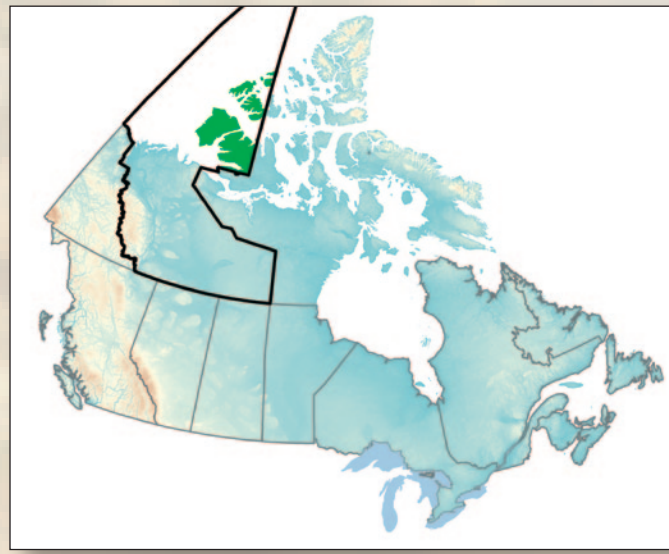
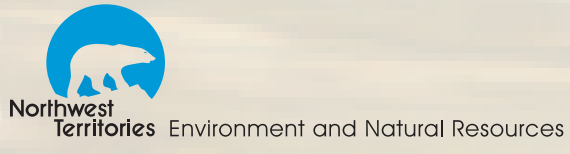
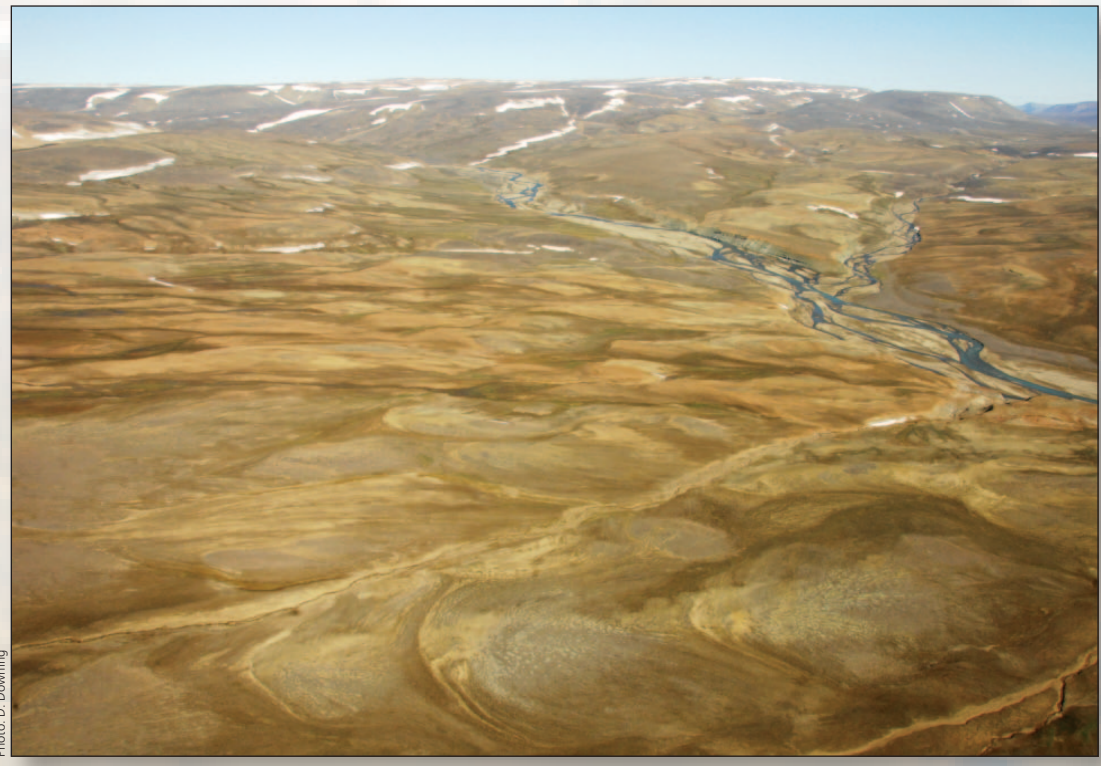


ECOLOGICAL REGIONS OF THE NORTHWEST TERRITORIES NORTHERN ARCTIC



Healthy natural ecosystems are critical to our well-being; they provide us with clean air and clean water, a wide range of renewable resources, and the opportunity to enjoy landscapes with their rich diversity of plant and animal communities. Climate and topography act together to produce ecosystems that can range in size from lichen communities on a piece of granite to landscapes the size of Great Slave Lake. Understanding what makes one area different from another is an important part of wisely managing the vast expanses of the Northwest Territories for present and future generations. These differences can be described by dividing larger landscapes into smaller areas that have unique combinations of climate, terrain, vegetation, soils and wildlife; these are called ecological regions (ecoregions).

