

3 Ecological Land Classification Summary

3.1 Program Summary

The development of a land cover mapping program for an area as large as the Kivalliq region (over 410,000 km²) involved substantial effort. The process incorporated many steps, all influenced by time, expense and environmental conditions. In order to attain the volume of information (imagery and field data) required to cover such a large area, the program was conducted over multiple years. This section outlines the approach followed to complete the Ecological Land Classification (ELC) mapping program. At an overview level, the process involved the acquisition of satellite imagery, followed by fieldwork to describe land cover attributes, and then subsequent analysis to compile the results into the ELC data product. The sections that follow describe the approach taken for each of the major components:

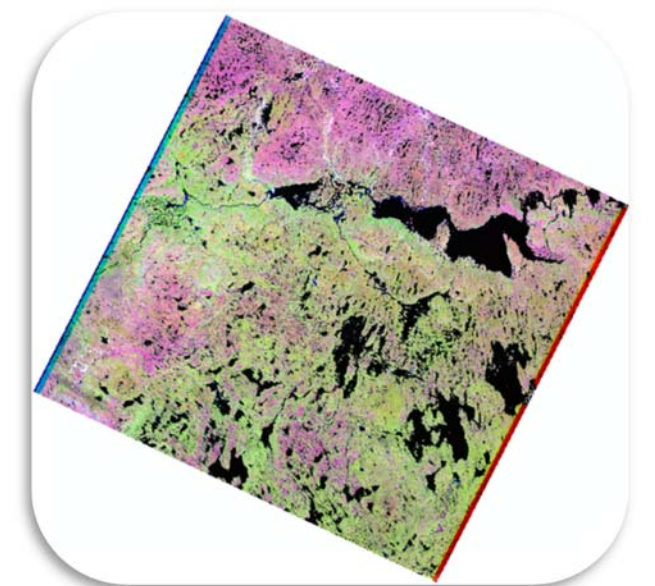
- Satellite image processing and stratification
- Field program
- Image classification and data analysis
- Accuracy assessment
- Data Limitations

These sections are followed by a detailed description of each ELC class.

3.2 Satellite Image Processing and Stratification

Satellite imagery is the key source of information used for the delineation of ecological land classes. The results of the field program provide a detailed picture of what exists on the ground in specific locations, however, the imagery provides the birds-eye view that facilitates mapping the distribution of vegetation patterns. Landsat satellite imagery has long been the accepted standard for regional mapping of this nature. One pass of the satellite covers a scene swath over 160 kilometres wide, with each pixel in the image representing 25 square metres of the ground surface. This level of resolution, combined with seven distinct wavelengths of information, including image data from visible to broad infrared, and thermal bands, provides a cost effective means to gather information over a study area of this size. Although there are satellites capable of detecting smaller objects on the ground, Landsat's unique multi-spectral band combinations provide a distinct advantage for determining the spectral signature (or fingerprint) of each unique type of ground cover.

Landsat imagery warehouses were reviewed to locate optimal images covering the study area with respect to several criteria. Foremost is the need to find cloud-free imagery within the growing season for vegetation (mid-July to late August). Recent imagery is more desirable to ensure that current data forms the backdrop for the classification mapping. Both Landsat 5 TM (Thematic Mapper) and Landsat 7 ETM (Enhanced TM) satellite sensors were considered. To develop a seamless mosaic of cloud-free images, scenes were acquired with dates ranging from August 2000 to August 2009. The images tile together along seams designed to minimize cloud cover and follow the edges of major geographic features (e.g., rivers and lakes). Map 3-1 illustrates the extent of the imagery used for the mapping project and Table 2 provides details for each image used in the classification.



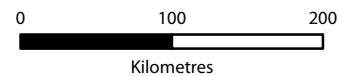
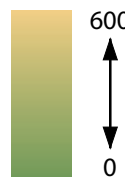
Beverly Lake Landsat 7 scene: Image acquired on July 26, 2001 and shown with a false colour enhancement.

Map 3-1 Ecological Land Classification Landsat Scenes

Legend

- ELC Sample Sites
- - - Nunavut Settlement Area boundary
- Region boundary
- ▭ Landsat Image extent

Elevation (m)



Canada Lambert Conformal Conic WGS 84

Data Sources:

Natural Resources Canada, Caslys Consulting Ltd.
Department of Environment (Government of Nunavut)

Prepared by:



Table 2. Satellite Image Details

Area Name	Image Date	Path/Row *	Sensor	Comments
Baker Lake	July 19, 2000	34/15	L7	Small bands of cloud/haze in eastern part of the image. Ice within Baker Lake
Banks Lake	August 31, 2001	34/16	L5	
Beverly Lake	July 26, 2001	38/15	L7	Small amounts of haze in southwest corner of the image.
Brown Lake	July 28, 2001	33/14	L7	Large bank of clouds in southern portion of the image. Popcorn clouds in northwestern corner.
Chesterfield Inlet	August 22, 2006	33/15	L5	
Henik Lake	July 29, 2004	35/17	L5	Small amounts of cloud banding present in the northwest quadrant of the image.
Lorrillard	August 13, 2008	31/15	L5	Haze present in the image. Popcorn clouds along coast in north east portion of the image.
Lyon Inlet	July 28, 2001	28/13	L7	Significant cloud in the northern portion of this scene. Sea ice present and has been excluded from the classifications. Ice present on the ground.
Lyon Inlet	July 26, 2001	30/13	L7	Ice present in this scene, with the majority in the ocean. Small amounts of cloud present in northern portion of the scene.
Maguse River	July 20, 2003	34/17	L5	Significant cloud in the northwest corner of the image.
Neultin Lake	July 29, 2004	35/18	L5	Small amount of popcorn cloud present in the western portion of the image.
Pennington Lake	August 28, 2009	35/14	L5	
Princess Mary Lake	July 23, 2002	36/15	L7	Moderate amounts of popcorn cloud in eastern portion of the image.
Rankin Inlet	July 24, 2001	32/16	L7	Cloud present along the southwestern edge of the scene.
Roes Sound	August 2, 2004	31/14	L5	Moderate amounts of cloud in the southern portion of the scene.
Snowbank River	July 26, 2001	30/14	L7	Ice present in the ocean. Significant haze in eastern portion of the scene over Southampton Island.
Tehek Lake	September 9, 2000	36/14	L7	Significant haze in the northwestern section of the scene.
Thlewiaza River	July 20, 2003	34/18	L5	
Tulemalu East	August 2, 2000	36/16	L7	Bands of cloud present in the northwestern portion of the scene.
Tulemalu West	July 27, 2001	37/16	L7	
Wattersson Lake	August 29, 2001	36/17	L5	Significant cloud cover present along northern edge and within the southern portion of the scene.

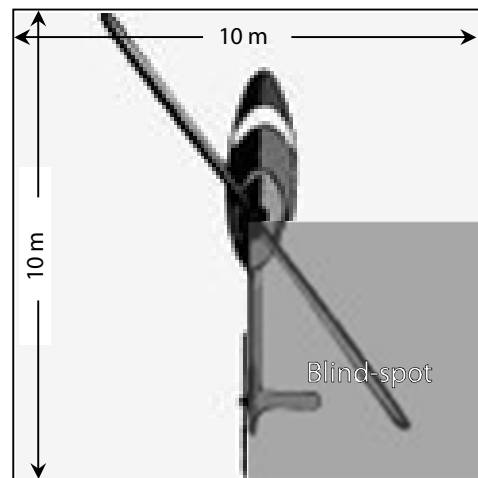
* The Path/Row heading indicates the satellite orbit location that is used for Landsat scene referencing for both the Landsat 5 (L5) and Landsat 7 (L7) satellites.

Radiometric enhancements were made to each satellite image scene to best match contrast for all spectral bands and to correct for atmospheric differences. These corrections help reduce variations between images and allow for the integration of images into a larger seamless dataset. A preliminary classification was then completed to identify distinct ecological areas within each scene. These results were used to delineate sample sites, stratified across each distinct area. The sample site locations were designed to maximize sample coverage and maintain efficient and safe field logistics with respect to both helicopter travel time and proximity to fuel cache locations. The development of a field atlas, showing the enhanced satellite imagery and sample sites, mapped at a scale of 1:50,000, was a key component to the field program – it was used by field staff to aid in navigation to and interpretation of the sample sites.

The preliminary classification provided information to formulate draft class breakdowns, understand broad class distributions across the landscape, and to plan field program logistics (i.e., ensuring a representative number of sites were surveyed). The field program provided ground-truthing, facilitating the comparison of mapping work completed on the computer to the actual groupings of biotic and abiotic land cover types in the field.

3.3 Field Program

Similar to the temporal windows used to select the satellite images, the field program was scheduled during the relatively short growing seasons (e.g., mid July to late August) from 2001 to 2007. The field program was designed to strike a balance, optimizing quality and quantity of data to guide the ELC mapping process, through the use of a Bell 206B Jet Ranger helicopter to visit pre-defined sample site locations. The lead biologist for the project was involved in all sample data collection to ensure consistent descriptions within the sample plot (10 metre by 10 metre quadrant) around the helicopter. To expedite data collection and plant identification, the helicopter landed on representative sample areas while visual observations were made from the front left seat position. Vegetation samples were collected by a second crew member for positive identification in the field, or in the lab, following the sampling program. This process occurred while the composition estimate and site characteristics were being recorded. The visual estimation of plant composition was based on $\frac{3}{4}$ of the quadrant (75m^2), which excluded the blind-spot area illustrated in grey in the adjacent diagram.



10 metre quadrant used in the visual estimation of plant species and site composition for field sample locations.

Over 2,900 sample sites (Map 3-1), were documented in this manner with an average of 140 sites on each satellite image scene (ranging between 54 - 339 sites per scene). At each site the following characteristics were recorded:

- Moisture regime
- Landforms and topography
- Surficial expression (of the landform)
- Substrate (general soil characteristics)
- Land cover descriptions of abiotic and biotic groups
- Vegetation species composition

In addition, three types of photographs were taken at each site, to be used later as reference. The first was taken in the downward direction as the helicopter approached from well above the site (similar to a detailed air photo); the second was captured on the ground as an oblique photograph to reference more of the terrain setting; and the third was captured to provide close up detail of the dominant plant species.

Once the field season was complete, the information collected was entered into a database using a combination of manual data entry, voice recognition and character recognition software. The data were then passed through several quality control checks built into the database to minimize data entry errors and reviewed by the field team. This review was an integral part of the quality assurance program. The database and the knowledge gained through the field program were then used to refine the classification strategy and the satellite imagery classification process on a scene by scene basis.

3.4 Image Classification and Data Analysis

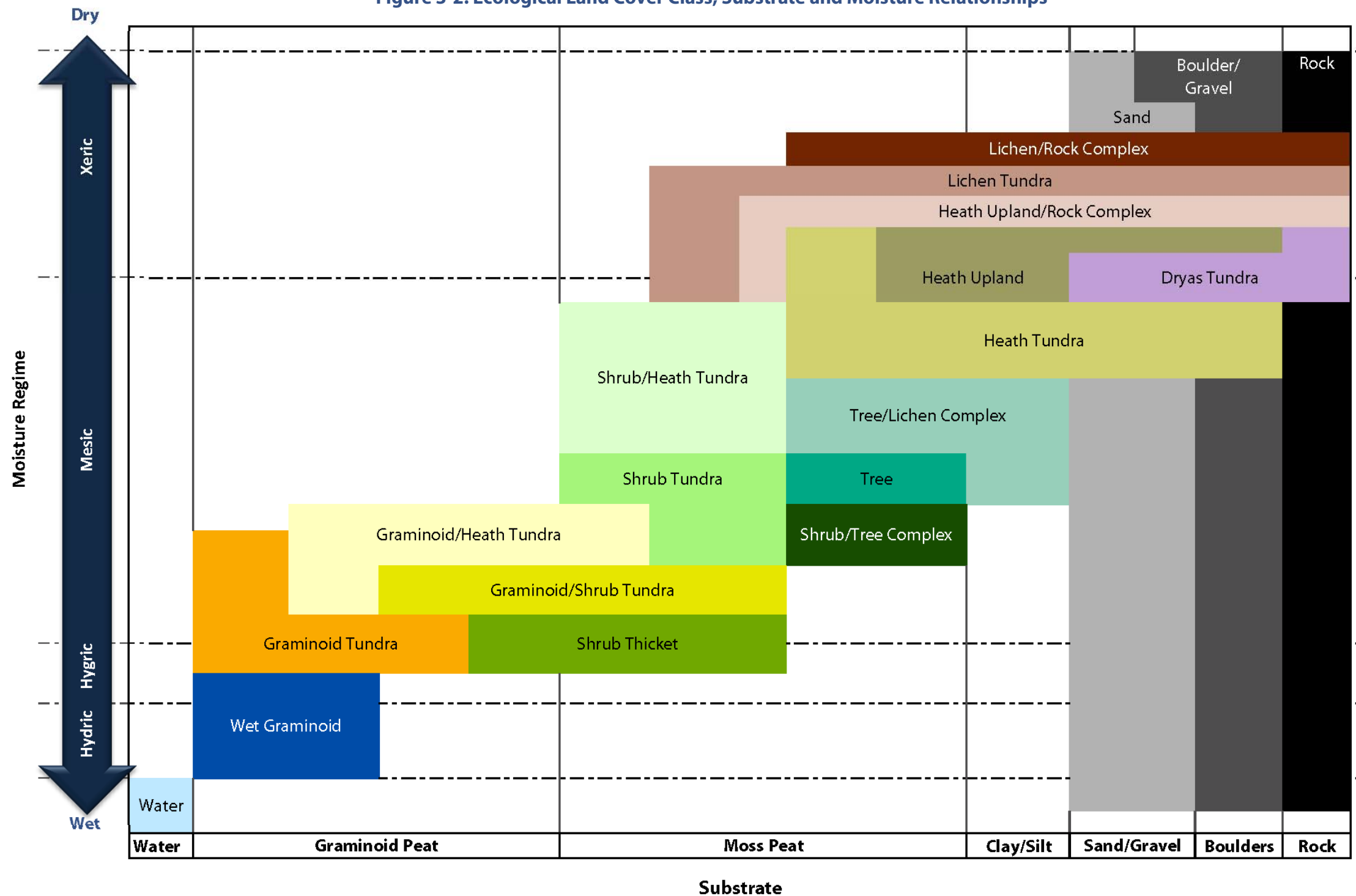
As mentioned previously, a preliminary classification was developed and used to design the field program and provide a basic breakdown of ecological land cover classes, however, the data and knowledge acquired during the field program are the basis for the final class descriptions. Many classes include similar vegetation species – the densities and distribution of these species help distinguish between different classes. The imagery and sample data were analyzed to generate refined classes based on multiple factors, including:

- Dominant plant functional groups (e.g., lichens, graminoids)
- Abiotic/biotic composition ratios (e.g., 50% boulder and 50% lichen)
- Species composition focusing on dominant species
- Substrate types
- Moisture regimes

Figure 3-2 illustrates the relationships between each of the 20 ELC classes, in terms of moisture regime and substrate. A detailed description of each ELC class outlining characteristics, listing dominant species, and displaying photographs of the class are provided in Section 3.7.

