

## SOUTHERN ARCTIC ECOZONE

**T**he Southern Arctic Ecozone covers northern mainland Canada from the coastal foothills of the Richardson Mountains in the Yukon to Ungava Bay in northern Quebec (Fig. 1). Over 80% of the land area in this ecozone lies west of Hudson Bay. Of the three arctic ecozones, this one has the most extensive vegetative cover and highest biodiversity. It is represented in the Yukon in only one ecoregion, the Yukon Coastal Plain.

**Climate:** This ecozone experiences long, cold winters, and short, cool summers. Mean annual temperature ranges from  $-11^{\circ}\text{C}$  in the northwest (i.e. Yukon and Tuktoyaktuk Peninsula) to  $-7^{\circ}\text{C}$  in northern Quebec. Mean summer temperature ranges from  $4$  to  $6^{\circ}\text{C}$ , producing a short growing season with up to 750

growing degree days, and enhanced by long periods of daylight. The mean winter temperature ranges from  $-28^{\circ}\text{C}$  in the northwest to  $-17.5^{\circ}\text{C}$  in Quebec. The mean annual precipitation in the northwestern portion of the ecozone is in the range of 200 to 250 mm.

**Hydrology:** The major controlling influence on hydrologic response is the presence of continuous permafrost underlying the landscape. Though the area receives relatively little precipitation, runoff is significant. Peak flows, which generally occur in June, exhibit very quick response times because of the shallow active layer. Because there is very little infiltration and evapotranspiration rates are low, snowmelt is quickly transported to the stream channel with little loss. Likewise, peak summer



Cotton grass (*Eriophorum vaginatum*) in flower on Herschel Island at Thetis Bay.

J. Hawkins, Canadian Wildlife Service

rain locally produces flash floods. Because of the relatively small streamflow generating areas, the largest streams in this part of the Yukon are relatively small compared with elsewhere in the ecozone. Many streams experience zero winter flow from November to April.

**Landforms and soils:** Most of the Southern Arctic Ecozone is underlain by Precambrian granitic bedrock, and the terrain consists largely of broadly rolling rocky uplands and intermittent lowlands. Much of it is mantled with discontinuous moraine, except in coastal areas and within much of the Yukon Coastal Plain Ecoregion, where fine-textured marine or glaciomarine sediments cover the surface. Thick glacial drift deposits characterize much of the westernmost section of the ecozone from Great Bear Lake to the Firth River on the Yukon coast. Strung out across the landscape are long, sinuous eskers, some reaching lengths of 100 km. A small part of the ecozone west of the Firth River is unglaciated. The undulating landscape is studded with innumerable lakes, ponds and wetlands. Cryosols, the dominant soils, are underlain by continuous permafrost with active layers that remain moist or wet throughout the summer.

**Vegetation:** This ecozone covers the major area of vegetation transition between the taiga forest to the south and the polar desert conditions of the Northern Arctic Ecozone. The vegetative cover is dominated by shrubs, which decrease in size to the north. Typical shrubs include dwarf birch, willow, and heath species; these are commonly mixed with various herbs, lichens and mosses. Major river valleys, such as the Babbage, support scattered clumps of stunted spruce trees. Wetlands are common in the low-lying coastal areas, and mainly support sedge moss vegetation.



White and intermediate phase snow geese photographed during late-summer staging along the Yukon Coastal Plain.



B. McLean

In this zone of continuous permafrost, the Arctic fox (*Alopex lagopus*) seeks out alluvial or well-drained sandy soils for den sites.

**Wildlife:** A wide variety of mammals live in this ecozone. It includes the major summer range and calving grounds for Canada's largest caribou herds, the barren-ground caribou in the west and the woodland caribou in the eastern portion of the ecozone. Other mammals include grizzly bear, black bear in northern Quebec, polar bear in coastal areas, wolf, moose, Arctic ground squirrel, and brown lemming. This ecozone is also a major breeding and nesting ground for a variety of migratory birds. Representative species include the Yellow-billed, Arctic, and Red-throated Loons; Tundra Swan; Snow Goose; Long-tailed Duck; Gyrfalcon; Willow and Rock Ptarmigan; Red Phalarope; Parasitic Jaeger; Snowy Owl; Hoary Redpoll; and Snow Bunting. Some typical marine species include walrus, seal, beluga whale, and narwhal.

