

# Comox Valley Naturalists Society

March 2024 Newsletter



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## Mycetozoans and the Continuity of Life

By Loys Maingon



Fig. 1a. *Diderma* (possibly *asteroides*) sorocarp, June 15, 2023, Strathcona Provincial Park Photo: Loys Maingon



Fig. 1b. *Diderma* (possibly *asteroides*) sorocarp, June 15, 2023, Strathcona Provincial Park Photo: Loys Maingon

With rotting snow still on the ground in mid-June of 2023, when the first blueberry blossoms were out in Strathcona Provincial Park, I spotted a strange new fungus on the bark of an oval-leaved blueberry twig (*Vaccinium ovalifolium*). It looked like a diminutive “earth-star” (*Geastrum*). I was not clear as to what it was. It seemed to be a fungus that was not listed in my field guides, so I ran it by my mycologist friends who tried as best they could—but finally came up blank. It was only months later as I was preparing to write something on the evolution of fungi that I stumbled on the answer. It was *Diderma asteroides* (“little star-shaped Diderma”) or a close relative thereof. It wasn’t a fungus, or a plant, or an animal. It was a **mycetozoan**, a plasmodial “slime mold” distantly related to amoebas, something from the chaotic Kingdom Protista, where nature seems to test run all manner of strange single-celled organisms. The key to identification was that first

instinct: “they looked very much like diminutive fungal “earth stars.”

Although the Salish Sea region is home to about 90 known species of “slime molds,” mycetozoans are notoriously hard to spot, even if you know what you are looking for. I was used to seeing the usual common slime molds after a rainfall (*Fuligo septica*, *Physarum polycephala*, *Lycogala epidendrum*, *Stemonitis* and *Trichia*, all of which can be found in guidebooks.) As one expert aptly notes after forty-five years of experience: “They are usually hard to find, but their beauty rewards the time, persistence, and luck it takes to find them.”<sup>1</sup> They are ever-present around us microscopically as amoebas, but only fleetingly observable at the macroscopic scale in their inflorescence. They are among the most difficult organisms to explain to a gaggle of naturalists on an outing. In spite of their English name, they are neither mold, nor fungus, nor plant, nor animal, but rather a bit of everything shoved into a complex single-cell-with-a-brain, so complex that some taxonomists believe that they should be placed in their own kingdom.

We take for granted too many of the organisms around us and go about our busy lives largely unaware of our kinship with and dependence on the presence of a multitude of smaller organisms we mistakenly class as “lesser” organisms. That may be particularly true of the mycetozoans. The mycetozoans used to be generally called “slime moulds,” or “Myxomycetes.” A few short decades ago they were still studied as primitive fungi, at a time when fungi were lumped with plants in the study of botany. With DNA studies those classifications have been set aside. Of course, it turns out that they were never molds either and don’t belong to the fungal kingdom, which is not part of the plant kingdom.

Mycetozoans are a lesson in, and about, evolution. They are **polyphyletic**, they are a group of unrelated organisms with more than one common ancestor.<sup>2</sup> They are poorly understood amoeboid protists, and they don’t fit our normal preconceptions. Their taxonomy is very complicated. It is made even more difficult by the use of the catch-all name “slime molds” which lumps mycetozoans and phytomyxans together. Phytomyxans are non-amoebozoan plant parasites that have an amoeboid-like stage. (Is that confusing enough?)

Fungi originated as a microscopic single-flagellated single-celled endoparasite in algae. Mycetozoans are also single-celled protozoans, but they are not parasitic. They merely feed on the surface and do not penetrate the substrate. Some scholars suggest that they are not host or substrate-specific, though others group them by

substrate. They are sensitive to pH and are therefore grouped in four ranges of pH, which grossly corresponds to the pH variations of their substrates. They feed on bacteria and microbes which are found on a variety of substrates—soil, moss, fungi, decaying wood, tree bark, flowers, and leaves—and therefore perform an extremely important role in controlling bacterial and microbial densities. They play a poorly understood essential role in nutrient cycling, on which entire ecosystems depend.



Fig. 2a. *Fuligo septica* (sorocarp-bearing aethelium) in Strathcona Provincial Park. Photo: Loys Maingon



Fig. 2b. *Stemonitis* (sorocarps) in Strathcona Provincial Park. Photo: Loys Maingon

Notably, mycetozoans have received considerable attention in biomedical research, such as the commonly seen *Fuligo septica* which is known to accumulate a lot of essential elements such as zinc, iron, magnesium, selenium and especially calcium. The high amount of calcium in mycetozoans is of particular interest because calcium is essential for neural function (muscular synapse and brainwork). Myxozoans are known for being able to compute and solve complex problems. They have been used to operate computer circuitry and to operate six-legged robots.<sup>3</sup> As the foremost authority on slime molds, Princeton's late Dr John Tyler Bonner, frequently noted, these simple one-celled organisms are a brain-in-a-bag: "they manage to have various behaviors that are equal to those of animals who possess muscles and nerves with ganglia -- that is, simple brains."

As the name suggests, mycetozoans are "fungal-animals," ("myceto" = fungus, and "zoan" = animal). Their life cycle involves the formation of a spore-bearing structure (**sorocarp**) which outwardly resembles, but is not, a fungal-reproductive structure (sporocarp.) They all seem to share a similar life cycle. They begin as haploid spores which develop into microscopic single nucleus "amoebas" or flagellated zooids which aggregate into a multi-nucleated "plasmodium" (slime blob) which matures in an **aethelium** out of which mold-like diploid sorocarps emerge, eventually to break and spread haploid spores, which will repeat the cycle.

