YUKON

Wetland Field Guide

Ducks Unlimited Canada

SINWAA | GREY RIDGE | MOUNT WHITE

YUKON
Wetland Field Guide

Acknowledgements

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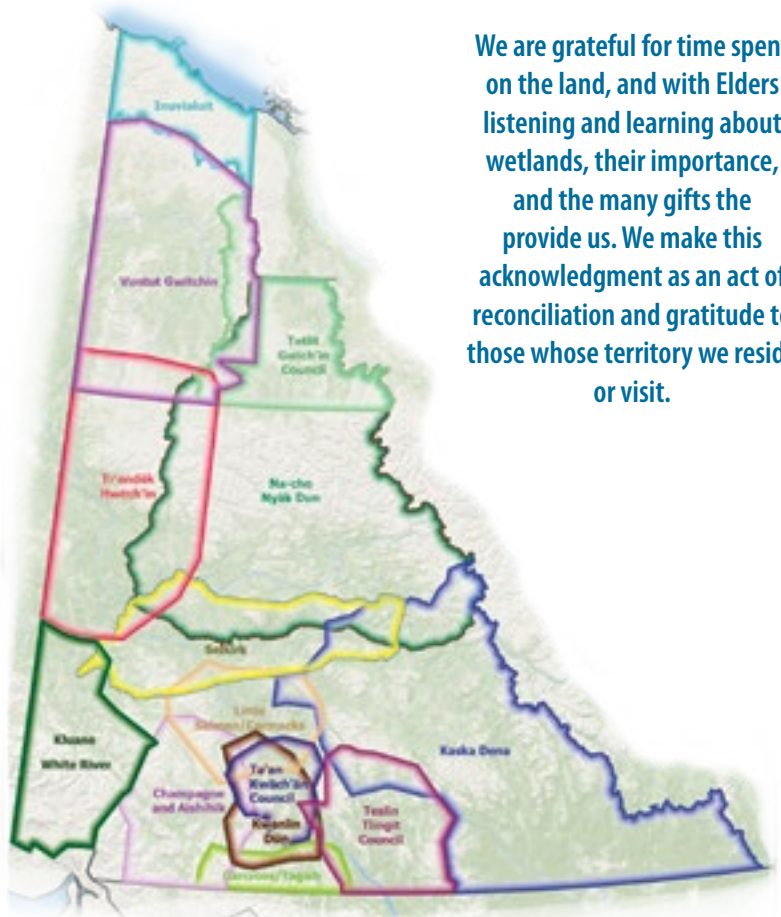
LAND ACKNOWLEDGMENT

Ducks Unlimited Canada (DUC) respectfully acknowledge the First Nation and Inuvialuit peoples who have lived in Yukon since time immemorial.

Indigenous peoples have travelled and cared for these lands for generations. Through fishing, hunting, trapping, gathering and performing ceremony on these lands, Indigenous peoples have forged a connection to the land and its resources that continues to be vitally important today.

This guide braids Traditional and Western Knowledge that would not be available without the Knowledge gifted to us by traditional Knowledge Keepers and Elders who are still with us today and those who have gone before us.



Traditional territories of Yukon First Nations and settlement areas of Inuvialuit and Tetlit Gwich'in.

We are grateful for time spent on the land, and with Elders listening and learning about wetlands, their importance, and the many gifts the provide us. We make this acknowledgment as an act of reconciliation and gratitude to those whose territory we reside or visit.

FOREWORD

"CH'IHILII CHÌK IS A LONG AGO PLACE, LAKE OF PLENTY, LAND OF OUR ANCESTORS, THE DAGOO PEOPLE FROM VUNTUT GWITCHIN, TEETL'IT GWICH'IN AND DAWSON AREAS, WHO HAD ONCE INHABITED THIS AREA WITH ITS RICH RESOURCES IN A VAST COUNTRY NOW KNOWN AS VUNTUT TRADITIONAL TERRITORY. THEIR RELATIVES; US, WHO HAVE COME HERE TODAY TO VISIT THEIR HOMELANDS AND REDISCOVER AND RECONNECT TO OUR PAST."

- Elder Mary Jane Moses

The following excerpt is by Elder Mary Jane Moses originally written July 23, 2009 for Vuntut Gwitchin First Nation to document experiences gained from an oral history trip to Whitefish Lake, gathering stories of the region from Elders.

It is the place to be, in upper Yukon, the lake that flows into Tizya Creek into Porcupine Lake, which is a part of the Porcupine River with its still waters.

Ch'ihilii Chìk is a small eroding island in the middle of a huge lake that is drying out slowly, filling up with the beautiful water lilies; the fish are no more. Once a rich caribou hunting area shared by Teetl'it Gwich'in, Dagoo Gwich'in and Vuntut Gwitchin. The long ago stories speak of that. The close connections that were between all Gwich'in of this vast area.

Ch'ihilii Chìk is the pristine wetlands with the many species of ducks and birds, the wildlife, now a protected area.

Ch'ihilii Chìk; remembered by our elders from a long time ago as a place of sustenance for traditional foods, the fat caribou, the dry meat, the blood soup, the itsuh and bone marrow and the tasty whitefish for which the lake is named.

We came here to connect with the past, to hear the stories from our elders of today of their travels and activities in the early 1900s, so we in turn could pass those stories to the younger generation to help them in their future deliberations, to know their true heritage going forward. Mahsi'

We came here to learn about where our roots lie, our identity, our connections to this rich land and our history; it makes one proud to

CH'IHILII CHIK | WHITEFISH LAKE

have known we came from strong people, a strong nation. Their travel routes criss-crossed a huge area, traveled only by dog team in winter and walking long distances to Fort McPherson in NWT with dog packs and rafts/boats in the summertime. Hai'

Ch'ihilii Chìk is a special gathering place for the Dagoo who shared their resources off of the land with their neighbors, the Vuntut Gwitchin and Teetl'it Gwich'in kat.

Mahsi' Cho that we were able to connect with this land, to see the vast distances that have been traveled in the past between Ch'ihilii Chìk, Kàachik, Chuu Tl'it, and Jak Chyahnjik Vadzaih Tthał, [Berry Creek Caribou fence], a spiritual place where hunters and families gathered for caribou, their markings still seen on the land, just seeing it meant so much, made by strong hands and strong minded people and all other places where our people lived strictly off of the land for their livelihood. Their imprints, their markings on trees are still on the land to see with our own eyes.

Mahsi' cho for those happy times shared by our elders and the ancestors, of gathering together, laughing, sharing food, telling stories, celebrating but for a short time before they had to go back out on the land to survive which sometimes happened when there was hardly food around, still they moved on and survived so that we could be here today, a testament of their courage and determination.

Mahsi' Cho our Gwich'in people from long ago worked so hard together to make things work amongst themselves and visitors, working with happy hearts, helping each other so that we could be here today to reconnect, rediscover and carry on those stories, carry on the teachings and traditions and the practices of the Gwich'in. We are to be so grateful, Hai'. We are of the Gwich'in Nation, we have much to be proud of; we need to carry forth the teachings and skills handed down through the generations. Mahsi' Cho.

I am grateful for experiencing the Whitefish Lake – Ch'ihilii Chìk oral history project trip, a once in a lifetime experience for me personally. I felt happy for the first time, so relaxed knowing deep down my roots are from this area, my mother is a Dagoo, from Dawson area, an elder from Old Crow told me once that I am "real Dagoo." I am Dagoo and proud of it. I had come home. I felt such a closeness to the land as never before, envisioning our ancestors in tune with the land and animals and all of nature. I left Whitefish Lake - Itilii [my Teel'it Gwich'in dialect] with a happy heart."

- Elder Mary Jane Moses

CONTENTS

INTRODUCTION

Wetlands are important landscape features that support ecosystem functions, provide benefits to surrounding ecosystems and communities, and are culturally important ecosystems for Indigenous communities. This guide is intended to introduce users to Yukon wetlands including the importance of wetlands on the landscape and to Indigenous peoples, and, how to identify wetlands to the five classes (bog, fen, swamp, marsh, shallow water) using readily observable water, plant and soil characteristics as it aligns with the Yukon Wetland Classification System.

This guide is intended for:

- Anyone interested in identifying and classifying wetlands in Yukon.
- People whose decisions or actions impact wetlands or their functions.

This guide can be used as:

- A quick reference field guide to assist in identifying and classifying Yukon's wetlands and in understanding their cultural significance, processes and functions.
- A resource for recognizing soils, plants and animals characteristic of Yukon wetlands.
- A support for outreach or knowledge exchange activities with communities, industry or government.

Wetlands are places you experience through sight, sound and smell. The smells are not always pleasant, swamps can smell of rotten eggs or of rotten meat from the moose kills of bears or wolves.

Regardless,

"WE SHOULD EXPERIENCE THE WETLANDS, LISTEN TO THE BIRDS, EVEN THE MOSQUITOES."

- Elder Charlie Dickson

Fireweed is the floral emblem of Yukon.

Fireweed on Birch Bark *by Darcy McDiarmid.*

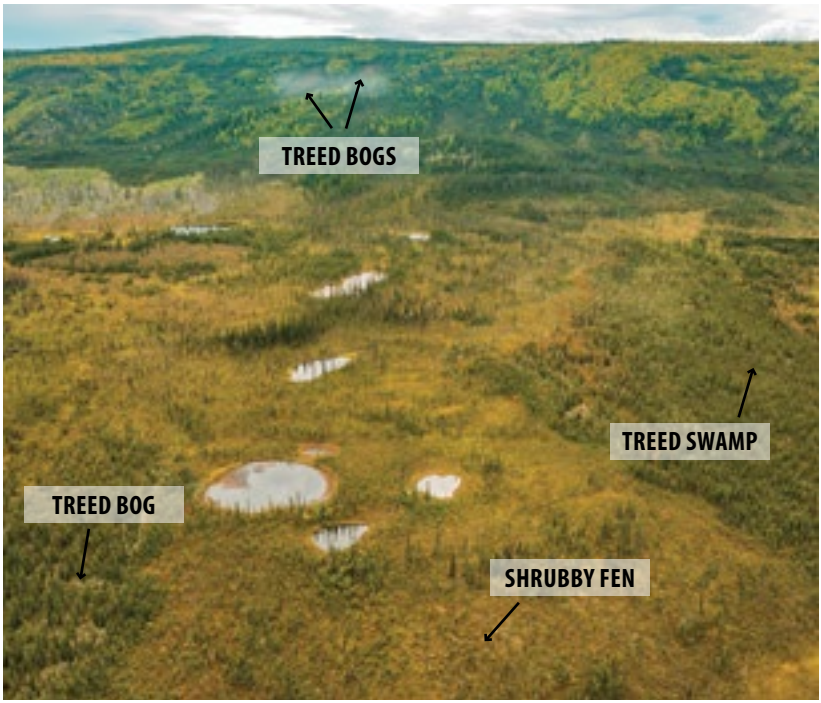
Darcy McDiarmid is a Han and Northern Tutchone artist from the crow clan, Darcy draws inspiration from nature, trying to capture the pristine beauty of our natural world. She believes in honouring her ancestors by devoting her art to heritage and culture and the reclamation of traditional practices.

What is a Wetland?

"A policy for the stewardship of Yukon's wetlands," hereafter referred to as the **Yukon Wetland Stewardship Policy**[1], defines wetlands as:

> *"…areas that typically have water at, or near, the ground surface during some or all of the year. These areas can be considered wetlands if the water is present long enough for poorly drained soils to form, and for water-loving plants to become the dominant type of plant in the area. There are five classes of wetlands: bogs, fens, marshes, swamps and shallow open water wetlands."*

Some wetlands are isolated, while others are highly interconnected along a landscape gradient. These interconnected wetlands are often referred to as complexes (shown below), integrated with other aquatic environments such as streams, rivers and lakes. For example, Indigenous cultures recognize that salmon habitat occurs within wetland pools along river systems, while moose forage occurs along riparian fringes of ponds and lakes.



1 Government of Yukon, 2022

Common Features of Yukon Wetlands

- Temporarily, seasonally or permanently flooded, with water present above or below the ground surface (within the plant rooting zone).
- Water is less than two metres deep in mid-summer; otherwise the ecosystem is classified as a lake.
- Vegetation cover is dominated by water-tolerant plants, including trees, shrubs, herbs, grasses, sedges, rushes and mosses *(see Wetland Plants on page 67)*.
- Below the surface, there may be a thick layer of organic soil, or peat, and an associated layer of frozen ground, or permafrost *(page 32)*.
- Water regime might be stagnant (little water level fluctuation or flow) or dynamic (seasonally fluctuating water levels or slow moving water above or below the ground surface).

Wetlands can appear differently depending on the time of year. For example, during mid-summer, when water levels are typically at their lowest, it can become difficult to identify a wetland by standing water alone. In such cases, wetlands are more reliably identified by examining the soil characteristics. We recommend that wetland identification and classification rely on the criteria outlined by the Government of Yukon's Wetland Classification Standards.[2]

"WETLANDS ARE A PART OF WHO WE ARE; THEY ARE A LINK TO OUR CULTURE, OUR WAY OF LIFE. WITHOUT WETLANDS, WE WOULD NOT SURVIVE, EVERYTHING WOULD BE OUT OF BALANCE. NOT ONLY DO THEY PROVIDE FOOD FOR HUMANS, BUT THEY ARE RICH ECOSYSTEMS FOR ALL WILDLIFE AND WATERS."

- Elder Mary Jane Moses

2 Government of Yukon, 2024

Wetland Functions and Benefits

Wetland functions refer to the living organisms, water regime and other chemical processes that operate within wetland ecosystems.[3] Wetlands and their functions provide numerous ecological, cultural and economic benefits to society such as:

- Fish and wildlife habitat; many wetlands are sanctuaries for raising young (e.g., moose, waterfowl) and protecting them from predators who cannot easily access these areas.
- A source of traditional medicine and food; wetlands are often gathering places for camps, supporting subsistence lifestyles.
- A place for practicing cultural or recreational pursuits (hunting, fishing, gathering, bird watching), with associated economic benefits.
- Places of spiritual importance; allowing for peace, connection and healing.
- Flood and drought resilience by storing and slowly releasing water during spring snowmelt or heavy rainfall events.
- Improved water quality by filtering nutrients and contaminants, slowing their passage to downstream environments (streams and rivers).
- Carbon storage and sequestration to help regulate the global climate.

The primary goal of the **Yukon Wetland Stewardship Policy** is to ensure that these enormous benefits of Yukon's wetlands are sustained for future generations.[4]

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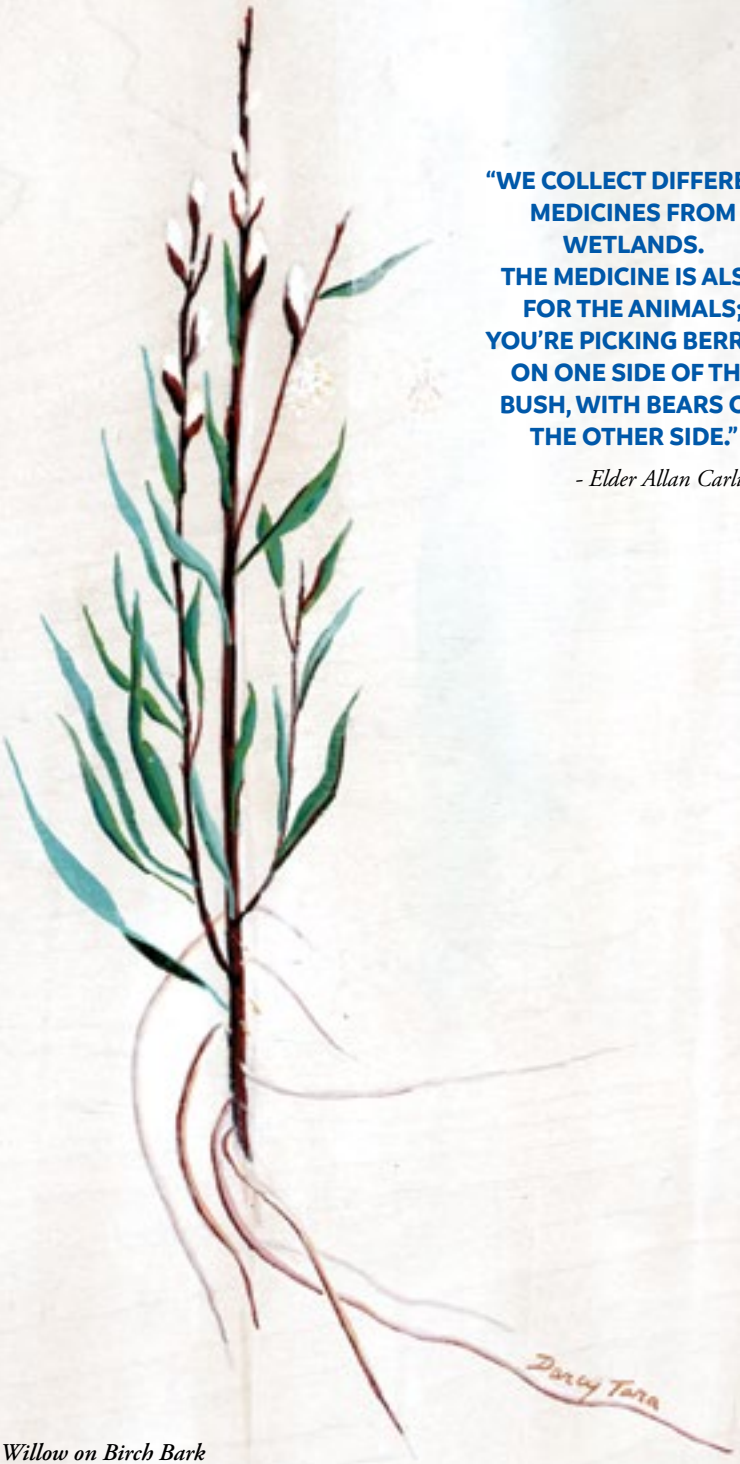


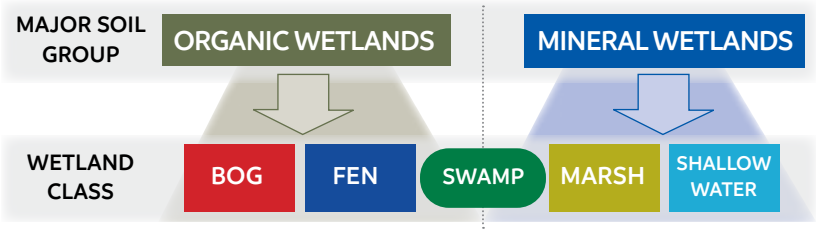
"WE COLLECT DIFFERENT MEDICINES FROM WETLANDS. THE MEDICINE IS ALSO FOR THE ANIMALS; YOU'RE PICKING BERRIES ON ONE SIDE OF THE BUSH, WITH BEARS ON THE OTHER SIDE."

- Elder Allan Carlick

Willow on Birch Bark
by Darcy McDiarmid.

Wetland Classes

There are five classes of wetlands: bog, fen, swamp, marsh and shallow open water. Organic wetlands, or peatlands, are bog and fen, and the mineral wetlands are swamp, marsh and shallow open water.



"IT TAKES EXPERIENCE TO LEARN HOW TO WALK THROUGH SWAMPS AND BOGS."

- Elder Charlie Dickson

Bogs

Bogs are peatlands with poorly decomposed organic soil (peat) at least 30 cm deep. The surface of a bog is often raised above the surrounding landscape and surface water is rarely present. If you dig into the peat, you are likely to encounter permafrost *(page 32)*. Bogs tend to receive their water inputs solely from rainfall and snowmelt, hence they have very limited nutrients and low plant diversity: black spruce trees, Labrador tea and bog cranberry are the most common species.

Bog. See Wetland Fact Sheets (page 46).

Fens

Fens are peatlands with poorly decomposed organic soil (peat) at least 30 cm deep. Fens have greater plant species diversity than bogs, owing to their nutrient-rich groundwater inputs. You are likely to find more mosses, sedges, cottongrass, herbs and several shrubs like bog birch and willows. In areas of the Peel River drainage and southeast Yukon, you can distinguish fens by the presence of tamarack trees in combination with soil indicators. Permafrost may be found below the mossy surface, although fens are not always perennially frozen and are capable of slow, diffuse water flow below the ground surface.

Fen. See Wetland Fact Sheets (page 52).

Swamps

Swamps are wooded mineral wetlands with organic soil deposits less than 30 cm. Occasionally, swamps can be peatlands, or peat-swamps, and have organic soil deposits deeper than 30cm. Surface waters are nutrient rich and fluctuate seasonally, often characterized by pools of water in mossy hummocks. Swamps are often found associated with river floodplains or transitional between uplands and ponds or peatlands; as a result, they are often termed as lowland or riparian areas. Plant species include robust black spruce trees, or sites with birch, poplar, willow and alders.

Swamp. See Wetland Fact Sheets (page 58).

Marshes

Marshes are mineral wetlands with shallow water that fluctuates across the growing season. At the surface, marshes may dry out in summer; however, water is still present in the rooting zone of plants. Marshes are also common along the fringes of rivers and lakes, and are often referred to as riparian areas. They are characterized by emergent vegetation such as sedges, grasses, rushes and reeds.

Marsh. See Wetland Fact Sheets (page 62).

Shallow Water Wetlands

Shallow water wetlands are mineral wetlands with standing water less than 2 m deep in mid-summer; deeper water sites are classified as lakes. Water levels vary seasonally, and may dry out entirely revealing mud flats in drought years. Given their water permanence and depth, aquatic plant species thrive in these ecosystems. They are often called ponds or sloughs.

Shallow water. See Wetland Fact Sheets (page 64).

Traditional Knowledge

Indigenous Traditional Knowledge and their Spirit laws are passed forward by Elders and Knowledge Keepers, originally received from Spirit, forming the foundation of the Indigenous worldview. Culturally significant, these laws are imparted within educational systems. The three core Indigenous Knowledge Laws of Respect, Care, and Share serve as universal principles globally, instilled as fundamental teachings to young children, thus constituting the building blocks of Indigenous laws and shaping relationships with all life forms.

In each recurring lifetime, individuals foster relationships with a Higher Power, Spirit Relations, self, family, community, land, water, creation, and others, progressing from oneself to the broader worldview.

Traditional Knowledge Laws:

- Respect everything, including Wetlands, water, animals, and plants.
- Take only what you need, giving thanks for what is taken.
- Share what is possessed, including Knowledge.
- Share Wetlands with all animals.
- Care for and steward the wetland, water, animals, and plants.
- Foster relationships with integrity, respect, and gratitude towards all living beings.
- Reciprocate giving back when receiving.

Principles:

- Harvest plants and medicines sustainably to ensure regrowth.
- Utilize established trails to respect Wetlands.
- Harvest only what is necessary, be it plants, fish, or game.
- Avoid chemical use on the land.
- Preserve water cleanliness, refraining from polluting.
- Camp and build away from Wetlands.
- Leave no trace, cleaning up after oneself.
- Honor seasons to allow natural replenishment.
- Observe and understand how changes impact the environment.
- Increase awareness of personal impact on nature, adapting in harmony with the environment.
- Manage wetlands and wildlife guided by Traditional Knowledge.

Healthy wetlands are essential to Indigenous ways of life (***Tre'Hudé***), serving as sanctuaries for wildlife, plants, insects, water, and Indigenous peoples. This traditional knowledge, shared through stories and conversations among Indigenous Knowledge Keepers and Elders, underscores wetlands' significance. Incorporating Elders' wisdom and traditional place, plant, and animal names, this guide urges readers to reflect on the importance of diverse ecosystems.

The traditional knowledge braided into this publication was accessed through a workshop with Indigenous Knowledge Keepers, Elders representing seven of the fourteen Yukon First Nations (and one from the Taku River First Nations in British Columbia) where Knowledge was verbally shared through stories and conversations between participants.

Stories and quotes from Elders further highlight wetlands' critical role in sustaining healthy ecosystems, wildlife, water, and Indigenous livelihoods. ***Doòli laws***, shared by the Elders, outline guidelines for harvesting from and spending time in wetlands, emphasizing respect for the land, responsible harvesting, and gratitude towards the Creator.

The wisdom and perspectives shared within this guide remain with the Elders, acknowledged with gratitude for enriching both the authors and readers with their invaluable insights.

"EVERYTHING IS TOTALLY CHANGING IN MY COUNTRY. WHERE I USED TO CAMP BY A SWAMP, TREES ARE FALLING OVER DUE TO FLOODING AND MOVING GROUND, SINKING AS THE WATER MELTS BELOW THE SURFACE. EARLY IN THE MORNING I COULD HEAR ALL THE BIRDS SINGING, DUCK NOISES - IT BRINGS ME PEACE AT HEART."

- Elder Rolland Peter

Elder Roland Peter is from White River First Nation, and lives in Beaver Creek, Yukon. A residential school survivor, Elder Peter spends much of his time on the land. He is an avid hunter and outdoorsman.

WE SHOULD CONTINUE TO MANAGE THE WETLANDS FOR OUR MEDICINES, WHICH ARE IN ABUNDANCE. WE NEED TO LISTEN TO AND TEACH THE YOUNGER GENERATIONS, WHO ARE CONCERNED ABOUT GLOBAL WARMING. WETLAND CHANGES COULD BE AN INDICATOR THAT SCIENCE AND TRADITIONAL KNOWLEDGE RESEARCH SHOULD MONITOR CAREFULLY."

- Elder Allan Carlick

Elder Allan Carlick is a Taku River Tlingit currently residing in Atlin, BC. Allan's career spans 40 years as a First Nation liaison, conservation officer and fisheries technician. Elder Carlick is a strong advocate of re-establishing traditional Indigenous educational structures, passing down knowledge to young people and establishing animal sanctuaries.

"CERTAIN TIMES WE LET PLANTS GROW, CERTAIN PLANTS THAT WE USE FOR MEDICINE, WE JUST LET IT GROW. WE DON'T BOTHER THINGS IN THE SPRINGTIME. OUR ELDERS TELL US THAT; DON'T BOTHER THINGS IN THE SPRING, JUST TAKE WHAT YOU NEED. SO, THAT'S RESPECTING THE ANIMALS, AND THE PLANTS, THE PONDS, AND THE WETLAND."

- Elder Russell Burns

Elder Russell Burns is a Kwanlin Dün First Nation citizen who resides near his trapline in the Annie Lake area. Along with staying active trapping, Russell also contracts with schools in on-the-land educational programs.

"A HEALTHY WETLAND IS WHERE EVERYTHING IS THRIVING, WITH AN ABUNDANCE OF WILDLIFE AND FISH, GOOD BERRY PICKING AND CLEAN WATER TO DRINK. WE MUST SHOW RESPECT FOR WHAT THE LAND PROVIDES TO US, IN ALL SEASONS, BY TAKING ONLY WHAT WE NEED, ENSURING SUSTENANCE FOR FUTURE GENERATIONS. WE MUST ENSURE OUR WAY OF LIFE IS PASSED ONTO FUTURE GENERATIONS."

- Elder Mary Jane Moses

Elder Mary Jane Moses is a Tetlit Gwich'in citizen from Ft. McPherson, NWT, currently residing in Old Crow, Yukon (for 44 years). Most of Elder Moses' career has been in the heritage field, within the Vuntut Gwitchin government. Mary Jane generously provided her observations from an oral history trip to Whitefish Lake as the foreword for this field guide.

