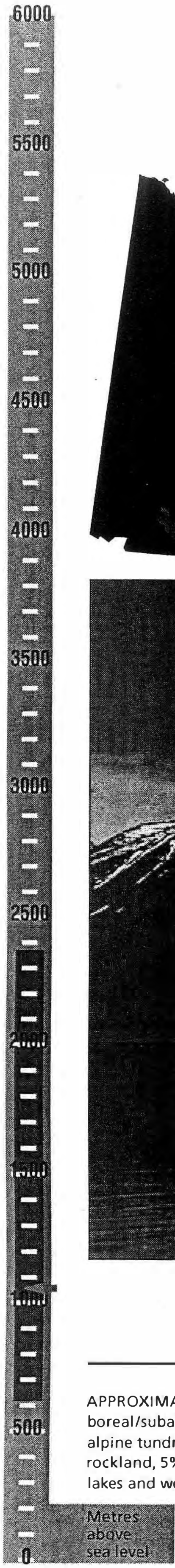
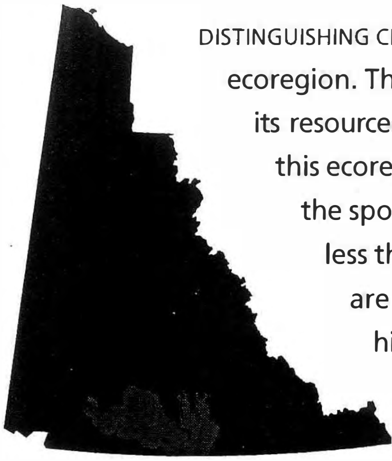


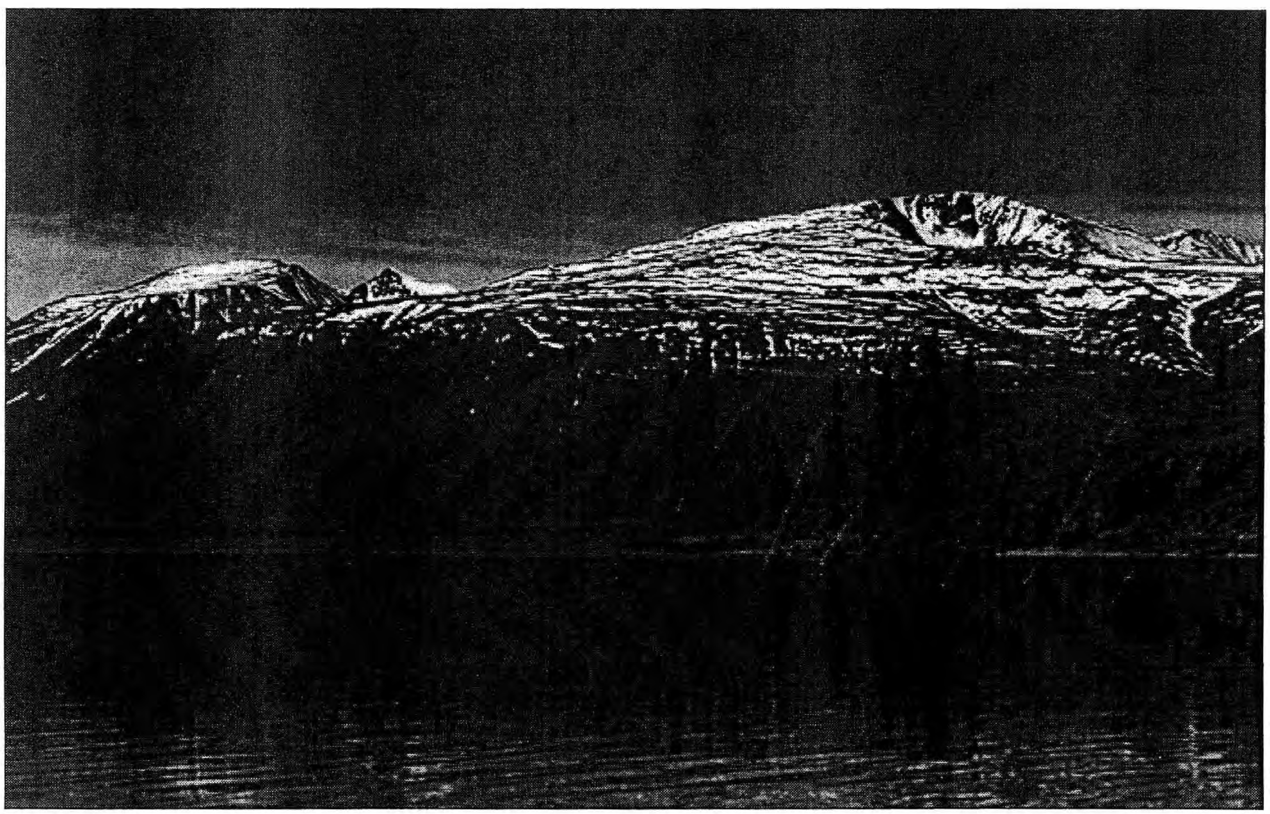
Yukon Southern Lakes

Taiga Cordillera Ecozone

ECOREGION 177



DISTINGUISHING CHARACTERISITICS: Broad valleys and large lakes characterize this ecoregion. The majority of the Yukon human population lives in the ecoregion, so its resources are well studied. Set within the rainshadow of the St. Elias Mountains this ecoregion's climate is dry and cool. The Yukon Southern Lakes lies in the sporadic discontinuous permafrost zone, where permafrost underlies less than a quarter of the landscape. Soils tend to be alkaline, wetlands are typically dominated by marl formation. The ecoregion supports the highest mammalian diversity in the Yukon with at least 50 of the 60 or more species known to occur in the Yukon present. and ungulate species found elsewhere in the territory.

