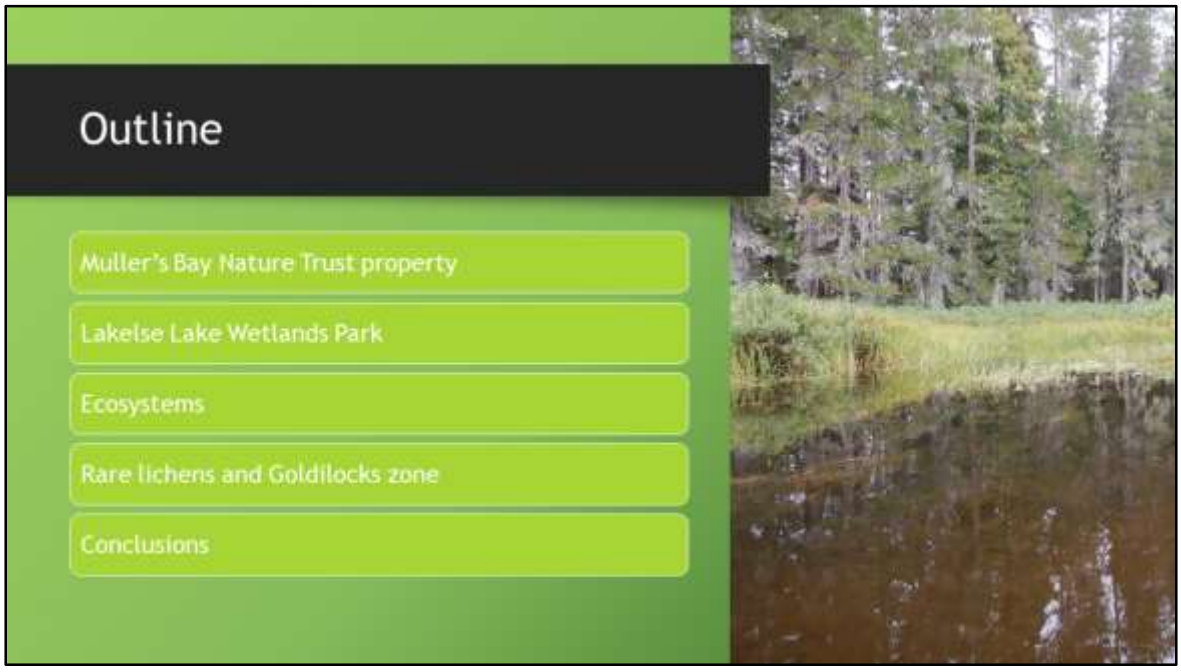
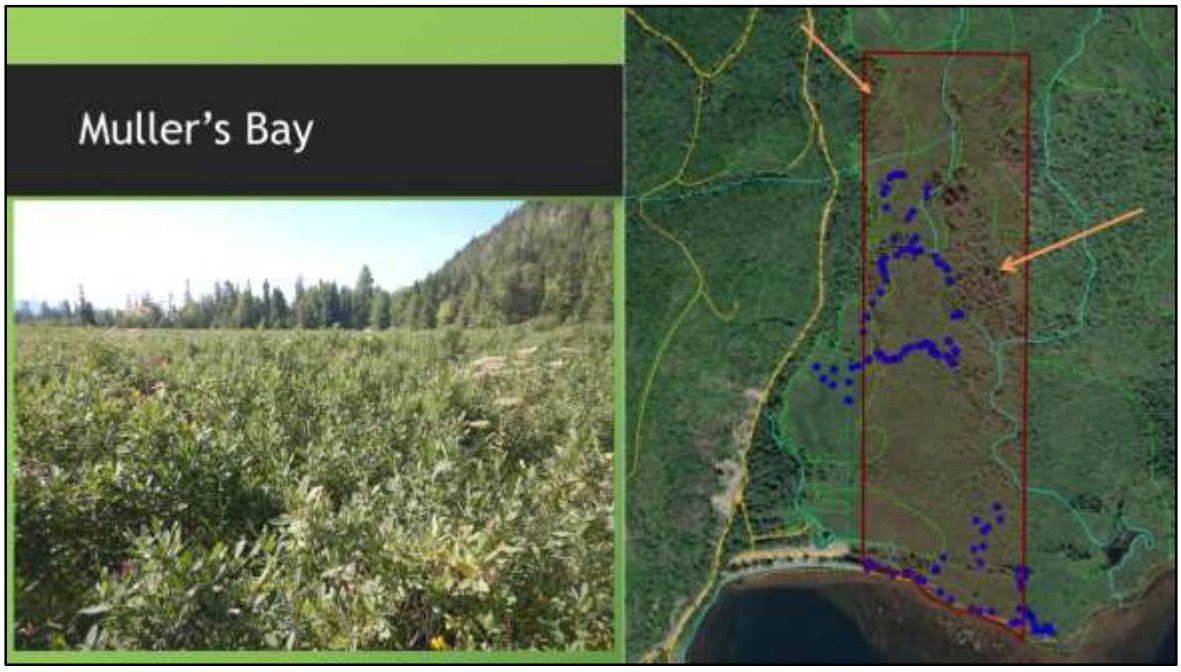

Lakelse Lake Wetlands
and the Goldilocks Zone
Paula Bartemucci



Today, I will share the results from two botanical surveys that I did last summer at Lakelse Lake. One was at Muller's Bay at the north end, and to the south Lakelse Lake Wetlands Park. The provincial park was protected in 2004 after the LRMP process. The park has not been formally surveyed for rare plants. Same for Muller's Bay. The surveys took place because Nature Trust funds baseline inventories of their properties when they have resources and LWSS (Cathy McRae's initiative) received a grant for this work.

I'll end with a discussion of a few federally-rare lichens found in the Terrace-Kitimat area – several are threatened in Canada. I am working on 3 status reports for COSEWIC, updates occur approx. every 10 year.



