



Newsletter SPRING 2022

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57th ANNUAL GENERAL MEETING of the **OKANAGAN SIMILKAMEEN PARKS SOCIETY**



GUEST PRESENTER **Michael Healey**

University of British Columbia Professor emeritus and a renowned Canadian-born fisheries scientist, known for his work on fisheries ecology, natural resource management and the role of science in public policy. His program is titled "The Forest is Longing for the Sea", in tribute to Shigeatsu Hatakeyama, a Japanese oyster farmer and well-known environmentalist. The presentation places the emphasis on how the forest benefits from the sea. Dr. Healey will introduce a holistic approach to the management of ecosystem of rivers, salmon, bears, using the forests in Pacific Northwest for context.

AGENDA

- ✓ Election
of Directors
- ✓ Financial
Report
- ✓ Business
Meeting
- ✓ Pioneer
Celebration

MUCH BETTER THAN TV!

SUMMERLAND MEMORIAL PARK

Backup Location: Centre Stage Theatre • Please bring your own lawn chair

Friday, April 29, 2022 • 7pm

ALL WELCOME Refreshments NO CHARGE Donations Welcome

EDITORIAL

The world as we have known it no longer exists. This is being written on the second anniversary of the declaration of the worldwide Corona-19 pandemic. During this pandemic British Columbia has not only witnessed severe illnesses, deaths, and financial inequity not to mention convoys and demonstrations all related to the illness but also the way of socially interacting has been drastically altered. Of course, while the province has been largely focused on these issues we have also experienced landslides, wildfires, floods, atmospheric rivers, and heat domes. Towns have been destroyed and important transportation routes wiped out.

While all of this has been occurring, B.C.s old growth forests have been logged, fishing stocks have dwindled, and innocent wolves have once more been slaughtered. Meanwhile, the annual average temperatures have continued to rise, and weather has become much more extreme, around the world. Crops are failing and hunger is increasing in a variety of nations. Add to this the instances of war and conflicts, including the current one. They further hamper social structures and instigate the need of people to become refugees. It is obvious that there is much to occupy our thoughts and hopefully our actions.

Continued on page 3...

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Huge forest fires don't cause living trees to release much carbon, research shows

BY OREGON STATE UNIVERSITY

Credit: CC0 Public Domain

Research on the ground following two large wildfires in California's Sierra Nevada mountain range showed the vast majority of carbon stored in trees before the blazes was still there after the fires. Published in the journal *Forests*, the findings are an important step toward understanding the connection between wildfires and climate-change-inducing carbon emissions, according to a scientific collaboration that included Mark Harmon of Oregon State University.

Carbon dioxide, a product of combustion, is a major greenhouse gas and one of the primary causes of climate change. Knowing how much carbon is released during fires can help inform decisions about the carbon storage and emissions implications of forest management decisions, say the scientists.

While satellite- and LiDAR-based research has suggested as much as 85% of living trees' biomass combusts in California's big fires, the study led by Harmon, professor emeritus in the OSU College of Forestry, indicates the amount of combusted biomass is less than 2%. "The general impression the public has is that much of a forest is combusted in a megafire, and that's usually what's been presented in the press," Harmon said. "But that did not match what we were observing, so we did a very detailed study examining the combustion process at different levels of the fire system, starting with twigs and ending up at the level of the entire fire."

Harmon, fire ecologist Chad Hanson of the John Muir Project and Dominick DellaSala, chief scientist with the Wild Heritage Project, looked at the Creek Fire, which affected nearly 400,000 acres beginning in September 2020, and the Rim Fire, which started in August 2013 and spread across more than 250,000 acres. The scientists spent four years on the ground in the fire areas, studying and

calculating combustion rates at the level of branches, trees, stands of trees and landscapes to determine the amount of carbon that remained in trees versus what was released into the atmosphere.

"The estimates of the percentage of trees combusted in large fires are all over the place—they are often high—and this has been a major concern in the recent literature, suggesting that better estimates are needed," Harmon said. "Our work delivers one such estimate, one that provides a framework to synthesize combustion rates at different levels of the forest and different levels of fire severity." The study showed that while combustion rates were 100% for the smaller branch segments of big trees and up to 57% for whole small trees, the combustion rates were low overall at the stand level (0.1% to 3.2%) and the landscape level (0.6% to 1.8%). Stand level refers to all trees of various species and sizes in an area of a particular fire severity class; landscape level means the entire burned area, averaging over the fire severity classes.

"While many field scientists likely would not find our results surprising, there were recent peer-reviewed published estimates of up to 85% live tree combustion from the Rim Fire," Harmon said. "Other studies based on a literature review suggest up to 65% of the live trees could have been combusted in high-severity patches. No one in the peer-review process questioned the results." Even in severe fire patches the larger-size trees showed low combustion rates—less than 5%, Harmon said. Large trees account for the majority of a forest's biomass, leading to the low overall combustion rates at the stand level, he explained. "Even for megafires classified as high severity, much of the area within the fire perimeter burned at low and moderate severity with less than 0.5% live tree combustion at the stand level," Hanson added. "This study demonstrates the value of ground-based studies to inform policy decisions and management. Removing vegetation over vast areas is likely to lead to more cumulative carbon emissions than large fires themselves."