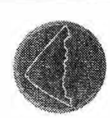


J. Meikle

Figure 65. *This view of the north end of Kusawa Lake illustrates well the broad lake-filled valleys that characterize the ecoregion. Note that the surrounding upland is a dissected portion of the Teslin Plateau with a surface elevation approximately 1,500 m higher than the valley floor.*

APPROXIMATE LAND COVER
boreal/subalpine coniferous forest, 65%
alpine tundra, 25%
rockland, 5%
lakes and wetlands, 5%

TOTAL AREA IN CANADA
35,650 km²



TOTAL AREA IN THE YUKON
29,892 km²

ECOREGION AREA AS A PROPORTION OF THE YUKON
6%

ELEVATIONAL RANGE
610-2,380 m asl
mean elevation 1,055 m asl

CORRELATION TO OTHER ECOLOGICAL REGIONS: Equivalent to **Lake Labarge ecoregion** (Oswald and Senyk 1977) • Portion of **Cordillera boreal region** (CEC 1997) • Southern portion of **Interior Yukon Dry Forests** (Ricketts et al. 1999)

PHYSIOGRAPHY K. McKenna

The Yukon Southern Lakes Ecoregion, a large area of rounded summits and broad valleys, is part of the Yukon Plateau physiographic unit as defined by Bostock (1948) and Hughes (1987b). Most of this ecoregion is located in the Yukon, but a portion extends south into British Columbia to include the south end of Teslin Lake. The Teslin and Nisutlin Plateaus, separated by the Teslin Fault are the other physiographic subdivisions within this ecoregion (Bostock, 1948; Mathews, 1986). Some mountain groupings are the Sifton, Englishman and Miners Ranges. The topography consists of dissected plateaus, rolling hills and broad valleys occupied by lakes and rivers (Figure 65).

Much of the terrain lies between 1,000 and 1,500 m asl. The highest peak is Mount Arkell at 2377 m asl. Other peaks over 2,000 m asl are Joe Mountain, Mount Lorne, Mount Byng, Pilot Mountain, and peaks in the Sifton and Englishman Ranges. The major rivers and Lake Laberge all lie below 760 m asl.

The numerous large lakes and rivers give the ecoregion its name. Most of the lakes, ~~such as Teslin, Marsh and Laberge,~~ and the larger rivers, ~~the Yukon and Teslin,~~ trend northwest-southeast or north-south. This pattern reflects the faults and folds of the bedrock ~~which also trend northwest-southeast.~~ Only the Takhini and Dezadeash rivers trend east-west. The Teslin River flows northwest along the Teslin fault, the Yukon River also flows northwest, while the Nisutlin, Wolf, Morley, and McClintock rivers flow south. The largest lakes include Teslin, Marsh, Laberge, Wolf, Little Atlin, Quiet and part of Kusawa.

BEDROCK GEOLOGY

Coarse-grained, crystalline metamorphic and granitic rocks predominate in the eastern and western thirds of this ecoregion, while mafic volcanic rocks, limestone reefs and clastic sediments characterize the central third. The ecoregion covers parts of six 1:250,000 scale map areas for which the regional rock units are shown by Kindle (1952 for 115A-Dezadeash), Tempelman-Kluit (1974 for 115H-Aishihik Lake; 1984 for 105E-Lake Laberge and 105F-Quiet Lake), Wheeler (1961 for 105D-Whitehorse), and Gordey and Stevens (1994a for 105C-Teslin). Certain areas have been mapped in greater detail (Hart, 1997 and references therein) and a contemporary map interpretation of the terranes is given by Gordey (in press). A regional survey of twenty metals plus fluorine in stream sediments and water is available in Geological Survey of Canada, Open Files 1217 (for 105C), 1218 (for 105D), 1960 (for 105E), 1290 (for 105F), 3293 and 2859 (for 115A) and 1219 (for 115H).

Within the ecoregion are four terranes — Yukon-Tanana, Stikinia, Cache Creek and Dorsey — each with different rock types and origins. The exposed rocks in each are summarized below, beginning in the west.

The western third — generally west of the Takhini River bridge on the Alaska Highway — is the western part of Yukon-Tanana Terrane, intruded by various granitic components of the Coast Plutonic Complex. The former consists of strongly metamorphosed quartzofeldspathic schist (Erdmer, 1991) flanked by quartz-biotite schist, granitic gneiss, marble and amphibolite (Johnston and Timmerman, 1994). In the Coast Plutonic Complex, the Early Jurassic Little River and the Paleocene Annie Ned batholiths consist of resistant granite, with cliffs and large talus blocks resulting from planar vertical fractures called joints (Hart, 1997).

Northern Stikinia contains sedimentary and volcanic rocks. Augite basalt flows and tuffs, the Povoas Formation of the Lewes River Group, predominate on the western part of the terrane. Upper Triassic to Middle Jurassic limestone, argillite, tuffaceous sandstone and conglomerate comprise the Whitehorse Trough Supergroup (Hart, 1997), which is the largest element of Northern Sti inia. Upper Triassic limestone forms sparsely vegetated, light-coloured cliffs, domes and pinnacles east of Lake Laberge, with some notable fossil reef communities (Reid and Tempelman-Kluit, 1987). Post-accretionary, that is after Stikinia accreted to ancient North America, mid-Cretaceous Mount Byng, and Late Cretaceous Open Creek volcanics and Carmacks Group consist mainly of thick andesite and basalt flows (Hart, 1997) locally in the north-central part of the ecoregion. The Carmacks Group is notable for its alkaline shoshonitic chemistry (e.g. Johnston et al.1996; Smuk et al., 1996). Numerous mid-Cretaceous granitic plutons that intrude Stikinia are named after nearby features, including Flat Creek, Haeckel Hill, Cap Mountain and Cap Creek, M'Clintock Lakes, Byng Creek and Mount M'Clintock (Hart, 1997; his

Figure 41). Vesicular basaltic lava erupted near Alligator Lake about three million years ago leaving spatter cones and scoria-covered uplands southwest of Whitehorse and eight million-year-old columnar-jointed flows between Cowley Creek, McCrae and the Whitehorse Rapids.