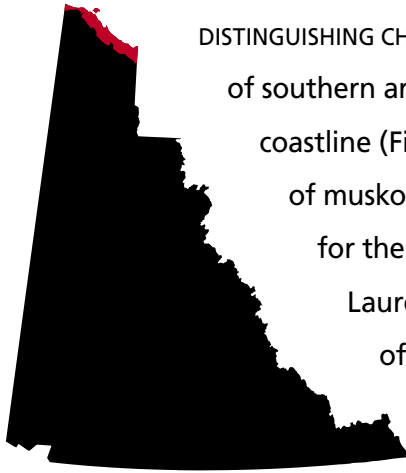
**Human activities:** This ecozone is sparsely populated. The total population of approximately 10,300 is scattered in 17 communities, including Tuktoyaktuk, Paulatuk, and Coppermine in the west; Chesterfield Inlet, Rankin Inlet, and Eskimo Point on the coast of Hudson Bay; and Kangirsuk on Ungava Bay. Rankin Inlet is the largest centre with a population of 1,706. Much of the local economy is based on subsistence hunting, trapping, and fishing. Inuit and Inuvialuit form over 80% of the population. The mineral and hydrocarbon potential of the zone has also led to increased exploration and some extraction activity. Construction, some tourism, and government services are the other principal activities.

# Yukon Coastal Plain

Southern Arctic Ecozone

## ECOREGION 32

**DISTINGUISHING CHARACTERISTICS:** This is the only ecoregion in the Yukon representative of southern arctic ecosystems and the only ecoregion in the Yukon with a marine coastline (Fig. 32-1). The Yukon Coastal Plain Ecoregion is home to populations of muskoxen, polar bear and Arctic fox and provides important summer range for the Porcupine caribou herd. Much of the land surface was glaciated by Laurentide ice moving westward from the Mackenzie Valley; the area west of Firth River is unglaciated.



**Figure 32-1.** Driftwood, carried down river (principally the Mackenzie) from the Taiga and Boreal Cordillera ecozones, is strewn along the beaches of the Yukon Coastal Plain where no trees grow.

J. Hawkings, Canadian Wildlife Service

**APPROXIMATE LAND COVER**  
tundra, 80%,  
lakes and wetlands, 20%



**TOTAL AREA OF ECOREGION IN CANADA**  
6,380 km<sup>2</sup>



**TOTAL AREA OF ECOREGION IN THE YUKON**  
5,460 km<sup>2</sup>



**ECOREGION AREA AS A PROPORTION OF THE YUKON**  
1% (includes coastal lagoons/shallow water)

**ELEVATIONAL RANGE**  
0–585 m asl  
mean elevation 82 m asl

**CORRELATION TO OTHER ECOLOGICAL REGIONS:** Northern portion of **Northern Mountains and Coastal Plain Ecoregion** (Oswald and Senyk, 1977) • Equivalent to **Northern Coastal Plain Ecoregion** (Wiken *et al.*, 1981) • Yukon portion of **Alaska Tundra Region** (CEC, 1997) • Yukon portion of **Arctic Coastal Tundra Ecoregion** (Ricketts *et al.*, 1999) • Contiguous with the **Beaufort Coastal Plain Ecoregion** of Alaska (Nowacki *et al.*, 2001)



## PHYSIOGRAPHY

The Yukon Coastal Plain Ecoregion incorporates the Yukon Coastal Plain (Bostock, 1948; Hughes, 1987b) or Lowland (Mathews, 1986) physiographic unit (Fig. 2). The coastal plain is a band of land, north of the British, Barn and Richardson mountains, that slopes to the Beaufort Sea (Rampton, 1982). It extends inland along the Babbage and Blow rivers. The slope increases moving in a southerly direction away from the coast.

Much of the plain is an erosion surface, or pediment, where the gentle slope is a result of a long period of uninterrupted erosion. Ongoing erosion carries material across the surface by soil creep and sheetwash. The surface of the pediment often intersects different rock types and bedding planes in the underlying bedrock. Eastern portions of the ecoregion are mantled with glacial drift, which imparts a rolling or hummocky nature to the surface (Rampton, 1982).

Relief is generally less than 30 m. The elevation is generally less than 80 m asl in the west, except for Herschel Island with a maximum elevation of 185 m asl, and one of the Buckland Hills between the Firth and Malcolm rivers at 585 m asl is the highest point in the ecoregion. The elevation of the plain increases to the east where the surface lies between 150 and 300 m asl. Streams have cut into the surface of the plain, typically between 3 m in the west to more than 150 m in the east. A coastal scarp is prominent in the eastern portion of the ecoregion but largely absent adjacent to the Alaska border. The greater relief in the east reflects isostatic rebound following retreat of the Laurentide Ice Sheet. The uplift results in downcutting by postglacial streams (Fig. 32-2).

The Coastal Plain is incised with several large rivers, as well as smaller streams. From the west, they include the Malcolm, Firth, Babbage, Blow and Big Fish rivers. These rivers broaden into large alluvial fans where they meet the Beaufort Sea. Wetlands and small lakes are common along the Beaufort coast.

## BEDROCK GEOLOGY

A veneer of glacial deposits, colluvium and alluvium covers most of this ecoregion, obscuring the bedrock, a pediment made of a Late Tertiary erosion surface. The distribution of underlying rock units is shown by Norris (1981a,b; 1985) and summarized

in Lane and Dietrich (1996). The region is part of the Arctic Alaska Terrane, which comprised the Foreland during the Tertiary compression stages of the Cordilleran orogeny. Fold and thrust structures project from the northern Richardson and Barn mountains northward beneath the coastal plain to the offshore Beaufort Foldbelt (Lane and Dietrich, 1995). The Rapid Depression beneath the northwestern half of the ecoregion is a V-shaped, northward-plunging, fault-controlled trough containing more than 4,000 m of Lower Cretaceous sandstone and conglomerate.