Scientists are increasingly emphasizing the importance of storing more carbon in mature, older trees whether forests have burned or not, DellaSala said, as a way to curb total greenhouse gas emissions. "We suggest that

researchers and policy makers avoid using combustion rates not based on field study as they appear to overstate the wildfire emissions used in carbon emissions reporting; this can potentially misdirect climate mitigation policy," he said. Dead trees decompose slowly as new vegetation grows and absorbs atmospheric carbon, the scientists point out. If fire-killed trees are allowed to remain in place, the natural decomposition process might take decades to hundreds of years to release the trees' carbon.

On the other hand, if those trees are logged to serve as energy-producing biomass, that same carbon could potentially enter the atmosphere much faster. More study is needed, the researchers note, to determine the degree to which post-fire forest management influences the carbon release time frame, including how biomass energy might offset the burning of fossil fuels and how wood products release carbon as they are used and disposed. "The effects of salvaging and putting some of that wood into durable wood products need to be fully investigated," Harmon said. "More fires need to be examined using our type of approach to determine how variable the combustion rates are at different levels for different forest types and ages."

See the *Forests* Article that this was based on at the OSPS website okanaganSimilkameenParksSociety.ca



...*EDITORIAL continued*

One way to become engaged is to join an existing society or club that is volunteering to contribute to the establishment or maintenance of something that can assist locally or more globally with positive outcomes. Several decades ago, we were admonished to “Think Globally; Act Locally” to make a difference. That can once again be the rallying cry.

The Okanagan Similkameen Parks Society, originally established in the 1970s to preserve land and wildlife by advocating for park lands and protected areas, will be holding the 57th Annual General Meeting on April 29 in Summerland at 7:00. This society has recently been involved in providing protective signage for newly designated areas in the Similkameen, assisting with the engineering fees for a difficult portion of the Trail of the Okanagans, presenting to the committee setting the recent provincial budget and visually documenting the clearcutting of the slopes of Brent Mountain, to name a few projects.

Our society has a mandate not only to establish and preserve parks and trails but also to educate the public about the necessity to do so. However, to carry out our tasks requires lots of volunteer input. If you are looking for a way to get involved in reestablishing the social balance and at the same time combat the need to safeguard our wild lands and the creatures that inhabit them the O.S.P.S. is a society that will allow you to do this. You can be active as a member, a volunteer, or a director. Your skill set, whatever it encompasses, can be used by the O.S.P.S. to further protect our environment in the future and whatever it holds for us.

Come out to the AGM and see what the group is all about. There has been a lot accomplished over the past half century plus, and there will be lots more to work with in the future. Protecting our valleys is a job for all of us, come and join in the cause.

Westbank First Nation Principles Applied To Forest Harvest Practices

Tree harvest formula takes environment impact into considerations

BARRY GERDING

Mar. 17, 2022

The Westbank First Nation has taken a progressive approach to managing its forestry interests, based on traditional land management beliefs and principles adopted by past generations, which it hopes will set a standard for other tree harvest licensees. Dave Gill, general manager of WFN forest tenure management for Ntityix Resources, said since it began working with the WFN in 2013, the Ntityix perspective on forest management has changed significantly as the Sylix environment preservation values are integrated into land-use practices.

Gill spoke about Ntityix’s change in forest management philosophy as a panel speaker at a virtual public forum hosted Wednesday (March 16) by the Okanagan Basin Water Board’s WaterWise program, an outreach and education initiative, in recognition of UN World Water Day on March 22. Gill said WFN timber licence holdings have been divided into two categories: old forest zone, which is about 50 per cent of the WFN’s current forestry holdings, and forest management zone. He described old forest zones as those centred around water, whether it be creeks, wetland riparian areas or lakes, that form what he called a “conductivity network” with the surrounding woods. “But in today’s age that does not mean just putting a fence

around an old-growth area and saying it is protected,” Gill noted.

Gill described old-growth zones as “sick forests,” overgrown areas that have not seen a fire in 100 years, thick with in-growth bush and surface fuels. Rather than be left alone, they



require wildfire mitigation efforts to reduce the fire hazard capability that can spread to neighbouring areas. He cited the Mt. Law Fire in West Kelowna, which reflected the impact of fire mitigation dynamics. “As that fire was being mopped up, you could see how in areas where we had done fire mitigation treatment, the fire damage was quite spotty. Ground cover had burned and some trees, but most of the forest had not been cremated and remained intact, while the private land that had not been treated burned ferociously,” he said.

OSPS ANNUAL GENERAL MEETING

The 57th Annual General Meeting of the Okanagan Similkameen Parks Society will be held on Friday, April 29, 2022 at 7pm at Summerland Memorial Park (9999 Wharton Street, Summerland). Participants are encouraged to bring their own lawn chair. In case of adverse weather, the venue may change to Summerland Centre Stage at 9518 Main Street. A notice will be put up at Memorial Park (on the Gazebo) if the venue changes.

This year’s guest presenter is Michael Healey, a University of British Columbia Professor emeritus and a renowned Canadian-born fisheries scientist, known for his work on fisheries ecology, natural resource management and the role of science in public policy. The presentation is titled “The Forest is Longing for the Sea” and it places emphasis on how the forest benefits from the sea. Dr. Healey will introduce a holistic approach to the management of ecosystem of rivers, salmon, bears, using the forests in Pacific Northwest for context.

