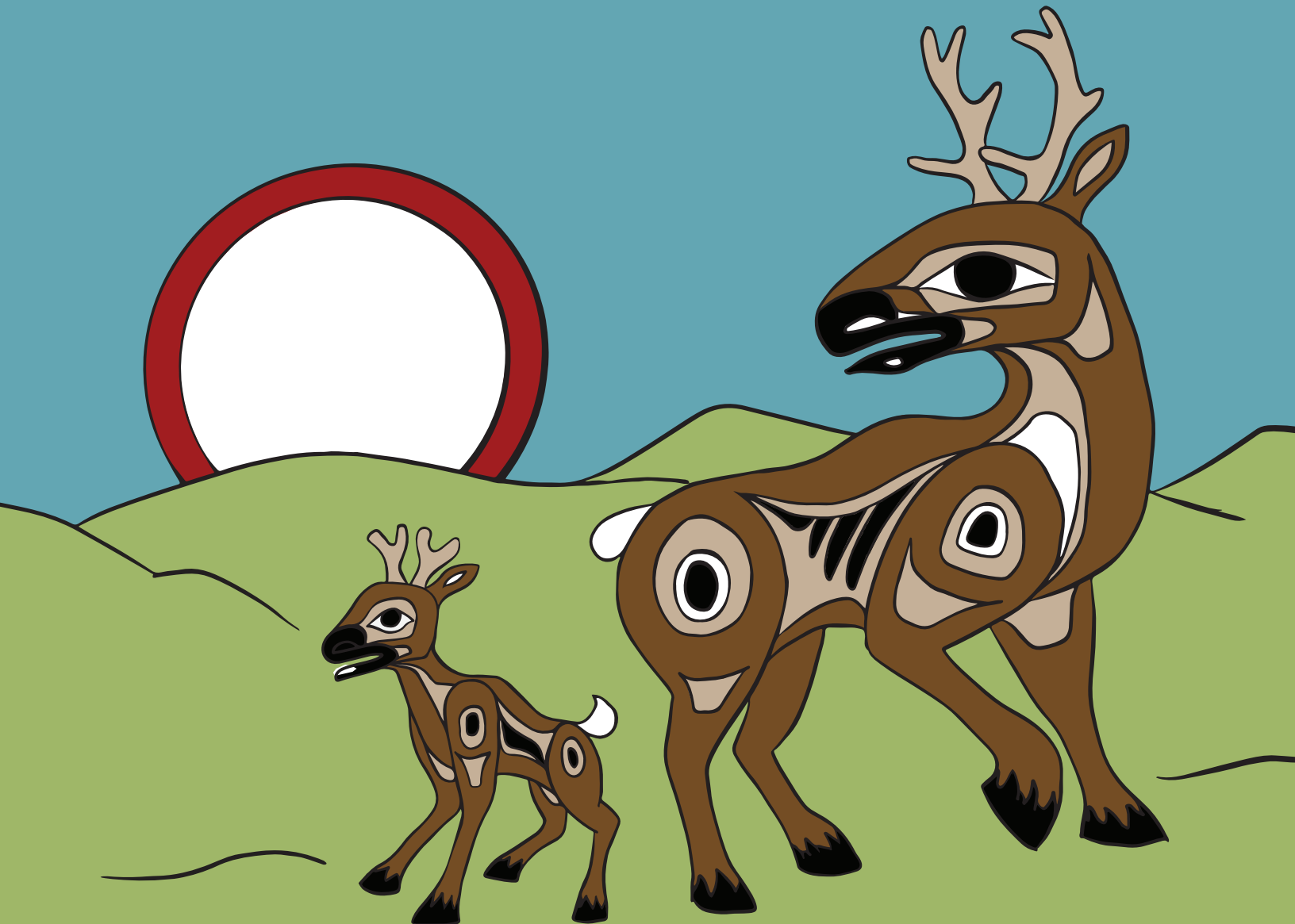


SOUTHERN LAKES
CARIBOU
ON THE LAND
TA'AN KWÄCH'ÄN COUNCIL



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SHARING THE STORY OF THE SOUTHERN LAKES CARIBOU

"THEY ARE SPIRIT ANIMALS. THEY ARE OUR
CULTURE. THEY ARE US, LIKE SO MANY
OTHER ANIMALS AND CREATURES."

– Shirley Beattie, 2021



"I WAS PUT HERE BY THE CREATOR, LIKE EVERYBODY. AND EVERYTHING THAT LIVES ON IT, YOU HAVE SHOW RESPECT FOR. TREES, WATER, SNOW WAS PUT THERE FOR A CERTAIN REASON, AND YOU HAVE TO LOOK AFTER THAT; IT'LL LOOK AFTER YOU. YOU HAVE TO HELP IT LOOK AFTER YOU. THAT'S HOW I UNDERSTAND IT. IT PROVIDES FOR YOU IF YOU DO IT RIGHT, IF YOU DO THINGS RIGHT. YOU LOOK AFTER IT, IN THE RIGHT WAY LIKE YOU'RE SUPPOSED TO, THEN EVERYTHING WILL BE FINE."

– Norman Adamson, 2020

Mezi (meh-zee)
Caribou in Tàa'an Män,
Southern Tutchone

Wejih (wag-jee)
Caribou in Tagish

CARIBOU HISTORY ON THE LAND

Why Caribou? Early French settlers used the name Caribou for this species and it is thought to have come from "Xalibu", a *Mi'kmaq* word meaning "shoveler or pawer of snow" (Centre for Biological Diversity). This is because of the size of their hooves and the way they use them to dig for food under the snow.

Sightings of Caribou have been dated as far back as 1.5 million years ago at Fort Selkirk, Yukon (Project Caribou, 2018). "Caribou are of ancient design – their fossil record goes back 1.5M years at Ft. Selkirk, YT. There's a good chance that they will still be here long after human civilization has adapted or is gone" (Farnell, 2009).

When North America was mostly covered by thick layers of ice, there was little **vegetation** for Caribou to feed on. This is why the Caribou **migrated** to the Yukon and Alaska, areas that had vegetation and no ice. This place was called the **refuge** or **refugium** also known as Beringia (Project Caribou, 2018).

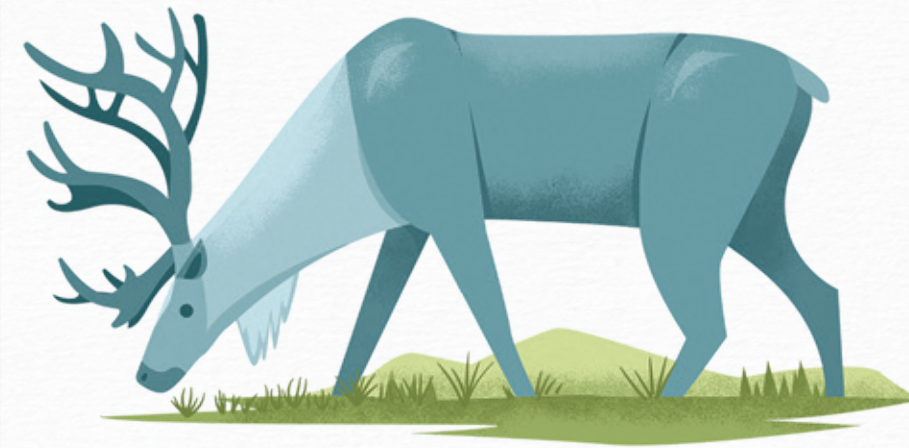
DID YOU KNOW

A Caribou image first appeared on the Canadian 25 cent piece in 1937 - an expression of the importance of Caribou to Canada.

There are three **subspecies** of Caribou in Canada including the Peary Caribou, the Barren-ground Caribou and the Woodland Caribou. The Southern Lakes Caribou are Woodland Caribou population. Let's find out about the **origin** of the Southern Lakes Caribou species, their habitat, their **biology** and **ecology**.

CARIBOU HABITAT IN THE SOUTHERN LAKES

Caribou are medium-sized members of the deer family. They can be found in many areas across North America in **boreal**, **mountainous** and arctic environments. There are five 'populations' of woodland Caribou in Canada: Boreal, Atlantic-Gaspésie, Newfoundland, Southern Mountain and Northern Mountain. The Northern Mountain Caribou population is comprised of 36 herds in the Yukon, western Northwest Territories and northwestern British Columbia. In the Yukon there are 24 herds, including the Southern Lakes Caribou. These herds live near the lakes around the Yukon-British Columbia border, including Bennett Lake, Tagish Lake, Marsh Lake, Lake Laberge, and Atlin Lakes.