Mycetozoans are part of a number of groups of organisms mainly found among the protists that merge characteristics of fungi, animals or plants. They defy our normal categories of classification. By doing so they tell us a lot about the dynamism and creativity of nature and biodiversity. Biodiversity is not a collection of species—it is a transition of connected life forms. Darwin's great challenge to the Victorian world he lived in was a question that remains to this day central to our understanding of biodiversity: "Is life on earth united in an evolving continuity, or is it a network of competitive hierarchies?" That is a question for "planetary biology" which traces the evolution and transformation of DNA and proteins through a constantly changing planetary history. Because of DNA we no longer think of Neanderthals as "another race" but as evolutionary cousins in humanity's journey, whose DNA we inherited. The Neanderthals are us, and the mycetozoans are not too far behind!

In classical biology this same question is phrased as: "Is it better to try to unify organisms by evolutionary history than to divide them?"<sup>4</sup> The concept behind "natural

selection" was never meant to be Herbert Spencer's (1820-1903) unfortunate catch phrase "survival of the fittest." Darwin's "struggle for existence" was meant to connote the fitness of an organism for an ecological place or "niche" in a continuously evolving and changing environment.

Darwin's nineteenth-century Victorian world was built on the racially structured and class-obsessed colonial empire that drove the rise of industrial capitalism and reduced nature to "resources." (A misconception still promoted by our politicians and corporate leaders which is largely responsible for our current climate and biodiversity crisis which endangers humanity's survival on this planet.)

Darwin came from a long tradition that saw the earth as a living organism. The challenge that Darwin presented to Victorians was at odds with the popularly endorsed simplistic and misleading misinterpretation of the theory of evolution that suggested that "man descended from monkeys." That was what the popular press, gutter politicians and racist apologists like Spencer would use to promote "social darwinism," a cornerstone of fascism which still finds favour today in right-wing conservatism. Darwin followed in the anti-racist footsteps of von Humboldt, whose works he prized, took and read on the voyage of the Beagle. Long before the advent of genetics and DNA, Darwin was awestruck by the relatedness of all life, and man's indebtedness and evolutionary proximity to all other species. Darwin's theory of evolution ties all life together as one large complex interdependent unity.

Unfortunately, over the last 100 years poorly taught science, promoted throughout our conventional educational system which mis-educates children for corporate careers, has often reduced the theory of evolution to hierarchies, levels and categories. Two centuries after von Humboldt and Darwin, that approach facilitates the view of nature as just "resources." The inconvenient essential part about the continuity of life, and the sentience of even single-celled organisms we rarely see has unfortunately been overlooked and failed to enter public discourse. We overlook or understate the problem of the unity of life at our expense, as the lack of a public understanding of the linkages between the climate and the biodiversity crises illustrates.

Mycologists often point out that members of the fungal kingdom are closer to animals and human beings than they are to plants. What then of the mycetozoans? They seem even closer to us, though distant in evolutionary time. The division between plants and animals gets blurred when we stop to consider the "plant sentience"

and models of sentient forests proposed by Suzanne Simard and others. The division even becomes increasingly spurious when we leave the comfort zones of our accepted categories and mental routines and take time out to stop to observe and consider the intractable mycetozoans.

The sooner we come to terms with the continuity and interdependence of life throughout nature, the sooner we will be able to address the rights of nature and overcome the divisiveness that has brought upon us the biodiversity and climate crisis.

1. <https://www.wnps.org/blog/slime-mold-interlude>

2. [https://www.mun.ca/biology/scarr/Taxon\\_types.htm](https://www.mun.ca/biology/scarr/Taxon_types.htm)

3. [https://www.researchgate.net/publication/242492553\\_Importance\\_of\\_Myxomycetes\\_in\\_Biological\\_Research\\_and\\_Teaching](https://www.researchgate.net/publication/242492553_Importance_of_Myxomycetes_in_Biological_Research_and_Teaching)

4. <https://asm.org/Articles/2021/January/Three-Reasons-Fungi-Are-Not-Plants>

### Board of Directors for 2024

At the Annual General Meeting in February, the following directors were elected by acclamation:

- President: David Innes
- Vice President: Lynn Gray
- Secretary: Eloise Holland
- Treasurer: Brian Storey
- BC Nature Representative: Royann Petrell
- Wetlands Restoration: Karen Cummins
- Director at Large: Jim Boulter
- Director at Large: David Orford

At its March meeting the Board created a new director position to formalize the role of CVN's representative to the Comox Valley Conservation Partnership. Kathie Woodley was appointed to the position of **CVCP Representative**.

Many thanks to both the continuing and new board members for their service to the Society!



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### Long-form Articles on Website

Sometimes the newsletter receives articles that might be longer than the ones we usually publish, or they're received long before we publish again. So, more than a year ago, we started publishing some longer articles on our website, each announced by a short blog post. If you weren't aware of these, be sure to check them out. To find them, click the Articles category in the sidebar of any page on the site. Highly recommended.

## CVN and CSEB Webinars in 2023

By David Innes

Comox Valley Nature continued with a successful webinar program during 2023. Again we thank Loys Maingon for organizing webinars through the Canadian Society of Environmental Biologists (CSEB). In addition, John Neilson played an important role in contacting potential webinar speakers and arranging for promotional material. Webinars were recorded and can be accessed through either the CSEB website (<https://cseb-scbe.org/resources/cseb-webinar-archives/>) or CVN website posts (<http://comoxvalleynaturalist.bc.ca/category/guest-speakers/>).



The first webinar in **January** was by Loys Maingon with a presentation on *Conservation Implications of Clearcutting around Strathcona Provincial Park*. BC's forests have been so intensively and unsustainably clear cut over the past five decades that even the premier has publicly acknowledged that they are "exhausted." Strathcona, BC's oldest and biggest provincial park, now stands as a virtual ecological island in a sea of clearcuts. This has important economic and ecological implications for the region and for the management of the park. The government's stated commitment to "30% by 2030" presents a unique opportunity to complete the 12%

advocated for in the 1989 Larkin report, and add a further 18% to the park, if only to meet our obligations to future generations.