Muller's Bay – north of lake it is a mosaic of wetland types, mostly non-forested, hydroriparian, supporting rich ecosystems. Blue dots show where I surveyed. Uniform green is predominantly shrub fens or swamps – these are dense thickets – nearly impenetrable. There are a few islands of wet forests. It was VERY wet, even in August. I followed the path of the bears through the dense shrubs and through slightly less-wet areas. There could be more old forest in extreme NW and I wish I had spent time in the forest at the eastern edge. Orange arrows show some of the un-surveyed forests.

The site was intersected by winding, deep, slow-moving drainage channels and wider areas that formed ponds. The channels were too deep to walk through and too wide to jump across, making the site difficult to navigate and parts of the site were hard to access.
Centre image; Some of channels were filled with yellow pond-lily (Nuphar polysepalum).

In some spots there was sparse tree cover in mountain alder swamps. The tree cover was not high enough to ‘true forest’. They were almost swamp forest.

Interesting, a large portion of the wetland area is covered by sweet gale – Sitka sedge fens, which are blue-listed.

It is an uncommon fen ecosystem in BC and will likely be negatively impacted by climate change. The water level tends to be just below the surface during the growing season but often experiences shallow flooding in the early season. Again, relatively dense shrub thickets (1 to 1.5 m tall). This fen is more common in the south.

The sites blend into the Wm50 – Sitka sedge – Pacific water-parsley (also blue-listed) and potentially the ws50 Pink spirea – Carex sitchensis in places.

Info: MacKenzie and Moran 2004

Some sections were almost 100% sweet gale but others were diverse with pink spirea (Spiraea douglasii), twinberry (Lonicera involucrate), and other species
Sweet gale is nitrogen fixing. It is not considered to be important forage for ungulates but butterflies and moths are known herbivores. Sweet gale can be made into tea that is supposed to cause lucid dreaming. It is called Monkey bush tea – sasquatches presumably had tea from it?
Yellow monkey flowers – Erythranthe guttata were unusually common in parts of the fen. They are usually part of seepage sites, often calcareous and sometimes rocky. They seem to be more common in 'drier' areas of the fen.
Pacific water parsley to the far right was common in places, along with other members of the celery family, most are poisonous species. *Angelica genuflexa*, ,

Yellow loosestrife – native, not many collections. Not in Skeena region.

Joshua Mayer from Madison, WI, USA

Douglas Goldman

Mountain alder (*Alnus incana*) – pink spirea swamps made up a substantial part of the mosaic. These swamps are common in wet climates in the Coast and Mountains (MacKenzie and Moran 2004). This site association occurs on beaver-flooded flats of small drainages, near wetlands and lakeshores, where there is poor drainage, continuous seepage near the surface and early season flooding (MacKenzie and Moran 2004).

Mountain alder – skunk cabbage (*Lysichiton americanum*) – lady fern (*Athyrium filix-femina*) (CWHws1/ws01) sites occurs where there is continuous seepage near the surface and poor drainage (MacKenzie and Moran 2004). *Alnus incana* dominates these sites, which have a lush understory of skunk cabbage, lady fern, horsetails, and Sitka sedge.

*Many skunk cabbage were eaten, signs of bears were everywhere. They seem to eat only the heart of the plant at this time of year. Perhaps by the end of August, the nutrients have already been moved to the rhizomes for winter storage?

There were two types of 'real forest' They occupied small areas at Muller's Bay.

1. Lodgepole pine – peat moss, with Labrador tea, bog laurel, bog cranberry, and *Vaccinium* open scrubby canopies of western hemlock, pine and redcedar. Mostly short statured-trees.

This site is not described in MacKenzie and Moran 2004.

Both forests occur on level sites in elevated areas in wetland basin.

They have relatively low productivity, high water table.

These forest types occurred along the western boundary, near road.

The other is red cedar – Sitka spruce – skunk cabbage. This site association is analogous to the blue-listed, **Western redcedar – western hemlock – skunk cabbage** (CWHws1/Ws54) swamp forests described in MacKenzie and Moran (2004). These forests are mounded with trees on raised hummocks. False azalea, *Vaccinium*, crabapple, lots of skunk cabbage.

The wetter versions of this site had standing water, tall sedges, alders and higher water. These sites were grading into alder – skunk cabbage sites.

There were sometimes large Cw trees present at the site but rarely. It is blue-listed in BC,

Rare lichens were found here.

Muller's Bay had a strip of sandy beach. Sandy beaches are not common in northern lakes.
Upland productive, riparian forests occupied higher land (well-drained sandy soils). Large Sitka spruce, black cottonwood and cedar were present. Upland species: Saskatoonberry, black hawthorn (Crataegus douglasii), Rosa nutkana, Aralia nudicaulis, Pyrola asarifolia, Smilacena (Maianthemum) racemosa, etc.
Typical shrub thickets were along shore at eastern end. Thickets of sweet gale bordered this part of the shore (not as much sand).

Some debris was observed along beach and into property ~ 30 m in some cases (old fuel can, floats, and styrofoam).

Invasive species including yellow flag *Iris pseudacorus* and yellow toadflax *Linaria vulgaris* among others were found on the shore. I saw that there was another yellow flag noted on iNaturalist near Lakelse Lk park boundary. Remove before they disperse seeds into the lake. Seeds float around.

The lakeshore in the property is exposed to prevailing southerly winds that funnel up the Kitimat Valley and the lake itself. The valuable shoreline habitat is therefore vulnerable to invasive species and garbage that are floated or blown in from disturbed areas along the lake

Erosion was noted, too. This is common on beaches perpendicular to wind direction. Note the trees being undercut along beach and at point.

Lakelse lake wetlands park – pink dots shows where I surveyed and made observations. The park was hard to access. I ended up entering from the far south on an old road, then at two locations in the extreme NE roads and the NW then by kayak.

Much of the southern part of the park has been logged. Upland forests occupy restricted, small areas to NE and NW.

