CRY LAKE WILDLIFE (UNGULATE) BIOPHYSICAL INVENTORY (104 I)

LEGEND

This map represents a biophysical classification for wildlife (ungulate) capability. It is general in nature and is presented at a scale of 1:250 000. Like capability maps for forestry and agriculture, ungulate capability maps are based on landforms, surficial materials, soils, climate and vegetation that are considered to form "ecologically significant" units of land. For wildlife, biophysical base maps may be supplemented by animal censuses to gain an insight into ungulate distribution and abundance.

The biophysical mapping approach used here is a step wise process beginning with the two most fundamental needs of wildlife - food and cover. These attributes are assessed using terrain and soils as mapped by other services in the Terrestrial Studies Branch. Areas of land judged to have differences significant to ungulate management are designated as map units. Subsequent steps in the assigning of capability values are the assessment of a number of environmental conditions influencing the expression of ungulate capability.

The capability of the land to support a given ungulate species is based on the long term ability of that land to meet the total needs of the species. In terms of food and cover requirements, the ratings are based on the optimum vegetational (successional) stage that can be maintained. Management prescriptions are limited to: prescribed burning or grazing; prescribed logging or slashing; or, protection from any land use practice that is detrimental to the wildlife species.

Carrying capacity estimates are expressed as animals/square kilometer/year which can be supported on a sustained basis and are represented on the map by a capability class rating from 1 (highest) to 6 (lowest). Each unit is assessed for its ability to sustain the assigned ungulate species during winter or summer (non-winter) periods.

This capability classification reflects only the biological and physical parameters of the environment and does not take into account social and economic factors. Also, the classification does

2. Example of Map Symbol

CAPABILTY RATING (see Boxes 4 & 5)

UNGULATE SPECIES (see Box 3)

SUBSCRIPT RATING INDICATES WINTER RANGE

SUBSCRIPT RATING INDICATES SUMMER RANGE

(see Box 6)

Note: An asterisk (*) following a capability rating indicates a rutting area.

This example would be interpreted as follows:

A floodplain unit of moderate winter snow accumulation which is a very high capability winter range for moose (also a rutting area), a moderate capability winter range for mule deer and white-tailed deer.

3. Ungulate Species Symbols

B...Black-tailed Deer E...Elk M...Mule Deer W...White-tailed Deer C...Caribou G...Mountain Goat S...Mountain Sheep X...Moose

4. Capability Classes

CLASS 1 Lands in this class have very high capability to support the assigned ungulate species. When required, this class may be subdivided on the basis of productivity into classes la, lb and lc.

CLASS 2 Lands in this class have high capability to support the assigned ungulate species.

CLASS 3 Lands in this class have moderate capability to support the assigned ungulate species.

CLASS 5 Lands in this class have very low capability to support the assigned ungulate species.

CLASS 6 Lands in this class have no or virtually no capability to support ungulates.

CLASS 4 Lands in this class have low capability to support the assigned ungulate species.

6. Environmental Conditions

The most significant environmental conditions influencing the production of the species and thus determining the capability class, are indicated on the map by symbols. The environmental conditions affect the ability of the land to meet the needs of the species in terms of food, cover and other requirements. For convenience, the environmental condition symbols are placed in three main categories: those relating to climate (such as snowfall or temperature), those relating to the inherent characteristics of the land (such as landforms, soils or vegetation potential), and those relating to permanent anthropogenic (man made)

Pa - RAIN SHADOW - unit in which more xeric tolerant plants become established due to climatic factors than occurs in adjacent areas

Sh - NIGH SHOW - unit in which snow accumulation is greater than approximately one meter

S1 - LOW SHOW - unit in which snow accumulation is less than approximately one half meter in depth

Sm - NODERATE SHOW - unit in which snow accumulation is approximately one half to one meter in depth

Sp - SHOWFIELDS AND GLACIERS - unit of permanent ice or snow

Ss - INTENSIFIED SOLAR RADIATION - unit in which snow accumulation is significantly reduced through exposure

The North Sular Rapialition of such and accumulation is significantly reduced through exposure to solar radiation of southerly aspects

Sw - WINDSWEPT SNOW - unit in which snow accumulation is considerably reduced by wind erosion

