The Log
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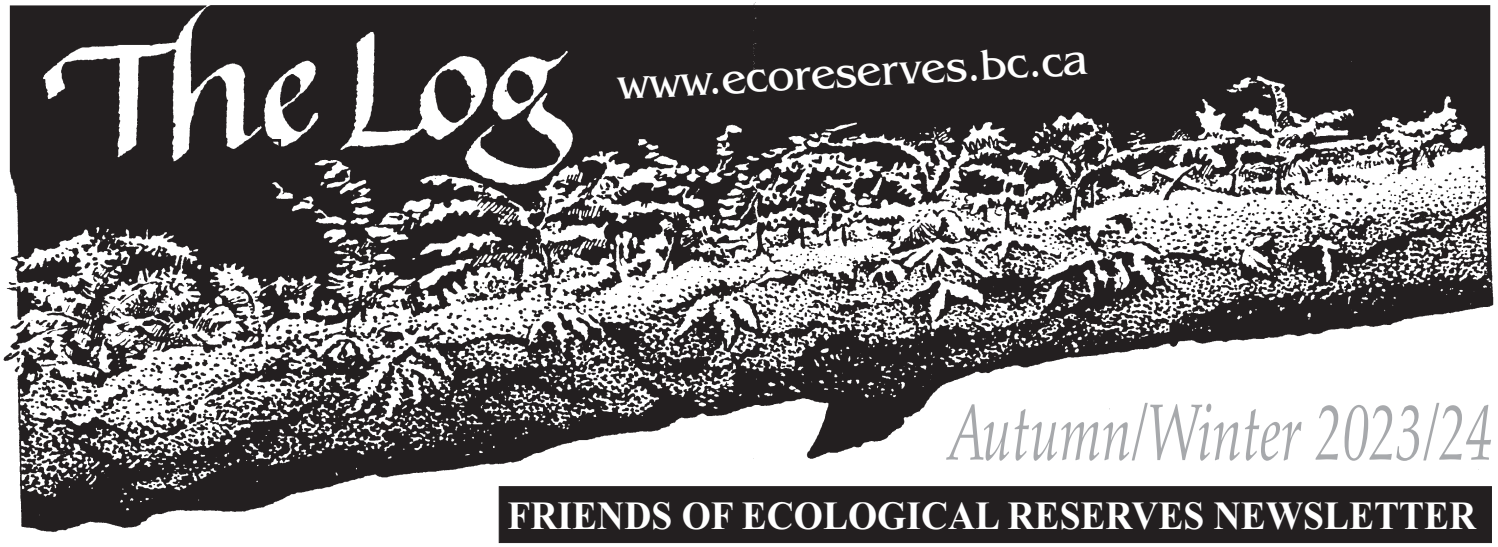

Autumn/Winter 2023/24

FRIENDS OF ECOLOGICAL RESERVES NEWSLETTER

FER's Response to the "B.C. Biodiversity and Ecosystem Health Framework"

By Harry Crosby and Mike Fenger

INTRODUCTION

The Draft B.C. Biodiversity and Ecosystem Health Framework was produced by the Ministry of Water, Land and Resource Stewardship and made public in November 2023. The Message from the Minister (Nathan Cullen) reads as follows:

"British Columbia (B.C.) is known for the diversity of the land and water and is the most biodiverse province in Canada. However, the province's biodiveristy and ecosystems are under threat. Healthy ecosystems and biodiversity are not only essential for our individual health and wellbeing, but they also ensure that ecosystems, economies, and communities throughout B.C. can flourish. Healthy ecosystems and biodiversity are vital for climate change resiliency and reducing the impacts and costs related to floods, droughts, and wildfires brought on by changing climate and extreme weather events.

We are seeing the urgent need for unprecedented shifts in land and water management to ensure biodiversity and ecosystem resilience for generations to come at international, national, and local scales. Internationally, the Global Biodiversity Framework was signed in 2022. Nationally, Canada has committed to halt and reverse biodiversity loss and formally recognizes that every Canadian has a right to a healthy environment.

A collaborative stewardship approach that prioritizes the conservation and management of biodiversity and ecosystem health is needed in B.C. to address emerging environmental issues as well as support true and lasting reconciliation with Indigenous Peoples.

B.C.'s Biodiversity and Ecosystem Health Framework (the Framework) is an important step towards the provincial government's commitment to prioritize the conservation and management of ecosystem health and biodiversity, including the conservation and recovery of species at risk, which will align all existing related initiatives and set the path for co-developement and implementation of new policies, legislation, and strategies.

In early 2023, we initiated engagement and the collaborative development of a draft Biodiversity and Ecosystem Health Framework with First Nations, local governments, interest groups and industry, in response to Recommendation 2 of the Old Growth Strategic Review. I want to thank everyone for their participation in the engagement and collaboration sessions, and the thoughtful input that was provided and incorporated in this draft Framework.

Through this draft Framework, we are committing to a collaborative stepwise approach to prioritizing healthy ecosystems and biodiversity, and to take a holistic approach to stewarding B.C.'s land and water resources, ensuring that they are healthy and resilient for the long term."

To see the complete Draft Framework visit: https://www2.gov.bc.ca/assets/gov/environment/biodiversity-habitat-management/draft_biodiversity_and_ecosystem_health_framework.pdf

The FER Executive Summary to the B.C. government starts on pages 2 and 3 with the link to our entire Submission at the end of page 3.

Inside ...

Visit our website at:
www.ecoreserves.bc.ca

The Log

Autumn/Winter 2023/24

The LOG is published two times a year by the Friends of Ecological Reserves to promote the establishment, management and maintenance of Ecological Reserves in British Columbia. The LOG is distributed to members, volunteer wardens, affiliates, supporters, government, friends and the enquiring public.

We encourage you to submit articles for publication. The deadline for submissions for the Spring/Summer 2024 issue of The Log is June 1, 2024.

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FER EXECUTIVE SUMMARY OF SUBMISSION TO GOVERNMENT

The government of British Columbia has distributed a Framework on Biodiversity and Ecosystem Health for discussion. (the "Framework"). The Framework expresses a well thought out approach to the protection of biodiversity and ecosystem health. The Biogeoclimatic Ecosystem Classification Zones (BEC zones) of British Columbia are not currently adequately protected with protection of zones ranging from 4% to 29%. Representation of underrepresented zones needs to be boosted.