"WHEN SWAMPS ARE DRAINED, YOU SEE GRIZZLY BEARS CHASING AROUND MOOSE CALVES. THE COW MOOSE RETURNS TO THE SAME SPOT TO CALVE EVERY YEAR BUT THE BEARS CAN CATCH CALVES WHEN THERE IS NO WATER."

- Elder Charlie Dickson

Elder Charlie Dickson is a Liard First Nation citizen originally from Watson Lake, currently residing in Upper Liard Village. He is an active trapper and outdoorsman. Elder Dickson enjoys taking young people out to his trapline cabin, to give them another perspective on their culture and homeland.

"VERY IMPORTANT TO KEEP THE AREA CLEAN. TAKE ONLY ONE MOOSE, AWAY FROM THE LAKESHORE. ALL THE BONES BURN, THEN THROW IN THE LAKE. WE HAVE TO START TEACHING YOUNGER PEOPLE BY TAKING THEM IN THE BUSH AND SHOWING THEM HOW IMPORTANT IT IS TO KEEP OUR LAND CLEAN."

- Elder Jimmy Johnny

Elder Jimmy Johnny is a Nacho Nyak Dun Citizen, who resides in Mayo, Yukon. Elder Johnny's legacy is his stories and experiences as a big-game hunting guide in the Bonnet Plume, Wind and Snake Rivers area of Yukon, where he was a hunting guide for 50 years.

FOLLOW THE TR'ONDEK HWËCH'IN TEACHINGS OF OLEG; WE GROW WITH IT, TRE'HUDÉ; THE WAY WE LIVE AND DENE ZHU; RESPECTING THE LAND, EVERYTHING THE LAND OFFERS YOU, GIVING BACK TO THE LAND AND NOT DESTROYING IT. IF YOU DO NOT LOOK AFTER THE LAND, EXPECT RECIPROCITY. WE ARE RESPONSIBLE TO COMMUNICATE AND MAINTAIN THE RELATIONSHIPS BETWEEN HUMANS, NON-HUMANS AND THE LAND."

- Elder Angie Joseph-Rear

Elder Angie Joseph-Rear is a Tr'ondek Hwëch'in citizen, and resides in Dawson City, Yukon. She has consistently and strongly advocated for the protection of wetlands, especially in the Indian River tributaries. Presently, Elder Joseph-Rear sits as a member of the Dawson Regional Land Use Planning Commission, which is near the final approval stage of their land use plan.

"IF YOU HARVEST PLANTS FOR MEDICINE SPREAD THE SEEDS OUT. WHEN YOU HARVEST THE ANIMALS IN THAT WETLAND YOU KEEP A BALANCE IN NATURE; IF YOU HAVE AN OVERPOPULATION OF BEAVER, OR THE MOOSE, IF THEIR POPULATION GETS TOO HIGH TOO THEY CAN CLEAN UP THE WILLOWS PRETTY GOOD AND OTHER TREES."

- Elder James Allen

Elder James Allen is a Champagne Aishihik Elder that lives in Haines Junction, Yukon. Elder Allen's family ties are to Aishihik Lake, Yukon and Copper Center, Alaska. As a businessman, he maintains cabins alongside Kluane Lake, that he rents for workshop retreats and seminars.

A special thank you to **Elder Joe Copper Jack** of Ta'an Kwach'an Council for facilitating workshops and guiding this project.

Mahsi Cho!

"ALMOST ALL WILD GAME HARVESTED BY HUNTERS OR PREDATORS ARE TAKEN IN OR NEAR WETLANDS. IT DOESN'T MATTER WHERE THE WETLAND IS LOCATED, ANIMALS SEEM TO FIND THEIR WAY THERE AS A STOPOVER, BEFORE MOVING ON TOWARDS THE NEXT WETLAND. IN GENERAL, ANIMALS MIGRATE FROM WETLAND TO WETLAND THROUGHOUT THEIR LIFE-CYCLES."

Based on the knowledge of the participating Elders, the unanimous conclusion drawn is that wetlands must be respected and protected to the highest degree possible. Elder storytellers shared how Indigenous cultures are tied intrinsically to wetlands for their health, welfare and cultural needs.

Traditional knowledge tells of the high value placed on wetlands by Indigenous peoples that must be recognized and adhered to by all users. Traditional knowledge laws also describe how these mini ecoregions are to be used and managed. As noted by the Elders, once a wetland is destroyed, it is impossible to recover to its original biodiversity state. Cultural laws state that wetland waters are to be kept clean. Therefore, campsites are to be erected a good distance away from the wetland. Traditional knowledge also states that ancient archaeological sites could be found adjacent to wetlands.

Most of the wildlife harvested by hunters are taken in or near wetlands. Hunters and gatherers such as Grizzly bears and Indigenous peoples eat the same country foods such as Bear roots, berries (soapberries, blueberries, cranberries, cloudberries, moss berries), fish (salmon, northern pike, grayling), moose, caribou and ground squirrels (gophers). Therefore, it is not uncommon for people and bears to periodically bump into each other. During times of encounter, it is a custom to talk to bears in a respectful manner and not to turn and run. This relationship between humans and bears elevated that kinship above other local wildlife species.

In the springtime, wetlands are calving and nesting areas for waterfowl and moose. Moose prefer swampy areas so that calves do not leave a scent-trail

behind them. Predators such as bears have a much harder time tracking and killing their prey, in a watery environment.

In the summer months, wetlands are the medicine cabinets of the watershed, as they produce medicinal plants for both animals and people. The medicine that grows in the wetlands are said to be more potent than plants growing elsewhere. In general, wildlife migrate from wetland to wetland throughout their seasonal and life-cycles, as evident by well-worn trails. Fall-time finds moose and caribou feeding in thickets and mountain wet spots. During the rut, cow moose will continue to feed on willows and aquatic plants, which in turn, attract bulls to these same areas.

Wintertime finds moose and caribou groups using these wetland sites as their winter range. Winter browse signs are evident of this practice. Moose and caribou will occupy these mountainous winter ranges until deep snow forces them to move down to lower elevations.

Wetlands are the incubators of land life that need immediate and full protection.

- Elder Joe Copper Jack

TRADITIONAL KNOWLEDGE

In developing this guide, the **Land and Peoples Relationship Model** was employed to elevate Traditional Knowledge of wetlands. The model is in alignment with the **Yukon Wetland Stewardship Policy**, which reinforces the following three concepts:

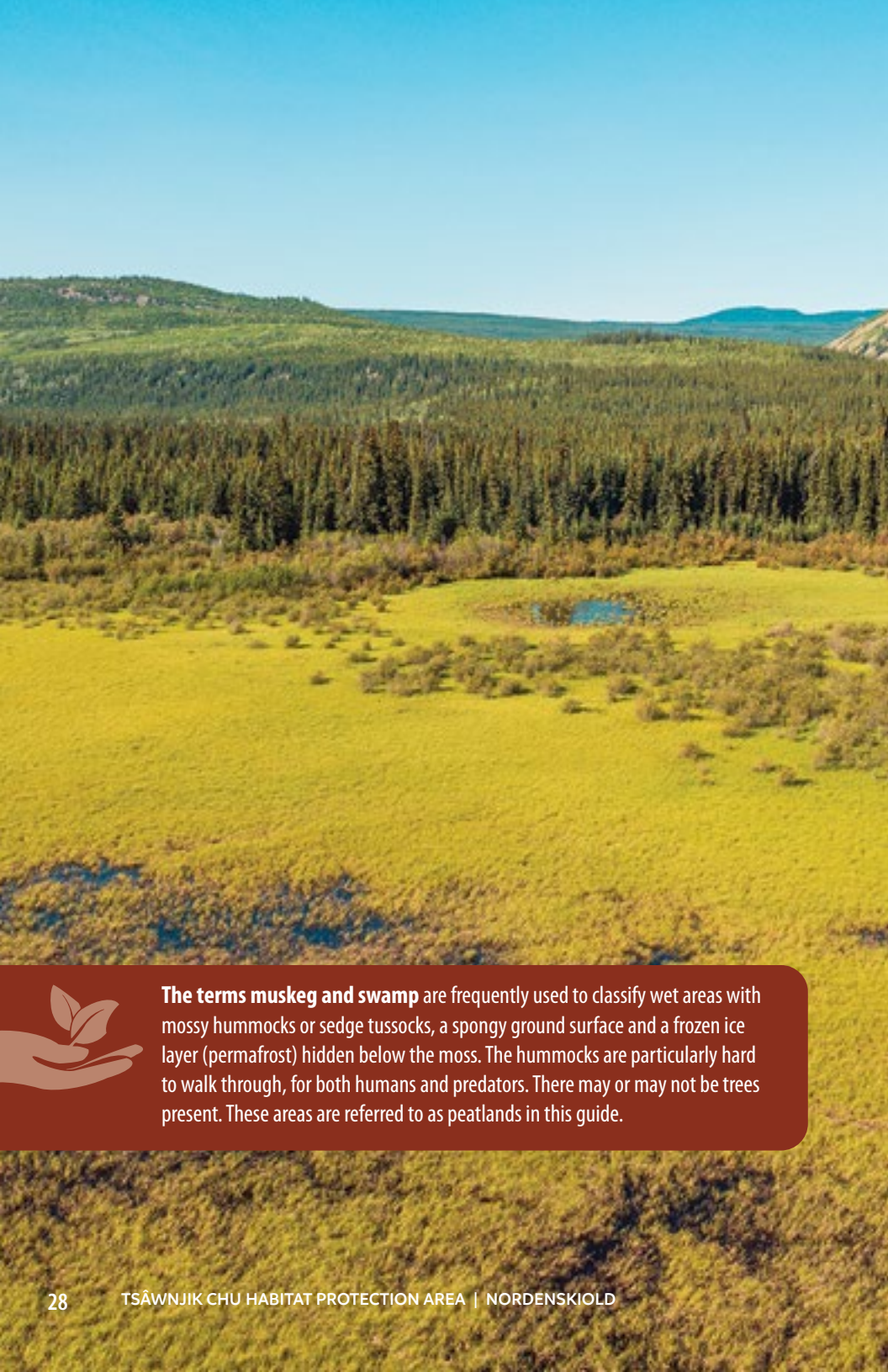
- The importance of taking a holistic approach that considers wetlands as an integral part of an interconnected system.
- The importance of respecting the land.
- The concept of reciprocity, whereby we must give back to the land when we take from the land.

The **Lands and Peoples Relationship Model**, developed by Joe Copper Jack, is a collaborative knowledge-building process that respects both Yukon First Nations' Long-Ago Peoples Way and Western knowledge. The model uses three key laws (Respect, Care, and Share) combined with two decision-making tools (No Voice and Knowledge Stream Tree) that include affected parties' viewpoints and long-ago knowledge.

The purpose of the model is to allow issues to be resolved through collaborative planning and consensus building. Participants of the roundtable are responsible for developing their rules of engagement that include the following requirements:

- Show respect for each other, affected parties and the land;
- Feel as much as you think;
- Listen to understand what is being said;
- Clarify what you say and hear; and
- Have patience!

To learn more about the model see Appendix 1.



The terms muskeg and swamp are frequently used to classify wet areas with mossy hummocks or sedge tussocks, a spongy ground surface and a frozen ice layer (permafrost) hidden below the moss. The hummocks are particularly hard to walk through, for both humans and predators. There may or may not be trees present. These areas are referred to as peatlands in this guide.

WETLAND CLASSIFICATION

How to Use this Section

This section of the guide provides the following steps to help you classify a wetland:

1

Step 1. Is it a Wetland?

The first step in wetland classification is to determine if the area is a wetland. Start at **Step 1** *(page 30)* to review helpful wetland vegetation, soil and hydrology indicators.

2

Step 2. Classification Decision Key

Once the wetland determination is made, the **Classification Decision Key** *(page 38)* can be used to characterize the wetland class and form if applicable. The key uses vegetation, soil and the presence and abundance of open water to guide classification.

3

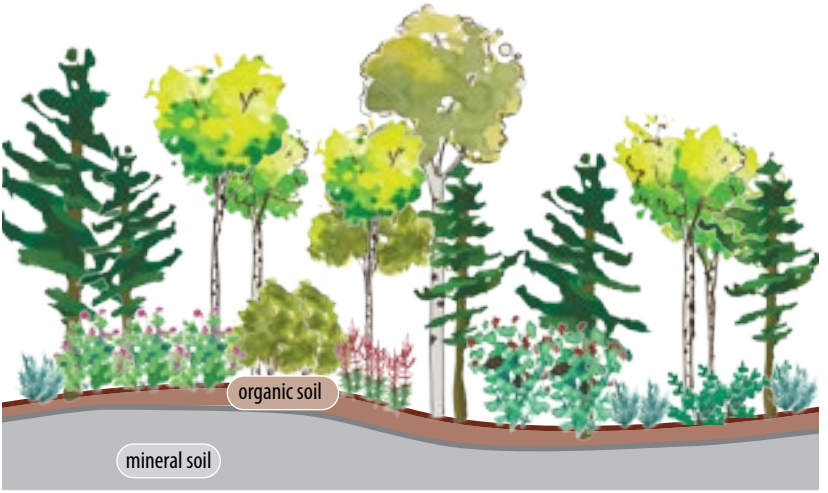
Step 3. Wetland Fact Sheets

Use the **Wetland Fact Sheets** *(page 45)* to verify the results you obtained from Step 2 and to help provide more detail about the typical characteristics of the wetland. Fact sheets are provided for each wetland class and forms (if applicable).

Step 1. Is it a Wetland?

The following upland and wetland characteristics will help you determine wetlands from uplands. When assessing a site, try to select an area with a consistent or uniform plant community, avoiding transition zones. If you see several (but not necessarily all) species and characteristics described, you can be reasonably confident you are in a wetland or upland.

Upland Characteristics



Trees: When present, generally tall, productive tree growth of predominantly pine or aspen, occasionally pine and white spruce.

Soils: Well-drained, shallow organic (less than 30 cm) or mineral soils lacking gleying or mottling indicators *(page 34)*.

Water Regime: No evidence of seasonally pooling water or high water table within rooting zone of vegetation. In the case of moist/floodplain sites, there might be temporary seepage but soils have good drainage.

Shrubs:
- Highbush cranberry
- Prickly rose
- Soapberry
- Currants
- Juniper
- Kinnikinnick

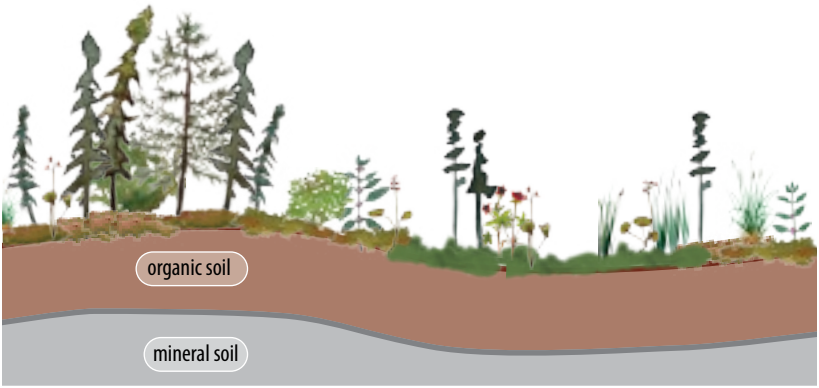
Ground Cover:
- Pasture sage
- Bastard toad-flax
- Tall bluebells
- Fireweed
- Mountain avens
- Purple reedgrass
- Fescues
- Feather mosses

**"MOTHER EARTH HEALS ITSELF.
EVERY SEASON THERE IS A CHANGE – FIRES AND FLOODS
ARE NATURAL WAYS OF MOTHER EARTH HEALING.
NEW PLANTS, NEW TREES GROWING."**

- Elder Russell Burns

Wetland Characteristics

Wetlands are dynamic and highly variable; their appearance and the plants that are found within them can change from year to year and even throughout the year. While some wetlands have water at or near the surface year-round, in many other wetlands the water may not be visible. In addition, in large areas of Yukon, permafrost *(page 32)* helps to retain water near the surface in wetlands.



Trees: When present, generally less productive tree growth of predominantly black spruce, tamarack or balsam poplar.

Soils: Deep organic (deeper than 30 cm) or mineral soils with gleying or mottling indicators.

Water Regime: Evidence of seasonal to permanent pooling water, or high water table within rooting zone of vegetation, with possible pools of water evident in hummocky terrain.

Shrubs:
- Willows
- Alders
- Shrub birch
- Labrador tea
- Leatherleaf
- Bog cranberry
- Bog blueberry

Ground Cover:
- Sedges
- Rushes
- Reeds
- Bluejoint
- Horsetail
- *Sphagnum* moss
- Brown moss

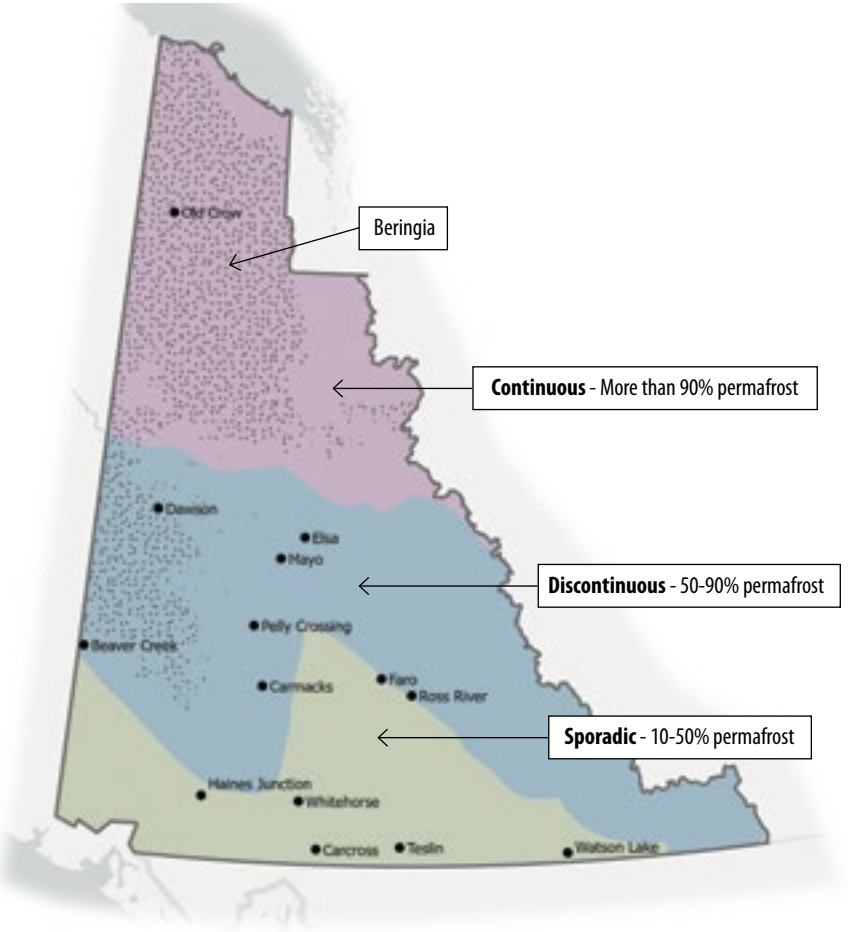
"DIG A HOLE WITH A STICK. YOU SHOULD BE ABLE TO FIND WATER."

- Elder Jimmy Johnny

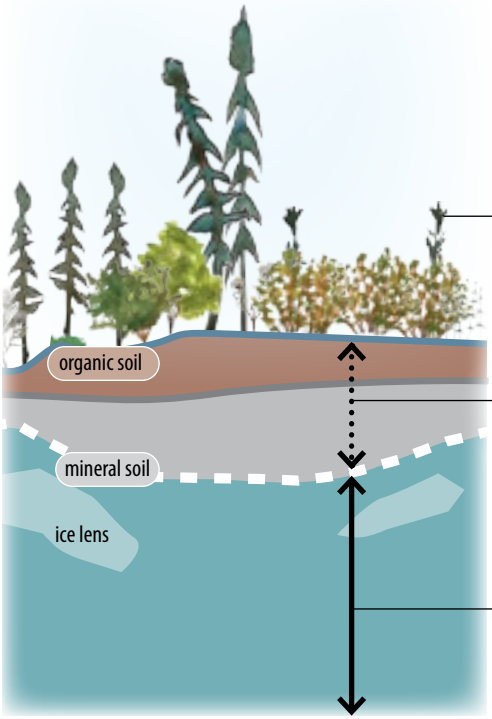
In Indigenous cultures, wetlands may be classified differently than the information presented here. Classifying wetlands may be based on who they offer habitat for, what medicinal plants are present, how they should be managed or by using place-based names.

Permafrost

Permafrost is frozen ground that remains at or below 0°C for more than two years. It plays a crucial role in shaping landscapes and influences wetland distribution. Permafrost can control water movement by holding water near the surface, in turn creating wetlands. In the Klondike Plateau ecoregion surounding Dawson, this includes wetlands that have developed on steep, north-facing slopes. Permafrost in northern parts of Yukon, including the Klondike Plateau ecoregion, is also influenced by the legacy of Beringia, a vast, ice-free, permafrost-rich region during the last ice age. Berengia allowed for the accumulation of organic matter, some of which is still stored, frozen in permafrost today.



Permafrost Extent in Yukon - The amount and distribution of permafrost in Yukon varies from north to south. In northern regions permafrost is continuous and found closer to the surface (within 30-40 cm). In southern regions permafrost becomes discontinuous and sporadic, and is found deeper from the surface (2-3 m or more).



Vegetation in permafrost areas are often dominated by black spruce and mosses and other water tolerant species, while upland forests usually grow in drier soils and are permafrost free.

Active layer is the top layer of soil that freezes and thaws each year. Organic or mineral soils can be found in the active layer. The active layer is influenced by the length of the summer season and sits on top of the permafrost.

Permafrost layer is the layer of soil that remains at or below 0°C for more than two years. Permafrost can be found in organic or mineral soils.

Active layer over top of the permafrost layer, with present ice lens (wedges of ice formed fwater during freeze thaw cycles).

Factors that influence active layer depth include:

- **Soil organic matter content:** areas with high soil organic matter content can have thinner active layers and store massive amounts of carbon.
- **Soil moisture:** moist soils insulate permafrost and result in stable active layer depth with shallower thaw depth.
- **Vegetation:** areas with dense canopy cover can insulate permafrost soils during the summer and can result in thinner active layers.
- **Thickness and duration of snow cover:** thick layers of snow can insulate soils against frost penetration and result in thicker active layers.

THERMOKARST WETLANDS:

Thawing permafrost can also lead to the development of thermokarst lakes, ponds and wetlands. As permafrost thaws it creates a surface depression that is filled as excess ground ice melts. These areas can commonly be distinguished by pooled water and slumped trees that can lead to wetland development through the establishment of mosses (image right).

Mineral and Organic Soils

Wetlands are divided into two major soil groups - mineral and organic.

Mineral soil.

Mottled mineral soil.

Mineral wetlands contain mineral soils (sand, silt and clay) with distinct colourations that indicate the presence of waterlogging (soil gleying) or seasonal fluctuations in water levels (soil mottling). *They are often referred to as ponds, sloughs, swamps, marshes and shallow water wetlands.*

Organic soil (peat).

Organic soil (peat) with visible fibrous plant materials.

Organic wetlands, or peatlands, are characterized by thick layers of organic soil (peat) composed of partially decayed plant materials that build up in wet, cold environments over time. In Yukon, peatlands are classified as having more than 30 cm of accumulated peat deposits, although they can be much deeper in certain areas. *These peatlands are often referred to as muskeg, bog, fen and occasionally are swamps.*

In the field, soil can be sampled by using a soil auger or a shovel to dig a soil pit. You can test if the soil is organic (between 30%-80% organic matter) by gently rubbing a pinch of wet soil material between the forefinger and thumb.

- If the material feels gritty or retains its shape, it is mineral soil material.
- If the material feels consistently greasy, it is likely organic soil material.

Core sample of mineral soil.

Core sample of organic soil (peat).

Ground Formations

A wetland can often be distinguished by it's spongy, uneven ground surface. Microtopographic features - hummocks, hollows and tussocks - are all characteristic of wetland environments due to the plants that grow within them.

Hummock

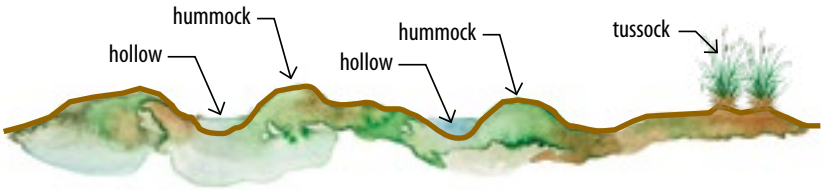
Elevated mounds of moss growth in peatlands, most often composed of hummock-forming species of *Sphagnum* mosses like rusty peat moss. These species are well-adapted to drawing water up from the water table and are able to thrive in drier, hummock-top locations.

Hollow

A depression or low-lying area between peatland hummocks, with characteristic species more tolerant of waterlogged conditions. Often have water pooling just at or above the surface.

Tussock

A dense clump or mound of grass or sedge that grows taller that its surrounding area due to the buildup of dead stem and root materials.



Moss Characteristics

Mosses are small, non-vascular plants lacking the tissues to move water internally within their structure. They also do not produce flowers or seeds, but instead reproduce via spores. More than 10,000 species, or types, of moss grow throughout the world. They belong to a group of plants called bryophytes.

Sphagnum

Examples:

- Rusty peat moss
- Poor-fen *Sphagnum*
- Midway peat moss
- Shore-growing peat moss

See Sphagnum mosses (page 125).

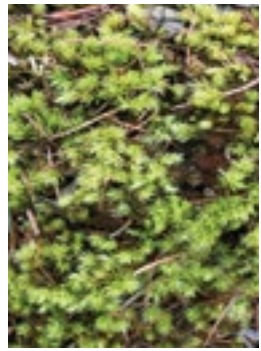
Feather

Examples:

- Haircap moss
- Red-stemmed moss
- Stair-step moss

See feather mosses (page 128).

Brown



Examples:

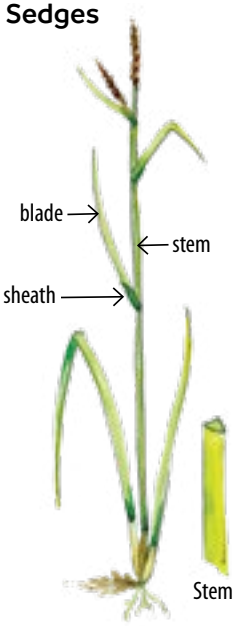
- Aduncus brown moss
- Golden moss
- Hamatocaulis moss
- Scorpidium moss

See brown mosses (page 130).

Graminoid Characteristics

Graminoids are herbaceous (non-woody) plants with long, narrow, blade-like leaves. They include grasses, sedges, rushes and cattails. They are often emergent species meaning they grow in aquatic environments but extend above the surface of the water, at least for a portion of the growing season.

Sedges

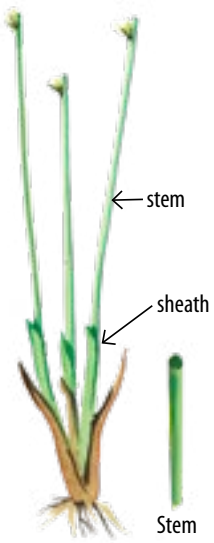


- Stem is triangular in cross-section
- Leaves have a blade and a sheath where the sheath is closed (like a tube).
- Stems are solid (not hollow)

Examples:
- Awned sedge
- Water sedge

See sedges (page 106).