Two webinar presentations were given in **February**. Stefanie Lane gave a presentation on *High marsh plant communities and response to Canada goose grazing in Salish Sea estuaries*. Land managers may assume that the absence of human disturbance will preserve ecological quality, and that nature will “take care of itself” to recover to a “pristine” state after disturbance. Stefanie discussed trends of biodiversity loss in an unmanaged Wildlife Management Area in the Fraser River Estuary, and significant increase in exotic species following goose grazing on Vancouver Island. Stefanie is currently working with Project Watershed to understand vegetation and seed bank resilience following goose herbivory in small estuaries on Vancouver Island.



The second February presentation, *What is the Rights of Nature Movement and How Might We Engage It*, was based on the Rights of Nature (RoN) global movement

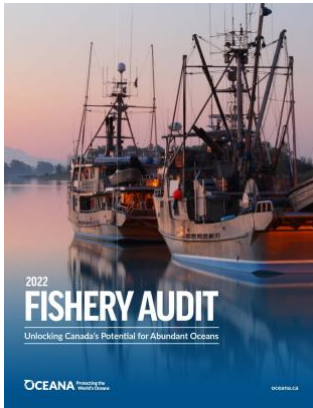
that recognizes nature as a subject with inherent rights to exist, regenerate vital cycles, and be restored when damaged. Kai Sanburn and Dr. Robin Reid (Department of Ecosystem Science and Sustainability at Colorado State University) described the history of RoN, the initiatives in progress today, and then focused on the efforts to recognize the rights of the Salish Sea in both Canada and the US. With deep roots in indigenous worldviews, world religions and human rights, RoN is now law in over 140 Indigenous nations, national and state constitutions and local communities around the world. For further information see: <https://legalrightsforthesalishsea.org/>.

The CVN AGM also occurred online in February with short presentations of group reports by Birders (Kelly Kline), Botany (Jocie Brooks), Wetlands (Karen Cummins), Tree of the Year (Karen Cummins), Airpark Restoration (Frank Hovenden), and Vanier Garry Oaks project (Jim Boulter). These reports show how active our groups are and provide information for CVN members to become more involved in these activities.

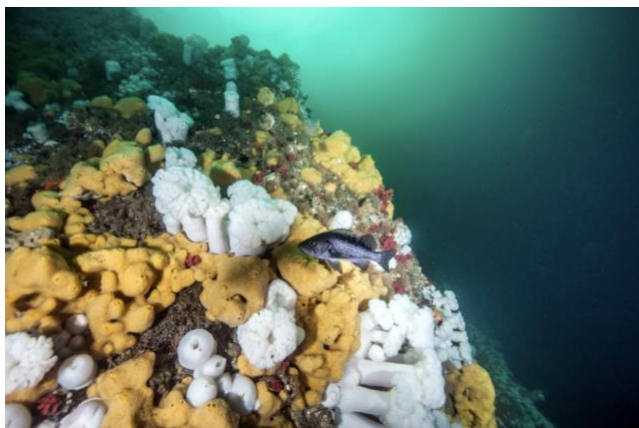


Two webinars were also presented in **March**. Donovan Jacobsen is a manager for Transport Canada in the area of Environmental Policy and gave an *Update on the National Strategy to address Canada's wrecked and abandoned vessels*. The Government of Canada recognizes that wrecked and abandoned vessels can pose hazards to the environment, public health and safety, and local economies such as fishing and tourism industries. Most owners are responsible and maintain and dispose of their vessels properly. However, the small percentage that are not responsible can create significant impacts on our coastal communities, with the burden for costly clean-up often falling on Canadian taxpayers. The Government of Canada launched the Oceans Protection Plan, to improve marine safety and responsible shipping, protect Canada's marine environment and help advance

Indigenous reconciliation. A key element of the Oceans Protection Plan was the commitment to develop a National Strategy to address Canada’s wrecked and abandoned vessels. This comprehensive strategy focused on prevention and removal of problem vessels. The webinar outlined the strategy and provided an update on progress, as well as information on ways the public can report vessels to responsible authorities. For more information see <https://www.canada.ca/en/transport-canada/news/2018/05/national-strategy-to-address-canadas-wrecked-and-abandoned-vessels0.html>.



In the second March webinar, Rebecca Schijns of Oceana Canada (<https://oceana.ca/en/>) gave an update on *The State of Canada’s Fisheries: Fishery Audit 2022*. Oceana Canada’s annual Fishery Audit reports on the state of fish stocks and tracks progress on how well the government is meeting its policy and management commitments. This year’s audit reveals that Canada’s fisheries are continuing to decline despite significant commitments, investments, new policies and updated laws from the federal government in efforts to rebuild them.



Two webinars were hosted in **April** by CSEB and CVN. Isabelle Jubinville (Oceana Canada) summarized *Canada’s Approach to Achieving Marine Protected Area Targets*. The past year has seen Canada reaffirm commitments to protect 25% of our oceans by 2025 (and 30% by 2030) and showcase national marine conservation efforts on the world stage. With new perspectives and standards for marine protected areas and ‘what counts’ towards these targets, it raises the question—are we meeting our commitments? Progress has been made recently but less than 15 per cent of Canada’s ocean territory is protected. More progress is needed so that we have healthy oceans for the future.



Globally, amphibians are declining at an alarming rate, yet few are listed. Mark Thompson (Ecologist with EcoLogic Consultants Ltd. and Adjunct Professor with the University of Northern British Columbia) provided an overview of *Amphibian Populations in the Old-Growth Microclimates of British Columbia*. North America has lost over 85% of its wetlands, and agriculture and secondary growth conversion is extensive. However, only two species are officially extinct. Mark’s research addresses questions such as: “Are microclimates saving amphibians?” and “Are

remnant patches of old-growth sufficient for their continued survival?”