Friends of Ecological Reserves (FER) makes the following contribution, suggesting additions to the Framework.

Ecological Reserves

Ecological Reserves, their establishment and monitoring need to be included in the final B.C. Biodiversity and Ecosystem Health Framework. Ecological Reserves safeguard natural ecosystem benchmarks which are needed for scientific study and monitoring of biodiversity change through natural succession and to understand species shifts occurring from climate change. Ecological Reserves will inform on how we can adapt practices to sustain B.C.'s biodiversity. The current 154 Ecological Reserves created in the 1970's and 80's have species lists and new data is being collected by volunteer Eco-guardians. A completed system of Ecological Reserves and on-going monitoring will provide a credible path forward for understanding the effect of climate change and adaptations needed to sustain ecological integrity. FER seeks a clear and coherent and scientifically informed approach to protect 1% per cent of the province as a network of Ecological Reserves to adequately represent the ecological diversity of B.C. either as part of 30% by 2030 or in addition to this.

Ers are set aside for scientific research and educational purposes to safeguard ecosystems for studies in productivity species assemblages, monitoring and gain knowledge of aspects of the natural environment. Ecological Reserves are areas with the highest degree of protection and least subject to human influence. The legislation exists; the final Framework needs to fully use it.

Outside of an expanded protected area system, FER supports the rapid shift to ecosystem based management (EBM) beyond the Great Bear Rainforest. Statutory decision makers need legislative changes in the *Forest and Range Practices Act* to require EBM forest development plans as a condition of approval.

Protection of 30% of the Province

The framework needs to state protection of 30% of the Biodiversity of the province is a priority and that development of measures to protect the ecosystem health of protected areas is a priority in collaboration with First Nations and the "Whole of Society". Government processes for managing the project need to be integrated in a "Whole of Government approach".

A substantial portion of the 30% protected areas, (at least 1% of the province) needs to be rigorously protected with Ecological Reserves. There needs to be community input into the process for identifying and managing protected areas. Areas to be protected need to have a proportional representation of the BEC zones in British Columbia.

First Nations

First nations need to be engaged with the process. The principles of UNDRIP have evolved and the details for engagement of First Nations as set out in the Convention of the Parties (COP15 targets) need to be incorporated into the framework. Science and Indigenous knowledge need to be considered together in accordance with principles identified by the Indigenous Circle of Experts (as set out in section 4 of the submission).

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BEH Framework cont'd. from p. 2

Legal Protection

There needs to be a shift in legal concepts for management of biodiversity and ecological health from the concept of environmental law (management of economic development) to ecological law (management of biodiversity and ecological health). Following the legal shift, legislation needs to be rewritten, particularly the *Forest Act* and other resource legislation, to establish a sustainable approach to harvesting of the forests and other resources. The 6% timber impact policy restrictions placed on Landscape Level biodiversity in the 1990's need to be immediately rescinded.

Actions for Protection of the remaining 70%

The remaining 70% of the province needs to be managed sustainably, with First Nations playing a key role preferably using Ecosystem Based Management. The proposed office of Biodiversity and Ecosystem Health needs to have overarching power to manage resources, and governmental decisions need to follow prescriptions of that office.

Accountability

A system for "Whole of Society" participation would best be modelled using the Cascades Process (as described in section 5, pillar 2). Accounting principles need to be followed in managing the remaining 70% of the province. The idea of transparency needs to be upgraded to a system of accountability. It is not adequate to be transparent about failure to sustainably manage the provinces ecological systems.

Management

1) Forest and Range management needs improved systems of Environmental Risk Assessment, Timber Supply reviews and Landscape Unit Planning, with improved restoration efforts.

2) The Timber Supply Review process used by the Chief Forester needs to be amended to include forecasts of indicators of biodiversity and the environmental risk and Allowable Annual Cuts (AACs) set that sustain biodiversity.

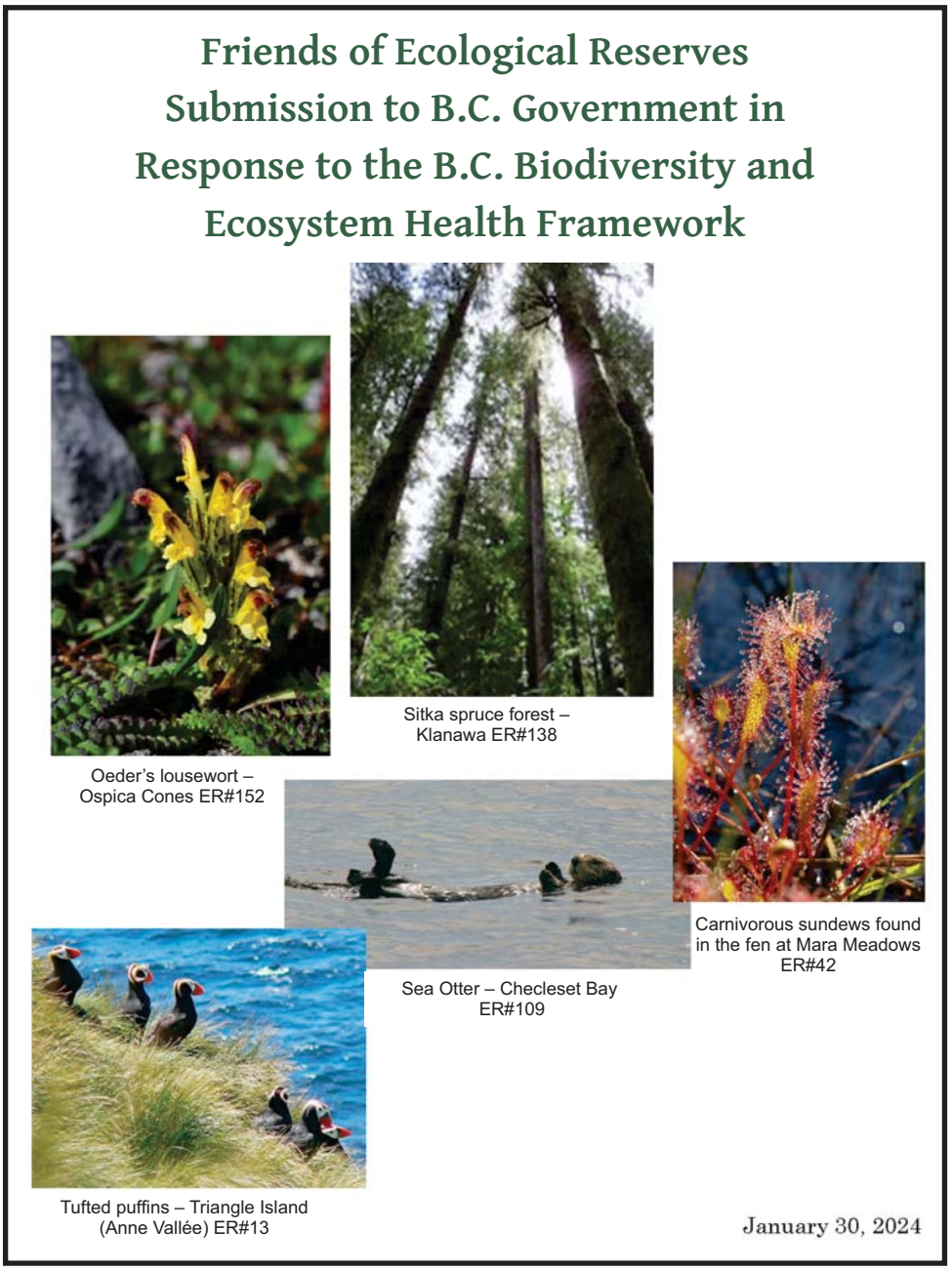
3) The Framework needs to incorporate management of the transitions necessitated as a result of the climate emergency.