Rushes

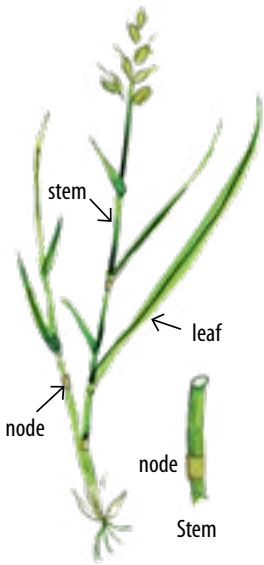


- Leaves are round/ cylindrical in cross-section and needle-like
- Stems are round and solid or pithy

Examples:
- Clubrush
- Wire rush
- Spikerush

See rushes (page 112).

Grasses



- Leaves are flat with a central rib
- Leaves have a sheath that can be open or closed (like a tube)
- Stems are round, jointed, often hollow.

Examples:
- Reed canary grass
- Bluejoint grass

See grasses (page 114).

Use this rhyme to remember the difference between these graminoids:

"Sedges have edges, rushes are round, and grasses have nodes all the way to the ground."

Step 2. Classification Decision Key

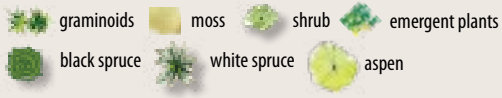
Follow the step-by-step key beginning with Check 1, answering each question based on your observation of the area. When observing the wetland, select an area with a consistent or uniform plant community, avoiding transition zones. The key asks you '**yes**' **or** '**no**' questions and the arrows guide you to the next question based on your responses. **All conditions within the yes/no box must be met for the classification to be accurate and to move to the next check in the key. Although, there are exceptions to every rule (see below).**

Determining Dominant Plant Species and Percent Cover

To determine the dominant plant species, estimate how much of the ground each plant covers, and the species with the highest percent coverage is considered dominant. Sometimes plant growth overlaps, so it is possible for the percentages to add up to more than 100%, or for more than one species to be dominant. When determining species dominance in classifying wetlands, it can be helpful to identifying a dominant species groups (eg. trees or mosses).

Refer to *Wetland Plants (page 67)* **to help identify trees, shrubs, mosses, emergent and submerged plants.**

LEGEND



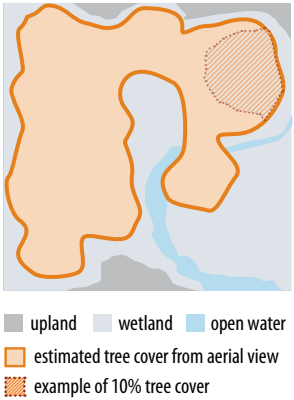
Exceptions to Every Rule

When identifying a wetland to class, consider how multiple wetland classes may exist along a moisture gradient and try to find a representative and uniform plant community within which to conduct your classification. Also keep in mind that the tools provided here for identifying wetlands cover most situations, but there are always exceptions, such as sites regenerating from forest harvest, wildfire, severe drought, cultivation, permafrost thaw, water flow changes or other disturbances.

Check 1.

In treed wetlands, tree cover must be more than 10% of the area. Roughly estimate the area of trees (see example below with estimated area outlined in orange). Include the tree canopy in your percentage of cover. In this case, the **trees cover more than 10%** of the area.

Aerial View



CHECK 1 - TREES

Is tree cover more than 10%?

YES

- Is the tree cover dominated by black or white spruce, typically less than 10 m tall? ***AND***
- Are fen species such as shrub birch, willows, leatherleaf, sedges and brown mosses present? ***AND***
- Is there more than 30 cm of poorly decomposed peat present?

YES → **TREED FEN** (page 54)

NO

GO TO CHECK 2 (page 40)

NO

- Is the tree cover dominated by black or white spruce, typically less than 10 m tall? ***AND***
- Does *Sphagnum* (peat) moss dominate the ground cover, with occasional lichens? ***AND***
- Is there more than 30 cm of poorly decomposed peat present?

YES → **TREED BOG** (page 48)

NO

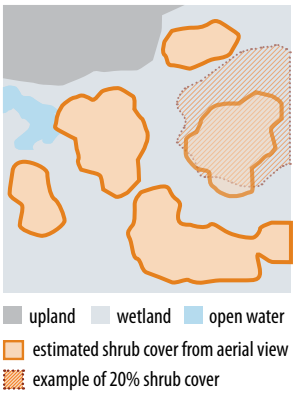
- Is there a tree cover of black spruce, white spruce, birch and/or balsam poplar present, typically more than 10 m tall? ***AND***
- Is the ground surface hummocky, with willow, alder and birch shrubs among scattered herb and moss cover? ***AND***
- Is there typically less than 30 cm of highly decomposed peat with woody debris present? Note: Occasionally, there may be more that 30cm of peat present.

YES → **TREED SWAMP** (page 60)

Check 2.

In shrubby wetlands, shrub cover must be more than 20% of the area. Roughly estimate the area of shrubs (see example below with estimated area outlined in orange). In this case, the **shrubs cover more than 20%** of the area.

Aerial View



CHECK 2 - SHRUBS

Is the wetland covered by more than 20% shrubs?

YES

- Are fen species such as shrub birch, willows, leatherleaf, sedges and brown mosses present? ***AND***
- Are there more than 30 cm of poorly decomposed peat present?

YES → **SHRUBBY FEN** (page 55)

NO

GO TO CHECK 3 (page 41)

NO

- Are the majority of shrubs Labrador tea and lowbush cranberry, and less than 1 m tall? ***AND***
- Does *Sphagnum* (peat) moss dominate the ground cover, with occasional lichens? ***AND***
- Are there more than 30 cm of poorly decomposed peat present?

YES → **SHRUBBY BOG** (page 49)

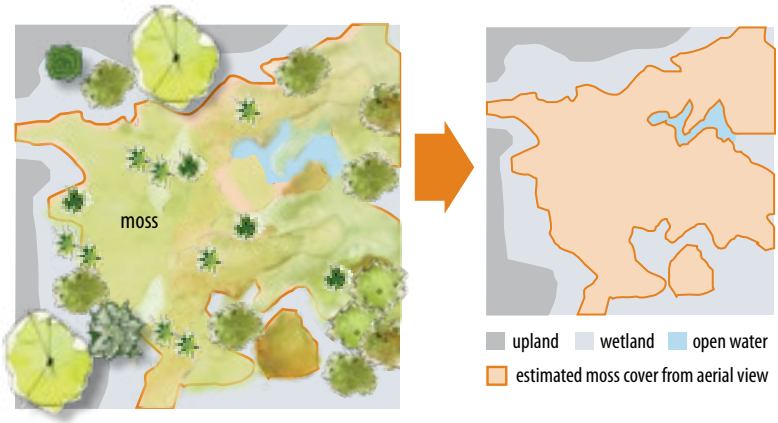
NO

- Are the majority of shrubs taller swamp species such as alders and willows (height may vary from 0.1m to greater than 2m from north to south)? ***AND***
- Is the ground surface hummocky, characterized by scattered herb and moss cover? ***AND***
- Is there typically less than 30 cm of highly decomposed peat with woody debris present? Note: Occasionally, there may be more that 30cm of peat present.

YES → **SHRUBBY SWAMP** (page 61)

Check 3.

Determine if mosses dominate the ground. To be dominant, they should cover the majority of the ground area. There may be other clusters of plants mixed in with the mosses. Or there could be small groups or individual plant species scattered or spread out across the area of moss. Roughly estimate the area of moss (see example below with estimated area outlined in orange). In this case, **mosses cover the majority of the area and therefore dominate.**



Aerial View

CHECK 3 - GROUND COVER

- Do bryophyte species such as *Sphagnum* ***AND/OR*** brown mosses dominate the ground cover, often intermixed with scattered graminoid cover?
- Are there more than 30 cm of poorly decomposed peat present?

YES → Is the ground cover dominated by fen species such as sedges, brown mosses and *Sphagnum* (peat) mosses?

NO → **GO TO CHECK 4** (page 42)

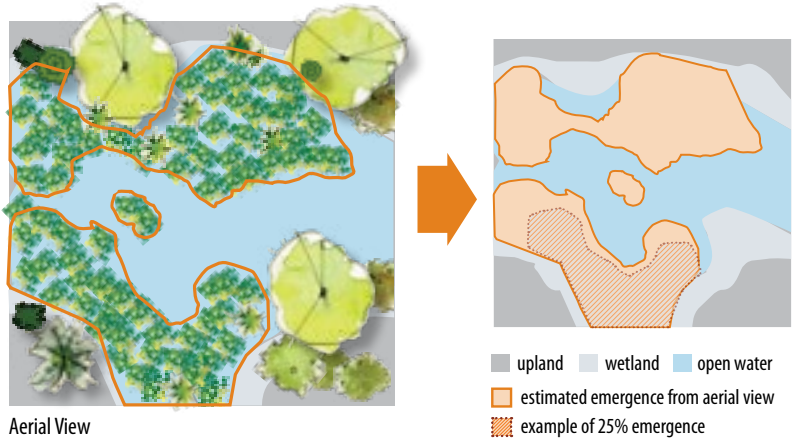
YES → **GRAMINOID FEN** (page 56)

NO → Is the ground cover dominated by *Sphagnum* (peat) mosses, only occasionally intermixed with graminoid species?

YES → **OPEN BOG** (page 50)

Check 4.

Determine the percentage of emergent plants (sedges, grasses, rushes and reeds)? Determine whether the plants are submerged (underwater) or emergent (rising above the water). You may also encounter floating plants. In this case, the emergent plants cover more than 25% of the area.



Aerial View

CHECK 4 - EMERGENT PLANTS

Is the area covered with more than 25% emergent plants *(sedges, grasses, rushes and reeds)?*

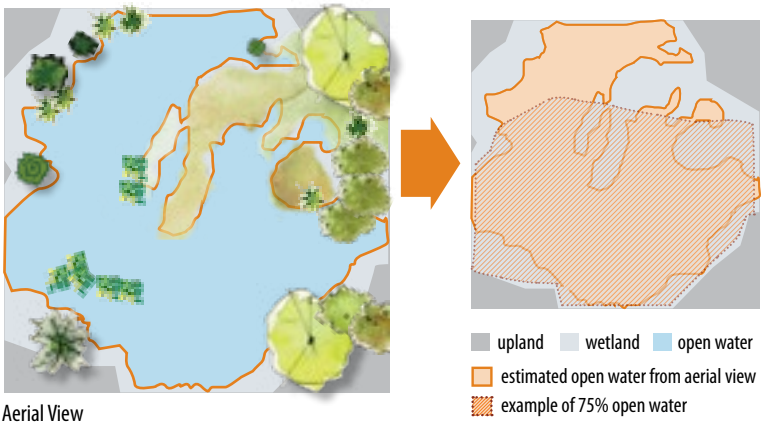
YES → **MARSH** (page 62)

NO → **GO TO CHECK 5** (page 43)

Emergence.

Check 5.

Determine the percentage of shallow open water (less than 2 meters deep) in the area. Are these areas of open water covering more than 75% of the area you are observing? Roughly estimate the area of open water (see example below with estimated area outlined in orange). In this case, open water covers more than 75% of the area.



Aerial View

CHECK 5 - OPEN WATER

Is the area covered with more than 75% open water less than 2 m deep, often with submerged and/or floating aquatic vegetation?

YES → **SHALLOW WATER WETLAND** (page 64)

Shallow water wetland.

Step 3. Wetland Fact Sheets

The additional details provided in the following fact sheets will help to confirm your keyed-out classification. If you are unable to reach an assessment, the site might be uncharacteristic of a typical wetland and you might look for further guidance or confirmatory information in the guidance criteria outlined by ***Government of Yukon Wetland Classification Standards and Criteria Guidance (2024)***.

BOG

THERE ARE 3 BOG FORMS:

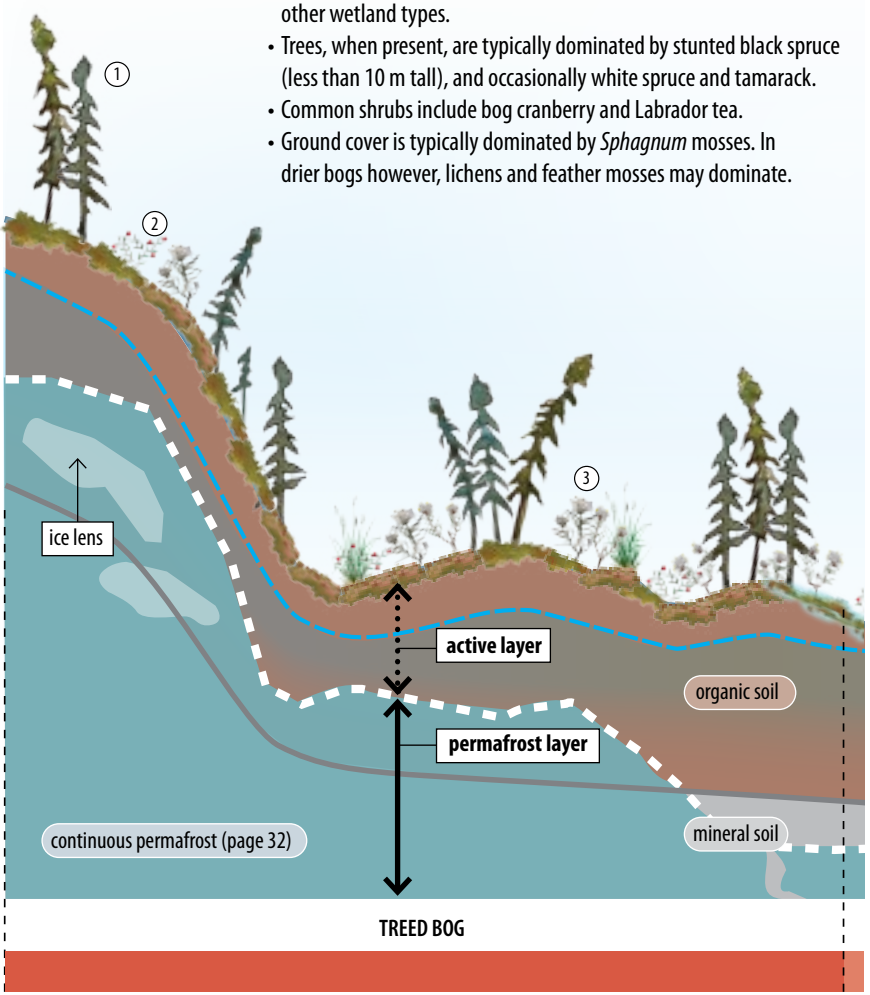
- Treed
- Shrubby
- Open

LANDSCAPE SETTING

- At a landscape-scale, bogs are elevated or domed above the surrounding terrain due to thick layers of peat accumulation below the surface, aided by land upheaval due to permafrost.
- At a site-scale, bogs have hummocky microtopography due to the mounding growth formations of *Sphagnum* mosses.
- Bogs occasionally occur on steep, cold north slopes in central and north Yukon.

VEGETATION

- Due to low nutrient availability, bogs are typically less diverse than other wetland types.
- Trees, when present, are typically dominated by stunted black spruce (less than 10 m tall), and occasionally white spruce and tamarack.
- Common shrubs include bog cranberry and Labrador tea.
- Ground cover is typically dominated by *Sphagnum* mosses. In drier bogs however, lichens and feather mosses may dominate.



SOIL

- Organic soil, or peat, more than 30 cm deep.
- 30-80% organic matter content.
- Peat contains *Sphagnum* mosses, and woody fragments.

WATER REGIME

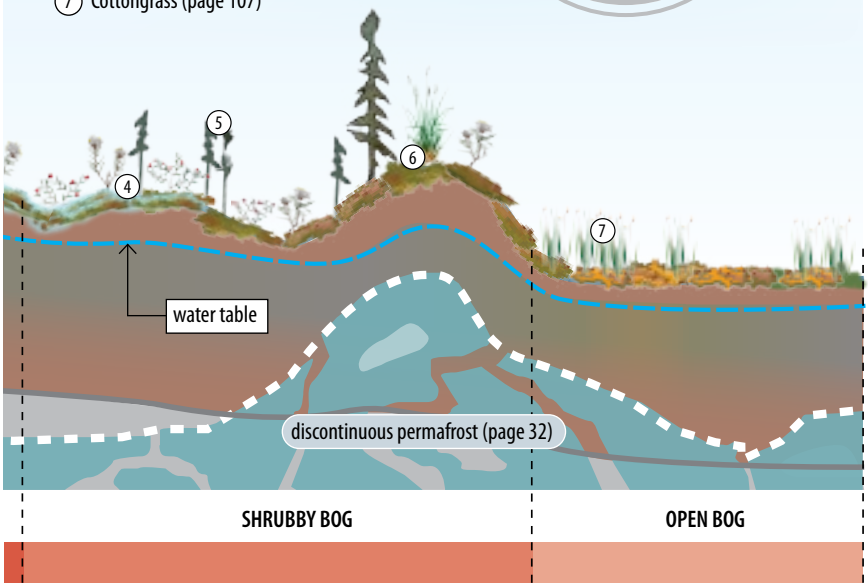
- Water comes mainly from precipitation; bogs are typically isolated from nutrient-rich groundwater and surface run-off.
- Stagnant to very slow water flow under normal conditions. Although the surface of a bog seems dry, soils are saturated below the surface.
- Landscape-scale water storage and recharge areas, helping manage excess water in wet periods and releasing it in dry periods, minimizing floods and droughts

NUTRIENT REGIME

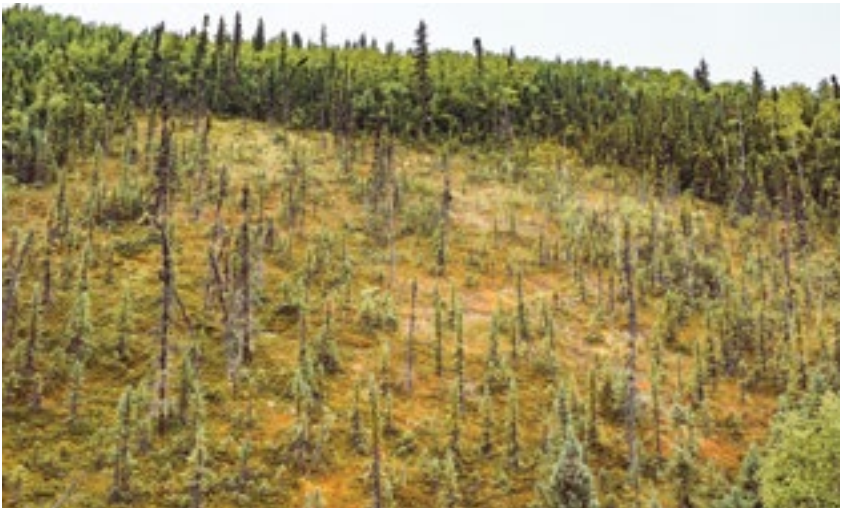
- Bogs are nutrient-poor and generally acidic, with a pH usually below 4.5 (higher in some Southern Lakes areas with calcareous parent materials).
- Low nutrient availability and acidity, influenced by water inputs and the acidifying properties of *Sphagnum* moss.

1. Black spruce (page 76)
2. Small bog cranberry (page 96)
3. Labrador tea (page 89)
4. Reindeer lichen (page 133)
5. Stunted black spruce
6. *Sphagnum* mosses (page 125)
7. Cottongrass (page 107)

Bog soils are crucial carbon stores aiding in global climate regulation.



TREED BOG



- Tree cover is more than 10%.
- Tree growth is stunted (less than 10 m tall).
- Moss layer is often dominated by *Sphagnum* mosses, although, in dryer bogs lichens and feather mosses can dominate ground cover.
- Trees are mostly black spruce, occasionally white spruce, or mixed. Some bogs in southeast Yukon and the Peel River drainage contain tamarack.

CHARACTERISTIC SPECIES		
Trees	**Shrubs**	**Ground Cover**
• Black Spruce (page 76) • White Spruce (page 77) • Tamarack (page 78)	• Bog blueberry (page 86) • Crowberry (page 87) • Labrador Tea (page 89) • Dwarf Labrador tea (page 89) • Lowbush cranberry (page 92) • Shrub birch (page 94) • Small bog cranberry (page 96)	• Cloudberry (page 100) • Cottongrass (page 107) • Small Northern bog orchid (page 105) • Round-leaf sundew (page 104) • *Sphagnum* mosses (page 125) • Feather mosses (page 128) • Brown mosses (page 130) • Reindeer lichen (page 133)

BOGS AND BERRIES:
Bogs are fruitful sites for many wildlife and humans to forage for nutritious lowbush cranberry, cloudberry, bog blueberry, and crowberry fruits in summer.

"YOU'RE PICKING BERRIES ON ONE SIDE OF THE BUSH, WITH BEARS ON THE OTHER SIDE"

- Elder Allan Carlick

SHRUBBY BOG

- Tree cover is less than 10%, with stunted growth (less than 10 m tall).
- Shrub cover is more than 20% shrub cover less than 1 m tall.

CHARACTERISTIC SPECIES	
Shrubs	**Ground Cover**
• Bog blueberry (page 86) • Crowberry (page 87) • Labrador Tea (page 89) • Dwarf Labrador tea (page 89) • Lowbush cranberry (page 92) • Shrub birch (page 94) • Small bog cranberry (page 96)	• Cloudberry (page 100) • Cottongrass (page 107) • Small Northern bog orchid (page 105) • Round-leaf sundew (page 104) • *Sphagnum* mosses (page 125) • Feather mosses (page 128) • Brown mosses (page 130) • Reindeer lichen (page 133)

ECOSYSTEM ENGINEER:
Sphagnum (peat) mosses engineer their own environments by creating the acidic conditions that they prefer, thereby excluding other competitor plant species from encroaching into bogs. Notes that in the Southern Lakes region, bogs are less acidic due to the influence of calcium-rich parent materials in the area.

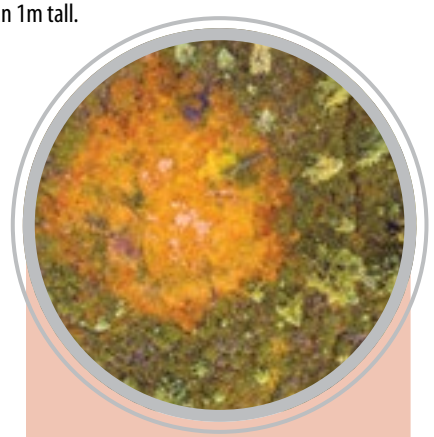
OPEN BOG

- Tree cover is less that 10%, with stunted growth (less than 10m tall).
- Shrub cover is less than 20% shrub cover less than 1m tall.
- Generally, lack trees and shrubs.
- *Sphagnum* mosses dominate the ground cover.

CHARACTERISTIC SPECIES

Ground Cover

- Cloudberry (page 100)
- Cottongrass (page 107)
- Small Northern bog orchid (page 105)
- Round-leaf sundew (page 104)
- *Sphagnum* mosses (page 125)
- Feather mosses (page 128)
- Brown mosses (page 130)
- Reindeer lichen (page 133)



COLLAPSE SCAR BOGS:
Permafrost thaw in bogs can lead to land subsidence and the formation of collapse scars. These tend to be wetter sites, sometimes with floating *Sphagnum* moss mats or areas of open water referred to as thermokarst ponds. This process can be initiated following forest fires, or after human-induced disturbance activities such as seismic exploration.

"IN THE SUMMER TIME I GO OUT AND CATCH SALMON. I DRY SOME OF IT ON DRY RACKS, AND SOME OF IT I PUT UNDERGROUND. THAT WAS MY FRIDGE, THE FROST UNDERGROUND.

- Elder Russell Burns

PERMAFROST BOGS:
The peat in bogs is an excellent insulator, supporting the development and maintenance of permafrost below the surface. Common terms for permafrost bogs include peat plateaus, polygonal peatlands, sloping veneer bogs, smaller palsa bogs and peat mound bogs. Disturbing the peat in these systems can lead to permafrost thaw and land subsidence, forming thermokarst ponds.

Jump to:
Contents
Classification
Key
Fact Sheets
Plants
Wildlife
At Risk

FEN

THERE ARE 3 FEN FORMS:

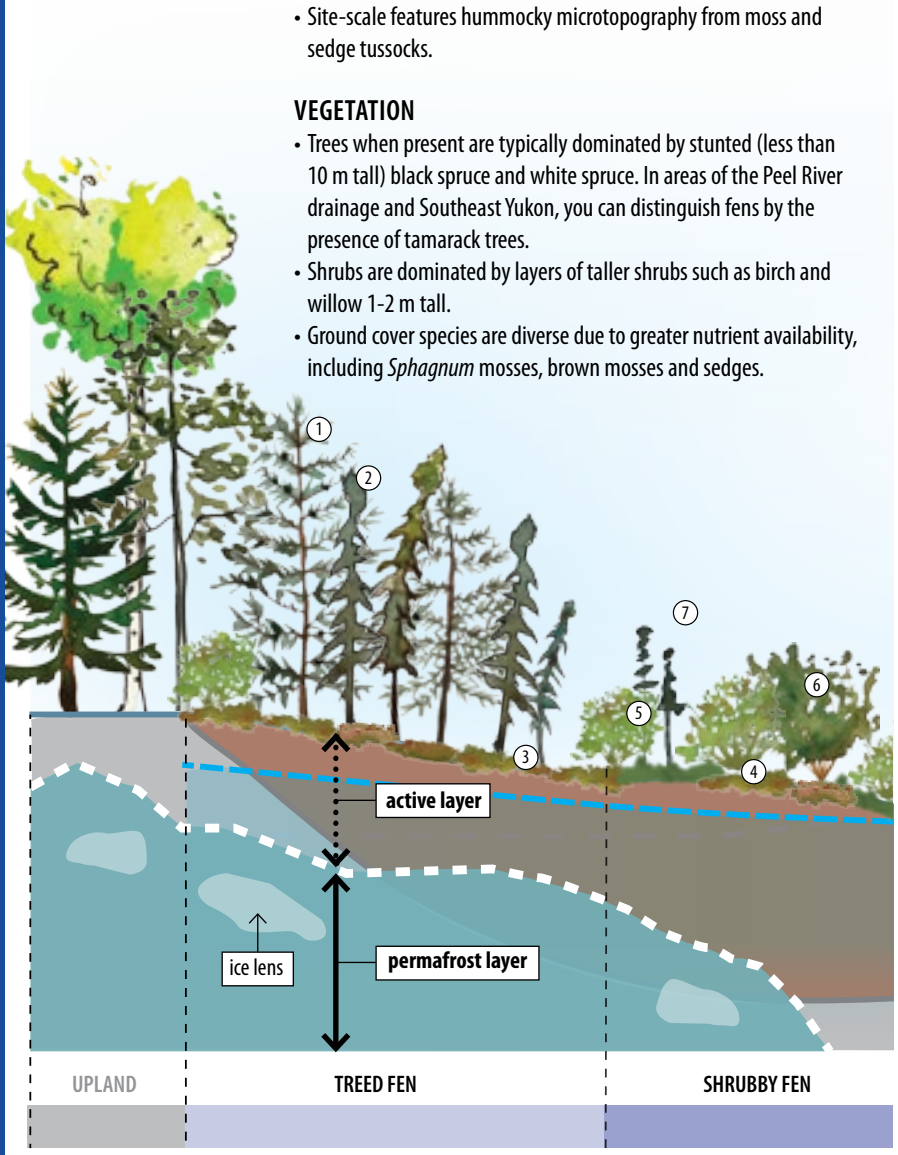
- Treed
- Shrubby
- Graminoid

LANDSCAPE SETTING

- Expansive wetlands, often in flat landscapes connected to larger wetland and lake complexes.
- Found at toe slopes with groundwater or permafrost-induced seepage.
- Also occur on alpine slopes with permafrost or drainage barriers.
- Site-scale features hummocky microtopography from moss and sedge tussocks.