WINTER

Caribou need to be able to move freely. This is because they need to migrate from their summer ranges to winter ranges. In the wintertime, the Southern Lakes Caribou mostly eat ground lichens but they will also eat grasses, sedges, and evergreen shrubs like Labrador tea. During the winter Caribou also need to be in areas with light snow. This is because they need to use their hooves to dig up ground lichens and they need to travel. If the snow is heavy and wet, Caribou will use more energy to eat and get from place to place. They need to eat about 6 pounds (equivalent to 2 garbage bags full of lichen) each day.



SOUTHERN LAKES CARIBOU IN THE WEB OF LIFE

Order: Artiodactyla, Family: Cervidae, Subfamily: Capreolinae, Genus: Rangifer, Species: tarandus;

SPRING, SUMMER AND AUTUMN

During spring, summer, and autumn or fall, Southern Lakes Caribou will look for plants to eat such as lichen and fungi or mushrooms. In the spring, pregnant cows (female Caribou) will search for safe places away from predators to give birth to their calves. These areas need a lot of vegetation to help calves build the strength needed for the winter months. Bulls (male Caribou), “will use their antlers to challenge and threaten other bulls for mating opportunities with a cow during the rut or breeding season,” in late autumn (Project Caribou, 2018).

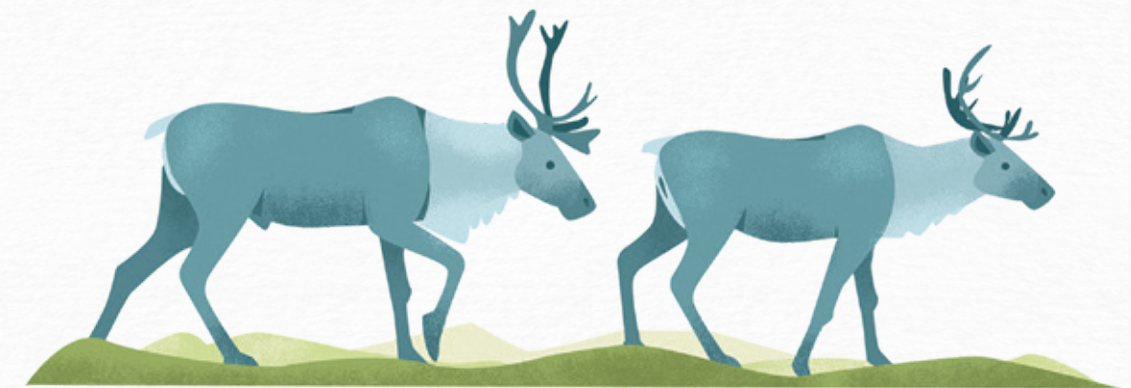
“Refuge from insects, predators and **thermal stress** while **foraging**, calving and recovering from calving is important and may be hard to find (James and Stuart-Smith 2000). Permanent alpine snow patches offer a safe haven from insects and heat in the summer months (Ion and Kershaw, 1989). Evidence suggests that these snow patches have been used by woodland Caribou for thousands of years” (Environment Canada. 2012 Management Plan for the Northern Mountain Population of Woodland Caribou (Rangifer tarandus Caribou) in Canada).



CARIBOU PROVIDE FOOD

Caribou have been a main source of food for some people in the Southern Lakes area. But, Caribou are not the main food source for many predators in this area. Predators, like wolves, mostly eat moose instead of Caribou. Recent research on wolves in the Southern Lakes area shows that 90% of their winter diet is made up of moose. The remaining 10% of their diet is made up of mostly Caribou.

Animals from the deer family, including Caribou, are known as ungulates. ‘Ungulate’ means any animal with hooves. There are two orders of ungulates: *Perissodactyls* and *Artiodactyls*. Perissodactyls have an odd number of toes, like elephants. Artiodactyls have an even number of toes, like Caribou and bison. All those in the deer family are called Cervidae. All Caribou belong to the same genus and species meaning they share the same name *Rangifer tarandus* (Project Caribou, 2018).



MALE AND FEMALE

Bull, or male Caribou, grow until they are 5 or 6 years old. Cows, or female Caribou, stop growing after age 3 or 4, or after they birth their first calves. Caribou have different social behaviors and calving strategies. Sometimes Caribou can be very friendly with one another. Males and females are often separate as the bulls hang out together in small groups for most of the year, while small groups of cows and calves do the same. During the rut, the Caribou will group together, with the large bulls trying to defend as many cows as possible. Very deep snow can bring larger groups of Caribou together in the winter because it is easier to dig with more animals.

“A BULL CARIBOU, STANDING. YOU EVER SEE THE COLLAR, HE’S GOT A WHITE COLLAR, ALL FLUFFED OUT? THAT’S A THING THAT PEOPLE USED TO KNOW

A LONG TIME AGO, SAYING WHEN THAT’S REALLY THICK AND WHITE IT SHOWS HE’S READY FOR HARVEST. KIND OF LIKE YOUR CALENDAR. THERE WERE A LOT OF DIFFERENT BELIEFS.”

– Norman Adamson, 2020

Female Northern Mountain Caribou, like the Southern Lakes herds, like to have space when they are calving. This is different from the barren-ground herd, who calve together on shared land. While each Northern Mountain Caribou may return to certain calving sites year after year, there is no defined ‘calving ground’ for the herds. Following calving, the cows and surviving calves and young bulls will form small groups on the summer range. There are more adult cows than adult bulls by a ratio of 2:1 in the herds. Males have a higher mortality rate throughout their lives.

ANTLERS, HOOVES AND HAIRS

Caribou are the only species in the deer family where both the male and female animals have antlers. In late winter, Caribou with antlers tend to be cows as they keep their antlers until just before the calving season. The large bulls drop their antlers in the late fall or early winter. Most people see Caribou on the roads or trails in the winter, and the presence of antlers is a good sign that it is a group of cows, or cows with young bulls or calves. Up to 5% of females have only one antler and less than 1% do not have any antlers (Bergerud 1971; Reimers 1993). A Caribou will grow a complete new set of antlers every year, with adult males growing much larger antlers than females or younger males. If you see Caribou with antlers in the winter, the chances are that the animal is female. This is because the males lose their antlers early in the winter after the rut, while the females retain their antlers until after their calves are born in the spring.

Another unique characteristic of all Caribou is their large, rounded hooves that help them from sinking in the snow. Their hooves also can be used as shovels in wetlands when digging for food under the snow. The 'dew claws' are large, widely spaced, and set back on the foot. With hooves like this, Caribou do not have as much pressure from their weight pushing down on their hooves while they walk. Dew claws therefore reduce their 'foot load' by spreading their weight along their large, wide hooves (Environment Canada. 2012 Management Plan for the Northern Mountain Population of Woodland Caribou (*Rangifer tarandus Caribou*) in Canada.).

The hair that covers the body of the Caribou is called the "*pelage*." The pelage changes colour throughout the year and is darkest in the summer. The neck, mane, shoulder stripe, underbelly, underside of tail, and patch just above each hoof are creamy white.



FIRST NATIONS PEOPLE AND THE SOUTHERN LAKES CARIBOU

"I SPEAK MY LANGUAGE. LANGUAGE
OPENS THE DOOR TO THE CULTURE."

– Norman Adamson, 2020

A great deal of local knowledge comes from local First Nations **Elders, Knowledge Holders** and community experts. They are teachers within and beyond their communities. Their teachings are known as sacred knowledge because of their spiritual and cultural connections.

CULTURE CONNECTION

There are many **First Nations in the Yukon** who place the Caribou as a central focus in their culture. The Tagish, Tlingit and Southern Tutchone First Nations people are ancestral to this land and have a strong, cultural relationship with the Southern Lakes Caribou. There are mythologies and legends surrounding Caribou that have been passed down through generations. These stories are shared to teach each **generation** how to respect Caribou on the land and during a hunt (Project Caribou, 2018).