The Cache Creek terrane, east of Carcross and between Marsh and Teslin Lakes contains altered basalt greenstone Nakina Formation, crinoid- and fusilinid-bearing limestone Horsefeed Formation and ribbon chert-rich Kedahda Formation (Monger, 1975; Hart and Pelletier, 1989a, b). Pods of serpentinized peridotite up to several kilometres long (Gordey and Stevens, 1994b) weather black and support only stunted vegetation where not covered by glacial deposits.

East of Teslin Lake is a strip of siliceous argillite, siltstone and sandstone with abundant fresh augite crystals interpreted as Quesnel terrane by Gordey and Stevens (1994a). Mostly quartz-mica phyllite of the Yukon-Tanana Terrane, called Kootenay terrane by Gordey and Stevens (1994a), is flanked to the northeast by sandstone, grit, chert and chert pebble conglomerate of the pericratonic Cassiar and Dorsey terranes. Small hornblende-biotite quartz monzonite plutons throughout the Thirtymile Range, and biotite granite with up to 40 percent pink feldspar phenocrysts in the Englishman's Range and west of Quiet Lake, constitute about one-fifth of the eastern third of the ecoregion.

The central part of the ecoregion has significant mineral potential and a long mining history. Copper in limestone skarns has been mined in thirteen places (Watson, 1984) immediately west of Whitehorse. Coal seams have been investigated 24 km south of the city (Bremner, 1988; Hunt and Hart, 1994). Gold in quartz veins has been explored throughout the area south of Whitehorse (Hart and Radloff, 1990). Gold also occurs in listwaenite alteration around Cache Creek ultramafic pods (e.g. Hart, 1996). East of Teslin River is the Red Mountain molybdenum porphyry, about twenty silver-lead-zinc veins, and both copper-iron and tin-tungsten skarn deposits, all related to Cretaceous plutons. A unique occurrence of baked mudstone (Laberge Group) west of Fish Lake has been used for cutting and scraping tools (Gotthardt and Hare, 1994).

SURFICIAL GEOLOGY

The main sources of information for the Yukon Southern Lakes surficial geology summary are several surficial geology and soil maps (Morison and McKenna, 1990; Morison and Klassen, in press for 105C; Morison and McKenna, 1981; Morison and Klassen, 1991; Mougeot and Smith, 1992 and 1996; Rostad et al., 1977 for 105D; Klassen and Morison, 1985 for 105E and for 115A; and terrain hazards and geological information for all maps sheets from Mougeot and Walton, 1995a, and in press).

The surface deposits of the Yukon Southern Lake Ecoregion are associated with the most recent Cordilleran glaciation, the McConnell, believed to have covered the south and central Yukon between 26,500 and 10,000 years ago. Most of the map sheet was covered by the Cassiar Lobe, which flowed towards the northwest from the Cassiar Mountains. Streamlined moraine deposits, primarily drumlins, are abundant west and north of Lake Laberge, all indicating a northwesterly ice flow direction. Subsequent to the maximum extent of McConnell ice, deglaciation produced disrupted drainage systems and large glacial lakes as a result of a complex assemblage of ice lobes, which were restricted to valley bottoms and controlled by local topography.

Quaternary deposit distribution in this area followed a general pattern. Representative sequences of Quaternary deposits are found in many major valleys such as the Yukon River Valley. High elevation slopes and summits are covered with thin and a discontinuous colluvium or moraine veneer over bedrock. When exposed, the bedrock is weathered or frost-shattered.

Moraine, often streamlined or gullied, covers most mid-elevation slopes mixed with colluvial fans or aprons. The general composition of the till matrix in adjoining map sheets (Jackson, 1994) indicates a wide range of sand content (20 to 70 percent), of silt (20 to 80 percent), and usually a lower clay content (5 to 30 percent). Isolated lenses of ice-rich permafrost may be present on north-facing slopes and at high elevations where thick organic deposits are present over the Quaternary sediments.

Glaciofluvial sand and gravel terraces flank the valley sides and pitted or hummocky deposits of sand and gravel deposits line the bottom of some valleys. These deposits usually are free of permafrost and have stable surfaces, but may contain undesirable, or weak, lithologies for potential use as aggregate. In addition to the glaciofluvial gravel, the largest river floors contain alluvial deposits.

During deglaciation, large volumes of meltwater were dammed in some valleys and formed large glacial lakes. Beachlines, lake bottom sediments and many modern lakes can now be found in these valleys (Figure 66). In the Takhini River and Tagish River valleys, Glacial Lake Champagne deposited up to 75 m of silt and clay. Glaciolacustrine silt and clay deposits border Teslin Lake, Little Atlin and Atlin Lakes, as well as the Nisutlin River valley and the Red River valley north of Fish Lake, and can be as thick as 15 m. They commonly contain massive ice bodies and are prone to retrogressive thaw slides and thermokarst degradation when disturbed either by river erosion, forest fires, or other changes in surface conditions.

GLACIAL HISTORY

The Yukon Southern Lakes area is dominated by till, glaciofluvial gravels and glaciolacustrine clay and silt deposited during the McConnell Glaciation (Bostock, 1966; Hughes, 1969a). Ice flowed into the area from the Cassiar Mountains to the southeast and the eastern Coast Mountains to the southwest (Jackson et al., 1991; Jackson and Mackay, 1991; Ryder and Maynard, 1991). Trunk glaciers followed the major valleys and flowed northwestward across this region to terminate in the central Yukon. The streamlined topography of this region was shaped by this flow. Glacial ice covered the lowland some time after 26,000 years ago and was probably gone well before 9,000 years ago (Jackson et al., 1991). Blockage of drainage, possibly supplemented by isostatic depression, created extensive lakes in this area during deglaciation so that lowlands are underlain by extensive glaciolacustrine sediments. During the postglacial period, streams incised into

J. Meikle

Figure 66. *The Takhini River Valley is filled with glaciolacustrine sediments deposited beneath glacial Lake Champagne between 9,000 and 10,0000 years ago. The Miners Range is shown in the distance. Western portions of the Takhini Valley receive only 200 mm of precipitation annually. Light precipitation has resulted in very slow regeneration of mixed forest cover that has replaced the white spruce and lodgepole pine that was burned in 1958.*

the thick drift of this region leaving steep-sided canyons and flights of terraces.