Webinars resumed after the summer break with Loys Maingon organizing two for **September**. Mateo Jaekel gave a presentation on *Climate Change and its Potential Impact on Insectivorous Bird Populations of Strathcona Provincial Park*. Mateo discussed how different aspects and trends of climate change may be impacting insectivorous bird populations that rely on productive fens found throughout Paradise Meadows in Strathcona Provincial Park. Using citizen science data from iNaturalist as well as on-site observations, the presentation assessed whether shifts in precipitation and hydric conditions could affect the ecology of the park. Mateo was the Programme Coordinator at Strathcona Wilderness Institute from 2020 to 2023, and in 2023 was a Research Student at SWI. He has a Bachelor of Environmental Studies degree from McGill University.



Tal Engel gave a presentation: *On Transforming Tree-Farms into Forests*. The talk presented an integrative and regenerative forestry approach to facilitating fire-resilience, moisture-retention, and overall ecological integrity in degraded forest ecosystems. This holistic restoration regime uses novel ecological thinning approaches, the reintroduction and establishment of keystone native biological agents, and the creation of

ecological replicated structures to promote and accelerate the development of resilient old-growth conditions. Tal lives in the Merville area where he practices ecoforestry and manages an organic (ecologically-oriented) apiary and farm. He also works with the Maxwell Creek Restoration project on Salt Spring Island developing experimental forest restoration methods. More information can be found at <https://www.raincoast.org/2023/03/maxwell-creek-watershed-project-field-files-part-5-experimental-forest-restoration-methodologies/>.

For the **October** webinar, Erik Piikkila gave a presentation: *21st-Century Forest Solutions: How Can We Slow Down or Stop: Heat Domes, Droughts, Forest Fires, & Flooding?* Erik suggested that we are not “seeing the forest for the trees.” We don’t seem to be able to see the cause and effect or cumulative effects of forestry and forest policies. But we see their impacts and results: droughts, wildfires, floods, heat domes, species losses. With an ecosystem-first focus, repurposed forestry systems and techniques can be used to restore ecosystem functioning, health, and resiliency. For over 30 years, Erik has worked or been trained in forests in BC, Washington, Oregon, California, and Finland. He has performed nearly every woods job by measuring/counting trees, laying out cutblocks/roads, and logging. He has also monitored forest companies’ harvesting and silviculture operations, permits, and data. Recently, he has been involved with forest/watershed ENGOS, and providing natural history and forest ecology walks to students, citizens, scientists, foresters, and government officials. Now he is working with First Nations to thin forests with multiple ecological objectives and benefits.



A summary of the *Key Biodiversity Areas and Protected Areas: B.C. Nature Projects in 2023* was the topic of the **November** webinar given by Liam Ragan and Kephra

Beckett. BC Nature is the provincial lead for the Municipal Protected Areas Project and Key Biodiversity Areas. Liam and Kephra discussed the ongoing work to understand and protect biodiversity throughout BC. They focussed on the Comox area, outlining the way they work to collaborate with First Nations at every stage of the process, and how local nature clubs can play a pivotal role in conservation success. Liam is BC Nature's Provincial Coordinator for Key Biodiversity Areas and Important Bird and Biodiversity Areas. Kephra is BC Nature's Conservation Coordinator.

The final 2023 webinar in **December** continued the theme of climate change with *Beyond Climate Change: the nuts and bolts of adaptation at the local scale* by Ruth Waldick. Climate change has become the primary explanation for ongoing environmental disasters. But is this the whole story? Dr. Waldick asks the questions "What creates vulnerability to climate change?" and "What can be done locally to reduce vulnerability?" She conducts her research on a model watershed on Salt Spring Island that is a microcosm of the larger challenge of adaptation. Ruth is an ecologist and population biologist who has worked at several universities and with the Government of Canada. She sits as a Director with Transition Salt Spring and the Institute for Multidisciplinary Ecological Research in the Salish Sea. She is a fan of collaboration, which has created the CARL experimental watershed study area on Salt Spring Island. More information can be found at <https://www.raincoast.org/tag/climate-adaptation-research-lab/>.

We look forward to more presentations for 2024 with a combination of webinars, hybrid and in-person meetings. Recordings of most webinars can be found using the links as noted at the beginning of this article. Many thanks to all the presenters and organizers for an interesting and informative series of webinars.



## New Email Addresses

You may have noticed some new email addresses for Society functions. We now have a Google for Nonprofits account using our alternate domain name [cvnature.ca](https://cvnature.ca), under which we can define Gmail accounts for each of our roles. These are administered by the organization, rather than the former ad hoc situation in which accounts were privately created by individuals with little consistency in naming, and no access if the person was unavailable. We are transitioning to this new system over time, with the goal of having all board and volunteer roles adopt the new system.

In particular, note that the general public email for the Society is now [info@cvnature.ca](mailto:info@cvnature.ca).

Please take note of the new addresses so far and update your address books accordingly.

## Seal or Sea Lion?

*Text and photos by Véronique McIntyre*

Walking along the beach at Deep Bay, one can't miss the incessant barking that comes from the boom across from the research centre. And every so often a head pops up in the water, very close to onlookers as the water is so deep that marine mammals easily swim there. Who are they? Let's just ask them.