The image classifications were run a second time using the updated class definitions to achieve the greatest possible accuracy when compared to the actual sample locations. As each scene was completed, the results were assessed for accuracy, and if greater than 80% was achieved, the scene was then merged into a single contiguous dataset under the new class structure. If the classification results did not meet the 80% accuracy target it was rerun focusing on the erroneous classes. Accuracy results and discussion can be found in Section 3.5. To merge adjacent classifications to yield a seamless dataset, image seams were manually defined along geographic features and boundaries to connect classes in a manner that minimized recognizable seam boundaries, (potentially due to vegetation differences from yearly variations in weather) over the entire region (Map 3-1).

Figure 3-2. Ecological Land Cover Class, Substrate and Moisture Relationships



3.5 Accuracy Assessment

The accuracy of each scene's classification was assessed by comparing the ELC results to the field sample locations. Ideally, samples used to determine the classes should not be used in an accuracy assessment, however due to the limited number of points available for any one scene, the accuracy assessment included all points that overlapped the classification (i.e., points used to classify the scene, together with any points from overlapping scenes). Two methods were considered when examining the accuracy. The first method extracts the ELC class that falls directly under the sample site and compares it to the field sample. The second method extracts the ELC classes within 100 metres of the sample site and compares them with the class of the field sample. The purpose of assessing the accuracy using the second approach is to overcome the spatial inaccuracies of both datasets and to account for scale differences. The issue with the first method is if a sample site, whose coordinates are obtained from a GPS that may have a positional accuracy of +/- 15 metres, falls on an edge of a pixel (25 metres in size) which is a different ELC class, the accuracy assessment would consider this a negative result. This may be the case, but a more accurate GPS coordinate could place it on the correct pixel in the imagery and therefore yield in a positive result in the assessment. The second method overcomes this issue, providing a more realistic estimation of the accuracy of the classification and therefore this approach was utilized.

Based on the 100 metre method, overall accuracy of the entire region's classification is 83%. The accuracy for each scene ranges from 80% (Maguse River) to 88% (Tulemalu East) and are based on the full list of ELC classes (i.e., all 36 classes). The accuracy increases when performed on the grouped ELC classes that are shown in this atlas (i.e., 20 classes). The classes that generally have a lower accuracy are the transitional classes. This is due to the fact that they are a mixture of more than one class and therefore can theoretically be grouped with either parent class, depending on which one they are closer to in composition. For example, locations of Heath Upland/Rock Complex have small levels of confusion with either Rock or Heath Upland, depending on the ratio of rock to heath vegetation within the site.

3.6 Data Limitations

Although the atlas strives to be the most detailed and accurate source of ELC information for the Kivalliq region, there are some limitations to the use of this information. One of the objectives of the study was to map much of the mainland portion of the Kivalliq region. Within the constraints of the project, there are some regions that have been left unmapped. These include a small rectangular data gap southwest of Wager Bay, the coastal region stretching south from Whale Cove to Manitoba along Hudson's Bay, and most border areas adjacent to the Kitikmeot region and the Northwest Territories (Map 3-1).

The scale of this atlas is appropriate for regional analysis and decision making. In standard ELC mapping initiatives, the 'minimum mapping unit' is often used to describe the level of detail on the maps. On these maps, the smallest classes being mapped are approximately ½ to 1 hectare. More detailed mapping may be needed to support decisions being made at local or very detailed scales.

Effort was made to utilize the most recent satellite image data, however, in areas where little ecological change occurs from one year to the next, it was deemed more important to obtain cloud-free imagery within the narrow growing season window than to use the most recently available images. As a result, some images were acquired as far back as July of 2000 and may omit changes that have occurred on the landscape since that date. Map 3-1 allows the vintage of the imagery for specific locations within the study area to be determined. For certain landscape disturbances (e.g., mine footprints, roads, etc.), more recent imagery or ancillary GIS data was used to define the extent, and these data have been integrated into the ELC classification within the disturbance class.

Yearly variation in moisture and temperature introduced difficulties when using field data collected on a different year than the image acquisition date to develop and/or assess the classification. There were cases where the site composition in the field looked different than what was expected on the imagery. In some cases this resulted in misclassified ELC classes, which had to be re-visited during the classification process.

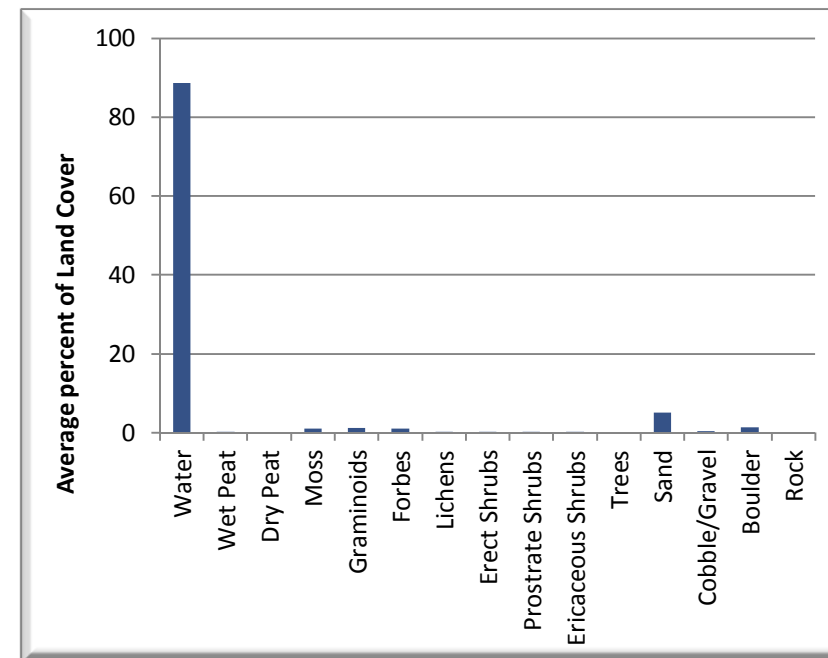
3.7 Detailed ELC Class Descriptions

The following class descriptions outline the sub-classes, characteristic features of the vegetation species, and the land cover groups found within each class. The percentage of the overall mapping and where the class occurs (i.e., the ecoregion) are also included. The Canadian Endangered Species Conservation Council (CESCC) Wild Species 2010 has been used to assign the nomenclature for the vegetation species. The ELC classes represent the overall composition based on the average values of the sample sites for each class. The groups can be of two types: biotic groups, which are plant functional groups (e.g., mosses¹, graminoids, forbs, lichens, shrubs [erect, prostrate and ericaceous], and trees); or abiotic groups - land covers that are non-vegetated (e.g., water, sand, cobble/gravel, boulder and rock). A list of terms used in this section can be found in the glossary of this atlas.

¹ Moss occurs in most of the biotic groups and to some extent in the abiotic groups as an understory community. In relation to the pixel size of the satellite imagery it represents a very small unit and has little influence on the classification process. Due to this, moss was excluded from the ELC class delineation and the classification process.

Water

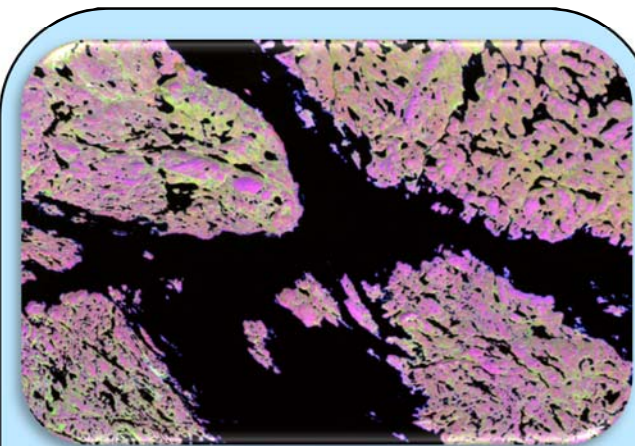
The water class represents just over 24% of the area mapped (approximately 100,000 km²). It includes rivers, lakes and up to 15 kilometres into salt water. Water is found within all the ecoregions, ranging between 15 to 46% of the mapped area. This class also includes the sand/water sub-class that represents shallow water. Typically, waterbodies greater than 0.75 hectares in size and rivers in excess of 75 metres in width are distinguishable in the imagery and are therefore included in the mapping. Typical vegetation species for this class (detailed in the table) are: water sedge (*Carex aquatilis*), northern bog sedge (*Carex gynocrates*), capitate sedge (*Carex capitata*), for freshwater sites and seaweed for sites occurring in the tidal flats.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

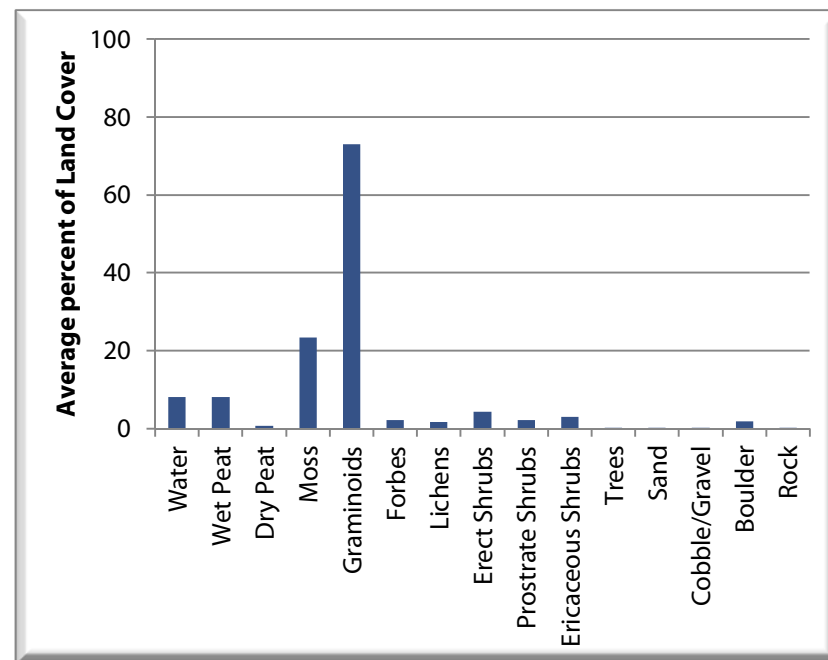
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Sand	Sand	-	3.8
	Seaweed	Seaweed	-	3.6
	Moss	Moss	<i>Moss spp.</i>	1.3
	Boulder	Boulder	-	0.8
Maguse River Upland	Water	Water	-	64.3
	Sand	Sand	-	9.0
	Seaweed	Seaweed	-	8.8
	Boulder	Boulder	-	6.6
	Gravel	Gravel	-	6.5
Back River Plain	Water	Water	-	88.0
	Sand	Sand	-	10.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	6.0
	Graminoide	Northern Bog Sedge and Capitate Sedge	<i>Carex gynocrates</i> and <i>Carex capitata</i>	4.0
	Moss	Moss	<i>Moss spp.</i>	1.0
Garry Lake Lowland	Sand	Sand	-	50.0
	Water	Water	-	40.0
	Gravel	Gravel	-	10.0

* The ecoregions listed in the table are only those where field data exist for this class.



Wet Graminoid

Wet graminoid, commonly known as sedge wetlands, represent 4.7% of the total area mapped (approximately 19,360 km²). It is present in all the ecoregions but is more prevalent in the southernmost five: Maguse River Upland, Dubawnt Lake Plain/Upland, Back River Plain, Kazan River Upland and Selwyn Lake Upland. This class occurs in poorly drained areas (hygric to hydric moisture regimes), where standing water is present. It often is located surrounding water features and typically occurs on a graminoid peat substrate. Graminoids are the main land cover in this class with moss, water and wet peat being the secondary covers. The dominant species for this class (detailed in the table) are: water sedge, northern bog sedge, capitata sedge, fragile sedge (*Carex membranacea*) and moss (*Moss spp.* and *Sphagnum spp.*). The wet graminoid/shrub complex sub-class has been grouped with this class in the atlas.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

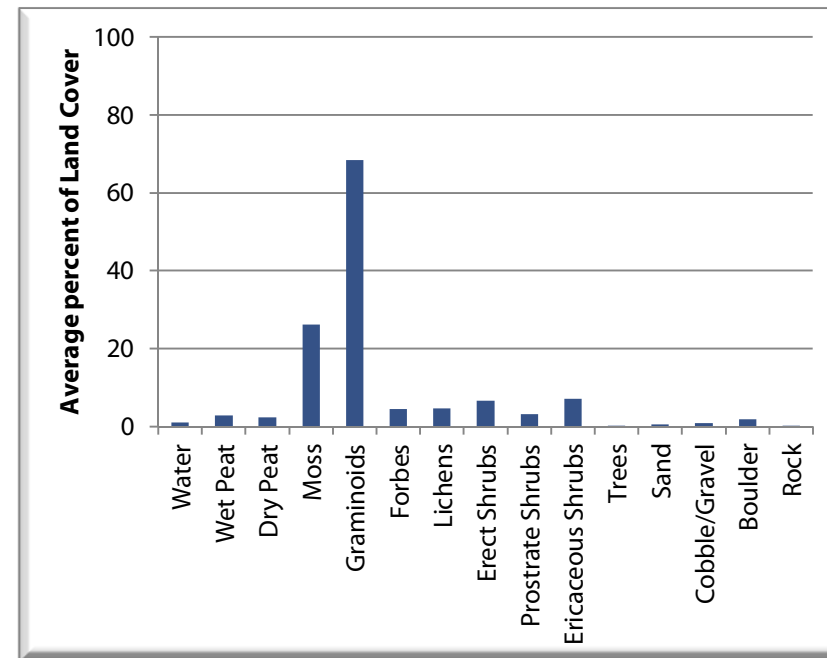
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	<i>Moss spp.</i>	17.5
	Water	Water	-	12.0
	Wet Peat	Wet Peat	-	9.0
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	7.3
Maguse River Upland	Graminoide	Water Sedge	<i>Carex aquatilis</i>	24.0
	Moss	Moss	<i>Moss spp.</i>	14.3
	Graminoide	Northern Bog Sedge and Capitata Sedge	<i>Carex gynocrates</i> and <i>Carex capitata</i>	11.5
	Wet Peat	Wet Peat	-	11.0
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	7.5
Dubawnt Lake Plain/Upland	Graminoide	Water Sedge	<i>Carex aquatilis</i>	34.1
	Graminoide	Northern Bog Sedge and Capitata Sedge	<i>Carex gynocrates</i> and <i>Carex capitata</i>	19.8
	Moss	Moss	<i>Moss spp.</i>	19.7
	Water	Water	-	7.8
Back River Plain	Peat Moss	Sphagnum Moss	-	6.9
	Moss	Moss	<i>Moss spp.</i>	32.5
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	21.7
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	15.2
Garry Lake Lowland	Peat Moss	Sphagnum Moss	-	9.8
	Graminoide	Northern Bog Sedge and Capitata Sedge	<i>Carex gynocrates</i> and <i>Carex capitata</i>	9.3
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	45.7
	Moss	Moss	<i>Moss spp.</i>	21.7
Kazan River Upland	Water	Water	-	11.1
	Peat Moss	Sphagnum Moss	-	8.0
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	6.9
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	16.7
Selwyn Lake Upland	Graminoide	Northern Bog Sedge and Capitata Sedge	<i>Carex gynocrates</i> and <i>Carex capitata</i>	16.2
	Water Sedge	<i>Carex aquatilis</i>	13.1	
	Moss	Moss	<i>Moss spp.</i>	12.4
	Peat Moss	Sphagnum Moss	-	11.9
Selwyn Lake Upland	Peat Moss	Sphagnum Moss	-	45.0
	Graminoide	Hairlike Sedge	<i>Carex capillaris</i>	30.0
		Fragile Sedge	<i>Carex membranacea</i>	30.0
		Narrow-leaved Cottongrass	<i>Eriophorum angustifolium</i>	15.0
Moss	Moss	<i>Moss spp.</i>	15.0	

* The ecoregions listed in the table are only those where field data exist for this class.