CLIMATE

The orientation of the topography is primarily northwest-trending over its eastern section, but has an east-west orientation over its western portion. This arid ecoregion lies in the heart of the rainshadow to the lee of the Saint Elias-Coast Mountains. Precipitation ranges from 200 to 325 mm. One-third to half of this falls during the summer months, primarily as showers. A secondary maximum occurs in the fall and early winter associated with active storm centers in the Gulf of Alaska. Snow cover is generally in place from late October to mid-April in the valley floors and a month longer over the higher terrain.

Mean annual temperatures are near -1 to -2°C over the southeastern portion of this ecoregion, and -3 to -4°C in the northwest. Mean January temperatures range from -21°C in the southeast to -25°C in the northwest. Mean temperatures are five degrees warmer over higher terrain due to the inversion. Short periods with temperatures above zero can be expected during the winter months. July mean temperatures range from 14 to 12°C and some five degrees cooler over higher terrain. Extreme temperatures have ranged from -55 to 34°C. Temperature extremes are not as great as in the Yukon interior valleys, due to the higher elevations of valley floors in this ecoregion. In the immediate vicinity of the larger lakes, spring can be delayed up to two weeks due to the persistence of the ice cover. Conversely, the onset of cold winter temperatures can be delayed from two weeks to a month due to the extensive low cloud associated with the lakes as they freeze over in November and December.

Winds are generally moderate because of the proximity of storm centers in the Gulf of Alaska, particularly in valleys with southeast to northwest orientation. Strong winds, ranging from 30 to 50 km/hour are not uncommon and occasionally reach destructive force with gusts over 100 km/hour, primarily from a southerly direction.

HYDROLOGY

The Yukon Southern Lakes Ecoregion is situated within the Interior Hydrologic Region though it forms a boundary with the Western Hydrologic Region. With a total area of approximately 30,000 km^2, the ecoregion primarily drains northward from the upland plateau complex consisting of the Teslin and Nisutlin plateaus. The western portion of the ecoregion consists of the footslopes of the Coast Mountains, and as such has greater relief and subsequently higher runoff and peak flows than the central and eastern portion of the ecoregion. Major streams include the Teslin River, which makes up part of the eastern boundary, the upper Yukon River, and the Takhini River. There are several smaller more representative intermediate size tributaries of the Yukon which include the Nisutlin, Wolf and M'Clintock rivers. The Dezadeash and Aishihik rivers at the western corner flow westward into the Alsek River. Wetlands and large lakes cover approximately five percent of the ecoregion. The ecoregion contains several large lakes including Teslin, Wolf, Marsh and Laberge. The most significant wetland complex is the Nisutlin River and Delta (Figure 67). Other wetlands include the M'Clintock and Yukon River downstream of Marsh Lake.

There are seven representative active, historical continuous, and seasonal hydrometric stations: Teslin (two), Nisutlin, Lubbock, M'Clintock and Ibex rivers, and Sidney Creek. Annual streamflow is characterized by a rapid increase in snowmelt discharge to a peak in June with secondary rainfall peaks later in the summer. On smaller streams, approximately 40 percent of the annual maximum flows are due to intense summer rainstorm events. The mean annual runoff is moderate, though variable, with a range of values of 73 to 366 mm and a ecosystem mean value of 245 mm. Mean seasonal and summer flows are moderate with values of 0.014 and 0.011 m^3/s/km^2. The mean annual flood and mean maximum summer flow are moderately low with values of 0.044 and 0.029 m^3/s/km^2 respectively. Minimum streamflow generally occurs during April with the relative magnitude reasonably high due to the moderating influence of the Gulf of Alaska on winter temperatures and subsequent groundwater contributions. The minimum annual and summer flows are high and moderate with values of 0.0016 and .0039 m^3/s/km^2 respectively. Only very small streams may experience zero winter flows during cold winters.

PERMAFROST

The Yukon Southern Lakes lies in the sporadic discontinuous permafrost zone, where permafrost underlies less than a quarter of the landscape. East of Whitehorse, less than eight percent of the Alaska Highway is built on permafrost (Brown, 1967) and less than five percent of holes drilled in association with the Alaska Highway gas pipeline encountered permafrost (Rampton et al., 1983). Between Whitehorse and Haines Junction, however, the gas pipeline drilling encountered permafrost in 20 percent of holes. The active layer in mineral soil is commonly over 1.5 m thick, and so permafrost may not be identified at sites of shallow inspection. In wet, organic terrain, the active layer may be less than one metre. In the Takhini River Valley, there is up to 15 m of permafrost (Figure 14), and the mean near-surface temperature is -0.8°C. However, when permafrost is encountered in Whitehorse or Teslin, it is only two or three metres thick (Burgess et al., 1982; EBA, 1995). Permafrost is infrequent because, in the rainshadow of the Coast Mountains, the ecoregion is dry, and thus the soils are warm in summer. Permafrost has rarely been recorded in numerous excavations in coarse materials near Carcross, Teslin, or Tagish (e.g., DPW, 1981a; EBA, 1987, 1988, 1993), but in moist, silty soils, overlain by a peaty organic layer, ground ice is more frequent (DPW, 1981b).

