LINC
Lasqueti Island Nature Conservancy

linking people to nature on Lasqueti and surrounding islands

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Climate Change – What can Lasquetians do about it?

by Sheila Harrington and Wendy Schneible, with contributions by Doug Hopwood

The climate and typical weather patterns are changing rapidly around the world. Here in BC and most of Canada we had record snows and cold temperatures this February, yet last summer the Province called a state of emergency for the second year in a row over fires and poor air quality. BC's forests used to be a carbon sink, meaning that our amazing plants captured some of the carbon we are emitting, creating biomass and bigger trees with it. Now those forests may be emitting more carbon than they store, due to these fires. On the other hand, on the Arctic archipelago of Novaya Zemla, polar bears are moving off the melting ice flows to find food, into towns and encountering people as they go.

350 yr. old growth at Salish View

In October, the United Nations Intergovernmental Panel on Climate Change released their latest of many reports, nicknamed "The Doomsday Report". We doubt anyone could read it and not feel discouraged and depressed. It compares the impacts of the original target of reducing climate warming to 2 degree C with a new target of 1.5 degrees C. The report's scientists warn that we have 10-12 years to make the urgent changes needed to reduce the risk of extreme heat, drought, floods and poverty.

Scientists have been trying to raise the alarm since the mid 1980's, but "alarmism" has been a rejection mantra for scientists, governments and naysayers. The planet is heating up, yet we seem to be doing so little about it. Many people find it hard to even listen to the news, or to know what to do. We can pretend it isn't happening, become cynical, or try hard to deny it. But with this report, and the call of 16-year old Greta Thunberg, the Swedish girl who is leading school-aged kids to protest on Fridays outside their schools and in front of government offices, the solutions are here. **In her words, "we need to focus on what needs to be done rather than what is politically possible."**

So, what can one human, or a small community, do to help reduce this rate of warming? On an ***individual level,*** we can decrease our carbon footprint by learning to celebrate abundance with our "Less is More" lifestyle: travel less, buy less, eat less imported food and less meat, use less, change our cars to electric. Many Lasquetians are innovators at these actions.

On a national and global scale, there are a variety of organizations which would benefit from our combined voices and actions.

On a community level, the most effective action we can take is to conserve forests, shorelines and eelgrass beds, and biological diversity.

Trees and forests store carbon

Trees and plants take carbon out of the atmosphere and store it at an incredible rate. As noted by both Ken Lertzman and Andrew Fall in past issues of this newsletter, they provide so many ecosystem services that we really ought to be creating new Odes to the Trees!

Scientists have calculated how much carbon forests sequester, and our coastal forests are the world's best. Forests not only store the largest fraction of terrestrial carbon (C) stocks, forest C storage is an important ecosystem service, sequestering C that

might otherwise exist in the atmosphere as carbon dioxide (CO_2) a potent greenhouse gas (GHG).[1] **In the Northern Hemisphere, forests are estimated to sequester nearly 10% of current global fossil fuel C emissions.**[2]

How much carbon is stored in a typical Lasqueti forest?[3]

Forests are made mostly out of air and water. Using the energy of sunlight, trees take in carbon-dioxide CO_2 from the atmosphere and water from the soil. These compounds are taken apart inside the leaves and converted to simple sugars, which are then converted to cellulose and other compounds that make up wood. As the trees grow, more and more carbon is sequestered in the trees, in decaying logs on the ground, and in organic matter in the soil.

On Lasqueti, one hectare of old growth forest on a productive site might contain about 900 tonnes of carbon, with 30-50% being in the soil. A stand of productive mature second-growth might average about 700 tonnes/ha. A young forest, or a forest of small trees on a rocky ridge, might have 150 to 400 tonnes/ha[4].

When forest land is permanently cleared, carbon is converted back to CO_2. This can happen quickly, by burning, or more slowly by decay, but eventually most of the stored carbon ends up in the atmosphere, contributing to climate change. Clearing one hectare of productive mature second growth on Lasqueti would produce about 2500 tonnes of CO_2, which is equivalent to burning more than a million litres of gasoline[5].

Lasqueti Island Nature Conservancy works to store carbon and adapt to climate change by protecting land. There are many available options including leaving your land as a bequest in your will or putting a conservation covenant on a part or all of it. With a NAPTEP covenant, held by the Islands Trust Conservancy, you could receive significant tax benefits, annually, while still living on and enjoying your land.