TRADITIONAL HUNTING METHODS

Depending on location, there were two types of pre-colonization hunting methods mainly used by First Nations in the Southern Lakes area:

1. Attracting Caribou close enough to use a bow and arrow
2. Capturing migrating Caribou in brush enclosures

"IN THE WOODS, YOU GO TO THOSE CARIBOU AND THEY'D MAKE FENCES. OUT OF A HERD OF CARIBOU, MAYBE 100 WOULD BREAK OFF ON THE MIGRATION. AND THE PEOPLE KNEW EXACTLY WHERE THEY WERE GONNA BE, BECAUSE OF THE FRESH WATER AND FRESH FOOD. SO THEY'D MAKE THOSE FENCES THERE, ALMOST LIKE A FISHTRAP, BUT DIFFERENT. AND WHAT THEY'D DO IS THEY DRIVE SO MANY CARIBOU IN THERE THAT SOME WOULD TURN AROUND AND COME BACK OUT. AND SOMEBODY WOULD CLOSE THE GATE, AND THEY'D CHASE OUT A COW OR A LITTLE ONE. THEY'D HAVE SO MANY THEY COULD ALMOST PICK AND CHOOSE. THEY'D HERD 'EM IN THERE UNTIL THEY WERE SATISFIED WITH WHAT THEY GOT. WHEN WHAT THEY SEE IS WHAT THEY NEED. AND THEN AFTER THAT THEY CLOSED THE GATE AROUND THEM, AND KILLED THEM. ANY THEY DIDN'T WANT THAT WERE MIXED IN,

WERE RELEASED. AND THEY'D CUT UP ALL THAT MEAT. THEY'D MAKE A SMALL CAMP - SMOKE THE SKIN, DRY THE MEAT. GET THE DOG PACKS READY AND USUALLY THE LADIES AND THE CHILDREN, YOUNGER MEN, THEY'D TAKE THIS BACK TO THEIR MAIN WINTER CAMPS. AND THERE THEY WOULD STORE THAT FOOD FOR THE WINTER. AND THEN SOMEBODY, THE TIME THEY GET BACK, THEY'D STAY MAYBE A FEW DAYS THERE TO COMPLETE THE DRYING. THEY'D DO THE SAME THING AND BRING IT DOWN TO THE CAMPS, AND EVERYONE WOULD MOVE FROM THERE. AND THEN THEY WOULD MOVE ONTO A DIFFERENT HARVEST, THEY'D KNOW WHAT THE SALMON ARE COMING BY THAT TIME. TIME TO CATCH FISH. JUST OUR WAY OF LIFE. I LOVED IT."

- Norman Adamson, 2020



During migration, First Nations hunters could build enclosures (i.e. **corrals** or **impoundments**) in open spaces or on frozen lakes to entrap the migrating Caribou. The enclosures were made from brush and had an **exterior** fence that could measure over 1km long. This fence would surround "a maze of shorter brush fences with **babiche snares** in the opening", to trap Caribou inside the enclosure. To stop Caribou from jumping over the fence, women and children would shout to scare the Caribou from breaking away, while hunters would spear or shoot the snared Caribou with arrows. If Caribou were migrating, hunters would wait along traditional river and lake crossings and attack Caribou as they crossed. This could be done by spearing the Caribou from a canoe or kayak, and collecting the floating **game** later (Project Caribou, 2018).

If hunters were traveling alone or in small groups, they could chase Caribou into the forest until they were close enough for bow and arrows. Hunters might also wear Caribou skins and hold antlers over their heads to disguise themselves until they were within bow and arrow range. During mating season (*the rut period*) hunters could strike antlers together to imitate the sounds of two bull Caribou fighting. This could draw in curious Caribou making it easier for hunters to seek out Caribou (Project Caribou, 2018).

FOOD AND MEDICINE

Caribou meat was and still is used either dried or fresh. All parts of the Caribou are used when hunted. The head, tongue, nose, and chin are considered **delicacies**. Velvet on the antlers could be **singed** and eaten. The heart, liver and kidneys could be roasted and eaten. The stomach could be used as a carrier to store either fat, blood or water. Often people did not eat the lungs so they would give them to their dogs for food instead (Project Caribou, 2018).

"WE USE SOME OF THEIR FOOD FOR MEDICINE. WE THANK THEM FOR TAKING WHAT WE NEED. THEY ARE OUR MEDICINE, IF WE DON'T TAKE CARE OF THEM HOW CAN THEY TAKE CARE OF US?"

- Shirley Beattie, 2021

TOOLS AND OTHER USES

First Nations people create needles and utensils from Caribou bones. The antlers could be turned into tools and the sinew (*tight tissue that holds muscle to bone- a tendon*) can be used as thread (Hinterland Who's Who). The other parts of the antlers can be "made into buttons, fishing jigs, knife handles, and ribs of kayaks" (Project Caribou, 2018).

People have used Caribou fat for fuel and light. Clothes can be made from Caribou skin (Hinterland Who's Who). *Dried or untanned Caribou hide*, also known as rawhide, is used to make drums, rattles, buckets or stretched over boats. Tanned hides can be used for making clothing like moccasins and dresses as well as skin houses. Tanned hides can be draped over frames to form the shape of these structures (Project Caribou, 2018).



CULTURAL LOSS & ONGOING STEWARDSHIP

Caribou have always been important to Yukon First Nations in the Southern Lakes area. As of 2021, in an effort to restore the numbers of the Southern Lakes Caribou herds, the First Nations of the Southern Lakes have largely not harvested Caribou since 1993. The associated cultural loss has been devastating. Hunting for Caribou continues to be culturally important to communities in the Southern Lakes, and is viewed as a central part of northern society and culture. Hunting for Caribou can offer an alternative to purchasing imported foods from retail stores and provides food security to communities. Ongoing **stewardship** will hopefully allow cultural and **subsistence** hunts to return to communities in the Southern Lakes.

"THE ELDERS USED TO SAY YOU DON'T TALK ABOUT THOSE THINGS, TO MAKE A JOKE OR ANY WAY AT ALL. YOU GOT SOMETHING CARIBOU, BE SATISFIED WITH IT. BECAUSE THAT'S WHAT THE CREATOR GAVE YOU. WE WERE TOLD NOT TO MAKE FUN OF CARIBOU, DON'T TALK ABOUT THEM AT ALL, TO SAY ANYTHING, CRITICIZE IT OR THE WAY THEY LOOK, OR SAY THIS MEAT IS NO GOOD, IT'S TOO TOUGH. THEY DIDN'T LIKE THAT, THE ELDERS, THE OLD PEOPLE. SO WE HAD TO LIVE BY IT. IT WAS THE LAW. EVERYBODY, PRETTY MUCH SOUTHERN TUTCHONE PEOPLE ANYWAY. THEY LIVED THAT WAY. THEY HAD TO."

- Norman Adamson, 2020

HUMAN IMPACTS ON CARIBOU

"LIFE WAS ONCE SIMPLE AND GOOD FOR THE CARIBOU. MOST PEOPLE HAVE FORGOTTEN THE REAL INHERENT VALUE OF THE CARIBOU, AND NATURE ITSELF. THIS PLACE IS SO HARD ON THEM NOW, THEIR CORRIDORS ARE ALL CLOGGED UP WITH FENCES, BUILDINGS, HAY FIELDS."

- William Asp, 2021

Effective habitat is *habitat that is useful for Caribou to eat, travel, rut, calve and move*. Some human actions have direct and indirect impacts on Caribou. Hunting and road collisions have a direct impact on Caribou themselves, and an indirect impact on habitat because the habitat becomes less effective once hunting and collisions happen. Direct impacts on habitat come from developments, roads and trails, gravel pits and mines. Reduced habitat effectiveness means that *the habitat is still there for Caribou to forage or move through, but it's not as useful to Caribou anymore because of sensory disturbance* (noises, smells, unfamiliar and threatening sights).

“TRY TO WATCH AND LEARN FROM THE ANIMALS AROUND US. EVERYTHING ABOUT THE ANIMALS IS A VALUABLE LESSON. YOU CAN SEE HEALTH AND VITALITY, OR LACK THEREOF, ON THE ANIMALS. GIVE THE ANIMALS THEIR SPACE. LEARN, ENJOY, WATCH, LISTEN AND GIVE OTHER SPECIES SPACE TO LIVE. KEEP YOUR CAMP CLEAN. DON'T ATTRACT THE ANIMALS AND THEY WON'T GET INTO TROUBLE. RESPECT AND SPACE. SHARE AND CARE.”