Graminoid Tundra

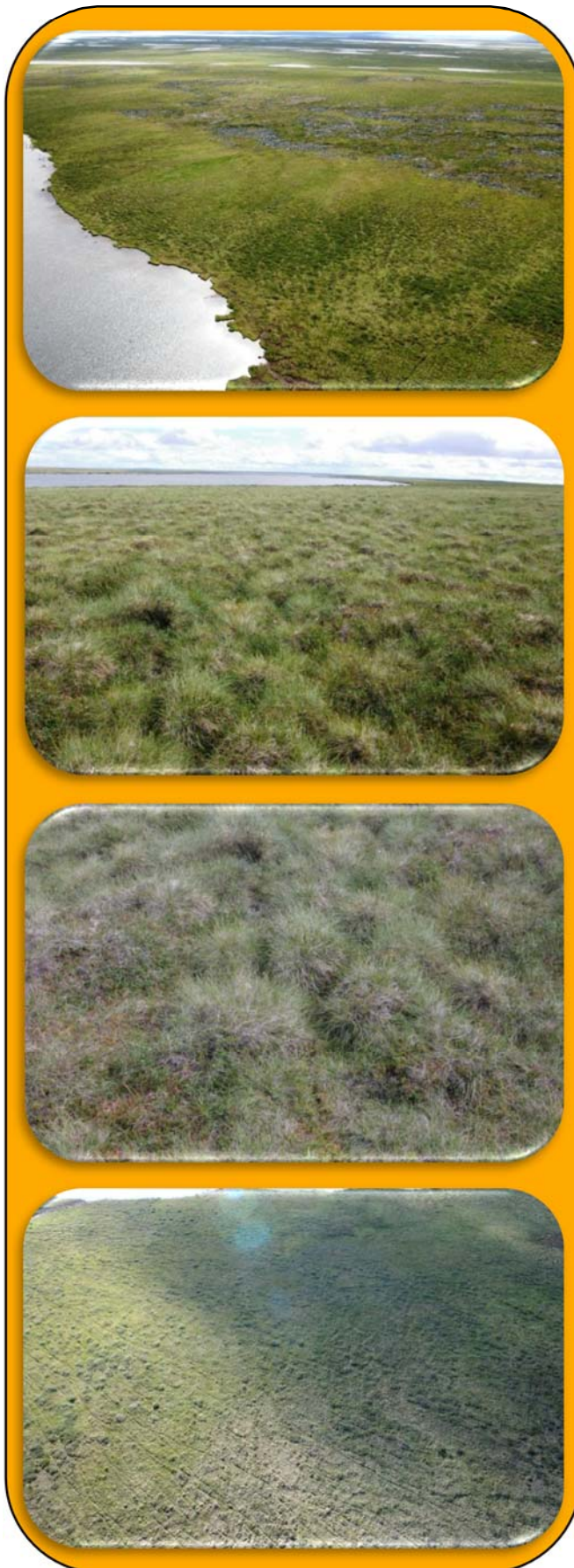
Graminoid tundra consists of sedge communities that occur on dryer areas (hygric to mesic moisture regimes) when compared to the wet graminoid class. It represents 3.1% of the mapped area (approximately 12,800 km²) and can be found in all the ecoregions. Selwyn Lake Upland and Chantrey Inlet Lowland have higher proportions of this class in comparison to the other ecoregions. The class includes tussock/hummock formations and is usually found on graminoid peat substrates. Graminoids are the main land cover with moss being the next most prevalent. Lichens, forbs and shrubs do occur but in relatively small percentages. The dominant species for this class (detailed in the table) are tussock cottongrass (*Eriophorum vaginatum*), fragile sedge, water sedge, glandular birch (*Betula glandulosa*) (typically between 0-25 centimetres in height), and moss.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

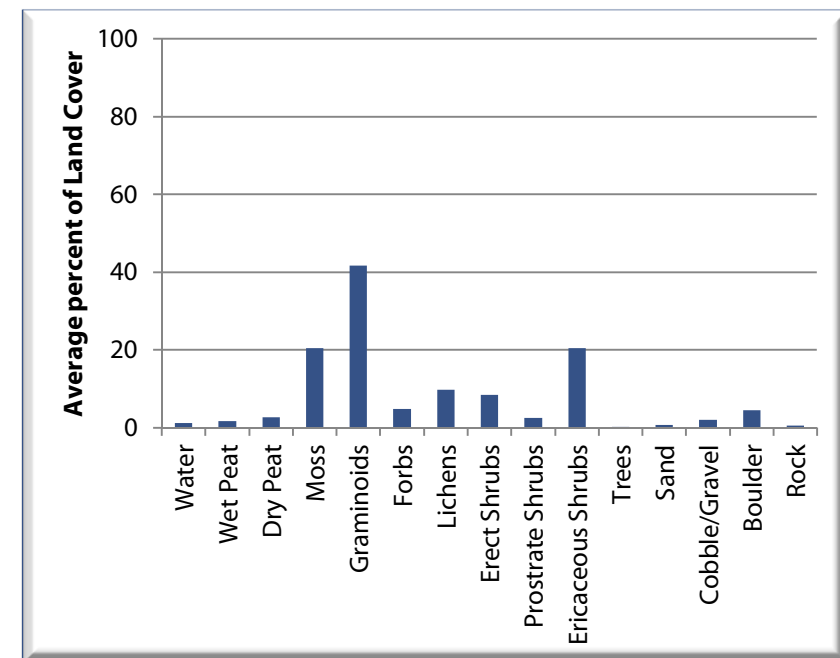
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	Moss spp.	23.6
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	10.8
		Fragile Sedge	<i>Carex membranacea</i>	10.0
		Water Sedge	<i>Carex aquatilis</i>	8.7
		Narrow-leaved Cottongrass	<i>Eriophorum angustifolium</i>	7.8
Maguse River Upland	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	15.2
	Moss	Moss	Moss spp.	14.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	10.9
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	7.0
Dubawnt Lake Plain/Upland	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	6.4
	Moss	Moss	Moss spp.	11.3
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	10.6
		Water Sedge	<i>Carex aquatilis</i>	9.8
Moss	Sphagnum Moss	-	9.1	
Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	8.8	
Back River Plain	Moss	Moss	Moss spp.	40.0
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	18.3
	Moss	Sphagnum Moss	-	11.9
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	9.7
Polar Grass		<i>Arctagrostis latifolia</i>	8.3	
Garry Lake Lowland	Moss	Moss	Moss spp.	23.2
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	16.9
		Fragile Sedge	<i>Carex membranacea</i>	14.2
		Short-leaved Sedge	<i>Carex fuliginosa</i>	10.5
Narrow-leaved Cottongrass	<i>Eriophorum angustifolium</i>	8.6		
Kazan River Upland	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	18.6
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	17.0
		Peat Moss	Sphagnum Moss	-
	Moss	Moss	Moss spp.	12.3
Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	8.7	

* The ecoregions listed in the table are only those where field data exist for this class.



Graminoid/Heath Tundra

Graminoid/heath tundra is a transitional class between the graminoid and heath tundra classes. It occurs on graminoid peat and moss peat substrates with a mesic moisture regime. It represents 3.5% of the total mapped area (approximately 14,300 km²) and is found in virtually all the ecoregions with the exception of the mapped areas of the Garry Lake Lowland, Queen Maud Gulf Lowland and the Chantry Inlet Lowland. It is prominent in the mapped areas of the Gulf of Boothia Plain and the Back River Plain. The main plant functional groups for this class are graminoids (highest percentage), moss and ericaceous shrubs. Graminoid/dryas tundra is a sub-class which transitions between graminoid and dryas tundra and has been grouped with this class. The dominant species (detailed in the table) are tussock cottongrass, fragile sedge, glandular birch (typically 0-25 centimetres tall), four-angled mountain heather (*Cassiope tetragona*) and marsh Labrador tea (*Ledum palustre*). Four-angled mountain heather replaces glandular birch in the northernmost ecoregion (Wager Bay Plateau).



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

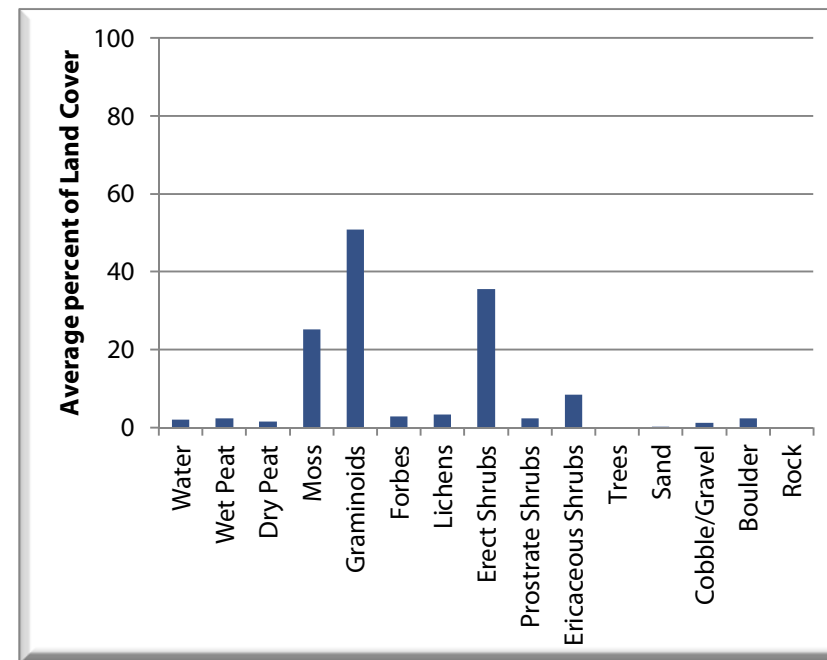
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	9.2
	Boulder	Boulder	-	7.0
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	6.5
	Forb	Entire-leaved Mountain Avens	<i>Dryas integrifolia</i>	5.9
Maguse River Upland	Moss	Moss	<i>Moss spp.</i>	16.7
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	14.3
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	12.8
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	9.0
Dubawnt Lake Plain/Upland	Moss	Moss	<i>Moss spp.</i>	15.6
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	8.3
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	8.1
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	8.1
	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	6.3
	Peat Moss	Sphagnum Moss	-	6.3
Back River Plain	Moss	Moss	<i>Moss spp.</i>	25.0
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	15.6
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	12.8
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	9.4
	Graminoide	Polar Grass	<i>Arctagrostis latifolia</i>	7.6
Kazan River Upland	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	22.3
	Peat Moss	Sphagnum Moss	-	18.6
	Moss	Moss	<i>Moss spp.</i>	11.5
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	10.6
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.5

* The ecoregions listed in the table are only those where field data exist for this class.



Graminoid/Shrub Tundra

Graminoid shrub/tundra is a transitional class between the graminoid tundra and shrub tundra classes. It represents 1.5% of the total mapped area (approximately 6,000 km²), occurring on graminoid and moss peat substrates with a mesic moisture regime. It is found in all ecoregions except the mapped areas of the Melville Peninsula Plateau and Gulf of Boothia Plain. The Dubawnt Lake Plain/Upland and Maguse River Upland have a higher proportion of this class in comparison to the other ecoregions. It has a similar land cover composition to the graminoid tundra class with the exception of a higher percentage of erect shrubs up to 50 centimetres in height. The dominant species for this class (detailed in the table) are glandular birch, water sedge, fragile sedge, tussock cottongrass and narrow-leaved cottongrass (*Eriophorum angustifolium*).



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	<i>Moss spp.</i>	18.5
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	13.0
		Fragile Sedge	<i>Carex membranacea</i>	11.5
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	5.3
Maguse River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	31.4
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	18.6
	Moss	Moss	<i>Moss spp.</i>	18.6
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	6.1
	Erect Shrub	Willow	<i>Salix spp.</i>	5.9
Dubawnt Lake Plain/Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	28.0
	Moss	Moss	<i>Moss spp.</i>	27.0
	Erect Shrub	Diamond-leaved Willow	<i>Salix planifolia</i>	15.0
	Peat Moss	Sphagnum Moss	-	12.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	9.0
Back River Plain	Moss	Moss	<i>Moss spp.</i>	42.5
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	36.3
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	21.3
		Tussock Cottongrass	<i>Eriophorum vaginatum</i>	11.3
		Polar Grass	<i>Arctagrostis latifolia</i>	10.5
Garry Lake Lowland	Moss	Moss	<i>Moss spp.</i>	23.3
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	16.7
	Graminoide	Fragile Sedge	<i>Carex membranacea</i>	11.7
		Narrow-leaved Cottongrass	<i>Eriophorum angustifolium</i>	10.0
		Water Sedge	<i>Carex aquatilis</i>	6.7
Gravel	Gravel	-	6.7	
Kazan River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	27.5
	Moss	Moss	<i>Moss spp.</i>	20.0
	Graminoide	Tussock Cottongrass	<i>Eriophorum vaginatum</i>	17.5
		Fragile Sedge	<i>Carex membranacea</i>	16.3
		Water Sedge	<i>Carex aquatilis</i>	8.0

* The ecoregions listed in the table are only those where field data exist for this class.