Ta - ALPINE ARIDITY - unit at high elevations that is subject to aridity in summer from extreme evapotranspiration and wind action

Tc - COLD AIR LAYER - extreme and persistent freezing temperatures below temperature inversions

Tf - FROST POCKETS - unit that is subject to increased occurance of freezing temperatures relative to the surrounding terrain

We - EXPOSURE - unit that is greatly exposed to local winds throughout the year

ANTHROPOGENIC

Wh - RESERVOIR DRAW-DOWN ZONE - the area between full pool and low pool in reservoirs

Wi - INDUSTRIAL DEVELOPMENT - unit of industrial development such as mills, mines, tailings or spoil areas

Hr - TRANSPORTATION CORRIDORS - unit that has a significant proportion of transportation development such as

roads or railroads

Th - HIGH HEAT - unit that is subject to high heat causing extreme evapotranspiration to - WARM AIR LAYER - relatively warm air, occuring over temperature inversions

roads or railroads

Hu - URBAN DEVELOPMENT - unit that has permanent urban development

SOILS AND LANDFORMS

Ea - ALPINE TUNDRA SOILS - unit of virtually treeless high elevation mountains or plateaus

Eb - ALKALINE SOILS - unit of strongly alkaline soil

Ed - OPE!! FOREST SOILS - unit where an open forest or a transition forest/grassland becomes established

Ef - UPLAND FOREST SOILS - unit where dense conifer forests become established

Eg - GRASSLAND SOILS - unit where a grassland becomes established

Eh - MOIST SOIL - area of moist mineral soil

Ek - KRUMHOLZ FOREST SOILS - unit that has an interrupted forest cover of stunted subalpine tree species

El - DEEP LACUSTRINE DEPOSITS - unit that is dominated by soils developed from deep, inactive lacustrine

deposits

Em - SUBALPINE MEADOW - unit where a subalpine meadow becomes established

Eo - ORGANIC SOILS - unit with poor drainage that is dominanted by organic soils

Er - BEDROCK - unit that is dominated by bedrock

Es - SALINE SOILS - unit of strongly saline soil

Et - TALUS - unit that is dominated by talus

Ew - DEEP FLUVIAL DEPOSITS - unit that is dominated by well to rapidly drained soils developed from deep, inactive fluvial deposits

Ex - DRY SOIL - unit that is dominated by well to rapidly drained soils of coarse textured morainal or colluvial materials

La - AVALANICHE TRACTS - unit that has avalanche chutes

Le - SOIL EROSION - unit that has erosion or potential erosion ranging from sheet erosion through to minor gulleying

Lf - ACTIVE FLOODPLANN - unit of flat land bordering a river and subject to periodic flooding

Li - FRESH WATER INUNDATION - unit that is subject to long periods of natural flooding resulting in marshy vegetation
Ll - LEVEL LAND - unit that is flat with slopes less than 2°
Lr - ROLLING OR HILLY LAND - unit with complex slopes of between 5 and 30° in a generally low relief area
Ls - STEEP SLOPES - unit with slopes greater than 25°
Lt - TIDAL INUNDATION - unit that is flooded frequently by tidal activity
Lw - FALLING SLOPES - unit of extensive slope movement

7. On-Site Symbols

Identifies the location of known mineral licks

Identifies important known or suspected seasonal movement corridors

8. References

For a more detailed description of the classification system the reader should refer to the guidelines which outline the Biophysical capability classification for ungulates in British Columbia. These guidelines are available from the Terrestrial Studies Branch, Ministry of Environment, Parliament Buildings, Victoria, British Columbia.

9. Credits

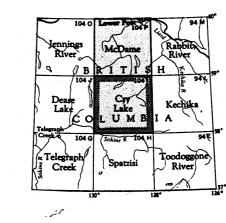
Mapped by: B. Fuhr and D. A. Demarchi
Date Mapped: |98| - O2
Date and scale of photography: |979 | 1:70000
Base Mapping: Cry Lake Biophysical by M. Fenger, |1982
Date drafted: |982 - O3
Revision dates: |983 - O8
Drafted by Cartography Unit, Terrestrial Studies Branch, Ministry of Environment, Victoria, B.C.
Base map provided by: Surveys and Mapping Branch, Ministry of Environment, Victoria, B.C.