*Hi. I am a harbour seal, Phoca vitulina. See my beautiful, mottled fur? That's the first hint:*



*And I am a California sea lion, Zalophus californianus. None of that fancy mottling for me. I am plain brown, good enough:*





See how smooth our foreheads are? We almost look like dogs. That's another hint that I am a seal:



None of that cute puppy look for us sea lions. We are tough and we show it; bumps at the top of our heads are the proof. Some say we are constantly wearing a bowler hat:



However, our females don't have that bump. To tell you the truth, our protruding foreheads are simply due to a ridge of bone running lengthwise along the midline of the top of our skull. This ridge is called a sagittal crest. Our extremely strong jaw muscles attach to that bone. You find such a crest in mammals and reptiles that bite and clench their teeth when they hunt.<sup>1</sup> Look, I have drawn here the contour of my skull in yellow. The ridge has diagonal lines:



And here is my little harbour seal skull. No ridge to outline for me:



Little is right. Generally, seals are smaller than us sea lions. I am sure you know that we both have flippers, both front and back, instead of arms and legs. We belong to the Pinnipeds family, which is Latin for fin footed. But if you see a fin, it's likely to be from one of us sea lions. Seals' fins are ridiculously small, and they need to really turn over on their flank to show them. Not us:



Besides the size, you can tell it's a sea lion fore flipper and not a seal's because you don't see any fur on it, just skin. Also note the absence of claws which seals have. Just in case you wonder, we have the same bones as you have in your arm, except that they are shorter as an adaptation to swimming. We make up for that with cartilage extensions at the tip of our finger bones. We use our fore flippers to swim, whereas seals use their back flippers for that purpose. We stretch our flippers out to the sides and bring them down forcefully, twisting them to push the water backwards. We then tuck them against our body, forming a torpedo shape that glides easily through the water where we can roll or twist if we need to.<sup>2</sup> This is very similar to the movements of a human breaststroke swimmer except that they bring their arms to the front, not along their bodies at the end of a stroke. For long distances we swim like porpoises, closer to a butterfly stroke.<sup>3</sup>

We seals don't swim long distances. We like it at home. No silly migration for us. And that's right, we move our hind flippers side to side to swim, like fish do. Fanned out that's quite a surface and we can move a good volume

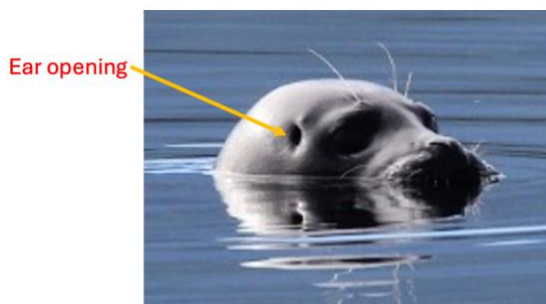
of water that way. Here you can see our nails (the little white things at the tip of the indentations which are each a finger). A sea lion's hind flipper only has nails on the middle 3 digits, not 5 like us seals. Of course, like all mammals we both do have a tail, albeit short, tucked between our hind flippers. So please, don't call our hind flippers a tail! We are not whales...



And our way of swimming is another hint as to whom you are seeing; because sea lions are such powerful swimmers, they lift up the top of their body out of the water when they glide. Not us, so we seem to simply drift in the water, no powerful wake behind us:



Of course, I am sure you've been told to look for visible external ears to know if we are seals like me or sea lions. That's what scientists use to place us either in the eared seal family (Otariidae)—the sea lions—or in the true seals (Phocidae).<sup>4</sup> No problem for the scientists—they defined us on dead samples. But for you humans, easier said than done! When far away, or in low grey wintery light, you can't tell. Still, in good light the difference is obvious. Here I am, like all good seals I have no external ear. Which does not mean I have no hearing! All mammals do. It's just that my ears directly open to the outside, no pavilion to capture the sound and channel it into the ear canal.



And you know what? I don't need external ears! I live mostly in the water, where sound conduction is much better than on land. Yes, you can see me on the rocks at point Holmes or Seal Bay, but notice that we tend to each lie on our own rock and don't touch each other. Therefore, we don't often need to send warnings and threats. So you don't hear us much, a couple grunts here and there, and we don't need outstanding hearing when out of water.

As for me, I spend more time on land with all my sea lion buddies, in a big mass of intertwined bodies. Conflict is unavoidable—that's why you hear us loudly bark so much. And we use our external ears to sort out all those calls.



When I turn my flaps downward the water does not go into my ear (it's very convenient). Don't you wish you had those too? Well, they come from millions of years of evolution. The oldest fossils of our ancestors date from 23 to 30 million years ago, from the North Pacific. At that time the ocean cooled and became richer in nutrients, hence in fish etc.<sup>3</sup> We derive from either ursids (bears) or musteloids (weasels). Eared seals (Otariidae) diverged from true seals (Phocidae) 19 to 14 million years ago.<sup>5</sup> *Enaliarctos*, a genus that includes five known species, is probably the group from which all us pinnipeds descended. Like us, all their limbs were flippers, but unlike us they likely swam using both their front and back flippers.<sup>3</sup>

So here we go, now you should be able to tell us apart from far and wide or from close by.

1. [https://en.wikipedia.org/wiki/Sagittal\\_crest](https://en.wikipedia.org/wiki/Sagittal_crest)
2. <https://www.smithsonianmag.com/science-nature/how-do-sea-lions-swim-180963847/>
3. <https://ocean.si.edu/ocean-life/marine-mammals/seals-sea-lions-and-walruses>
4. <https://en.wikipedia.org/wiki/Pinniped>
5. Annalisa Berta et al. 2018. The origin and evolutionary biology of pinnipeds: seals, sea lions and walruses. *Annual Review of Earth and Planetary Sciences* 46:203–228. <https://doi.org/10.1146/annurev-earth-082517-010009>

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## Wetlands Restoration at Little River

By Karen Cummins

Our stewardship activities at Little River Nature Park will resume in early April.

We always begin the season with a walk through the entire park to observe changes over the winter, what and where new growth is beginning and to discuss our general plans for the season.



May 2023 at Little River: Last of the purple lamium.  
*Photo: Angela Dawson*

Our target invasive species for the season will likely remain the same: curled dock, Himalayan blackberry, Dalmatian toadflax, purple lamium, reed canary grass and tansy. We expect, however, that the density and occurrence of most of these species will be less this coming season as that has been the trend for the last 4 years.