4) Care must be taken to ensure that the Framework is implemented in a way that provides employment of the "Whole of Society".

5) Whole of government training is needed to shift the culture towards conservation and away from the current resource management paradigm.

6) Significant funding is needed for Landscape Unit plans, planning tables and restoration of degraded ecosystems.

To view the entire Friends of Ecological Reserves submission to the B.C. Government please visit this link on our website:
https://ecoreserves.bc.ca/wp-content/uploads/Final-FER-Submission-to-BC-Government-Biodiversity-and-ESH-Framework-Jan31-2024.pdf



Cover of the Friends of Ecological Reserves Submission to the B.C. Government

Oil Spill Response is Questioned

INTRODUCTION

Below you will find two responses to a December 6, 2023 edition of the Victoria Times Colonist which carried a front-page article on the new spill-response ship arriving in Beecher Bay (southern coast of Vancouver Island). The first response comes from Sidney Coles, whose article appeared in The Capital Daily (Victoria-based online news source); and the second from Garry Fletcher, Friends of Ecological Reserves Board member and the Warden for Race Rocks ER.

RA large bulk carrier near the Race Rocks Ecological Reserve– Dec 12, 2014 (photo by Alex Fletcher)

Will Hope Be Enough?

By Sidney Coles, Local Journalism Initiative, December 11, 2023
(Excerpted from the Capital Daily)

Last week, *Capital Daily* reported that the new 74.5-metre (244-foot) Western Marine Response Corporation (WMRC) vessel named the K.J. Gardner will be docked in Beecher Bay early in the new year. The ship is purpose-built to patrol the BC coastline and respond in the event of an oil spill.

This additional response resource is being deployed in anticipation of the 34+ tankers per month (450 per year) that will soon come out of Burnaby's Westridge Marine Terminal laden with oil from the TMX pipeline before making their way through the San Juan Islands and the Strait of Juan de Fuca.

That oil that originates in the Alberta oil sands and travels a 1,150-km pipeline to the Burnaby Terminal, is high in bitumen and is notoriously viscous and dirty. To facilitate its transport through the pipeline, oil sands bitumen is chemically diluted to make what is called 'dilbit.' Canada has limited capacity to refine heavy crude oil like this so it needs to transport it in tankers to refineries with larger capacity in the US like Ferndale in Washington State.

The David Suzuki Foundation considers dilbit spills particularly toxic and hard to clean up. "Tar balls sink to the bottom of the water or hang in the water column, eluding conventional booms used to contain spills."

En route to Washington, tankers carrying this heavy oil will travel the migration routes of significant Sockeye salmon that head up the Fraser River and past the Gulf Islands. Clear Seas, an independent research centre that supports safe and sustainable marine shipping in Canada, says the TMX project could represent a 9% increase in commercial ship traffic travelling through the Strait of Juan de Fuca.

Those tankers will also pass by the Race Rocks Ecological Reserve (RRER) off the coast of East Sooke where, according to Warden Derrick Sterling, "Humpbacks are visible every day." According to the RRER site, Southern Resident orcas also pass south of Race Rocks reserve heading west, and Bigg's (Transient) orcas pass, heading east.

Race Rocks is the most southerly part of Canada on the Pacific Coast, roughly one nautical mile from Rocky Point off the southern shore of Beecher Bay on Vancouver Island. The reserve's name refers to the tidal race that swirls around its rocky outcrops at rates of up to eight knots.

RRER is home to a diverse range of large and small animal and vegetable marine life. It's the site of haul-out and a pupping colony for Elephant Seals. California and Northern sea lions "haul out" there by the thousands in the fall of each year, meaning they leave the water for periods of time to forage, rest and reproduce. The RRER is also host to thousands of migratory birds each year like Auklets, Petrels and is a winter roosting area for thousands of seabirds like Buffleheads and Ancient Murrelets.

Despite TMX assurances that all of its tankers will be carefully escorted by tug vessels through the Georgia and Juan de Fuca Straits and will receive extended pilot guidance to the Race Rocks area, no precautions are 100% infallible.

In 2019, the Natural Energy Board (NEB) conducted an investigation or

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what it called a 'reconsideration of TMX'. The NEB report states that it agreed with Natural Resources Canada's OH-001-2014 reporting that indicated that spilled diluted bitumen (the same type that will be transported from Burnaby in the super tankers) "could be prone to submergence within as little as one or two days and in large quantities over widespread areas." That potential 24-hour submergence timeline falls well within WMRC's low urgency response time of six hours and its high-urgency, one-hour response time but regardless of the response, oil spills can have immediate and lasting impacts on wildlife.

UBC Okanagan researcher and engineer Saeed Mohammaduin specializes in Oil Spill Response Methods (OSRMs). He says that time is of the essence. "Swift and efficient response to an oil spill is crucial to minimize the adverse consequences." Mohammaduin is looking at ways to minimize the time and costs associated with (oil spill) mechanical retainment and recovery (MCR), oily wastewater management (OWM), and the volume of weathered oil (oil left on the surface) during the cleanup operations.