CRY LAKE
BRITISH COLUMBIA

Scale 1: 250,000

1 Inch to 4 Miles Approximately

Miles 5 10 15 20 Miles Mile



INTRODUCTION

The biophysical mapping project in the Cry Lake map area was a pilot project for general scale (1:250 000) ungulate capability mapping intended to provide ungulate information for the northern third of British Columbia, an area not completed by the Canada Land Inventory.

The Cry Lake map area covers approximately 12 800 square kilometres of the Cassiar Mountains in northwestern British Columbia. This mountainous area is dissected by the Dease and Turnagain Rivers which drain to the northeast into the Liard River system and by the Stikine River which drains to the west into the Pacific Ocean. The area is high in elevation with most valley bottoms being above 900 metres (3000 feet) and mountain tops rising over 2100 metres (7000 feet). The high elevation combined with high latitude (58° to 59° north) and continental climate contribute to a low general level of biological productivity. Forestry capabilities are low with the exception of some lower elevation valleys which have maderate capability for forestry (Fenger, 1982). Ungulate capabilities are also low except for caribou, which have adapted to utilize such habitat; Stone's sheep and mountain goats, which occur in large numbers in the rainshadow area of the lower Major Hart and lower Turnagain Rivers; and moose, in the areas of higher primary productivity associated with lower elevation valleys and plateaus.

The methodology used in this project incorporates the capability concept used in the Canada Land Inventory Programme plus the biophysical concept developed by the Terrestrial Studies Branch to classify the environment. The objective of this general scale biophysical mapping project is to provide a regional overview of ungulate capability as a basis for land use

units to ungulates; and some of the salient physical and biological properties of the units as they pertain to ungulates. Physical and biological inventory sampling for the area is generally low so that some inaccuracies undoubtedly exist in unit boundaries and descriptions. Ungulate carrying capacity estimates must be applied with caution since non-typical areas (inclusions) of better or poorer habitat may occur within a unit. This is an unavoidable consequence of mapping scale, a low level of inventory information and the low level of survey intensity.

PROJECT OUTPUTS

Project outputs consist of this ungulate capability map and the Cry Lake Biophysical (Fenger, 1982) map from which it was derived. The latter map portrays important features of the land as they relate to soils, terrain and vegetation. It also provides descriptive notes on drainage, physiography, bedrock geology, late Quaternary history, climate, and recreation. For further information on these subjects refer to the Cry Lake Biophysical map, as they have been repeated here only as they pertain to ungulates.

METHODS

Background data pertaining to ungulates in the area was compiled from the files of the Terrestrial Studies Branch, Fish and Wildlife Branch rarious consultants and other people with local knowledge. Field studies onsisted of three weeks of summer field survey and one week of winter ungulate survey. The survey team consisted of three persons: a soil-terrai specialist, a plant ecologist and a wildlife biologist. During the summer forty-one plots were located in representative biophysical types. The lethods used in collecting information relating to site describtion, terain, soils, vegetation and wildlife are described in: "Describing Eco systems in the Field", Walmsley et al, 1980. Access was primarily by helicopter (twenty-eight hours of flight time) except for limited wehicle accession the Stewart-Cassiar Highway and along the abandoned British Columbications are supposed.

Biophysical units were delineated for the Cry Lake Biophysical Map (Fenger, 1982) by air photo interpretation and field checking. This map shows relatively homogenous units of terrain and vegetation. The units on the Cry Lake Biophysical Map were then rated for their value to wildlife based on field observations of ungulates, background ungulate data, the biophysical information and airphoto interpretation. Winter ungulate surveys were conducted by helicopter (twenty-five hours of flight time) to supplement background ungulate data and to observe winter habitat conditions on various biophysical types. More detailed information on preparation of ungulate capability maps is contained in "Methodology for Ungulate Biophysical Mapping" (Terrestrial Studies Branch, in prep.) and in "Biophysical Ungulate Capability Mapping in British Columbia (Demarchi et. al., 1980). This survey information is held on file with the Terrestrial Studies Branch, Victoria.

