

Student Handbook for Saskatchewan Ecozones



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1. An Ecological System

An Ecosystem

An ecosystem is a system in nature containing living (biotic) and their nonliving environment (abiotic). An ecosystem includes the interaction of biotic and abiotic in a defined area.

Governments, non-government groups, universities, and industries have worked to develop a common ecosystem for Canada. In 1991 a project was undertaken by some federal agencies to redevelop past work and develop a common ecological framework for our country. In 1996, The National Ecological Framework for Canada incorporated the major components of ecosystems to provide a countrywide framework. It recognized that ecosystems are interactive and Canada is an ecologically diverse country. They believed this diversity could be represented in an ecological framework.

Recent developments have occurred in our province since the works of the National Ecological Framework of Canada. In 1998, The Ecoregions of Saskatchewan was prepared and edited by Saskatchewan Environment and Resource Management to act as an information guide and learning tool in understanding ecosystems of our province.

2. Ecosystems Defined

Our ecosystem consists of the following levels:



Ecozones	At the top of the hierarchy, it defines the major physiological features of the country.
Ecoregions	Subdivisions of the Ecozones characterized by climatic zones or regional landforms.
Ecodistricts	Subdivisions of Ecoregions, characterized by distinctive relief, geological material, soil, water bodies, vegetation and land uses.

3. Ecozones of Canada

To understand the Ecozones of Saskatchewan we must look at the Ecozones of our entire country and be aware of how they fit into the entire picture.

Canada is a collage of unique ecosystems. There are 20 major Ecozones- 15 terrestrial Ecozones and 5 marine Ecozones. Ecozones vary in shape and size. The Boreal Shield Ecozone is the largest in Canada stretching across six provinces. The Prairie Ecozone is only the tip of a unit that reaches into the heartland of the United States. This ecozone forms part of the world's grassland.

The Terrestrial Ecozones

1. Arctic Cordillera
2. Northern Arctic
3. Southern Arctic
4. Taiga Cordillera
5. Taiga Plain
6. Taiga Shield
7. Hudson Plain
8. Boreal Cordillera
9. Boreal Plain
10. Boreal Shield
11. Prairie
12. Montane Cordillera
13. Pacific Maritime
14. Atlantic Maritime
15. Mixed Wood Plain

The Marine Ecozones

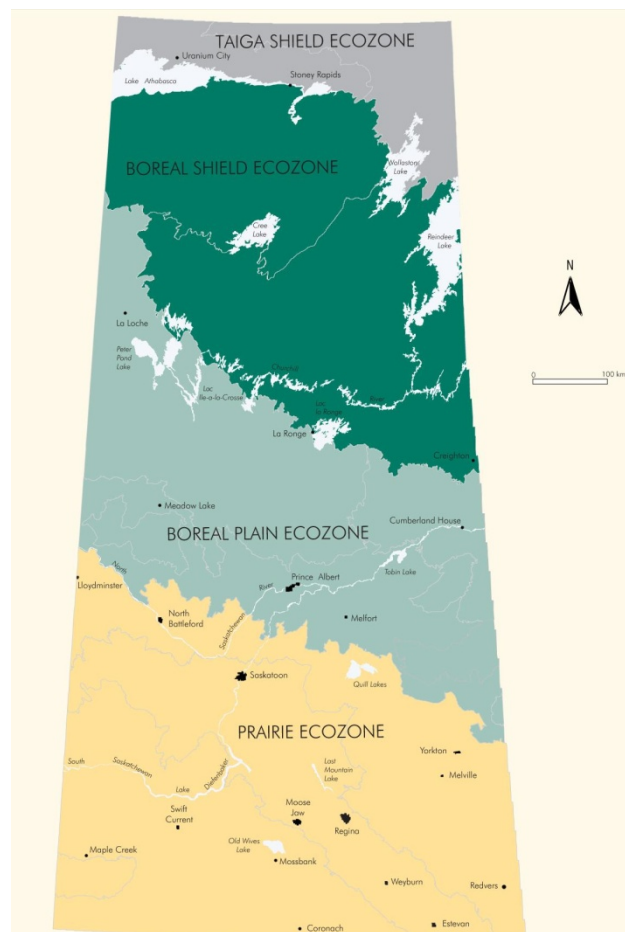
1. Pacific
2. Arctic Archipelago
3. Arctic
4. Northwest Atlantic
5. Atlantic