June 2023 at Little River: Last of the curled dock.  
*Photo: Véronique McIntyre*

What draws us back season after season? As naturalists, most of us enjoy our time in nature, appreciating its beauty and many benefits. Active stewardship on our common lands, though, gives us a new perspective and awareness of our place in nature and a sense of reciprocity or giving back to nature. Come join us sometime for an hour or two. We guarantee satisfying exercise, interesting conversation, and a warm welcome. Email [toty@cvnature.ca](mailto:toty@cvnature.ca) if you have questions or would like to be put on our email list.



July 2023 at Little River: Displaying a toadflax rhizome.  
*Photo: Véronique McIntyre*

**Airpark Restoration: 2023 Report**

Frank Hovenden’s Airpark restoration team was as busy as ever in 2023. Read Frank’s annual report on CVN’s website: <https://comoxvalleynaturalist.bc.ca/wp-content/uploads/2023/12/Airpark-Report-2023-compressed.pdf>.



**Airpark camas plot #1: Blooming camas with Garry oak in background (2018).** *Photo: Frank Hovenden*



**Shirley with her nominated tree.** *Photo: Véronique McIntyre*

We ask for estimates of tree height and circumference of the trunk. However, our tree checker team is armed with a clinometer and measuring tapes and will also measure your tree. Finding the nominated trees is like a treasure hunt for us!

**Trees of the Year 2024 Event**

*By Karen Cummins*



**Nominee #7: Douglas-fir, looking up** *Photo: Shirley Coulson*

Do you know of a tree that deserves recognition? Nominate that tree by March 31.

There is an easy nomination form on the CVN website. The most important question for you to answer is why you think the tree deserves recognition. We also need clear directions to the tree.



**Measuring circumference of a nominee.** *Photo: Véronique McIntyre*

By April 15 we will have the full list of trees that have been nominated for 2024 on the website along with route maps to help you get out and see some great trees. We will also lead some walking tours of the nominated trees by the end of April. Watch for those walks on the Events tab on the CVN website.

Questions? Email [toty@cvnature.ca](mailto:toty@cvnature.ca).

# Nature Viewing Guide Brochure

## The Update and Reprinting Project

By Karen Cummins



Over the winter and spring of 2023 twelve CVN members visited the 20 sites to be included in the 2023 edition of the CVN Nature Viewing Guide brochure, checked the information given in the previous version and researched or made observations about the current site status.

Isabella E. collated all the correct site information so this could be sent to Kathryn Hardy who gave us more instructions for editing the information and proceeded with all the graphic work changes over the summer and fall. Kathie, David O., Isabella, and Karen helped review the final draft.

The Nature Viewing Guide 2023 updates were completed in December and the 4,000 new brochures have now been printed by ABC Printing.

The overall look of this edition is very similar to the 2018 version with some exceptions:

- The cover top and bottom text bars are blue instead of green.
- All the information was confirmed and corrected where necessary.
- Some new photos from Terry Thormin were added.
- The new brochure is a larger sheet so that there are five panels across instead of four, so we were able to

add three new viewing sites: Bear Creek Park, Nymph Falls Park, and Rosewall Provincial Park.

- One of the new panels has a brief history of CVN.
- There is a land acknowledgement to KFN.

ABC Printing let us know that our setup cost for the re-printing was very minimal (\$15) because Kathryn's final proof copy was so well done. Thank you, Kathryn, for all your hard work!

The Vancouver Island Tourist Bureau, Comox Valley, has already been given some of the new brochures, Linda C. fills a brochure holder at the Airpark from April through October, MARS Visitor Center will stock the brochures, and many will be shared with the community from the CVN Education and Outreach events.

### Work inspired by updating the printed Nature Viewing Guide

When we let CVN members know that we planned to update and reprint the guide and needed help to do so, members did step up to help with that work. However, most amazing was how two members in particular saw particular value in this brochure and the more extensive and detailed nature viewing site information on our website.

Bruce Moffat, from the CVN photography group, told us this info "is a real naturalist jewel" for the valley and he wanted to offer his support to update the online resource with the addition of spherical panoramic photos to all the 44 sites. He enlisted the help of the CVN group but also the Comox Valley Photography Club which has an active drone group. These photos, added to the website with the efforts of our webmaster, David O. is a wonderful and completely unexpected bonus for CVN and anyone who visits the site. It was also apparently a very satisfying experience for the photographers.

Similarly, Veronique M., an avid birder and botany group member, not only helped gather info for the brochure update by visiting 6 sites on her own. She also undertook hours of work to update the Botany group's plant lists for 20 of the online nature viewing sites so that the taxonomic plant names there were up to date. [Editor's note: These website updates are still in progress.]

I worked on the new CVN History panel for the brochure. This involved discussions with other CVN members, most of whom have had a long association with the activities of the society themselves. In one case their parents were both founding members. To write all the history of a society that is 55 years old would fill

books, so I focused on the three iterations of nature guides that were undertaken by many CVN members over fifty years. Helen Robinson kindly lent me the two oldest printed versions to study. Krista Kaptein, who coordinated the 2011 edition and spearheaded the online nature viewing guide, generously answered many questions. The conclusion I reached is in our brochure history panel and quoted from the 1997 guidebook: “We hope that this book will be of interest and use to residents, newcomers and visitors: that it will deepen your knowledge and enjoyment of the diversity and beauty around us.” The form and content of this nature viewing guide may have changed over the years, but the motivation for it has remained the same.

We would like to acknowledge the generous support given to us by our grant funders: the Comox Valley Community Foundation for the Environment Grant of \$1900 and the Comox Valley Regional District for the Rural Community Grant of \$1900. These grants made the updating and reprinting of the Nature Viewing Guide possible.



### Public Walks Resume with Online Sign-up

A CVN committee has been working hard to restart the regular public walks which have been suspended since the start of the pandemic restrictions. The committee hopes to offer these once per month. Since the number of participants will be capped, the public walks are not intended for CVN members, but rather as an outreach activity for non-members. An online registration system has been implemented—see the Events page on the website, linked from the main menu, where you will find the first few walks.

