Vegetation Communities of Sheep Mountain
Faro, Yukon Territory

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Study Area

Sheep Mountain is the local name for a high ridge that extends from Faro, east along the Pelly river for about 11 km. Sheep Mountain rises from the north bank of the Pelly, starting at an elevation of 650 m up to its peak at 1402 m. It is well known as a traditional winter range for a population of about 80 - 100 Stone sheep (*Ovis dalli stonei*), also referred to as Fannin sheep. Communities of grasses and forbs are interspersed among rocky outcrops on the open south and southwest facing slopes, providing important winter range for these sheep. Farther down the mountain, a number of mineral licks occur which are frequently used by the sheep.

A forest fire in 1969 burned most of the area, leaving only a few small remnant stands untouched. The fire produced a lot of snags and deadfall, as well as a mosaic of successional vegetation along the face of Sheep mountain, some of it encroaching upon the winter range (see Fig. 1).

Methodology

Fieldwork occurred from July 16-19, 1990 and was carried out by Catherine Kennedy and Valerie Loewen, Habitat Management Section, YTG Renewable Resources. Sampling sites were accessed primarily by truck and on foot. One helicopter trip provided access to the top of Sheep Mountain.

Vegetation and site data were sampled concurrently at 27 sites in the study area, with the majority of the work occurring on the slopes of Sheep Mountain. Sampling sites were chosen to reflect the major vegetation communities of the area and were characterized by homogeneous vegetative cover. Species present, physiognomic class (strata), and percent cover for each species were recorded as well as water, nonvegetative material, litter and slash for each circular plot of approximately 20 m diameter. Unknown plant species were collected for later identification and verification. Photographs depicting the vegetative community were taken at each site.

Physical data (elevation, slope, aspect, topography, drainage, etc) were recorded to supplement the vegetative information (see attached field forms). No soil work was done during this investigation.

From the field data, 15 vegetation communities were then identified and described for the area. Colour airphotos (1976) as well as black and white airphotos (1993) at scales of 1:20,000 were obtained and used to help type the vegetation. A LANDSAT TM

transparency of the area was also available, however the scale and season were not appropriate and it could not be used effectively.

Sheep Mountain was revisited January 22-23, 1998 by Jennifer Staniforth, Habitat Technician in order to better understand the major vegetation associations of the area that could be distinguished at this time of year. Field checks were carried out on foot, by truck and by skidoo.

Vegetation boundaries were transferred from the airphotos onto a base map at a scale of 1:25,000, derived from the NTS 1:50,000 map sheet 105K/3. The vegetation communities identified during the fieldwork were simplified to allow for effective mapping. Certain discrete communities exist in such small areas that they could not be mapped at this scale. Other communities that were found in the study area were not sampled in 1990 and therefore were difficult to describe in detail. A description of the 11 mapped vegetation types is found in Appendix 1.

No truthing of the map has occurred apart from the brief visit in January, and this step is recommended to improve the accuracy of the vegetation map.

Vegetation Overview

Due to the forest fire of 1969, the majority of the study area exists in a patchwork of successional growth. A few remnant pockets of original forest are found at high elevation as well as along the valley bottom. The area can be divided into a subalpine zone near the top of Sheep Mountain and a boreal zone extending down along the base of the mountain to the valley floor.

Subalpine Zone

The top portion of Sheep Mountain escaped the worst of the burn and is dominated by medium to low shrubs with scattered tree communities of white spruce (*Picea glauca*) and alpine fir (*Abies lasiocarpa*). The main shrubs of the subalpine are dwarf birch (*Betula glandulosa*), willows (*Salix spp.*) and alder (*Alnus crispa*). Lichens are a prevalent understory, with *Cladonia spp.*, *Cetraria spp.*, *Stereocaulon spp.*, and *Nephroma sp.* being noted. Grasses, sedges and forbs are found on dry open areas as well as in more protected moist meadows. Rocky outcrops exist amidst the clumps of vegetation and extend down the whole face of the mountain. Small wetlands and moist sedge meadows surrounded by shrubs were found at higher elevations as well as in the valley, but were rare.

Boreal Zone

Below the crest of Sheep Mountain, the boreal zone dominates most of the study area, and contains a number of communities related mostly to fire succession, but also to terrain conditions. The area was glaciated, leaving deposits of morainal and glaciofluvial materials. Eskers and kettle and kame topography are observed between Sheep Mountain and the Pelly River, and the slopes are generally well drained. Trees tend to dominate the vegetation, though most of the trees are less than 100 years old (Oswald *et al.*1983). Forests of alpine fir and paper birch (*Betula papyrifera*) occur in patches on the northern aspect and more extensive forests of white spruce are found on other aspects. The face of Sheep Mountain is dominated by pure stands of trembling aspen (*Populus tremuloides*) on south facing slopes. A mixture of trembling aspen and lodgepole pine (*Pinus contorta*) and white spruce are found on the other aspects. Many of the draws and gullies are thick with shrubs and aspen regeneration. Where the trees are more open a dense understory of shrubs may form with dwarf birch and willows being common. Lichens are found at the drier sites with mosses more common as groundcover at moister sites.