- Shirley Beattie, 2021

COLONIZATION OF THE YUKON

The arrival of *settlers* changed the relationship between northern peoples and the Caribou. “In the 1890s *missionaries, prospectors* and *fur traders* brought towns, roads, *industrial development*, disease and social problems to the Southern Lakes that permanently changed the First Nations peoples’ way of life. The White Pass railway and the Alaska Highway also caused great changes to the way First Nations people lived. After the development of the Alaska Highway, the herd range of the Carcross herd in particular, began to be intersected by roads, trails, subdivisions, agriculture, gravel pits, forestry, power lines, and other human developments. As the human population grew, so did these impacts, and these unplanned developments began to have a significant impact on the herds. The Alaska Highway corridor now forms a massive barrier to Caribou. The Caribou to the north and south of this line largely move and live as separate herds.

However, First Nation people in the Southern Lakes area continue to keep up their values as *stewards* of the land and wildlife” (Regional Assessment of Wildlife in the Yukon Southern Lakes Area, Southern Lakes Wildlife Coordinating Committee, 2012).

Fur traders, trappers, prospectors, and miners who were new to the territory also began to rely on Caribou for supplies. “In the 1930s, a great deal of Caribou meat was needed to feed the animals of the many people who used dogs and sleds for travel. The introduction of the rifle made it easier to kill the Caribou and lessened the amount of skill needed in the hunt” (Project Caribou, 2018).



“THIS IS WHAT I WAS TOLD, ONE OF THE STORIES. CARIBOU AT THE TIME WEREN'T VERY MANY BEFORE THEY CAME BACK, EH? AND THIS WAS SUPPOSED TO HAVE HAPPENED BEFORE THAT. THERE WAS A MAN AND HIS FAMILY. THINGS WERE HARD. THEY WERE GOING THROUGH A ROUGH TIME, AND EVERYBODY WAS TRYING FOR THEMSELVES. THINGS WERE GETTING TOUGH. AND SO THIS MAN, HE HAD A FAMILY, I DON'T KNOW HOW MANY CHILDREN, AND HIS MOTHER-IN-LAW AND HIS WIFE, MAYBE 4 OR 5 OR 6 OF THEM. AND THEY WERE STARVING, THESE PEOPLE. THEY HAD NO FOOD AT ALL. THEY COULDN'T GET ANYTHING, NOT EVEN A RABBIT. THEY COULDN'T FIND ANYTHING, THEY WERE GETTING BAD LUCK ALL OVER THE PLACE. SO THE MAN SAID 'WELL I TELL YOU I'M GOING TO GO HUNTING. I'M GONNA GO HUNT.' THAT TIME WAS BEFORE THEY EVEN HAD A GUN UP HERE. THIS MAN PICKED UP AND HUNTED ALL DAY FOR TWO DAYS, HE WAS GETTING TIRED AND HUNGRY, AND HIS WIFE AND CHILDREN AND MOTHER-IN-LAW WERE BACK AT THE CAMP THERE. HE COULD SEE THE SMOKE. THAT'S WHAT I WAS TOLD ANYWAY. HE SEEN SOME FRESH CARIBOU TRACKS, SO HE TRACKED THAT CARIBOU ALL DAY, PICKED THE TRACK UP UNTIL THE NEXT DAY WHEN IT GOT REALLY DARK, EH? SO THE NEXT DAY HE PICKED UP THE TRACK. HE HAD A LITTLE BIT OF LUCK, AND HE CAUGHT UP TO THE CARIBOU. SO HE TOOK OUT HIS BOW AND ARROW, AND THE CARIBOU WAS GRAZING THERE, MINDING HIS OWN BUSINESS SORT OF, KNEW HE WAS THERE, I DON'T KNOW. AND THE MAN BROUGHT UP HIS BOW AND ARROW, HE HAD AN ARROW INSIDE THE BOW, AND HE JUST AIMED IT, AND THE CARIBOU BOLTED. JUST LIKE THAT. THEY SAY HE JUST TOOK RIGHT OFF. THE GUY DIDN'T KNOW WHAT TO DO, HE JUST SET DOWN HIS BOW AND ARROW, AND HE FELL TO HIS KNEES AND STARTED TO CRY. HE SAID 'I DON'T KNOW WHAT'S GOING TO HAPPEN TO MY CHILDREN, MY WIFE AND MY MOTHER IN LAW,' AND HE CRIED THERE FOR HOW LONG I DON'T KNOW, I WASN'T THERE. BUT HE FELT PRETTY BAD BECAUSE HE COULDN'T PROVIDE FOR HIS FAMILY. HIS CHANCES RAN OUT ON HIM. AND THAT'S THE NAME OF A PLACE OVER THERE, THE NAME OF IT IS 'PLACE WHERE CARIBOU WAS CRIED FOR'. IF YOU MAKE FUN OF CARIBOU YOU BRING BAD LUCK ON YOURSELF. IT'S ONE OF THE STORIES THEY TOLD.”

- Norman Adamson, 2020

RECREATION AND TOURISM

“ONE TIME THE CARIBOU ROAMED FREELY AND WERE ABLE TO DO WHAT THEY NEEDED TO SURVIVE. I THINK THE CARIBOU WOULD SAY YOU ARE DESTROYING MY HOME, YOU SHOULD BE LOOKING AFTER MY HABITAT.”

– William Asp, 2021

The Southern Lakes Caribou continue to be affected by human activity that leads to habitat loss and interference in winter ranges (Francis and Nishi, p.3-4). The Southern Lakes Caribou is made up of four herds: the Carcross, Ibex, Laberge and Atlin herds. Out of these herds, the most vulnerable winter range is that of the Carcross herd. This herd has the smallest seasonal range which is in a forested lowland where humans often take part in **recreational activities**. The Atlin winter range is somewhat affected by snowmobiling activity and the Ibex winter range is affected by **extensive** snowmobiling activity. Still, Carcross receives the greatest amount of impact from recreational activity. This means that it experiences all the impacts felt by the Atlin and Ibex herds, including the impacts from “residential/commercial lots, forestry, woodcutting, agriculture land titles/grazing leases, dog mushing, skiers, etc.” (Egli, 2000).



“WE ARE MOVING IN ON THEIR SPACE, IT’S NOT OUR SPACE, IT’S THEIRS. OUR ACTIONS HAVE SERIOUS CONSEQUENCES FOR THE LIFE AND HEALTH OF ALL OTHER SPECIES.”

– Shirley Beattie, 2021

Growth in tourism in the Carcross region is also based on wilderness and wildlife with hunting, fishing, hiking, and viewing. This growth in tourism depends on easy access, meaning arriving at their destination on a motorized vehicle and human activity follows any new access trail (Kuiack, 2006). Because recreational activities are popular in the Carcross range, more trails are being cut each year. New trails lead to more habitat disturbances caused by mountain bikers in the summer and dog teams and snowmobiles in the winter.