Letter from Scientists to Prime Minister Justin Trudeau Regarding the Protection of Canada's Primary Forests

MARCH 23, 2022

Dear Prime Minister Trudeau,

As more than 90 scientists working at the intersection of ecosystems and climate change, we are deeply concerned by the evidence of continued deforestation and degradation of primary forests globally and in Canada because of the resulting impact on greenhouse gas emissions and the biodiversity crisis. Canada's primary boreal and temperate forests have a vital role to play as natural climate solutions, and it is important that their protection is central to Canada's climate and biodiversity policies.

The climate and biodiversity crises are inextricably linked and require solutions that address them in tandem. Among the most urgent, critical solutions at the intersection of these crises is the protection of the world's

primary forests (those that have never been industrially disturbed and where natural processes prevail) and older forests, which have unique and irreplaceable ecological values and provide among the most effective, large-scale climate mitigation benefits. Addressing the threat of climate change requires both the elimination of our dependence on fossil fuels and the preservation of the world's primary and older (old growth and mature) forests. In short, these forests are a critical lifeline to a safe climate as they sequester and store massive amounts of carbon, provide essential habitats, and often have high levels of biodiversity that provide unique natural solutions to both crises.

With the release of Canada's 2030 Emission Reduction Plan this spring, we strongly recommend the Government of Canada use this opportunity to advance measures to protect primary forests and older forests, and to make their protection a key pillar of its natural climate solutions commitments. We further recommend that the Government of Canada commit to improve the accuracy and transparency of its national greenhouse gas emissions accounting for and reporting of emissions from its logging sector.

Primary forests have unique values and provide significant benefits for addressing the climate and biodiversity crises. These increasingly rare forests, which account for between approximately one quarter and one-third of forests globally, hold 30-50% more carbon per hectare than logged forests, and provide a continuing sink for carbon dioxide (CO₂) and other greenhouse gases, while also providing critical habitat for at-risk species. Canada is the steward of a substantial proportion (~16%) of the world's remaining primary forests, with some of the last large stretches of these irreplaceable ecosystems found in its boreal forest, which contains globally significant stocks of ecosystem carbon.

When primary forests, whether in Canada or elsewhere, are logged they release significant amounts of carbon dioxide, exacerbating climate change. Because primary forest ecosystems store more carbon than secondary forests, replacing primary forests with younger stands, as Canada is doing, ultimately reduces the forest ecosystem's overall carbon stocks, contributing to atmospheric greenhouse gas levels.

Even if a clearcut forest eventually regrows, it can take over a decade to return to being a net

Preserving Forest Snowpack Longer into Spring Months

The best place to store water for trees (and people) is in a long-lasting snowpack.

But forest structures create a complex equation that doesn't always help to keep a snowpack in place.



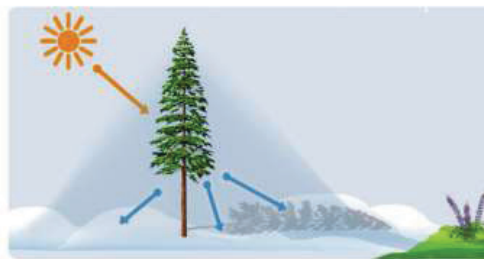
Snow won't accumulate directly under healthy trees where snowfall is blocked by branches.



Wildfire indirectly accelerates snowmelt by producing litter that absorbs energy and heat.



Trees emit low and persistent levels of long-wave energy that melt adjacent drifts.



But big trees also offer lots of shade, which blocks significant amounts of solar energy and keeps surrounding snowdrifts intact longer into the spring and summer months, feeding thirsty forests and reservoirs.

One of the many revelations that science has made clearer for us. Gradual release of the snow-pack does not just contribute to flood mitigation but also retains moisture in the carbon storing large trees that our forests are 'built' around.

Considering this equation, new research found that

Snowpacks last longer in forests with big, healthy trees that are spaced further apart.



absorber of carbon dioxide, and the overall carbon debt in carbon stocks that were removed from older forests can take centuries to repay, a luxury we simply no longer have. Recent studies also indicate that soil disturbance associated with logging results in large emissions of methane (CH₄), a powerful greenhouse gas second only to CO₂ in its climate forcing effects. As the Intergovernmental Panel on Climate Change (IPCC) recently concluded, we have under a decade to significantly reduce global greenhouse gas emissions in order to avoid exceeding 1.5 degrees C of warming, meaning any continued loss of primary forests erodes our remaining atmospheric carbon budget. Responding to the latest climate projections, UN Secretary

General António Guterres' issued a "code red emergency". Importantly, the Glasgow Climate Pact (paragraph 38) emphasizes the importance of protecting, conserving and restoring nature and ecosystems to achieve the Paris Agreement temperature goal, including through forests acting as sinks and reservoirs of greenhouse gases and by protecting biodiversity.

Primary forests are also generally more resilient than logged forests to wildfires and other natural disturbances likely to worsen with the climate crisis. Notably, clearcutting and other intensive logging practices are often associated with more intense wildfires. Thus, achieving the most stable, resilient possible forest carbon stores requires protecting pri-

mary forests from industrial logging.

While we commend Canada for its commitment to natural climate solutions as a climate priority, we are concerned by the rate of continued industrial logging in primary forests from the boreal to coastal rainforests and the absence of a comprehensive primary forest protection policy.

Replacement of these carbon-dense, biodiverse forests with lower-carbon, less biodiverse secondary forests is undermining global climate progress and contributing to the biodiversity crisis. In Canada, only

15 of 51 boreal caribou herds, which rely on primary and older forests, have sufficient habitat left to survive long-term. Additionally, only about a quarter of forests in British Columbia are old-growth and of these, only about 3% are highly productive with large trees.