Common groundshrubs are low bush cranberry (*Vaccinium vitis - idaea*), bearberry (*Arctostaphylos rubra*), and mossberry (*Empetrum nigrum*), found in conjunction with tree cover.

The typical successional stage following fire would be the establishment of grasses and forbs such as fireweed (*Epilobium angustifolium*). These are soon invaded by shrubs (willows, dwarf birch) followed by trees such as aspen and lodgepole pine. White spruce seedlings will finally establish themselves on certain sites to form the climax community. In some valleys, shrubs constitute the main vegetation due to cold air pooling, drainage and permafrost conditions.

(Oswald et al. 1982)

Finer textured fluvial deposits form some level terraces near the river and creeks. These terraces, if not affected by fire, support climax vegetation of white spruce/feathermoss. The edges of some of the terraces as well as low and moderate southerly facing slopes support grasses in association with forbs such as sage (*Artemesia spp.*) as well as kinnikinick (*Arctostaphylos uva-ursi*). Penstemon (*Penstemon spp.*), death camas (*Zygadenus elegans*), saxifages (*Saxifraga spp.*) and junipers (*Juniperus spp.*) are common on the slopes. Wild rose (*Rosa acicularis*) may form extensive patches, especially at the edge of more treed areas. Aspen tends to encroach upon the grasslands over time.

Recent alluvium extends along most drainages and constitutes the most productive sites of the area. The usual successional sequence begins with horsetails (*Equisetum spp.*) and other herbs, followed by shrubs (willows and alders), then balsam poplar (*Populus balsamifera*) and finally white spruce.

Wetlands form in low gradient valleys, small catchment basins and depressions in the area with fens and carrs being the most common. The fens are generally dominated by grasses (*Poaceae spp*) and sedges (*Carex spp.*) and have a moderate abundance of shrubs made up of willows, dwarf birch and Labrador tea (*Ledum groenlandicum*)

The following table summarizes the vegetation associations sampled:

Herb Dominated	1. (Willow)/Sedge Wetland	*Carex spp. – Sparganium sp.*
	2. Grass - Forb	*Poaceae spp/Epilobium angustifolium*
	3. Sage – Graminoid	*Artemisia frigida*
Shrub/Low Tree Dominated	4. Rose/Forb	*Rosa acicularis/Artemisia - Potentilla*
	5. Shrub Birch-Willow/ Lichen	*Betula glandulosa-Salix spp./Cetraria spp.*
	6. Willow/Aspen	*Salix spp/Populus tremuloides-Picea glauca*
	7. Alder-Willow Riparian	*Alnus crispa-Salix* spp/*Cornus stolonifera-Vibernum edule*
	8. Willow/Alder-Shrub birch	*Salix* spp/*Alnus crispa-Betula glandulosa*
Tree – Deciduous Dominated	9. Aspen/Kinnikinnick	*Populus tremuloides/Arctostaphylos uva-ursi*
	10. Paper birch/Alder	*Betula papyrifera/Alnus crispa*
Tree – Coniferous Dominated	11. WhiteSpruce/ Feathermoss	*Picea glauca*/Bryopyte spp
	12. Alpine Fir/ Feathermoss	*Abies lasiocarpa*/Bryophyte
Tree – Mixed Dominated	13. White Spruce/Willow	*Picea glauca/Salix* spp.
	14. Lodgepole Pine-Aspen/White Spruce	*Pinus contorta-Populus tremuloides/ Picea glauca*
	15. White Spruce-Balsam Poplar-Alpine Fir-Paper Birch	*Picea glauca-Populus balsamifera-Abies lasiocarpa-Betula papyrifera*

Descriptions of Vegetation Communities

1. (Willow)/Sedge Wetland (*Carex* spp-*Sparganium* spp.)

This wetland community was found in moist to wet alpine situations and was dominated by a mixture of sedges (*Carex* spp) and graminoids (*Eriophorum* spp, *Sparganium* spp, *Equisetum* spp). Where standing water persists for long periods of time *Carex aquatilis* is the dominant species. A common forb was coltsfoot (*Petasites* spp) and abundant wetland mosses were present. Shrubs such as willows and dwarf birch encroach on the edges of the wetland. This type was found in small depressions where drainage was probably restricted by bedrock or poorly drained soils.