Terrain features associated with permafrost degradation are more common than those associated with aggradation. As in many other ecoregions, glaciolacustrine sediments often contain substantial ground ice. Thermokarst lakes occur where the ice is melting, as in the Takhini Valley. Widespread subsidence in these terrains is associated with ground thawing after forest fires (Burn, 1998) and there are retrogressive thaw slumps initiated by river erosion. However, because permafrost is so scattered, there are numerous perennial springs in the ecoregion. Where these emerge, icings form in winter that may build up over two metres thick. Landforms associated with permafrost aggradation are palsas, with occasional

J. Meikle

Figure 67. *The Nisutlin Delta is an important staging area for migratory waterfowl. The delta is the largest such feature in the southern Yukon and is designated a National Wildlife Sanctuary.*

peat plateaus, restricted to wetlands and underlain by a metre or so of permafrost (e.g., Harris, 1993).

SOILS

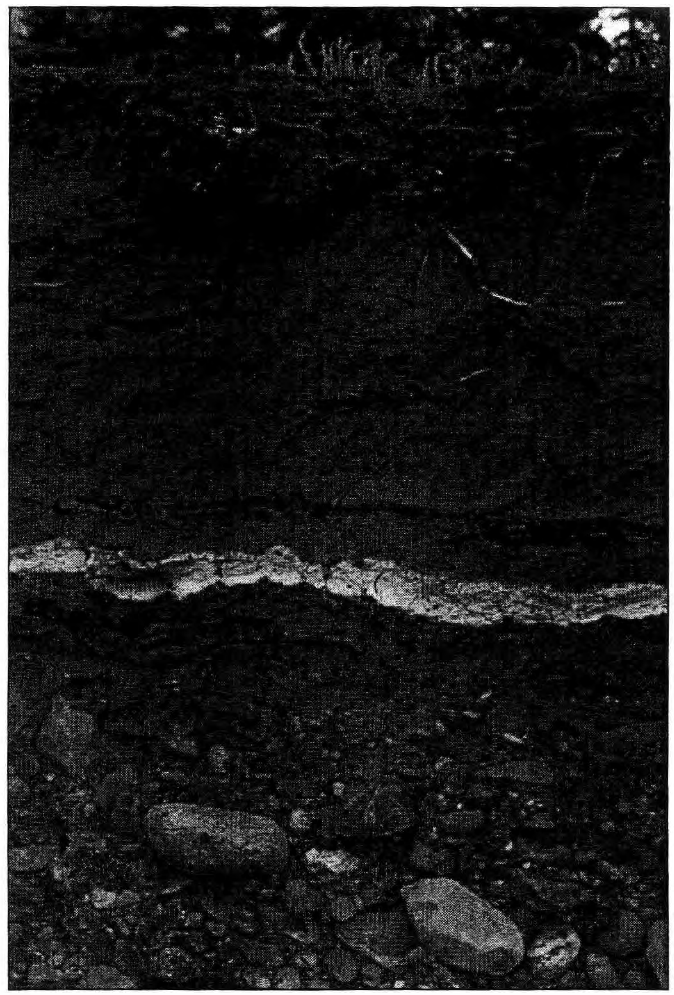
Soils in this ecoregion have formed under a relatively mild, semi-arid climate within the rainshadow of the St. Elias Mountains. Mineral soils tend to be weakly weathered and peat accumulations are generally less than one metre in thickness.

The soils are relatively well studied and numerous detailed soil surveys have been conducted in the major valleys systems of the ecoregion, including Day (1962), Rostad et al. (1977), Davies et al. (1983a), and Mougeot and Smith (1992 and 1994). Soils are predominately Eutric Brunisols formed on a variety of glacial parent materials. Soils affected by near-surface permafrost (Cryosols) are largely confined to upper elevations, moist north-facing slopes, and some wetlands.

Major valleys in the ecoregion are comprised of glaciolacustrine deposits of calcareous silt and clay. Soils are alkaline and usually classified as Eutric Brunisols. Soils are often saline in areas of groundwater discharge (Humic Gleysols, saline phase), but those exhibiting morphologies characteristic of the Solonetzic order (i.e. Alkaline Solonetz) are rare.

Soils of depressions are usually classified as Humic Gleysols or as Turbic Cryosols, if permafrost is present. Floodplain soils are classified as Gleysolic, or as Regosolic if no soil development has yet occurred. South-facing slopes may support grassland communities and the associated soils may have surface A horizons rich in humus. These soils are classified as Melanic Brunisols. For the most part, forested lower and middle slopes are Eutric Brunisols. A thin veneer (two to five centimetres) of White River volcanic ash covers most stable soil surfaces in the ecoregion or can be seen buried within sediments on river banks or road cuts (Figure 68).

Permafrost is scattered and discontinuous, and Cryosols are intermittently distributed amongst the Brunisols. They are most commonly associated with upper subalpine vegetation and northerly aspects. Massive ground ice is occasionally present in these fine-textured materials. Palsas have been recorded here associated with minerotrophic wetlands (Harris, 1993). Thick accumulations of peat are uncommon in the ecoregion. Most wetlands are alkaline fens due to the base-rich nature of the geologic materials and rest on mineral soil or marl at less than 50 cm depth (Mougeot and Smith, 1998). Alpine zones are typically on colluvial rubble or moraine. In well-drained locations, these soils are also classified as Eutric Brunisols. In moist locations, the presence of permafrost and active frost churning result in soils classified as Turbic Cryosols.



P. Sinclair

Figure 68. *White River volcanic ash can be seen throughout the southern Yukon as a thin band of white silty glass shards (tephra) either on the soil surface or buried in cutbanks as shown here. In this photo, the volcanic ash, which fell some 1250 years ago, lies over glacial fluvial gravels. Above the ash are recently deposited wind blown sediments. The dark layer above the ash is charcoal from a forest fire. The modern forest floor sits on top of the section.*

VEGETATION K. McKenna

The vegetation of the Yukon Southern Lakes Ecoregion is dominantly open coniferous and mixed woodland reflecting the rainshadow climate of the area and the pattern of forest fires. Medium shrubs dominate the higher elevation slopes while mountain summits are usually dry dwarf shrub tundra.