VEGETATION

- Trees when present are typically dominated by stunted (less than 10 m tall) black spruce and white spruce. In areas of the Peel River drainage and Southeast Yukon, you can distinguish fens by the presence of tamarack trees.
- Shrubs are dominated by layers of taller shrubs such as birch and willow 1-2 m tall.
- Ground cover species are diverse due to greater nutrient availability, including *Sphagnum* mosses, brown mosses and sedges.



SOIL

- Organic soil, or peat, more than 30 cm deep.
- 30-80% organic matter content.
- Peat contains *Sphagnum* mosses, brown mosses and sedges.

WATER REGIME

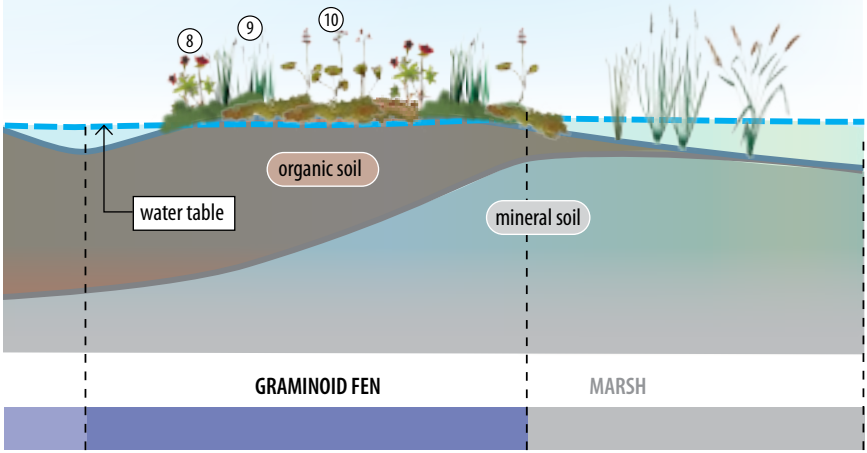
- Receive water inputs from rainfall, snowmelt, surface runoff and groundwater.
- Have a consistently high (near-surface) water table, unless permafrost is present.
- Water flows through fens, with flow below the ground surface.
- Can transport large volumes of water and nutrients across the landscape, often connecting wetland systems over large distances and regulating landscape-level water supply throughout the growing season.

NUTRIENT REGIME

- Nutrient rich due to mineral-rich water inputs.
- The pH in fens can range from 5 (poor fens) to more than 7.5 (rich fens).

Fen soils are crucial carbon stores aiding in global climate regulation.

1. Tamarack (page 78)
2. Black spruce (page 76)
3. *Sphagnum* moss (page 125)
4. Brown moss (page 130)
5. Shrubs (page 86)
6. Willows (page 82)
7. Stunted black spruce
8. Marsh cinquefoil (page 101)
9. Sedges (page 106)
10. Buckbean (page 99)



TREED FEN

- Tree cover is more than 10%, with stunted growth (less than 10 m tall).
- Tree cover is mostly black spruce, occasionally white spruce with shrub birch, willows, Labrador tea, and sedges, generally either water sedge, spruce muskeg sedge, or cotton-grass.
- In areas of the Peel River drainage and Southeast Yukon, you can distinguish fens by the presence of tamarack trees.
- Driest fen form.

CHARACTERISTIC SPECIES		
Trees	**Shrubs**	**Ground Cover**
• Black Spruce (page 76) • White Spruce (page 77) • Tamarack (page 78)	• Willows (page 82) • Labrador tea (page 89) • Leatherleaf (page 91) • Lowbush cranberry (page 92) • Shrub birch (page 94) • Sweet bayberry (page 97)	• Cottongrass (page 107) • Marsh horsetail (page 103) • Tufted club-rush (page 113) • *Sphagnum* mosses (page 125) • Brown mosses (page 130)

SHRUBBY FEN

- Tree cover is less than 10%, with stunted growth (less than 10 m tall).
- Shrub cover is more than 20%, with shrub cover less than 1 m tall.

CHARACTERISTIC SPECIES	
Shrubs	**Ground Cover**
• Willows (page 82) • Labrador tea (page 89) • Leatherleaf (page 91) • Lowbush cranberry (page 92) • Shrub birch (page 94) • Sweet bayberry (page 97)	• Cottongrass (page 107) • Marsh horsetail (page 103) • Tufted club-rush (page 113) • *Sphagnum* mosses (page 125) • Brown mosses (page 130)

GRAMINOID FEN

- Generally, lack trees and shrubs.
- Tree cover is less that 10%, with stunted growth (less than 10m tall).
- Shrub cover is less than 20%, with shrub cover less than 1m tall.
- *Sphagnum* mosses dominate the ground cover.

CHARACTERISTIC SPECIES

Ground Cover

- Cottongrass (page 107)
- Marsh horsetail (page 103)
- Tufted club-rush (page 113)
- *Sphagnum* mosses (page 125)
- Brown mosses (page 130)

"YOU HAVE TO CARRY A LONG POLE WITH YOU, WHEN YOU'RE WALKING THROUGH A MUSKEG... THERE'S WATER UNDER THERE AND THERE'S ROOTS UNDER THERE... IF YOU GO IN YOU'RE NEVER GOING OUT IF YOU DON'T HAVE A POLE, IT'S LIKE WALKING ON ICE IN THE SPRINGTIME

- Elder Roland Peter

"WETLANDS ARE A VERY IMPORTANT PART OF OUR CULTURE; PART OF OUR HEALING. ONCE ALL THAT IS GONE WHERE WILL WE GO, WHAT WILL WE DO? IT WILL BE TOO LATE THEN TO DECIDE TO DO SOMETHING?"

- Elder Roland Peter

PERMAFROST FENS:
Common terms for permafrost fens include polygonal fens, patterned fens, sloping permafrost tussock fens and smaller collapse scar fens, spring fens and snowpatch fens. As permafrost thaws, there is a landscape-scale "turning on the taps" in these ecosystems, whereby they become wetter, there is more water and nutrient flow and export, and as a result, the landscape may eventually become much drier as water is lost to downstream ecosystems.

Jump to:
Contents
Classification
Key
Fact Sheets
Plants
Wildlife
At Risk

SWAMP

THERE ARE 2 SWAMP FORMS:

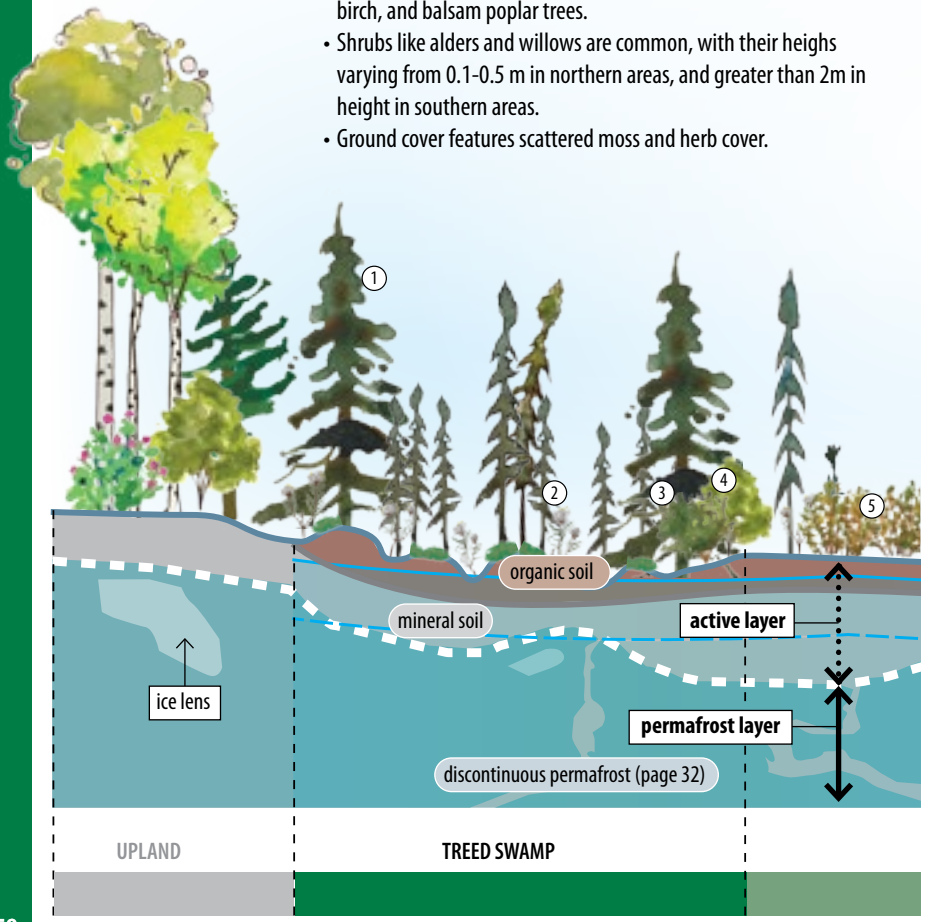
- Treed
- Shrubby

LANDSCAPE SETTING

- Recognized at a landscape scale as riparian or floodplain areas of streams, rivers, and lakes.
- Common in forested transitions between peatlands, streams, rivers, lakes, and uplands.
- Sometimes challenging to distinguish from moist uplands and floodplain ecosites (refer to *Yukon Government Ecosite Classification Guides*)
- Treed swamps may display hummocky microtopography, with water pooling in depressions during the spring.

VEGETATION

- Abundant woody vegetation, including black spruce, tamarack, birch, and balsam poplar trees.
- Shrubs like alders and willows are common, with their heighs varying from 0.1-0.5 m in northern areas, and greater than 2m in height in southern areas.
- Ground cover features scattered moss and herb cover.



SOIL

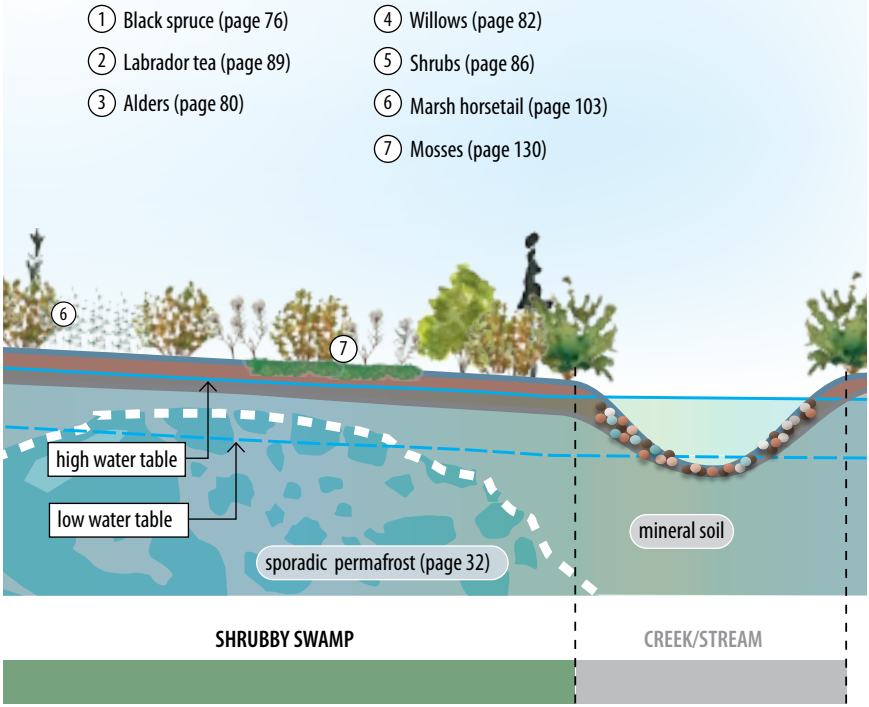
- Mineral soils (clay, silt, sand) with less than 30 cm of organic soil.
- Occasionally, you may find peat swamps with more than 30 cm of organic soil, or peat, in Yukon.
- Prominent mottling or gleying within 30 cm of the soil surface (or 45 cm if organic soil is present) in the soil indicates seasonal water level fluctuations.
- Peat in swamps is highly decomposed and contains woody debris.

WATER REGIME

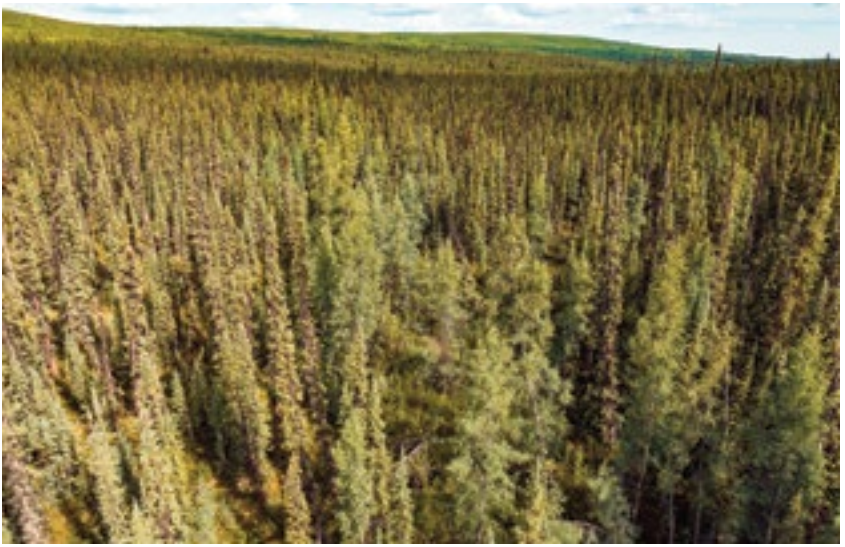
- Water sources include rainfall, snowmelt, surface runoff/overflow, and groundwater.
- Seasonal fluctuation of the water table within the rooting zone, with mid-summer dryness contrasting spring wet conditions.
- Slow-moving water flows above or below ground, especially in riparian areas, capable of storing and moderating floodwater while protecting riverbanks from erosion.
- Signs of spring flooding, such as transported plants or soil deposits, and tree damage from ice blocks, can help identify swamps.

NUTRIENT REGIME

- Nutrient-rich, fertile soils that periodically dry out.



TREED SWAMP



- Tree cover is more than 10%.
- Dense, taller tree canopy, typically more than 10 m tall. In colder, northern locations, tree height can be less than 10 m tall.
- Often found in transitions zones between uplands and peatlands.
- Hummocky microtopography allows for pools of water to accumulate around tree bases.
- Mosses are more common where the tree canopy is less dense.

CHARACTERISTIC SPECIES		
Trees	**Shrubs**	**Ground Cover**
• Black spruce (page 76) • White spruce (page 77) • Occasional tamarack (page 78), subalpine fir, Alaska birch and balsam poplar	• Alder (page 80) • Willow (page 82) • Lowbush cranberry (page 92) • Shrubby cinquefoil (page 95) ***In colder, northern locations:*** • Arctic sweet coltsfoot (page 99) • Bluejoint reedgrass (page 114) • Crowberry (page 87) • Dwarf raspberry (page 88) • Labrador tea (page 89) • Marsh horsetail (page 103) • Red bearberry (page 93) • Shrub birch (page 94)	• Occasional *Sphagnum*, feather and brown mosses (page 125)

PERMAFROST SWAMPS: Common in central and north Yukon, these swamps can also be found on many slopes at higher elevation in the south. Riparian swamps with less than 30 cm of peat may also be underlain by permafrost, generally occurring in colder regions.

SHRUBBY SWAMP

- Tree cover is less that 10%, with stunted growth (less than 10 m tall).
- Shrub cover is more than 20%, with shrub cover less than 1 m tall.
- Often found lining drainages and in riparian areas.

CHARACTERISTIC SPECIES	
Shrubs	**Ground Cover**
• Alder (page 80) • Willow (page 82) • Lowbush cranberry (page 92) • Shrubby cinquefoil (page 95) ***In colder, northern locations:*** • Arctic sweet coltsfoot (page 99) • Bluejoint reedgrass (page 114) • Crowberry (page 87) • Dwarf raspberry (page 88) • Labrador tea (page 89) • Marsh horsetail (page 103) • Red bearberry (page 93) • Shrub birch (page 94)	• Occasional *Sphagnum*, feather and brown mosses (page 125)

SOIL & VEGETATION INDICATORS:
Many plant species found in Yukon swamps can grow in wetland, upland and riparian habitats. Species like lodgepole pine, trembling aspen, prickly rose, juniper and soapberry have been recorded in swamps. As a result, it is often necessary to look at underlying soils for indicators of prominent mottling or gleying to positively classify a swamp ecosystem. If you find yourself in one of these sites, refer to Yukon Government's *Ecosite Classification Field Guides*.[1]

1. https://yukon.ca/en/ecological-landscape-classification#find-elc-publications

MARSH

LANDSCAPE SETTING

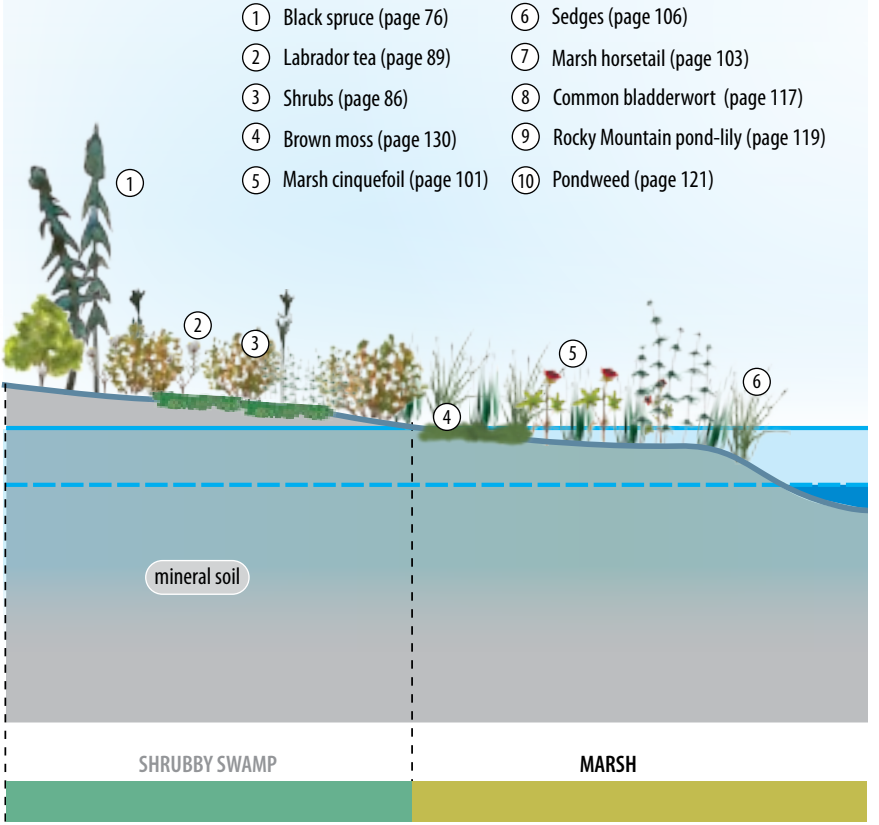
- Occur most often in the transition areas between shallow water wetlands or lakes and other wetland classes or uplands.
- Identification can be challenging in dry seasons or years without standing water.

VEGETATION

- All marshes have a dominant vegetation community of herbaceous plants (sedges, grasses, rushes and reeds); these water-tolerant species are often emerging from standing water in the springtime.
- Tree cover is less than 10%, shrub cover is less than 20%.
- Emergent herbaceous species cover more than 25%, with less than 75% open water.

SOIL

- Mineral soils (clay, silt, sand) with less than 30 cm or organic soil (peat).
- Soils are wet, with prominent mottling and/or gleying indicating seasonal water level fluctuations.



WATER REGIME

- Variety of water inputs including: snowmelt, run-off, groundwater, and stream inflow.
- Water levels fluctuate daily, seasonally, and/or annually within marshes.
- Marshes absorb excess water in spring, helping mitigate flooding events.

NUTRIENT REGIME

- Nutrient-rich wetlands, that act as nutrient and sediment traps for surrounding upland ecosystems.

CHARACTERISTIC SPECIES

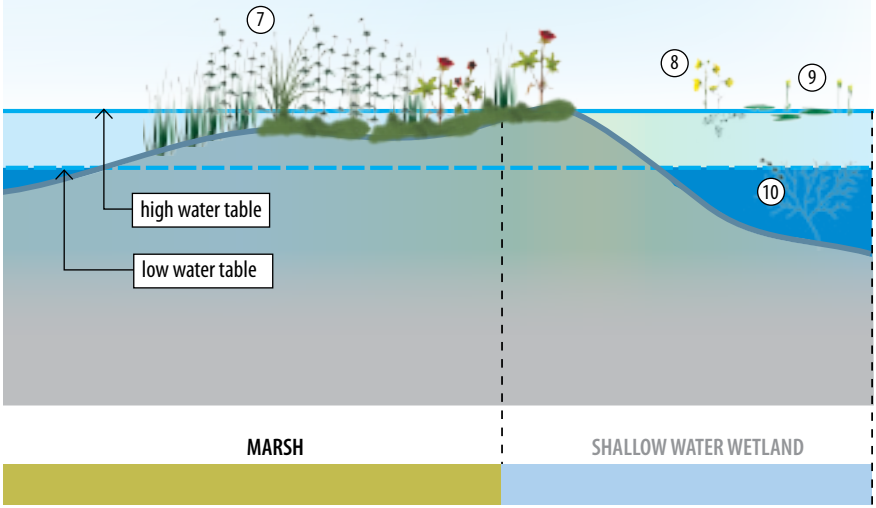
- Arctic dock (page 98)
- Bluejoint reedgrass (page 114)
- Least spike-rush (page 112)
- Marsh cinquefoil (page 101)
- Marsh horsetail (page 103)
- Tall mannagrass (page 116)
- Tufted hairgrass (page 116)
- White water buttercup (page 120)
- Brown mosses (page 130)

SALINE MARSHES

These sites can be found in some groundwater discharge areas on calcium-rich soils in the dry interior parts of southern Yukon (salt marshes), or along estuaries of the Beaufort Sea (estuarine marsh).

LESS COMMON MARSH COMMUNITIES

In remote areas of Yukon, you might also find marsh wetlands in deltas and alluvial fans of river systems, including tidal marshes along the Beaufort Sea, as well as newly formed marshes at the base of permafrost slumps.



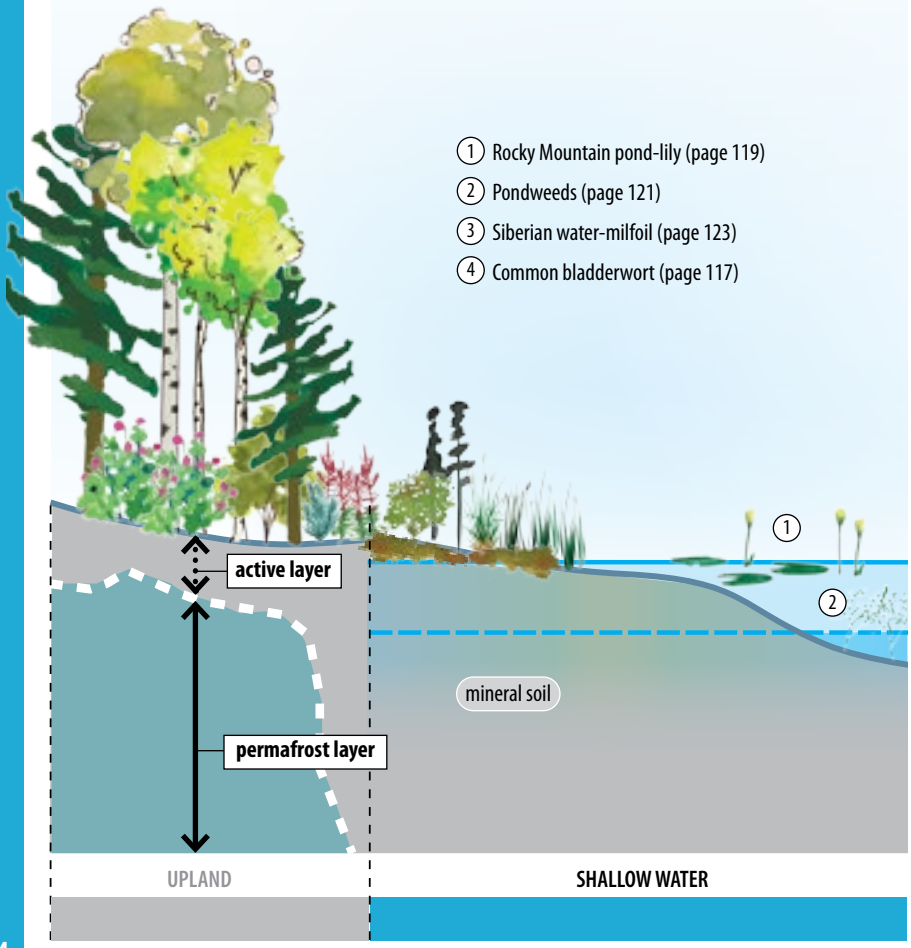
SHALLOW WATER WETLAND

LANDSCAPE SETTING

- Appear as sloughs, ponds, or shallow lakes.
- Support diverse aquatic plant species like pond-lily and submerged vegetation.
- Generally, permanently flooded, with seasonal fluctuations exposing mudflats during drought years.

VEGETATION

- Submersed and/or floating aquatic plants, possibly including algae or aquatic mosses.
- Emergent plants common along edges.
- 75% open water cover in mid-summer, with less than 25% emergent species.
- Tree cover is less than 10%, shrub cover is less than 20%.



SOIL

- Mineral soils (clay, silt, sand) with less than 30 cm or organic soil (peat).
- Soils are wet, with prominent mottling and/or gleying indicating seasonal water level fluctuations.

WATER REGIME

- Standing water (less than 2 m deep), preventing emergent plants.
- Receive water from rainfall, snowmelt, runoff, groundwater, and streams.
- Dynamic water levels fluctuate, exposing mudflats during drought.
- Retain and store water, moderating flooding and supporting groundwater recharge and stream flows.

NUTRIENT REGIME

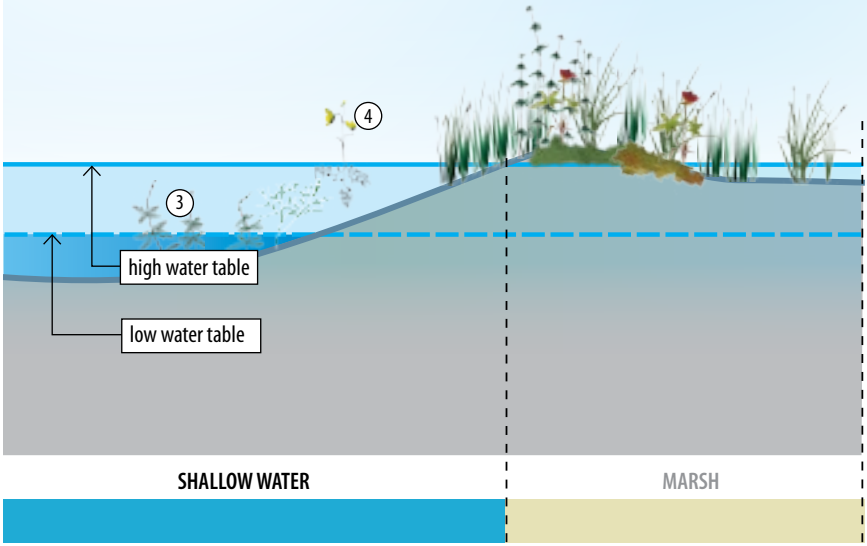
- Extremely nutrient-rich wetlands, filtering nutrients and sediments from surrounding ecosystems.