2. Grass - Forb (Poaceae spp/*Epilobium angustifolium*)

This community was dominated by grasses such as *Bromus* spp., *Calamagrostis* spp., and *Festuca* spp. Some sedges also occurred as well as an assortment of forbs with fireweed (*Epilobium angustifolium*) being most prominent. Other forbs such as wormwoods (*Artemisia* spp.) were also important. This community was found in small patches on the slopes and terraces in the study area.

3. Sage-Graminoid (*Artemisia frigida*)

This type was dominated by forbs, principally sage (*Artemisia frigida*), and beard-tongue (*Penstemon gormanii*). Grasses were also prevalent with a mixture of *Poa* spp., *Agropyron* spp. as well as certain sedges (*Carex* spp.). Groundshrubs such as kinnikinick may also be present. This community is adapted to dry conditions found on south facing slopes, kame deposits and other glaciofluvial landforms. The soils tend to be coarse and well drained. In winter, they are generally windswept and snowfree, further contributing to their lack of moisture. This community is found in very small units from Sheep Mountain down to the valley floor.

4. Rose/Forb (*Rosa acicularis/Artemisia-Potentilla*)

This type was dominated by the low shrub, wild rose (Rosa acicularis), with an understory of forbs, primarily sage (*Artemisia frigida*) and cinquefoil (*Potentilla* spp) and grasses, such as *Calamagrostis* spp., *Bromus* spp. and some sedges. It was generally found at the edges of aspen forests and occurred over small areas on the hillsides.

5. Shrub Birch-Willow/Lichen (*Betula glandulosa-Salix* spp./ Lichen)

This type is characteristic of mountainslopes, blanketing the top of Sheep Mountain in the subalpine zone. Shrub birch dominates the community, often associated with willows (*Salix* spp.). A variety of groundshrubs such as mossberry (*Empetrum nigrum*), low bush

cranberry (*Vaccinium vitis-idaea*) and blueberry (*Vaccinium uliginosum*) are found in the understory. However lichens tend to dominate the groundcover. Common ones would be the reindeer lichens (*Cetraria* spp. and *Cladina* spp.). Krummholz white spruce and alpine fir occur occasionally.

6. Willow/Aspen (*Salix* spp/*Populus tremuloides-Picea glauca*)

This community was found on moderately moist sites at the edges or bottoms of slopes in the area. Tall and medium willows dominate, with an evident understory of regenerating aspen and some spruce. Groundshrubs offer moderate cover made up of low bush cranberry and kinnikinnick while grasses and forbs are sparse. Moss cover was moderate.

7. Alder-Willow Riparian (*Alnus crispa-Salix* spp./*Cornus stolonifera-Viburnum edule*)

Tall alders and willows form a thick canopy over a variety of medium shrubs including dogwood (*Cornus stolonifera*), high bush cranberry (*Viburnum edule*), shrubby cinquefoil (*Potentilla fruticosa*) and wild rose (*Rosa acicularis*). Due to the thick overstory of shrubs, herbs are sparse. This riparian type occupied creek beds in the study area.

8. Willow/Alder-Shrub Birch (*Salix* spp/*Alnus crispa -Betula glandulosa*)

This community was ubiquitous occurring on gentle to steep slopes that were affected by fire. This dense burn regeneration consisted of tall and medium shrubs of willow, alder, and shrub birch. The understory was sparse with the exception of fireweed. Mosses and lichens were low in cover.

9. Aspen/Kinnikinnick (*Populus tremuloides/Arctostaphylos uva-ursi*)

This community occurred on well to rapidly drained soils. It was found on steep south facing slopes on Sheep Mountain and on eskers and terraces in the area. It establishes following fire and encroaches upon some of the grassland slopes in the area. Trembling aspen (*Populus tremuloides*) of even age structure formed the canopy. Soapberry (*Shepherdia canadensis*) and rose (*Rosa acicularis*) were common medium shrubs; kinnikinnick (*Arctostaphylos uva-ursii*) was the most prevalent groundcover. A variety of forbs and grasses were present, though with low cover values.

10. Paper Birch/Alder (*Betula papyrifera/Alnus crispa*)

This community was found on mesic (moist) sites in the Boreal zone. This type was of limited distribution in the study area and occurred in small units. The tree layer was dominated by paper birch (*Betula papyrifera*) with a well developed layer of alders and willows. Lower shrubs of Labrador tea (*Ledum* spp.) and wild rose (*Rosa acicularis*) and low bush cranberry (*Vaccinium vitis-idaea*) were also represented. The herb layer was

dominated by wintergreens (*Pyrola* spp), fireweed (*Epilobium angustifolium*) and some grass (*Calamagrostis sp*).