This section describes the four physiographic regions of the area and how the ungulates in these regions are influenced by the dominant factors of climate, landform, soils and vegetation. The four broad physiographic regions (Holland, 1976) are; the Kechika Ranges, the Stikine Ranges, the Spatsizi Plateau and the Tanzilla Plateau. Habitat potential for six species was identified in the Cry Lake may area: woodland caribou (Rangifer tarandus), Stone's sheep (Ovis dalli stonei), mountain goat (Oreamnos americanus), moose (Alces alces andersoni), mule deer (Odocoileus hemionus) hemionus), and elk (Cervus elaphus canadensis).

1. KECHIKA RANGES

The Kechika Ranges lie in the northeastern corner of the map area along the lower reaches of the Major Hart and Turnagain Rivers. Snow depth is much less than other areas on the map area, probably because of the rainshadow effect of the Stikine Ranges. Along with the northeastern edge of the Stikine Ranges, this area supports high capability for Stone's sheep, locally high capability for mountain goats, moderate capability for moose, low to moderate capability for caribou, and was considered to have low to moderate capability to support mule deer and elk, although these latter two species were not recorded.

Important Stone's sheep habitat includes the steeply sloping alpine areas of the Kechika Ranges, the adjacent northeastern edge of the Stikine Ranges and the lower elevation steep south aspect slopes along the Major Hart and Turnagain River valleys. The latter areas are especially important as winter range since they are relatively snowfree due to low snow fall, wind action and solar radiation. If maintained in an early seral state by fire as at present, the sites below tree-line can produce forage which is better suited for Stone's sheep than can higher elevation areas. Limestone outcrops both above and below treeline provide escape terrain important to Stone's sheep.

Mountain goats require rugged escape terrain, which in this area is usually in the form of limestone outcroppings. An important area for mountain goats is along either side of the Turnagain River valley near its confluence with the Cassiar River. Here escape terrain combined with accessible forage provides suitable habitat at both high and low elevations. This area is in the Kechika Range and Stikine Range transition.

Moderate densities of moose occur year-round along the floodplain of the Major Hart River, on the nearby morainal areas and on the more moderately sloping colluvial areas. Excellent forage for moose is available along the floodplain, in the adjacent organic areas and on the numerous fluvial fans adjacent to the floodplain. The early seral stages of shrub growth created by fire on morainal uplands has resulted in greatly improved moose winter range compared to more heavily forested areas. Some low capability habitat for mule deer and elk was identified along the lower slopes in the area of the Lower Major Hart and Turnagain River valleys, although there is no reported present use by these species. Low to moderate numbers of caribou occur in the area year-round. However, this area lacks the broad rolling alpine areas which caribou in northern B.C. favour as an important component of their winter range (Bergerud, 1979).

2. STIKINE RANGES

Most of the mapsheet is within the Stikine Range physiographic unit. It is aligned northwest to southeast, bounded on the northeast corner of the mapsheet by the Kechika Ranges and in the southwest by the Tanzilla Plateau and the Stikine River. The Spatsizi Plateau is restricted to lower elevations along the southern edge of the map area. Snow depth is generally high (approximately one metre or greater) throughout the Stikine Ranges and thereby confines most ungulate winter range to specific areas of habitat where snow depth is moderated by local climatic and topographic factors.

The variation in bedrock type within the Stikine Ranges has particular significance to ungulates. The granitic Cassiar Batholith within the Stikine mountains stretches from the Cassiar River and Hottah Lake in the east to Meek Lake and Sphinx Mountain in the northwest. The mountains of the Cassiar Batholith are generally low quality ungulate range. This primarily appears to be the combined result of the low nutrient status of the acidic soils, the high snow depth and rubbly colluvium common to this area. The Three Sisters Range, although further south, is similar to these rugged, granitic areas.

The northeastern edge of the Stikine Ranges is composed of a band of sedimentary rock which intergrades into the Kechika Ranges. Compared to other portions of the Stikine Ranges, this area appears to have less precipitation, more alpine vegetation and more favourable terrain to ungulates. Snow depth is progressively reduced and the habitat value for ungulates. Snow depth is progressively reduced and the habitat value for ungulates. Snow depth is progressively reduced and the habitat value for ungulates. Snow depth and the Kechika Ranges. Caribou, however, occur in relatively larger numbers throughout most of the southern portions of the map area. The subdued alpine landforms and wider valleys appear to differ greatly from other western areas of the Stikine ranges.