CHARACTERISTIC SPECIES

- Arum-leaved arrowhead (page 117)
- Common bladderwort (page 117)
- Common mare's tail (page 118)
- Horn wort (page 121)
- Muskgrass (page 121)
- Narrow-leaved bur-reed (page 113)
- Northern star-wort (page 118)
- Rocky Mountain pond-lily (page 119)
- Siberian water-milfoil (page 123)

UNEXPECTED SHALLOW WATER WETLANDS

Look carefully and you might now recognize shallow water wetlands in river oxbows or abandoned channels, along the margins or within the bays of larger lakes and as ponds within peatlands. Some shallow water wetlands occur where ice rich permafrost terrain has collapsed due to thermokarst. This is especially common in the MacKenzie Delta, Old Crow Flats and the Whitefish Basin.



WETLAND PLANTS

Introduction

To assist in wetland classification, this section contains profiles of the common wetland plant species highlighted in the Wetland Class Fact Sheets. This is not a comprehensive guide to all wetland plant species in Yukon. Reviewing additional resources, including species dichotomous keys, is recommended to aid in confirming your plant identification.

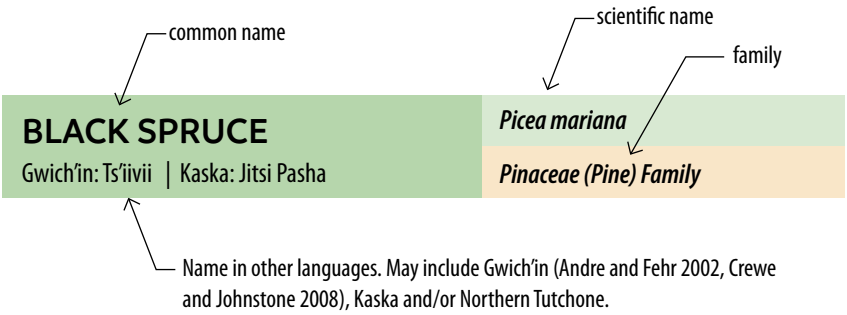
Recommended Resources:

- Flora of the Yukon Territory (Cody, 2000)
- Gwich'in Ethnobotany: Plants used by the Gwich'in for Food, Medicine, Shelter and Tools (Andre and Fehr, 2002)
- Plant Use in Vuntut Gwitchin Territory (Johnstone, 2008)
- Plants of Northern British Columbia (MacKinnon, Pojar & Coupe, 2021)
- Wild Flowers of the Yukon, Alaska & Northwestern Canada (Trelawny, 2009)

Species Naming:

For naming conventions, this guide uses information available at time of publishing from the VasCan database, but relies on local authorities for species common names.

Each page provides naming as shown:



"NUMBER ONE IS THE RESPECT FOR HARVESTING THE PLANTS; OFFERING PRAYERS, TOBACCO, IN YOUR PRAYERS ASKING FOR WHAT YOU NEED THAT MEDICINE FOR AND HOW YOU WANT IT TO HELP YOU, AND TAKING ONLY WHAT YOU NEED, ALWAYS RESPECTING IT."

- Elder Mary Jane Moses

In addition to species information, each page provides a visual check box for what class of wetland(s) the species may be found in:

If the box is greyed out and unchecked, the plant is not likely found in that wetland class.

Where possible, traditional and wildlife uses have also been provided and formated as shown below:

Traditional Use

Traditional use information, particularly the edible and medicinal uses, is informational only and not meant as a guide for harvesting or consumption practices. **Some plants can be harmful or toxic to human health if taken in large doses.** Please consult an expert for further information on plant harvesting, offerings and traditional uses.

Wildlife Use

Wildlife use has also been included where possible. For more about the wildlife that rely on wetlands see *Wetland Wildlife on page 135.*

Organization of Species

Trees: Woody plants with a single, well-defined trunk, taller than 3 metres. There are both deciduous (in this case, denoting broadleaf species which shed their leaves annually) and coniferous (trees with needle-shaped leaves and cones) wetland trees in Yukon.

Alders: Alders *(Alnus)* are part of the birch *(Betulaceae)* family. Alder trees grow in a conical shape. The bark is often covered in lichen.

Willows: Willows *(Salicoideae)* family have abundant watery bark sap, which is heavily charged with salicylic acid, soft, usually pliant, tough wood, slender branches, and large, fibrous, often stoloniferous roots.

Shrubs: Woody plants typically less than 3 metres in height with multiple, branched stems.

Herbs: Herbaceous (non-woody) plant species, specifically forbs and graminoids. Forbs include broad-leaved flowering plants, while graminoids are narrow-leaved grasses, sedges, rushes, cattails, etc (see page 37 for illustration). They are often emergent species that tolerate flooded conditions, at least for a portion of the growing season.

Sedges: Grass-like plants with hollow triangular stems with leaves growing on all 3 sides, and typically grow in wet ground. bulrushes are close relatives in the same family as true sedges.

Rushes and Reeds: Rush stems are always round in cross section, but are not hallow. Reeds are generally, a tall, grasslike marsh plants with a firm stem.

Grasses: Grasses are usually distinguished from other graminoids by their knee-like nodes along their stems, also known as culms. Other than at the culms, grass stems are hollow.

Pondweeds: Submersed aquatic species with flowering spikes above the water.

Aquatic Species: Species adapted to living continuously in water. These include submersed and floating species which occupy standing water typically less than 2 metres in depth. Aquatic plants may be free-floating in the water column or fixed to the bottom sediment.

Bryophytes (*Sphagnum* moss, feather moss and brown moss): Small, non-vascular plant species such as mosses, liverworts and hornworts. These species do not produce flowers or seeds, but instead reproduce via spores.

Lichens: Complex life forms consisting of a symbiotic partnership between a fungus and an alga. The dominant partner is the fungus, which gives the lichen the majority of its characteristics, from its shape to its fruiting bodies.

Terminology

Leaf Arrangements

Alternate

Opposite

Whorled

Pinnate

Palmate

Leaf Shapes

Lance

Linear

Elliptic

Oval

Round

Triangular

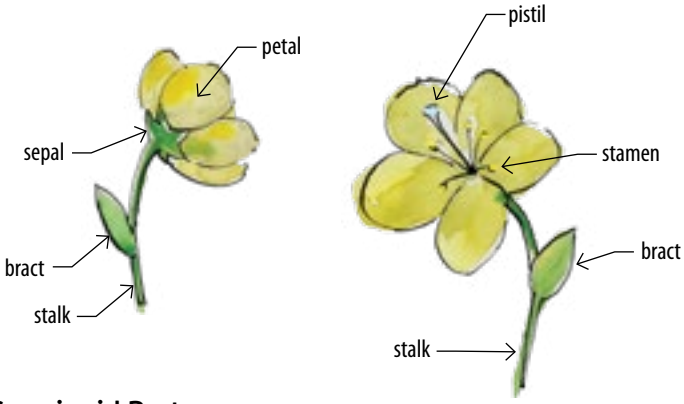
Diamond

Smooth

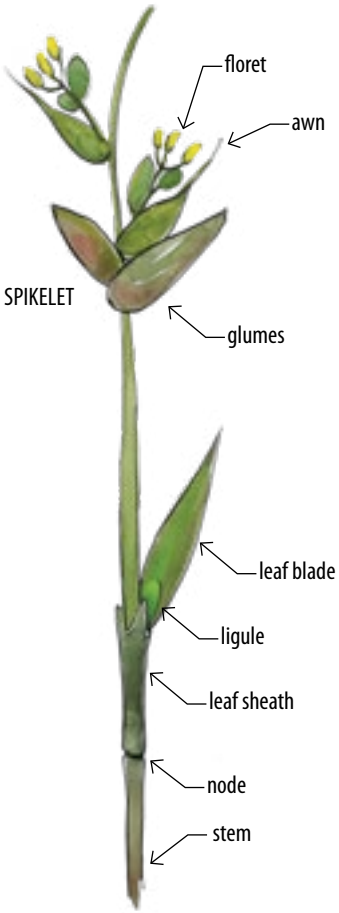
Toothed

Double-toothed

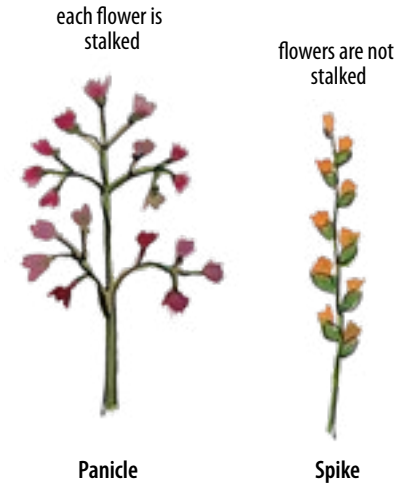
Forb Flower Parts



Graminoid Parts



Graminoid Flower Arrangements



Plant List

TREES

ALDERS

WILLOWS

SHRUBS

HERBS

SEDGES

RUSHES AND REEDS

GRASSES

AQUATIC SPECIES

PONDWEEDS

SPHAGNUM MOSSES

FEATHER MOSSES

BROWN MOSSES

LICHENS

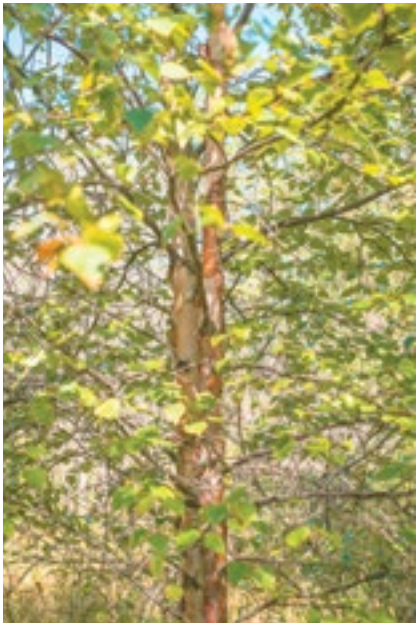
ALASKA BIRCH

Gwich'in: Aat'oo

Betula neoalaskana

Betulaceae (Birch) Family

- ☐ Bark is dark reddish brown when young, becoming creamy white with age but less peeling than white birch.
- ☐ Branches and leaves alternate with hairless, reddish brown, densely warty twigs.
- ☐ Leaves 4-7 cm, triangular, double-toothed, hairless to sparsely hairy below, and tapering off to a sharp point.



Tree.

Leaves.

Reddish brown bark.

"USE THE BOTTOM PART OF THE BIRCH TREE (WHERE THERE ARE NO BRANCHES) TO MAKE SNOWSHOES."

- Elder Russell Burns

A food, medicine and tool source for northern communities – the inner bark is watertight, allowing for use as canoes, baskets, dishes, etc.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP ✓	MARSH	SHALLOW OPEN WATER

BALSAM POPLAR

Gwich'in: T'oo | Kaska: Du sha

Populus balsamifera

Salicaceae (Willow) Family

- ☐ Bark is deeply furrowed and grayish brown when mature compared to the smoother, white appearance of aspen bark.
- ☐ Branches and leaves alternate .
- ☐ Leaves 7-10 cm (considerably larger than aspen), oval to lance-shaped, finely toothed, dark green and shiny above with lighter underside.
- ☐ Large, sticky, fragrant buds on the branch. Good indicator when leaves are not present .

Balsam poplar trees.

Leaves.

"BUDS CAN BE USED FOR SORE JOINTS, AS AN ESSENTIAL OIL."

- Elder Angie Joseph-Rear

A medicine and fuel source for northern communities – the sticky buds are often collected and boiled into tea or used as a binding agent for wounds.[1] The green wood is also a good smoking agent for drying fish or tanning moose hide. It has also been used as bait for trapping beavers.

1. Andre and Fehr, 2002.

BOG	FEN	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

BLACK SPRUCE

Gwich'in: Ts'iivii | Kaska: Jitsi Pasha

Picea mariana

Pinaceae (Pine) Family

- ☐ Small and slow-growing with characteristic clump of branches towards the top of its crown.
- ☐ Branches whorled, lowermost sloping steeply downwards.
- ☐ Young twigs with short (1-2 cm) needles and rusty hairs, compared to smooth white spruce twigs.
- ☐ Seed cones are small (1-2.5 cm, half the length of white spruce cones), oval and often purple in colour .

Trees.

Twigs.

Branch.

"WE CALL IT SKINNY SPRUCE TREE. SPRUCE GUM IS GOOD FOR STOMACH ACHES OR TOOTHACHES, OR USED AS A BINDING AGENT ON OPEN CUTS."

- Elder Jimmy Johnny

An important food, medicine, shelter, tool and fuel source in northern communities.[1] The bark, sap, cones and tips can be used for various medicinal purposes by boiling into tea or as a wound binding agent.

1. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

WHITE SPRUCE

Gwich'in: Ts'iivii

Picea glauca

Pinaceae (Pine) Family

- ☐ Evergreen tree; needles blueish green, 12-20 mm long, whorled (like a bottle brush).
- ☐ Large cones, 2.5-4 cm long, hanging down off branches, closed and purplish when young; open and light brown when mature.
- ☐ **White spruce can be differentiated from black spruce by looking at the young twigs, white spruce twigs are hairless, black spruce twigs have small reddish hairs.**

Trees.

Twig.

Bark.

"YOU ALWAYS MAKE SPRUCE TEA WHEN YOU SET UP CAMP, BEFORE YOU HEAD OUT TO HUNT."

- Elder Allan Carlick

Similar to black spruce, white spruce important food, medicine, shelter, tool and fuel resource in northern communities.[1] The bark, sap, cones and tips can be used for various medicinal purposes by boiling into tea or as a wound binding agent.

1. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

Jump to:
Plant List

TAMARACK

Gwich'in: Ts'iiheenjoo | Kaska: Ta Dusya

Larix laricina

Pinaceae (Pine) Family

- ☐ Also known as **larch.**
- ☐ Branches alternate.
- ☐ Needles are short (1-2.5 cm) and soft, arranged in clusters of 10-20, bluish green in colour turning yellow and dropping in fall .
- ☐ Seed cones are small (1-2 cm) and oval.

Trees.

Cones and needles.

Needles (fall colours).

A medicine and fuel source for northern communities – the branches and cones are often collected and boiled into tea[1]. Tamarack roots are considered the strongest for uses such as rope or fish nets.

1. Andre and Fehr, 2002.

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

"MOTHER EARTH HEALS ITSELF. EVERY SEASON THERE IS A CHANGE – FLOODS, FIRES, SNOW, RAIN. WE SEE MOTHER EARTH HEAL ITSELF THROUGH IT ALL. FIRES AND FLOODS ARE NATURAL WAYS OF MOTHER EARTH HEALING... NEW PLANTS, NEW TREES GROWING."

- Elder Russell Burns

Spruce on Birch Bark
by Darcy McDiarmid.

GREEN ALDER/RED WILLOW

Gwich'in: K'oh | Kaska: Gula dit je la

Alnus alnobetula ssp. crispa

Betulaceae (Birch) Family

- ☐ Shrub, 1-8 m tall, twigs with conspicuous raised pores.
- ☐ Narrowly oval, alternate leaves, sharp-pointed at tip, toothed along edges.
- ☐ Catkins appear with leaves in spring, followed by small (1-2 cm), egg-shaped seed cones.
- ☐ Margins of leaves are finely single-toothed, dark green above and shiny green, hairless below.

Leaves.

Cones.

Alders have been widely used by Indigenous people as a dye to treat animal hides, for fuel, smoking salmon and meat, carving and basket making.[1] Red willow is a notable medicinal plant, as valuable as spruce gum tea.[2] Either the bark or buds can be boiled into a medicinal tea.

1. MacKinnon et al., 1999 .
2. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

RIVER ALDER

Gwich'in: Maomi gi | Kaska: Giss

Alnus incana

Betulaceae (Birch) Family

- ☐ Note: Grey alder (*Alnus incana tenuifolia*) is a sub species of river alder.
- ☐ Shrub, 1-8 m tall, twigs with conspicuous raised pores.
- ☐ Narrowly oval, alternate leaves, sharp-pointed at tip, toothed along edges.
- ☐ Catkins appear with leaves in spring, followed by small (1-2 cm), egg-shaped seed cones.
- ☐ Leaves coarsely double-toothed, dull green above with sticky hairs on underside.

Leaves and stem.

Alders flower early in spring, providing an important food source for pollinators. Grouse are known to eat alder leaves, buds and seeds, while hares and beavers feast on the bark. The "seeds" (nutlets) are an important foodsource for songbirds in fall and winter.[1]

1. MacKinnon et al., 1999.

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

There are over 50 species of willow in Yukon, with the most easily identifiable characteristic being their small inconspicuous flowers arranged in catkins that appear in spring. Willows are also distinguished as having only one bud scale.

DIAMOND-LEAVED WILLOW

Gwich'in: K'aii

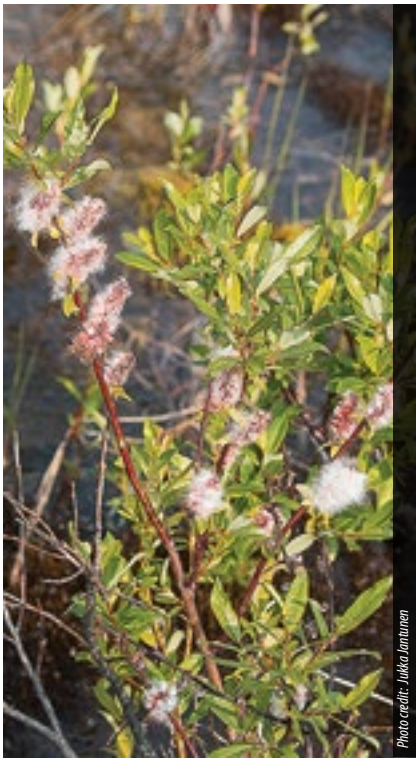
Salix pulchra

Salicaceae (Willow) Family

- ☐ 0.5-4 m tall.
- ☐ Twigs dark brown, smooth to hairy.
- ☐ Narrow leaves, more diamond-shaped than tea-leaved willow.

Catkins.

Leaves.



Plant.

Willows are a staple food source for browsing moose, and also serve as bedding, hiding and birthing places for many smaller animals, such as rabbits and ptarmigan.[1,2]

1. MacKinnon et al., 1999.
2. Andre and Fehr, 2002.

BOG | FEN ✓ | SWAMP ✓ | MARSH | SHALLOW OPEN WATER

FELT-LEAF WILLOW

Gwich'in: K'aii

Salix alaxensis

Salicaceae (Willow) Family

- ☐ Also known as **Alaska willow.**
- ☐ 1-8 m tall.
- ☐ Twigs and catkins densely white-hairy.
- ☐ Leaves entire, dark green above, densely white-woolly below.

Plant.

Catkin.

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

LOW BLUEBERRY WILLOW

Gwich'in: K'àii

Salix myrtillifolia

Salicaceae (Willow) Family

- ☐ 0.1-1.5 m tall.
- ☐ Twigs greenish brown, with short hairs.
- ☐ Leaves narrow, hairless, green on both sides with blunt, rounded teeth.

Photo credit: Syd Cannings

Plant.

Photo credit: Jozien Keyzer

Catkin.

A fuel, medicine, food, tool and shelter source for northern communities.[1] Flexible stems are often used for basket weaving, fishing weirs, snares, utensils, snowshoes, as fire-starter, for smoking or drying meat and fish, or even as clothing.[1,2] Shredded bark might be used as diapers, wound dressings or as sanitary napkins.[2] Chewed leaves might be used on wounds.[1]

1. Andre and Fehr, 2002.
2. MacKinnon et al., 1999.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓		

TEA-LEAVED WILLOW

Gwich'in: K'àii

Salix planifolia

Salicaceae (Willow) Family

- ☐ 0.5-4 m tall.
- ☐ Twigs dark brown, smooth to hairy.
- ☐ Narrow leaves, sometimes toothed, with short silky hairs that may be rust-coloured.

Photo credit: Avery Bartells

Leaves.

Female catkin.

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

BOG BLUEBERRY

Gwich'in: Chukqui / Jak zraii

Vaccinium uliginosum

Ericaceae (Heath) Family

- ☐ Also known as **bog bilberry**, **huckleberry** or **alpine blueberry.**
- ☐ Short, deciduous shrub up to 50 cm tall.
- ☐ Oval leaves up to 3 cm long, no teeth on edges.
- ☐ Pink, urn-shaped flowers in clusters of up to four followed by small, blueberries.

Leaves and flowers.

Berries.

Used widely by Indigenous people, either eaten as fresh berries or boiled in grease and stored for winter.[1] The stems and leaves might be harvested and boiled into a medicinal tea.[2]

1. MacKinnon et al., 1999.
2. Andre and Fehr, 2002.

✓ **BOG** | FEN | SWAMP | MARSH | SHALLOW OPEN WATER

CROWBERRY

Gwich'in: Dineech'ùh

Empetrum nigrum

Empetraceae Family

- ☐ Also known as **mossberry.**
- ☐ Low, creeping shrub with distinct, narrow, needle-like leaves up to 8 mm long whorled around the stem.
- ☐ Solitary, tiny purple flowers followed by a distinctive, shiny, dark blue-black berry.

Leaves.

Berry.

"PEEL AND BOIL THE BARK, IT IS GOOD FOR STOMACH AILMENTS - BUT DON'T DRINK TOO MUCH."

- Elder Charlie Dickson

Crowberries are a favourite food of bears, they can even be harvested from under the snow.[1]

A food and medicine source for northern communities – the berries are edible and make a good jam.[2] The roots, berries and stems might be harvested and boiled into a medicinal tea.

1. MacKinnon et al., 1999.
2. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓			

Jump to:
Plant List

DWARF RASPBERRY

Rubus arcticus ssp. acaulis

Rosaceae (Rose) Family

- ☐ Also known as **Nagoonberry.**
- ☐ Creeping, rhizomatous (having rhizomes) shrub, up to 10 cm tall.
- ☐ Leaves are in threes (trifoliate) with toothed edges.
- ☐ Single, attractive, deep pink/purple flower turning into a dark red fruit (raspberry).

Leaves and flower.

These sweet berries can be eaten raw or made into jams, jellies or used as a flavouring agent.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP ✓	MARSH	SHALLOW OPEN WATER

LABRADOR TEA

Gwich'in: Midena skip / Lidii masgit

Rhododendron groenlandicum

Ericaceae (Heath) Family

- ☐ Also known as **muskeg tea** or **Hudson Bay tea.**
- ☐ Short shrub up to 1 m tall.
- ☐ Leaves evergreen and alternate, 1-6 cm, oval to linear shape with smooth edges that roll under, dull green above and rusty orange below with dense, woolly hairs.
- ☐ Flowers white to pinkish, forming round, umbrella-shaped clusters.
- ☐ **Dwarf Labrador tea** *(Rhododendron tomentosum)* is a shorter shrub (up to 50 cm tall), with smaller, linear leaves (2 cm long).

Leaves and stem.

Underside of leaf.

Dwarf Labrador tea *(Rhododendron tomentosum).*

A food and medicine source for northern communities – the leaves and stems can be picked year round and boiled into a medicinal tea particularly high in Vitamin C.[1] While both Labrador tea and Dwarf Labrador tea can be harvested for medicine, the latter is considered the better one to taste.[1]

1. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

Jump to:
Plant List

"THE TEA IS DRUNK TO TREAT COLDS."

- Elder Mary Jane Moses

Labrador Tea on Birch Bark
by Darcy McDiarmid.

LEATHERLEAF

Chamaedaphne calyculata

Ericaceae (Heath) Family

- ☐ Short shrub up to 60 cm tall.
- ☐ Leaves alternate and leathery in appearance, up to 5 cm long, oval to elliptic, underside with small brown scales.
- ☐ Flowers white, bell-shaped hanging down from one side of the branch in elongated clusters (racemes).

Leaves and flowers.

Leaves and flowers.

BOG ✓	FEN ✓	SWAMP	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

LOWBUSH CRANBERRY

Gwich'in: Natl'at

Vaccinium vitis-idaea

Ericaceae (Heath) Family

- ☐ Also known as **lingonberry.**
- ☐ Trailing stems 10-20 cm long.
- ☐ Leaves evergreen, alternate, 5-15 mm, oval to elliptic with down-rolled edges, upper surface leathery, shiny dark green and lower surface light green.
- ☐ Flowers pinkish-white and bell shaped, forming in clusters.
- ☐ Fruits are small, bright red, edible berries that are hard and tart until they are exposed to frost.
- ☐ Can be easily confused with **bearberry/kinnikinnick** which is also red on the outside but white on the inside.

Berries.

Leaves.

"JUICE IS GOOD FOR KIDNEYS."

- Elder Mary Jane Moses

A food, medicine and dye source for northern communities – the berries are edible and can be enjoyed year round.[1] The juice is good for treating kidney problems or might be boiled with the leaved to make a medicinal tea.

1. Andre and Fehr, 2002.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓			

RED BEARBERRY

Arctostaphylos rubra

Ericaceae (Heath) Family

- ☐ Ground trailing shrub, usually less than 15 cm tall.
- ☐ Deciduous leaves that turn bright red in the fall.
- ☐ Leaves are oval in shape, up to 4 cm long with conspicuous veins and toothed edges.
- ☐ Produces small, pink urn-like flowers immediately after snowmelt, followed by bright red berries.

Leaves.

Berries.

✓

BOG | FEN | **SWAMP** | MARSH | SHALLOW OPEN WATER

Jump to:
Plant List

SHRUB BIRCH

Gwich'in: K'oh | Kaska: Gula dit je la

Betula glandulosa

Betulaceae (Birch) Family

- ☐ Spreading to erect shrub up to 2 m tall.
- ☐ Twigs reddish brown, covered with large, warty glands.
- ☐ Leaves 1-2 cm, round, thick and leathery, dotted with glands and with 6-10 rounded teeth per side.

Leaves and stem.

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

SHRUBBY CINQUEFOIL

Dasiphora fruticosa

Rosaceae (Rose) Family

- ☐ Low, rounded shrub (bushy), up to 1.5 m tall.
- ☐ Deciduous leaves are small, greyish-green in colour with 3-5 toothed leaflets.
- ☐ Intensely yellow flowers, with 5 round petals.

Flowers.

Leaves.

BOG	FEN	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

SMALL BOG CRANBERRY

Yup'ik: Uingiaraat ("husband berries")

Vaccinium microcarpum

Ericaceae (Heath) Family

- ☐ Tiny, creeping shrub 10-50 cm long.
- ☐ Leaves tiny (2-6 mm), alternate, leathery, oval to elliptic with edges that roll under; leaves are widely spaced along vine.
- ☐ Flowers appear like tiny shooting stars, comprised of four pink petals sharply pointed backwards.
- ☐ Fruit small, round, pale pink, turning to dark red berries.