The dominant rock types in this ecoregion are slates and shale of Paleozoic through Early Tertiary age; as a result exposures are few and crumbly, or have been reduced to fine-grained talus. Sandstone and minor chert produce blocky talus. The prominent rock pillar called Engigstciak is composed of early Ordovician chert. Mudstone and sandstone of the Upper Cretaceous Tent Island, and Lower Tertiary Moose Channel formations are exposed along the Big Fish River where it runs northeastward out of the Yukon Territory. Bluffs of dark-coloured shale and siltstone of the Jurassic Kingak Formation extend to the mouths of the Spring and Firth rivers, the latter exposing fine ammonite and crinoid fossils. In 1826, John Franklin noted lignite seams near the mouth of the Babbage River; these are within the Moose Channel Formation. The Reindeer Formation also contains bituminous coal: it has been mined near the mouth of Rapid Creek and at Shingle Point. Tertiary sandstone delta-fronts immediately offshore to the north have hydrocarbon potential, but these reservoir strata appear thinner and narrower than those in the Beaufort and Mackenzie Delta region to the east.

## SURFICIAL GEOLOGY AND GEOMORPHOLOGY

The Yukon Coastal Plain can be subdivided into two main land units: the low relief, gently sloping coastal margin and the mountain fringe, which forms a narrow belt of land at the contact between the Richardson Mountains and the Coastal Plain itself (Rampton, 1982).

The entire area is underlain by permafrost, and the coastal area is modified by shoreline processes. Thermokarst lakes, retrogressive thaw flow slides, non-sorted polygons and stripes, pingos and other periglacial features are common. Organic deposits

are found throughout the area, overlying most surficial geology units. Peat thickness ranges from 0.3 to 3.5 m, influencing the thermal and moisture balance of the surface. Disturbance of the organic layer can result in thermokarst, which can produce soil subsidence, slumps, slides and gullies where the slope is greater than 5 degrees.

Unglaciaded terrain exists in the ecoregion west of Herschel Island. Surficial materials here consist of coalescent fluvial fans, terraces, sandy eolian deposits and fine-textured marine colluvial and lacustrine materials. Beaches, spits and bars are the common shoreline landforms through the extent of the Beaufort coastline.

The low relief portion of the Coastal Plain includes several large fluvial fans, at the mouths of Craig and Clarence creeks, and the Malcolm, Firth and Babbage rivers. The fans west of the Firth River are mainly coarse-grained and contain less ice than the finer-grained, organic-rich fan deposits of the Babbage and Firth rivers. The lower parts of these fans, as well as the floodplains of most streams in the area, are unvegetated and have shifting channels.

The easternmost boundary of the ecoregion includes a portion of the Mackenzie Delta. These deposits are fine-grained, organic and ice-rich, except for the talik zone under active channels.

Moraines left by glaciers are found east of the Firth River, generally at elevations lower than 300 m asl (Rampton, 1982). The moraines cover large surfaces and have been modified by thermokarst, retrogressive thaw slides and other periglacial processes, such as solifluction and soil creep. They generally present a rolling to hummocky surface. The moraines are fairly rich in silt and clay and contain high volumes (10 to 40%) of segregated ice, in the form of ice lenses and ice wedges. The first 3 m of the moraines are usually a mixture of mudflow deposits, lacustrine sediments, colluvial moraine and ice. Two large ice-push features, Herschel Island and the ridge east of the Babbage River's lowermost floodplain, are distinct from other glacial deposits of the area. They consist of unconsolidated sediments thrust by the front of overriding glaciers, now containing large bodies of ice-rich sediments and segregated ice.

Large outwash deposits or glaciofluvial sand and gravel deposits are southeast of the Firth River, on the north side of the Tugulak River floodplain and a narrow band between Deep Creek and Blow River. These larger deposits formed as meltwater streams flowed along the southwestern edge of the Buckland glaciers. They have a low gradient and poor drainage, and are often covered by thick ice-rich organic deposits and punctuated by numerous shallow thermokarst ponds. A large esker runs between the Blow and Running rivers. Small glaciofluvial deposits located at higher elevations are usually well drained and have low ice content.

Glacial lakes formed in several areas between the rising slope of the coastal and mountain fringe and the retreating glaciers. Ice-rafted boulders, beach lines and fine-grained sediments, ranging in thickness between 1.5 and 6 m, were left over older sediments. The glaciolacustrine deposits are usually poorly drained, low relief, ice-rich and often covered by peat. Thermokarst lakes, ice wedges and polygons are commonly seen in this kind of terrain.