WMRC spokesperson Michael Lowry told *Capital Daily*, "We use different types of skimmers for different products, typically our brush skimmers are the most effective with the persistent oils. We do have experience cleaning up a diluted bitumen spill and our equipment was effective."

When spills happen over large areas, they impact marine wildlife in multiple ways: fouling or oiling and oil toxicity. Wildlife impacted by spills are often hard to catch and recover. Whales are certainly too big to "catch" and recover but, in the event of a spill, Lowry explained that the Department of Fisheries and Oceans (DFO) will work to divert and deter impacted whales from a spill area as it did in an incident around Bligh Island in the Nootka Sound in 2020.

Dolphins and whales can inhale or ingest spilled oil which can affect their lungs, immune and reproductive systems. Contributors to the Humpback Whales of the Salish Sea, an ongoing photo identification project, reports that they have "photographed and identified over 800 individual humpback whales in the Salish Sea and western entrance to Juan de Fuca Strait."

Western Marine Response Corporation's response vessel, K.J. Gardner (photo by fleetmon.com)

With spill events in mind, TMX (Canada) has set aside a $75 million Coastal Restoration Fund that will provide resources to restore coastal maritime ecosystems that "may be disrupted from natural resource extraction or transportation."

Much thought and preparation across sectors and communities has gone into preparing for the coming migration of TMX super tankers through the Strait of Juan De Fuca. Coastal First Nations have been involved in mapping highly spill sensitive and high-risk areas and are involved in contracted response strategies.

Risk can never be entirely eliminated and there is a lot at stake in protecting the biodiverse marine environment the oil tankers will move through. Here's hoping for the best in a worst case scenario.

(Capital Daily is part of the Trust Project)

Image taken from Stafford Reid's Presentation on "Understanding oil spill risks to Marine waters and shores along the coast of southern Vancouver Island : FER AGM, 2018

Full presentation on FER website at: https://ecoreserves.bc.ca/2018/10/04/oil-spill-risks-southern-vancouver-island/

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Oil Response Question Cont'd from p. 5

Protecting Our Waters – A Call for Responsible Regulation in the Strait of Juan de Fuca

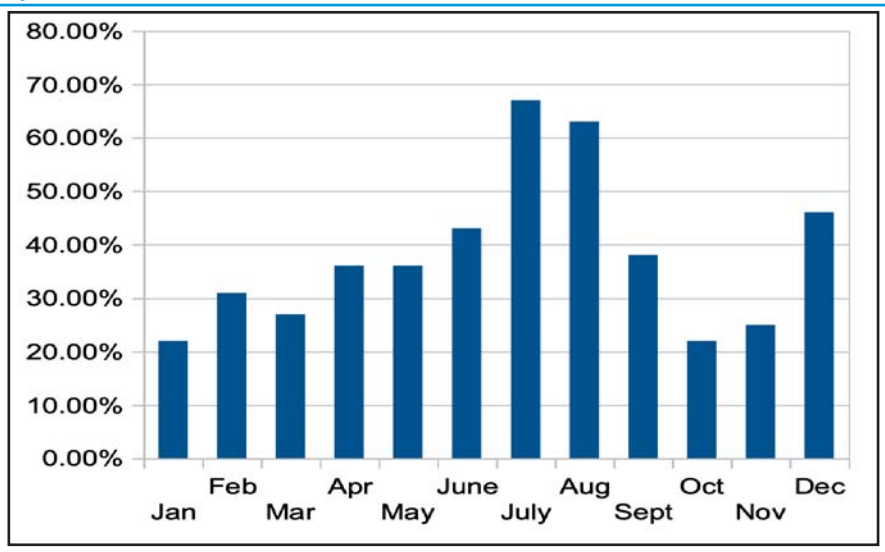
By Garry Fletcher, Race Rocks ER Warden

In the delicate balance between economic progress and environmental preservation, the citizens of Southern Vancouver Island find themselves at a crossroads, urging Transport Canada to reassess the risks associated with tanker traffic in the Strait of Juan de Fuca. The need for stringent regulations has never been more apparent, considering the alarming challenges faced by spill response teams in adverse sea conditions.

The December 6th edition of the *Time Colonist*, carried a front-page article on the new Spill-response ship arriving in Beecher Bay. This would lead us all to believe that we are fully protected from disasters involving tankers carrying toxic diluted bitumen from our new Trans Mountain pipeline through the Strait of Juan de Fuca. However, the public is not reminded of the inconvenient truth about the reality of environmental conditions in our coastal waters that dictate the impossibility of a successful response to an oil spill.

Environment Canada's anemometer at Race Rocks Ecological Reserves has spoken, and its message is clear. Records from every hour during the year 2022 reveal that wind speeds exceeding 28 kilometres per hour (kph) dominate the Eastern entrance to the Strait of Juan de Fuca 43% of the time. This staggering statistic raises a red flag, especially for the Western Canada Marine Response Corporation (WCMRC) and other spill response teams whose effectiveness is severely compromised during periods of high winds.

The Strait of Juan de Fuca, a critical passage for tanker traffic, demands a comprehensive understanding of the environmental conditions that pose risks to our coastal ecosystems. The inability to respond promptly to oil spills during adverse weather conditions leaves our shores vulnerable to irreversible damage. As stewards of this beautiful region, we cannot stand idly by while the very essence of our coastal life is jeopardized.



Compounding this issue is the challenge of deploying booms, a fundamental tool in containing oil spills. The records show that when current speeds exceed 3 knots – a condition prevalent for most of the time in the area – the placement of booms becomes impractical. Further to that the wave heights generated by storms in the Pacific on some parts of the coastline can also frequently exceed 5 metres. The limitation of these environmental factors further underscores the vulnerability of our coastlines to the devastating consequences of oil spills.

The concern voiced recently by the municipal councils of Sooke and Metchosin is a testament to the shared sentiment among communities directly impacted by the passage of tankers through our waters. These elected representatives have taken the lead in expressing their apprehensions to the BC Ministry of the Environment, emphasizing the need for a comprehensive and proactive approach to mitigate the risks posed by tanker traffic in adverse sea conditions.

Transport Canada holds a pivotal role in ensuring the safety of our coastal waters and the protection of our invaluable ecosystems. As citizens, we implore the regulatory body to listen to the concerns raised by local communities and take decisive action to deny permission for tanker entry into the Strait of Juan de Fuca during conditions that impede effective spill response.

