at maturity. Birch seldom attains a size larger than pole-timber. Black spruce is always of seedling-sapling size. This hillside could be classified into many different types or one type, depending on map scale.



Map type - 70dc9 (bottom)

A closed dwarf shrub-lichen type (70) on a dry (d) site with a ground covering of 40-90 percent (c) and 10-40 percent barren ground.

90 (top right center)

Barren ground (90) type having less than 10 percent vegetation cover.

85 (top left center)

A permanent ice and snow type.

GLOSSARY

Canopy: (1) More or less continuous cover of branches and foliage formed collectively by crowns of adjacent trees, shrubs, or herbs depending upon the type of vegetation. (2) The cover of leaves and branches formed by the tops or crowns of plants as viewed from above.

Canopy cover: The proportion of the ground area covered by the vertical projection of the canopy. Expressed as a percent of area.

Crown cover: (1) The ground area covered by the crown of a tree or shrub, as delimited by the vertical projection of its outer-most perimeter. (2) The canopy of green leaves and branches formed by the crowns of all trees in a stand or forest.

Forest: (1) Plant community predominately of trees and other woody plants, growing more or less closely together. (2) Ecosystem characterized by more or less dense and extensive tree cover, i.e., larger than what might be called a grove. (3) In the Preliminary Classification for Alaskan Vegetation, vegetation with at least a 10% crown cover by trees; i.e., single stemmed woody plants at least 5 meters (approximately 16 ft.) in height at maturity.

Herbaceous: In the Preliminary Classification of Alaskan Vegetation, vegetation with 5% or more crown cover in vascular and nonvascular (mosses and lichens) plants and less than 10% crown cover of woody plants.

Orthophotograph: Photograph having the properties of an orthophotographic projection. It is derived from a conventional perspective photograph by simple or differential rectification so that image displacements and scale differences caused by camera tilt and terrain relief are removed.

Orthophotographic map: Map produced by assembling orthophotographs at a specified uniform scale in a map format.

Shrub: A wood perennial plant differing from a tree by its low stature and by generally producing several basal stems instead of a single bole, and from a perennial herb by its persistent and woody stem(s).