Wetlands such as fens and bog forest occupy most of the undisturbed part of the park.

I discovered historic air photos online and was interested to see the Kitimat valley before it logged.
1947 left image and then 1985 right image showing extent of logging – almost 100% of upland forest in this area was logged. You can see the small pockets of older forest near the blue arrows.

Large stumps were found in the 2nd growth forests regeneration. Young forests were dense stems, with low light, poorly-developed understories.

An impressive stand of open and productive **Sitka spruce – salmonberry forest** (CWHws1/07) occupies that remnant patch in the NE that I showed on the previous slide.

Highly productive forests are dominated by Sitka spruce. Immense old Sitka spruce were scattered throughout this forest as were large western redcedar and western hemlock.

These red-listed forests develop on alluvial soils and differ slightly from the high fluvial bench ecosystems described in Banner *et al.* (1993)

Understory species included: salmonberry, devil's club, lady fern, oak fern, spiny woodfern, foamflower, enchanter's nightshade, skunk cabbage, red-osier dogwood and Pacific crab apples. Hans Roemer found these forests in the nearby Lakelse Lk park in 2002.

This exceptional old growth Sitka spruce forest was not picked up by the OG Technical Advisory Panels analysis. Turquoise arrow shows Sitka spruce – salmonberry old forest.
The red polygons show where there is big-treed priority areas in the vicinity of Lakelse Lake From Imap BC.
I have circled some polygons close to the lake in yellow. There appear to be 2 small polygons in the Lakelse Lake Wetlands Park, one in Lakelse Lk Park and several in the vicinity of the lak..

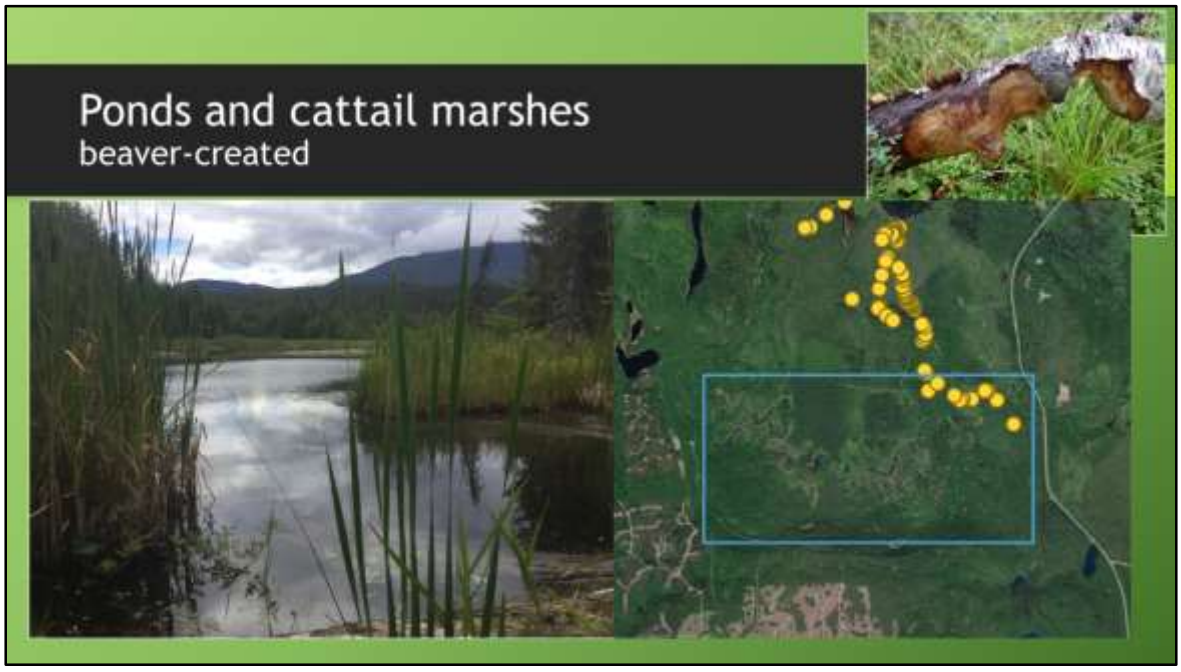
I found goblin's gold for the first time in the old Sitka spruce forest. I have been searching for about 25 years ever since I read page 33 of Wilf Schofield's book – Some common mosses of BC. He had included 3 uncommon, but charismatic mosses for beginners to search for. They were like 'trophy mosses.'

Goblin's gold grows on fine soils on uprooted trees (tip ups). The small fern-like leaves were glowing or luminous when I saw them just as Schofield described. It did not disappoint.

(ps The other 2 mosses are bug moss (*Buxbaumia piperi*) and *Splachnum rubrum* or fairy lantern dung moss).

I even found a recent (2022) article from the Guardian – where it described caves in Italy that are cloaked in the green glow of this moss. "When its spores germinate they grow filaments that fan out, scavenging for any faint light they can find. Cells on the surface of the moss are covered with tiny lenses that focus any dim light deep down into the bottom of the cells where chloroplasts move around to harvest any pinpricks of light."

https://www.theguardian.com/science/2022/jan/19/plantwatch-goblins-gold-luminous-moss-schistostega-pennata-caves-glowing-green-light



Currently, the presence of beavers are significantly altering the hydrology of the wetlands in the park. Beaver flooding was also encountered in the previously-logged areas. Numerous large beaver homes, beaver-felled trees and ponds were observed throughout the park

Blue rectangle – extensive beaver ponds and wetlands. Beaver ponds were large at times and important aquatic ecosystems.

The frequent beaver ponds were often fringed with **cattail marshes** (CWHws1/wm05) and swamps of skunk cabbage, small-flowered bulrush, mountain alder, horsetails, and pink spirea.

Sitka sedge – Pacific water-parsley marsh ecosystem (Wm50) occurred as small fringes near sloughs and lakeshores, mixed in with mountain alder or sweet gale sites.