1 (Nabuurs et al., 2007) & (Goodale et al., 2002), &(IPCC 2007)

2 *Carbon Sequestration in British Columbia's Forests and Management Options* T. Andrew Black et al. University of Northern British Columbia Pacific Institute for Climate Solutions. Nov. 2008)

3 written by Doug Hopwood

4 Estimated based on Smithwick and others (2002) who found that forests in coastal Oregon stored, on average, 1127 tonnes C/ha, while stands in eastern Oregon stored 195 tonnes C/ha. Reference: Smithwick, E., and others. 2002. "Potential upper bounds of carbon stores in forests of the Pacific Northwest." *Ecological Applications 12*, 1303–1317

5 ***Here is the math:***

• One atom of carbon (atomic weight 12) combines with two atoms of oxygen (atomic weight 16) to make one molecule of CO2, with a molecular weight of 44 (12 + 16 +16), so one tonne of carbon produces 3.67 tonnes of CO2.

•700 tonnes/ha of carbon * 3.67 = 2,567 tonnes (2,566,667 kg) of CO2.

• One litre of gasoline yields 2.3 kg of CO2.

•2,566,667 kg of CO2 / 2.3.kg/litre of gasoline= 1,115,942 litres of gas.

Courtesy of Coastal Photography Studio

Eelgrass , Shorelines and Carbon

When it comes to Lasqueti's sheltered bays, it turns out they are home to a small, nondescript plant that's a powerhouse of carbon storage and biodiversity. *Zostera marina* is a flowering seagrass known as eelgrass. **Although this plant covers less than .2% of the world's oceans, it sequesters 12-20% of the worlds carbon.** Recent science seems to indicate that a hectare of eelgrass can sequester much more carbon than a hectare of mature forest.[6] How is this possible? The magic is in its root system, which somehow squirrels away the carbon in the oxygen-poor sediment, where it can remain for millennia if the plant is not disturbed or dies. The bad news is that a soccer field of seagrass is being lost every half hour to pollution, drought and development. The good news is Lasqueti's eelgrass beds are relatively healthy.

Carbon storage is only one of the functions of an eelgrass bed. They are among the world's richest and most productive habitats, attracting more than 70 species of fish. Many of these, like salmon, herring and rockfish, are species we like to eat, and others, like sand lance and perch, support the food chain. Then there are the 100 species of algae growing on the blades which the crabs snails and shrimp munch on, and the shorebirds who dine on them. Add in the herons and eagles hunting small fish at low tide, and this modest grass is hosting a hive of abundance.

Besides acting as a nursery bed, eelgrass also protects the shoreline from erosion by moderating the action of waves and currents and allowing sediments to settle. Too much sediment, though, can block its light and smother it.

6 James Fourqurean et al., "Seagrass Ecosystems as a Globally Significant Carbon Stock,"Florida International University and the National Science Foundation's (NSF) Florida Coastal Everglades Long-Term Ecological

How To Protect Eelgrass Beds & Shorelines

Find an eelgrass-free route to drag your kayak up and down the beach. Don't repeatedly use the same path when walking through the beds. Tie up to a mooring buoy rather than anchor in an eelgrass bed. Special mooring buoys are now available which will minimize eelgrass damage. Raise your propeller and slow down when passing over a bed.

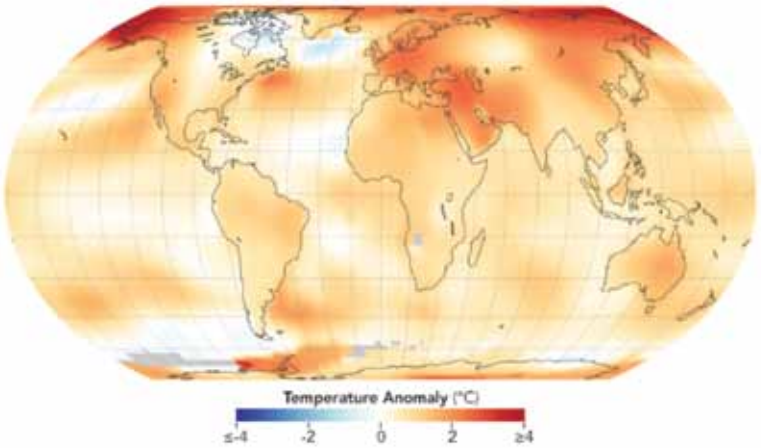
Residents living along the beach can plant trees, shrubs and grasses, especially native ones, to stabilize the shoreline. Avoid bulwarks or any blockage of the tides' natural flows. These generally result in more erosion rather than less. Use nature-friendly products and avoid excessive fertilizer. A stream can carry chemicals or sediment many kilometres from its source. Think about the impact your construction or land clearing project may have downstream.