We strongly encourage Canada to adopt policies that will incentivize protection of primary and older forests, particularly under the leadership of Indigenous Peoples and in accordance with Indigenous Peoples' internationally recognized rights. Where Indigenous land rights are strong, ecosystems' climate and biodiversity values tend to be better protected, and Indigenous Peoples' meaningful participation and leadership is foundational to equitable and effective forest protection policies. **We also encourage**

Canada to undertake a comprehensive review of its forest carbon accounting and quantification practices. Recent global studies have shown significant disparities between national greenhouse gas inventories and actual atmospheric emissions, most egregiously in the land sector. Given Canada's large forest area and high logging rates, accurate forest emissions accounting is essential to ensuring the integrity of Canada's overall climate goals. More accurate accounting and reporting will help ensure that Canada is properly valuing the climate benefit of its primary forests and the environmental costs of industrial logging.

The decisions Canada makes regarding its primary forests over the next few years will have profound ramifications for the global climate and biodiversity crises. Canada's primary and older forests have a key role to play in preserving a safe and livable world, and the Government can make a significant contribution by prioritizing keeping these vital and irreplaceable ecosystems standing.

Sincerely,

Note: Institutional affiliations listed for identification purposes only.

Dr. William Anderson

Professor Emeritus, College of Charleston
And 89 other Scientists. (The list can be found with the letter, complete with notes, on our website.)

Park Expanding

FEBRUARY 11, 2022

Okanagan Mountain Park between Kelowna and Penticton is being expanded by two-tenths of a per cent.

The provincial government on Thursday announced a 21-hectare addition to the wilderness park, which covers 11,038,000 ha.

The addition will enhance wildlife connectivity and species protection, and allow for

the addition of a new trail, called the Golden Mile, the provincial government says.

In 2020-21, the province bought more than 229 ha of land across B.C. for \$24 million, to expand existing parks.

"People's desire to interact with nature has never been greater," Environment Minister George Herman said in a news release. "Parks provide the opportunity to connect with nature and strengthen our physical and mental well-being."

Most of Okanagan Mountain Park, estab-

lished in 1973, is accessible only by foot, bike, or horseback. It has six marine campgrounds along the 33-km-long lakeshore.

In December 1950, a CP Air DC-3 crashed into the mountain. The two pilots were killed but all 16 passengers were rescued.

During the Second World War, a secluded beach-front section of the park was used to train Chinese-Canadians for commando missions in Southeast Asia.

By Okanagan Newspaper Group Staff

Environmental groups and First Nations give provincial government poor grades as old-growth logging continues

MARCH 10, 2021

VICTORIA (Unceded Lekwungen Territories) — In the 18 months since the B.C. government promised to implement the recommendations of the Old-Growth Strategic Review (OGSR) panel, only 24 percent of the most at-risk old-growth forests have been deferred from logging.

The findings are part of an assessment by the Ancient Forest Alliance, Sierra Club BC and Wilderness Committee, who today issued a report card grading the B.C. government's progress on implementing the recommendations of the OGSR panel. This is the third report card issued since the panel's recommendations were released on September 11, 2020, and falls at the halfway point of the three-year framework the panel laid out.

The OGSR panel's recommendations included taking immediate action to protect at-risk old-growth forests and a paradigm shift away from a focus on timber value and towards safeguarding biodiversity and the ecological integrity of all forests in B.C.

"The B.C. government has taken some small, slow actions, but has not delivered the fundamental change it promised in the wake of the old-growth panel's report and in the last provincial election," said Torrance Coste, national campaign director for the Wilderness Committee. "Premier John Horgan has set some nice intentions for old-growth forests, but done very little to actually limit logging of the most endangered stands – this is more talk-and-log, not the beginning of a paradigm shift."

Using the limited publicly available data around confirmed old-growth deferrals and logging, the three organizations have calculated that in the 18 months since the Horgan government committed to these recommendations, approximately 624,000 hectares or 24 percent of the 2.6 million hectares of the most at-risk old-growth has been confirmed for deferral or a pause on logging.

The past year has seen the establishment of a

Technical Advisory Panel to provide expert guidance around old-growth deferrals and the announcement of the government's intention to defer logging in 2.6 million hectares of the most at-risk old-growth in November 2021. For the first time, the government has adopted a scientific assessment of the state of old-growth forests in B.C., with a priority on protecting the biggest and oldest trees. But the various announcements and new processes haven't resulted in substantial on-the-ground protection for threatened forests.

The government's approach has been criticized by environmentalists and Indigenous leaders as putting unfair pressure on First Nations without providing adequate resources and support.

"The BC NDP government has neglected its responsibility to take swift action and despite all the words and promises, chainsaws continue to roar and threatened old-growth forests across B.C. remain without protection," said Grand Chief Stewart Phillip, President of the Union of BC Indian Chiefs. "Premier John Horgan promised permanent protection of old-growth forests, but without providing a clear plan and adequate resources his government has put First Nations in an impossible position – moving slowly is no longer an option if we're serious about leaving old-growth for our children and grandchildren."