This ecosystem is common at low elevations in the Coast and Mountains in basins, and along slow-moving streams, ponds and lake shores (MacKenzie and Moran 2004). The ecosystem tolerates variable hydrology and disturbance. This ecosystem occurred in areas of higher water, more flooding (fluctuating water table) and higher nutrient availability than the sweet gale – Sitka sedge sites (MacKenzie and Moran 2004). Sitka sedge

dominated but *Oenanthe sarmentosa*, skunk cabbage, *Angelica genuflexa, Galium trifidum*, *Cicuta douglasii* and *Epilobium ciliolatum* were also present.
Of course, there are transitional systems too.

It was really difficult to access the lake shore vegetation in the park. In most cases, the homogenous bright green vegetation in the satellite image was too deep to access or sample. Over your head in spots.

Luckily, Eileen kindly brought me by kayak to a small part of this foreshore vegetation.

Un-explorerd parts of the long shoreline at the southern end of Lakelse Lake may support unusual species or ecosystems

The foreshore vegetation communities at the creek outlet appeared to cover a similar area in the 1947 aerial photograph, which suggests they are long-lived.

Examples of some of the aquatic vegetation just in from the foreshore – pure stands of mare's tail (Hippuris vulgaris), then other patches of common bulrush, *Schoenoplectus lacustris* (once collected for weaving).
The far-right image is of the assemblage of submerged plants – water starwort and water milfoil *Myriophyllum* species

Foreshore species included great bulrush, mare's tail (*Hippurus vulgaris),* cattails (*Typha latifolia*), water milfoil (*Myriophyllum* species), *Callitriche heterophylla*, *Equisetum fluviatile*, and numerous species of pondweed (*Potamogeton*)

Floating rafts (islands) of vegetation were diverse in species, comprising a mix of wetland and aquatic plant species and sometimes even woody terrestrial species (e.g. red-osier dogwood, highbush cranberry).
Some of the species on the floating island plants did not occur elsewhere in the park. Most islands are similar to fen ecosystems but are floating, as they occur on buoyant mats of plant roots and detritus.

These floating islands represent a unique habitat – differing from the shoreline vegetation and from the aquatic plant communities. Studies have found that

floating islands trap nutrients and sediment making them rich in nutrients compared to surrounding water and sediments.
Some of the floating islands functioned more as peninsula since they appeared to be attached to the shoreline.

Most of Lakelse Lake Wetlands park is covered by extensive bog woodlands – The left image shows a rough sketch of the extent in blue.
They are best classified as Lodgepole pine – Sphagnum bog woodlands (CWHws1/10) but they are varied in composition esp. in their understory

They have open canopies of scrubby western hemlock, western redcedar, lodgepole pine and rarely mountain hemlock.

These bog woodlands are uncommon in the CWHws1, where they are restricted to peat-filled depressions at the base of slopes or in valley floors (Banner *et al.* 1993).

Many of the trees were dead-topped or standing dead. It was not clear if the standing dead trees were caused by changes in hydrology in the bog woodland. The more likely reason is that the forests are very old.

Bog woodlands

Sitka spruce was found in wetter, richer areas within the large bog woodland complex. These sites were tending to the redcedar – Sitka spruce- skunk cabbage sites (Left image)

The understory was not uniform. In the right hand image it was characterized by Labrador tea, *Vaccinium* species, false azalea, and *Sphagnum*.

In other parts, the bog woodland understory was nearly100% bracken though peatland elements occurred below the bracken fern .
The righthand images shows how sweet gale, pink spiraea, sedges were also common.
Like Muller's Bay, the sweet gale blue-listed fen was frequently encountered and the meandering deep channels with yellow pondlily, too.

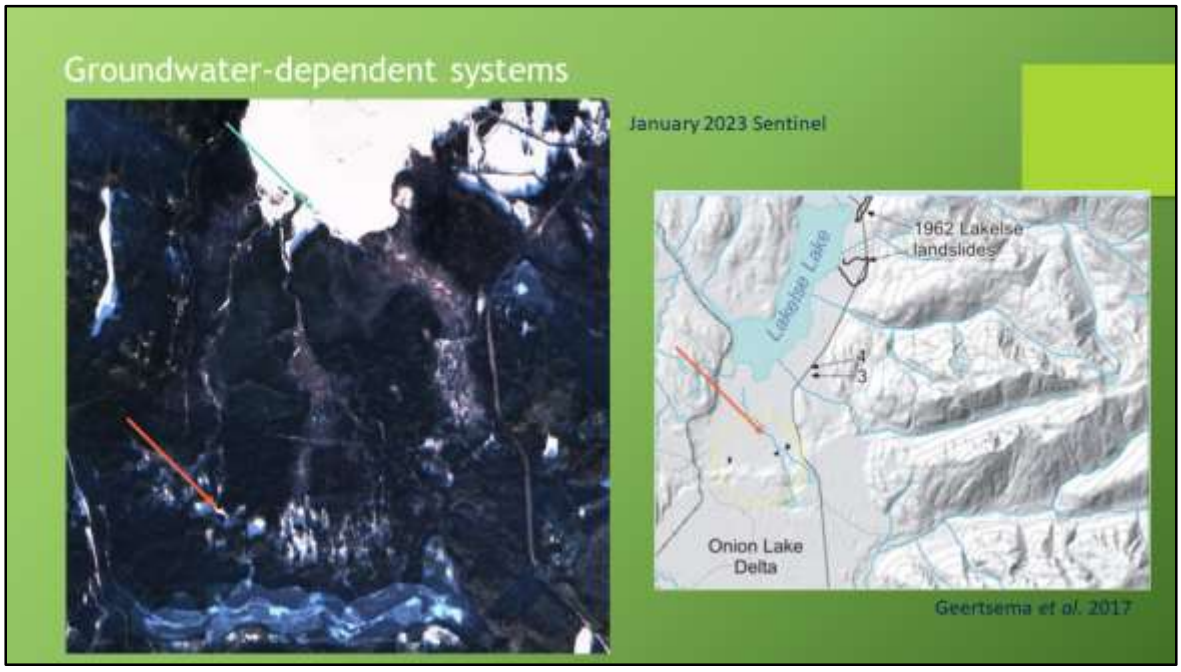
Only a few small pockets of 'true' peat bog were encountered, and they occurred as small, raised peatlands within the matrix of the bog woodland ecosystem. Most of the area had high shrub cover or bracken fern so there were only small areas of open bog.
The pocket bog had several *Sphagnum* species, round-leaved sundew, *Kalmia microphylla*, the miniature bog cranberry (*Oxycoccus oxycoccus*), beggarticks (bottom right) and cloudberry (Rubus *chamaemorus*). However, there could be additional peat bogs in un-surveyed areas in the park.