Berries.

Leaves.

Closely related to commercial cranberries, these tart berries have been an important food source for Indigenous peoples. They can be eaten raw, boiled with meat or preserved for winter.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓			

SWEET BAYBERRY

Myrica gale

Betulaceae (Birch) Family

- ☐ Medium-sized, deciduous shrub up to 1 m tall.
- ☐ Leaves 3-5 cm long, oval to lance-shaped, grayish in colour with toothed edges at the tip.
- ☐ Yellow flowers borne in male and female catkins (dioecious – on separate shrubs).
- ☐ Has a pleasant fragrance reminiscent of bay, sage and nutmeg.

Flowers.

Leaves.

✔

BOG | **FEN** | SWAMP | MARSH | SHALLOW OPEN WATER

Jump to:
Plant List

ARCTIC DOCK

Gwich'in: Trî'itthoh | Northern Tutchone: Dun chew nee

Rumex arcticus

Polygonaceae (Buckwheat) Family

- ☐ Stems simple, often red, 100 cm tall or greater.
- ☐ Dark green leaves are mostly basal, lance-shaped up to 30 cm long.
- ☐ Flowers form in dense clusters on upper part of stem, red in colour.

Plant.

Flowers.

An important medicine source for northern Indigenous communities, the roots are harvested in the fall and boiled and strained into a medicinal juice.[1]

1. Crewe and Johnstone, 2008.

BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER

ARCTIC SWEET COLTSFOOT

Petasites frigidus ssp. Frigidus

Asteraceae (Aster) Family

- ☐ Simple stems, up to 50 cm tall, develop before the appearance of the distinctive, large leaves.
- ☐ Leaves (up to 25 cm long) emerge from stem base, roughly heart-shaped with shallow to deep lobes; smooth above and white-woolly below.
- ☐ Dense clusters of small, white flowers.

The leaves are harvested and boiled as a medicinal tea by the Vuntut Gwichin.[1]

1. Crewe and Johnstone, 2008.

✓

BOG | FEN | SWAMP | **MARSH** | SHALLOW OPEN WATER

BUCKBEAN

Menyanthes trifoliata

Menyantheceae (Buckbean) Family

- ☐ Aquatic to emergent spreading plants, more commonly found in the south.
- ☐ Leaves alternate, crowded near the stem base, compound with three oval leaflets.
- ☐ Flowers clustered at tip of long stem with 5 white, hairy petals.

Leaves.

Flowers.

✓

BOG | **FEN** | SWAMP | MARSH | SHALLOW OPEN WATER

Jump to:
Plant List

CLOUDBERRY

Gwich'in: Nakàl

Rubus chamaemorus

Rosaceae (Rose) Family

- ☐ Also known as **yellowberry**, **salmonberry**, **swamp apple** or **bake apple** due to their flavour.
- ☐ Typically grows on *Sphagnum* moss hummocks, more commonly found in the north.
- ☐ Low herb with erect flowering stems, up to 30 cm tall.
- ☐ Leaves 1-3 per stem; round to kidney shaped, shallowly 5-7 lobed, leathery and toothed.
- ☐ Single, white flower at stem tip becomes raspberry-like cluster of berries, reddish when young, amber to yellow when mature.

Leaves.

Berry.

Flower.

The berries are very high in Vitamin C, making them a staple foodsource for northern Indigenous peoples. They can be eaten fresh or frozen for winter use.[1]

1. MacKinnon et al., 1999.

"WHEN YOU HARVEST DIFFERENT PLANTS, YOU SPREAD THE SEEDS OUT, LEAVING SOME TO REGROW. THANK THE CREATOR FOR TAKING THE PLANT, LEAVE TOBACCO AS AN OFFERING TO KEEP NATURE IN BALANCE. IF WE OBEY OUR DOOLÌ LAWS, WETLANDS CAN KEEP EVERYTHING IN CHECK."

- Elder James Allen

BOG ✓	FEN ✓	SWAMP	MARSH	SHALLOW OPEN WATER

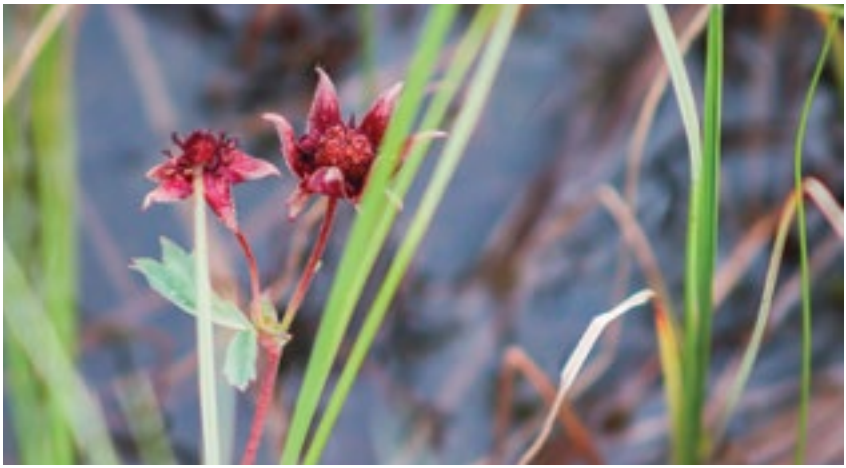
MARSH CINQUEFOIL

Comarum palustre

Rosaceae (Rose) Family

- ☐ Stems reddish brown, spreading along ground with ascending flowering stems.
- ☐ Leaves pinnately compound with 5-7 leaflets on flowering stem, oval and coarsely toothed.
- ☐ Flowers cluster at stem tip with 5 purple sepals and 5 maroon petals.

Leaves.



Flowers.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

Jump to:
Plant List

"CAN BE USED FOR SORE THROATS."

- Elder Angie Joseph-Rear

Horsetail on Birch Bark
by Darcy McDiarmid.

MARSH HORSETAIL

Gwich'in: Khehdi'

Equisetum palustre

Equisetaceae (Horsetail) Family

- ☐ Also known as **moosegrass** or **goosefood.**
- ☐ Erect stems up to 50 cm tall, with 6-8 brown teeth instead of true leaves.
- ☐ Numerous fine branches in whorls around stem with 5-10 ridges.

Reproductive shoots.

Vegetative shoots.

The roots, leaves and stems can be steamed as a medicinal agent or used to scrub pots and clean dishes.[1]

An important food source for geese and muskrats.[1]

1. Andre and Fehr, 2002.

BOG	FEN ✓	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

Jump to:
Plant List

ROUND-LEAF SUNDEW

Drosera rotundifolia

Droseraceae (Sundew) Family

- ☐ Carnivorous (insect-digesting) plant, 5 to 10 cm tall.
- ☐ Leaves round with sticky, with red, gland-tipped hairs, located at stem base in a circular arrangement.
- ☐ Each leaf hair is tipped by a drop of sticky fluid that acts as a trap for insects, supplementing the plant with phosphorus and nitrogen nutrients that are otherwise lacking in acidic peatlands.
- ☐ Flowers small with 5 white petals, only open in sunlight.

Plant.

Sundews are often pollinated by the same species they target as food – mosquitoes, midges and gnats.[1]

1. MacKinnon et al., 1999.

✓ ✓

BOG | FEN | SWAMP | MARSH | SHALLOW OPEN WATER

SMALL NORTHERN BOG ORCHID

Platanthera obtusata

Orchidaceae Family

- ☐ Less than 35 cm tall herb with yellowish-green flowers, one of many orchids which grow in peatlands across Yukon.
- ☐ Single blunt-tipped leaf at base of the stem.
- ☐ Lance-shaped leaves become smaller moving up the stem.
- ☐ Flowers loosely clustered along the top of the stem, each has a distinctive, orchid shape with a spur and pointed lip to invite pollinators.

Plant.

"SHOW RESPECT WHEN HARVESTING PLANTS. OFFER PRAYERS AND TOBACCO. LET THE PLANT KNOW WHAT YOU NEED MEDICINE FOR. LEAVE SOMETHING TO REPLACE IT ON THE GROUND. KNOW WHAT PLANTS TO HARVEST AND WHAT YOU'RE GOING TO USE THEM FOR."

- Elder Mary Jane Moses

This species is regularly cross-pollinated by mosquitoes.[1]

1. MacKinnon et al., 1999.

✓ BOG	✓ FEN	SWAMP	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

Sedges have edges, meaning that they are triangular in cross section with distinct corners when rolled between your fingers.

AWNED SEDGE

Carex atherodes

Cyperaceae (Sedge) Family

☐ Robust, up to 120 cm tall, with wide leaves that are hairy at the base and large spikes.

Plant.

Spikes.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

COTTONGRASS

Kaska: Chōs

Eriophorum scheuchzeri

Cyperaceae (Sedge) Family

- ☐ Often forms stands of solitary stems up to 30 cm high, with narrow leaves at the base.
- ☐ Easily recognized by the flower, a white woolly tuft which resembles a cotton ball.

Photo credit: Cameron Decker

Flowering plants.

Photo credit: Logan McLeod

Flowers.

"WHEN IT STARTS TO FLOAT AROUND IN THE AIR (MID-JULY), YOU KNOW THE MOOSE ARE FAT (READY TO HARVEST)."

- Elder Charlie Dickson

BOG	FEN ✓	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

LESSER PANICLED SEDGE

Carex diandra

Cyperaceae (Sedge) Family

☐ Slender, densely tufted up to 100 cm tall, with brownish green narrow but long leaves, dark brown-black at base, and 5-7 spikes up to 3 cm long.

Photo credit: Jukka Jantunen

Plants.

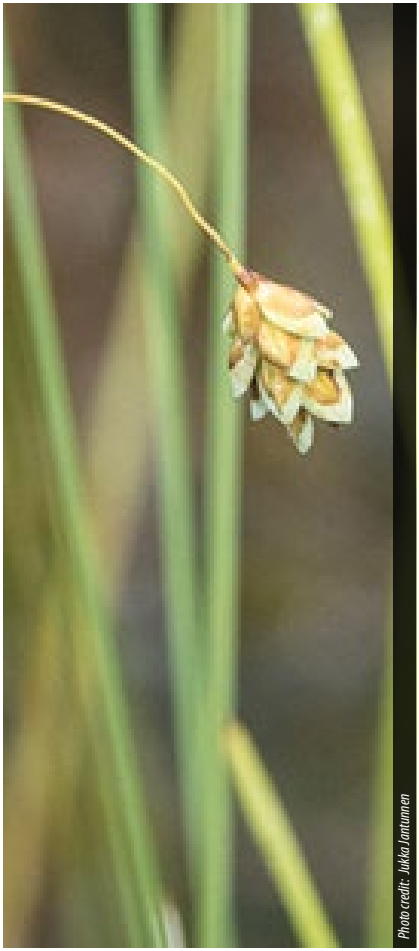
BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

MUD SEDGE

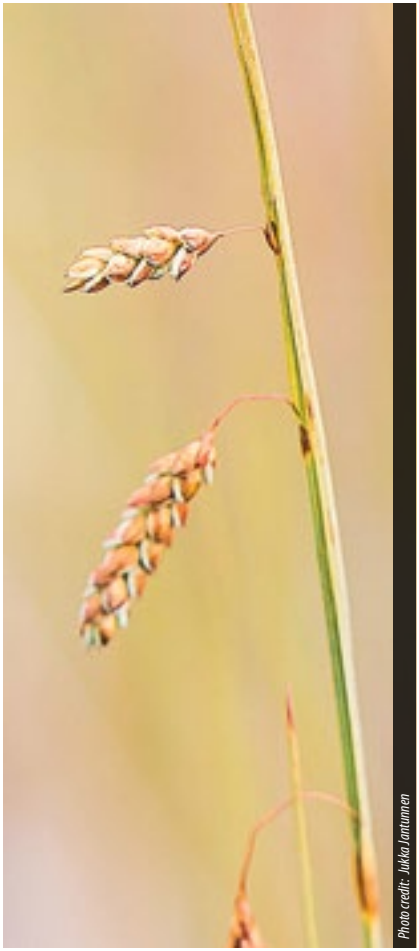
Carex limosa

Cyperaceae (Sedge) Family

- ☐ Slender, 20-60 cm tall, leaves reddish at base.
- ☐ 2 to 4 spikes with somewhat flattened, egg-shaped green fruits. Male spike at tip of stem, female spikes drooping.
- ☐ Roots have rusty, felt-like covering.



Seed.



Stem and seed.

BOG	FEN ✓	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

Jump to:
Plant List

NORTHERN BEAKED SEDGE

Carex utriculata

Cyperaceae (Sedge) Family

☐ Robust, up to 100 cm tall, with wide hairless leaves with distinct cross-hatching pattern at the base and large spike resembling bottle brush.

Seeds and leaves.

Cross-hatching pattern at base.

Sedges in general are used by Indigenous peoples for food preparation, bedding and on floors.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

SILVERY SEDGE

Carex canescens

Cyperaceae (Sedge) Family

- ☐ Also known as **hoary sedge.**
- ☐ Slender, densely tufted in clumps, up to 50 cm tall, bluish-green narrow leaves and 4-7 small spikes along stem.

Plant.

Seeds.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

WATER SEDGE

Carex aquatilis

Cyperaceae (Sedge) Family

- ☐ Robust, up to 80 cm tall, densely tufted with blueish green leaves, narrower than awned sedge and bottle brush sedge; spikes are separated into male at the tip of stem and female below.

Stem and seed.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

Jump to:
Plant List

LEAST SPIKE-RUSH

Eleocharis acicularis

Cyperaceae (Sedge) Family

- ☐ Forms dense mats, stems are needle-like up to 10 cm tall and round in cross-section.
- ☐ Leaves are bladeless sheaths emerging from base of stem.
- ☐ Flowers consist of single small spike at stem tip, oval to lance-shaped, somewhat flattened.

Plants.

BOG	FEN	SWAMP	✓ MARSH	SHALLOW OPEN WATER

NARROW-LEAVED BUR-REED

Sparganium angustifolium

Typhaceae (Cattail) Family

- ☐ Stems submersed or floating, with elongated narrow leaves.
- ☐ Small flowers with 1-3 fruiting heads, 1-2 cm wide.

Photo credit: Syd Cannings

Plant.

BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER

TUFTED CLUB-RUSH

Trichophorum cespitosum

Cyperaceae (Sedge) Family

- ☐ Densely tufted in tussocks, up to 40 cm tall, stems round in cross-section.
- ☐ Small inconspicuous leaves up to 1 cm long.
- ☐ Brown, egg-shaped flowers, each surrounded by 6 delicate white bristles.

Photo credit: Jozien Keyzer

Plants.

Photo credit: Jozien Keyzer

Close up.

BOG	FEN ✓	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

Jump to:
Plant List

BLUEJOINT REEDGRASS

Calamagrostis canadensis

Poaceae (Grass) Family

- ☐ Stems up to 150 cm tall, nodes along stems coloured purplish blue.
- ☐ Leaves numerous with blades up to 30 cm long, rough to touch with stiff hairs above and below.
- ☐ Flowers in panicles, typically loose and open (more than 2 cm wide) with a fuzzy appearance.

Plant.

Cluster.

Grasses are extremely beneficial food sources for humans and wildlife (think of cereal crops), from large grazing mammals to waterfowl, as well as providing shelter to small animal species Tall mannagrass is a particularly important forage species for wildlife.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

FOWL BLUEGRASS

Poa palustris

Poaceae (Grass) Family

- ☐ Stems up to 100 cm, often in clumps without spreading root stocks.
- ☐ Leaf blades have a distinct boat-shaped tip.
- ☐ Flowers in pyramid-shaped panicles, loose and open on spreading branches in whorls of 4 or 5.
- ☐ Lemmas have long cobwebby hairs at their base.

Cluster.

Grasses have traditionally been used by Indigenous peoples to weave fine spruce-root baskets and other important household items.[1]

1. MacKinnon et al., 1999.

BOG	FEN	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

Jump to:
Plant List

TALL MANNAGRASS

Glyceria grandis

Poaceae (Grass) Family

- ☐ Loosely tufted perennial up to 150 cm tall.
- ☐ Flat leaves, 6-12 mm wide.
- ☐ Flowers in large panicles with spreading branches, up to 40 cm long.

Plants.

Close up.

BOG	FEN	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

TUFTED HAIRGRASS

Deschampsia cespitosa

Poaceae (Grass) Family

- ☐ Densely tufted, up to 120 cm tall.
- ☐ Leaves stiff and narrow (3 mm wide).
- ☐ Flowers in an open, loose panicle up to 24 cm long, spikelets bronze and glistening.

Plants.

Close up.

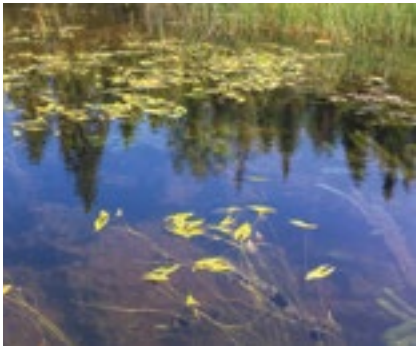
BOG	FEN	SWAMP ✓	MARSH ✓	SHALLOW OPEN WATER

ARUM-LEAVED ARROWHEAD

Sagittaria cuneata

Alismataceae (Water Plantain) Family

- ☐ Emergent perennial, stem arising from a tuberous rhizome.
- ☐ Long, slender leaves are arrow-shaped, up to 18 cm long.
- ☐ Flower with 3 large white petals.



Plants.

Flower.

BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER ✓

COMMON BLADDERWORT

Utricularia vulgaris

Lentibulariaceae (Bladderwort) Family

- ☐ Submersed, free floating carnivorous plant.
- ☐ Leaves submersed and pinnately divided; leaflets finely branched in hair-like segments with abundant insect-trapping bladders attached to each base.
- ☐ Flowers are small and bright yellow, held above the water surface.

Leaves.

Photo credit: Jukka Jantunen

Flower.

BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER ✓

Jump to:
Plant List

COMMON MARE'S TAIL

Hippuris vulgaris

Hippuridaceae (Mare's tail) Family

Plant.

- ☐ Fleshy, emergent stems up to 40 cm tall (more in deeper water), 5 mm in diameter.
- ☐ Narrow, linear leaves in whorls of 6-12, up to 3 cm long.
- ☐ Flowers mostly perfect; fruit 2.5 mm long.

BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER ✓

NORTHERN WATER STAR-WORT

Callitriche hermaphroditica

Plantaginaceae (Planta) Family

- ☐ Small, submersed perennial, dark green in colour, rooted and tufted with weak, leafy stems up to 40 cm long.
- ☐ Leaves short, opposite, linear, not floating.
- ☐ Solitary flowers with conspicuous wings.

Plants.

Close up.

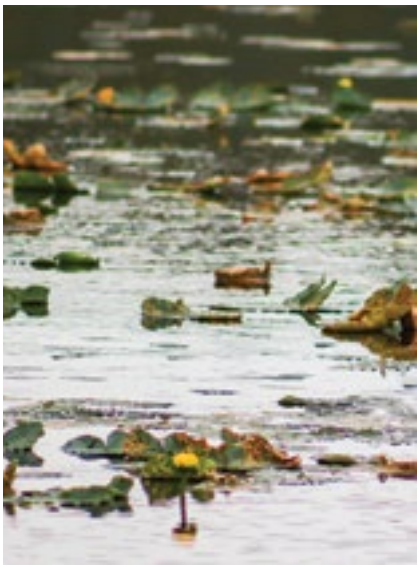
BOG	FEN	SWAMP	MARSH ✓	SHALLOW OPEN WATER ✓

ROCKY MOUNTAIN POND-LILY

Nuphar polysepala

Nymphaeaceae (Water-lily) Family

- ☐ Also known as **pond-lily.**
- ☐ Large, showy yellow flowers rise above floating lily pads on open water wetlands.
- ☐ Leaves floating, heart-shaped and connected to rhizomes on the muddy bottom by stems up to 2 m long.



Plants with yellow flowers.

Leaves.

"THE BULB CAN BE USED TO TREAT COLDS."

- Elder Charlie Dickson

The rhizomes are also known as bulbs and act as an important food source for beaver, muskrat and moose.

BOG | FEN | SWAMP | MARSH | SHALLOW OPEN WATER ✔

WATER SMARTWEED

Persicaria amphibia

Polygonaceae (Buckwheat) Family

- ☐ Stems erect to trailing, this plant has both terrestrial and aquatic (emergent) forms.
- ☐ Leaves lance-shaped and alternate, generally short-stalked and hairy except when floating they are long-stalked and hairless.
- ☐ Flowers in pink spikes, up to 18 cm in length.

Plant with flower.

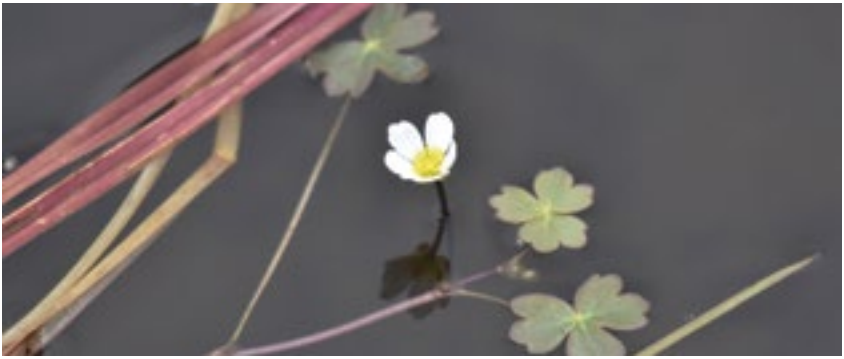
BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
			✓	✓

WHITE WATER BUTTERCUP

Ranunculus aquatilis

Ranunculaceae (Buttercup) Family

- ☐ Also known as **water crowfoot.**
- ☐ Stem submersed, weak and leafy.
- ☐ Submersed leaves are hair-like and soft, collapsing when they are out of the water; floating leaves are broad, flat with 3-5 lobes.
- ☐ Flowers floating or held above water surface, 5 white petals with a yellow center.



Plant with flower.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
			✓	✓

HORN WORT

Ceratophyllum demersum

Ceratophyllaceae (Hornwort) Family

- ☐ Submersed, free-floating plant.
- ☐ Stems slender and branching.
- ☐ Leaves narrow and long in whorls of 5-12, further forked with spiny teeth and becoming denser towards the end of branches.
- ☐ Flowers tiny, red and cylindrical, forming in the axils of submersed leaves.

✓ BOG ✓ FEN ✓ SWAMP ✓ MARSH SHALLOW OPEN WATER

MUSKGRASS

Chara sp.

Characeae (Stonewort) Family

- ☐ This species of macroalgae is multicellular and superficially resembles a land plant because of stem-like and leaf-like structures.
- ☐ Grows submersed, rooted, preferring less oxygenated water.
- ☐ The main stem bear whorls of branches in a superficial resemblance to **horsetail.**
- ☐ Plants are rough to the touch because of deposited calcium salts on the cell wall.

Plants.

Close up.

BOG FEN SWAMP MARSH ✓ SHALLOW OPEN WATER

Jump to:
Plant List

NORTHERN PONDWEED

Potamogeton alpinus

Potamogetonaceae (Pondweed) Family

- ☐ Reddish tinged plant with stems up to 1 m long.
- ☐ Leaves translucent and lance-shaped up to 25 cm long, with occasional wider oval floating leaves.
- ☐ Flowers are dense spikes.

Plants.

Flower.

BOG | FEN | SWAMP | MARSH | ✓ SHALLOW OPEN WATER

RICHARDSON'S PONDWEED

Potamogeton richardsonii

Potamogetonaceae (Pondweed) Family

- ☐ Leaved up to 13 cm long, oval to lance-shaped, translucent green with strong parallel veins and wavy edges.
- ☐ Flowers long (up to 10 cm) spikes with dense whorls forming above the water.

Plant.

BOG | FEN | SWAMP | MARSH | ✓ SHALLOW OPEN WATER

SAGO PONDWEED

Stuckenia pectinata

Potamogetonaceae (Pondweed) Family

- ☐ Stems thin, abundantly branched, light green to white.
- ☐ Leaved thread-like and sharply pointed, form fan-like clusters.
- ☐ Flowers greenish white in spikes consisting of 2 to 6 interrupted clusters in a loose whorl.

Plants.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER ✓

SIBERIAN WATER-MILFOIL

Myriophyllum sibiricum

Haloragaceae (Watermilfoil) Family

- ☐ Submersed stems and leaves, rooted, up to 1 m tall.
- ☐ Leaves dark green to purple, pinnately divided (feather-like) and whorled around the stem, 1-3 cm long.
- ☐ Flowers in an interrupted spike, whorled.

Photo credit: Logan McLeod

Plant.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER ✓

Jump to:
Plant List

THREAD-LEAVED PONDWEED

Stuckenia filiformis

Potamogetonaceae (Pondweed) Family

- ☐ Slender plant up to 15 cm long and highly branched.
- ☐ Leaves up to 10 cm long, very narrow.
- ☐ Spikes are solitary, resemble a string of beads.

Plant.

"EVERY PLACE WE CAMP IS BESIDE WETLANDS FOR OUR FOODS. LAND PICKED BY ELDERS TO CAMP WAS ALWAYS BETWEEN WETLANDS. WETLANDS HAVE TONS OF MEDICINE."

- Elder Allan Carlick

BOG | FEN | SWAMP | MARSH | ✔ SHALLOW OPEN WATER

Sphagnum moss (Nu') is commonly referred to as peat moss and are often harvested for use in gardens.[1] *Sphagnum* mosses are generally tightly-packed with distinct star-shaped heads, or capitula. Generally termed ecosystem engineers, *sphagnum* mosses are a keystone species of many peatland ecosystems and possess an ability to efficiently store water and accumulate large volumes of carbon within their cells.

Sphagnum moss has traditionally been dried and used for bedding, sanitary napkins and baby diapers.[2] It is also known to have antiseptic properties for cleaning wounds.

1. Crewe and Johnstone, 2008.
2. MacKinnon et al.,1999.

MIDWAY PEAT MOSS

Sphagnum magellanicum

Sphagnaceae Family

- ☐ Submersed, free-floating plant.
- ☐ Stems slender and branching.
- ☐ Leaves narrow and long in whorls of 5-12, further forked with spiny teeth and becoming denser towards the end of branches.
- ☐ Flowers tiny, red and cylindrical, forming in the axils of submersed leaves.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

Jump to:
Plant List

POOR-FEN SPHAGNUM

Sphagnum angustifolium

Sphagnaceae Family

- ☐ Hollow-forming moss, often located in close proximity to the water table.
- ☐ Stems transparent yellow-green.
- ☐ Forms loose, fluffy canopies with two hanging branches.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

RUSTY PEAT MOSS

Sphagnum fuscum

Sphagnaceae Family

- ☐ Hummock-forming moss, found on higher and drier locations further away from the water table.
- ☐ Stem dark brown, forms dense canopies with small, compact heads.

Hummock.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

SHORE-GROWING PEAT MOSS

Sphagnum riparium

Sphagnaceae Family

- ☐ Forms loose mats often in standing water, preferring more minerotrophic conditions.
- ☐ Leaves and heads relatively large, yellow-green in colour in loose canopies.

"MOSS IS IMPORTANT IN WETLANDS, IT HOLDS THE WATER. ANIMAL PRINTS IN THE MOSS CAN REVEAL THE HIDDEN WATER BELOW THE SURFACE."