4. Ecozones of Saskatchewan

Four Ecozones of Canada are recognized in the province of Saskatchewan:

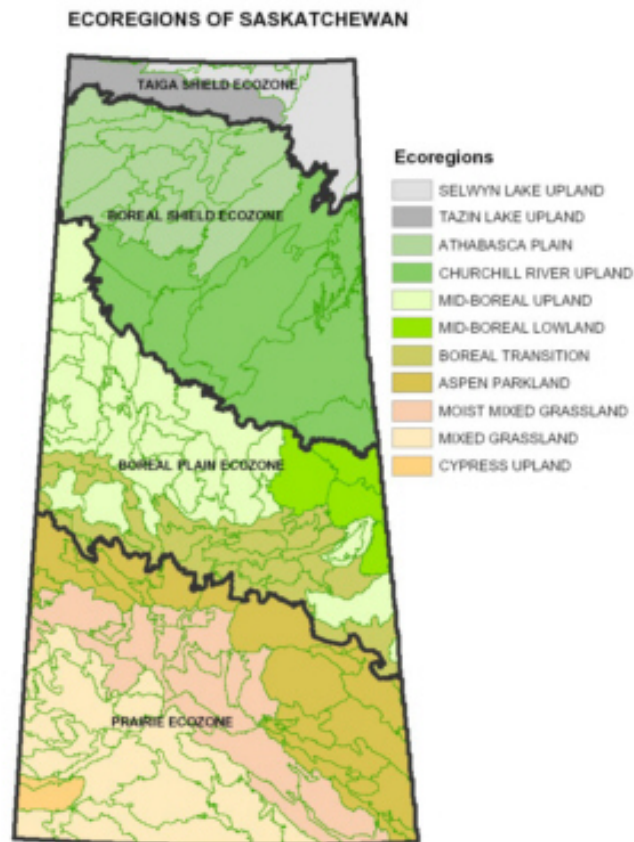
1. **The Taiga Shield Ecozone** lies on either side of Hudson Bay. The eastern segment occupies the central part of Quebec and Labrador, and a western segment occupies portions of northern Manitoba, Saskatchewan and the south-central area of the continental Northwest Territories.
2. **The Boreal Shield Ecozone** is the largest in Canada stretching across six provinces. The Boreal Shield Ecozone is a broadly "U" shaped zone that extends from northern Saskatchewan east to Newfoundland, passing north of Lake Winnipeg, the Great Lakes and the St. Lawrence River.
3. **The Boreal Plains Ecozone** extends as a wide band from the Peace River country of British Columbia in the northwest to the southeastern corner of Manitoba.
4. **The Prairie Ecozone** named "bread basket" of Canada occupies a semi-circular area that has its base on the Canada-U.S. border and arcs from the western edge of Alberta to the eastern edge of Manitoba.



5. Ecoregions of Saskatchewan

There are eleven Ecoregions recognized as subdivisions of the Ecozones. The Ecoregions are the following:

Taiga Shield Ecozone	Boreal Shield Ecozone	Boreal Plain Ecozone	Prairie Ecozone
<ul style="list-style-type: none"> · Selwyn Lake Upland Ecoregion · Tazin Lake Upland Ecoregion 	<ul style="list-style-type: none"> · Athabasca Plain Ecoregion · Churchill River Upland Ecoregion 	<ul style="list-style-type: none"> · Mid-Boreal Upland Ecoregion · Mid-Boreal Lowland Ecoregion · Boreal Transition Ecoregion 	<ul style="list-style-type: none"> · Aspen Parkland Ecoregion · Moist Mixed Grassland Ecoregion · Mixed Grassland Cypress Upland Ecoregion · Cypress Upland Ecoregion



7. Descriptions of Ecozones of Saskatchewan

Taiga Shield

The Taiga Shield extends from Labrador to Alaska. It is Saskatchewan's smallest Ecozone that occupies 4.7 million hectares. This represents only 7% of the provincial land mass.