Nodding beggar ticks – not found in Terrace-Kitimat area (Kitwanga closest on Eflora). Ducks eat seeds, seed attach well to clothes.
Carnivorous plants are always fun to find.
Sundew curl around prey, digest over few weeks, 15 min to kill. Sticky glands on glandular hairs or 'tentacles.
Bladderworts were found in the deep channels and in the floating mats.. Left image.

"…its stems are covered in tiny bladders that act as prey traps. When an unsuspecting prey organism touches hair-like triggers attached to the bladder trap door, water is sucked into the bladder, taking the prey with it. Incredibly, this process occurs in less

than a millisecond and with an acceleration of up to 600 G!. To put this in perspective, humans will pass out at just 8Gs.
Each trap can be fired over and over again such that a single plant can trap thousands of tiny organisms in a single day. After being trapped, prey organisms inside the bladders are dissolved with digestive enzymes and absorbed by the plant. Because the bladders are small (1.2 cm or less), prey organisms are typically small as well, and include such things as water fleas, rotifers and small insect larvae. Some bladderworts, however, can capture larger prey such as tadpoles or fish fry."

from CBC article: https://www.cbc.ca/news/canada/north/predator-plants-how-n-w-t-s-carnivorous-vegetation-snare-their-prey-1.3138051



Because Andalas and Clearwater Creeks remain free of snow and ice during winter, warm-water springs are believed to feed into them.

A shallow groundwater spring was found near the headwaters of Andalus and Clearwater Creeks by Fred Heikkinen – he noticed that it was open in winter when they were flying over it.

I didn't make it to the groundwater spring but Sentinel

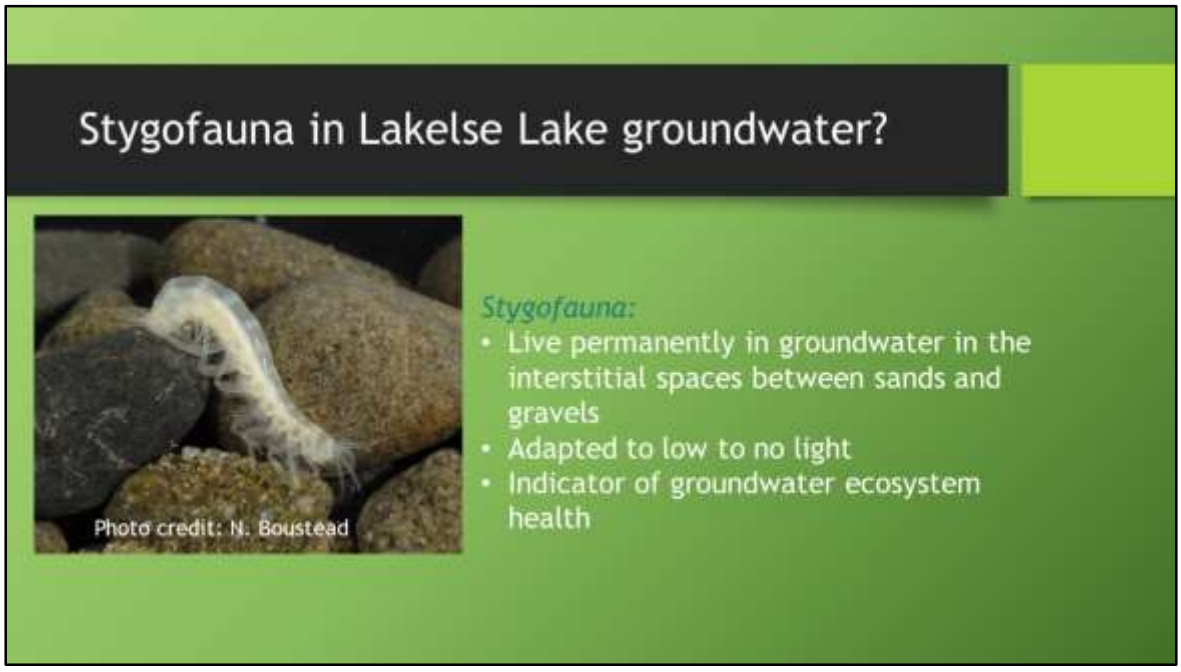
satellite imagery showed this area ice-free and the creeks open in early January and in March 2023 Location marked with an arrow on the left image.

Fred did not think that the water temperature, chemistry and other properties suggested **deep-fault origins like the** Mount Layton deep-seated fault system. Instead, he thinks that the ground water emerges from the base of the 100 to 200-m deep escarpments of glaciofluvial sediments that formed the Onion Lake delta to the south.

It is therefore likely that high levels of groundwater flow from the base of this delta (from 1-2 km south) may keep the creeks warmer and ice-free in winter.

Right image: I added this map showing the massive fan-delta of the Onion Lake Flats. It also shows historic landslide scarps (black dots and numbers). Three historic slides occurred in Lakelse Lake Wetlands Park (yellow) and two occur slightly to the northeast of the park. Also shown is the famous 1962 quick clay slide.