Colluvial deposits are associated with foothills of the Richardson and other mountain ranges to the south of the ecoregion. The colluvium is derived from local bedrock and frost-shattered debris moved through soil creep or solifluction, sometimes mixed with alluvium at the base of the slopes. Colluvium composition ranges from coarse boulder fields to fine-grained organic and ice-rich debris.

## GLACIAL HISTORY

The Yukon Coastal Plain includes both glaciaded and unglaciaded terrain. The boundary between these terrains is marked by the Late Wisconsinan absolute limit of the Laurentide Ice Sheet about 30,000 years ago (Hughes *et al.*, 1981; Lemmen *et al.*, 1994; Duk-Rodkin and Hughes, 1995). The limit follows the northeastern front of the Richardson, Barn and British mountains, descending westward towards Herschel Island (Fig. 15). The ice sheet advanced across extensive late Cenozoic pediments, surfaces that extend from the foothills to the coast, descending from approximately 850 m asl at the east end of the coastal plain to almost sea level at the border with Alaska (Rampton, 1982). In addition to the Laurentide glacial maximum, two other well-defined former ice margins occur in this ecoregion. The first is the Katherine Creek Phase (ca. 22 ka;

Duk-Rodkin and Hughes, 1991; Lemmen *et al.*, 1994), traceable from southern Mackenzie Mountain to Deep Creek, a tributary to the Babbage River (Fig. 32-2). The other is the Tutsieta Lake Phase (ca. 13 ka; Hughes, 1987a; Duk-Rodkin and Hughes, 1995) that follows the Peel River and the western edge of the Mackenzie Delta. The three former ice margins are considered correlative to the Buckland phase, Sabine phase (both from Rampton, 1982) and Late Wisconsinan limits of glaciation, respectively.

## CLIMATE

This ecoregion has an arctic climate. Winters are prolonged, lasting from October through June. Summers are brief, with temperatures very dependent on whether the winds are onshore or offshore, with ice cover, even in summer, near the coast. Precipitation is light, but the winds are some of the strongest in the Yukon.

Mean annual temperatures are  $-10$  to  $-12^{\circ}\text{C}$ ; February is the coldest month near  $-28^{\circ}\text{C}$ , with the mean maximum near  $-24^{\circ}\text{C}$  and the mean minimum near  $-32^{\circ}\text{C}$ . Above freezing temperatures can occur during the winter but are accompanied by strong winds. Extreme minimums are only near  $-50^{\circ}\text{C}$  due to some heat transfer from the Arctic Ocean through the ice cover. July is the warmest month with means ranging from  $8$  to  $10^{\circ}\text{C}$ . Temperatures near  $30^{\circ}\text{C}$  have occurred during June, July and August, but fairly heavy frosts can also occur in these months.

Annual precipitation is light, being between only  $125$  and  $200$  mm. June through August has the heaviest precipitation,  $20$  to  $35$  mm, in the form of rain, drizzle, and occasional snow. The months of October to May have mean monthly amounts of  $3$  to  $5$  cm of snow.

Winds are strong throughout the year with mean speeds near  $20$  km/hr. They are strongest from



C. Kennedy, Yukon Government

**Figure 32-2.** The Blow, Babbage (above), Firth and Malcolm rivers cut into the pediment surface of the Yukon Coastal Plain, creating rare bedrock exposures. Deep Creek, a tributary to the Babbage River near this point, occupies a drainage channel, parallel to the coast, that formed along the front of the intermediate Laurentide glacial maximum, the Katherine Creek Phase.

October through May; sustained winds of 50 to 80 km/hr do occur. The prevailing direction is either from the west or from the east, although a southerly component can develop in the major valleys such as the Blow and Babbage rivers. These prevailing winds cause much redistribution of the light snow cover.

Detailed historic climatic data are available from Komakuk Beach, Stokes Point and Shingle Point. As these stations are on the coast, summer temperatures are frequently higher some 2 to 3 km inland than reported by these stations. Currently, a limited range of weather data is collected by automated weather stations at Komakuk Beach and Shingle Point only.

## HYDROLOGY

The Yukon Coastal Plain Ecoregion is situated within the Arctic Hydrologic Region (Fig. 8). The major direction of drainage is to the north into the Beaufort Sea. The ecoregion drains the northern foothill slopes of the British–Richardson Mountains Ecoregion, the relatively flat coastal plain that includes Herschel Island, and the western Mackenzie Delta. Numerous larger streams within the ecoregion originate in the British and the Richardson mountains, with streamflow response that is not characteristic of the ecoregion. These include the lower reaches of the Blow, Firth and Malcolm rivers. Because the ecoregion is long and narrow, there are no representative intermediate or large streams within the ecoregion. Small representative streams include Deep and Poland creeks. While there are no intermediate- or large-sized lakes, the ecoregion contains numerous small pothole lakes and ponds. Lakes and wetlands are estimated to cover approximately 20% of the ecoregion.