11. White Spruce/Feathermoss (*Picea glauca*/Bryophyte)

This community commonly occurred on mesic sites from the valley floor up to the subalpine zone, though most frequently on alluvial flats in the study area. A few remnant stands of white spruce that had escaped the fire were found scattered in the area. This tends to be a productive community and is often the climax forest in the area. Shrubs are not abundant due to the dense tree cover, though the species diversity can be high (e.g. wild rose, high bush cranberry, Labrador tea, low bush cranberry and twinflower). The herb layer is represented by wintergreen and toadflax (*Geocaulon lividum*). A thick carpet of feathermosses (*Hylocomnium splendens*, *Pleurozium schreberi*, *Ptilium spp.*) was present.

12. Alpine Fir/Feathermoss (Abies lasiocarpa/Bryophyte)

This tends to be a stable subalpine community occurring on well-drained soils on north and northeast facing slopes. Alpine Fir (*Abies lasiocarpa*) is the dominant tree species though white spruce may also be present. As the tree canopy is generally closed, a minimal shrub layer exists. Willows and shrub birch as well as Labrador tea can be found at low cover levels. Groundshrubs usually include mossberry, blueberry and low bush cranberry. The herb layer may be diverse and include liquorice-root (*Hedysarum sp.*), bluebell (*Mertensia paniculata)*, wintergreens, and louseworts (*Pedicularis* spp.). Feathermosses form an extensive carpet.

13. White Spruce/Willow (*Picea glauca/Salix sp.*)

This community occurs both in the Boreal zone and the Subalpine zone. White spruce (*Picea glauca)* dominates the tree layer with tall willows as subdominant in the canopy. White spruce and willow also occupy the tall and medium shrub layers. Wild rose is the dominant low shrub. Groundcover varies with moisture regime, though twinflower (*Linnaea borealis*) is often present as groundcover with moss. The forb layer is variable with lupine (*Lupinus arcticus*), milk-vetch (*Astragulus sp)*, fireweed, liquorice-root, and wild strawberry (*Fragaria virginiana*) occurring.

14. Mixed Pine-Aspen/Poplar-White Spruce (*Pinus contorta-Populus tremuloides/P. balsamifera-Picea glauca*)

The canopy is a mixture of pine and aspen, but may also contain balsam poplar, white spruce and even paper birch. There is a medium and low shrub layer of willows, alder, Labrador tea and wild rose. Moss makes up the majority of the groundcover with some groundshrubs (mossberry, low bush cranberry and twinflower). Herbs may be diverse, but are low in cover. This mixed type is a typical mid-successional forest following fire.

15. Mixed White Spruce-Balsam Poplar-Subalpine Fir-Paper Birch
(Picea glauca-Populus balsamifera-Abies lasiocarpa-Betula papyrifera)

This community is made up of a mixture of coniferous and deciduous trees with a moderate shrub layer of willow and shrub birch. Groundshrub cover is generally high with a mixture of mossberry and kinnikinnick. Common forbs are fireweed, lupine and sage. Fescue is the dominant grass. Moss and lichen cover is generally low. This is mid-successional community that occurs on upper treed slopes.

Sheep Winter Range

Three vegetation communities were identified on Sheep Mountain as important winter range. The Sage-Graminoid association (Community #3) occurs on the open windswept south facing slopes and was considered the most important as it would be the most snow free during winter. The Rose/Forb community (Community #4) was found mainly at the edges of south facing aspen groves, in low-lying gullies and high snow accumulation areas. The Grass-Forb community (Community #2) also occurs at the edge of the aspen groves but on the more northerly aspects. The last two communities would tend to be used more in spring, fall and early winter, due to the higher accumulation of snow in these areas. (Sanderson 1991)

Given that these communities occur in very small patches, they could not be identified on the scale of the airphotos available. These three communities were grouped into one Graminoid/Forb community that could then be mapped with some degree of accuracy. Rocky outcrops occurred in association with all three of the important winter range communities. The sheep also use these outcrops for escape terrain and for a small amount of foraging, and they were included in the map with the grass and forb communities as sheep winter range and referred to as Rock/Grass/Forb on the map.

Literature Cited

Oswald, E.T., B.N. Brown and R.K.King.1983 Vegetation, Forest Cover and Firewood Mapping in the Carmacks-Ross River Priority Area, Yukon Territory. Environ.Can., Can. For. Serv. Pac. For. Res. Cent., File Rept., 61 pp. and maps.