Last year, the province made some funding commitments to help First Nations review deferral options and support forestry workers impacted by deferrals. Budget 2022 included \$185 million to help workers and communities and enable deferrals. This funding commitment is a significant step but not enough to enable both short-term deferrals and lasting Indigenous-led conservation solutions. The federal government has pledged \$2.3 billion to achieve the protection of 30 percent of Canada's landmass by 2030 but the B.C. government has yet to embrace this target and use this opportunity to secure a significant portion of these federal funds to support old-growth protection.

"The B.C. government has taken a step in the right direction in funding for old-growth," stated Ancient Forest Alliance campaigner and photographer TJ Watt. "However, they've fallen short on the amount needed to relieve the economic pressure faced by First Nations so that logging deferrals can become an economically viable option. This funding shortfall makes enacting the full suite of old-growth logging deferrals virtually impossible to achieve. B.C. also has a golden opportunity to obtain hundreds of millions in federal funding to support the creation of new Indigenous Protected Areas. It's high time they embraced this."

Of the 2.6 million hectares recommended for deferral in November 2021, the province hasn't provided consistent updates on how much has been deferred to date.

"We are halfway through the timeline laid out in the old-growth recommendations Premier John Horgan promised to implement, but only a small amount of the most at-risk forest in B.C. is temporarily off the chopping block and there is still no path to permanent protection," said Jens Wieting, senior forest and climate campaigner with Sierra Club BC. "With every day of delay, irreplaceable ancient forests, the web of life that depends on them and our last defense against the climate crisis are clearcut. We must stop the bleeding now."






Ancient Forest Alliance, Sierra Club BC and Wilderness Committee are calling on the B.C. government to: immediately defer logging in all at-risk old-growth forests while compensating for any lost revenue for First Nations, increase funding to support deferrals, economic transition and permanent protection to at least \$300 million, implement legislation to protect biodiversity across B.C., establish a plan with milestones consistent with the OGSR framework and regularly publish accurate and detailed progress updates on the deferral process.

B.C. Government Old-Growth Report Card

Date: March 2022

Premier: John Horgan

In the fall of 2020, Premier John Horgan made a big promise. He pledged his government would implement the Old-Growth Strategic Review (OGSR) panel recommendations 'in their totality'. The 14 recommendations, published and committed to 18 months ago, follow a three-year timeframe (including short-term actions) and call on the B.C. government to work with Indigenous Nations for a paradigm shift that makes ecological integrity and biodiversity the top priority. This report card grades how the government is doing, looking at the half-time milestone based on the panel's three-year framework.

SUBJECT	PROGRESS	GRADE
Immediate action for at-risk forest		D <small>Up from "F" in Sept. 2021.</small>
<p>The OGSR panel called for interim protection (deferrals) for at-risk old-growth within six months to allow provincial and Indigenous governments sufficient time to develop long-term conservation solutions. One and a half years later most of the 2.6 million hectares of the most at-risk forests remain without temporary or long-term protection. Nine areas were deferred for two years in 2020, another two areas in the summer of 2021. At the end of last year, the province announced that BC Timber Sales has paused selling licenses for 570,000 hectares and shared news about voluntary local agreements between Indigenous Nations and industry. So far less than 25% of the most high-risk irreplaceable old-growth in B.C. has been deferred from logging, and these forests continue to fall. To improve this grade, the government must change course, follow a precautionary approach and take all necessary steps to immediately defer logging for all of the most at-risk old-growth, in particular adequate short-term support for Indigenous Nations and forestry workers.</p>		
Funding for implementation, First Nations and forestry transition		C <small>Up from "F" in Sept. 2021.</small>
<p>In early 2021, the province committed close to \$12.7 million to assist Indigenous Nations in reviewing deferral options and \$19 million to support forestry workers immediately impacted by deferrals. Budget 2022 improved upon funding by including \$185 million to help workers, industry, communities and First Nations respond to deferrals. This is a positive step forward, however, additional, much greater contributions are needed to enable both temporary and permanent Indigenous-led conservation solutions. Funding must consider the values of standing old-growth, the lost revenues from logging and enable the sustainable economic diversification in lieu of old-growth logging and linked to the establishment of Indigenous Protected Areas. Additionally, the Federal Government has pledged \$2.3 billion to achieve protection of 30 percent of Canada's landmass by 2030, the B.C. government has yet to embrace this target and take this opportunity to secure a significant portion of these federal funds to support old-growth protection. To improve this grade, the government must increase funding to at least \$300 million and embrace the federal funding available for the permanent Indigenous-led protection of forests.</p>		
Change course and prioritize ecosystem integrity and biodiversity		D <small>No grade change.</small>
<p>The OGSR panel's call for a paradigm shift to prioritize ecosystem integrity and biodiversity requires dramatic amendments in forestry laws to make it easier for statutory decision-makers like the chief forester and district managers to execute this course correction. But the B.C. government has only made timid amendments to provincial forestry laws, and they remain without unambiguous legal mechanisms to protect at-risk old-growth forests and habitat of endangered species from logging. The creation of the new Ministry of Lands, Waters and Resource Stewardship could help to implement the promised shift. But none of the recent announcements reflect the promise to prioritize protection of biodiversity the OGSR panel called for. To improve this grade, the government must urgently introduce and apply adequate amendments to forestry laws and deliver legislation that protects biodiversity across the province.</p>		
Three-year workplan with milestone dates		D <small>No grade change.</small>
<p>The OGSR panel recommendations were embedded in a three-year framework with six-month steps, starting with immediate action for at-risk forests and engagement with Indigenous governments, followed by a transition plan prioritizing ecological integrity and alternatives to clearcutting. Last June, the B.C. government included their own three-year-plan in their forestry intentions paper. Instead of committing to milestone dates, it describes all recommendations as 'ongoing' work. This is a clear recipe for a 'talk-and-log' process, where logging continues unabated during a long, drawn out planning period. This will only exacerbate the biodiversity crisis. To improve this grade, the government must set implementation milestones with deadlines, consistent with the OGSR panel framework.</p>		
Transparency and communication		C <small>Up from "F" in Sept. 2021.</small>
<p>The work by the technical advisory panel created last summer and shared by the B.C. government in November resulted in significant progress in transparent communication about the state of old-growth forests in B.C. New data shows the province's ecological emergency in better detail and pinpoints which old-growth forests need immediate interim protection. The new data and mapping show that old-growth forests cover a smaller area than previously reported and that about two-thirds of the remaining old-growth are at-risk. It also shows that only one third of this at-risk old-growth is protected and that one third of these at-risk old-growth forests should be deferred from logging immediately. This progress is overshadowed however by insufficient communication about provincial "intentions", progress updates and logging rates. There is no clarity on how many total hectares of at-risk old-growth have been deferred or protected since the province promised to protect old-growth in 2020 and the last available annual old-growth logging data is for 2018. To improve this grade, the government must share accurate and detailed conservation progress and logging updates.</p>		