There are no historical representative hydrometric stations within the Yukon portion of the ecoregion, but there is one representative Alaskan station, at Nunavak Creek near Barrow. The Babbage River and Kaparuk River near Deadhorse are somewhat representative transitional basins, useful in characterizing the hydrologic response. Annual streamflow has an increase in discharge in May due to snowmelt, rising to a peak in June within the majority of streams. Summer rain events will produce secondary, and occasionally the annual peak flows, on some streams. Fall (September)

streamflows are often high. The mean annual runoff is estimated to be relatively low with an ecosystem average of 168 mm, while mean seasonal and summer flows are estimated to be at  $14.4 \times 10^{-3}$  and  $6.9 \times 10^{-3} \text{ m}^3/\text{s}/\text{km}^2$  respectively. The mean annual flood is estimated to be among the highest of all Yukon ecoregions (on a unit-area basis) with a value of  $175 \times 10^{-3} \text{ m}^3/\text{s}/\text{km}^2$ . The mean maximum summer flow is estimated to have a value of  $40 \times 10^{-3} \text{ m}^3/\text{s}/\text{km}^2$ . The minimum annual and summer flows are estimated at 0 and  $0.6 \times 10^{-3} \text{ m}^3/\text{s}/\text{km}^2$ , respectively. Due to the dominant role of winter temperatures and permafrost on streamflow, all ecoregion streams experience no water flows from December to April.

## PERMAFROST

Permafrost is continuous beneath the tundra of the Yukon Coastal Plain Ecoregion. Ground temperatures in an exploration well drilled by Imperial Oil near Blow River indicate the base of permafrost in eastern portions of the ecoregion is about 240 m deep (Fig. 21). Equilibrium near-surface temperatures at Blow River are calculated to be about  $-5.5^\circ\text{C}$  (Burgess *et al.*, 1982; their Figure 16). At the coast, ground temperatures may be lower, with  $-9^\circ\text{C}$  recorded in a suite of holes drilled near Kay Point. In unglaciated portions of the North Slope of Alaska, permafrost is up to 700 m thick (Lachenbruch and Marshall, 1986), and the same may be expected in contiguous portions of the Yukon Coastal Plain west of the glacial limit.

The near-surface layers of permafrost are often ice-rich (Mackay, 1983), and large masses of ground ice are regularly exposed in thaw slumps along the coast (Pollard and Dallimore, 1988). Some of these icy beds likely formed during regional permafrost aggradation following deglaciation (Mackay and Dallimore, 1992). Coastal recession is about 10 m/yr at many points due to these highly erodible sediments (Mackay, 1963). Storms in September, when wave fetch is greatest, are the major erosion events (Dallimore *et al.*, 1996).

Ice wedges are ever-present features of the terrain. A warmer, regional, early-Holocene climate has been inferred from truncated ice wedges exposed at coastal sites (Harry *et al.*, 1988; Burn, 1997). Occasionally, large icy bodies form when snowbanks accumulate at the foot of coastal bluffs and are covered by falling debris (Pollard and Dallimore,

1988). Ground ice found within the glacial limit is thought to be generally formed after glaciation, but deformation of icy beds on Herschel Island may have occurred approximately 30 ka ago during their excavation by glacier ice from Herschel Basin, a depression almost equal in volume to the island, currently submerged between the island and the mainland (Mackay, 1959).

As on the north coast of Alaska, the summer climate is warmer inland than at the coast (Romanovsky and Osterkamp, 1995; Burn, 1997), leading to an increase in active layer depth with distance inland. The active layer depth also varies with surficial materials, so that it is 30 to 40 cm in fine-grained sediments, but over 1 m thick in gravels or sands (Rampton, 1982). Much of the terrain surface is hummocky (Mackay *et al.*, 1961), due to cryoturbation and soil movement during thawing in the active layer (Mackay, 1980). The terrain contains some thermokarst lakes, though not to the proportion found in the Tuktoyaktuk Coastlands east of the ecoregion (Rampton, 1988).

## SOILS

Soils in the eastern and central portions of the ecoregion are formed on glacial materials. In the extreme western portion of the ecoregion, soils are found on unglaciated pediments or on vast alluvial fans of the Firth, Malcolm and Clarence rivers. The soils of the Yukon Coastal Plain Ecoregion were described by Wiken *et al.* (1984) and in part by Welch and Smith (1990). Tarnocai (1986) mapped soils in the Firth River as well, and Smith *et al.* (1989) conducted a detailed soil and vegetation survey of Herschel Island.

On the undulating glacial moraine that covers much of the ecoregion, shrub vegetation is associated with well-drained landscapes. Soils have active layers greater than 50 cm and show evidence of mild cryoturbation. These soils are classified as Orthic Turbic Cryosols. Closer to the coastal fringe, much of the low-lying landscape is characterized by brackish wetlands dominated by small waterbodies. There is minor peat accumulation in these wetlands, usually less than 40 cm, and soils are most often classified as Gleysolic Turbic Cryosols. There is evidence in eroding headwalls along the coast that 3 to 4 m of peat formed in the past, but peat does not seem to be accumulating to the same extent in modern soils of the ecoregion; lowland polygonal wetlands seldom

contain more than 50 cm of peat over perennially frozen mineral soils.