Caribou are the most widespread and abundant ungulate species on the Stikine Range physiographic unit and on the Cry Lake map area as a whole. They are highly mobile, use a wide range of habitat types over a large area, and may use different geographical areas as seasonal ranges from year to year (Kelsall, 1968). Specific factors which influence their distribution and abundance are less well understood than for other ungulate species, so that an assessment of caribou range based on a low level of inventory data with present herds reportedly at a fraction of their previous sizes (Bergerud, 1978) is somewhat speculative. Areas of important habitat may not have been identified, especially potential winter range in forested areas.

The alpine areas of the Stikine Ranges provide some of the most important habitat units for caribou. While most alpine units provide summer range for caribou, summer use appears to be concentrated in the southwestern sedimentary area of the Stikine Ranges with less use in the more rugged granitic portions of the ranges. Rugged alpine areas have been reported to provide scape terrain for caribou calving (Bergerud, 1978). Wintering caribou have been most frequently observed on the rounded alpine areas of the southern third of the map area. These areas are frequently swept clear of snow, permitting caribou to travel and forage. In addition, many of these areas serve as rutting grounds in the autumn. Rounded alpine areas known to be of high importance to caribou include Cake Hill, the southern edge of the Three Sisters Range, the mountains south of the area bounded by the Turnagain River and Kutcho Creek, and the areas adjacent to the lower Tucho River (Bergerud, 1978; Page, pers. comm.; Hatler, pers. comm.; Webb, 1980).

Caribou also winter below tree line, especially in lodgepole pine forest communities that have terrestrial and arboreal lichens. The most extensive of these areas occurs along the bottomlands and lower slopes of the Turnagain River valley upstream from Kutcho Creek. Other areas include the upper McBride River, the Kehlechoa River, the valley floor from Rainbow Lakes to Hottah Lake and the kame deposits in the Tucho River valley. Evidence of caribou winter use ("cratering", trails and caribou sightings) has been recorded during winter surveys of these areas. The close proximity of these lodgepole pine forests to previously mentioned rounded alpine areas permit caribou to utilize either of these habitat types as weather and snow conditions vary throughout the year.

There is evidence to indicate that many of the caribou wintering in the southern portion of the Cry Lake map area spend the summer south of the Stikine River in Spatsizi Wilderness Park (Hatler, pers. comm.). Caribou also are reported to use broad treeless valley bottoms for seasonal migration and post-calving aggregations (Bergerud, 1978, Page, pers. comm.). Such areas include the valleys of upper Kutcho Creek, the upper Eagle River, Hard Creek and Caribou Creek.

Stone's sheep are found throughout the mountains of the Stikine Range physiographic unit. High capibility for sheep exists in the northeastern sedimentary portion of the Stikine Ranges adjacent to the Kechika Ranges as

Stone's sheep are found throughout the mountains of the physiographic unit. High capibility for sheep exists in the sedimentary portion of the Stikine Ranges adjacent to the Kech described earlier. Capabilities for sheep in generally low tic assiar Batholith. Beale Mountain is an "outlier" of sedimer the Cassiar Batholith, providing an area of good year-round sin the sedimentary area to the southwest of the Cassiar Batholish, providing an area of good year-round sin the sedimentary area to the southwest of the Cassiar Batholsheep exist in low to moderate numbers in those habitats wrugged south-facing slopes and cliffs which can be used for Sheep are able to winter in these areas because they provide e and relatively snowfree foraging areas in a region of deep snow seldom observed on mountain groups that did not have some of terrain. Important areas for sheep winter range include t facing aspects of the Tanzilla River valley, the Dome Mountai two unnamed mountains east of the McBride River, and the ruggroup to the southwest of Hottah Lake. During the summer me sheep are more widely dispersed but are usually located on the groups on which they winter.