These mounting impacts can negatively influence the Caribou’s habitat and feeding areas for winter range. Human activity can disturb Caribou during feeding. Snowmobiles pack down the snow, making it challenging for Caribou to dig for lichen and making it easier for predators to hunt Caribou. Caribou need winter ranges with lichen and low snowfall to be able to get through during the winter (Egli, 2000). The First Nations and other residents with extensive experience are observing some changing patterns in winter habitat use by

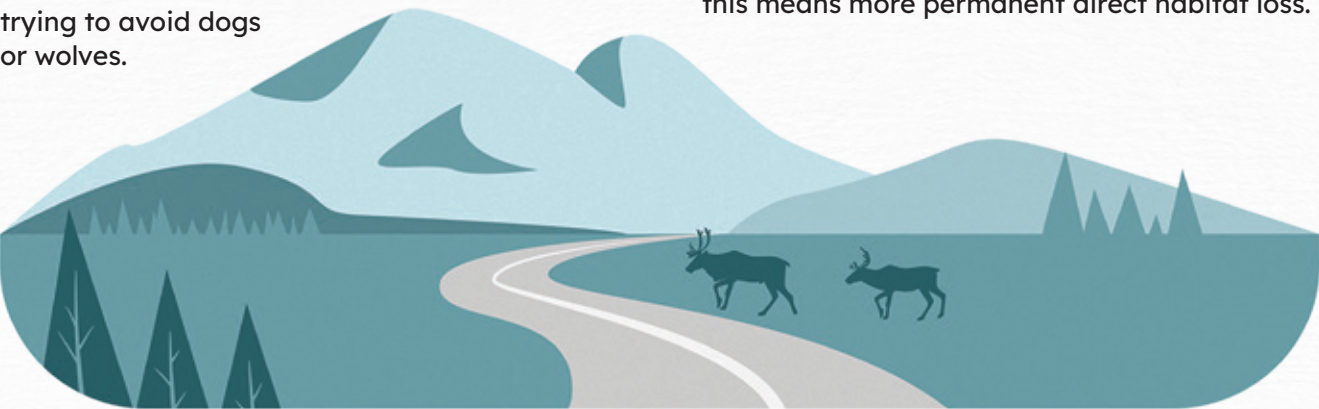
Caribou. These changes are in response to human rectreation, mostly snowmobiles and dog teams, which have the most impacts on Caribou because they travel the furthest and are the most common disturbances on many backcountry trails. These concerns led to a partnered research project on the impacts of human recreation and Caribou, being carried out by the the six Southern Lakes First Nations, Yukon Government, Yukon University, and Renewable Resources Councils.

Each of these activities and developments have large impacts on the Southern Lakes Caribou. The impacts of all of these activities can make Caribou leave parts of their range and can lead to the disappearance of the Southern Lakes Caribou in the area (Egli, 2000).

Human recreation will become more important as the population of the Southern Lakes grows. The Yukon population has grown by almost 15,000 people since the recovery program started (about 28,000 in 1991, and currently about 43,000), and most of these people live in the Southern Lakes area. The technology has also improved with snowmobiles, off road vehicles, and GPS, which affects Caribou habitat.

FARMS AND FENCES

Within the Carcross herd’s winter range, there are about 50 parcels of agricultural land. Many of these parcels of land are fenced and usually with barbed wire. Generally, Caribou do not jump fences, but the amount of energy used by walking alongside or around fences to reach new feeding areas can be exhausting. The fences around agricultural land can also create barriers to Caribou trying to avoid dogs or wolves.



“SO MANY THINGS WE COULD DO TO TEACH THE KIDS THE VALUES OF PROTECTING THESE CORRIDORS AND HABITATS, THE FENCES THAT DISRUPT THIS, HOW TO CARE FOR THE MIGRATION AND MOVEMENT OF THE CARIBOU AND OTHER ANIMALS.” – William Asp, 2021

ROADS AND HIGHWAYS

Driving along the Alaska, South Klondike, or Tagish Highways takes you through the Carcross winter range. Vehicles have been known to collide with Caribou crossing roads and highways in this area because sometimes Caribou lick salt off of the roads (Egli, 2000). Highways also reduce the ways in which Caribou can easily move across their ranges. Snowbanks make it difficult for the Caribou to cross the highways. The Caribou must cross the road to do all of the things they do in the winter: access winter feeding areas and avoid predators and people. Even though the roads cross directly through important Caribou habitat, they still avoid the roads and this changes their ability to move freely. When the roads also have developments, the Caribou avoid those areas even more because Caribou tend to avoid all linear disturbances. This means that roads, trails, and powerlines have direct and indirect habitat loss. Roads and trails also bring more activity of people with traffic and recreational activities. Roads are also easy travel for predators (humans and wolves), which can increase predation and hunting. Finally, roads tend to encourage further developments and this means more permanent direct habitat loss.

Collisions with Caribou on the roads have slowly increased to 8 Caribou per winter, all in the Carcross herd range.

The slow increase is potentially linked to growing traffic volumes, highway improvements resulting in increased speeds, and increased Caribou abundance. Some Caribou are struck and die later, but poor reporting of vehicle collisions also contributes to an underestimate. Vehicle collisions have a high impact on the herds because most collisions (about 65%) tend to be with female Caribou. This is because there are more female than male Caribou in the herd. When you add the vehicle collision mortality, roads are one of the single most impactful developments on Caribou. If the road is not built, many other potential future impacts are avoided.

Whether you see them or not, Caribou are around us all of the time. In the winter it is important to slow down for Caribou when you are driving on the highways. You will see the signs to watch for Caribou as a reminder that these areas are Caribou winter ranges.



LOGS AND FUELWOOD

Personal and commercial fuelwood is harvested within the Carcross winter range. Each year the demand for logs and fuelwood increases and this puts pressure on this region. Unfortunately, 75% of fuelwood is harvested illegally, so control over where people harvest is challenging. Personal fuelwood use overlaps with Caribou habitat and both woodcutters and Caribou like older forests. Personal fuelwood cutters do not really remove much habitat. It is the commercial logging that has more of an impact because it results in direct habitat loss as well as the creation of roads. Timing windows are used in Caribou habitat so that the impacts of fuelwood harvesting are lower, by not harvesting wood during the winter where the Caribou are in these areas.

Another impact of forestry activities has been the long-term prevention of forest fires. Caribou evolved in a fire landscape here, and a forest of many ages provides the best for Caribou because there are old stands supporting lichen, mixed with young stands which will have lichen in the future. The aging stands of the Southern Lakes also make for a higher risk of a big fire, and the potential loss of a large portion of winter range all at once.

FOREST FIRES

Forest fires can destroy a large area of forest and the effects can be terrible in the short-term. Fires are also necessary because they can lighten the competition of moss growth and **regenerate** pine and lichen species (Klein 1982; Schaefer and Pruitt 1991). Therefore, the average **fire-return cycle** is an important part of Caribou habitat (Environment Canada. 2012 Management Plan for the Northern Mountain

Population of Woodland Caribou (Rangifer tarandus Caribou) in Canada.). A Caribou’s diet is mostly made up of plant growth that grows on the ground and in the forest. These are called **lichens** and can take a very long time to grow. Forest fires can wipe out these lichens and it can be a long time before Caribou can forage in the forest once again.



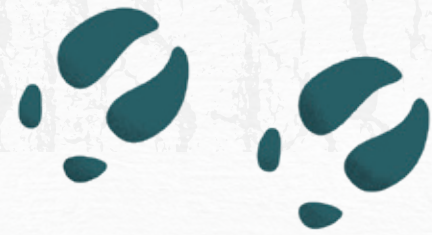
CLIMATE CHANGE

“THE EXOTIC WEATHER IS COMING, OUR COLD WEATHER AND WINTERS ARE LEAVING. BIG SHIFTS IN WARMING. THE ANIMALS ARE GETTING MIXED UP. SUCH RAPIDLY CHANGING CLIMATE FROM WHAT THE ANIMALS ARE USED TO, YOU CAN SEE THEM GETTING CONFUSED. SEASONS ARE GETTING MIXED UP AND THE ANIMALS ARE NOT SURE HOW TO RESPOND. SO MANY CHANGES.”

– Shirley Beattie, 2021

DID YOU KNOW

Rivers with thin ice cause danger for Caribou (even though they are excellent swimmers).



INSECTS

Climate change affects Caribou in all seasons. There is an increase of insect activity as the summers get warmer (Climate Change Affects Caribou, Environment Canada). This has a huge impact on Caribou because many insects prey on them; mosquitoes, blackflies, and nose bot flies, for example. Insects can also travel longer with herds when there is an increase in temperature. Caribou travel to higher altitudes making an effort to move away from swarms of insects to try and reduce the biting. During summer, they are often confined to mountain blocks and can only move either higher up, into windier locations, or find snow patches to avoid the bugs. Extra energy is used in this travel to avoid insects, which lowers Caribou's energy reserves (Project Caribou, 2018).

CHANGING ICE

Bodies of water are also freezing later in the season. This means that ice is thinner in the winter and melts more quickly with warmer temperatures in the spring. Rivers with thin ice cause danger for Caribou (even though they are excellent swimmers). Caribou can drown if the ice cannot support their weight (Project Caribou, 2018).

In the summer months, Caribou seek refuge from insects by gathering on cooler ice patches - areas of snow and ice up high on certain mountains that don't melt in the summer. Warmer summer temperatures meant that ice patches are not as large or available to Caribou in the Southern Lakes.