On the unglaciated portion of the ecoregion, pediment surfaces tend to be composed of long gentle slopes at less than 10% grade with rather uniform tussock tundra and shrub tundra vegetation cover. These soils are for the most part Orthic Turbic Cryosols with active layers less than 50 cm. The large active fans provide fresh alluvial materials to the landscapes. Older terraces have permafrost established within them, yet there has been little soil formation and weathering. These soils are Regosolic Static Cryosols. The more active floodplains, and localized dune fields adjacent to the coast, do not have permafrost within 1 m of the surface and are classified as Orthic Regosols. These coarse-textured regosolic soils are relatively rare in the ecoregion but are important denning sites for foxes and wolves (Smith *et al.*, 1988; 1991)

Glacial ice-thrust marine sediments occur near King Point and form Herschel Island. Orthic Turbic Cryosols and associated patterned ground are the most common soils associated with the upland of the island (Fig. 32-3). Abundant thermokarst activity creates large fresh surfaces for renewed soil development. These scar areas are widespread on Herschel Island and Regosolic Static Cryosols are most commonly associated with them (Smith *et al.*, 1989).

## VEGETATION

The vegetation of the Yukon Coastal Plain Ecoregion reflects its major physiographic features, including the marine coastline, low-lying polygonal wetlands, tussock tundra, broad alluvial fans and deltas, and rolling hills flanking the Richardson Mountains (Fig. 32-4).

The coastal areas support early-succession vegetation on beaches and spits, and littoral graminoid communities on estuaries and the shores of brackish lagoons. Development of salt marshes is inhibited compared with lower latitudes, due to sea ice abrasion, low tidal amplitudes and erosion. Massive thaw slumps, which build at the foot of the melting faces of cliffs of frozen sediments, are colonized by dense stands of mastodon flower (Smith *et al.*, 1989).





S. Smith, Agriculture and Agri-Food Canada

**Figure 32-3.** Frost action in the active layer of the fine-textured Cryosolic soils on Herschel Island and elsewhere in the ecoregion produces patterned ground. Patches of bare ground are set within a matrix of tundra vegetation.

The low inland terrain is covered by extensive wetlands and cottongrass tussock tundra (Hawkings 1999). Freestanding sedges, marsh grass and willows have colonized wet sites, such as low centre polygons, the margins of ponds and thermokarst lakes, beaded drainages and ice wedge channels. Tussocks of cotton grass, growing in association with various ericaceous shrubs, lichens and forbs, dominate well-drained sites, such as high-centre polygons or pediments.

Major drainages flowing from the mountains dissect the coastal plain in a north–south direction. The massive active alluvial fans of rivers like the Malcolm and Firth, with their constantly changing network of channels, exhibit various stages of succession. The active channels remain scoured and unvegetated, while stabilized gravel bars and fluvial terraces are gradually vegetated by bear root, lupine, dryas and willow.