Our natural surroundings are not negotiable, and the potential consequences of lax regulations in the face of adverse sea conditions are too dire to ignore. It is time for Transport Canada to rise to the occasion, prioritize the preservation of our waters, and enact measures that safeguard the unique and fragile ecosystems of the Strait of Juan de Fuca.

With the Trans Mountain pipeline nearing completion, the pipeline system will increase the transport of oil to Burnaby by 590,000 barrels per day to a total of 890,000 barrels per day. Currently 5 tankers per month transport oil past the Victoria waterfront and out the Strait of Juan de Fuca. This increase in volume will result in 34 tankers per month carrying toxic diluted bitumen.

Garry Fletcher is a Board member of SeaChange and Friends of Ecological Reserves. He submitted this letter to the Times Colonist but it was never published.

An Ecological Reserve as an Outdoor Classroom

By Harold Sellers, Friends of Ecological Reserves Board Member
and Cougar Canyon ER # 108 Warden

Vance Creek Ecological Reserve was visited this past September by a group of high school students from Vernon.

Rob Buchanan is a teacher at Clarence Fulton Secondary School in Vernon, where he leads the Awaken Inquiry Adventure Okanagan (AIAO) program. There are about 30 students in the program, which provides them with a rich variety of frequent outdoor explorations. During the outings, the students are immersed in nature, learning from mentors and experts whom Rob invites to come along. The learning experienced by the young people is the result of the curiosity of the students themselves.

Vance Creek Ecological Reserve is ER #30, located 33 km from Vernon and a short drive north of the town of Lumby. Its 49 hectares are on the edge of a Cedar-Hemlock Zone. It was established in 1972 for research and education purposes because it contains an usually large number of conifer species on a single site. There are eight: Western Larch, Ponderosa Pine, Lodgepole Pine, Western White Pine, Western Hemlock, Engelmann Spruce, Interior Douglas-fir, and Western Redcedar. No logging has taken place here since the 1930s.

Joining the tour group was Dr. Ward Strong, a retired BC Ministry of Forests research scientist. Your writer, a warden for another Okanagan ER, shared some words about ERs.

Dr. Strong's specialty was, and is, forestry entomology. Retirement has not dimmed his enthusiasm in the least!

He explained to the students how the site was used, prior to becoming an Ecological Reserve, in the early study of pest insects to identify species and the trees that they attacked. Larvae were brought from around B.C., raised and studied here.

High school students from Clarence Fulton Secondary School in Vernon participate in the Awaken Inquiry Adventure Okanagan program in Vance Creek Ecological Reserve in September 2023.

For fifty years, from 1920 to 1970, the site was a national and technological hub for the study of insect species. At one time over 40 people worked there!! In those days, the dedicated personnel of the Vernon forest entomology laboratory conducted groundbreaking scientific research, battled epidemics threatening commercial timber, and diligently monitored insect populations.

Dr. Strong's enthralling stories about his adventures kept everyone engaged. Teacher Rob Buchanan said: "We delved into a myriad of topics, from the fascinating world of insect diversity and its impact on ecosystem health to the use of insects as indicators of ecosystem well-being. We learned how invasive species can disrupt ecological processes, the intricate world of pheromone communication, and the essential field equipment of an entomologist. Dr. Strong also shed light on hyperparasites, parasitoids, and their roles in ecosystem population control, as well as the complex dynamics of the mountain pine beetle.

"Our discussions expanded beyond insects to encompass the characteristics of old-growth forests, which extend far beyond the notion of big trees. We explored the significance of Ecological Reserves as permanent sanctuaries preserving British Columbia's diverse ecosystems, rare and endangered plant and animal species, and unique geological features. These reserves also provide vital spaces for scientific research and environmental education."

The day was a good example of the continuing importance of Ecological Reserves. They can preserve important ecosystems, provide protected homes for numerous species and might even serve as outdoor classrooms for students. One day one of those students might be doing valuable research, continuing work that had its origins in locations now protected as ERs.

Ecological Reserve Proposal History and Current Status

By Adrian de Groot, Friends of Ecological Reserves Board Member

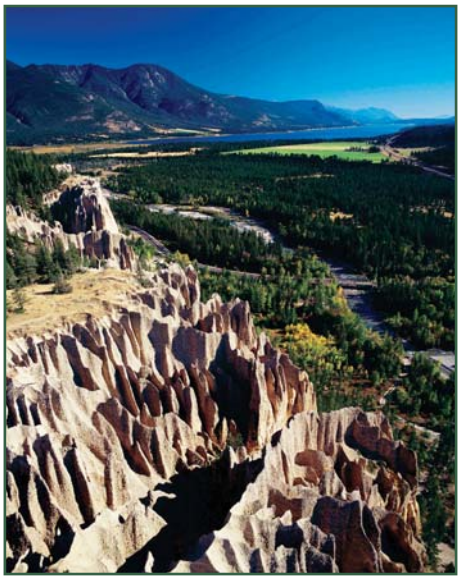
As a new FER board member, when the conversation turned to Ecological Reserve proposals I thought it would be good to know the status of land covered by all the ER proposals over the years. I knew there were 148 ERs and many more proposals, but what has happened to the areas that never made it to becoming ERs?

I took it upon myself to try and find out. The first step was to try and find maps and descriptions of all the proposals. There is a link on the FER website to a number of proposal that are posted on the B.C. government's Ecological Reports Catalogue (EcoCat) (see: https://a100.gov.bc.ca/pub/acat/public/welcome.do) so I went through those. There is also a report on the FER website about the Ecological Reserve fonds of Professor Vladimir J. Krajina, (see: https://ecoreserves.bc.ca/er-proposals/) who was the main person responsible for B.C. having an Ecological Reserve system. The fonds, which are a group of documents that share the same origin by a person, or organization, are held at UBC, and contain the descriptions of nearly all the ER proposals. Unfortunately, I live in northern B.C. so don't have easy access to UBC. Fortunately, Dr. Jim Pojar lives down the road from me and he has his personal ER proposal collection. Jim worked for the Ecological Reserve Program from 1976 to 1978 and has a copy of most of the proposals.

I visited Jim and came away with two neatly organized filing cabinet drawers full of ER proposals, 298 in total. Between these proposal sources and the written description of proposals produced in 1985, I was able to determine the state of nearly every ER proposal in the province. The ER program had a numbering system for proposals. This seems to have broken down in 1986 as later proposals were not numbered. In total there have been 412 Ecological Reserves proposals.