The Northwest Territories developed an ecologically-based landscape classification for environmental assessment, cumulative effects management, biodiversity monitoring and reporting, forest resource analysis and planning, wildlife habitat evaluation and conservation, and protected area identification. Such a classification is essential for responding to local, regional, national and international enquiries, and the Northwest Territories is working with other Canadian provinces and territories to use a North American continental approach to improve its ecological classification. Because of a rapidly changing climate and the increasing pace of landscape changes in the northern-most regions of the Northwest Territories it was important to update the description of these ecosystems as a benchmark for future monitoring. This poster, describing the Northern Arctic Ecological Region, completes the set of five posters and accompanying reports that cover the entire Northwest Territories.

Ecological classification and mapping for the Northern Arctic are presented within an ecoregion framework for continental North America that includes four levels, from very large Level I ecoregions that represent ecosystems of global extent to relatively small Level IV ecoregions that represent ecosystems of several thousand square kilometers. The Northwest Territories includes parts of three Level I ecoregions: Tundra, Taiga and Northwest Forested Mountains. Eight Level II ecoregions including the Northern Arctic are nested within the Level I ecoregions and 17 Level III ecoregions are grouped under the Level II ecoregions. There are four Level III ecoregions within the Northern Arctic: the Northern Arctic High Arctic-oceanic (HAo); the Northern Arctic High Arctic (HA); the Northern Arctic Mid-Arctic (MA); and the Northern Arctic Low Arctic-north (LAN). Level III ecoregions are identified primarily by regional climate differences reflected in the soils and vegetation unique to each ecoregion. The Level III ecoregions of the Northern Arctic are further divided into 21 Level IV ecoregions that are typically defined by a unique combination of terrain and vegetation patterns.



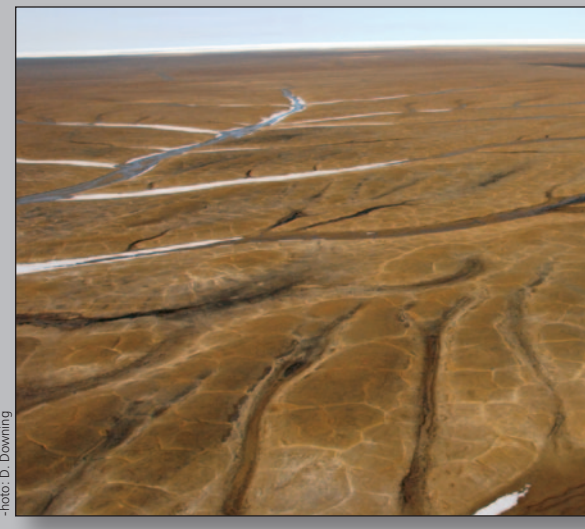
This poster is associated with the ENR technical report: "Ecological Regions of the Northwest Territories – Northern Arctic".
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Northern Arctic High Arctic-oceanic (HAo) Ecoregion