The Taiga Shield is a bed of rock that is either exposed or covered with a thin layer of soil. The rock is a result of ancient mountains that were built 2 billion years ago and have been eroded to develop low relief areas. There are a series of bedrock surfaces that form smooth uplands and eroded lowlands. Distinctive landscapes formed in this area are drumlins, eskers, boulder fields or felsenmere. Between the ridges that often run parallel to each other are rivers connected with shorter streams.

Because of the glacial actions, the Precambrian bedrock dominates the zone, but some glaciofluvial and moraine deposits can be found. The area is dominated by Brunisolic soils. The climate of the zone is either subarctic or arctic climate. This means that in this area you will experience cold temperatures and little precipitation. The winters occur for 6 to 8 months and summers are cool with daylight occurring for greater than 18 hours.

The soil is almost always frozen resulting in stunted black spruce. Ground cover may consist of lichen with a few fungi growing on them. Some arctic plants like alpine azalea, false asphodel, anemone and northern grass- of- Parnassus.

You will not find many different species of animals in this region- only about fifteen different mammal species and 82 bird species and 18 fish species. You may find an occasional bear or moose, more caribou, snowshoe hare and red backed vole. Numerous gray wolves, martens, wolverines, red fox and mink can be seen. Birds that nest only in the Taiga Shield in Saskatchewan are the surf scoter, arctic tern, least sandpiper and mew gulls. Gray jays, willow ptarmigan, spruce grouse, boreal chickadee and common raven live here all year round. The golden eagle and horned lark are known to nest in the Taiga Shield.

Fish include northern pike, lake white fish, cisco, burbot and white sucker. The only amphibian found in this zone is the wood frog.

The Taiga Shield consists of two Ecoregions - the Selwyn Lake Upland Ecozone and the Tazin Lake Upland. The Selwyn Lake Upland is in the extreme northeast corner of our province and the Tazin Lake Upland stretches northward from Lake Athabasca the border with the North West Territories. There are only about 600 people living in this entire Ecozone. The area has no roads, so boats would transport you in the short summer or snowmobile in the winter. There are plane flights available year round. There are no parks in the area, only some prospecting activity.

Boreal Shield

The Boreal Shield extends from the Atlantic Coast to the Rocky Mountains. The Boreal Plain is to the south and the Taiga Shield is to the north. The zone covers 18.7 million hectares or about one third of the province.

The Boreal Shield Ecozone consists of two distinct geological areas, one that is composed of sandstone or metamorphic rock and the other, Precambrian basement rock.

One would see many rolling uplands and wetlands here. You learn about words like eskers and drumlins. These distinctive landscapes were formed because of surface materials of hummocky deposits of glacial till, glaciolucustrine and glaciofluvial deposits. Brunisolic and Luvisolic soils dominate the area. Winters in the Boreal shield are very long and cold- about 7 months long - and the summers are cool with periods of daylight up to 18.5 hours.

There are more than 40 mammal species, 218 bird species, 30 fish species and 5 species of amphibian and reptiles reported to exist in the Boreal Shield Ecozone. Arctic fox, black bear, little and big brown bats, moose, mink woodchuck, marten lynx, black bear, are found here. Birds include spruce grouse, red-breasted nuthatch, loons, Philadelphia vireo, red-tailed hawk, boreal chickadee, and hermit thrush. You could fish for arctic grayling, northern pike, lake trout, and lake white fish. Species of amphibians and reptiles are the Canadian toad and the boreal chorus frog.

Many forests prevail in this zone ranging from black spruce forest to mixed wood forests. Many varieties of trees can be found like balsam poplar, trembling aspen, white spruce and balsam poplar where the soil drainage is better to jack pine and black spruce on poorly drained soils. Shrubs found here include beaked willow, labrador tea and dwarf birch. The forest beds may be covered with sand heather, bog rosemary and ericaceous shrubs. Fire is common and provides a collage of jack pine. Acid- loving sphagnum moss thrives in bogs.