In addition, some walks for CVN members only may be offered. These will be general nature walks or on topics not covered by our main interest groups. These will also use the Events registration system.

## Book Review

*Review and commentary by Tony de Castro*

### ***The Emergent Agriculture: Farming, Sustainability and the Return of the Local Economy***

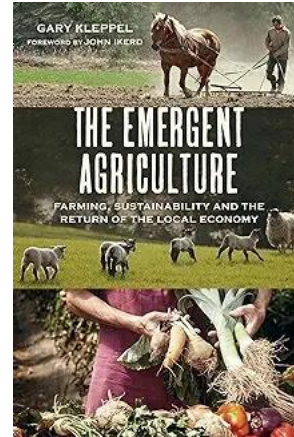
by

**Gary S. Kleppel**

New Society Publishers, 2014, 192 pages, paperback

ISBN-10: 0865717737

ISBN-13: 978-0865717732



Even though 10 years have gone by since this book was published, the issues described in it are still relevant, as our society keeps making the same mistakes again and again.

The author argues that industrial-scale agriculture is no longer viable or ethical. He proposes a sustainable, locally based agricultural alternative that meets the needs of communities and provides food autonomy while supporting local economies.

Modern industrial agriculture is increasingly dominated by large, for-profit conglomerates that are mostly interested in the quarterly value of their shares and their yearly profit margins. The long-term sustainability of their practices and the ethical treatment of farm animals are not their first priority. In this they are aided by agrochemical and biotechnology corporations, which provide pesticides and genetically modified crops that try to make farming a controlled industrial process that is not viable without constant inputs of fertilizers, hormones, pesticides and fuel.

This process pollutes the air, soil and water. It also reduces biodiversity by concentrating on monocultures, discourages the saving of seeds, and makes it much harder for organic farmers to maintain their lands free of pollutants. This dominant paradigm produces high volumes of food that is relatively cheap, standardized in

terms of taste and appearance, and with a long shelf life to allow transportation to far-away markets.

Gary Kleppel argues that the industrial method of food production is incompatible with the realities of nature, science and ethics. *The Emergent Agriculture* is a collection of fourteen essays in which he makes the case for a sustainable, locally based food system with these characteristics:

- Stable in the face of economic uncertainty
- Resilient in the face of environmental variability
- Grounded in stewardship of the land, on attaching value to food and the craft involved in producing it, and on respecting the dignity of farmers, consumers and livestock

Kleppel makes a good case for supporting agricultural systems that are community-based, appropriately scaled to local needs and resources, nutritionally rich, and ethically based.

It would appear that this model could easily be applied in the Comox Valley. There is, in fact, already a significant number of farmers practicing this type of farming in our area. What perhaps remains to be done is scaling this process up so that more of the food consumed in the valley is locally produced.

Some questions we need to keep asking:

- Is there enough farmland to feed the population of the valley? Is the land affordable?
- Are the local municipalities providing enough incentives to support local food independence?
- Is the income from local farming high enough to attract and retain young farmers?
- What is happening to local family farms as older farmers retire?

Without clear planning around the protection of local agricultural land, a reliable and significant customer base willing to pay to buy local food, and a younger generation interested in farming, food independence becomes so much harder to achieve.

Interestingly, while adopting a local organic food production approach takes a lot of work, abandoning it is really easy. The following issue is not covered in Gary Kleppel's book: The country of Cuba is considered one of the world leaders in organic farming. Famous for its sugar cane monoculture in the 1960s and 70s, the country had to adapt in a hurry in the 90s when the Soviet Union broke apart. Without the cheap oil and fertilizer supplied by the Soviets, Cubans had to feed themselves through a massive organic farming initiative.

Over 40,000 people got involved, and organic farming was accepted as a "normal" way of growing food. Later, as the economy improved a bit, the old monoculture mindset started to return in some areas. When the economy got worse again, organic farming returned. Throughout these phases, as in other countries, younger Cubans often did not see farming as an important occupation and there was little money to be made growing food.

This reminds us that food independence and organic farming practices rely on more than just farming techniques. The cultural value of farming and how much support it gets from the average citizen of a particular area are just as important.

Tony notes that this book has the following ratings at the indicated websites:

- 3.8 stars out of 5 at <https://www.goodreads.com>
- 4.6 stars out of 5 at [amazon.com](https://www.amazon.com)

The CVN website has previously published two longer reviews by Tony of books with related themes. You can find them here: <https://comoxvalleynaturalist.bc.ca/category/book-reviews/>.

## Upcoming CVNS Activities

### General Instructions for Field Trips

- All field trips are club events and reserved for members only unless otherwise stated. Typically, one walk each month is open to the public.
- Meet either at the carpooling location or the trailhead 10 minutes before the specified time unless otherwise announced. The carpooling location is usually the Driftwood Mall (Canadian Tire) parking lot, near Cliffe Avenue close to Boston Pizza. For trips going north, it is the Courtenay Country Market on Hwy 19A about 2 km north of Veteran's Memorial Parkway.
- Participants are responsible for their own safety.
- Walks typically take at least 2 hours.
- Wear clothing and footwear suitable for the conditions.
- Bring water and a snack (or lunch for longer trips).
- No dogs please.

## Schedule

For general club activities, watch for the latest information and additional details in the Board's periodic email announcements and on the website.

To be notified of the activities of a particular interest group, contact the Group Leader and ask to be added to the group's contact list.

## Reminder for Field Trip Leaders

All field trip participants who are not CVNS members must sign our *Assumption of Risk, Release of Liability and Waiver of Claims* agreement, and those who are not members of BC Nature must also pay the day membership fee before participating.