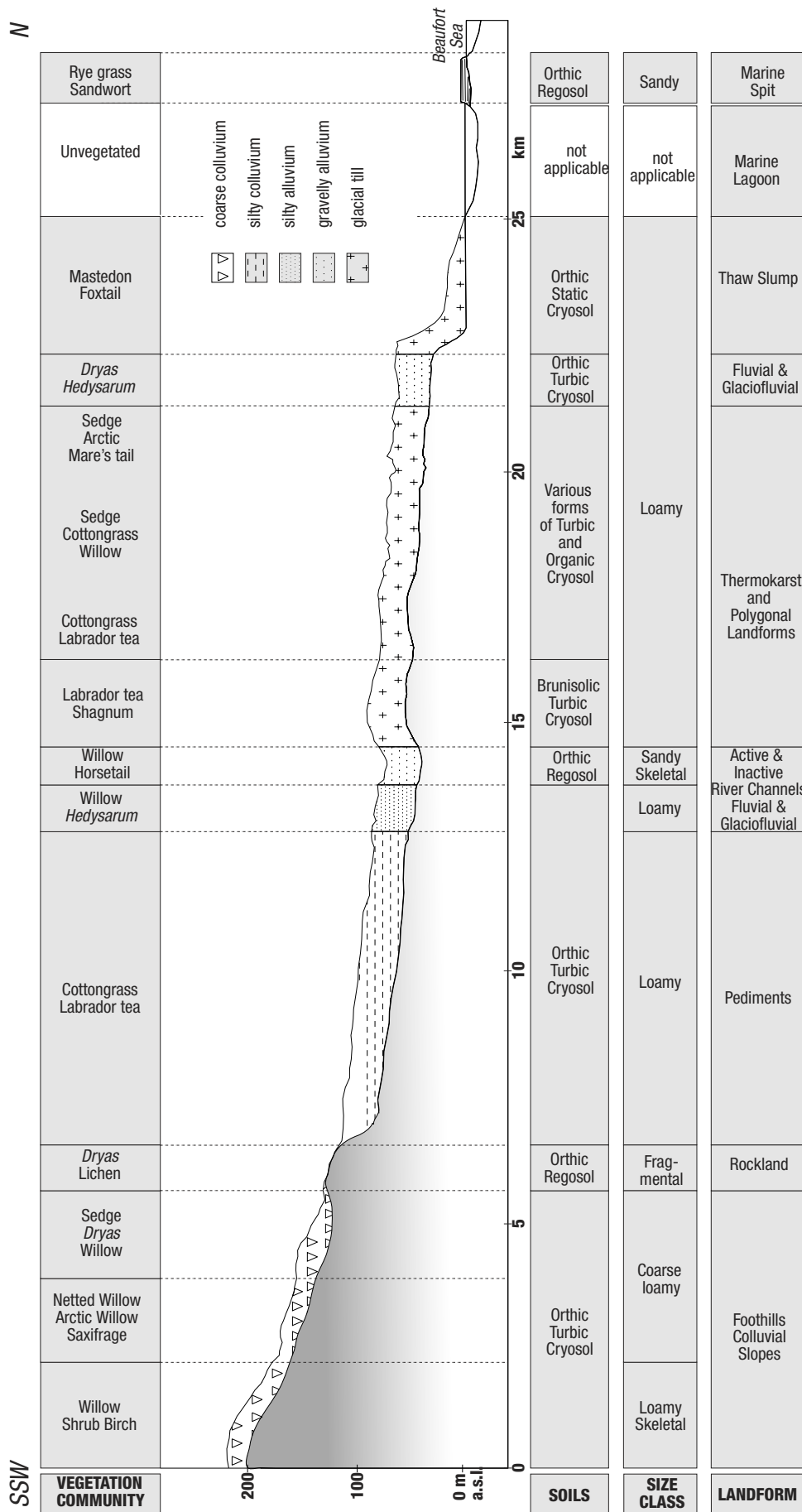
In contrast, the floodplains of other major but less active drainages, like the Babbage River, support well-established vegetation, such as sedges, willows, alders and, in the Mackenzie Delta, trees.

In the foothills of the northern mountains rising above the coastal plain, site drainage is improved; gentle slopes are vegetated with shrub birch and willow, dryas, lichen and prostrate willows.

## WILDLIFE

### Mammals

The Yukon Coastal Plain is the only ecoregion in the Yukon normally inhabited by Arctic fox, barren-ground shrew, polar bear and muskoxen, although these species are occasionally seen further south (Jingfors, 1989). Arctic fox winter on offshore ice; however, they whelp and raise their young on land using traditional den sites. Summer fox activity is most prevalent on Herschel Island (Smits and Slough, 1993). The winter Arctic fox coat is white; the blue phase is not found here. Muskoxen, native to the arctic west of the Mackenzie River until extirpation by hunters in the 19<sup>th</sup> century, have immigrated to the Yukon Coastal Plain from a herd reintroduced to the coastal plain in Alaska between 1967 and 1970 (Alaska Geographic Society,



**Figure 32-4.** Schematic profile of soil and vegetation patterns across the Yukon Coastal Plain Ecoregion between the foothills of the Richardson Mountains and the Beaufort Sea coast. Stippled portion shows approximate thickness and extent of soil parent materials over bedrock. Note exaggerated vertical scale.

1981). The Yukon herd in 1995 numbered about 120 individuals, with another 30 or so roaming the region alone or in small groups (Fig. 32-5).

The Porcupine barren-ground caribou herd was estimated at 160,000 individuals in 1995 and 123,000 in 2001. During spring, the herd migrates north from their wintering grounds to the coastal plain in Alaska and the Yukon (Fancy *et al.*, 1994). Calving is concentrated in the foothills of the British Mountains, but extends to the coast (Fig. 32-6). Pre- and post-calving aggregations of both sexes use the area. A fall migration returns the herd to winter range in Alaska, the Northwest Territories, and the Yukon, south to the Ogilvie and Mackenzie mountains.

The ranges of several mammal species that occupy forested or alpine habitats extend to the coastal plain, including those of the meadow vole, northern vole, red-backed vole, wolverine, short-tailed weasel, wolf, red fox, grizzly bear, and moose (Youngman, 1975). Grizzly bears are not as abundant as they are in the British–Richardson Mountains Ecoregion (Nagy, 1990). Moose are restricted to riparian habitats and are not abundant (Smits, 1991).