The Boreal Shield consists of two Ecoregions: The Athabasca Plain and the Churchill River Upland. The Athabasca Plain extends from Lake Athabasca to Cree Lake and as far east as Wollaston Lake. The Churchill River Upland Ecoregion is a horn shaped area with Wollaston Lake and Amisk Lake on the rim and Turnor Lake at the mouth. There are about 9,000 people in this zone. This represents about 1% of the population. There are parks and protected areas in the area, some of which are the Lac La Ronge Provincial Park and the Clearwater River Provincial Park. The natural resources are of extreme importance to the people of the Boreal Shield. Mining, forestry, fishing and agriculture provide employment for the people of the Boreal Shield. Wild rice is harvested and tourism activities prevail.

Boreal Plain

The Boreal Plain extends from Newfoundland to the Rock Mountains. The Boreal Shield is to the North and The Prairie is to the south. The zone covers 17 million hectares or about 27% of the province. The zone consists mostly of rolling plain.

The geology of the Boreal Plain is made up of younger sedimentary rock that would have been deposited 400 to 500 million years ago. There are an abundant number of lakes resulting from ground moraine deposited beneath continental glaciers. This has influenced the landscape of the area. You could experience the beauty of glaciofluvial areas modified by wind, till plains, hammocky moraines and plenty of glacial kettles.

Luviosolic, Brunisolic and Organic soils prevail in this zone. The climate varies in high and low areas- humid continental at lower elevations and subarctic at higher elevations. Winters are long cold and very snowy. Summers are short, warm and moist.

Vegetation is much richer in the Boreal Plain than in the other ecozones to the north. Both coniferous and deciduous trees predominate. Coniferous trees here include white and black spruce, tamarack and jack pine. White birch, balsam poplar and trembling aspen represent the deciduous species in this zone. Small bush shrubs include the prickly rose, red osier dogwood and high bush cranberry.

There are more than 50 mammal species, 300 bird species, 40 fish species and 6 amphibian and reptiles species in the Boreal Plain Ecozone. Chipmunk, Squirrels, wolves, Northern Flying squirrels, beavers, elk, white tailed deer and moose can be seen in this zone. Representatives of the bird species here would be gray and blue jays, ruffed and spruce grouse, Canada Goose, boreal chickadee, hawks and warbler. Fish species found in the Boreal Plain include walleye, goldeye, fathead minnow, walleye, northern pike, lake trout and white suckers.

The Boreal Plain consists of three Ecoregions - Mid-Boreal Upland Ecoregion, Mid-Boreal Lowland Ecoregion, and Boreal Transition Ecoregion. The Mid-Boreal Upland Ecoregion extends westward from the east central part of the ecozone and several outliers in the south and eastern part of the province. The Mid-Boreal Lowland Ecoregion is situated near the Manitoba border below the Manitoba escarpment. The Boreal Transition Ecoregion extends from the Alberta to the Manitoba border. About 15% of the population lives in this Ecozone, which are approximately 151,000 people. These people are employed in the agriculture, oil and gas exploration and production, outdoor recreation, tourism, forestry, and hunting and trapping industries.

Prairie

The prairie ecozone extends from the Rocky Mountains on the west to the deciduous forest on the east and from the boreal forests in the north to the Gulf of Mexico. The ecozone covers one third of Saskatchewan situated between the Boreal Plain and the United States.

Essentially, the Prairie is a gentle rolling plain. The topography of the area is similar to the surface of bedrock that existed prior to glaciation. Since the ecozone has resisted millions of glacial erosion, the rocks contain a great deal of quartzite and gravel.

However, glacial deposits have affected the landscape forming till plains, sand dunes, hammocky moraine and glacial kettles. Regional features of the area include the Missouri Couteau (a bedrock escarpment), Cypress Hills (nonglaciaded hills that represent the highest elevation of land between the Rockies and Labrador in Canada) and the Dirt Hills (best ice pushed ridges in the world).

Chernozemic soils dominate the area. The climate varies from semi arid to humid continental, with long cold winters and short very warm summers. Cyclonic storms may be experienced in this ecozone.

A variation of vegetation exists in the Prairie although the ecozone is predominantly a grassland area. Vegetation includes blue grama grass and sedge, wheat grasses, pasture sage and moss phlox and the prickly pear cactus. However, as one heads north you may view a mosaic of trembling aspens and small forests of lodgepole pine in the Cypress Hills area. Spring is welcomed with a field of crocuses. Many sloughs are found here ringed with trembling aspen and willows. Sedges, bulrushes, cattails and reed grasses can be seen around freshwater sloughs. In drier areas the sloughs become more saline and have shorelines covered with white salt and salt tolerant grasses and red samphire.