## About the Society

### Website

<https://comoxvalleynaturalist.bc.ca/>

### General Email Address

[info@cvnature.ca](mailto:info@cvnature.ca)

### Mailing Address

Comox Valley Naturalists Society  
Box 3222  
Courtenay BC, V9N 5N4

### Board of Directors

President: David Innes ([president@cvnature.ca](mailto:president@cvnature.ca))  
Vice-President: Lynn Gray ([vp@cvnature.ca](mailto:vp@cvnature.ca))  
Secretary: Eloise Holland ([secretary@cvnature.ca](mailto:secretary@cvnature.ca))  
Treasurer: Brian Storey ([treasurer@cvnature.ca](mailto:treasurer@cvnature.ca))  
BC Nature Representative: Royann Petrell  
Wetlands Restoration Director: Karen Cummins  
CVCP Representative: Kathie Woodley  
Directors-at-Large: Jim Boulter, David Orford

### Group Leaders and Other Volunteers

Membership Secretary: Aileen Williams  
([cvnsmembership@gmail.com](mailto:cvnsmembership@gmail.com))  
Bookkeeper: Isabella Erni ([accounts@cvnature.ca](mailto:accounts@cvnature.ca))  
Birding: Kelly Kline ([cvnbirds@gmail.com](mailto:cvnbirds@gmail.com))  
Botany/Mycology: Véronique McIntyre and Karen Cummins ([botany@cvnature.ca](mailto:botany@cvnature.ca))  
Shoreline: Yvette Crane and Mary Mitchell  
([shoreline@cvnature.ca](mailto:shoreline@cvnature.ca))  
Photography: Bruce Moffat ([moffat.images@gmail.com](mailto:moffat.images@gmail.com))  
Conservation: Loys Maingon

Vanier Forest Garry Oaks Project: Jim Boulter  
([vanier@cvnature.ca](mailto:vanier@cvnature.ca))

Airpark Restoration: Frank Hovenden  
Environmental Heritage and Culture: Gordon Olsen  
Swan Count: Ernie Stefanik, Krista Kaptein  
([ernie.stefanik@gmail.com](mailto:ernie.stefanik@gmail.com))

Comox Valley Conservation Partners liaison: Kathie Woodley

Speakers Planning: David Innes  
Bursary Committee: Barbara Neilson  
([cvnbursary@gmail.com](mailto:cvnbursary@gmail.com))

Trees of the Year Committee: Karen Cummins  
([toty@cvnature.ca](mailto:toty@cvnature.ca))

Education and Outreach Committee: Karen Cummins  
Website: David Orford ([web\\_admin@cvnature.ca](mailto:web_admin@cvnature.ca))

Facebook: Eloise Holland ([socialmedia@cvnature.ca](mailto:socialmedia@cvnature.ca))

Instagram: Eloise Holland ([socialmedia@cvnature.ca](mailto:socialmedia@cvnature.ca))

Newsletter Advertising: Kathie Woodley

Newsletter Editor: David Orford  
([newsletter@cvnature.ca](mailto:newsletter@cvnature.ca))

### Constitution and Bylaws

Available in PDF form on this web page:  
<http://comoxvalleynaturalist.bc.ca/about-us/>

### Membership

Includes membership in BC Nature.

Membership form (including the Informed Consent and Assumption of Risk Agreement) is available at meetings and on the website. This must be completed each year.

Fee: \$30 per year per household (1 or 2 adults plus children 18 and under)

Discount of \$16 if you are already a paid-up member of BC Nature (either directly or through another club).

An optional additional fee of \$5 is payable if you wish to receive printed copies of *BC Nature* magazine (otherwise available online).

Pay at general meetings, on the website, or mail a cheque payable to Comox Valley Nature to:  
CVNS Membership Secretary

Box 3222  
Courtenay BC, V9N 5N4

Membership runs for the calendar year and is considered lapsed if not renewed by January 31. Lapsed members are removed from the CVNS and BC Nature membership lists.

**Change of address, phone number or email:** Please advise the Membership Secretary.



## Meeting and Field Trip Schedules

Post-pandemic, the schedules for in-person meetings are still variable. Watch for email announcements.

**General meetings** are held at a place and time to be determined.

**June meeting:** Picnic at a designated location.

**No general meeting in July, August, or December.**

**Guest speakers:** Typically, one talk per month, either at an in-person general meeting or as an online webinar. Details announced in the periodic email notices to members.

**Birding Group:** Birding walks are held weekly, most on Thursday mornings, and once per month on a Sunday. For information or to be included on the Birding Group list, send email to [cvnbirds@gmail.com](mailto:cvnbirds@gmail.com).

**Botany/Mycology Group:** Typically meets for one walk per month, with occasional additional outings. An email is sent prior to the meeting to confirm location, time and topic. To be included on the Botany Group list, send email to [botany@cvnature.ca](mailto:botany@cvnature.ca).

**Shoreline Group:** Aims to have several field trips and/or guest speakers per year, with details communicated by email. To be included on the Shoreline Group list, send email to [shoreline@cvnature.ca](mailto:shoreline@cvnature.ca).

## Newsletter

The newsletter is published 3 times per year (March, June, and November). The full-colour version is available on the website in PDF form, and a link is emailed to all members on the general email list.

The newsletter depends on your contributions. Please consider contributing an **article** or **note** on any topic of interest to other members such as natural history, conservation activities, trips, unusual sightings, or a book review. **Photos** are also appreciated, either with a story or stand-alone. You can send your contribution by email to [newsletter@cvnature.ca](mailto:newsletter@cvnature.ca).

We would appreciate receiving articles by the first day of the publication month. All articles are subject to editing.

## NatureKids

CVNS has a cooperative relationship with NatureKids Comox Valley, a separate nature club for children which is part of the NatureKids BC organization. For more information, see <https://www.naturekidsbc.ca/>.

## From our online Nature Viewing Guide