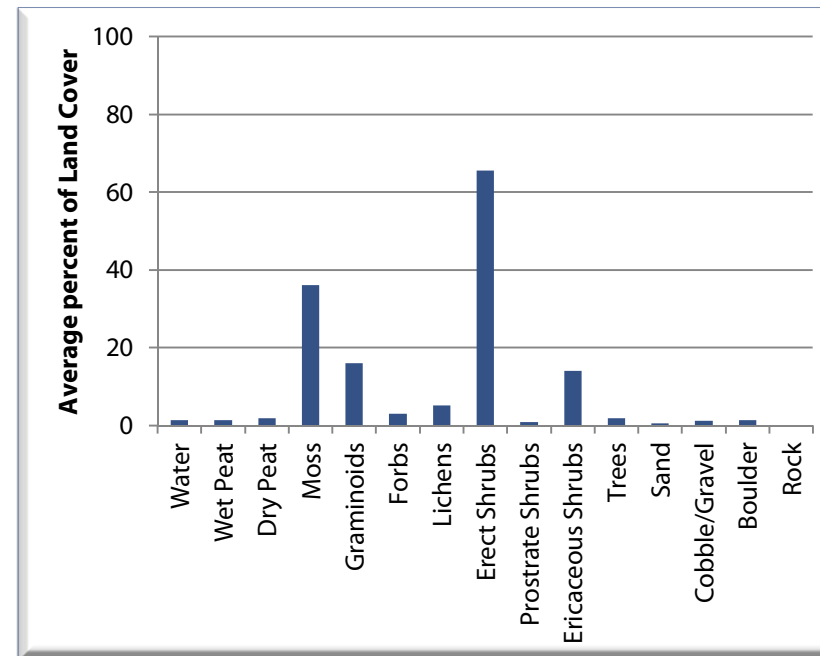
Shrub Thicket

The shrub thickets class contains a high percentage cover of erect shrubs, typically glandular birch ranging between 25 and 200 centimetres in height. It represents 1.0% of the study area, encompassing just over 4,000 km². They occur in six of the ecoregions: Wager Bay Plateau, Maguse River Upland, Dubawnt Lake Plain/Upland, Back River Plain, Kazan River Upland and Selwyn Lake Upland. The proportion of this class increases in the southern ecoregions. The dominant land cover group is erect shrub with moss being the secondary cover type. Shrub thickets typically occur on moss peat substrates but can also be found on graminoid peat substrates. They have a hygric to mesic moisture regime and can tolerate moister soils near riparian areas. The dominant species for this class (detailed in the table) are glandular birch, diamond-leaved willow (*Salix planifolia*), and alpine bilberry (*Vaccinium uliginosum*).

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	<i>Moss spp.</i>	20.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	5.3
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	5.3
	Evergreen Ericaceous Shrub	Mountain Cranberry	<i>Vaccinium vitis-idaea</i>	4.5
Maguse River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	65.2
	Moss	Moss	<i>Moss spp.</i>	25.7
	Peat Moss	Sphagnum Moss	-	10.5
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	8.6
	Erect Shrub	Diamond-leaved Willow	<i>Salix planifolia</i>	6.2
Dubawnt Lake Plain/Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	66.7
	Moss	Moss	<i>Moss spp.</i>	32.6
	Peat Moss	Sphagnum Moss	-	13.5
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	5.5
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	4.9
Back River Plain	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	48.3
	Moss	Moss	<i>Moss spp.</i>	39.2
	Erect Shrub	Diamond-leaved Willow	<i>Salix planifolia</i>	16.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	14.2
	Erect Shrub	Alaska Willow	<i>Salix alaxensis</i>	11.7
Kazan River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	43.3
	Moss	Moss	<i>Moss spp.</i>	24.1
	Erect Shrub	Diamond-leaved Willow	<i>Salix planifolia</i>	19.6
	Peat Moss	Sphagnum Moss	-	15.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	7.3
Selwyn Lake Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	52.5
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	15.0
	Moss	Broom Moss	<i>Dicranum spp.</i>	15.0
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	10.5

* The ecoregions listed in the table are only those where field data exist for this class.



Old Padlei Settlement – Salix Shrub Thicket



Glandular birch
(*Betula glandulosa*)



Alpine Bilberry
(*Vaccinium uliginosum*)

Photo: Martin Gebauer



Shrub Tundra

Shrub tundra represents 4.5% of the total mapped area (approximately 18,560 km²). It has a mesic moisture regime and is typically found on moss peat substrates. All the ecoregions, with the exception of the Melville Peninsula Plateau, Gulf of Boothia Plain and the Selwyn Lake Upland support this class within the mapped areas. Kazan River Upland, Dubawnt Lake Plain/Upland and Maguse River Upland have a higher proportion of this class in comparison to the other ecoregions. The erect shrub plant functional group is the main component with moss, ericaceous shrub and graminoids also providing significant cover. The dominant species for this class (detailed in the table) are glandular birch (typically between 25-50 centimetres in height), marsh Labrador tea, and alpine bilberry.

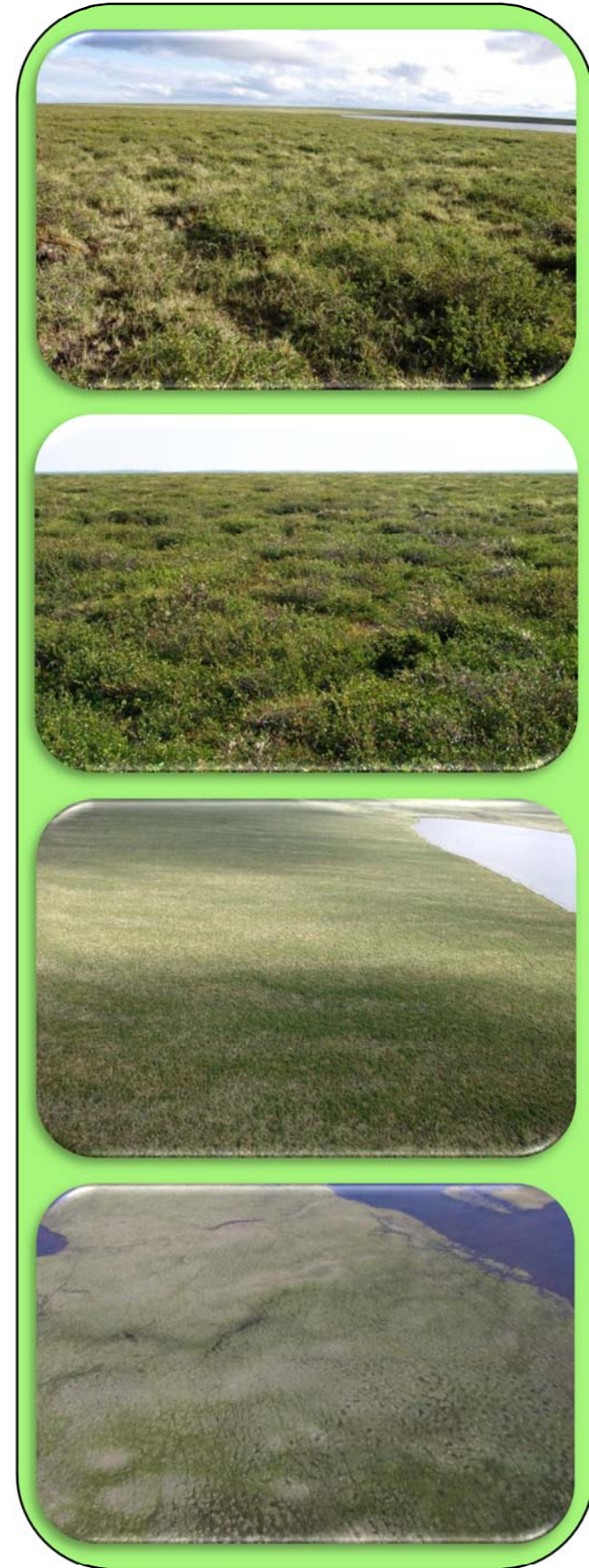
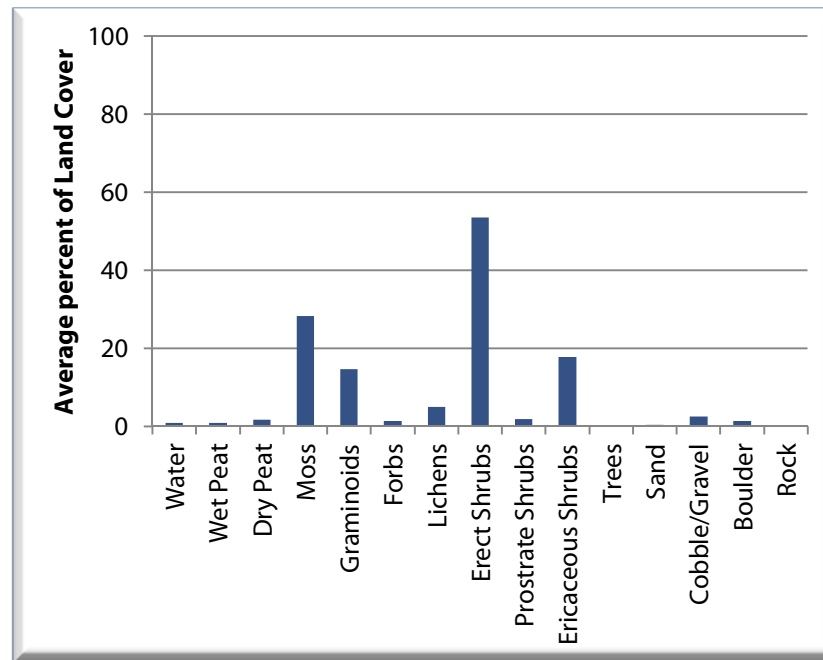


Photo: Martin Gebauer

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	<i>Moss spp.</i>	30.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	15.7
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	5.7
		Reed Grass	<i>Calamagrostis spp.</i>	2.0
Lichen	Crinkled Snow Lichen and Curled Snow Lichen		<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	2.0
	Maguse River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>
Moss		Moss	<i>Moss spp.</i>	23.3
Evergreen Ericaceous Shrub		Marsh Labrador Tea	<i>Ledum palustre</i>	9.2
Ericaceous Shrub		Alpine Bilberry	<i>Vaccinium uliginosum</i>	8.6
Evergreen Prostrate Shrub	Black Crowberry		<i>Empetrum nigrum</i>	4.8
	Dubawnt Lake Plain/Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>
Moss		Moss	<i>Moss spp.</i>	38.3
Evergreen Ericaceous Shrub		Marsh Labrador Tea	<i>Ledum palustre</i>	6.9
Ericaceous Shrub		Alpine Bilberry	<i>Vaccinium uliginosum</i>	6.4
Graminoide		Polar Grass	<i>Arctagrostis latifolia</i>	3.8
Lichen	Crinkled Snow Lichen and Curled Snow Lichen		<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	3.8
	Back River Plain	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>
Moss		Moss	<i>Moss spp.</i>	33.8
Evergreen Ericaceous Shrub		Marsh Labrador Tea	<i>Ledum palustre</i>	7.1
Ericaceous Shrub		Alpine Bilberry	<i>Vaccinium uliginosum</i>	5.5
Graminoide	Polar Grass	<i>Arctagrostis latifolia</i>	5.0	
Garry Lake Lowland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	78.3
	Moss	Moss	<i>Moss spp.</i>	51.7
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	13.3
		Narrow-leaved Cottongrass	<i>Eriophorum angustifolium</i>	3.7
		Alpine Sweet Grass	<i>Anthoxanthum monticulum</i>	3.3
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen		<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>
Water	Water	-	3.3	
Kazan River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	39.4
	Moss	Moss	<i>Moss spp.</i>	33.9
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	9.7
	Erect Shrub	Green Alder	<i>Alnus viridis</i>	7.8
Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	6.7	

* The ecoregions listed in the table are only those where field data exist for this class.

Shrub/Heath Tundra

Shrub/heath tundra is a transitional class between shrub tundra and heath tundra communities. It occurs on well to moderately drained soils (i.e., in a mesic moisture regime) and typically on a moss peat substrate. It represents 5.6% (approximately 23,100 km²) of the total area and occurring in the mapped portions of all but two ecoregions: Melville Peninsula Plateau and the Gulf of Boothia Plain. The major land cover components are similar to shrub tundra with an increasing cover of ericaceous shrubs and lichens. The height of the erect shrubs is usually under 50 centimetres. The dominant species for this class (detailed in the table) are glandular birch, marsh Labrador tea, and alpine bilberry.

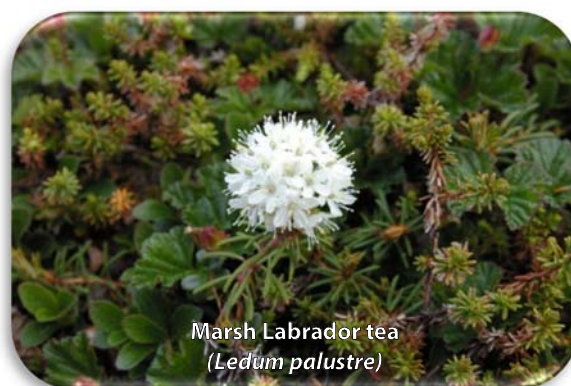
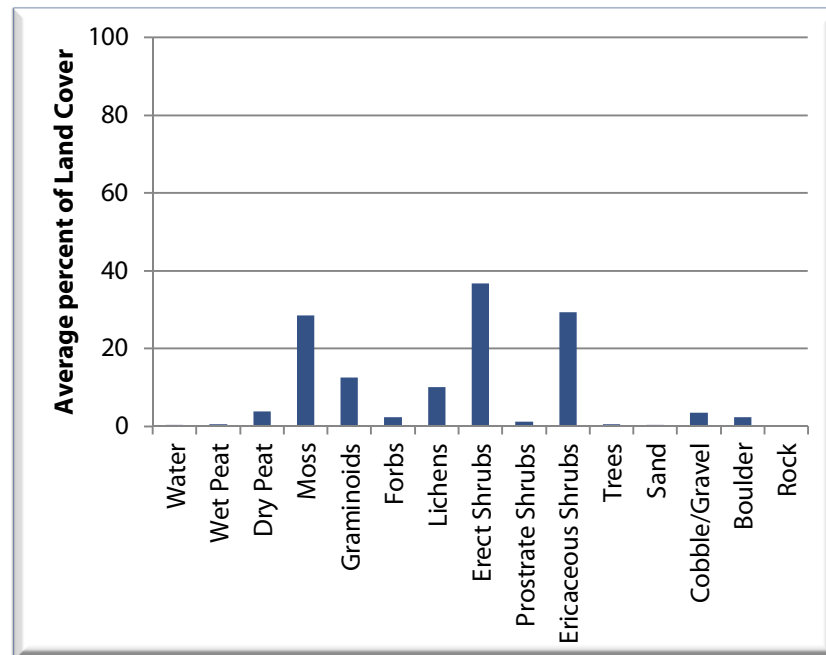
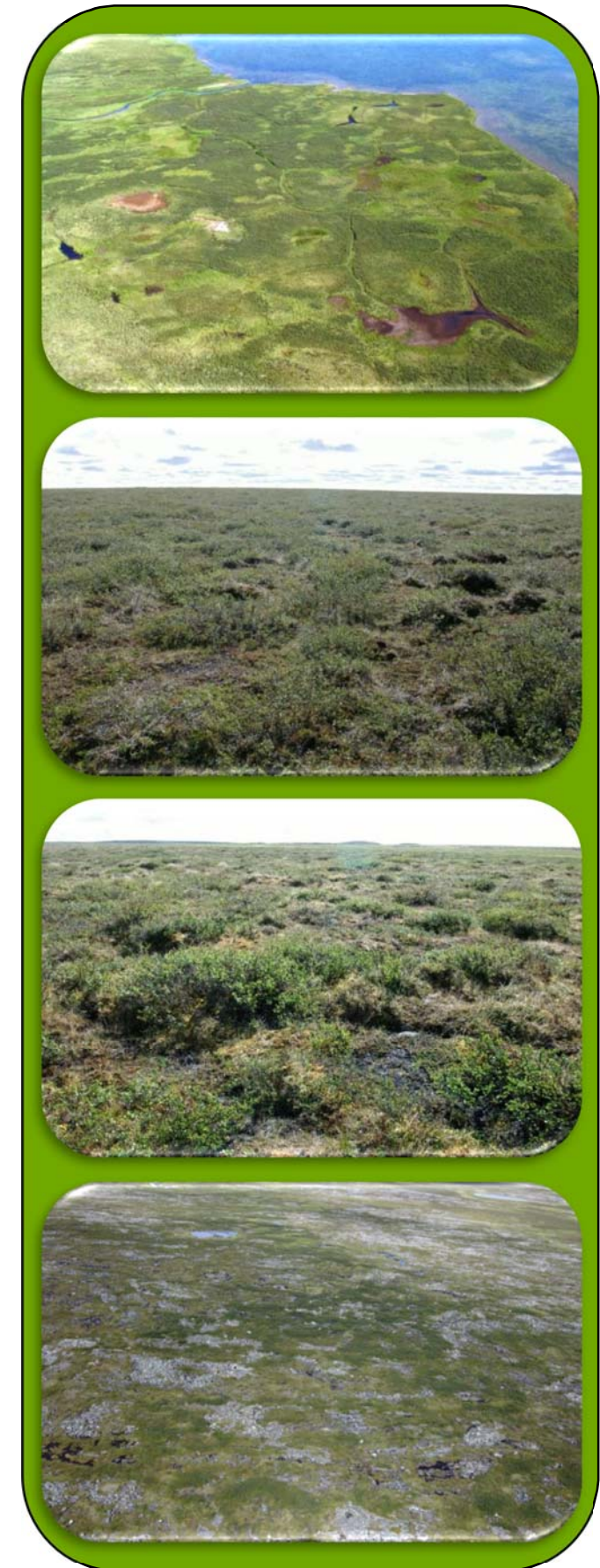