The bison was the wildlife synonymous with the Prairie but the cultivation of the grasslands has caused some species to come to the brink of extinction or to occupy only a small portion of their original range. Mammals the ecozone include elk, pronghorn antelope, wolves, mice, voles, Richardson Ground squirrel, badgers, striped skunks, swift fox, woodchucks and snowshoe hares. Species of bird that can be seen include the upland sandpiper; brown headed cowbird, red tailed hawk, snow bunting, vesper sparrows and western meadowlark. Fourteen species of reptiles and amphibians prevail, more numerous here than in any other ecozone. The Canadian toad, tiger salamander, painted turtle, rattle snake, green garter snake and Northern leopard frog are a few of the amphibians and reptiles in the Prairie.

There is more fish species found in the Prairie than in the Boreal Plain because of the warmer water. Walleye, yellow perch, Lake Sturgeon, and burbot are common as in other parts of the province, but some species found only in the Prairie Ecozone include the channel catfish, chestnut lamprey, brown bullhead and rock bass.

This ecozone generates for more than 80% of the economic developments of the province. Economic activities like agriculture, oil and gas extraction, trapping, aquaculture, and tourism provide the people with employment in this ecozone.

8. Glossary

abiotic - non-living; e.g. rocks.

arctic climate - Conditions that support the development of treeless vegetation, with tundra or polar deserts.

bedrock - a general term for the rock, usually solid, that underlies soil or other material.

biotic - pertaining to life or living organisms; e.g. deer.

boreal climate - environmental conditions that support closed- canopied forests of conifer or mixed conifer-hardwood.

brunisollic - see classification, soil.

chernozemic - see classification, soil.

crysollic - see classification, soil.

classification, soil - Soils are classified using the Canadian Soil Classification System. The units to be used are:

Brunisollic - soils chiefly occurring on sandy deposits in the boreal forest region having brown to reddish brown subsurface horizons that lack sufficient accumulations of iron oxides and organic matter.

Chernozemic - soils formed under grasses and forbs, or under grassland-forest transition vegetation. The soils have a dark colored surface and subsurface horizons rich in calcium salts.

Crysollic - mineral or organic soils that have perennially frozen material within one metre of the surface.

Gleysolic - mineral soils formed under wet conditions but gleysols have a layer of peat over the mineral soil.

Luvisollic - soils developed under forest that have a grey surface and subsurface organic soils that have developed chiefly from organic deposits. They are usually saturated for most of the year, but some are only saturated for a few months.

Organic - soils developed from organic deposits.

Regosolic - weakly developed soils usually associated with recent deposits or eroded surfaces.

Solonetzic - soils developed under grass or grass forest vegetation in semiarid or subhumid climates. They are characterized by a stained, brownish subsurface layer and saline subsoils.

coniferous - evergreen shrubs and trees characterized by needle- shaped leaves, cones and a resinous wood.

continental - the climate of the interior of a continent.

climate - temperature extremes, and by the occurrence of maximum and minimum temperatures soon after summer and winter solstice, respectively.

coulee - a drainage course created by erosive forces of water flow from glaciers or surface runoff.

deciduous - plants that shed their leaves or needles at a particular season, usually autumn.

diversity - a measure of the number of species and their relative abundance.

dolomite - a sedimentary rock comprised of calcium carbonate and magnesium.

drainage classes - a group of soils defined as having a specific range in relative wetness under natural conditions as it pertains to wetness due to a water table under conditions similar to those which the soil developed. The classes include:

rapidly drained - The soil moisture content seldom exceeds field capacity; commonly of coarse texture or on steep slopes.

well- drained - The soil moisture content does not normally exceed field capacity for a significant part of the year.

moderately well drained - The soil moisture in excess of field capacity remains for a small but significant part of the year.

imperfectly drained - The soil moisture in excess of field capacity remains in lower parts of the soil for moderately long period of the year.

poorly drained - The soil moisture in excess of field capacity remains in all parts of the soil for a large part of the year.

very poorly drained - Free water remains at or near the surface for a large part of the year.