Nisga'a Memorial Lava Bed Provincial Park. (Photo by Adrian de Groot)

The number of proposals has varied widely among the regions with the Skeena and Vancouver Island regions leading the way, and Thompson having the fewest. When looked at as a proportion of the province in each region versus the proportion of the Ecological Reserves, Vancouver Island has a large share of the province's ERs, and the Skeena and Peace have few. Thirty-five per cent of the proposals have become Ecological Reserves, with an additional five reserves having been transferred to Parks Canada and one to the City of Vancouver. Overall, 70% of the proposals have all or part of their area under some form of protection. This includes Ecological Reserve, National Park, Provincial Park, Protected Area, Conservancy, Regional Park,



Valley of the Hoodoos now a Nature Trust of BC Property.

Continued on page 9

ER Proposal History Cont'd from p. 8

Marine Park, Wildlife Management Area, Fee Simple land managed for conservation, and First Nations Protected Area.

Of the proposal areas that have been only partly protected, there are a range of outcomes. Some have adjacent larger protected areas, the boundaries of which only partly covered the proposed area; others might have been partially privately owned, or a decision was made somewhere to only protect a portion of the proposed area.

The high proportion of the proposals that have some form of protection is a credit to the staff in the Ecological Reserves Program and the people that selected the areas and proposed them for protection and the political will that existed to establish Ecological Reserves from 1971 to 1985. With the 30% of the province protected by 2030 initiative going on, there is the possibility that more of the proposals will see some form of protection.

Region	Current Status of Proposal Area						Total	% Unprotected
	Ecological Reserve	Protected	Mostly Protected	Partly Protected	Unprotected	Unknown		
Cariboo	7	7	1	2	12	1	30	40.0
Kootenay	7	7	1	1	15	0	31	48.4
Lower Mainland	15	4	1	0	7	2	29	24.1
Okanagan	16	4	1	1	9	2	33	27.3
Omenica	18	3	2	1	12	1	37	32.4
Peace	10	6	0	3	6	0	25	24.0
Skeena	22	33	2	12	40	0	108	37.0
Thompson	7	6	1	1	5	2	22	22.7
Vancouver Island	46	21	1	7	17	5	97	17.5
Total	**148**	**91**	**11**	**27**	**123**	**13**	**412**	29.9
Percent of Total	**35.2**	**22.1**	**2.4**	**6.6**	**29.9**	**3.2**		

Grand Canyon on the Stikine River, part of the Stikine River Provincial Park.

Study in Contrasts: the Flora of Two East Kootenay Ecological Reserves

By Jenny L. Feick, PhD (All photos by Jenny Feick)

Ian Hatter and I serve as the BC Parks volunteer wardens for the Columbia Lake Ecological Reserve (#20) and the Mount Sabine Ecological Reserve (#19) in the headwaters of the Columbia River.

Since we began our volunteer work as ER wardens in 2022, one of our duties has been to learn as much as we can about the flora in each Ecological Reserve (ER), to post observations on iNaturalist, and develop a plant list for each ER. We have visited Columbia Lake Ecological Reserve seven times and the less accessible Mount Sabine twice. Mount Sabine, ER #19, and Columbia Lake, ER #20 were among the first 29 ERs established by the *Ecological Reserve Act*'s first Order in Council passed on May 6, 1971. They are among the oldest ERs in B.C., Canada, and the world. Although these two ERs are located quite close to one another, they exhibit very different vegetation.

Gnarly limber pine cling to cliffs in Columbia Lake ER.

The Flora of Columbia Lake Ecological Reserve

Columbia Lake ER perches above Columbia Lake, in the headwaters of the Columbia River. The predominant habitat in this rugged 32-hectare ER typifies the Rocky Mountain Trench. Arid open Interior Douglas-fir forest intersperses with groves of Rocky Mountain juniper, and bunchgrass grassland. This is the only ER that represents this type of dry Interior Douglas-fir biogeoclimatic ecological zone.

Pining for Pines

This ER is famous for its limber pine (*Pinus flexilis)*, an endangered five-needle pine species on the Schedule A of Canada's *Species at Risk Act*. Several years ago, BC Parks commissioned Randy Moodie to inventory the limber pine in this ER and he found 139 individual trees in two populations, one on southern cliffs, the other further north. Most of the limber pine trees that we observed in 2022 and 2023 were at the south end. We saw no evidence of white pine blister rust on limber pine in the ER on our seven site visits, but could check only a few trees. The majority of the limber pines cling to steep limestone cliffs. The difficult terrain made it impossible for us to examine most limber pines up close.

The other pine tree that one finds in the dry rugged parts of the CLER is the ponderosa pine (*Pinus ponderosa*). These large-crowned trees have straight trunks. Most are about 25 to 30 metres tall but some approach a height of 50 metres with a diameter of two metres. Their long, slender needles occur in bunches of three. On mature trees the very thick bark (up to 10 cm) appears bright orangey-brown, and is deeply grooved into flat, flaky

A young ponderosa pine above Columbia Lake.