Geertsema, M., Cruden, D.M., and J.C. Clague. 2017. The landslide-modified glacimarine landscape of the Terrace-Kitimat area, BC. In O. Slaymaker (ed.), Landscapes and Landforms of Western Canada,World Geomorphological Landscapes, DOI: 10.1007/978-3-319-44595-3_25



Groundwater-fed systems like this one are under-studied, globally rare and their ecological importance not well understood. Stygofauna are any bug, beetle, crustacean, worm, fish, gastropd or fish that live in groundwater aquifers. Ancient, rare, endemic stygofauna communities are being discovered, new species to science. Live in interstices, often with no light.

https://www.sciencedirect.com/science/article/pii/S0169772222000699

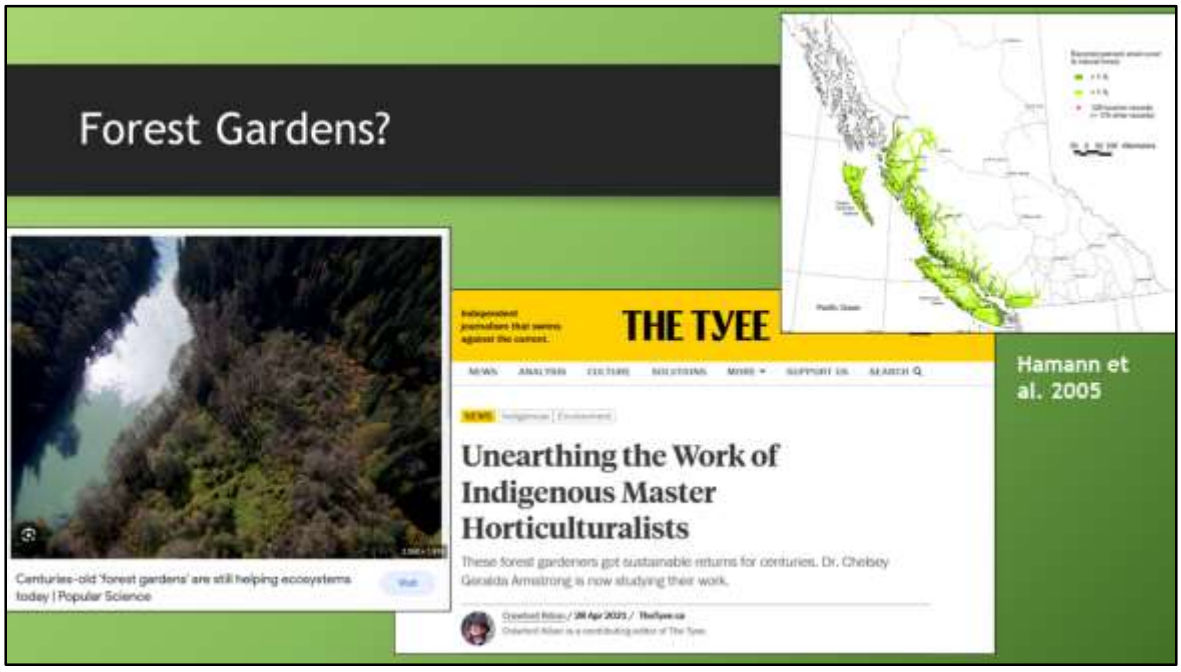
I am not sure if we have as many endemic or rare stygofauna as most diversity has been found in unglaciated regions of the world (e.g. Australia).

Even without stygofauna, groundwater dependent ecosystems are important for salmon, and other species in streams. Climate Refugia. Cooler in summer, warmer in winter.

Pacific crab apple (*Malus fusca*) ecosystems

Small patches of large-stemmed crab apple were frequently found at both sites. Pacific crab apple – skunk cabbage ecosystems (right) were found within the bog woodland and the regenerating cut-blocks. Large trees were found sporadically.

Banner *et al.* (1993) did not describe Pacific crab apple ecosystems for the CWHws1 or other interior subzones, but they described three shoreline Sitka spruce – crab apple forests in the very wet, hyper-maritime subzone of the CWH.



Looking at the distribution of Pacific crab apple – you can see it is found primarily near the coast, where it is found frequently along estuaries. However, it does grow further inland along the Skeena River valley in moist to wet habitats. https://cfcg.forestry.ubc.ca/resources/species-reports/pacific-crab-apple/ or Hamann, A., Smets, P., Aitken, S. N. and Yanchuk, A. D. 2005. *An ecogeographic framework for in situ conservation of forest trees in British Columbia*. Can. J. For. Res. 35:2553-2561.

Chelsea Armstrong has done incredible work on forest gardens. Here is an article from the Tyee. https://thetyee.ca/News/2021/04/28/Unearthing-Work-Indigenous-Master-Horticulturalists/
Her work has shown that large stands of Pacific crab apple, growing along with other culturally-important plant species, are generally believed to represent indigenous forest gardens (Armstrong 2017). Because there are historic forest gardens in the vicinity of Lakelse Lake I looked hard. I even sent Chelsea photos.

Armstrong, C. G. 2017. Historical ecology of cultural landscapes in the Pacific Northwest of North America.

Doctoral Dissertation, Department of Archaeology, Simon Fraser University, Burnaby, BC.

Armstrong, C., J. Miller, A. C. McAlvay, P. M. Ritchie, and D. Lepofsky. 2021. Historical Indigenous Land-Use Explains Plant Functional Trait Diversity. *Ecology and Society* 26(2):6. https://doi.org/10.5751/ES-12322-260206

None of the crab apple patches seemed to be forest gardens.

During the surveys, I noticed that there were a lot of dead crab apple trees, and some that were defoliated. I am still not sure what caused the damage. I had wondered about a webworm.

Pacific crab apple trees also support lichens due to nutrient enrichment (*e.g.* calcium). Which is my segue to switch to lichens.