drumlin - a low smoothly rounded, elongated and oval hill, mound or ridge composed of compact glacial till, built under the margin of the ice, and shaped by its flow, or carved of an older moraine by re-advancing ice. It usually has a blunt nose pointing in the direction from which the ice approached, and a gentler slope tapering in the other direction.

ecodistricts - subdivisions of ecoregions, characterized by distinctive assemblages of landforms, relief, surficial geological material, soil, water bodies, vegetation and land uses.

ecoregions - subdivisions of the ecozone, characterized by distinctive climatic zones or regional landforms, and constitute the major bridge between the subcontinental scale ecozones and the more localized ecodistricts.

ecosystem - a community of organisms, interacting with one another, plus the environment in which they live and with which they also interact.

ecozones - the top of the ecological hierarchy. It defines the major physiological features of the country.

erosion - the wearing away of land by water, wind or ice.

esker - a long, large, low, narrow, sinuous, steep-side ridge or mound composed of sand and gravel that was deposited by a stream flowing in a tunnel beneath or within a glacier and left behind when the ice melted.

felsenmere - a flat or gently sloping area covered with a blocks of rocks formed from intensive frost action.

forage - the leaves and stems of crops harvested as hay for animal feed. These crops are often perennial, e.g., alfalfa, brome grass, crested wheat.

glacier - a river of ice.

glaciofluvial - pertaining to the melt water streams flowing from the wasting glacier ice and especially to the the deposits and landforms produced by such streams.

glaciolacustrine - pertaining to glacial lakes.

gleysolic - see classification, soil.

grasses - plants that have rounded and hollow jointed stems, narrow sheathing leaves, flowers born in spikes.

groundwater - that part of the subsurface water that is the zone of saturation, including underground streams.

imperfectly drained - see drainage classes.

herb - plants with no persistent parts above ground, as distinct from shrubs and trees.

hummocky moraine - an area of knob-and-kettle topography that may have been formed along ice fronts.

kettle - a steep-sided, usually basin- or bowl- shaped hole or depression without surface drainage in glacial drift deposits, often containing a lake and believed to have been formed by melting of glacier ice.

lacustrine - pertaining to lakes, ponds, or other relatively static waters.

lichens - flowerless plants composed of fungi and algae in symbiotic union, commonly growing in flat greenish gray, yellowish, or blackish patches on rocks, trees, etc.

luvisolic - see classification, soil.

marsh - a wet or periodically wet area, with aquatic or grass- like vegetation and no peat formation.

metamorphic rock - a rock derived from pre- existing rocks by mineralogical, chemical, and structural changes, essentially in the solid state, in response to marked changes in temperature, pressure, shearing stress, and chemical environment at depth in the earth's crust.

moderately well drained - see drainage classes.

moraine - a mound, ridge, or other distinct accumulation of unsorted, unstratified glacial drift, predominantly till, deposited chiefly by direct action of glacier ice in a variety of topographical landforms that are independent of control by the surface on which the drift lies.

organic - see classification, soil.

permafrost - any soil, subsoil, or other surficial deposit occurring in arctic or subarctic regions at a variable depth below the earth's surface in which a temperature below freezing has existed for a long time (from two to thousands of years).

poorly drained - see drainage classes.

precambrian - relating to an era in geological history, prior to the Cambrian era.

rangeland - extensive areas of grasslands that are used and managed as habitat and food supply for free roaming livestock such as cattle, sheep, horses, and bison.

rapidly drained - see drainage classes.

regosolic - see classification, soil.

solonetzic - see classification, soil.

summerfallow - land that is not seeded to crop, but rather is tilled several times during the summer to control weeds, conserve soil moisture, and break down crop residues from previous year.

till - drift deposited underneath a glacier consisting of clay, silt, sand, gravel and boulder.

topography - a description of all the surface features , natural and artificial, of a region.

tundra - a treeless, level, or gently undulating plain characteristic of arctic or subarctic regions. It usually has a marshy surface that supports a growth of mosses, lichens, and numerous low shrubs, and underlain by a dark, mucky soil and permafrost.

very poorly drained - see drainage classes.

watershed - an elevated boundary area separating tributaries that drain into different river systems.

well drained - see drainage classes.

9. Sources

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