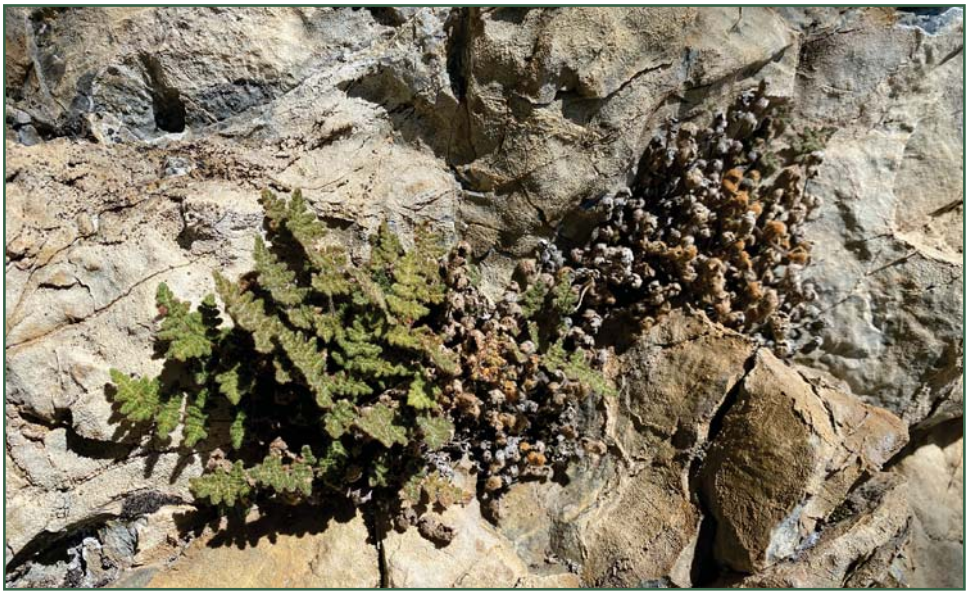
Continued on page 11

Flora of two E. Kootenay ERs cont'd from page 10

plates. It protects the tree from low-intensity ground fires. Sometimes the bark smells like vanilla and this may indicate the presence of n-heptane, a volatile terpene compound that is explosive when burned. Ponderosa pine has a long, deep root that enables it to access the deeper, moister soil and makes it quite wind-firm. Like the Interior Douglas-fir in this area, these trees can live up to 500 years.

Beauty Despite a Harsh Environment

The limestone cliffs of the Columbia Lake ER contain more than limber and ponderosa pines. Besides flowering plants adapted to life on the cliffs, including common harebells (*Campanula rotundifolia*) and linearleaf phacelia (*Phacelia linearis*), this ER harbours the rare Fee's lip-fern (*Myriopteris gracilis*, formerly known as *Cheilanthes feei*), also called slender lip fern. It tenaciously sprouts from the cracks and crevices in the calcareous cliffs. One of the largest, most impressive flowers in the ER, the sagebrush mariposa lily, (*Calochortus macrocarpus*) grows in the dry shrubland, grasslands and open forests. A wide diversity of insects, including bees, flies, wasps and beetles, pollinates these lovely lilies. The large, one – to three-petaled, pink to purple flowers bloom from mid-June to early July. *Calochortus macrocarpus* leaves are blue-green and grass-like. The bulbs taper like a carrot. Indigenous peoples in southern B.C harvested them from April to June and ate them raw or cooked.



The rare Fee's lip-fern grows in cliff crevices

A pollinator's view of a sagebrush mariposa lily.

Linear-leafed phacelia.

Marvellous Micro-Habitats

Cold, clear springs flow through and near the CLER. In stark contrast with the hot dry open Douglas-fir forests and limestone cliffs that characterize most of the ER, these springs create linear oases with mossy edges and green vegetation. The extra moisture results in an amazing vertical floral display in Columbia Lake ER. In the vicinity of the springs, several trees are covered with Western white clematis (*Clematis ligusticifolia*) vines that grow from the forest floor to the tree tops — 15-20 metres high!

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Flora of two E. Kootenay ERs cont'd from page 11

We did not find this phenomenon anywhere else in the ER.

The springs also produce tufa deposits. Tufa is a rare type of limestone rock composed of calcium carbonate ($CaCO_3$) that forms at the mouth of a spring. Tufa formations derive from the dissolution of rocks rich in calcium carbonate. When calcium carbonate-saturated ambient temperature water releases carbon dioxide it precipitates this soft, calcium carbonate-based rock. Unfortunately, some of the best tufa deposits in the area lie just outside the Columbia Lake ER.

Columbia Lake ER was established in part to protect its calciocolous vegetation, plants that grow in soils rich in calcium carbonate. Some of the plants associated with these springs include the carnivorous horned butterwort (*Pinguicula macroceras*), the dark-throated shootingstar (*Primula pauciflora*), the very showy Wood lily, (*Lilium philadelphicum*), Kalm's lobelia, (*Lobelia kalmii*), which attracts hummingbirds, and Western Indian paintbrush, (*Castilleja oxidentalis*), which like other species of paintbrush is a hemi-parasite.

Kalm's lobelia grows near cold springs in Columbia Lake ER.

ER wardens monitor the population of the rare and gaudy stream orchid

Ogling Orchids

Thanks to these springs, Columbia Lake ER features an abundance of orchids. These include Yellow lady's slipper (*Cyparipedium parviflorum*), North wind bog orchid (*Platanthera aquilonis*), slender bog orchid (*Platanthera stricta*), and green bog orchid (*Platanthera huronensis*). The most famous orchid in this ER is the stream orchid or giant helleborine, (*Epipactis gigantea*), which is rare in the dry East Kootenays, and listed as a Species of Concern in Canada's *Species at Risk Act*. This perennial orchid can grow to be anywhere from 30 centimeters to one meter in height. Its stems have prominently-veined, wide or narrow lance-shaped leaves that are five to 15 centimeters long. Unlike many orchids, stream orchids are autotrophs producing their own food from sunlight, water and carbon dioxide through photo-synthesis. This orchid's labellum or lip, a modified petal positioned on the lower side of the flower, offers pollinators a landing platform. The pollinators for this orchid include syrphid flies (also known as hover-flies or flower flies), which lay their eggs among aphids on which their larvae feed. The orchid attracts these flies by producing a fragrance mimicking the smell of honeydew, the sweet liquid excreted by aphids. This fragrance and the bumpy surface on the orchid's lip, convince the fly it found a nest of aphids. The fly enters the flower to lay its eggs

North wind bog orchid.

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Flora of two E. Kootenay ERs cont'd from page 12

and any pollen on the fly's back gets scraped off. As the fly backs out of the flower, a new load of pollen is transferred to the fly. Wasps also pollinate stream orchids.

One of our tasks as wardens in this ER involves counting the number of flowering stream orchid plants. We did the inventory on July 9, 2023, and found 177 stream orchid plants blooming. Since each plant has multiple blooms, that's a lot of stream orchids! We also discovered and mapped a previously unidentified patch of stream orchids on Sept. 9, 2023. We will add that spot to the 2024 census.

The Flora of Mount Sabine Ecological Reserve

Mount Sabine ER is in the forested area on top of but not at the summit of Mount Sabine above Columbia Lake near Canal Flats. The altitude is around 1,400 m asl. Mount Sabine marks the southern extent of the Stanford Range, which is part of the Western Ranges of the Rocky Mountains. This range extends north to Sinclair Creek near Radium Hot Springs. On their website, BC Parks lists this ER's purpose as "preservation of a forest site representative of the Montane Spruce Zone east of the Rocky Mountain Trench".