I once told a Quantum physicist that I studied lichens and he thought I meant werewolves. So I thought I would start this part of talk by quickly going over lcihens- what they are, what they require for growth and survival.

A simple definition is that they are a long-lasting partnership between two or more unrelated organisms (2 or 3 kingdoms) – fungi, algae and cyanobacteria. Trevor Goward.

Recent work shows it is more complex than that and that yeast are also involved, and likely other organisms

Trevor Goward, BC's authority on lichens has spent a lot of time thinking and studying lichens:

Some of his definitions include: *they are organisms and ecosystems all at once. They have emergent properties. Lichens are the easiest way in to understanding emergence because when the symbiotic partners come together, they produce something with characteristics*

not found in the parts: a lichen. In short, emergence is when something becomes more than the sum of its parts.

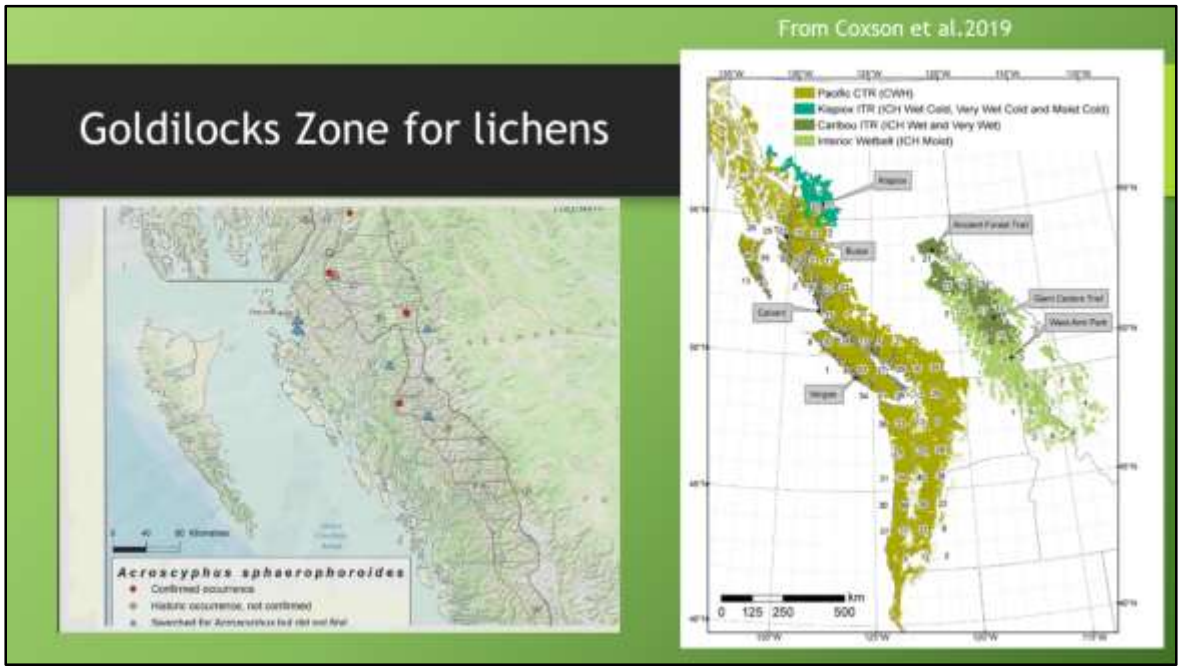
See here for more good lichen reading: https://www.waysofenlichenment.net/ways/readings/index

Green lichen is common lungwort (fungus has green alga as partner), grey is a relate lung lichen with cynobacterial partner - Lobaria hallii.

They are sensitive to the environment/atmosphere around them. They have no way to prevent themselves from drying out or regulate their water content. They have no roots or vascular system.

Cyanolichens require liquid water as rain or dew to initiate normal photosynthesis

Lichens with cyanobacteria are globally important due to their role in nitrogen fixation and nutrient cycling, their association with unpolluted old forests and sensitivity to environmental disturbance



Goldilocks is a term we (myself, Jim Pojar and Patrick Williston) used in our Cosewic report for mountain crabeye – We found that this species did not occur near Smithers nor did it occur on the outer coast. Instead it seemed to occur in the coast mountains, in the area north and south of Terrace = the hand-drawn area on left image.

For this talk, I am considering the northern part of the Pacific Coastal Temperate Rainforest towards the Kispiox ITR as the Goldilocks zone.
This rainforest exists because of a combination of high humidity, cool temperatures, and frequent but relatively low levels of summer rain. The region is transitional between wet hypermaritime rainforests of the coast and the continental climates eastwards but it is similar to the cooler Kispiox inland rainforest. Both are rich in rare old-growth canopy lichens and has a unique epiphytic lichen flora, especially in lichens that have cyanobacteria.
Excess hydration by liquid water often suppresses lichen photosynthesis, a phenomenon referred to as suprasaturation depression (Lange et al. 2001) https://pubmed.ncbi.nlm.nih.gov/11559739/
In this talk, I am focusing in the Terrace-Kitimat area since at least 6 nationally-listed lichens occur nearby.

Old forest lung lichen was found once in the Muller's Bay site on a crabapple in cedar – Sitka spruce – alder – crabapple- skunk cabbage forest.