Photo: Martin Gebauer

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	<i>Moss spp.</i>	26.7
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	9.6
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	7.2
	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	6.3
Maguse River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	32.1
	Moss	Moss	<i>Moss spp.</i>	23.6
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	11.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.2
Dubawnt Lake Plain/Upland	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.5
	Moss	Moss	<i>Moss spp.</i>	40.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	35.4
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.3
Back River Plain	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.4
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	37.9
	Moss	Moss	<i>Moss spp.</i>	32.9
	Gravel	Gravel	-	8.1
Garry Lake Lowland	Graminoide	Cottongrass	<i>Eriophorum spp.</i>	7.1
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	6.0
	Moss	Moss	<i>Moss spp.</i>	45.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	40.0
Kazan River Upland	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.0
	Graminoide	Water Sedge	<i>Carex aquatilis</i>	10.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	37.9
	Moss	Moss	<i>Moss spp.</i>	30.8
Selwyn Lake Upland	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	11.3
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	40.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	20.0
Selwyn Lake Upland	Willow	<i>Salix spp.</i>	20.0	
	Moss	Moss	<i>Moss spp.</i>	20.0

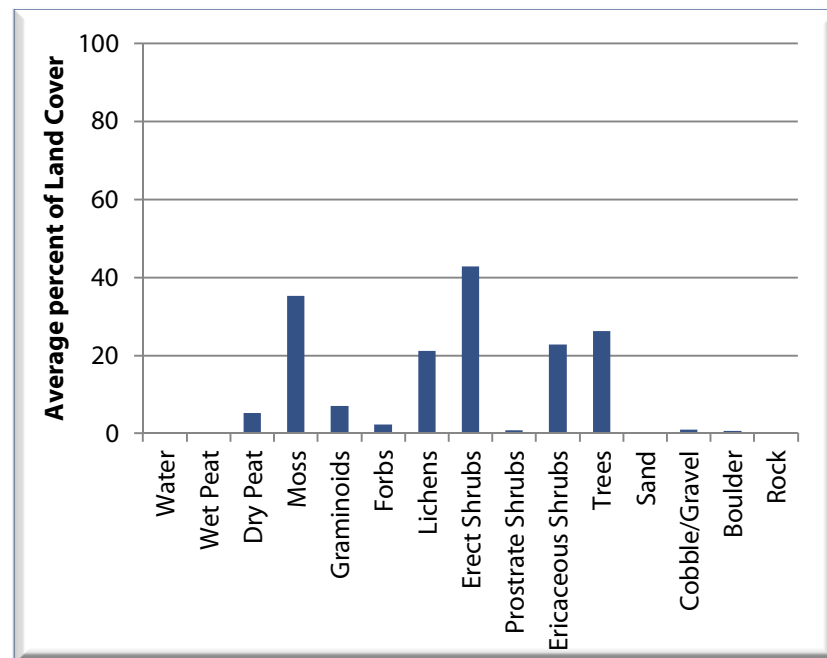
* The ecoregions listed in the table are only those where field data exist for this class.





Shrub/Tree Complex

Shrub/tree complex represents 0.2% of the total area mapped (approximately 990 km²). It is found in the southern four ecoregions: Maguse River Upland, Dubawnt Lake Plain/Upland, Kazan River Upland and Selwyn Lake Upland and increases in proportion towards the south. It has a mesic moisture regime and occurs on a moss peat substrate. Spruce, in the form of a scattered to open canopy forests, and erect shrubs up to 200 centimetres in height make up the understory, while moss and lichen form the groundcover structural layer of this class. The dominant species for this class (detailed in the table) are glandular birch, spruce (*Picea spp.* and *Picea mariana* (black spruce)) and in the southernmost ecoregion (Selwyn Lake Upland), and green alder (*Alnus viridis*).



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Maguse River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	20.0
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	20.0
	Tree	Spruce	<i>Picea spp.</i>	15.0
	Dry Peat	Dry Peat	-	10.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.0
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	10.0
Kazan River Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	27.4
	Moss	Moss	<i>Moss spp.</i>	24.6
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	17.4
	Tree	Black Spruce	<i>Picea mariana</i>	14.6
	Moss	Sphagnum Moss	-	11.5
Selwyn Lake Upland	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	25.0
	Erect Shrub	Green Alder	<i>Alnus viridis</i>	20.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	20.0
	Moss	Moss	<i>Moss spp.</i>	20.0
	Tree	Spruce	<i>Picea spp.</i>	20.0

* The ecoregions listed in the table are only those where field data exist for this class.



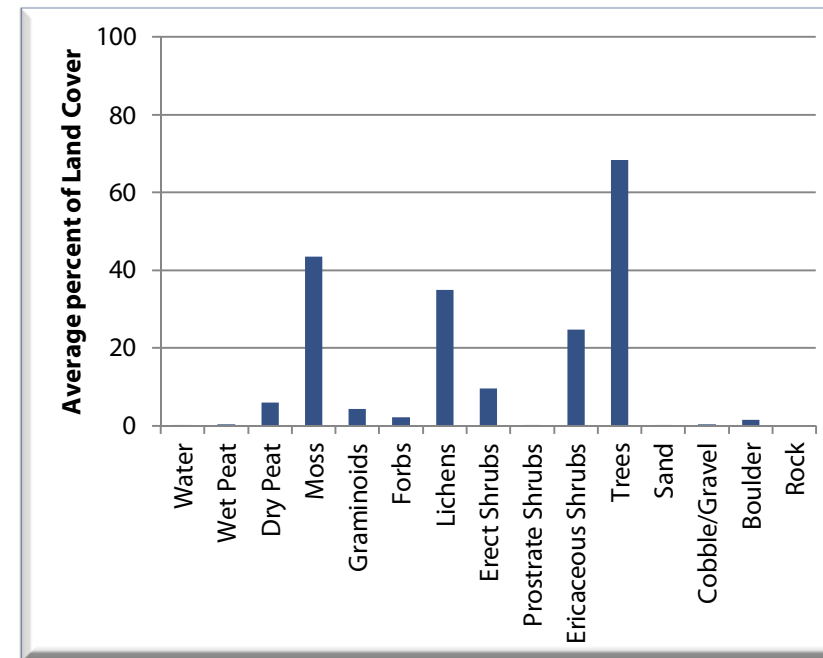
Tree

The tree class represents 1% of the total mapped area (approximately 4,120 km²) and is present in the southernmost three ecoregions: Maguse River Upland, Kazan River Upland and Selwyn Lake Upland. Open forests of coniferous trees occur on sites with a mesic moisture regime and moss peat substrate which supports better soil development. Lichens, moss and ericaceous shrubs are the dominant plant functional groups beneath the trees. Spruce and tamarack (*Larix laricina*) are the dominant tree species for this class with reindeer lichen (*Cladonia spp.*) prominent in the understory.

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

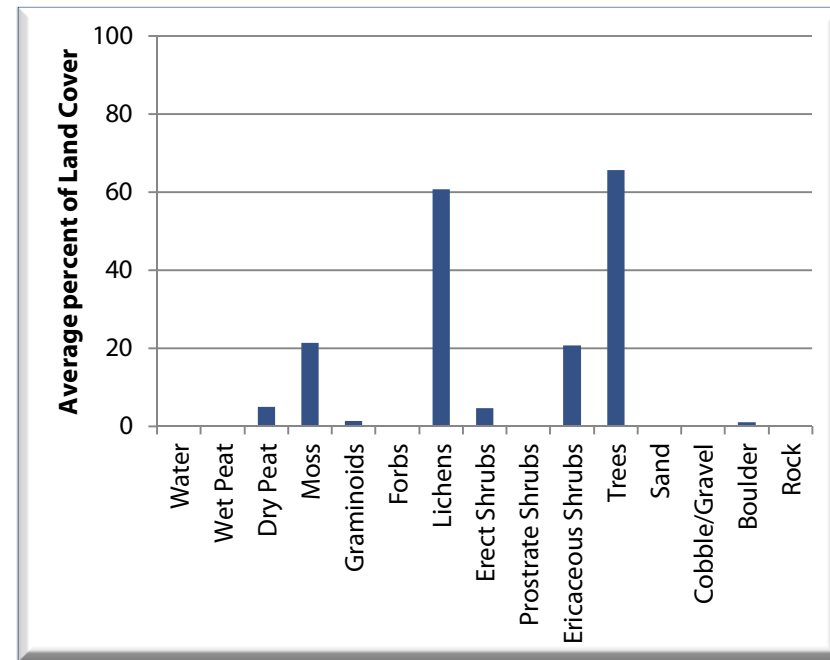
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Kazan River Upland	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	29.5
	Moss	Moss	<i>Moss spp.</i>	25.4
	Peat Moss	Sphagnum Moss	-	20.2
	Tree	Tamarack	<i>Larix laricina</i>	16.2
Selwyn Lake Upland	Tree	Spruce	<i>Picea spp.</i>	50.7
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	50.4
	Peat Moss	Sphagnum Moss	-	14.3
	Moss	Moss	<i>Moss spp.</i>	13.9
	Tree	Tamarack	<i>Larix laricina</i>	11.4

* The ecoregions listed in the table are only those where field data exist for this class.



Tree/Lichen Complex

The tree/lichen complex class represents 0.3% of the mapped area (approximately 1,440 km²). It occurs in treed areas of the three southernmost ecoregions: Maguse River Upland, Kazan River Upland and Selwyn Lake Upland. In areas where the tree cover is more open, reindeer lichens form a thick ground cover mat. The class occurs on sites with a mesic to xeric moisture regime, in a variety of substrates: moss peat, clay/silt, sand/gravel boulders and rock. The main land cover components that occur within this class other than trees and lichens are moss and ericaceous shrubs. Spruce and tamarack are the dominant tree species.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

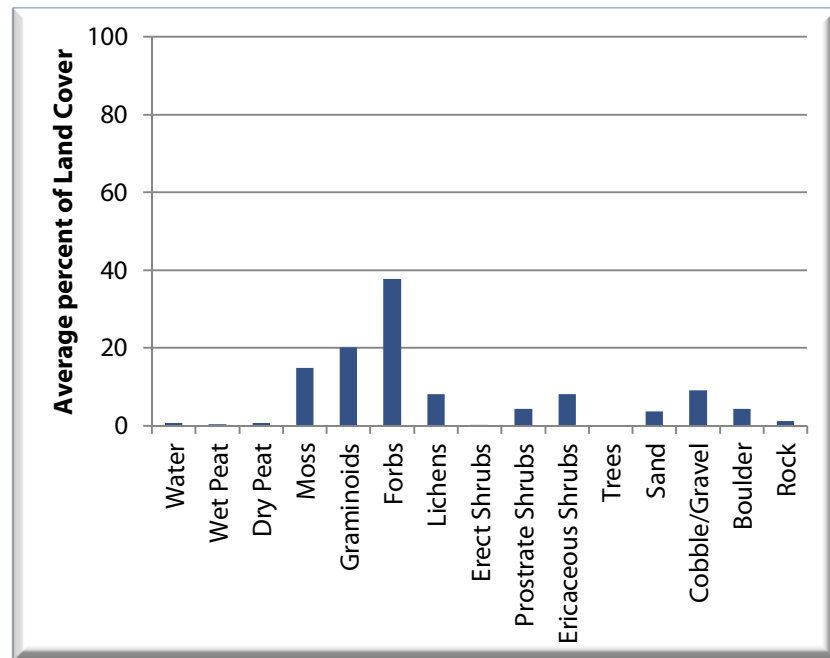
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Kazan River Upland	Tree	Spruce	<i>Picea spp.</i>	55.0
	Moss	Moss	<i>Moss spp.</i>	18.0
	Tree	Tamarack	<i>Larix laricina</i>	9.2
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	9.0
Selwyn Lake Upland	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	65.5
	Tree	Spruce	<i>Picea spp.</i>	57.5
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.0
	Peat Moss	Sphagnum Moss	-	7.5
	Moss	Moss	<i>Moss spp.</i>	7.5

* The ecoregions listed in the table are only those where field data exist for this class.