Pine is the dominant tree species, because it quickly regenerates in burned areas. White spruce-feathermoss forests are common on low river terraces and in small pockets on steep slopes of terraces and fine-textured deposits, which have not burned in the last hundred years. Pine, or mixed spruce and pine, forests are common on coarser glaciofluvial deposits and moraine. On dry upland sites, the understory vegetation is dominated by a mixture of ground shrubs including twinflower, kinnikinnick, lingonberry and lichen with abundant litter. Gravelly river terraces that have not burned in the last hundred years are characterized by open spruce and pine forest with a *Cladina* lichen groundcover.

Black spruce has limited distribution in this ecoregion. It is largely restricted to the eastern portion, most commonly along the Nisutlin River. It is found on low, wet and cold sites often associated with Cryosols and near surface permafrost.

Alpine fir is found in the subalpine with a feathermoss understory, where the canopy is dense, or shrub birch and lichen in open stands.

Mixed aspen and white spruce are common on fine soils with a variable cover of ground shrubs, lichen and litter. Willow and soapberry are common. Aspen is also found on steep south-facing slopes, often with small pockets of spruce occupying the moister sites. Balsam poplar is found on roadsides and along creeks and rivers; it is an early invader and usually replaced in the successional sequence by white spruce. Paper birch is scattered on cooler, moister sites, but is neither common nor known to form pure stands.

Open areas at low elevations include grasslands on steep south-facing slopes and alkaline lacustrine depressions, such as those found in the Takhini Valley. Shrub birch is common in moist depressions subject to cold air drainage. Willows dominate fen and marsh wetlands and are common in areas subject to flooding.

Around treeline, shrub birch underlain by lichen and moss takes over the drier sites. On moister and north-facing sites, willow and shrub birch with moss groundcover are more dominant. The alpine dwarf shrub tundra found at higher elevations includes willow, lingonberry, bearberry, bilberry, and mat or cushion plants such as dryas, lichen and graminoids. The vegetation cover is sparse on the most exposed sites.

WILDLIFE

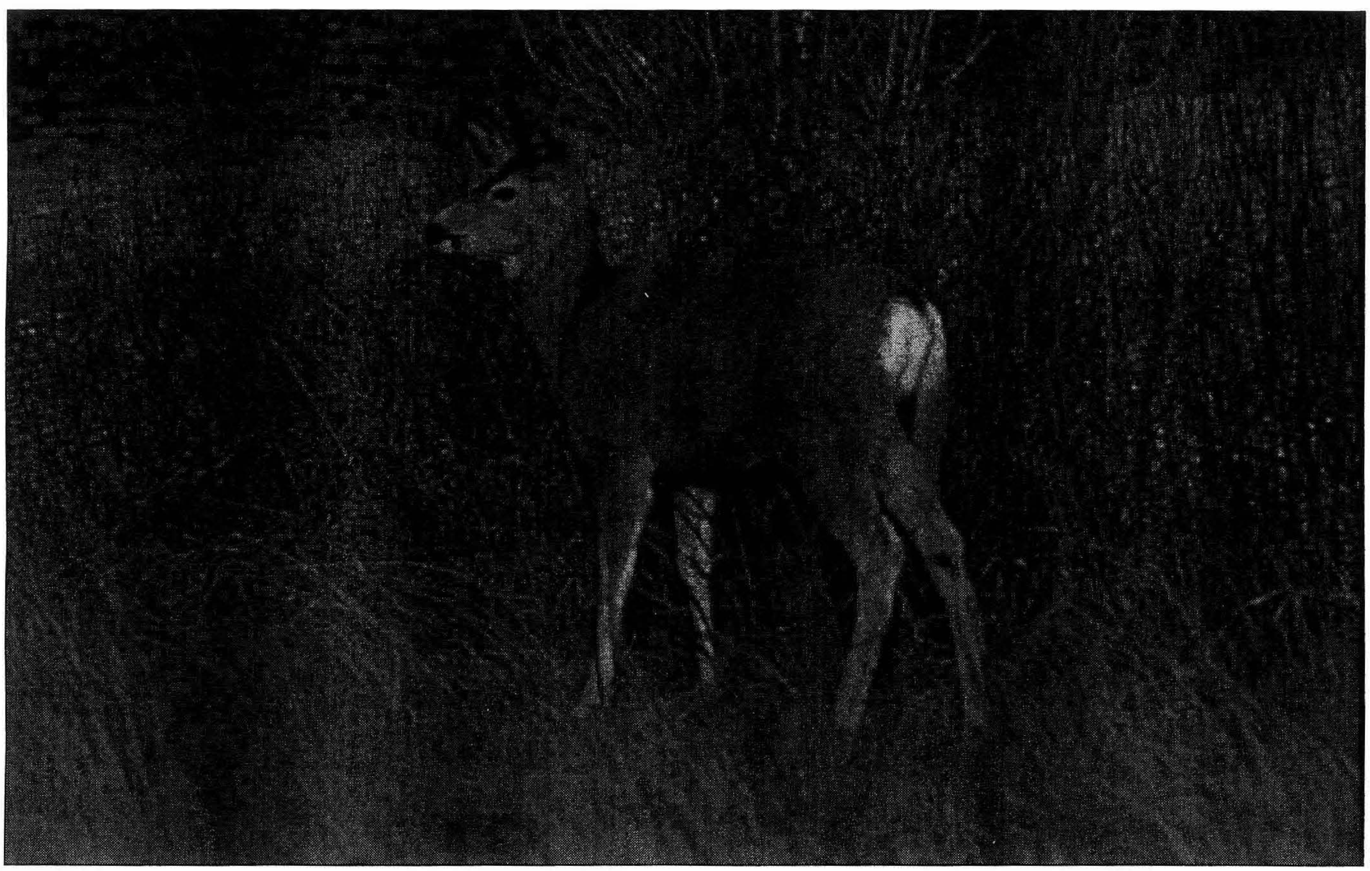
Mammals

The topographically diverse Yukon Southern Lakes Ecoregion supports the highest mammalian diversity in the Yukon with at least 50 of the 60 or more species. Dall sheep (Barichello et al., 1989a), grizzly bear (Larsen and Markel, 1989), wolves (Hayes et al., 1991), coyotes, red fox, and wolverine (Banci, 1987) are abundant. Wolf and wolverine densities are among the highest in the Yukon. Coyotes invaded the Territory in the early 20th century, probably benefiting from widespread wolf control across North America and the ability to out-compete red fox. Coyotes are most abundant in the southern Yukon and range north to the Klondike Plateau and Yukon Plateau-Central. Stone sheep are found east of Lake Laberge.