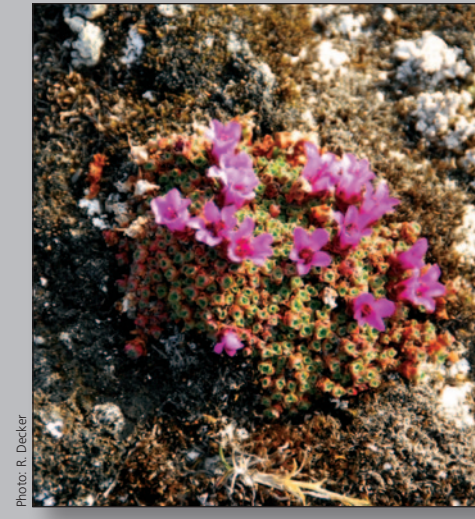
The Northern Arctic High Arctic-oceanic (HAo) Ecoregion occupies about 22,300 km², and includes two Level IV ecoregions on all or parts of four main islands and several smaller islands in the extreme northwest of the Canadian Arctic Archipelago. The islands included within the Ecoregion are nearly level to gently rolling, and are surrounded by multi-year pack ice. The Ecoregion is a polar desert where vegetation (tundra) is restricted to small areas because of the extremely dry and cold conditions; only cushion forbs, a few dwarf grasses and crusts composed of algae, lichens and bacteria are found here. This Ecoregion was covered by ice in the most recent Laurentide glaciations and the islands were then partly submerged along their coastlines as the ice melted and ocean waters flooded over lands that had been depressed by the weight of overlying ice sheets. Permafrost is continuous. There is a dense drainage network, but most streams are ephemeral or intermittent with only a few narrow, shallow permanent creeks and rivers. A few small ponds and semi-permanent snow patches are scattered throughout and provide seasonal water sources.



Cryptogams are a type of semi-barren landscape found in the coldest, driest places of the Northern Arctic. The blackish crusts are lichens, mosses, algae and bacteria with a few scattered cushion-form herbs, such as purple saxifrage (*Saxifraga oppositifolia*), arctic poppy (*Rhodiola* spp.), and rushes (*Luzula* spp.). There are no shrubs.



The northern halves of Brock and Borden Islands are sand and gravel lowlands criss-crossed by hundreds of shallow drainages, only a few of which have any water in summer. Darker patches seen in this picture are cryptogams.



The purple saxifrage (*Saxifraga oppositifolia*) is one of very few herbs that can survive the harshest climates in the Northern Arctic. Its tiny, waxy leaves and low-growing cushion growth form reduce its exposure to wind and damaging ice crystals, and maximize its use of a meagre water supply.



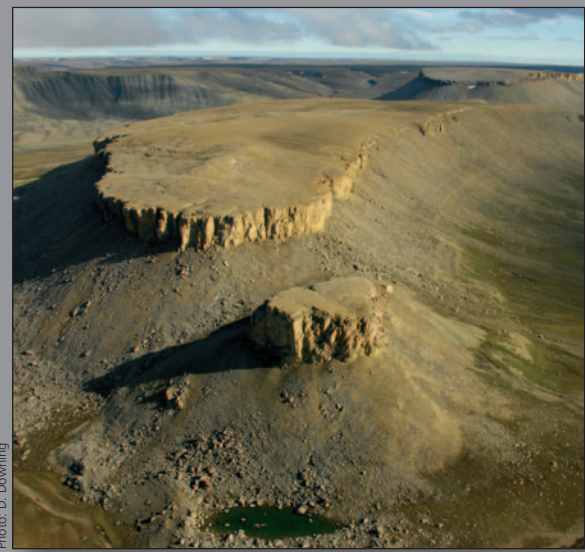
The ice pack is an important component of the Northern Arctic ecosystem, supporting ice specialists such as the Polar Bear (*Ursus maritimus*). The crack in the ice is an open water lead, the blue patches are meltwater ponds from which water evaporates and condenses to form the low stratus cloud and fog layer typical of the northern islands in summer. Some ocean areas called polynias, have open water year-round. Several species of ducks, loons, gulls and jaegers depend on open leads and polynias in offshore sea ice for migration pathways and food.



Mackenzie King Island is sparsely vegetated and mostly low-lying. Part of its interior is occupied by a barren eolian (windblown sand) plain that has eroded bedrock exposures in places. Castle Butte, about 30-m high, is capped by erosion-resistant bedrock.