Dryas Tundra

Dryas tundra represents 0.9% of the total mapped area (approximately 3,600 km²). It is the only land cover class where the forb functional group is dominant. Graminoids, moss and, to a lesser degree, lichens, ericaceous shrubs and cobble/gravel are also components of this class. Dryas tundra is found within the mapped areas of the five ecoregions that are closest to Hudson Bay: Melville Peninsula Plateau, Wager Bay Plateau, Gulf of Boothia Plain, Maguse River Upland and the Kazan River Upland. This class occurs on sites with a mesic to xeric moisture regime having sand/gravel, boulder and rock substrates. Entire-leaved mountain avens (*Dryas integrifolia*) is the dominant plant species for this class. Dryas/heath tundra is a sub-class grouped within dryas tundra having higher percentages of other plant functional groups besides forbs.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Moss	Moss	Moss spp	13.9
	Gravel	Gravel	-	9.0
	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	Cassiope tetragona	6.7
	Graminoid	Scirpuslike Sedge	Carex scirpoidea	6.4
Maguse River Upland	Forb	Entire-leaved Mountain Avens	Dryas integrifolia	25.0
	Moss	Moss	Moss spp	15.0
	Evergreen Prostrate Shrub	Black Crowberry	Empetrum nigrum	8.5
	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	Cassiope tetragona	5.0
	Gravel	Gravel	-	5.0

* The ecoregions listed in the table are only those where field data exist for this class.



Heath Tundra

Heath tundra is one of the main land cover classes in the Kivalliq region, representing 9.5% of the total area mapped (approximately 39,200 km²). It occurs in all the ecoregions with higher proportions found in the Dubawnt Lake Plain/Upland, Kazan River Upland, Maguse River Upland, and Garry Lake Lowland ecoregions. This class is found on well to moderately drained soils (mesic-xeric moisture regimes) on a variety of substrates including moss peat, clay/silt, sand/gravel, and boulders. Most land cover groups are components of this class with ericaceous shrubs and moss having higher cover percentages. It contains smaller amounts of lichens, erect shrubs (under 50 centimetres tall) and graminoids (non-tussock forming species). The dominant species for this class (detailed in the table) are glandular birch, four-angled mountain heather, alpine bilberry, marsh Labrador tea and black crowberry (*Empetrum nigrum*).

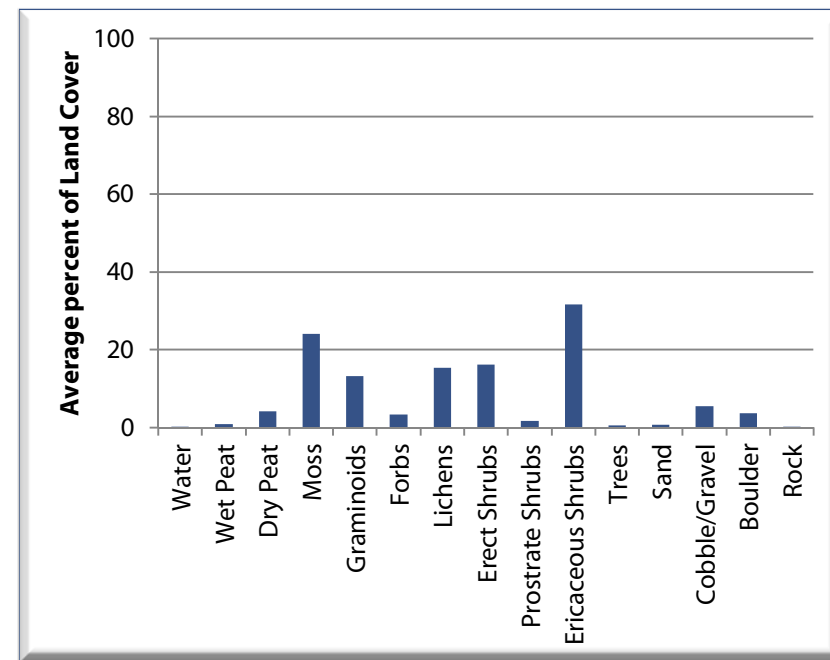


Photo: Page Burt

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	10.8
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	9.4
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	7.8
	Boulder	Boulder	-	5.0
Maguse River Upland	Moss	Moss	<i>Moss spp.</i>	16.4
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	12.3
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.9
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	9.1
Dubawnt Lake Plain/Upland	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	8.9
	Moss	Moss	<i>Moss spp.</i>	30.1
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	19.5
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	9.9
Back River Plain	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	9.8
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	8.8
	Moss	Moss	<i>Moss spp.</i>	39.1
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	14.2
Garry Lake Lowland	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	8.1
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	7.3
	Gravel	Gravel	-	6.0
	Moss	Moss	<i>Moss spp.</i>	28.0
Kazan River Upland	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	15.2
	Gravel	Gravel	-	10.4
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	9.0
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	6.4
Selwyn Lake Upland	Moss	Moss	<i>Moss spp.</i>	20.2
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	17.4
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.2
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	9.3
Selwyn Lake Upland	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	8.9
	Dry Peat	Dry Peat	-	40.0
	Erect Shrub	Green Alder	<i>Alnus viridis</i>	20.0
Selwyn Lake Upland	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	20.0

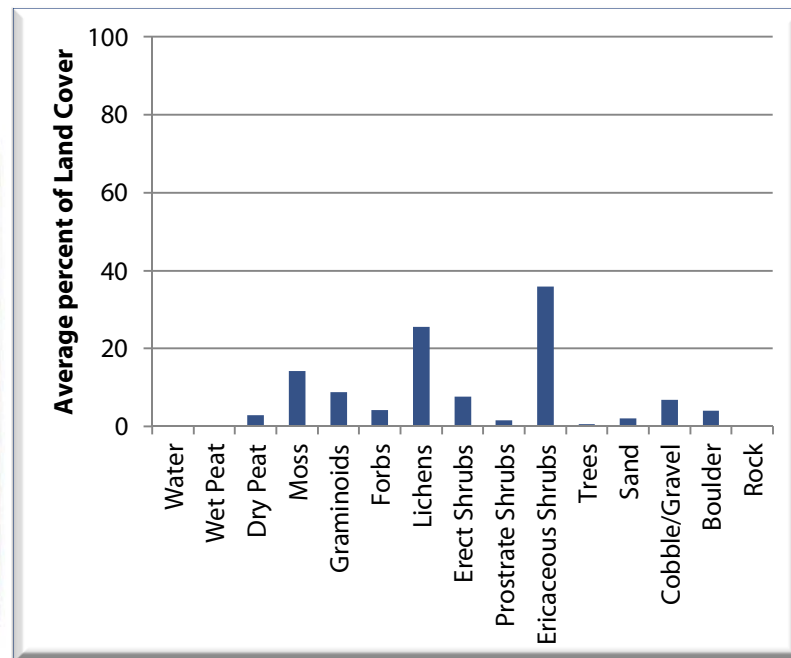
* The ecoregions listed in the table are only those where field data exist for this class.

Heath Upland

Heath upland is one of the predominant land cover classes in the Kivalliq region, representing 9.8% of the total area mapped (approximately 40,600 km²). It is present in all the ecoregions with higher proportions found in the Back River Plain, Garry Lake Lowland, Chantrey Inlet Lowland, Dubawnt Lake Plain/Upland and Kazan River Upland ecoregions. It occurs on well-drained soils (xeric moisture regime) and the main plant functional groups are ericaceous shrubs and lichens with smaller amounts of moss, graminoids and erect shrub (under 50 centimetres in height) when compared to the heath tundra class. Typically, a rocky substrate is present (boulders, cobble, gravel, sand) but heath upland also occurs on a moss peat substrate. The dominant species for this class (detailed in the table) are four-angled mountain heather in the northern ecoregions, black crowberry, marsh labrador tea, *Alectoria spp.*, crinkled snow lichen (*Flavocetraria nivalis*), curled snow lichen (*Flavocetraria cucullata*) and reindeer lichens. Heath upland consists of three sub-classes: heath/lichen tundra, ericaceous shrub and ericaceous shrub/lichen tundra.



Four-angled mountain heather (*Cassiope tetragona*)



Green witch's hair lichen (*Alectoria ochroleuca*)



Curled snow lichen (*Flavocetraria cucullata*)

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

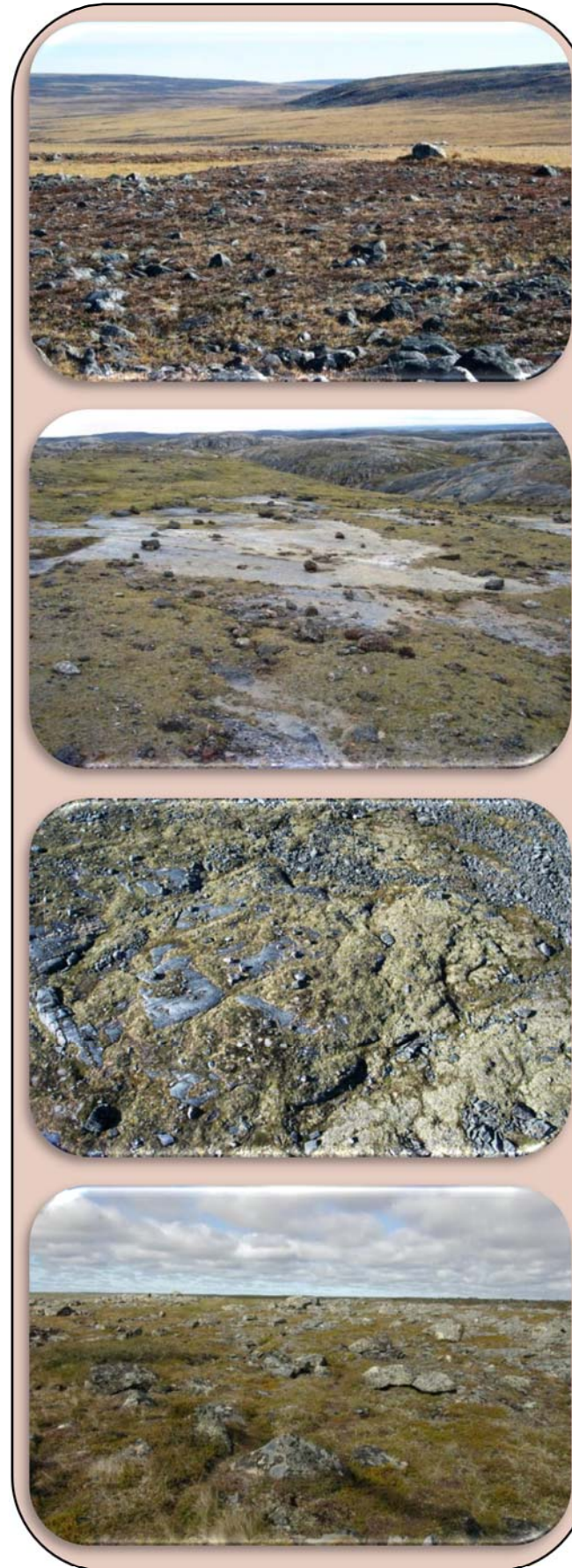
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	12.2
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	9.8
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	7.4
		Reindeer Lichen	<i>Cladonia spp.</i>	6.7
Maguse River Upland	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	13.1
	Moss	Moss	<i>Moss spp.</i>	12.6
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	10.7
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.7
Dubawnt Lake Plain/Upland	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	7.1
	Moss	Moss	<i>Moss spp.</i>	22.4
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	16.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.6
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	9.9
Back River Plain	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	6.0
	Moss	Moss	<i>Moss spp.</i>	26.5
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	17.4
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	12.9
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	12.4
Garry Lake Lowland	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	7.1	
	Moss	Moss	<i>Moss spp.</i>	21.7
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	16.7
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	15.3
Kazan River Upland	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	11.7	
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	8.7
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	14.7
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	13.1
Selwyn Lake Upland	Moss	Moss	<i>Moss spp.</i>	12.7
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	12.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.0
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	35.3
	Moss	Sphagnum Moss	-	20.0
Selwyn Lake Upland	Peat Moss	Alpine Bilberry	<i>Vaccinium uliginosum</i>	15.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	12.3
	Moss	Moss	<i>Moss spp.</i>	10.7

* The ecoregions listed in the table are only those where field data exist for this class.

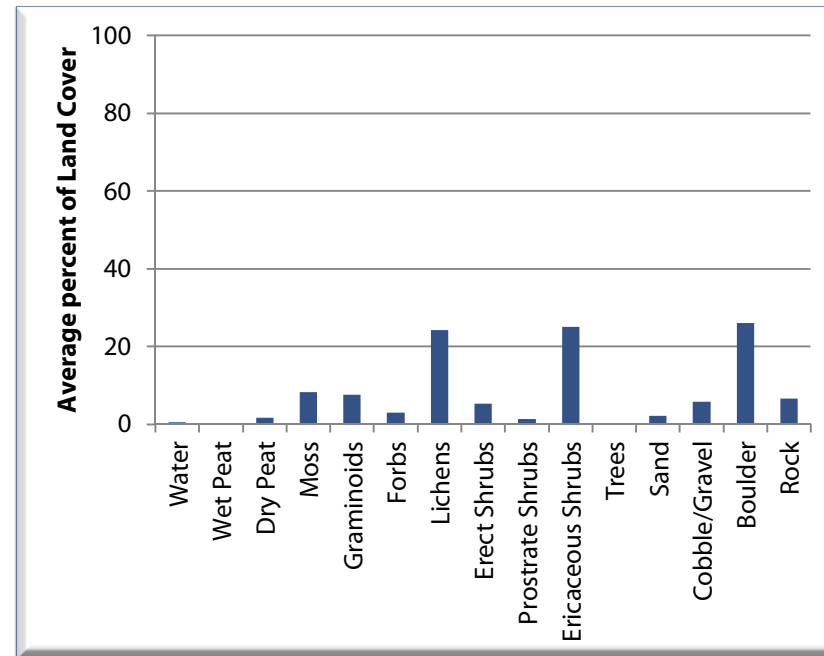


Heath Upland/Rock Complex

The heath upland/rock complex class is very similar to heath upland with the difference being that this class has more rocky components - typically boulders. It represents 8.4% of the total mapped area (approximately 34,800km²) and is found within all the ecoregions in the Kivalliq. The Wager Bay Plateau and Melville Peninsula Plateau ecoregions have higher proportions for the area mapped in comparison to the other ecoregions. The class occurs on well drained soils (xeric moisture regime) and typically in rocky substrates (e.g., sand/gravel, boulders and rock) but it can also be found on moss peat substrates. The dominant species for this class (detailed in the table) are four-angled mountain heather in the more northern ecoregions, black crowberry, marsh Labrador tea, *Alectoria spp.*, tundra horsehair lichen (*Bryoria nitidula*), crinkled snow, curled snow and reindeer lichens. Heath upland/rock complex has the most sub-classes of any ELC class: ericaceous shrub/rock complex, heath/boulder complex, heath upland/rock complex, heath/rock complex and lichen/heath/boulder complex.