Up and down the Salish Sea many groups are passionately and energetically working to restore native shoreline plants. SeaChange, a group based in the Saanich Peninsula, has done restoration projects in some of the mainland inlets and the lower Gulf Islands. Their next focus is Denman, Hornby and Lasqueti. LINC is working with them, using some of our forage fish data from the Lasqueti Island Forage Fish Team, gathering information and considering which areas might benefit most from restoration, or if simply monitoring and awareness might be the most effective. Many hands and legs are needed for monitoring, so there will be lots of chances for citizen scientists to help. Stay tuned!

Biological diversity and our Changing Climate

Canada's average air temperatures are warming at twice the global rate, and as a result shifting seasons and extreme temperatures caused by climate change are an emerging threat to wildlife. In Canada overall, a total of 451 species are in decline. Roughly half of all the mammals, birds, fish, reptiles and amphibians studied as part of the World Wildlife Fund Canada's Living Index, revealed a population decline by an average of 83 percent between 1970 and 2014.

Amphibians are at the top of the list of species threatened by pollution and climate change. They breathe through their skin, which is susceptible to pathogens and weakened immune systems. They breed according to temperature and moisture, so local changes can affect them. Let's welcome and be aware of the native frogs and snakes and newts as they waken this spring. Drive slowly and avoid amphibians as you go from the Dump Road to Pete's Lake and along Scotty Bay Road.



The map above depicts global temperature anomalies in 2018: it shows how much warmer or cooler each region of Earth was compared to a baseline average from 1951 to 1980. 2018 was the fourth warmest year since 1880
from NASA Earth Observatory

Coastal BC has a greater plant, animal and other species diversity than anywhere else in North America. "Of all the provinces, BC has the most biodiversity in Canada. The great abundance of life found in many of BC's marine areas rivals the biodiversity of tropical rain forests. Around 7,000 marine species have been identified in the region off the coast of BC, and at least as many unidentified species are believed to exist." (CRD)

Species loss is one of the prime results of human development and pollution. Some species will migrate to find new habitat in order to live. According to most climate scientists, they will move northward and upslope. However like the polar bears, their opportunity to move is dependent on their neighbouring territories. We live on a finite planet, and other species may simply become extinct due to loss of habitat and prey – such as the orca/salmon/herring crisis currently underway in the Salish Sea.

How Can We Protect Biological Diversity?

We can help minimize the loss of biodiversity by conserving forests and wetlands, protecting eelgrass beds, and restoring, rather than modifying or banking up the shorelines. Limit cutting of trees and forests, and consider developing already degraded land rather than clearing forested areas. Help reduce or eliminate invasive species. Non-native species often aggressively reduce and replace native plants and the birds, butterflies, and bees which depend on them, drastically

altering the landscape. Reduce or eliminate the use of chemicals, which are often directly toxic to plants and animals and contaminate food and water. Consider reducing hunting and fishing of native species, as we are now at a time when we really need to change our priorities to conserve species and biodiversity.

We can do something about climate change right here in our own community. Conservation and stewardship of natural lands is one of the quickest, simplest, and most cost-effective ways to slow down carbon input into the atmosphere. LINC UP!

LINC works with willing landowners to legally conserve forests, wetlands, special habitats and the natural processes they support. LINC's conservation work helps sequester living carbon by perpetually conserving the standing forests on the Mt. Trematon and Johnny Osland Nature Reserves and soon Salish View, through conservation covenants. LINC members are surveying and studying our surrounding marine ecosystem and raising awareness about the role of eelgrass in carbon sequestration and marine biodiversity. LINC is working to increase biodiversity in areas where species diversity has been simplified by past logging, farming and foraging by planting trees and shrubs and encouraging new vegetation through protective fencing.