A long history of overharvesting of moose and caribou populations throughout much of this ecoregion necessitated management programs that restricted human harvest beginning in the 1990s (Larsen et al., 1986; Larsen et al., 1989). The Carcross-Squanga, Ibex and Atlin woodland caribou herds are small and fragmented, estimated at 300, 450, and 450 caribou respectively. The Carcross-Squanga and Ibex herds are not restricted to smaller winter ranges by snowfall, and therefore expose themselves to a greater number of wolf packs. The more remote Wolf Lake caribou herd to the east is healthy (Farnell and MacDonald, 1989). The Teslin burn of 1958 supports some of the highest densities of moose, wolves, snowshoe hare and lynx in the Yukon. The lynx density in 1990-91 of 45 per 100 km^2 was the highest ever reported in North America (Slough and Mowat, 1996). Beavers are also abundant where burns and wetlands meet, as in the Teslin burn (Slough and Jessup, 1984). Muskrats are still common but once thrived in the Lewes River marsh prior to flow control, which has altered seasonal water level fluctuations. A small population of mountain goats was re-established on White Mountain in the 1983-84 following extirpation in the 1960s (Barichello et al., 1989b). An elk herd, introduced in the 1950s, with additions for genetic outcrossing in the 1990s, has survived in the Takhini River Valley at numbers about 60. Mule deer are common in this ecoregion and are often seen in small herds of 12 to 15 (Figure 69). The cougar, with the greatest range of any mammal in the Western Hemisphere, makes infrequent movements through this area from northern British Columbia. Marten are uncommon west of the Teslin River, however a transplant program and natural colonization in the 1980s have increased marten abundance in local climax coniferous habitats, primarily at higher elevations (Slough, 1989).

The Northern Flying Squirrel, Bushy-tailed Wood Rat and woodchuck are uncommonly seen residents. Arctic ground squirrels and Least Chipmunks flourish in the forest openings and slopes common to the more arid sections. The only know location of the Western Jumping Mouse in the Yukon is on the South Canol Road. The Meadow Jumping Mouse is common throughout the southern Yukon (Youngman, 1975). There is abundant aquatic habitat for Water Shrew in the Yukon Southern Lakes. The House Mouse, originating in mid-eastern Asia and now a world traveler, has taken up residence around the habitations of Whitehorse.

The Little Brown Myotis is abundant near lakes where it gleans insects on the wing. It probably winters in coastal Alaska. Bats have received little attention in the Yukon, and other species may yet be found, especially in the south and near the coast. Bat species found near the Yukon include the Long-legged Myotis, Keen's Long-eared Myotis, the Silver-haired Bat and the Big Brown Bat (Nagorsen and Brigham, 1993; Parker et al., 1997; Slough, 1998; van Zyll de Jong, 1985). A list of mammal species known or expected to occur in this ecoregion is given in Table 4.



M. Hoefs

Figure 69. *Mule deer (Odocoileus hemious) are increasing in numbers in the southern and central Yukon. The deer spend much of the year in small herds of up to 15 animals. Yukon Southern Lakes Ecoregion supports a relatively high diversity of mammals with over 60 species present.*

Birds

The inlets and outlets of the large lakes provide some of the most important waterfowl staging areas in the Yukon (Department of Renewable Resources, 1994). Perhaps the most significant waterfowl staging area in early spring is the Marsh Lake outlet from M'Clintock Bay and the adjacent Lewes River marsh (Johnston and McEwen, 1983; Hawkings, 1994; Eckert, 1997c). Early open water and exposed mudflats and sandbars make M'Clintock Bay a spring staging site of national importance (Yukon Waterfowl Technical Committee, 1991) hosting up to 2,000 swans a day (Mossop, 1976; Hawkings, 1994). Along with M'Clintock Bay and Lewes Marsh, Tagish Narrows between Tagish Lake and Marsh Lake are important to a variety of other waterbirds such as Red-throated, Pacific, and Common Loons, Horned and Red-necked Grebes, and virtually all southern Yukon geese and ducks (Mossop, 1976; Yukon Waterfowl Technical Committee, 1991; Canadian Wildlife Service, 1979b; Hawkings, 1986; Johnston and McEwen, 1983; Eckert, 1997c). These areas are equally important to numerous shorebirds such as American Golden-Plover, Semipalmated Plover, Lesser Yellowlegs, Semipalmated, Least, and Pectoral Sandpipers, and Common Snipe (Eckert, 1997c; Eckert, 1997d), and migrant songbirds such as American Robin, American Pipit, Lapland Longspur and Rusty Blackbird (Eckert, 1997c). Other important staging areas are upper Lake Laberge and the Teslin Lake outlet (Yukon Waterfowl Technical Committee, 1991).