OTHER EFFECTS

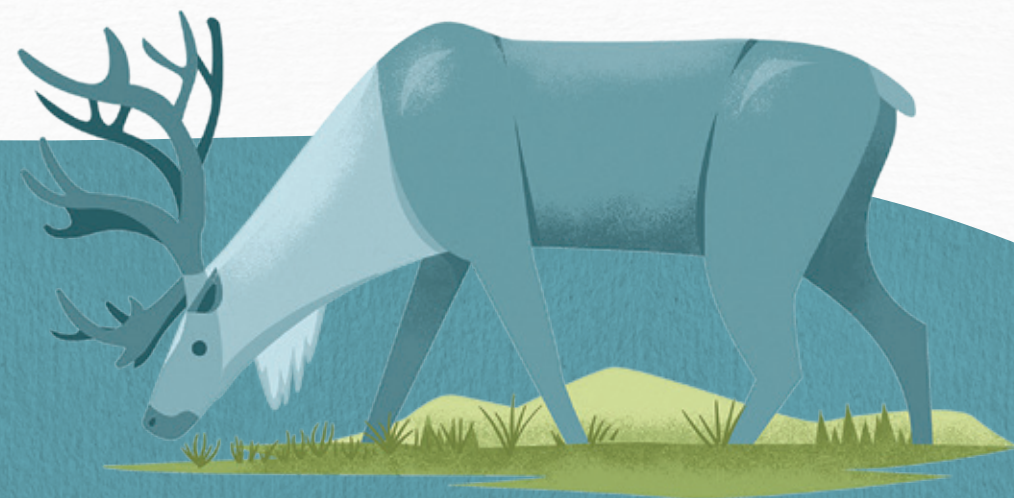
Other climate change impacts that have been observed over the years have been:

- deeper snow causing issues for Caribou travel and digging for lichens,
- freezing rain and melting winter conditions cause crust on the snow, making both travel and digging more difficult,
- softening of soil, and
- melting of permafrost with the potential for landslides and rock falls (Project Caribou, 2018).

These will all have an impact on the Caribou's ability to thrive in their environment (Hinterlands Who's Who).

POSITIVE IMPACTS

Not all changes have negative impacts on Caribou. The increase in temperature during the month of May means an earlier spring. This supports cows and calves because during this time, calves need to build strength in order to prepare themselves for the harsher winter months. An earlier spring means that the calves have more time to become stronger before winter arrives.



RELATIONSHIPS FOR RECOVERY: COMMUNITY-LED STEWARDSHIP



"YOU DON'T TRY TO CHANGE THEM IN ANY WAY AT ALL. IF YOU LOOK AFTER THEM, BECAUSE THAT'S WHAT THE CREATOR WANTS YOU TO DO, THEN IN A ROUNDABOUT WAY THE CARIBOU WILL LOOK AFTER YOU TOO, AND THE WHOLE LAND, EVERYTHING WILL LOOK AFTER YOU. AND SOMETIMES WHEN YOU'RE OUT IN THE WOODS YOU CAN SEE THAT, YOU CAN TELL."

– Norman Adamson, 2020



CO-MANAGEMENT

Caribou management has improved in recent years through co-management, where partnerships are created with the local First Nations who know and rely on Caribou in the area. These partnerships also include territorial and federal government representatives, biologists, and other stakeholders (Project Caribou, 2018). Together, these groups form decisions and determine how Caribou and factors impacting Caribou should be managed.

The Southern Lakes Caribou Steering Committee is a partnership between Carcross/Tagish First Nation, Kwanlin Dun First Nation, Ta'an Kwäch'än Council, Teslin Tlingit Council, Champagne and Aishihik First Nation, Taku River Tlingit First Nation, Government of Yukon, Government of British Columbia, and Government of Canada. The Southern Lakes Caribou Steering Committee is developing a management plan for Southern Lakes Caribou.

Humans can take action against the mounting impacts to support Caribou populations. One way is through **wildlife co-management**, which can involve bringing in management partners such as First Nations governments, boards and councils, stakeholder groups, and the public. 'Co-management' of wildlife resources is different than traditional 'wildlife management', which had much less focus on engagement and shared decision-making, especially before the land claim process in Yukon.

These groups have come together to create **Land Use** or **Range Planning Maps**. These management tools can imagine the consequences of human actions to reduce human impacts while supporting Caribou. This can be in the form of:

- licensing hunters and setting hunting seasons and quotas,
- protecting habitats,
- setting guidelines for habitat use (Project Caribou, 2018).

In Yukon, harvest of Caribou is managed differently for First Nation subsistence, licensed resident Yukoners, and licensed non-resident Yukoners. There is a similar system in British Columbia. Licensed harvest is looked after by the territorial or provincial governments.

First Nation harvest is a protected right in the Constitution, and under each Nation's Final Agreement. First Nation harvest can only be limited in very specific circumstances that have never been employed in Yukon.

RENEWABLE RESOURCE COUNCILS (RRCs)

Renewable Resource Councils are the independent, local management bodies in Yukon where land claim agreements have been signed. RRCs make recommendations back to government decision-makers. Membership of the RRCs is made up of 6-10 members, half of which are nominated by the local First Nation, and half by the Government of Yukon. These members do not represent any government or other agency. Rather, they are intended to represent the community.

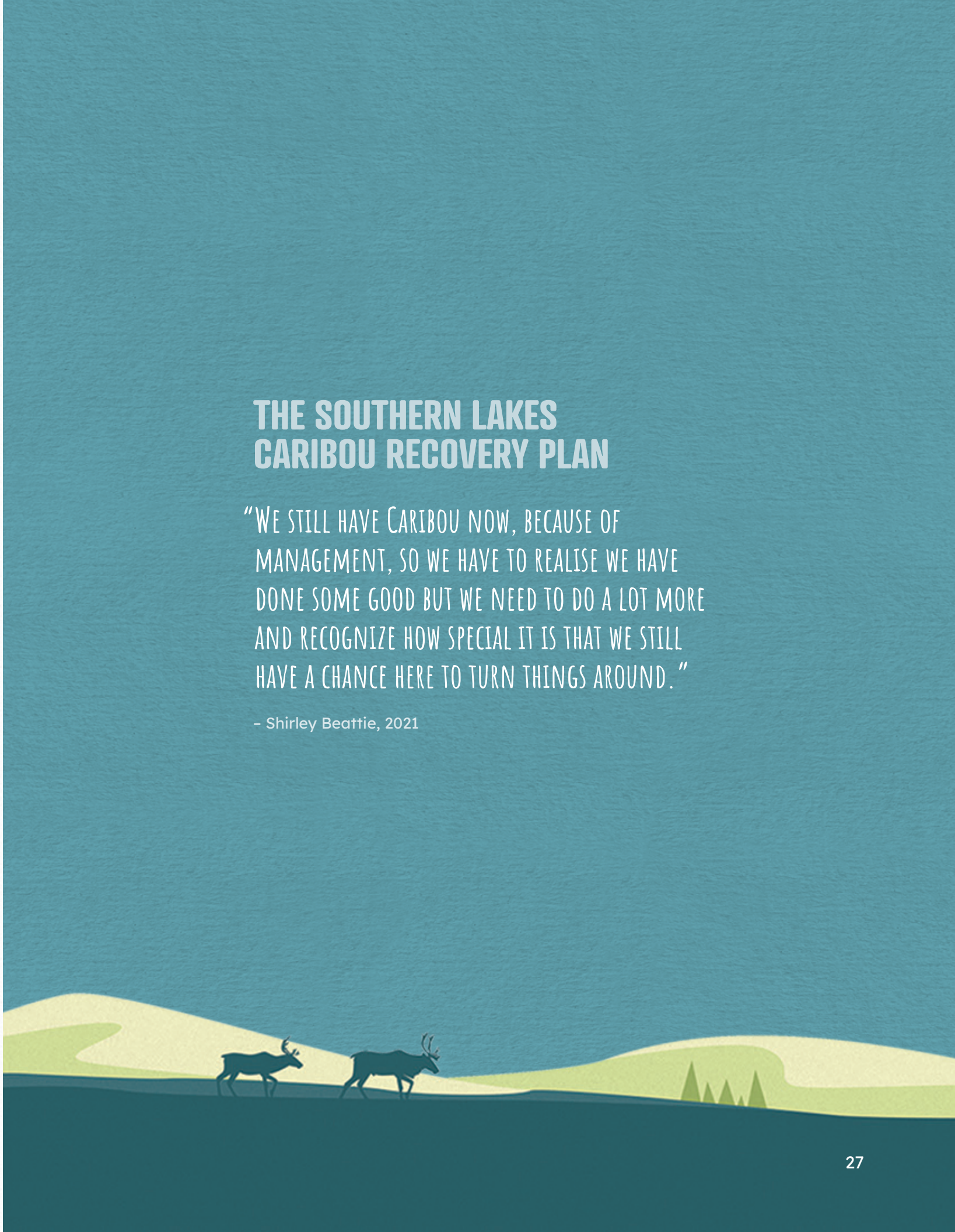
The RRCs were an attempt at co-management under the Umbrella Final Agreement. They attempt to better represent the specific needs, environments, and concerns of different communities.