Northern Arctic High Arctic (HA) Ecoregion

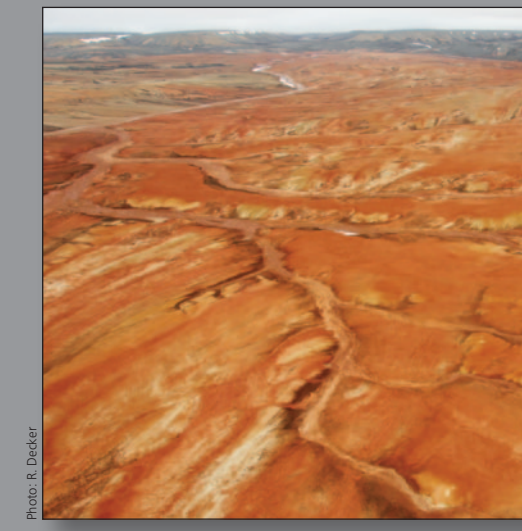
The Northern Arctic High Arctic (HA) Ecoregion occupies about 45,600 km², and includes six Level IV ecoregions on most of Melville Island, Eglinton Island, part of Prince Patrick Island and the extreme northwest and northeast corners of Banks Island. Pack ice surrounds most of the Ecoregion year-round, although this is changing rapidly. Tundra is absent or limited at high elevations and on bouldery or excessively well-drained sites. This Ecoregion has a climate only slightly less extreme than that of the more northerly High Arctic-oceanic Ecoregion. The highest terrain in the Northwest Territories Northern Arctic occurs on central Melville Island (755 m above sea level). This Ecoregion has several remnant ice caps; a reminder that it was covered by ice in the most recent glaciation. Permafrost is continuous. Tundra including low-growing willows (*Salix* sp.) and mountain avens (*Dryas integrifolia*) occurs in warmer microclimates such as in protected valleys and on calcareous soils. Tundra with sedges, grasses, and mosses is widespread on wet lowlands and seepage slopes.



Parker Plateau on the northeast corner of Banks Island is capped by frost-shattered limestone, here exposed as small cliffs. Talus slopes below the cliffs are too bouldery for plant growth and the upper plateau is very dry with areas of barren to very sparse tundra, but the lower valley slopes receive seepage waters and have finer-textured soils that support continuous tundra (green tones).



Peary caribou are the smallest North American caribou and are found only in the high Arctic. Their populations declined in the 1960s-1970s because of harsh winters, and other factors such as hunting, predation, and competition with muskoxen. Their numbers are now stable but still low. They were listed as endangered under the federal Species at Risk Act in 2011.



Bright red shales cover parts of western Melville Island. The colouration is thought to be the result of spontaneous combustion millions of years ago, perhaps in low-grade coals associated with the shales.



This Ecoregion is the northern limit of the shrub-line, where Arctic willow (*Salix arctica*) will grow but is restricted to warm sites.



Arctic hares select boulder strewn hilly habitats that provide shelter from severe weather and escape from predators. Arctic willow is the main winter food for these hares, and the diet becomes more diverse in summer consisting mainly of legumes.



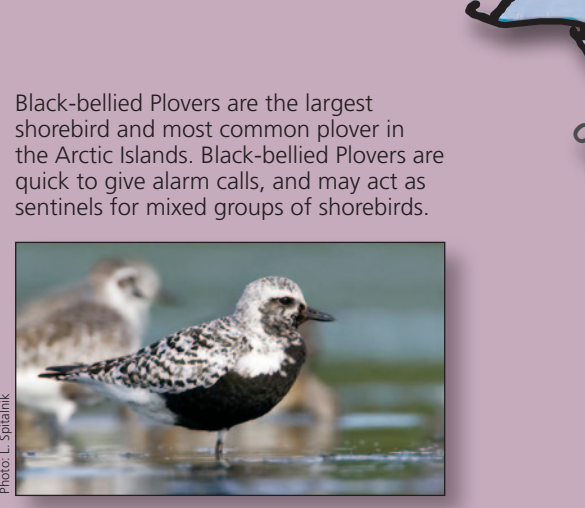
Parallel meltwater rivulets cross the surface of Leopold Glacier, the largest of the remnant glaciers on Melville Island.