As delays continue, the old-growth crisis in B.C. worsens. Time is running out to save what is left. In the midst of a climate and extinction crisis, a continued lack of interim protection will result in irreversible loss for present and future generations. This delay must end immediately.



of defensive chemicals. The current focus on aboveground biodiversity neglects more than half of the most biodiverse underground ecosystems, because areas with the highest biodiversity aboveground are not always those with the highest soil biodiversity.

Mycorrhizal fungal networks and the nutrient flows and processes they manage should be considered a global public good, analogous to clean air and water. For millennia in many parts of the world, traditional farming and land management practices have attended to the health of the soil and thus supported plants' fungal relationships implicitly. But over the course of the 20th century, our behaviour has led us into trouble.

Organisations like the Society for the Protection of Underground Networks (Spun), the Fungi Foundation and GlobalFungi are advocating for soil ecosystems, and leading a massive global sampling effort to create open-source maps of Earth's fungal networks. These maps will help chart the properties of underground ecosystems, such as carbon sequestration hotspots, and document new fungal species able to withstand drought and high temperatures. Researchers will be able to track the distribution of fungal networks as they shift in response to changing climates and patterns of land use, much as they already do for global vegetation, climates and ocean currents.

A deeper knowledge of these dynamic living systems will support conservation projects and policies that aim to halt their destruction and encourage their recovery, besides driving much-needed innovation in underground ecosystem science and technology.

Mycorrhizal fungal networks have long sustained and enriched life on our planet. It's time they receive the attention they deserve.

Please use the enclosed membership form on the back page to help us carry out our mission.

A powerful and underappreciated ally in the climate crisis? Fungi

Toby Kiers is professor of evolutionary biology at Vrije Universiteit Amsterdam and co-founder of the Society for the Protection of Underground Networks (Spun)

*Merlin Sheldrake is a biologist and the author of *Entangled Life: How Fungi Make Our Worlds, Change Our Minds, and Shape Our Futures**

Mycorrhizal fungal networks are a major global carbon sink. When we destroy them, we sabotage our efforts to limit global heating. If we want to tackle the climate crisis, we need to address a global blind spot: the vast underground fungal networks that sequester carbon and sustain much of life on Earth.

Fungi are largely invisible ecosystem engineers. Most live as branching, fusing networks of tubular cells known as mycelium. Globally, the total length of fungal mycelium in the top 10cm of soil is more than 450 quadrillion km: about half the width of our galaxy. These symbiotic networks comprise an ancient life-support system that easily qualifies as one of the wonders of the living world.

Through fungal activity, carbon floods into the soil, where it supports intricate food webs – about 25% of all of the planet’s species live underground. Much of it remains in the soil, making underground ecosystems the stable store of 75% of all terrestrial carbon. But climate change strategies, conservation agendas and restoration efforts overlook fungi and focus overwhelmingly on aboveground ecosystems. This is a problem: the destruction of underground fungal networks accelerates both climate change and biodiversity loss and interrupts vital global nutrient cycles. These networks should be regarded as a global public good to be mapped, protected and restored as a matter of urgency.

Fungi lie at the base of the food webs that support much of life on Earth. About 500m years ago, fungi facilitated the movement of aquatic plants on to land, fungal mycelium serving as plant root systems for tens of millions of years until plants could evolve their own. This association transformed the planet and its atmosphere – the evolution of plant-fungal partnerships coincided with

a 90% reduction in the level of atmospheric carbon dioxide. Today, most plants depend on mycorrhizal fungi – from the Greek words for fungus (mykes) and root (rhiza) – which weave themselves through roots, provide plants with crucial nutrients, defend them from disease and link them in shared networks sometimes referred to as the “wood wide web”. These fungi are a more fundamental part of planthood than leaves, wood, fruit, flowers or even roots.