RRCs have a mandate on public engagement and provide a mechanism for local community members to provide input into the planning and regulation of **renewable resources** such as wildlife, fisheries, and forestry specific to their traditional territories by all levels of government (territorial, federal and First Nations).

THE SOUTHERN LAKES CARIBOU RECOVERY PLAN

"WE STILL HAVE CARIBOU NOW, BECAUSE OF MANAGEMENT, SO WE HAVE TO REALISE WE HAVE DONE SOME GOOD BUT WE NEED TO DO A LOT MORE AND RECOGNIZE HOW SPECIAL IT IS THAT WE STILL HAVE A CHANCE HERE TO TURN THINGS AROUND."

- Shirley Beattie, 2021



In 1993, First Nations representatives came together in Carcross to talk about what could be done about the low numbers of the Southern Lakes Caribou Herd. These representatives were from:

- Carcross/Tagish First Nation
- Kwanlin Dün First Nation
- Ta'an Kwäch'än Council
- Teslin Tlingit Council
- Champagne and Aishihik First Nations
- Taku River Tlingit First Nation

And were joined by:

- Government of Yukon representatives
- and community members

The meeting sparked the start of the Southern Lakes Recovery Program (Southern Lakes Caribou RP), and a five-year plan was created to restore Caribou populations. The Southern Lakes Caribou RP “set out the following clear and basic goals to develop meaningful management strategies to achieve the goal of long-term recovery and **sustainability** of Caribou:

1. Increase public awareness.
2. Use local knowledge.
3. Eliminate harvest.
4. Discourage human developments that are harmful to Caribou.
5. Monitor the number of predators and harvests.
6. Monitor Caribou and alternate prey population patterns.” (Farnell, 2009).



The Southern Lakes Caribou Recovery Plan included:

- “regular community workshops,
- formation of a steering group,
- interviews with Elders,
- youth outreach through school programs,
- media features including related public service announcements,
- and a 24-hour wildlife telephone hotline” (Farnell, 2009)

A STOP TO HARVESTING

In 1993, all licensed harvest was forbidden and so people had to find alternate sources of game meat. The Carcross/Tagish First Nation, Kwanlin Dün First Nation, Ta'an Kwäch'än First Nation, Teslin Tlingit Council, Champagne and Aishihik First Nations, and the Taku River Tlingit First Nation voluntarily stopped hunting. Game Guardians were hired to keep an eye on the area during winter. Mapping and ongoing monitoring of migration, population, human disturbance, predation and more were tackled (Farnell, 2009).

Together, “these management actions [led to a] continuous population growth in the herds”. Without predator control intervention increases in herd numbers could only have happened through the collaborative effort of recovery partners with [an elimination] of all hunting” (Farnell, 2009).

As of 2022, collisions with motor vehicles has become the single largest source of human-caused mortality for Southern Lakes Caribou in Yukon (Farnell, 2009).

The licensed harvest ban is still in effect today and other efforts have been made to help the Caribou thrive. First Nations Game Guardians were created to watch over the herds, to make sure no hunting was taking place. *Game Guardians patrol the Yukon portion of land that the three herds range on.* Respected Carcross/Tagish First Nation Elder Art Johns had been guarding the Carcross herd since 1993 and former Conservation Officer Larry Bill had been patrolling the Ibex herd since 1998 until his retirement. This is a First Nations-led collaborative effort, and has sparked continued **advocacy** and **activism** for the Southern Lakes Caribou herds.

GAME GUARDIANS ON THE LAND

First Nations Game Guardians were hired to watch, to keep an eye on the area during winter, and to spread the word out on the land. Mapping and ongoing monitoring of migration, population, human disturbance, predation and more were tackled (Farnell, 2009). Game Guardians spoke with hunters they met on the land, and this was critical in the early years to build support for the voluntary harvest restrictions. They talked about Caribou and the program, helping to raise awareness and build respect for the Caribou, well beyond simply hunting. *Game Guardians patrol the Yukon portion of land that the three herds range on.*

Art Johns, a respected Carcross/Tagish First Nations Elder, was a pivotal guardian of the Carcross herd, and Larry Bill, a former conservation officer, was an important guardian of the Ibex herd. This is a First Nations-led collaborative effort, and has sparked continued **advocacy** and **activism** for the Southern Lakes Caribou herds.

“OUR CULTURE IS BUILT UPON LOOKING AFTER THE LAND - THE ANIMALS. WE AREN'T DOING A GOOD JOB OF THAT RIGHT NOW. WE NEED TO CHANGE THAT. WE NEED MORE PROTECTED AREAS, PARKS, WHATEVER NEEDS TO BE DONE TO SAVE THE SPECIES.”

- William Asp, 2021



Together, “these management actions [lead to a] continuous population growth in the herds”. Without predator control intervention increases in herd numbers could only have happened through the collaborative effort of recovery partners with [an elimination] of all hunting” (Farnell, 2009). This is remarkable, a rarity across Canada, and there are almost no other examples where Caribou recovery has been so successful without the use of predator control.

CURRENT MONITORING AND MANAGEMENT TECHNIQUES

The Yukon Government and local First Nations collaborate to use a number of methods to monitor Caribou herds in the Southern Lakes including:

- Collaboration on research projects with the academic community, indigenous groups, etc.
- Seasonal **aerial** surveys to see how many males, females and calves are in the herd
- Collaring Caribou (collars give us real-time locations of Caribou and help us understand how Caribou choose to use the landscape --> identifies movement corridors, *areas of high-quality habitat, responses to disturbance, etc.*)
- Intensive aerial surveys to get population estimates
- Health/diet info (e.g., body condition, disease/parasite sampling, fecal pellet collection, etc.)
- Motion-sensing cameras to detect Caribou presence
- Ongoing Game Guardian programs to monitor the land and speak with land users
- Public communication and information sharing initiatives, like the southern lakes Caribou story map, website, radio ads, and others

- Studying wolf abundance, pack range, behaviour, and diet to look at the impact of predation on the recovering Caribou herds
- Studying the impact of human recreation on the behaviour, stress levels, and habitat use of Caribou
- Using current and past knowledge of Caribou range use to inform land development
- Studying the fate of collared Caribou to obtain adult survival rates

ONGOING STEWARDSHIP: THE SOUTHERN LAKES CARIBOU RELATIONSHIP PLAN

“TRY TO WATCH AND LEARN FROM THE ANIMALS AROUND US. EVERYTHING ABOUT THE ANIMALS IS A VALUABLE LESSON. YOU CAN SEE HEALTH AND VITALITY, OR LACK THEREOF, ON THE ANIMALS. GIVE THE ANIMALS THEIR SPACE. LEARN, ENJOY, WATCH, LISTEN AND GIVE OTHER SPECIES SPACE TO LIVE. KEEP YOUR CAMP CLEAN. DON’T ATTRACT THE ANIMALS AND THEY WON’T GET INTO TROUBLE. RESPECT AND SPACE. SHARE AND CARE.”

– Shirley Beattie, 2021



Caribou have been roaming the Yukon wilderness for thousands of years. Carcross, first known as Caribou Crossing, is on the Traditional Territory of the Carcross and Tlingit First Nations. The Southern Lakes Caribou (Southern Lakes Caribou) are strongly linked to the history of this land and to future generations on this land. To be sure that the Southern Lakes Caribou continue to thrive and stay healthy, there needs to be ongoing **monitoring** and planning. In 2017 the Southern Lakes Caribou Relationship Plan (Southern Lakes Caribou Recovery Plan) began.