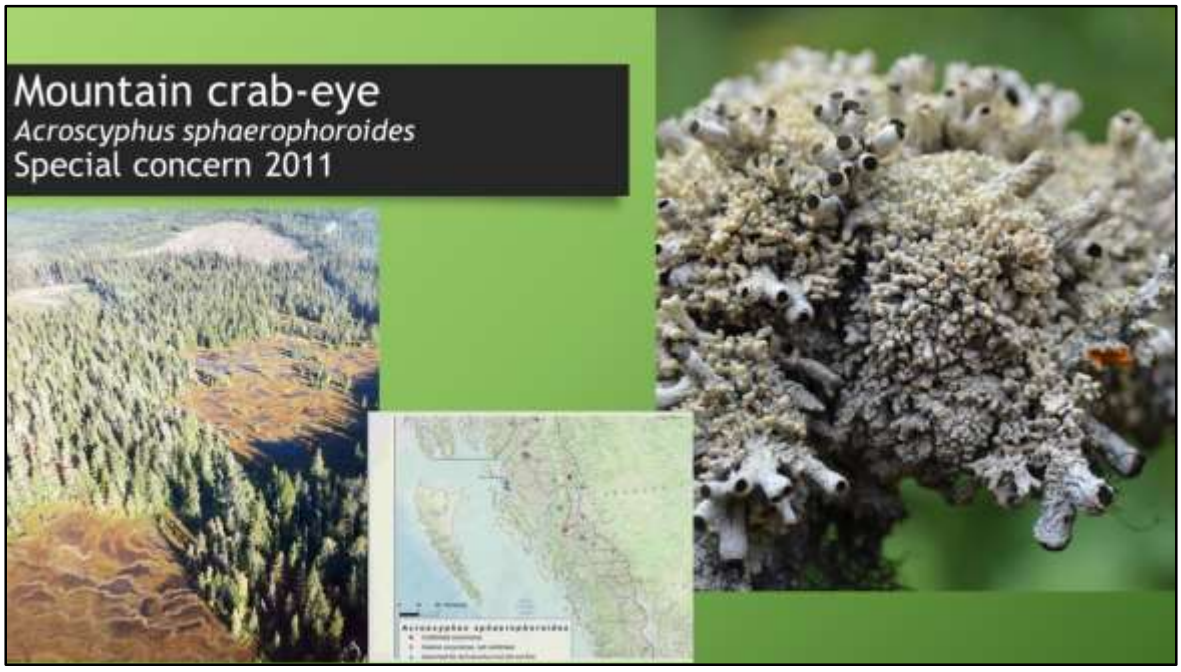
Trevor Goward described Lobaria silvae-veteris, old forest lung lichen (here on the left) in 1993

It is a super cool lichen – the same fungal partner can pair with cyanobacteria and become old forest lung lichen – tiny, grey leafy lichen with minute projections on the margins.

If the fungus pairs with a green algae, then it becomes Oregon lung lichen – large, green leafy lichen, microlobules on margins that can act as dispersal agents.

What is most interesting is that they can sometimes grow together as one composite individual.

Yellow specklebelly – 2 locations in the park and 5 spots (all near one another) in the Nature Trust site.
Tacoma jelly lichen was found on a crabapple in riparian forest.
Newly described species in 1999, it is not official known from BC yet but I have heard there are 2-3 back-logged collections at the UBC herbarium.
Note that wet and dry differences of the jelly lichen.
Blue-listed in quotes – not ranked in BC because of the new taxonomic info for both.
These three lichens therefore were the only rare ones found at Mullers Bay or Lakelse Lake Wetlands during the survey.



Now I will discuss the COSEWIC lichens found nearby.
1.Mountain crabeye
Williams Creek ecological reserve and wetland nearby have the largest number of individuals in Canada.
Crabeye grows on the tops of trees (snags or dead-topped) in patterned fens. The type of nutrient-rich fen that look like rice paddies.
We recently found out that our goldilocks zone was extended to Vancouver Island (in the mountains such as in Strathcona park and in similar fens). They are found between the hypermaritime west and dry east coasts.
Vancouver Island – 6 new occurrences 2022-23 after I found it near Sayward last summer.

2. Cryptic paw lichen – recent assessment. Sensitive to climate change, cyanobacteria.
Found at Forceman Ridge and nearby.
Williston (2020) established a research project to assess the effects of air pollution on epiphytic lichens in the Kitimat Valley airshed. Nearby lichen research sites included Williams Creek, Sockeye Creek, and Onion Lake, with the closest site being 2 km northeast of Muller's Bay. Numerous red- and blue-listed lichens were encountered: cryptic paw lichen (*Nephroma occultum*), oldgrowth lung lichen (*Lobaria silvae-veteris*), smoker's lung lichen (*Lobaria retigera*), pebbled paw lichen (*Nephroma isidiosum*), corrugated shingles lichen

(*Fuscopannaria ahlneri*), and yellow specklebelly lichen (*Pseudocyphellaria citrina*).

Smoker's lung lichen (*Lobaria retigera)* was found in oldgrowth forest in 1970 near Furlong Bay in Lakelse Lake park, and was re-located in 2015.
The largest number of known occurrences and individuals occur in the Kispiox ITR.

This is one of the lichens that I am currently working on. It was only known from the area east of Prince George (Bowron Forest Service Road, MacGregor) during first status report in 2010

Now it has been found as far north as the Yukon, Galiano Island, and I found it on Ferry Island while watching my daughters race at one of the x-country running events. It was found under cottonwoods on a red osier.

This is another super cool lichen – it is aquatic and grows underwater in subalpine streams. Jim Pojar found this lichen in the 1970s and has been searching for it and finding it in new spots ever since. I re-traced his steps last summer checking on its numbers.

Darwyn Coxson at UNBC found it at Trapline Mountain (off the Copper River FSR). I tried to re-located it last year but no luck.

This species is known from old forests up and down the coast Alaska – Oregon, Vancouver Island and Haida Gwaii. It is found near Robinson Lake and near Prince Rupert.
It is strongly associated with old forests, yellow cedar, and Amabilis fir.

Conclusions

Both protected areas harbour

- Provincially-rare epiphytic lichens
- Provincially-rare wetlands, swamp forests, and old Sitka spruce forests
- Regionally-rare floating fens, bog woodlands, lakeshore habitats, extensive foreshore vegetation.
- Globally-rare (perhaps) groundwater-dependent systems.

Conservation priorities: invasive species (foreshore and aquatic), climate change impacts to wetlands, old forests, lichens, groundwater systems

Thank you

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