Four-angled mountain heather (*Cassiope tetragona*)



Marsh Labrador tea (*Ledum palustre*)



Black crowberry (*Empetrum nigrum*)

Photo: Page Burt



Tundra horsehair lichen (*Bryoria nitidula*)

Photo: Page Burt

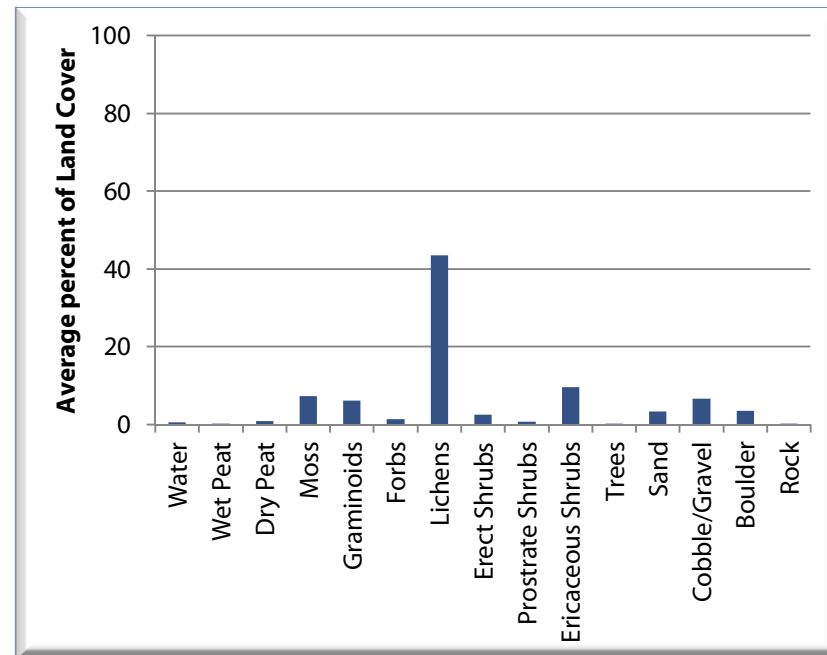
Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	10.2
	Moss	Moss	<i>Moss spp.</i>	9.9
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	8.5
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	7.5
Maguse River Upland	Boulder	Boulder	-	23.4
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	10.7
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	8.9
	Rock	Rock	-	8.9
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	7.7
Dubawnt Lake Plain/Upland	Boulder	Boulder	-	32.5
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	12.5
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	11.8
		Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	10.0
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	8.8
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	8.8
Back River Plain	Gravel	Gravel	-	31.7
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	13.3
	Boulder	Boulder	-	12.7
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	11.7
	Moss	Moss	<i>Moss spp.</i>	10.0
Garry Lake Lowland	Boulder	Boulder	-	30.0
	Moss	Moss	<i>Moss spp.</i>	20.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	17.5
	Graminoid	Fragile Sedge	<i>Carex membranacea</i>	7.5
Kazan River Upland	Water	Water	-	7.5
	Boulder	Boulder	-	29.5
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	13.1
	Gravel	Gravel	-	9.9
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	7.3
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	7.0

* The ecoregions listed in the table are only those where field data exist for this class.

Lichen Tundra

Lichen tundra represents 2.3% of the total area (approximately 9,600 km²) and is found within the mapped extents of all but two ecoregions: Melville Peninsula Plateau and Gulf of Boothia Plateau. Back River Plain has the highest proportion of lichen tundra when compared to the other ecoregions. Small amounts of all the land cover groups can be found in this class, but lichens are the dominant plant functional group (ranging from 45 to 70%). Lichen tundra has a xeric moisture regime and can occur on moss peat substrate and more rocky substrates (clay/silt, sand/gravel, boulders and rock). The dominant species for this class (detailed in the table) are *Alectoria spp.*, tundra horsehair, crinkled snow, curled snow and reindeer lichens.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	19.5
		Witch's Hair Lichen	<i>Alectoria spp.</i>	16.9
	Moss	Moss	<i>Moss spp.</i>	12.7
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	7.8
Maguse River Upland	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	23.6
		Witch's Hair Lichen	<i>Alectoria spp.</i>	20.0
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	15.9
	Sand	Sand	-	7.8
Dubawnt Lake Plain/Upland	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	23.1
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	21.8
	Moss	Moss	<i>Moss spp.</i>	11.0
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	10.4
Back River Plain	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	29.6
		Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	19.3
	Moss	Moss	<i>Moss spp.</i>	15.4
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	12.1
Garry Lake Lowland	Moss	Moss	<i>Moss spp.</i>	50.0
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	15.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	10.0
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	10.0
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	10.0
Kazan River Upland	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	58.1
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	11.3
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	8.1
	Boulder	Boulder	-	5.5
Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	5.5	

* The ecoregions listed in the table are only those where field data exist for this class.



Tundra horsehair lichen
(*Bryoria nitidula*)

Photo: Page Burt



Crinkled snow lichen
(*Flavocetraria nivalis*)



Green witch's hair lichen
(*Alectoria ochroleuca*)



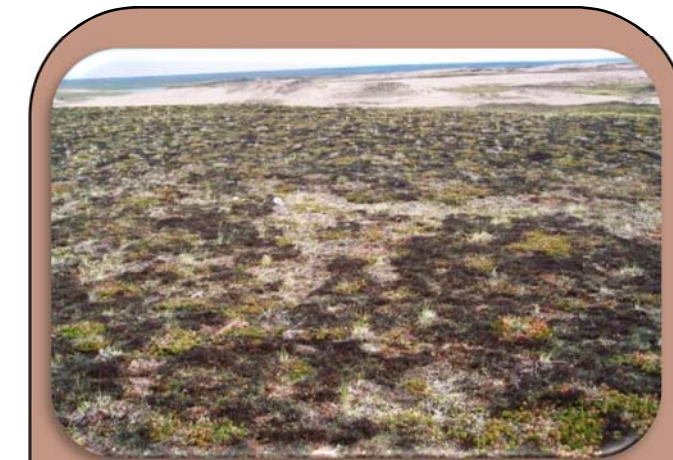
Curled snow lichen
(*Flavocetraria cucullata*)



Green reindeer lichen
(*Cladonia mitis*)

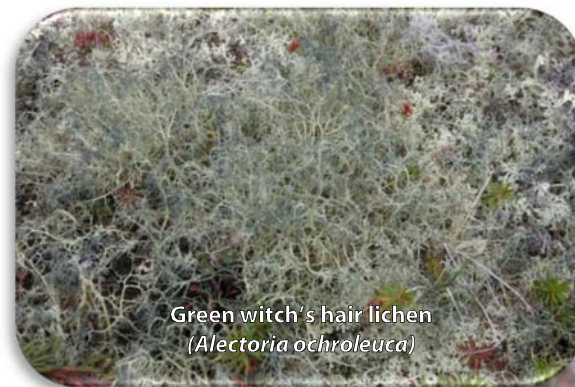
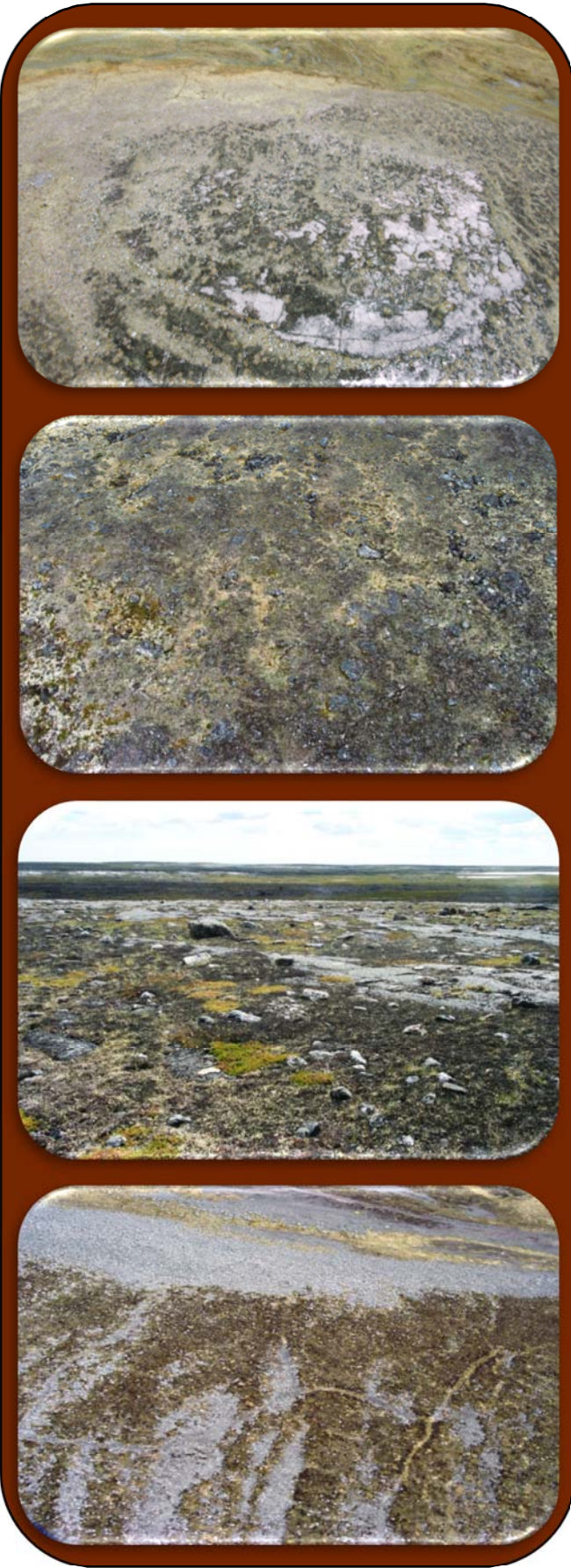
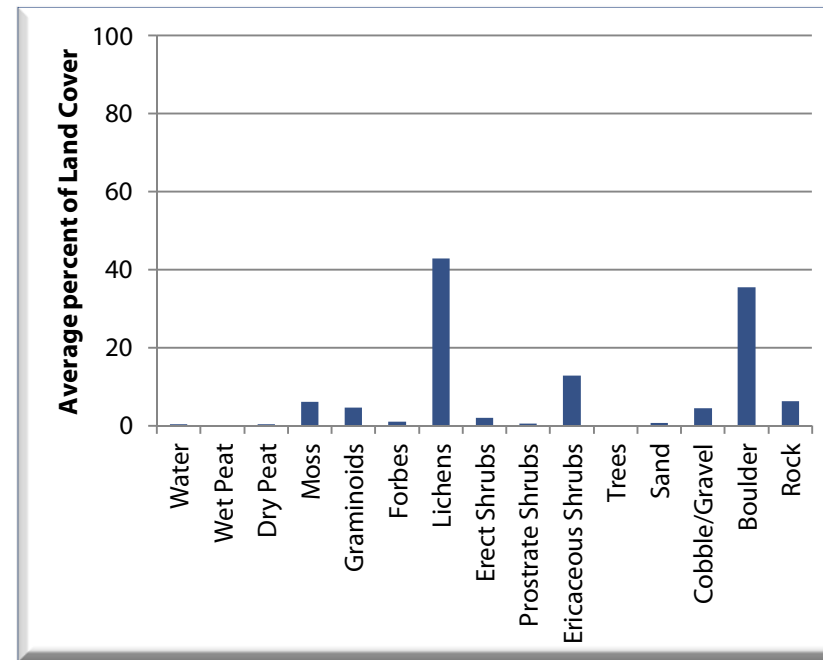


Star-tipped reindeer lichen
(*Cladonia stellaris*)



Lichen/Rock Complex

The lichen/rock complex class is very similar to the lichen tundra class with the exception of a higher representation of rocky land cover groups, particularly boulders. It represents 7.3% of the study area (approximately 30,200 km²), being found within the mapped area of all the ecoregions but two: Gulf of Boothia Plain and Selwyn Lake Upland. Chantrey Inlet Lowland, Garry Lake Lowland and Wager Bay Plateau have a higher proportion of this class in comparison to the other ecoregions. It occurs on well drained soils (xeric moisture regime) with a more rocky substrates. The dominant species for this class (detailed in the table) are *Alectoria spp.*, tundra horsehair, crinkled snow, curled snow and reindeer lichens. Lichen/rock complex consists of two sub-classes: lichen/rock complex and lichen/boulder complex.



Green witch's hair lichen
(*Alectoria ochroleuca*)



Curled snow lichen
(*Flavocetraria cucullata*)



Tundra horsehair lichen
(*Bryoria nitidula*)

Photo: Page Burt

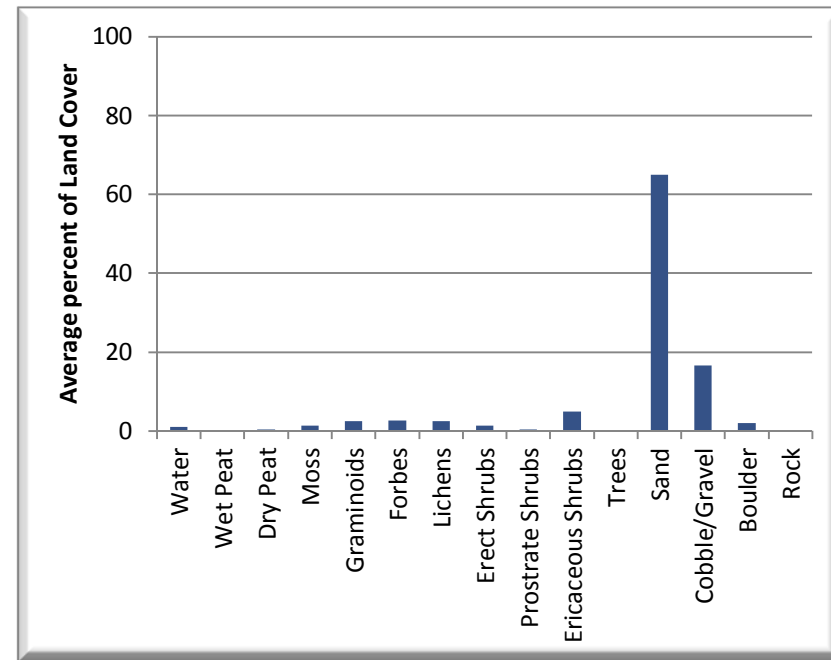
Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover	
Wager Bay Plateau	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	15.4	
		Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	10.9	
		Reindeer Lichen	<i>Cladonia spp.</i>	7.6	
	Rock	Rock	-	7.0	
Maguse River Upland	Boulder	Boulder	-	31.1	
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	11.9	
		Witch's Hair Lichen	<i>Alectoria spp.</i>	11.8	
	Rock	Rock	-	10.0	
Dubawnt Lake Plain/Upland	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	8.9	
		Boulder	Boulder	-	45.7
		Witch's Hair Lichen	<i>Alectoria spp.</i>	14.7	
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	8.0	
Back River Plain	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	12.4	
		Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	10.1	
	Boulder	Boulder	-	38.9	
	Gravel	Witch's Hair Lichen	<i>Alectoria spp.</i>	17.6	
		Gravel	Gravel	-	7.1
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	6.4	
Garry Lake Lowland	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	6.4	
		Witch's Hair Lichen	<i>Alectoria spp.</i>	11.8	
	Boulder	Boulder	-	42.5	
	Gravel	Gravel	-	10.0	
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.5	
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	5.5	
Kazan River Upland	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	24.3	
	Boulder	Boulder	-	15.5	
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	8.8	
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	8.3	
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	7.3	

* The ecoregions listed in the table are only those where field data exist for this class.