Northern Arctic Mid-Arctic (MA) Ecoregion

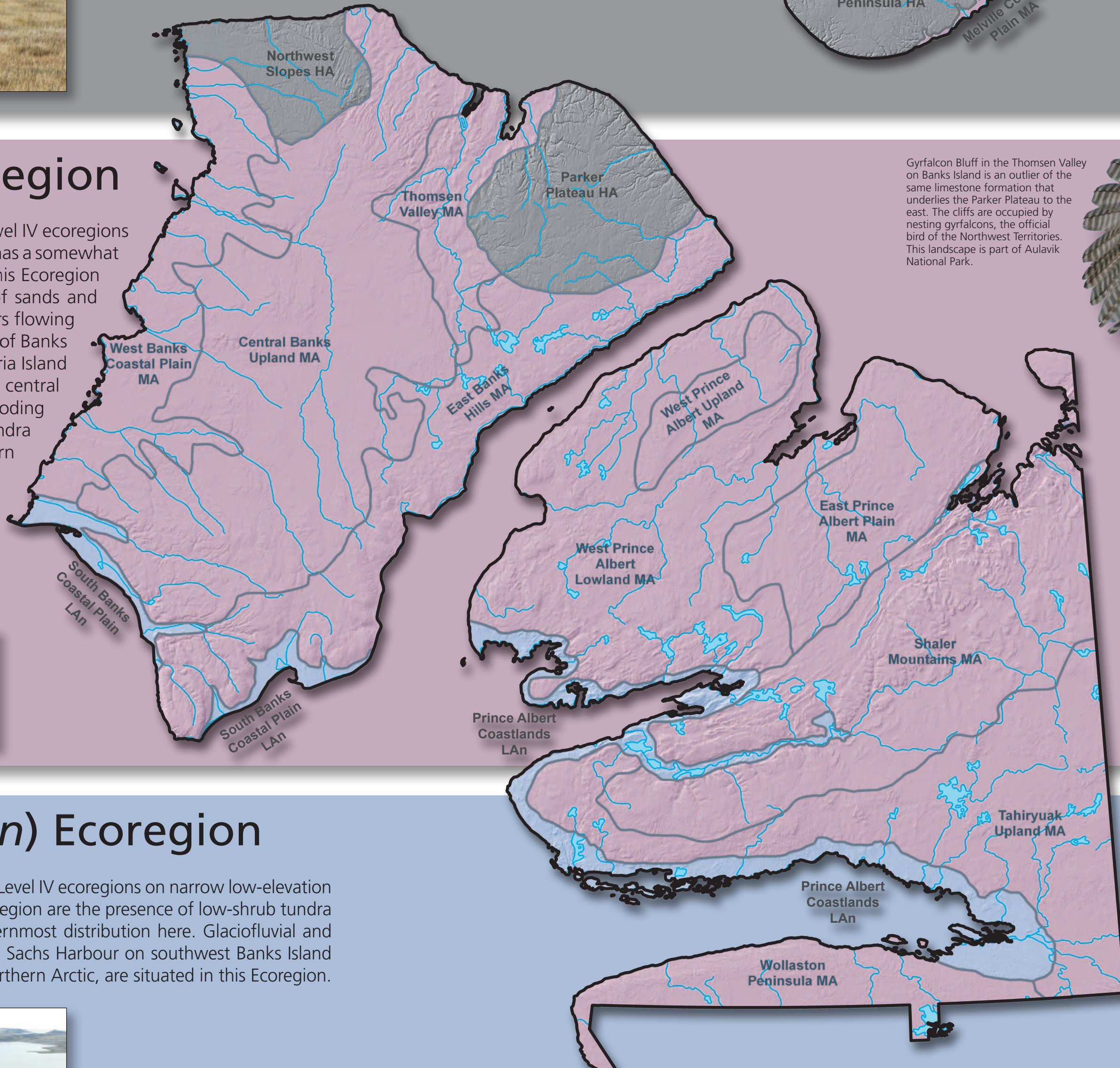
The Northern Arctic Mid-Arctic (MA) Ecoregion occupies almost 134,000 km², and includes 11 Level IV ecoregions on most of Banks and Victoria Islands and sheltered coastal areas on Melville Island. This Ecoregion has a somewhat more moderate climate than the High Arctic Ecoregion. Banks and Victoria islands portions of this Ecoregion have distinctly different topography and geology. Banks Island has gently undulating terrain of sands and gravels, blanketed by weathered low-relief tills and extensive fluvial plains, and several large rivers flowing west and north in broad shallow valleys with many shallow ponds. Along the south-eastern coast of Banks Island, Palaeozoic and Precambrian bedrock outcrops form spectacular cliffs. The terrain on Victoria Island is of calcareous Cambrian to Silurian sedimentary rock surrounding the Shaler Mountains, a high central spine of dissected Precambrian volcanic and intrusive bedrock ridges and plateaus underlain by eroding Precambrian sedimentary rocks. Two main tundra types occur here: upland sites have shrub tundra and wetter lowland sites develop continuous sedge – grass – moss tundra. The central and western portions of Banks Island include the most productive tundra in this Ecoregion.



The Shaler Mountains on north-western Victoria Island ends as tall cliffs near Glenelg Bay. Dark brown erosion-resistant plates (sills) of igneous rock overlie thick Precambrian sedimentary limestones and shales and white gypsum layers. A massive failure produced the bouldery talus piles, which probably have icy cores that deform slowly, producing lobes that have the appearance of rock glaciers. The extent of Precambrian volcanic and intrusive bedrock makes these Mountains unique in the western Canadian Arctic Archipelago. They are a geologically and biologically diverse landscape.