We are destroying the planet’s fungal networks at an alarming rate. Based on current trends, more than 90% of the Earth’s soil will be degraded by 2050. Modern industries, from agriculture to forestry, have failed to take account of the life in the soil. Despite the fact that mycorrhizal fungi supply as much as 80% of a plant’s nutrients, intensive farming practices – through a combination of ploughing and application of chemical fertilisers, pesticides and fungicides – severely reduce the abundance, diversity and physical integrity of fungal networks. Logging wreaks havoc below ground, decreasing the abundance of mycorrhizal fungi by as much as 95%, and the diversity of fungal communities by as much as 75%. A large study published in 2018 suggested that the “alarming deterioration” of the health of trees across Europe was caused by a disruption of their mycorrhizal relationships, brought about by nitrogen pollution from fossil fuel combustion and agricultural fertiliser.

Mycorrhizal fungal networks make up between a third and a half of the living mass of soils and are a major global carbon sink. When we destroy them, we sabotage our efforts to limit global heating. Plants supply carbon to their fungal partners in exchange for nutrients like nitrogen and phospho-



Globally, at least 5bn tons of carbon dioxide are sequestered within mycorrhizal networks each year, a quantity roughly equivalent to the amount of carbon dioxide emitted annually by the US. Photograph: Stephen R Johnson/Alamy

rus – much of the phosphorus that makes up the DNA in your own body will have passed through a mycorrhizal fungus. In their exchange, plants and fungi engage in sophisticated trading strategies, striking compromises and resolving dizzyingly complex trade-offs. The influence of these quadrillions of microscopic trading decisions spills out over whole continents.

Globally, at least 5bn tons of carbon dioxide are sequestered within mycorrhizal networks each year, a quantity roughly equivalent to the amount of carbon dioxide emitted annually by the US (unpublished data suggests this figure is closer to 17bn tons). Even small reductions in the prevalence of fungal networks have significant consequences: a release of just 0.1% of the carbon now stored in Europe’s soils is equal to the annual emissions from 100m cars.

Mycorrhizal fungi are keystone organisms that support planetary biodiversity; when we disrupt them, we jeopardise the health and resilience of the organisms on which we depend. Fungal networks form a sticky living seam that holds soil together; remove the fungi, and the ground washes away. Mycorrhizal networks increase the volume of water that the soil can absorb, reducing the quantity of nutrients leached out of the soil by rainfall by as much as 50%. They make plants less susceptible to drought and more resistant to salinity and heavy metals. They even boost the ability of plants to fight off attacks from pests by stimulating the production

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a boy with the same last name. "That's your brother," taunted another student. Indeed, it was her younger brother, John, one of three sons Florence and Moses had hung on to.

The pain of being "not wanted" by her birth parents still shows deep in Grandma's eyes. "But I got lucky with my foster parents," she says. Esther and Howard Lowe loved Rose, hiding their tears when social workers tried to reunite her with her birth mother. After several meetings at the happy Lowe family home, Florence decided not take Rose back to the reserve. Rose says Esther often took her to see Florence at a laundromat when Florence was doing laundry there, but Florence ignored her. By the time Rose turned 19, the Indian Affairs social workers who once were convinced she was "mentally retarded" now were confident she would "find success and happiness in life." Rose "impresses as a very sensible, thoughtful and industrious young woman," one wrote.

But Rose craved freedom. Instead of finishing Grade 12, she went to Calgary to reunite with a Lowe family foster brother. "I was not ready for that independence," she says. "It led me on a fast track to homelessness." At age 21, in 1979, Rose says she was beaten and raped by a stranger with a gun and left in a dumpster during a snowstorm, naked except for a coat. She remembers the car stopping beside her at the bus stop, the nylon stocking wrapped around her neck and the gun misfiring. She remembers waking up in a dumpster, firefighters taking her to hospital, how cold her bare feet were and police refusing to believe her story. Grandma says she wrote to the Calgary police 10 years ago asking for the report on her assault. It had been labelled a domestic dispute. The assault and the injustice propel her advocacy work to this day, she says.

Grandma lost the use of an arm in the attack and was being prepped for surgery 15 months later when she learned she was pregnant. She brought her baby back to her foster home to escape her then-partner's flying fists. "This miracle child" helped her decide "I wasn't going to be a statistic," Grandma says, and she returned to Victoria to finish school. Rose had participated in political rallies and advocacy with her foster mother, Esther, from age 14.

Yellowed newspaper clippings show Rose receiving awards for volunteer work and helping at charity fundraisers. Esther received the Heart of Gold Award from B.C.'s lieutenant governor in 1988 for her community work.

Grandma moved to Victoria just as the Canadian Charter of Rights and Freedoms was igniting Indigenous activism in the early 1980s and she started speaking at rallies. David Turner, a University of Victoria School of Social Work professor, was listening. Grandma was drawing connections between race, economic class and human rights. Turner, who was mayor of Victoria from 1991 to 1993, heard her speaking at a rally, approached her, and asked, "Do you know how profound that was?" Turner says he brought her to speak to his university students and connected her with local activist groups. She pressed home her message about the tough transition from foster care, the need for voting rights for the unhoused and combating racism. "My students really appreciated her authenticity... and liked working with her," says Turner. She also travelled around the U.S. speaking at universities and sat at a table with Nelson Mandela at the 2001 United Nations Conference Against Racism in Durban, South Africa.

As a single mother, Grandma helped raise four foster children alongside her son, working in homeless shelters, as a cleaner and selling street newspapers to make ends meet. "We had to live without hydro sometimes," she says. She took her children to anti-poverty and anti-logging rallies. "My son was 12 years old at Clayoquot Sound," the anti-logging protests in 1993, she says. She married James Henry that same year.