Thank you for joining the Lasqueti Island Nature Conservancy to protect and restore nature on Lasqueti and surrounding islands.

Join us for our Annual General Meeting April 20, 2019. Become a member and support our work in any way you can.

See our website: www.lasqueti.ca/linc for all back issues of this newsletter and other information about our charity.

Keep informed and join the conversation https://www.facebook.com/LINCBC/

Contact us: linc@lasqueti.ca 250-333-8754 Donations to support our work are tax deductible

LINC, Lasqueti Island, BC V0R 2J0

Charity BN #84848 5595

photo courtesy Invasive Species Council of Bc MAL

Scotch Broom *Cystisus scoparius*

You have likely seen Scotch Broom as a sea of brilliant yellow flowers in sunny disturbed areas like roadsides, power lines and clearcuts. It is a perennial nitrogen-fixing shrub native to the Mediterranean areas of Europe, intentionally introduced to North America as an ornamental plant by European settlers and now listed as an invasive species in BC. It is extremely flammable and can create high fire hazard areas.

Nitrogen fixers are a class of plants that form symbiotic relationships with bacteria that convert nitrogen from the air into a form useable by plants. They are a key component of the early colonization of disturbed sites because they can easily establish on poor soils and then build up nutrient levels for the plant communities that follow. Farmers mimic this pattern when they include nitrogen-fixing peas and beans in their crop rotations. On the BC coast, Red Alder is the main native nitrogen fixer. Some research suggests that Scotch Broom changes the soil chemistry around it in ways that discourage germination and growth of native plant species.[i] Others insist that broom without seeds provides prolific nitrogen-rich biomass that can be used as mulch to help other species get established.[ii]

Scotch Broom is well adapted to tolerate drought with its deep taproot, reduced leaf area, photosynthetically active stems, and thick waxy coating.[ii] It can grow 1-2 meters high within a year and within 2-3 years starts producing an abundance of black seed pods that audibly 'pop' open in summer every year for the remaining 10-15 years of the plant's life, spreading seeds in all directions. A protective seed coat can delay germination for decades. Goats and sheep will eat limited amounts, but Scotch Broom faces little predation in its new range, likely due to the high levels of tannins and alkaloids in its tissues. Pulling the plant up by the roots tends to disturb the ground and trigger germination of any seeds present, so cutting is considered preferable. The plant is, however, relatively intolerant to shade, so planting trees or other native species after removal is a good idea, or even better, simply leave forested areas undisturbed.

i Kuletz Ivan," Hero to Zero: Scotch Broom", BI454 at Western Oregon University, May 2012.
ii https://permies.com/t/55536/Permaculture-solutions-Scotch-Broom
iii Scotch Broom, Invasive Species, SHIM BC.

2018 Christmas Bird Count Results - Sheila Ray

Luckily, with all the storms we've had this winter, our Christmas bird count was held on December 30th, a beautiful sunny day. 35 participants came out to count. Unfortunately there was a brisk Northwest wind blowing and Terry and Doane were away, so no one was able to get out by boat to count sea birds. I think this was one of the factors that made our count low this year. Although there were the average number of counters, we only counted 52 species and 1,849 individual birds, compared to 62 species last year and 2,839 individuals.

We did see 7 additional species during count week and they included sea birds such as Surf Scoters, Pacific Loons, Black Turnstones, Marbled Murrelets and Red-necked Grebes. There were no Swans seen this year, although 2 dead Swans have been found this winter. The more unusual birds seen this year were a Great Horned Owl and 4 Ring-billed Gulls. There were 4 Hutton's Vireos and 3 Red-tailed Hawks spotted, which are high numbers for these species.

If you are interested in the results of other Christmas Bird Counts from previous years, go to https://www.audubon.org/conservation/science/christmas-bird-count and click on Christmas Bird Count, then Current Year and Historical Data.