The Nisutlin River Delta is a fall staging area of national importance for swans, geese, dabbling ducks, and diving ducks (Yukon Waterfowl Technical Committee, 1991; Mossop and Coleman, 1984; Hawkings, 1994). While spring water levels are high at the Nisutlin delta, they decrease in the late summer and fall to expose extensive mudflats and dense beds of aquatic vegetation (Dennington, 1985). These exposed mudflats also provide important feeding areas for many migrant shorebirds including Semipalmated Plover, Lesser Yellowlegs, Semipalmated, Least, Baird's, and Pectoral Sandpipers, Long-billed Dowitcher, and migrant songbirds such as American Pipit and Lapland Longspur (Eckert, 1997a; Eckert, 1998a). One of North America's rarest migrant shorebirds, the Sharp-tailed Sandpiper, is apparently a regular fall migrant here (Eckert, 1997a; Eckert, 1998a). The large numbers of waterfowl and shorebirds in turn attract numerous predators such as Bald Eagle, Merlin, Peregrine Falcon, and Gyrfalcon (Mossop and Coleman, 1984; Eckert, 1997a; Eckert, 1998a). Southbound Trumpeter Swans arrive on the delta in mid-September and by late September are greatly outnumbered by large flocks of migrating Tundra Swans, a few of which linger until freeze-up (Mossop and Coleman, 1984; Eckert, 1997a; Eckert, 1998a). The lower Nisutlin River is a rare example of a river supporting large numbers of breeding waterfowl (Hawkings, 1994). This river's abundant cut-off channels, oxbows, and sloughs harbour breeding and moulting Canada Goose, American Widgeon, Mallard, Green-winged Teal, Ring-necked Ducks, scaup, and goldeneye (Dennington, 1985; Hawkings, 1994). Since 1992, these wetlands have hosted the highest density of breeding Trumpeter Swan in the Yukon (Hawkings, 1994). During fall migration from early September to late October, large lakes and other sites that concentrate gulls witness movements of Thayer's Gull with lesser numbers of Glaucous Gull (Eckert, 1998a; Birds of the Yukon Database, CWS).

Larger lakes and rivers support breeding Pacific and Common Loons, Surf Scoter, Mew and Herring Gulls, Arctic Tern, and Belted Kingfisher (Rand, 1946; Godfrey, 1951; Stelfox, 1972; Nixon et al., 1992; Canadian Wildlife Service, 1979a). Numerous wetlands such as Swan Lake (Grunberg, 1994), Rat Lake, Cowley Lake, McIntyre Creek, Mary Lake and Chinook Creek are important to many waterfowl as well as Pied-billed Grebe, Sora, and American Coot (Birds of the Yukon Database, CWS). McIntyre Creek wetlands are especially important to very large numbers of migrating swallows especially Tree, Violet-green, Northern Rough-winged, Bank, and Cliff Swallows (Eckert, 1977b; Birds of the Yukon Database, CWS). Marshy areas associated with lakes, streams and ponds have breeding Northern Harrier, Lesser Yellowlegs, Solitary and Least Sandpipers, Common Snipe, Wilson's and Red-necked Phalaropes, Bonaparte's Gull, Rusty and Red-winged Blackbirds, Northern Waterthrush, Common Yellowthroat, and Savannah and Lincoln's Sparrows (Grunberg, 1994; Eckert, 1999b; Birds of the Yukon Database, CWS). Rocky and sandy lakeshores provide breeding habitat for Semipalmated Plover, Killdeer, Spotted Sandpiper, and Arctic Tern (Johnston and McEwen, 1983; Birds of the Yukon Database, CWS), while Harlequin Ducks and American Dippers breed on swift mountain streams (Soper, 1954). Osprey and

Bald Eagle nest near lakes and rivers containing spawning fish (Yukon Wildlife Branch, 1977).

Deciduous and mixed forests in riparian areas support breeding Yellow-bellied Sapsucker, Hammond's Flycatcher, Yellow Warbler, Chipping Sparrow, and Fox Sparrow, with Least Flycatcher occurring locally in trembling aspen forests (e.g. Grunberg, 1994). Ruffed Grouse are year-round residents of trembling aspen forests while Blue Grouse inhabit subalpine alpine-fir forests (Rand, 1946). Rufous Hummingbirds reach their northern limit in the Southern Lakes Ecoregion although breeding is unconfirmed (Birds of the Yukon Database, CWS).

Open mixed woodland and coniferous forests support raptors such as Northern Goshawk, Red-tailed Hawk, Great Horned Owl, Northern Hawk Owl, Great Gray Owl, and Boreal Owl (Rand, 1946; Godfrey, 1951). Year-round residents include Three-toed, Black-backed, Downy, and Hairy Woodpeckers, Spruce Grouse, Gray Jay, Black-billed Magpie, Common Raven, Black-capped and Boreal Chickadees, Bohemian Waxwing, Pine Grosbeak, and White-winged Crossbill, with Red Crossbill regularly occurring at a few locations (Eckert et al., 1995). Common and Hoary Redpolls occur regularly in winter (Eckert et al., 1995). Common forest species include Olive-sided Flycatcher, Western Wood-Pewee, Ruby-crowned Kinglet, Swainson's Thrush, American Robin, Varied Thrush, Warbling Vireo, Yellow-rumped Warbler, Blackpoll Warbler, Dark-eyed Junco, Purple Finch, and in mature spruce forests, Golden Crowned Kinglet (Department of Renewable Resources, 1994; Grunberg, 1994; Eckert et al., 1995; Birds of the Yukon Database, CWS). Open country species include Common Nighthawk, Say's Phoebe, Mountain Bluebird, and Brown-headed Cowbird (Eckert et al., 1995), with Fox and White-crowned Sparrows in shrubby areas (Birds of the Yukon Database, CWS).

Alpine areas support Golden Eagle and Gyrfalcon (Foothills Pipe Lines Ltd., 1978; Department of Renewable Resources, 1994). A few Rock and White-tailed Ptarmigan inhabit these exposed rocky areas, while Willow Ptarmigan are common in subalpine willow and alder shrub (Department of Renewable Resources, 1994). Shrubby subalpine areas also provide breeding habitat for Dusky Flycatcher, Northern Shrike, Townsend's Solitaire, Wilson's Warbler, American Tree, Brewer's, and Golden-crowned Sparrows, and Common Redpoll (Department of Renewable Resources, 1994; Birds of the Yukon Database, CWS).