Grandma Losah has run five times for Victoria City Council. As Grandma sees it, the fight she is now leading at Fairy Creek to stop old-growth logging is about more than trees. "In northern Vancouver Island, the last old-growth tree was logged 20 years ago," she notes. "Now (Indigenous people) are not able to make their medicines. They have not been able to make a canoe since then... It's a human rights violation."

Some criticize Grandma Losah for representing Indigenous people when she was not brought up in an Indigenous family. But Grandma sees herself as a victim of both

worlds and says her multicultural background puts her in a good position to lead in the fractious Fairy Creek environment. "My own community said that I was too white to be Indian and in the white community I was too Indian to be white." At a recent vigil for her missing relative Bear Henry (who was found alive this month after 10 weeks stuck on a mountain) she welcomed a police investigator to join the circle, to the surprise of the group. "We need to work together with the RCMP," she told her fellow protesters. "We cannot always be against them."

At times Grandma Losah sounds less like an anarchist leader and more like a mother. Elder Bill Jones criticizes her for this, saying "she asserts herself as boss." But Grandma doesn't seem to care. She always speaks from the middle of a group, not a podium, she explains, because "we are not lesser or greater than the person sitting beside us."

Many of the Fairy Creek protesters are mouthy with police, but not Grandma. She doesn't condone drugs, alcohol and physical violence, say other protesters. She sets boundaries, she says, and often needs to be a disciplinarian. "Anarchists are not good at boundaries, or they wouldn't be good protesters." She has ejected fellow land defenders from protest camps for being rude and disrespectful, which makes her unpopular with some. But Grandma is cherished by most in the Fairy Creek movement. "Grandma Losah is like a grandmother to me but more than that," says Ojistoh Hemhawke, a Mohawk teenage protester. "From a lifetime of experiences... she is a true role model," says Rainbow Eyes. She has had a big impact on Victoria, says Turner. "She is quite a symbol actually. An icon."

As if to prove the point, an angry motorist gets out of his car on Douglas Street and shouts obscenities at Grandma Losah's family of protesters. Grandma's steely expression betrays no emotion. She stays until two protesters are arrested and taken away by police. Then she heads to the station to support them. "Both land defenders are out," she texts me later that evening. "Now we are working to prepare our plans for spring," she says. "We can't let those trees go unprotected."

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An Interesting Person in the Ecological Movement

Cameras surround them. “That’s Grandma Losah!” shouts one reporter, snapping her picture. Within seconds, Grandma’s photo is lighting up Twitter feeds in the crowd. Grandma Losah, whose legal name is Rose Henry, has been leading demonstrations against old-growth logging at Fairy Creek, three hours northwest of Victoria, for more than 500 days

The 63-year-old activist from the Tla’amin Nation on B.C.’s Sunshine Coast, north of Vancouver, was sought out to help lead the movement by Pacheedaht Elder Bill Jones, who invited the protesters to his community’s traditional territory to campaign against the logging of old-growth trees by timber company Teal-Jones. “Grandma Losah is like a mother to the protesters,” says Jones. Her leadership in the movement “can never be underestimated,” says Rainbow Eyes, a core group member. “She brings wisdom, compassion, leadership and knowledge.” Grandma Losah is an Indigenous leader, an anti-poverty advocate and a community support worker. She has also been labelled an anarchist, professional agitator and workaholic. But as a child she was abused, treated as mentally retarded, and brought up in virtual seclusion.

It seems only yesterday, she says, that she was eight-year-old Rose, driving with her social worker, Miss Bledsoe, in a little white Volvo to meet her foster parents. “I realized on that drive that I wanted to help others like Miss Bledsoe helped me.” Rose had spent most

of her first eight years in the B.C. Children’s Hospital in Vancouver, five hours from her family’s home on the reserve in Powell River, before being placed in foster care. It took 30 years for her to gain access to her welfare files to understand why. The documents arrived in 2013, the result of a Sixties Scoop class-action lawsuit.

Almost 10 years later, Rose has still not looked at those files, fearing the trauma they might reveal. “All I remember from that time is that I was the only child (in my hospital room) who was able to get out of bed... I was alone.” Nonetheless, she shared the 162 pages of the files with this reporter. “This child has had a difficult time to survive,” wrote an Indian Affairs social worker when Rose was seven. According to the records, Rose was admitted to hospital because her teenage mother, Florence, was “unable to keep weekly medical appointments” for her daughter’s kidney condition, which cleared up by age seven. Florence lived in a four-room house with 12 others, “and there is considerable drinking there,” a district supervisor wrote. Rose’s father, Moses, a residential school survivor, was jailed for incest when Rose was four. Although all mentions of Moses’s victims have been redacted, social workers worried for Rose’s safety once he was released.

Upon leaving hospital, Rose had only “one



change of clothing, and a pair of shoes that were far too large for her.” Her medical records report her as “mentally retarded” and “estimate her IQ at 60.” Grandma remembers her foster dad, Howard Lowe, a white teacher, arguing with school authorities who had put her in a “special education” stream: “She is only mentally retarded because she has not been exposed to the rest of the world,” she recalls him saying.

Within a year of moving in with the Lowe family, Rose was progressing well. Still, it would be six more years before she was admitted to a mainstream class. Grandma still remembers the agony of her first day of junior high, where she was one of three Indigenous students. She was seated beside

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