Sand

Sand represents 0.3% of the total area mapped (approximately 1,410 km²) and is present in all the ecoregions. Gulf of Boothia Plain and Back River Plain have the highest percentage of this class. Sand can be present in all moisture regimes (hydric through xeric) and can be a substrate for many other ELC classes. Typically the sand class is associated with eskers, ridged moraine and hydrological features (e.g., river deltas, sandbanks). Forbs (typically between 10-15%), are the main vegetation group that is found within this class behind sand, cobble and gravel.



Foam lichen
(*Stereocaulon spp.*)



Tundra horsehair lichen
(*Bryoria nitidula*)

Photo: Page Burt



Black crowberry
(*Empetrum nigrum*)

Photo: Page Burt

Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

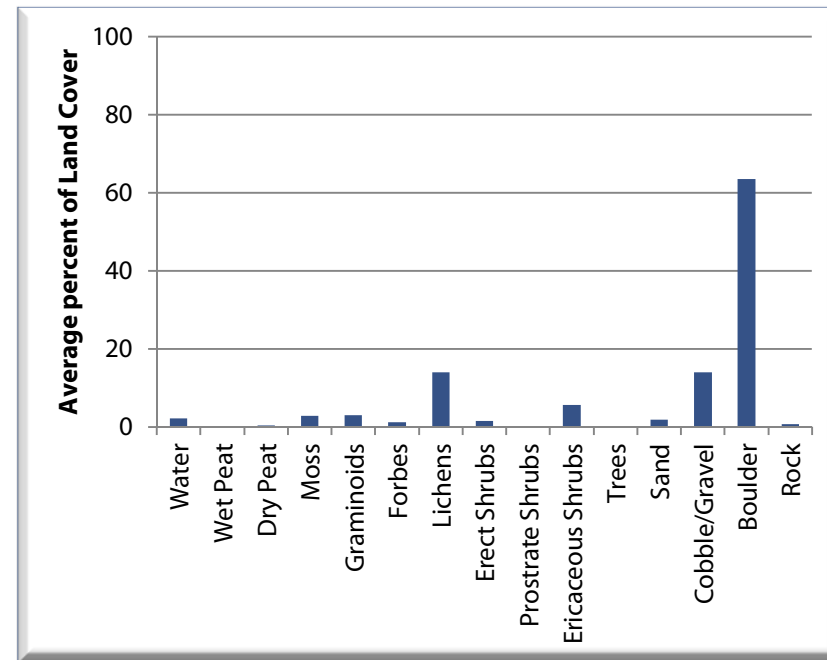
Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Gravel	Gravel	-	16.7
	Boulder	Boulder	-	3.5
	Clay/Silt	Clay/Silt	-	2.5
	Disturbed	Disturbed	-	2.3
Maguse River Upland	Sand	Sand	-	59.5
	Gravel	Gravel	-	15.1
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	6.2
	Clay/Silt	Clay/Silt	-	5.3
Dubawnt Lake Plain/Upland	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	1.9
	Sand	Sand	-	85.0
	Gravel	Gravel	-	5.8
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	2.2
	Graminoid	Bigelow's Sedge	<i>Carex bigelowii</i>	1.7
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	0.8
Back River Plain	Forb	Moss Champion	<i>Silene acaulis</i>	0.8
	Sand	Sand	-	92.5
	Water	Water	-	5.0
	Gravel	Gravel	-	1.0
Kazan River Upland	Boulder	Boulder	-	0.8
	Gravel	Gravel	-	45.0
	Sand	Sand	-	45.0
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.0
Selwyn Lake Upland	Lichen	Foam Lichen	<i>Stereocaulon spp.</i>	5.0
	Sand	Sand	-	76.7
	Erect Shrub	Green Alder	<i>Alnus viridis</i>	7.3
	Gravel	Gravel	-	4.0
	Erect Shrub	Glandular Birch	<i>Betula glandulosa</i>	3.7
Tree	Paper Birch	<i>Betula papyrifera</i>	3.7	

* The ecoregions listed in the table are only those where field data exist for this class.



Boulder/Gravel

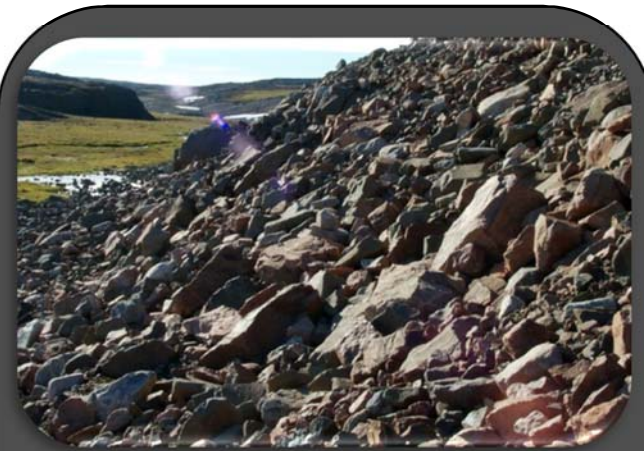
The boulder/gravel class is found within all the ecoregions, representing 6.8% of the total area mapped (approximately 28,200 km²). High proportions of this class are found within the mapped areas of the Melville Peninsula Plateau, Wager Bay Plateau, Chantry Inlet Lowland, Back River Plain and Garry Lake Lowland. Boulder, gravel and cobble are the main land cover components of this class with small amounts (5-15%) of lichens and ericaceous shrubs being present. Vegetation species (detailed in the table) occurring on these sites are black crowberry, marsh Labrador tea, *Alectoria spp.*, tundra horsehair, crinkled snow, curled snow and reindeer lichens. The boulder/gravel class consists of the boulder and boulder/gravel sub-classes.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Gravel	Gravel	-	10.8
	Water	Water	-	3.8
	Moss	Moss	<i>Moss spp.</i>	2.8
	Evergreen Ericaceous Shrub	Four-Angled Mountain Heather	<i>Cassiope tetragona</i>	2.4
Maguse River Upland	Boulder	Boulder	-	56.6
	Gravel	Gravel	-	21.8
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	2.9
	Sand	Sand	-	2.8
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	2.8
Dubawnt Lake Plain/Upland	Boulder	Boulder	-	62.8
	Cobble	Cobble	-	9.1
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	5.9
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	4.4
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	4.2
Back River Plain	Boulder	Boulder	-	65.9
	Gravel	Gravel	-	16.3
	Cobble	Cobble	-	9.4
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	2.4
		Witch's Hair Lichen	<i>Alectoria spp.</i>	1.4
Garry Lake Lowland	Boulder	Boulder	-	86.1
	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	4.6
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	3.7
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	3.1
		Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	2.9
Kazan River Upland	Boulder	Boulder	-	67.1
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	6.8
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.8
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	3.7
	Gravel	Gravel	-	3.1
Selwyn Lake Upland	Dry Peat	Dry Peat	-	30.0
	Boulder	Boulder	-	20.0
	Clay/Silt	Clay/Silt	-	10.0
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	10.0

* The ecoregions listed in the table are only those where field data exist for this class.



Black crowberry
(*Empetrum nigrum*)

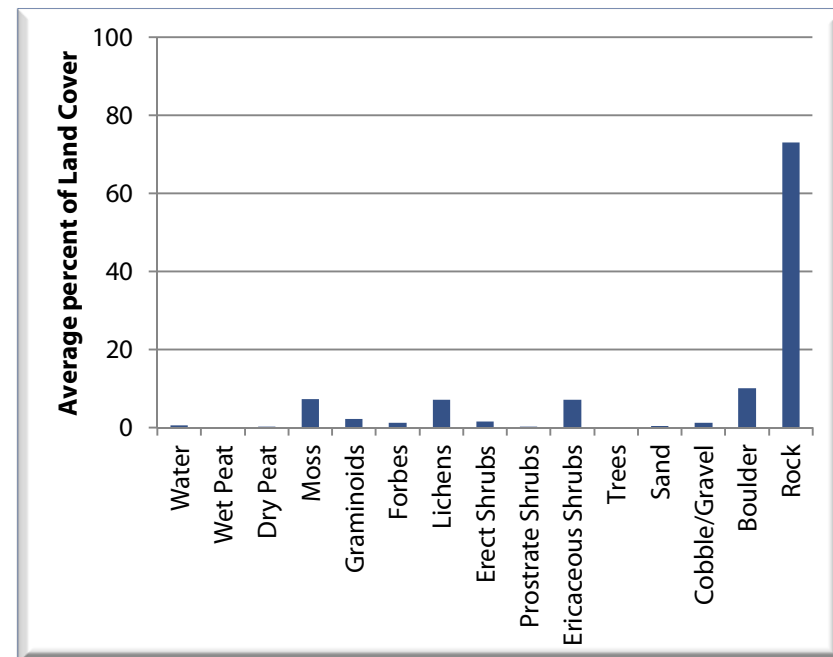


Marsh Labrador tea
(*Ledum palustre*)

Photo: Page Burt

Rock

Rock, in the form of bedrock outcrops, represents 1.5% of the total mapped area (approximately 6,300 km²), with the highest proportion found in the mapped area of the Melville Peninsula Plateau. It occurs in six other ecoregions: Wager Bay Plateau, Gulf of Boothia Plain, Maguse River Upland, Dubawnt Lake Plain/Upland, Kazan River Upland and Selwyn Lake Upland. Low percentages of moss, lichens and ericaceous shrub are secondary land cover components within this class. Vegetation species (detailed in the table) that can occur on these sites are black crowberry, marsh Labrador tea, *Alectoria spp.*, tundra horsehair, crinkled snow, curled snow and reindeer lichens. The boulder/rock subclass was grouped with rock to yield this class.



Top 5 Dominant Abiotic/Biotic Cover Types by Ecoregion

Ecoregion*	Land Cover Type	Common Name	Scientific Name	Average % Cover
Wager Bay Plateau	Boulder	Boulder	-	12.1
	Moss	Moss	<i>Moss spp.</i>	5.0
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	2.5
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	2.1
Maguse River Upland	Rock	Rock	-	73.5
	Boulder	Boulder	-	6.6
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	5.0
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	3.9
Dubawnt Lake Plain/Upland	Moss	Moss	<i>Moss spp.</i>	3.6
	Rock	Rock	-	90.0
	Boulder	Boulder	-	3.3
	Evergreen Ericaceous Shrub	Marsh Labrador Tea	<i>Ledum palustre</i>	2.3
	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	2.3
Back River Plain	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	2.3
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	2.3
	Rock	Rock	-	82.5
	Lichen	Tundra Horsehair Lichen	<i>Bryoria nitidula</i>	5.0
Kazan River Upland	Lichen	Witch's Hair Lichen	<i>Alectoria spp.</i>	4.3
	Boulder	Boulder	-	3.8
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	3.5
	Rock	Rock	-	64.4
	Lichen	Reindeer Lichen	<i>Cladonia spp.</i>	12.5
Kazan River Upland	Evergreen Prostrate Shrub	Black Crowberry	<i>Empetrum nigrum</i>	8.1
	Lichen	Crinkled Snow Lichen and Curled Snow Lichen	<i>Flavocetraria nivalis</i> and <i>Flavocetraria cucullata</i>	4.1
	Ericaceous Shrub	Alpine Bilberry	<i>Vaccinium uliginosum</i>	3.9

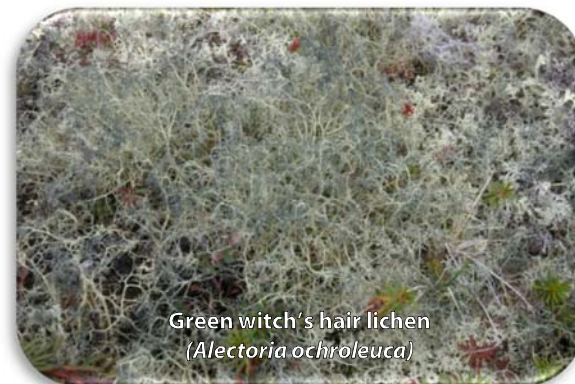
* The ecoregions listed in the table are only those where field data exist for this class.



Black crowberry
(*Empetrum nigrum*)



Marsh Labrador tea
(*Ledum palustre*)



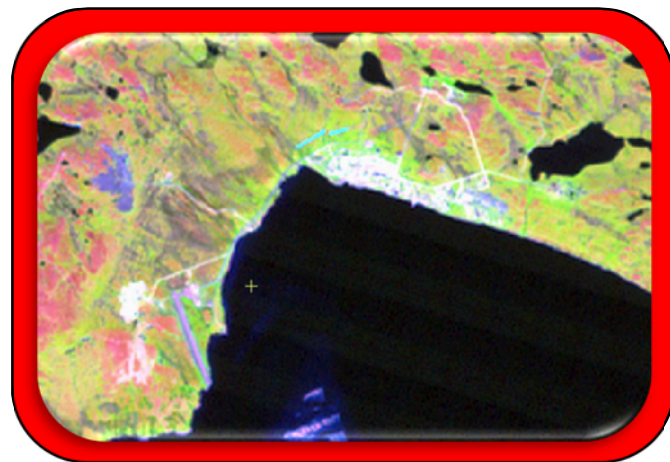
Green witch's hair lichen
(*Alectoria ochroleuca*)



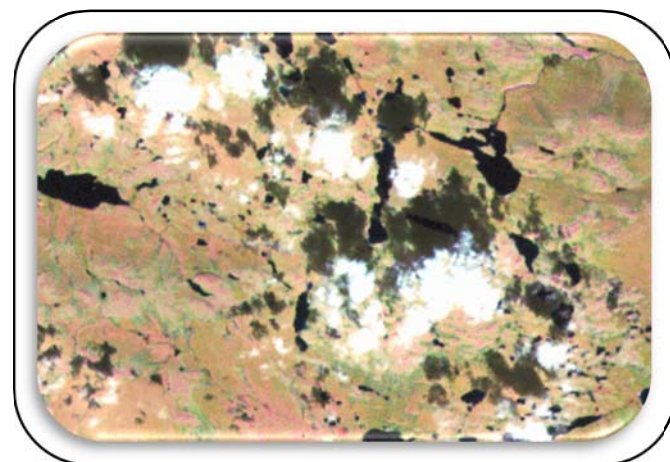
Curled snow lichen
(*Flavocetraria cucullata*)

**Ice**

Ice and snow features identified in the imagery within the growing season. The ice class represents 0.1% (approximately 260 km²) of the total area mapped.

**Disturbance**

Anthropogenic disturbances on the landscape including features such as: mine sites, communities and associated airstrips and roads. The disturbance class represents less than 0.1% of the total area mapped (approximately 38 km²).

**Cloud/Shadow**

Areas of cloud and associated shadows present within the source Landsat image. The cloud/shadow class represents 3.2% of the total area mapped (approximately 13,150 km²).