Photo: Cara Gordon, by Sheila Ray

Citizen Science Opportunities

Christmas Bird Count is organized by Bird Studies Canada and the American Audubon Society. It was started in 1900 by the American ornithologist, Frank Chapman, as a reaction against a holiday tradition known as the Christmas "Side Hunt." Twenty-seven birders, from Toronto to Pacific Grove California took part in the first year of counting birds, instead of shooting them, they tallied ninety bird species. This tradition has been held on Lasqueti since 1986 and everyone is welcome to participate. You can count the birds you see from your window or spend the whole day birding with a group.

ebird.org is the world's largest biodiversity-related citizen science project around the world. As far as I know there are only three of us and occasional visitors that contribute to ebird sightings on Lasqueti. It is easy to use: you enter when, where, and how you went birding, and then fill out a checklist of all the birds seen and heard during the outing. You are shown a checklist of birds likely to be seen in your area. This makes it helpful for beginners and if you say you saw something unusual you need to add field notes and a local expert may email you for details. This sounds intimidating, but I have found it really useful to get tips and suggestions from an expert birder. You can record your counts on your phone while in the field and without cell service or using data.

Feeder Watch: If you feed birds, you might want to join Feeder Watch. This is a joint program of Bird Studies Canada and the Cornell Lab of Ornithology. In Canada, you must be a member of Bird Studies Canada (BSC) to participate. You simply count the number of each species of bird that comes to your feeders from November to April. You will be contributing to a continent wide research project.

Nest Watch: is a monitoring program designed to track status and trends in the reproductive biology of birds, including when nesting occurs, number of eggs laid, how many eggs hatch, and how many hatchlings survive. To participate you find a nest, visit it every three or four days and record what you see.

British Columbia Coastal Waterbird Study: British Columbia's coastlines are of international importance for waterbirds. In winter, vast numbers of loons, grebes, cormorants, herons, swans, geese, ducks, shorebirds, and gulls can be found feeding and roosting in bays and estuaries, and along the rocky intertidal beaches of the BC coast. If you can commit to monitoring a coastal area the second Sunday of each month, especially in the winter and can reliably identify different species of gulls and shorebirds you could take part in this program.

naturewatch.ca: If birds are not your major interest you may want to check out Nature Watch. Nature Watch monitors plants, ice, frogs and, especially for kids, worms! It is an easy-to-use environmental monitoring programs that encourages you to learn about the environment while gathering the information that scientists need to monitor and protect it.

wildwhales.org: You can report sightings of cetaceans (whales, dolphins, porpoise) or sea turtles on this sight. You can report on line, by email or they will even send you a log book to keep a hard copy of your sightings.

Why become a Citizen Scientist?
Because it is fun and good for you. Spending time in nature and developing a sense of connection with the natural world enhances our health and happiness. And, you can actually make a contribution to scientific knowledge. Scientists cannot be everywhere, but thousands of interested naturalists all over the world can record data for them. In order for your observations to be useful, you must follow the protocols for any group. Check out these websites first and learn how and what they want you to do.

Photos by Chris Whiting & Sheila Ray
Left - gulls and black turnstones in Tucker Bay
Right top - Surf and Black Scoters off Qualicum Beach
Right bottom - mother merganser and babies near Jervis Island

Salish View Update

Thank you to everyone who volunteered, donated money and treasures, opened their gardens, cooked food, entertained and supported the creation of the Salish View Nature Reserve. After all that hard work, we are delighted to announce that we have raised enough money to acquire the spectacular 28-acre Salish View property next to Squitty bay Provincial Park! Thank you LINC members and all supporters!

We are now working through the details to finalize the transaction. Sadly, Jennifer McGown, owner of a fractional interest in the Salish View property passed away during 2018, and we are awaiting the finalization of her estate before proceeding. Once that process has been completed, LINC will work with Islands Trust Conservancy (ITC) to finalize the transaction. At closing ITC will become the owner of the property while simultaneously granting LINC and the Nanaimo and Area Land Trust a conservation covenant over the property. Just like the Mt. Trematon and Johnny Osland Nature Reserves, LINC will provide local input into the management of the new nature reserve.

LINC and ITC plan to host a community gathering to commemorate the creation of the new Salish View Nature Reserve once final details are complete. Stay tuned. We invite you to come join with us as we celebrate the conservation of cliff, wetland and old growth forests on Lasqueti Island.

Photo above by Richard Hebda

Red- Flowering Current *(Ribes sanguineum)* is possibly the best-known wildflower on this coast. It blooms in spring, coinciding with the return of Rufous Hummingbirds. The small blue-black berries are "edible but insipid", according to *Plants of British Columbia*, by Pojar and MacKinnon. They grow on rocky or disturbed slopes and are tolerant of drought. We often see them growing out of cracks in sheer rock: a beautiful sight in early spring sunshine.