WHAT IS A RELATIONSHIP PLAN?

A *Relationship Plan* is a wildlife work plan that uses information to manage and create ways to protect wildlife. In the past, territorial governments have managed the herds by gathering and sharing information.

This Relationship Plan brings together the information gathered but also includes First Nations perspectives on how Caribou are connected to language, culture, and sustenance. With First Nations in the Yukon and British Columbia taking the lead, this means that there is a focus on respect for each other and for all wildlife including Caribou.

This Relationship Plan is **co-managed**, meaning that there are many voices coming together to manage the future of the Southern Lakes Caribou.

Co-management involves an **engagement process** beginning in 2022. This is where **feedback** will be gathered from Elders, Knowledge Keepers/Holders and the public. A draft of the Relationship Plan is being looked over by nine groups whose voices will come together with partnering governments.



THREE PILLARS

Efforts of the Southern Lakes Caribou Recovery Plan have monitored the herds and now know their preferred habitats and how their habitat has been affected by human activity. These can be seen in the three pillars that can help support Caribou populations:

1. HARVEST

All harvesting stopped. No person with a hunting license could hunt Caribou and all six First Nations volunteered to stop hunting Caribou.

2. MONITORING

How are the herds doing? Growing, shrinking, stable? Biologists came to suspect that the Southern Lakes Caribou herd was not growing because of overhunting. Carcorss and Tagish First Nations agreed with this conclusion—there was too much shooting of wildlife and activity with *poachers* in the area. *Game Guardians*, First Nations patrols, began monitoring the highway, questioning hunters they came across and also counted herds of Caribou.

3. HABITAT USE

How do people go on the land in ways that are respectful to Caribou? From driving on the highway, biking on trails, using a camper to travel down sideroads, we all need to do our part in rethinking how we connect with the land that Caribou calls home. Forestry, mining, agriculture, rural residential lots all affect the Southern Lakes Caribou habitat areas.

Monitoring herds and being mindful of habitat use are two ways that have supported the recovery of the Southern Lakes Caribou. Now there are about 4,000 Caribou in total among the Southern Lakes' four herds. If hunting begins again, these numbers could go down very quickly and the Southern Lakes Caribou could be at risk. The Southern Lakes Caribou Recovery Plan could rebuild the relationship that many First Nations have been missing related to sustainable harvesting and Traditional Ways of Knowing, Doing and Being. Language and culture are also built into their relationship with Caribou because of a spiritual connection to land and water. The Southern Lakes Caribou Recovery Plan could help the Caribou population grow for future generations, support traditional harvests, and support healthy Caribou.

CHALLENGES WITH THE RELATIONSHIP PLAN

We know that Caribou numbers have gone up and that is exciting to see, but what about returning to harvesting? Some questions people have include:

Will there be a return to harvesting practices in the Southern Lakes District (SLD)?

What will happen with cultural harvests for First Nations and permit hunts for Yukoners and outfitters?

Should harvests begin again? Who should harvest?

All nine voices are working together with their shared values for Caribou.

What about other voices in this conversation? There may be people outside of these nine voices who will have an opinion on whether or not harvesting should be allowed. There may be people who would like permission to harvest, permission to access habitat or to end spending on monitoring programs. Discussions about harvesting need to be a focus point moving forward.

HELPING SOUTHERN LAKES CARIBOU AND BEYOND

"JUST THE FACT THAT WE STILL HAVE THEM[CARIBOU]. WE NEED TO KEEP THEM AROUND. THEY ARE A SPECIES THAT IS INCREDIBLY IMPORTANT AND NEEDING PROTECTION. WE STILL HAVE ANIMALS AROUND AT THE MOMENT BECAUSE OF MANAGEMENT. WE NEED TO KEEP THAT UP. THAT IS SPECIAL. WE HAVE TO RECOGNIZE THAT AND KEEP IN MIND WHAT OUR ELDERS SAY."

– Shirley Beattie, 2021

The Southern Lakes Caribou Recovery Plan has been successful and has highlighted the need to protect other wildlife in the area. Here are some of the ways that this program moved beyond just helping Caribou:

- British Columbia stopped hunting the Carcross herd in 2020;
- A phone line called a *TIPP line* was created for reporting Caribou sightings in the southern lakes is now used for all wildlife reporting in the Yukon;
- An assessment of ALL wildlife in the SLD has been created and is being used;
- A set of recommendations has been created for the SLD with Yukon First Nations partnering with other governments for protection of all species in the SLD.

This means that the same nine voices will continue to come together with First Nation voices guiding the way in partnering with governments for all species of wildlife in the SLD. This is a unique plan because it is led by First Nations, and is in partnership with governments. This is a big step forward in protecting wildlife for years to come.

"EVEN IF WE'VE DONE THAT, WE'LL NEVER GET IT BACK TO THE WAY THEY WERE, WITH THOUSANDS AND THOUSANDS AND THOUSANDS LIKE THEY TOLD ME. MY GRANDFATHER USED TO TELL ME 'YOU SEE THAT HILL, IT USED TO BE JUST BLACK.' ONLY THING YOU CAN DO NOW, FOR WHAT'S THERE, IS GIVE IT A HELPING HAND. IT WOULD INVOLVE EVERYBODY, SCHOOLS, EVERYBODY."

– Norman Adamson, 2020

GLOSSARY

Activism the policy or action of using vigorous campaigning to bring about political or social change

Advocacy is an activity by an individual or group that aims to influence decisions within political, economic, and social institutions

Aerial existing, happening, or operating in the air

Babiche snare A snare that is made from the tendons of Caribou, which is used to hunt small animals

Biology the plant and animal life of a region or environment

Boreal of, relating to, or located in northern regions

Captive rearing wildlife born, bred, raised, or held in captivity.

Climate change a change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels

Controversial giving rise or likely to give rise to public disagreement

Corrals a pen or enclosure

Cultural harvests harvesting plants or animals for cultural purposes

Delicacies something pleasing to eat that is considered rare or luxurious

Ecology the totality or pattern of relations between organisms and their environment

Ecotype a population of a species that survives as a distinct group through environmental selection and isolation and that is comparable with a taxonomic subspecies

Elders a respected person that holds vast knowledge in Indigenous culture

Extensive covering or affecting a large area

Exterior situated on the outside

Fire-return cycle The time between fires in a defined area, usually at the scale of a point, stand or relatively small landscape area

Foraging to wander in search of forage or food

Fur traders a person who is in the business of buying and selling furs

Game wild animal hunted for sport or food

Generation the average span of time between the birth of parents and that of their offspring

Impoundments a body of water formed by impounding

Industrial development is the building and growing of industries within an economy by using new technologies

Knowledge Holders a person in entrusted with vast knowledge of Indigenous culture

Land use planning is the process of regulating the use of land by a central authority

Lichens a simple slow-growing plant that typically forms a low crusty, leaflike, or branching growth on rocks and trees.

Migrated to move from one country, place, or locality to another

Missionaries person or people undertaking a mission and especially a religious mission

Mortality the number lost or the rate of loss or failure

Mountainous containing many mountains

Origin the point or place where something begins or is created

Permit Hunts a licence authorising the bearer to kill a certain type of animal during a specified period of time

Prospectors a person who searches for mineral deposits, especially by drilling and excavation

Recreational activities any outdoor activity under- taken for the purpose of exercise, relaxation or pleasure

Refuge a place that provides shelter or protection

Refugium an area of relatively unaltered climate that is inhabited by plants and animals

Regenerate to become formed again

Renewable resources are an energy source that cannot be depleted and are able to supply a continuous source of clean energy.

Settlers someone who settles in a new region or colony

Singed superficially or lightly burned burned on the edges

Species a class of individuals having common attributes and designated by a common name

Stakeholders denoting a type of organization or system in which all the members or participants are seen as having an interest in its success

Sterilization surgery to make a person or animal unable to produce offspring

Stewards a person who acts for another in management

Stewardship the careful and responsible management of something entrusted to one’s care

Subsistence a source or means of obtaining the necessities of life

Sustainability of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged

Thermal stress stress in a body or structure due to inequalities of temperature

Vegetation plant life or total plant cover