The Mount Sabine ER is VERY different than the Columbia Lake ER. The area gets more shade due to the dense forest cover and the site is moister. It is a very small (7.9 ha or 19.5 acres), somewhat strange ER, in that it is square in shape, unmarked by any sign, cut through by an access road, and with evidence of past logging and timber cruising since it became officially protected in 1971.

The Mystery of the Disappearing Sedge Meadow

After our first visit to the Mount Sabine Ecological Reserve on September 10, 2022, I agreed to dig into the history of this ER. Botanist Dr. Jim Pojar, who worked in the BC government's ER Program in its first decade, told me that the original proposal for Mt. Sabine ER was submitted to the BC government by UBC Botanist Dr. Jack Maze. His application identified an open "vernally moist *Carex* meadow" surrounded by a closed forest dominated by Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and lodgepole pine (*Pinus contorta*). Despite searching the perimeter of the ER in 2022 and the interior of the ER in mid-June of 2023, we found no sedges, much less an entire sedge meadow. Even Google Earth reveals no likely looking spots inside the ER, although there are some potential areas near the ER that we hope to check in 2024. BC Parks and members of the Rocky Mountain Naturalists Club have also looked in vain for the sedge meadow in past decades. So, it is a bit of a mystery. The original proposal put forward by Dr. Maze called for a much larger reserve, 20.23 ha or 50 acres in area. Mt Sabine ER ended up being 39% of what he originally proposed. So, perhaps the area containing the sedge meadow got left out.

Yellow columbine blooming in Mt. Sabine ER.

Problem or Opportunity? Evidence of Changing Climate and Land Use

On our visits in 2022 and 2023, we found very few Englemann spruce and most of the subalpine fir are dead or dying. Over the past five decades, the climate has become warmer and more arid. The site thus offers an opportunity to monitor the effects that this has on the ER's vegetation.

What did we find during our two site visits? Some mature paper birch (*Betula papyrifera*) remains. However, many of the old timers have died and recruitment of young saplings is minimal. Western larch was not mentioned in Dr. Maze's report, yet there is a lot of tall Western larch (*Larix occidentalis*), especially near the perimeter where there is more light. Adjacent lands around this tiny ER were obviously clear cut in the past, thus allowing more light and heat into the site.

Not only were areas around this ER logged, but there is evidence of

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Flora of two E. Kootenay ERs cont'd from page 13

past logging and timber cruising in the late 1990's and early 2000's within the ER boundaries! The 4WD access road to the Azimov Cliffs, a popular mountain climbing area, cuts right through this tiny ER. Since Sept. 12, 1997, the East Columbia Lake Wildlife Management Area surrounds this ER, acting as a bit of a buffer zone.

Denizens of the Forest Floor

Moss carpets much of the forest floor in Mount Sabine ER. We are just starting to get to know a few of the species, including red-stemmed feather moss (*Pleurozium schreberi*), fragile fork-moss (*Dicranum tauricum*), and Austria timmia moss (*Timmia austriaca*). Pinegrass (*Calamagrostis rubescens*) also covers much of the forest floor where patches of light can reach.

Forest-dwelling flora we have seen in bloom include curved-beak lousewort, (*Pedicularis contorta*), Canadian bunchberry, (*Cornus canadensis*), bronze bells, (*Anticlea occidentalis*), twinflower, (*Linnaea borealis*), and prince's pine or Pipsissewa (*Chimaphila umbellata*). We also observed Yellow columbine, (*Aquilegia flavescens*), one-sided wintergreen, (*Orthilia secunda),* prickly rose, (*Rosa acicularis*), and creeping mahonia, (*Berberis repens*). The only orchid we have found so far is Western rattlesnake plantain, (*Goodyera oblongifolia*).

Instead of the white clematis found in Columbia Lake ER, we saw the fluffy seed heads of purple clematis (*Clematis occidentalis*) on our first visit to Mount Sabine ER. In berry during that same day were the Canadian bunchberry (*Cornus canadensis*), and Western snowberry (*Symphoricarpos occidentalis*). In 2023, on June 16, we saw Utah honeysuckle (*Lonicera utahensis*) fruiting.

Straying outside of the plant kingdom, something that Mount Sabine ER has more variety of than Columbia Lake ER is fungi, including conifer mazegill (*Gloeophyllum sepiarium*) and rufous milkcap (*Lactarius rufus*). Both ERs have many lichen species. Two species we often saw in Mount Sabine ER are wolf lichen (*Letharia vulpina*) on conifers and veinless pelt lichen (*Peltigera malacea*) on the ground.

Utah honeysuckle.

For More Information

Jenny Feick's annual report on Mount Sabine ER for 2023 including species list, can be found on the Friends of Ecological Reserves website at:
https://ecoreserves.bc.ca/wp-content/uploads/Mt-Sabine-Ecological-Reserve-Warden-Report-for-2023-final-1.pdf

Ian Hatter's annual report on Columbia Lake ER for 2023 including species lists, can be found on the Friends of Ecological Reserves website at:
https://ecoreserves.bc.ca/wp-content/uploads/Columbia-Lake-Ecological-Reserve-Warden-Report-2023_final.pdf

Austria timmia moss.

Rufous milkcap.

Wolf lichen.

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- B.C was the first province in Canada to formalize and give permanent protected status to Ecological Reserves?
- the volunteer Warden program was put into effect in 1980?
- the first 29 Ecological Reserves were all established on May 4, 1971?
- the last Ecological Reserve (Det San) was established October 20, 2009?
- the smallest Ecological Reserve is Canoe Islet (0.6 ha) and was established as a sea bird colony and sea mammal haul out?
- the largest Ecological Reserve is Gladys Lake (44,098 ha) and was established to protect alpine and subalpine habitat for Stone's sheep, mountain goat and caribou?
- the farthest north Ecological Reserve is Blue/Dease Rivers (59° 52' N) and is in the Boreal white and black spruce zone?
- the Ecological Reserve farthest south is Race Rocks (48° 18' N) and protect outstanding marine life, sea lion haul out and sea birds?
- there are Tufted puffins nesting at Anne Vallée Ecological Reserve which contains B.C.'s largest sea bird population, estimated at over on million birds?

Trembling aspen and snowberries in Det San ER.

If you have any interesting facts or photos from any of the 148 Ecological Reserves in British Columbia, please email them to me at:

Louise Beinheuer
lbeinhau@telus.net

I will share in the next issue of The LOG.

Tufted puffins can be found in Anne Vallée ER.

The Log

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