Muskrat occupy the lowland lakes of the Mackenzie Delta. Typical small mammals include the collared

lemming, brown lemming, and tundra vole. Although populations of these rodents are cyclic elsewhere in the arctic, these species do not appear to fluctuate greatly in the Yukon. The Arctic fox and avian predator populations cycle every three to five years, but this is most likely due to waves of



B. McLean

**Figure 32-5.** Muskoxen (*Ovibos moschatus*) were extirpated from the Yukon Coastal Plain by hunters in the 19th century. Individuals have immigrated to the area from a herd reintroduced to the Alaskan Coastal Plain between 1967 and 1970.



J. Hawkings, Canadian Wildlife Service

**Figure 32-6.** Caribou grazing on the sedge tundra of the Yukon Coastal Plain Ecoregion near the mouth of the Firth River in late summer. The abrupt change in topography in the background marks the boundary with the adjacent British–Richardson Mountains Ecoregion.

immigrants from adjacent cyclic populations. Tundra hares, arctic residents of Alaska and the Northwest Territories, are absent from the Yukon.

The overall mammalian diversity of the ecoregion is very low due to low productivity, a harsh environment, and a similarly low diversity of habitats. Mammal species known or expected to occur in this ecoregion are listed in Table 4.

## Birds

Unlike the suitability for mammals, the Yukon Coastal Plain is one of the richest areas in the territory for birds. The avian community here is unique in the Yukon, featuring many species that do not nest elsewhere in the territory. As well, some of the highest nesting densities for many other Yukon species occur in this ecoregion.

From early June to mid-August, lowland tundra, sedge marshes, and small river deltas along the coast provide breeding habitat for a number of species that do not nest elsewhere in the territory. These include Brant; Parasitic Jaeger; Glaucous Gull; Semipalmated, Pectoral, and Buff-breasted Sandpipers; Long-billed Dowitcher; Red Phalarope; and Lapland Longspur. Other species which commonly nest along coastal fringes of the ecoregion are Red-throated and Pacific Loons, Tundra Swan, Greater White-fronted Goose, Greater and Lesser Scaup, Red-breasted Merganser, Long-tailed Duck, American Widgeon, Mallard, Northern Shoveler, Northern Pintail, Green-winged Teal, Sandhill Crane, Common Snipe, Red-necked Phalarope, Long-tailed Jaeger, and Arctic Tern (Salter *et al.*, 1980; Sinclair *et al.* [editors], 2003).

Gravel beds of creeks and rivers provide nest sites for Semipalmated Plover and Spotted Sandpiper. Driftwood-strewn beaches along the Beaufort Sea are nesting areas for Common Eider and Glaucous Gull, which breed in the Yukon only in this ecoregion, as well as Snow Bunting. Mud banks of larger creeks and rivers house small colonies of Bank Swallow.

The upland tundra most prevalent on Herschel Island and the western portion of the ecoregion supports breeding species such as Rock Ptarmigan, American Golden-Plover, Baird's Sandpiper, Ruddy

Turnstone, Horned Lark, American Pipit, and occasionally Snowy Owl and Smith's Longspur. Remarkably high densities of Rough-legged Hawk nest on ledges and pinnacles of coastal bluffs and inland ravines on Herschel Island (Ward and Mossop, 1985); this is the only Yukon ecoregion where the tundra race of Peregrine Falcon nests.

On Herschel Island, abandoned buildings at Pauline Cove are occupied by one of only six breeding colonies of Black Guillemot in the western Arctic (Ward and Mossop, 1985).

Shrubby habitats on the tundra and along some lakes, ponds, draws, and creeks support breeding Willow Ptarmigan, Common and Hoary Redpolls, Savannah, American Tree, and White-crowned Sparrows. Taller shrubs along larger creeks and rivers of the eastern half of the Coastal Plain support Northern Shrike, Gray-cheeked Thrush, American Robin, Yellow Warbler, and Fox Sparrow (Salter *et al.*, 1980). Two other species found in shrubby habitats, Bluethroat and Yellow Wagtail, are predominantly Eurasian in their distribution and do not occur elsewhere in Canada (Black, 1972; Taylor and Judge, 1974; Eckert, 1995b).

While spring migration along the coast is unremarkable, some spectacular staging and migration events occur in late summer and fall. Thousands of Snow Geese feed on the coastal plain from late August through mid-September (Hawkings, 1987) and thousands of Red-necked and hundreds of Red Phalarope stage along the coast in August (Ealey *et al.*, 1988). Also notable are thousands of moulting sea ducks, mostly Long-tailed Duck and Surf Scoter, which gather in Workboat Passage, between the mainland and Herschel Island, in July and August. Migration along the coast is both eastward toward the Mackenzie River delta and westward toward the Alaskan coast, depending on the species. Small river deltas, spits, and lagoons along the coast are used for resting and feeding by many waterfowl and shorebird species (Eckert, 1997b, 1998b).

While data are limited, the only species known to occur in winter are Gyrfalcon, Willow and Rock Ptarmigans, Snowy Owl, and Common Raven (Salter *et al.*, 1980).