Black-bellied Plovers are the largest shorebird and most common plover in the Arctic Islands. Black-bellied Plovers are quick to give alarm calls, and may act as sentinels for mixed groups of shorebirds.



Gyr Falcon Bluff in the Thomsen Valley on Banks Island is an outlier of the same limestone formation that underlies the Parker Plateau to the east. The cliffs are occupied by nesting gyrfalcons, the official bird of the Northwest Territories. This landscape is part of Aulavik National Park.



Layered cliffs of ancient sedimentary and igneous rock rise nearly 300 metres from the Beaufort Sea near Nelson Head, forming a visually striking feature on the southern edge of Banks Island. Talus cones at the base of the cliffs and outlying spires of resistant rock indicate the slow continuous progress of erosion. These features show that some of Banks Island was not glaciated during the last Ice Age.



Diverse landscapes and abundant vegetation on the lowlands provides excellent habitat for many mammals and birds, such as Arctic foxes, muskoxen, wolves and nesting and brood rearing habitat for lesser snow geese.



Red Knots are the largest sandpiper in the Northern Arctic and undergo some of the longest migrations. They have been found nesting on rock plains with scant vegetation on Melville, Eglinton and Prince Patrick Islands, and probably extend their summer distribution to the extreme northerly limits of land in the NWT, as they do in Nunavut. Red Knots may often nest in wet habitats, but prefer to forage in dry, elevated habitats; if lower elevations remain snow-covered.

Northern Arctic Low Arctic-north (LAN) Ecoregion

The Northern Arctic Low Arctic-north (LAN) Ecoregion occupies almost 10,000 km², and includes two Level IV ecoregions on narrow low-elevation belts along the southern coasts of Victoria and Banks Islands. Two distinguishing features of this Ecoregion are the presence of low-shrub tundra communities and plant species typical of the mainland Low Arctic. Some plants reach their northernmost distribution here. Glaciofluvial and modern-day fluvial and eolian silts and sands are mixed with the marine sediments and glacial tills. Sachs Harbour on southwest Banks Island and Ulukhaktok on Victoria Island, the two established communities in the Northwest Territories' Northern Arctic, are situated in this Ecoregion.

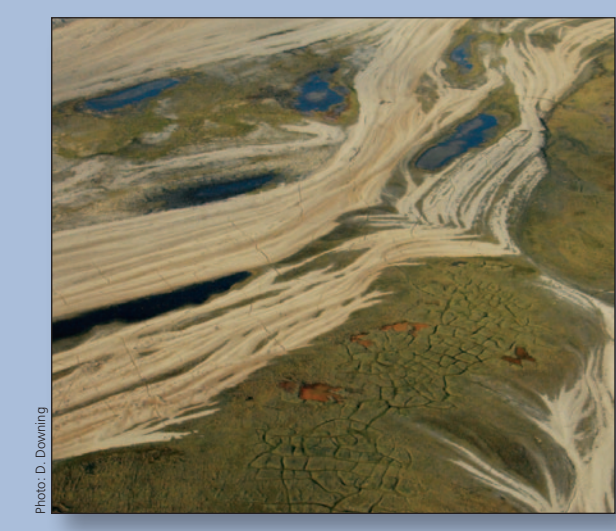


Lush shrub tundra east of Sachs Harbour on Banks Island and in a few places on Victoria Island has established on moist, silty soils. These sites include Alaska willow (*Salix alaxensis*), an indicator of milder Low Arctic conditions. They can grow several metres high, in particular on Root Islet, are the most northerly in Canada and a unique feature of the Northern Arctic.



This eroded plateau just north of Ulukhaktok, Victoria Island shows columns typical of frost-shattered igneous rocks. The slopes are fractured sedimentary and igneous blocks. Water seeping from the base of the plateau supports sedge tundra. The dark-coloured rocks absorb solar radiation and re-radiate it, creating warmer local conditions in the valleys.

- High Arctic-oceanic
- High Arctic
- Mid-Arctic
- Low Arctic-north



Retrogressive flow slides (slope failures) occur when permafrost underlying silty soils melts.



On sunny days, the dark bedrock cliffs confining this narrow hanging valley above the Kuujua River, Victoria Island, well inland of the coast absorb solar energy and warm the air, creating an oasis suitable for the growth of lush wetland and upland tundra.