- Elder Jimmy Johnny

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓		

Jump to:
Plant List

Feathermosses are extremely abundant across the boreal forest, in both upland and wetland habitats, although they prefer drier sites in peatlands such as hummocks. Characteristic traits include a distinct red stem and feather-like appearance.

HAIRCAP MOSS

Polytrichum strictum

Polytrichaceae Family

- ☐ Erect, unbranched blueish green moss.
- ☐ Stems covered with whitish rhizoids.
- ☐ Leaves erect when dry, spreading when moist.
- ☐ Often found intermixed with ***Sphagnum*** **mosses.**

Dry.

Wet.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓	✓	

RED-STEMMED FEATHERMOSS

Pleurozium schreberi

Hylocomiaceae Family

- ☐ Also known as **big red stem.**
- ☐ Stems distinctly red, pinnately branched.
- ☐ Leaves shiny, relatively large, light yellow to green in colour.

✓ BOG | FEN | ✓ SWAMP | MARSH | SHALLOW OPEN WATER

STAIR-STEP MOSS

Hylocomium splendens

Hylocomiaceae Family

- ☐ Regularly branched, feather-like, olive to bright green.
- ☐ Stems red and creeping.
- ☐ Branches form a characteristic stair-step arrangement.

✓ BOG | FEN | ✓ SWAMP | MARSH | SHALLOW OPEN WATER

Brown mosses are characteristic of nutrient rich habitats, most often fens, but also including swamps and marshes. They are often found submerged within or floating on pools of water.

ADUNCUS BROWN MOSS

Drepanocladus aduncus

Amblystegiaceae Family

- ☐ Stems slender and irregularly branched.
- ☐ Leaves characteristically curled to point in one direction.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

FLOATING HOOK MOSS

Warnstorfia fluitans

Calliergonaceae Family

- ☐ Slender moss, green in colour, often found floating.
- ☐ Leaves are lance-shaped, with toothed margins.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓	✓	

GOLDEN FUZZY FEN MOSS

Tomentypnum nitens

Amblystegiaceae Family

- ☐ Relatively large with erect stems.
- ☐ Stems covered with reddish rhizoids.
- ☐ Leaves long, lance-shaped and strongly folded (pleated), yellow to golden brown.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

SCORPIDIUM MOSS

Scorpidium scorpioides

Scorpidiaceae Family

- ☐ Found in rich fens often floating in water.
- ☐ Sparsely branched.
- ☐ Leaves overlap, resembling a caterpillar.
- ☐ Colour varies from green to purplish black.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

Jump to:
Plant List

TUFTED MOSS

Aulacomnium palustre

Aulacomniaceae Family

- ☐ Erect and unbranched.
- ☐ Stems covered in rhizoids leading to reddish hue.
- ☐ Leaves yellow-green, curled when dry, erect and spreading when moist.

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
✓	✓	✓	✓	

YELLOW STARRY FEN MOSS

Campylium stellatum

Amblystegiaceae Family

- ☐ Erect moss, infrequently branched, golden-green in colour.
- ☐ Characteristic widely-spreading, stiff leaves which taper to distinct point (resembling a star-shape).

BOG	FEN	SWAMP	MARSH	SHALLOW OPEN WATER
	✓	✓	✓	

REINDEER LICHEN

Gwich'in: Ch'oodeezhuh

Cladonia rangiferina

Cladoniaceae Family

- ☐ Light-coloured (grey) cup lichen species with extensive branching.
- ☐ Able to form mats up to 10 cm tall, but is slow growing and easily damaged if overgrazed, trampled or burned.
- ☐ Grows in well-drained, open environments and is extremely cold-hardy.

Reindeer lichen is an extremely important food source for caribou.

Recognizing its immense value for caribou, Indigenous children were taught to respect the lichen; not to play or trample it and to give thanks when harvesting it.[1] Reindeer lichen can be used medicinally or dried into a powder to add to soups as a thickener.[2] Digested lichen found in caribou stomachs is a particular delicacy.

1. Andre and Fehr, 2002.
2. Crewe and Johnstone, 2008.

BOG ✓	FEN	SWAMP ✓	MARSH	SHALLOW OPEN WATER

Jump to:
Plant List

WETLAND WILDLIFE

Introduction

Yukon is home to a rich tapestry of wildlife, with thousands of species reliant on its wetlands for survival. These wetlands are not only vital for sustaining diverse ecosystems but also hold immense cultural and intrinsic value. From supporting subsistence lifestyles to serving as crucial habitats for medicinal plants and iconic Canadian symbols, Yukon's wetlands play a pivotal role in the region's ecological and cultural landscape.

"YOU GO OUT INTO THE WETLANDS AND YOU SEE HOW THE LIFE IS FLOURISHING. FAMILIES SEE THIS AS A PLACE OF RECREATION, FOOD, MEDICINE AND ALL KINDS OF WILDLIFE. THERE ARE MANY TYPES OF BIRDS NESTING, KINGFISHERS, THE FEEDING PLACE OF MOOSE, CARIBOU, BEAVEER AND MUSKRAT"

- Elder Allan Carlick

In the pages ahead, we highlight some of the iconic species that depend on Yukon's wetlands, including:

- Migratory birds: Undertaking long journeys to converge in Yukon during the summer months. Here, they find an oasis, with wetlands offering essential breeding, nesting, and spawning grounds, along with abundant seasonal food sources like berries and insects.
- Fish: Shallow waters and marshes that fringe larger lakes and river systems act as vital feeding and spawning grounds while also serving as natural filters, safeguarding fish habitats from sediment and contaminants.
- Amphibians: Including three species of frogs and one toad, their dependence on water for egg-laying and their sensitivity to environmental changes, these amphibians serve as crucial indicators of wetland health.
- Insects: The intricate web of life in Yukon's wetlands is sustained by an abundance of insects. While it's impossible to catalog every species, these insects form the cornerstone of the wetland food chain, providing sustenance for small mammals, birds, and bats alike.

In this exploration of Yukon's wetlands and their inhabitants, we delve into the interconnectedness of lifeforms and the delicate balance that sustains this unique ecosystem. Through understanding and appreciation, we endeavor to protect and preserve these invaluable habitats for generations to come.

"THE ANIMALS TEACH US TO BE RESPECTFUL TO THESE LANDS AND NOT DISTURB THEM. IF WE DISTURB THE WETLANDS, THE ANIMALS WILL LEAVE AND NOT COME BACK."

- Elder Angie Jospeh-Rear

Bog Wildlife

Bogs are plentiful with fruits such as berries in the summer, attracting a diversity of wildlife to forage from their bushes.

Great horned owls (Osts'ǒde) are relatively common, found in a variety of habitats, including treed bogs.

"THERE ARE NUMEROUS INSECTS IN WETLANDS THAT ARE IMPORTANT FOR FEEDING THE BIRDS.

- Elder James Allen

Bohemian waxwings can be seen perching on spruce tops and foraging for flying insects above treed bogs.

Bogs are vital habitats for **woodland caribou**, especially in permafrost settings where reindeer lichen is abundantly available.

"IT'S A WETLAND FOR MOOSE, IT'S A WETLAND FOR GRIZZLY BEAR, AND THE FISH SPAWN IN OUR WETLANDS. WE ARE BLESSED WITH AN ABUNDANCE OF WETLANDS ALONG THE TAKU RIVER."

- Elder Allan Carlick

White-winged crossbills (Tsidedodze, K'asdzudze) are a nomad of northern treed peatlands with beaks adapted to prying open spruce cones.

Black bears depend on boreal wetlands for important food sources like berries, roots, and small mammals. These areas also provide water, travel paths, and shelter, offering a safe place to raise their cubs.

Spruce grouse (Dih) are solitary birds who perch in spruce trees foraging on needles.

Fen Wildlife

Fens are biodiveristy hotspots , attracting wildlife due to their abundace in of foraging, insects, and nesting habitat.

Sandhill cranes (Tsésdōle) are an iconic waterbird relying on nesting habitat within graminoid marshes, bogs or fens.

Wood bison rely on a variety of grasses and sedges found on south-facing slopes, wetlands, open meadows and alpine tundra.

"BISON TURN UP THE GROUND IN WETLANDS, ENCOURAGING NEW GROWTH. WE HARVEST BISON TO PRESERVE THE BALANCE OF NATURE"

- Elder James Allen

Voles are common small mammals reliant on seeds, berries, roots, plants and insects. They are also an important part of the food chain[1].

1. Government of Yukon, 2023b

"WHEN SNEAKING AROUND FOR MOOSE IN WETLANDS, SOMETIMES YOU ENCOUNTER A WILSON'S SNIPE, OR TATTLETALE, THAT SHRIEKS OUT YOUR PRESENCE; THE MOOSE RECOGNIZES THE SNIPE'S ALARM CALL."

- Elder Charlie Dickson

Northern hawk owls (Ts'I dzadze') can be spotted perched at the tops of conifer trees, preferring treed fens.

Wilson's snipes are solitary birds recognized by their characteristic zig-zag flightpath and harsh noises made when flushed from their nests. They rely on graminoid marshes, bogs and fens for habitat.

Common nighthawks (Azauti) nest on the ground in open habitats, including bogs, marshes, lakeshores and riverbanks.
(page 149)

Dorcas Coppers rely on treed wetlands such as swamps, bogs and fens. It specializes on marsh cinquefoil as a food source.

Swamp Wildlife

Swamps are difficult for predators to traverse, making them excellent nurseries or sanctuaries for prey species.

Olive-sided flycatchers breed in boreal forest stands, often located near water or wetlands which support a high abundance of bees, wasps, flies and moths as a food source. They require tall trees or snags for perching sites. *(page 153)*

Rusty blackbirds (Tihch'ohe) breed in boreal wetlands selecting sites with shallow water and emergent vegetation with coniferous or tall shrub nesting cover. They eat insect larvae, nymphs, snails, tadpoles, grasshoppers, beetles, and spiders. *(page 155)*

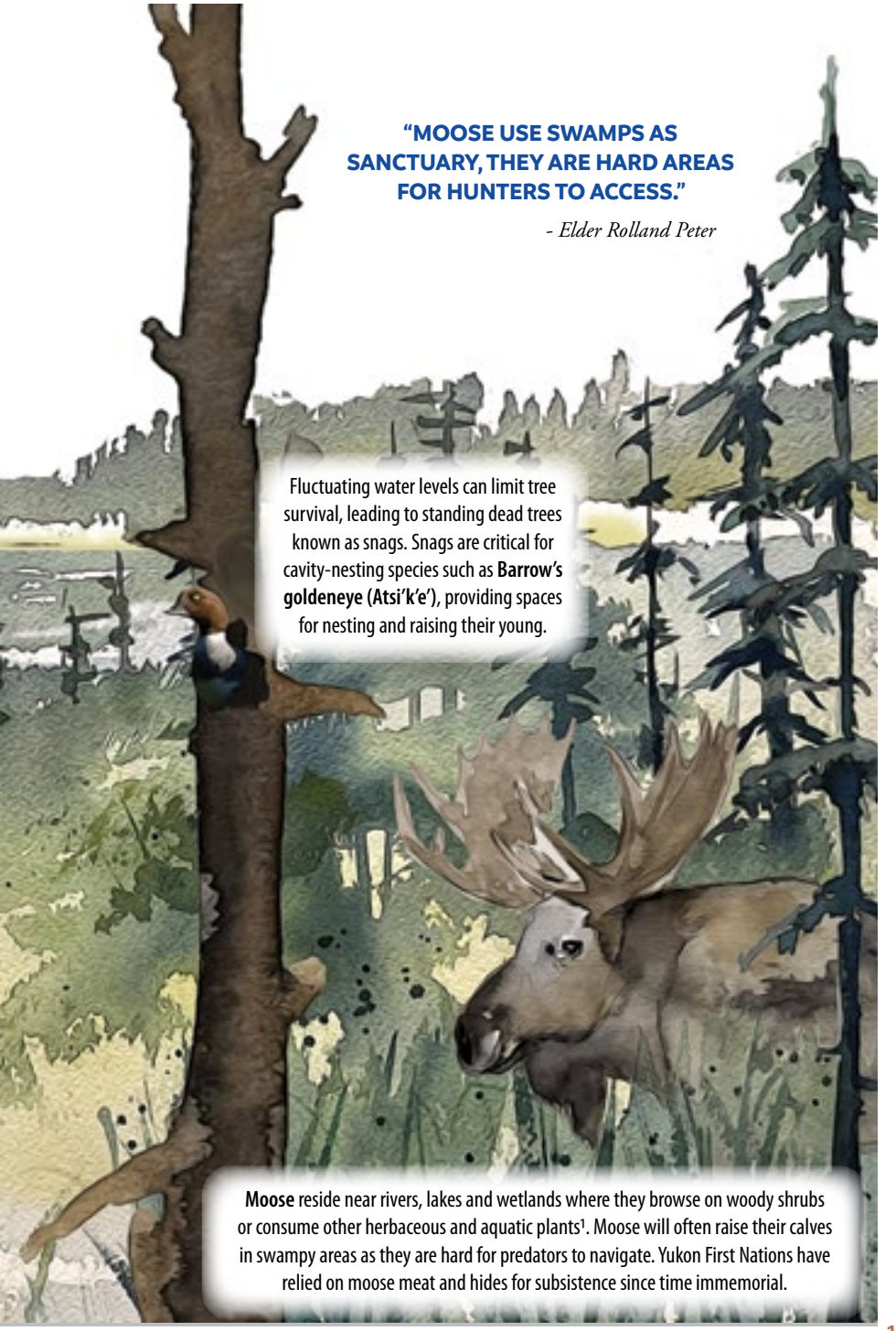
"AT NIGHT TIME YOU CAN HEAR EVERYTHING COME TO LIFE IN THE SWAMP, THAT'S A REAL GOOD SONG"

- Elder Allan Carlick

Yellow warblers, small, bright songbirds, can be found in swamp thickets or shrubby peatlands, preferring dense willow and alder groves near streams.

Mice rely on seeds and berries[2]. They are also superb swimmers and divers, kicking like frogs through the water.

1. Government of Yukon, 2023b
2. Government of Yukon, 2023b



"MOOSE USE SWAMPS AS SANCTUARY, THEY ARE HARD AREAS FOR HUNTERS TO ACCESS."

- Elder Rolland Peter

Fluctuating water levels can limit tree survival, leading to standing dead trees known as snags. Snags are critical for cavity-nesting species such as **Barrow's goldeneye (Atsi'k'e')**, providing spaces for nesting and raising their young.

Moose reside near rivers, lakes and wetlands where they browse on woody shrubs or consume other herbaceous and aquatic plants[1]. Moose will often raise their calves in swampy areas as they are hard for predators to navigate. Yukon First Nations have relied on moose meat and hides for subsistence since time immemorial.

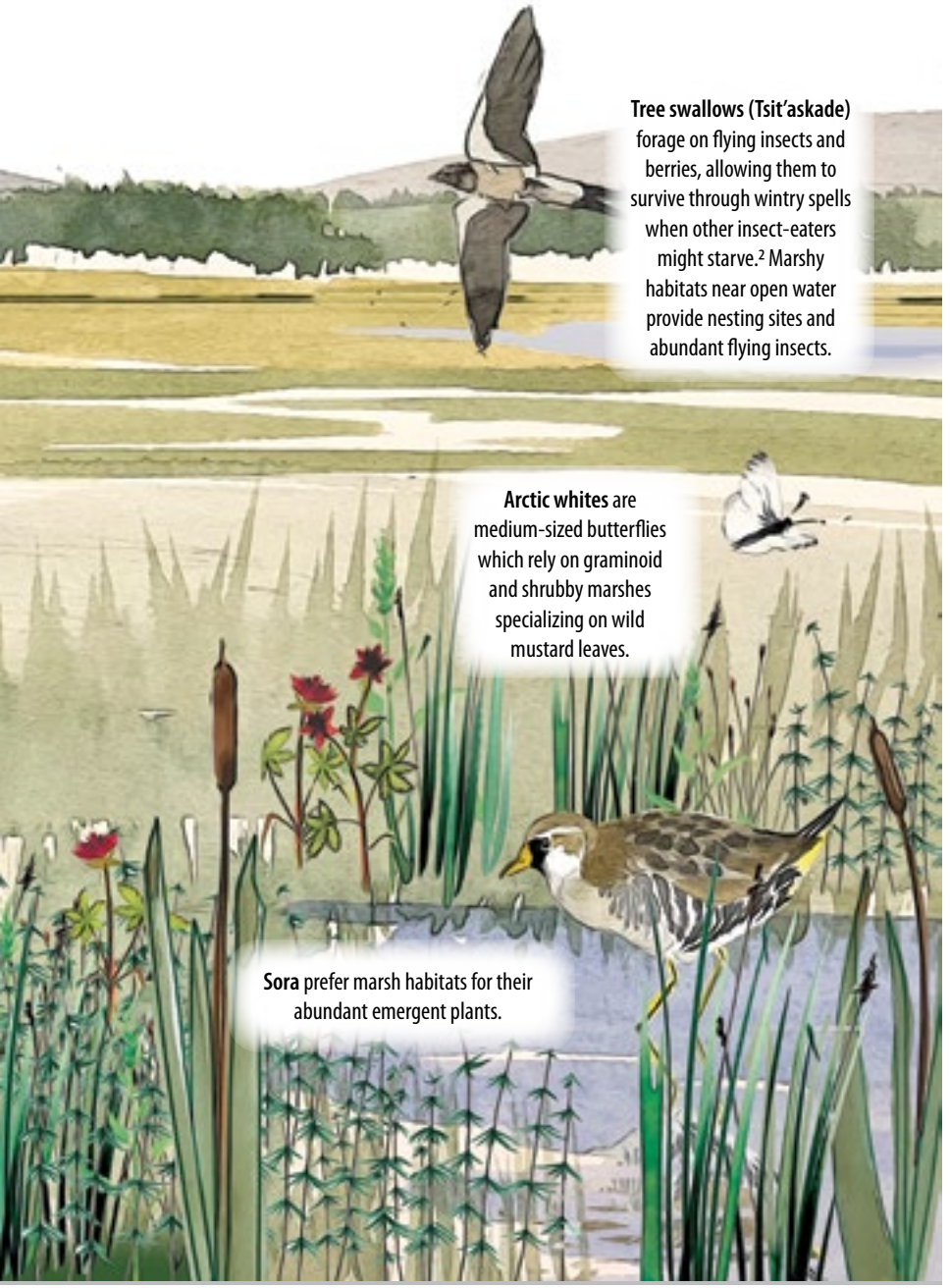
Marsh Wildlife

Marshes provide stopover habitat for migratory waterfowl species in the springtime, owing to their relatively early thaw and "green-up" dates compared to many surrounding ecosystems.

1. Government of Yukon, 2023b
2. Audobon 2023

"YOU CAN FOLLOW ANIMALS TRAILS THROUGH AND AROUND WETLANDS BECAUSE THEY KNOW THE BEST WAY TO WALK."

- Elder Allan Carlick



Shallow Water Wetland Wildlife

These nutrient-rich, productive wetland ecosystems support waterfowl, beaver, muskrat, moose and fish and offer protection from predators and food sources.

Little brown myotis bats establish summer maternity colonies, often in buildings or large-diameter trees or snags. Foraging occurs at night over open water, forest edges or small clearings.
(page 152)

Trumpeter swans (Degī) are Yukon's most numerous swan species, particularly in the spring - more than 13,000 are documented passing through Tagish to the Whitehorse area. They are also known as "Gukl" in Tagish or Tlingit.

"FROGS, IN PARTICULAR, TELL YOU A WETLAND IS HEALTHY."

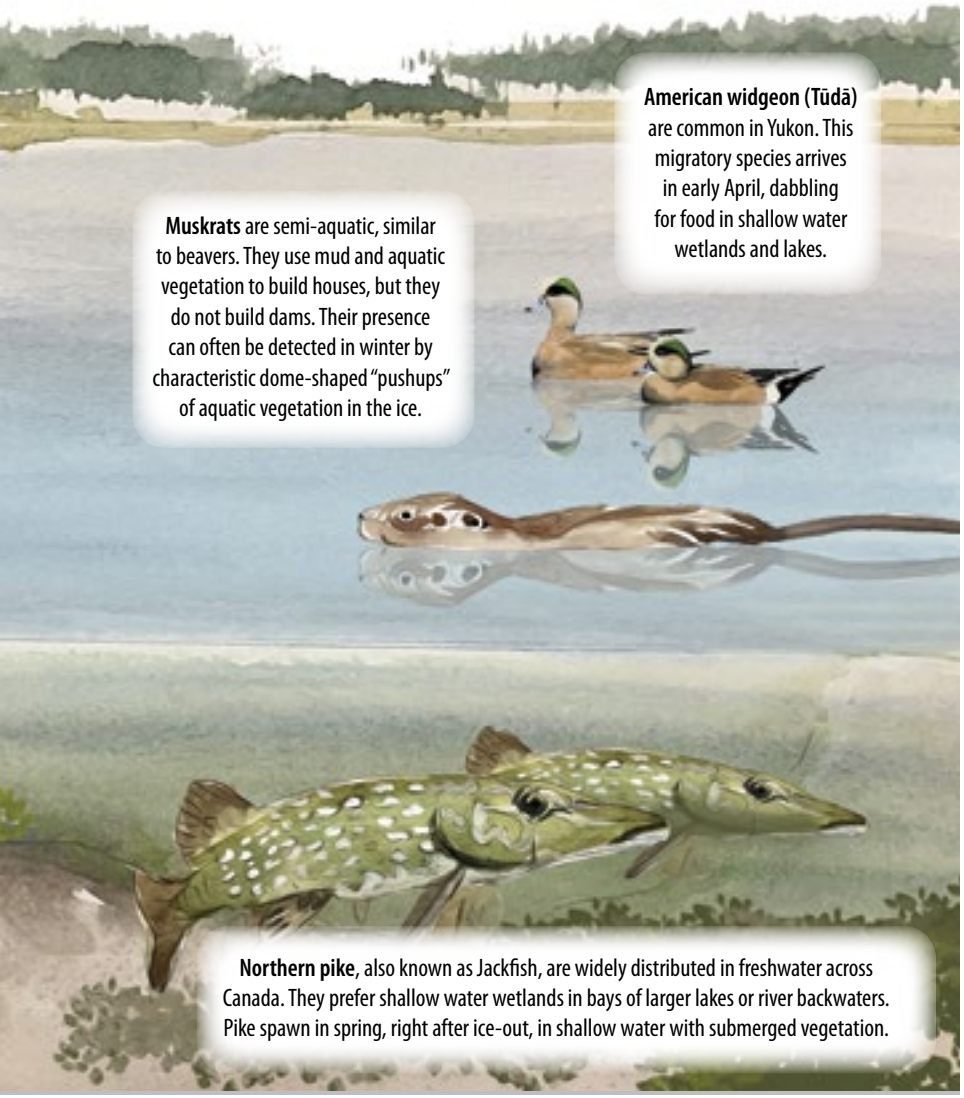
- Elder Allan Carlick

Beavers create shallow water habitats near aspen or poplar stands which they use as building materials. They have been harvested by First Nations as part of the early fur trade and as a food source.

Wood frogs are found breeding in shallow water wetlands as far north as Ney Khwi Vun (Frog Lake) on the Old Crow Flats. Listen for their choruses of duck-like quacks, an early indication of spring.

"MUSKRAT PUSH-UPS IS A GOOD SIGN, BECAUSE YOU KNOW THERE'S FRESH PLANTS THERE. OTHER ANIMALS CAN TELL YOU A LOT ABOUT WHAT IS HAPPENING ON THE LAND: IF THERE'S NOT ENOUGH FOOD, IF A WETLAND IS DRYING OR CONTAMINATED."

- Elder James Allen



American widgeon (Tūdā) are common in Yukon. This migratory species arrives in early April, dabbling for food in shallow water wetlands and lakes.

Muskrats are semi-aquatic, similar to beavers. They use mud and aquatic vegetation to build houses, but they do not build dams. Their presence can often be detected in winter by characteristic dome-shaped "pushups" of aquatic vegetation in the ice.

Northern pike, also known as Jackfish, are widely distributed in freshwater across Canada. They prefer shallow water wetlands in bays of larger lakes or river backwaters. Pike spawn in spring, right after ice-out, in shallow water with submerged vegetation.

SARA Status Categories:

Special Concern	A species that may become threatened or endangered because of characteristics that make it particularly sensitive to human activities or natural events.
Threatened	A species likely to become endangered if limiting factors are not reversed.
Endangered	A species facing imminent extirpation or extinction.
Extirpated	A species no longer existing in the wild in Canada, but occurring elsewhere.
Extinct	A species that no longer exists.

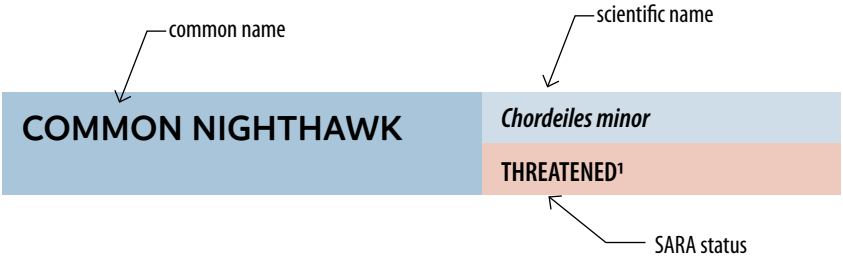
SPECIES AT RISK

Introduction

The federal **Species At Risk Act (SARA)** provides for the legal protection of wildlife species in Canada and the conservation of their biological diversity. The Act provides the legal framework for conservation and protection of wildlife species by securing the necessary recovery plans for endangered and threatened species, and encouraging management plans for species of special concern to prevent them from becoming at risk.

While extinction can occur naturally, the vast majority of modern extinctions are caused by various human activities which are noted for each species.

Each page includes the common and scientific names and SARA status.



Species at Risk List

"THERE'S A LOT OF CHANGES THERE FROM A LONG LONG TIME AGO. WHEN MY PARENTS WERE ALIVE, WHERE THEY WOULD GO TRAPPING, THERE WERE A LOT OF ANIMALS... WE USED TO CALL IT OUR MUSKRAT CAMP AND OUR BEAVER CAMP... A LOT OF THOSE CREEKS AND SWAMPS NOW ARE NOT THERE... THEY'RE JUST ALL DRIED UP."

- Elder Russell Burns

BANK SWALLOW

Riparia riparia

THREATENED[1]

- ☐ Migratory, small-sized songbird averaging 12-14 cm in length and weighing between 10 and 18 grams. Both male and female bank swallows look alike.
- ☐ Features brown upperparts and white underparts, with a distinctive dark breast band. A brown band across the chest near the neck area is common, often extending halfway down the middle of the chest.
- ☐ Distinguished in flight by its quick, erratic wing beats and almost constant buzzy, chattering vocalizations. These characteristics help differentiate it from other swallow species.
- ☐ Known to consume land and water-based insects or spiders when abundant.

HABITAT:

- ☐ Gather in large colonies on telephone wires, fences, or in tree clusters for roosting, while they forage across vast open landscapes like wetlands, grasslands, agricultural fields, and bodies of water.
- ☐ Exploit a range of lowland ecosystems during migration including wetlands, fields, coastal areas, savannas, and estuaries.
- ☐ Select diverse natural and man-made habitats with vertical banks for nesting, such as riverbanks, bluffs, quarries, road cuts, and soil stockpiles.