Mountain goats occur throughout the Stikine Ranges where provide escape terrain. The highest densities of mountain goats occur sides and mountains of the lower Turnagain and the valleys ides and mountains of the lower Turnagain and the valleys ides and mountains of the lower Turnagain and the cyalleys. These ranges are highly suited to mountain goats becgreat relief, steep rocky slopes and reduced snow depth. Mount scattered sporadically throughout the remainder of the Sti

Mose occur in low numbers throughout the Stikine Ranges because of the relatively high elevation of the valleys and long winters with deep persistant snow. There is better moose winter habitat within the Boreal White Spruce Zone than in the Subalpine Alpine Fir Zone. The upper Turnagain River valley provides good year-round moose range as it is at a lower elevation than most other valleys in the Stikine Ranges. Numerous moose were noted during the summer months along the many lakes in the Turnagain River valley between Turnagain Lake and Flat Creek. The Turnagain River valley provides the only moose winter range in the central portion of the map area.

3. SPATSIZI PLATEAU

A small portion of this physiographic region extends onto the lower elevations of the southern edge of the Cry Lake map area. Here the valley bottoms are at much lower elevations than those in the Stikine Ranges with a correspondingly less severe climate. The Stikine River has descended to 750 metres (2500 feet) at the southwest corner of the map area. Glacial drift-fit will be appeared to the Statesia Plateau.

correspondingly less severe climate. The Stikine River has descended to 750 metres (2500 feet) at the southwest corner of the map area. Glacial drift-filled valleys with numerous organic areas and active fluvial bottomlands dominate the materials of this portion of the Spatsizi Plateau.

Moose are abundant in this area, especially along active fluvial valley bottoms and deciduous south aspect slopes. The Pitman River is a very important area for moose with its meandering floodplain and organic areas. The Stikine River has a broad active floodplain and is also an important area for moose. Both of these areas are enhanced by the close proximity of south aspect of deciduous forest to their floodplains. These slopes provide the majority of the wintering area for moose when snow depth is not excessive while the valley bottoms provide a "critical" wintering area as well as calving areas and corridors for movement. Other valleys with smaller yet heavily used floodplains include Moose Creek, the lower McBride River, the lower Kehlechoa River drainage, and the lower Tucho River.

Caribou can potentially be found wintering throughout most of the coniferous forest within this portion of the Spatsizi Plateau. As in the Stikine Range physiographic region, mature lodgepole pine forests also provide winter range. Important areas which have have been identified include the lower slopes along the Pitman and Tucho Rivers, especially the gravelly fan at their confluence, the gravelly and organic areas associated with the Kehlechoa River and the lower McBride River. Caribou migrate through this area seasonally to and from their winter range in the Stikine Ranges to the Spatsizi Wilderness Park area, crossing the Stikine River. Traditional movement corridors and river crossings in this area likely exist but have not as yet been identified in south-facing aspects. Snow depth is greatly reduced on the lower elevation south-facing aspects. Snow depth is greatly reduced on the lower elevation south-facing aspects. Snow depth is greatly

4. TANZILLA PLATEAU

The Tanzilla Plateau extends onto the extreme western portion of the map area. This plateau is primarily rolling moraine, rock outcrops, rounded alpine areas and gravelly valley bottoms. Most of the plateau is above 900 metres (3000 feet) elevation except for the valley of the Tanzilla River which dissects the plateau surface to 750 metres (2500 feet) in the vicinity of Dease Lake. The snow depth on the Tanzilla Plateau is moderate to high, Dease Lake has an average March 1 snowdepth of 59 centimetres (16 year average - Snow Survey, 1980).

Moose winter throughout the forested area of the Tanzilla Plateau, but primarily below 1000 metres (3500 feet) because of deeper snow at higher elevations. While some moose winter along the Eagle River and across the plateau to the east of the Eagle River, most wintering areas are located on the southwest aspect slopes above Dease Lake or along the lower Tanzilla River within the Boreal white spruce forest zone. Numerous water bodies and organic areas provide good summer range for moose on the Tanzilla Plateau on the lodgepole pine/lichen flats along the Tanzilla River, in the upper Gnat Creek valley and on Thenatlodi Mountain. While they have not been recorded in these locations in recent years, this may be due to human disturbance from access into these areas. During the March, 1981 winter ungulate survey, caribou cratering activity was observed in the open lodgepole pine habitat north of Thenatlodi Mountain.

ACKNOWLEDGEMENTS

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M. Fenger provided the soils and terrain data base; C. Clement assisted in the identification of vegetation zonation; B. van Drimmelen, B. Pende past, K. Child and J. Elliott provided critical reviews of the project.

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