THREATS:

- ☐ Nest crushing in man-made structures, due to loss of historical nesting sites.
- ☐ Hydrological changes, including stream channelization and dam installations, contribute to the loss of natural bluff nesting habitats.
- ☐ Pesticide use and climate change.
- ☐ Road mortality.
- ☐ Loss of foraging habitats.

STATUS INFORMATION:

Multiple stressors have likely contributed to the significant decline observed over the past four decades, resulting in a loss of 98% of its Canadian population. While the exact mechanisms behind these declines are not fully understood, the cumulative effects of various threats underscore the urgent need for conservation efforts to mitigate further population loss.

1. Environment Canada, 2013.

COMMON NIGHTHAWK

Chordeiles minor

THREATENED[1]

- ☐ Known as **Azauti** by the Kaska First Nation.
- ☐ Migratory, medium-sized bird usually seen or heard overhead at dusk and dawn.
- ☐ Colouring is mottled grey-brown with long, white, pointed wings with distict white strip on undersit of wings while inflight.
- ☐ Unique bounding flight pattern.
- ☐ Territorial males produce a distinct booming sound during steep dives at females or threats, caused by air rushing through the long flight feathers on the ends of their wings.

HABITAT:

- ☐ Nests on the ground in a wide range of open habitats, including bogs, marshes, lakeshores and riverbanks, among other vegetation-free upland forest and grassland habitats.
- ☐ Shallow water wetlands are also productive area for foraging insects (beetles, caddisflies and moths).

THREATS:

- ☐ Natural system modifications (e.g., reduced insect prey).
- ☐ Habitat loss and degradation.
- ☐ Climate change and severe weather.
- ☐ Accidental mortality.
- ☐ Pollution.
- ☐ Problematic native and invasive non-native species.

STATUS INFORMATION:

Approximately 10% (400,000-900,000 individuals) of the global population breeds in Canada from coast to coast. The Canadian population experienced a 76% decline from 1973 to 2012.

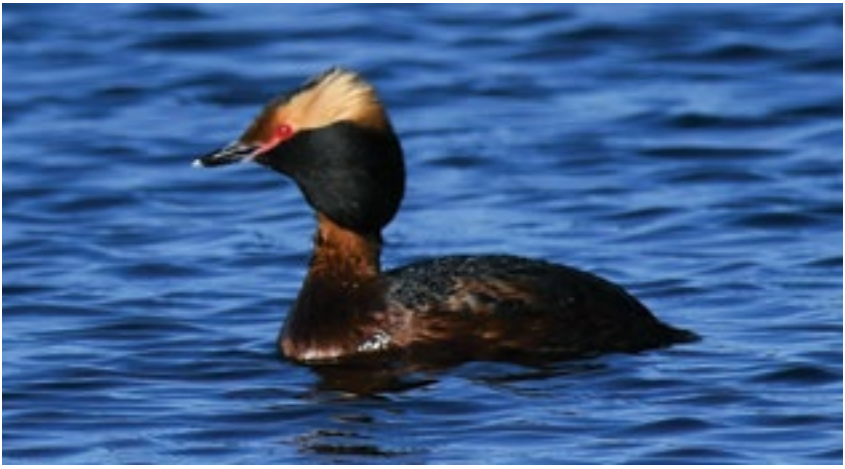
1. Environment Canada, 2016a.

HORNED GREBE - WESTERN POPULATION

Podiceps auratus

SPECIAL CONCERN[1]

- ☐ Known as **Surilitchiaq** in Inuvialuktun and **Tagwaatsik** by the Teetl'it Gwich'in First Nation.
- ☐ Migratory waterbird species with two populations in North America - Western population and a small, isolated population on the Magdalen Islands, Quebec (not addressed here).
- ☐ Males and females have similar flashy red and black colours during breeding season, with a distinctive patch of bright yellow feathers tufted like horns behind piercing red eyes.



HABITAT:

- ☐ Horned grebes depend on wetland habitats for all stages of their lifecycle.
- ☐ They prefer breeding sites in shallow water wetlands with emergent plants (rushes, sedges) along the borders.
- ☐ These plant species provide nest materials, concealment and protection for young.
- ☐ After breeding, they move to larger lakes to undergo molt or for use as migratory stopover sites.

THREATS:

- ☐ Degradation of wetland breeding habitats.
- ☐ Droughts (especially in the prairies, driving populations northward to the boreal region).
- ☐ Increasing populations of nest predators (mostly in the prairies).
- ☐ Oil spills on their wintering grounds in the Pacific and Atlantic Oceans.

STATUS INFORMATION:

The western population consists of an estimated 200,000-500,000 individuals, with 92% of the breeding range of the population in Canada. The breeding population has experienced long-term declines in Canada since 1970. This species remains quite common throughout southern Yukon.

1. Environment Canada, 2021.

LESSER YELLOWLEGS

Tringa flavipes

THREATENED[1]

- Migratory, small shorebird, greyish in colour with a long neck, a straight black bill and easily recognizable long, bright-yellow legs.

HABITAT:

- 80% of breeding range is within Canada's boreal region.
- Lesser Yellowlegs relies entirely on wetland habitats across the boreal forest and taiga for nesting sites: specifically, it nests on dry ground near peatlands, marshes and shallow water wetlands.
- Adults may travel many kilometres from the nest to the wetlands where they forage. Young are raised by both parents. The female often leaves the family first, with the male staying to defend the chicks until they can fly.

THREATS:

- Loss of wetland and intertidal habitat through migration route.
- Hunting for sport and subsistence.
- Climate change, including risk of drought in breeding areas.

STATUS INFORMATION:

With an estimated breeding population in Canada of 422,000 in 2020, this species has experienced long-term population declines estimated between 25-50%.

1. Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 2020.

LITTLE BROWN MYOTIS AND NORTHERN MYOTIS

Myotis lucifugus/septentrionalis

ENDANGERED[1]

- ☐ Small, insectivorous bat species, brown in colour with black ears, wings and tails (all generally longer in Northern Myotis than Little Brown Myotis).
- ☐ Their wingspans are approximately 22-27 cm.
- ☐ Females tend to be slightly larger than males.
- ☐ Individuals can live for more than 30 years and a colony of 100 individuals can eat almost 20 kilograms of insects in four months (with one bat devouring up to 600 mosquito-sized insects per hour).

Little brown myotis.

Northern myotis.

HABITAT:

- ☐ Female bats establish summer maternity colonies, often in buildings or large-diameter trees or snags. Foraging occurs at night over open water such as shallow wetlands, marshes, other waterways, forest edges or small clearings.
- ☐ Both species overwinter in cold and humid hibernacula (caves/mines). Their specific physiological requirements limit the number of suitable sites for overwintering.
- ☐ Few maternity roosts or hibernacula have been located in the northern portions of the range, with no recorded hibernacula in Yukon as of 2018. None-the-less, breeding individuals have been recorded south of 64° in Yukon.
- ☐ One of the best known Little Brown Myotis colonies can be viewed at Chadburn Lake recreation site, near Whitehorse.

THREATS:

- ☐ White-nose syndrome.
- ☐ Development.
- ☐ Human intrusions and disturbance (eg. caving, forestry).
- ☐ Climate change and severe weather.

STATUS INFORMATION:

There have been sudden and dramatic declines across the eastern portions of their ranges as a direct result of white-nose syndrome, a fungal disease caused by an introduced pathogen. Approximately 40-50% of the global range of these bat species are found in Canada, and eastern populations had experienced declines of 94% in 2013.

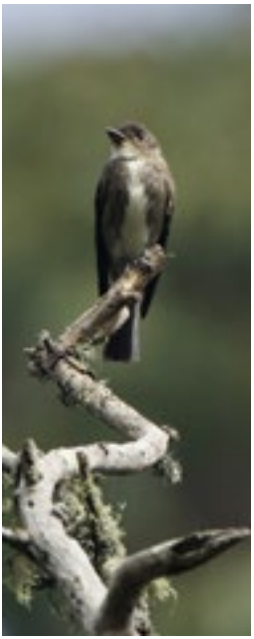
1. Environment Canada, 2021.

OLIVE-SIDED FLYCATCHER

Contopus cooperi

THREATENED[1]

- ☐ Migratory, medium-sized songbird that reaches a total length of 20 cm.
- ☐ Has a streaked brownish olive-grey colouring, with a white throat and breast.
- ☐ Song is a loud and distinctive three-note whistle: quick, three beers!



HABITAT:

- ☐ Breeds in open coniferous or mixedwood boreal forest stands, often located near water or wetlands which support a high abundance of aerial insects (bees, wasps, flies, moths, etc.) as a food source.
- ☐ Requires tall trees or snags for perching sites.
- ☐ It is currently unknown whether the availability of breeding habitat is a limiting factor in Canada.

THREATS:

- ☐ Availability of insect prey.
- ☐ Fire suppression.
- ☐ Forest harvesting and silviculture.
- ☐ Energy and mining exploration and extraction.
- ☐ Residential and commercial development.

STATUS INFORMATION:

An estimated 900,000 individuals (53%) of the global population migrate to Canada to breed, from coast to coast. There have been widespread declines, estimated at 3.4% annually between 1973 and 2012.

1. Environment Canada, 2016b.

RED-NECKED PHALAROPE

Phalaropus lobatus

SPECIAL CONCERN[1]

- ☐ Migratory, medium-sized sandpiper that exhibits sex-role reversal, whereby the males provide all parental care and the females compete for mates.
- ☐ Females are slightly larger than the males and have brighter plumage during the breeding season – specifically, the bright chestnut-red plumage that circles the base of the neck and face.

HABITAT:

- ☐ Nests continuously along Canada's northern coast, as well as inland within Yukon and other provinces/territories.
- ☐ Prefers arctic tundra wetlands with abundant open water as courtship grounds and food sources for the breeding pair and their offspring.
- ☐ Maintains a home range near open water, with graminoid vegetation, aquatic emergent plants, and minimal mud or shrubs, usually on polygonal peatland formations underlain by permafrost.
- ☐ Nests are located in places with more graminoid vegetation, providing additional cover to protect the nests from predators.

THREATS:

- ☐ Climate change, with resulting impacts to habitat availability (drying and shrubification of tundra breeding and nesting sites).
- ☐ El Niño events effecting food availability on the wintering grounds.
- ☐ Chronic and point-source oil pollution on wintering grounds.

STATUS INFORMATION:

With an estimated Canadian population of 2.3 million individuals, there have been estimates of population decline at 7.6% annually. For example, the once-common species has not bred on Herschel Island, Yukon, since 1999. There are also local reports of declines on the North Slope and Crow Flats, Yukon.

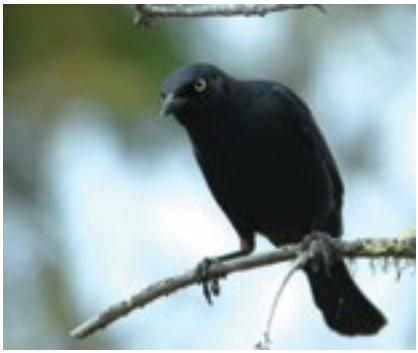
1. Environment Canada, 2022.

RUSTY BLACKBIRD

Euphagus carolinus

SPECIAL CONCERN[1]

- ☐ Knows as **Tihch'ohe** and **Tosch'ahj** by the Kaska First Nation.
- ☐ Migratory, medium-sized bird. Both males and females have long, pointed wings, pale yellow eyes, black feet, and slightly curved, short black bills.
- ☐ Breeding males are iridescent black, while non-breeding males are rusty brown in colour.
- ☐ During the breeding season, the female is slate gray with a bluish-green gloss turning generally rust coloured in fall.
- ☐ Conspicuous song resembles the sound of a squeaky hinge.



HABITAT:

- ☐ Breeds almost entirely within boreal wetland habitats (bogs, fens, swamps, marshes, beaver ponds and other riparian habitats).
- ☐ Tend to select breeding sites with shallow water and emergent vegetation for foraging, with adjacent nesting cover provided by wetlands with relatively dense coniferous or tall shrub cover.
- ☐ Rely on wetlands to provide food such as aquatic invertebrates (insect larvae, nymphs, snails, and crustaceans), as well as tadpoles, grasshoppers, beetles, and spiders.

THREATS:

- ☐ Wetland conversion (particularly boreal treed wetlands).
- ☐ Forest clearing/changes to water flow which disrupts wetlands (road crossings).
- ☐ Pollution (mercury) and acidification of wetlands.
- ☐ Agricultural pesticides.
- ☐ Climate change and drying of wetlands.
- ☐ Predator and competitor species dynamics.
- ☐ Disease and parasites.

STATUS INFORMATION:

Approximately 86% of the global population breeds in Canada from coast to coast, particularly abundant in the northern portions of the boreal forest. In fact, there is evidence that the breeding range is retracting further northward with climate change. It is estimated that the wintering population has experienced a long-term annual decline of 6.3% per year between 1970 to 2012.

1. Environment Canada, 2016b.

SHORT-EARED OWL

Asio flammeus

SPECIAL CONCERN[1]

- ☐ Medium-sized owl up to 42 cm in length.
- ☐ Individuals have a large, round head, with small tufts of feathers that look like ears (not easily visible).
- ☐ Eyes of the adults are yellow and framed by black feathers.
- ☐ Adults are a camouflaged/streaked brown-back colour, with a creamy-buff chest.
- ☐ Females are slightly larger.
- ☐ Conspicuous when it flies, often at dawn and dusk, in erratic and moth-like pattern.

Photo credit: Cameron Eckert

HABITAT:

- ☐ Nests continuously along Canada's northern coast, as well as inland within Yukon and other provinces/territories.
- ☐ Prefers arctic tundra wetlands with abundant open water as courtship grounds and food sources for the breeding pair and their offspring.
- ☐ Maintains home range near open water, with graminoid vegetation, aquatic emergent plants, and minimal mud or shrubs, usually on polygonal peatland formations underlain by permafrost.
- ☐ Nests are located in places with more graminoid vegetation, providing additional cover to protect the nests from predators.

THREATS:

- ☐ Habitat loss and degradation (agriculture, urban and commercial development, energy production and mining).
- ☐ Activities that affect individuals, nests and eggs (grazing, mowing and harvesting, pesticide use, collisions).
- ☐ Climate change.

STATUS INFORMATION:

Around 300,000 individuals and 63% of the Short-eared Owl's North American breeding range are in Canada. Most common in the Prairies and along the Arctic coast, including northern Yukon. Suitable breeding, migration and wintering habitat has declined significantly, resulting in a reduction of owls. Populations experienced a mean annual decline of between 2.3-5.2% from the 1960s to 2012. Population size somewhat stabilized between 2002 and 2012.

1. Environment Canada, 2018a.

WOODLAND CARIBOU

Rangifer tarandus caribou

SPECIAL CONCERN[1]

- Height at the shoulder ranges from 100 cm to 120 cm, with males weighing 180-270 kg and females around 90-135 kg.
- Large, rounded hooves designed to prevent sinking in snow and wetlands, serving as effective shovels for digging food beneath the snow.
- Female caribou also grow antlers, though less pronounced than males. Both sexes shed their antlers by February.
- In summer, caribou are mostly brown, turning grey in winter. However, the neck, mane, shoulder stripe, underbelly, underside of the tail, and patches above each hoof are off-white.

HABITAT:

- Caribou rely on lichen-rich mature coniferous forests.
- During summer, they prefer open spaces like mountains, upper subalpine zones, peatlands, islands, and shorelines, where they can find nutritious plants like forbs and sedges.
- In the winter, they move into lower areas where snow cover is shallow, and they can easily access ground lichens.

THREATS:

- Resource exploration and development resulting in habitat loss resulting in higher risk of predation.
- Highways present a threat to certain herds through collisions.
- Climate change, including fire eliminating their winter forage.

STATUS INFORMATION:

In 2014, there were around 43,000 – 48,000 Northern Mountain woodland caribou, accounting for 29% of Canada's total woodland caribou. Spread across Yukon, Northwest Territories, and northwestern British Columbia, these caribou form 36 local herds, with 26 in Yukon covering most of south and central Yukon. Recent research indicates that woodland caribou populations in Yukon are generally stable.[2]

1. Environment Canada, 2005.
2. Yukon Species At Risk, 2018.

DEMPSTER HIGHWAY | SOUTH OF TOMBSTONE TERRITORIAL PARK

THE LEGEND OF HOW MOSQUITOES CAME TO BE

"A long time ago at an Indian village, there used to be a monster, like sasquatch but bigger. "Godagook." He would come to the village and take people away to the forest and eat them. Usually young girls.

The villagers got together with their leader to come up with a plan to kill the monster. They dug a big hole and at the bottom they put many sharp sticks. They covered the hole with spruce branches. They asked the smallest girl in the village to help them, to be brave. She agreed.

She stood near the corner of the pit and waited. They attracted Godagook with a bonfire. Pretty soon they heard him coming, snarling and breaking tree branches. The villagers hid. Only the girl remained standing on the trap. Godagook ran towards her and lunged. She moved and he fell into the stakes, hollering and screaming. Villagers threw in dried spruce branches, lit on fire.

Before he died, Godagook cursed the villagers: "You might kill me, but I'll still drink your blood." Villagers checked the trap the next day. When they stirred up the ashes, they rose out of the trap as mosquitoes."

- Elder James Allen

APPENDIX I

Lands and Peoples Relationship Model

The Land and Peoples Relationship Model is a collaborative knowledge-building process that respects both Yukon First Nations' Long-Ago Peoples Way and Western knowledge. Collaborative knowledge-building is a process by which participants reach favorable conclusions through the sharing and exchange of knowledge. Participants are asked to show the greatest respect possible during the planning and decision-making stages. The model uses three key laws (Respect, Care, and Share) combined with two decision-making tools (No Voice and Knowledge Stream Tree) that include affected parties' viewpoints and long-ago knowledge. The model is the guideline that directs and balances the collaborative planning process. The crux of the model is how respect is shown among participants within the planning and decision-making processes. The roundtable experts function as a neutral body focused solely on resolving issues, based on relevancy and usefulness. The Model also describe a sacred space.

Respect, Care and Share

Yukon First Nations' Long-Ago Peoples have always defined themselves as being part of nature, and were sent here by the Creator to care for Mother Earth. Their key laws centered around the principles of Respect, Care and Share which were treated equally, and used in combination with other natural laws. Respect is the law applied to all other natural laws. Long-Ago Peoples laws are applied internally first, then to others moving outwards into the broader worldview. For instance, long ago people's laws apply to self, immediate family members, Clan, community, Nation, pets, dwellers, plants, land, water, air, and universe. Respect is the greatest consideration given to life and everything created by the Creator. Care is taking care of the land and each other, which is the responsibility of all peoples. Share is the passing down and sharing of knowledge openly, and in a respectful manner. The model attempts to rebuild equal respect between the land and people, knowing that reconciliation cannot happen if people continue to view themselves as superior to nature and life. The model also aims to rebuild respect between people, where no knowledge system, gender, or group is superior to another.

No Voice Perspective

Long ago people's approach to land relationship and care include the perspective of all affected parties such as future generations, non-human relations, land and waters in planning and decision-making. The model includes "those with no voice" in all discussions and decisions made at the roundtable, and their presence is represented with a sign or symbol. Participants are asked to contribute what they feel represent the No Voice reaction to the issue at-hand. The No Voice reactions are part of the information that is assessed in decision-making. In the event of a stand-off on a particular issue, the "no voice" contribution become a critical factor in the final decision.

Knowledge Stream Tree

The parable of the Knowledge Stream Tree is a story of how two knowledge systems and worldviews could function collaboratively side-by-side, without one trying to dominate the other. The watershed framework of the stream tree consists of tributaries (branches) that allow life-giving water (knowledge) to flow into the main waterway (trunk). As water is life knowledge is sacred, and should be shared with care and respect. The area between the waterway banks, above the water, is the sacred space needed for meaningful dialogue to take place. A mountain stream with long ago people's knowledge on one side, and Western knowledge on the other side, respect each other's system. As one travels upstream, there will be certain places where crossing is possible. At these narrows, collaborative knowledge could be shared. When Western Science speaks of "sustainable development," Long-Ago People say "Take care of the land; the land takes care of you; and take only what you need." As these two systems support sustainable development, "sustainability" could become a fundamental collaborative law.

The story emphasizes the importance of how the two knowledge systems respect each other's differences and collaborate on common principles. By sharing their strengths and weaknesses on each point of interest, experts could decide which knowledge system would be best utilized when dealing with that particular issue. The Model allows for the rediscovery and rebuilding of cultures rather than merging concepts. The Model encourages participants to look for commonality within different knowledge systems, then use the strength of interconnection to resolve issues.

Rules of Engagement

Purpose of the model is to allow issues to be resolved through collaborative planning and consensus building. Participants of the roundtable are responsible for developing their rules of engagement that include the following requirements:

- Show respect for each other, affected parties and the land;
- Feel as much as you think;
- Listen to understand what is being said;
- Clarify what you say and hear; and
- Have patience.

Long Ago Peoples Way state that knowledge and land should not be damaged because both belong to the grandchildren and future generations. Indigenous Way of Life say Indigenous traditional knowledge requires the Knowledge Holder to have experienced the knowledge through indigenous traditional lifestyle to be fully understood. It is important to recognize and respect that some people communicate thorough storytelling and animation, while others verbalize and record. Participation may be non-verbal. Participants using the model should always be aware of culture shock when delving deep into the multiple knowledge systems.

Joe Copper Jack
Go'gon'
Traditional Knowledge Holder
Yukon First Nation Elder
copperchief85@gmail.com
www.respectcareshare.ca

GLOSSARY

Active Layer: Ground above the permafrost that is subject to annual freezing and thawing. The thickness of this layer depends on soil organic matter content, soil moisture, vegetation, thickness and duration of snow cover. The longer the summer an area experiences, the thicker the active layer.

Aquatic vegetation: Plants which grow in open water up to 2 m in depth.

Beringia: A geographic region which includes the Bering Strait and abutting landforms in Alaska and Siberia.

Bog: A peatland which receives water mainly from precipitation. Ground cover is dominated by *Sphagnum* moss and have low water and soil pH.

Bryophyte: Collective name for mosses, liverworts, and hornworts. These species are non-vascular and reproduce via spores.

Calcareous: Substances predominately composed of calcium carbonate, such as limestone.

Continuous permafrost: Area is 90% underlain by permafrost.

Discontinuous permafrost: Area is 50-90% underlain by permafrost.

Dominate or Dominant: The species within a plant community that contributes the largest percentage of vegetation ground cover.

Emergent vegetation: Plants that are rooted in water, with leaves and stems growing above the water surface.

Ericaceous shrubs: Members of *Ericaceae*, a family of flowering plants that include cranberries, blueberries, and Labrador tea among many others. Typically adapted to growing in acidic soil conditions.

Fen: A peatland which receives water from groundwater, surface water and precipitation. The pH in fens can range from acidic to slightly alkaline.

Floating vegetation: Plants which float on the surface of open water, either partly (fixed floating) or completely (free floating).

Floodplain: Areas adjacent to rivers with relatively level topography, which become saturated or flooded during periods of high discharge.

Forb: Non-graminoid herbaceous plants.

Frost heave: See ice lens.

Gleying: Process by which soils are exposed to saturated and low-oxygen conditions for prolonged periods. Gleying reduces iron and manganese present in the soil, resulting in a grey-blue-green colouration.

Graminoid: Grass-like plants in the order Poales, including Grasses (*Poaceae*), sedges (*Cyperaceae*), and rushes (*Juncaceae*).

Groundwater: Water occurring below the earth's surface, either standing or moving via gravity.

Herb: Any soft-bodied (non-woody) vascular plant with stems that die back at the end of their growing season.

Hollow: A low depression in between hummocks. During wet periods, standing water often collects in hollows.

Hummock: A mound of organic material (usually peat). At a site level, collections of hummocks form a microtopography with different forms of vegetation occurring on top of the hummocks from those growing in the hollows between them.

Ice lens: A discreet layer of ice that forms within freezing soils. Creates upward displacement of surface soils known as frost heaves, resulting in polygonal ground surface patterns.

Ice wedge: Ice wedges occur when rapid cooling occurs during seasonal changes.Cracks form in the ground and fill with melt water in the spring, that result in wedges of ice forming on the landscape. From a birds eye view, this results in polygonal shape networks on the landscape.

Lichen: A complex organism composed of both fungi and algae operating in symbiosis. Many lichen species provide important winter forage for caribou.

Marsh: Graminoid-dominated mineral wetlands with seasonally fluctuating water levels near or above ground level.

Mineral wetlands: Wetlands in which mineral substrates occur less than 30 cm beneath the soil surface.

Mottling: Depositions of oxidized iron or manganese within a soil layer, which take on a characteristic splotchy red-brown appearance.

Muskeg: From Cree **maskêk** and Ojibwe **mashkiig**, a swamp or peatland with spongy, hummocky ground.

Non-vascular: Plants which lack internal structures to transport water, and are instead limited to absorbing water from their immediate surroundings.

Nutrient regime: The availability of nutrients in a given area necessary for plant growth, which imposes limitations on which species are able to occupy a space.

Organic soil: Soils composed of once-living organic matter (such as mosses, sedges and woody plants) accumulated in various states of decay (also see peat).

Organic wetlands: See peatland.

Peat: Organic soils found in peatlands, under various degrees of decomposition in saturated, anaerobic conditions.

Peatland: Any wetland with more than 30cm of accumulated peat is considered a peatland. This includes bogs, fens, and some swamps.

Permafrost: Ground that remains frozen (at or below 0 degrees Celsius) for more than 2 years.

pH: Measurement of how acidic/alkaline a chemical or substance is. Using a scale from 0-14, anything with pH below 7 is considered acidic, while a pH above 7 is alkaline.

Riparian: Area adjacent to streams, lakes or wetlands, transitioning into upland.

Run-off: Water traveling across the ground surface of an area that is not absorbed into the soil.

Shallow water wetlands: Wetlands that retain 75% open water below 2m deep for most or all of their growing seasons.

Shrub: A woody perennial plant, usually with multiple branched stems, and typically less than 2m tall.

Soils: mineral and organic materials naturally occurring at the surface of the earth, capable of supporting plant growth.

Species at Risk Act (SARA): Canadian Federal Act passed in 2002, which regulates the assessment of threatened wildlife species, and establishes legal protections for wildlife and their habitats.

Sporadic permafrost: Area is 10-50% is underlain by permafrost.

Submerged vegetation: Aquatic plants that grow underneath the water surface, with the exception of floating flowers/leaves in some species.

Swamp: A wetland identified as having more than 25% woody species cover and fluctuating water levels. Typically mineral wetlands but occasionally peatlands.

Thermokarst: Thawing permafrost leads to a collapsing or slumping of the ground. Excess ground ice, such as ice wedges melt and fill these areas with water. This results in thermokarst lakes and ponds.

Tree: Any tall woody plant, usually with a single branching stem.

Tussock: A tuft or mound of graminoid vegetation.

Upland: Terrain with well-draining soils which do not experience prolonged periods of saturation. Vegetation present is adapted to drier conditions compared to wetlands.

Water regime: The amount of fluctuations in water table levels or flow in an area. Stagnant water regime indicates minimal fluctuation, whereas a dynamic regime would have high fluctuation.

Water table: The highest point of ground water saturation at a given point in time, above or below the soil surface.

Wetland: Terrain which are saturated for long enough periods that soils are poorly drained and have low levels of oxygen. Vegetation present is adapted to periodic or permanent states of saturation.

Wetland complex: A formation of interconnected wetlands of varying classes across a landscape.

Woody: Hard-stemmed, perennial plants.

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