



ENVIRONMENTAL STEWARDSHIP

NEWSLETTER

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VISION

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“We, the Musqueam, will work together to take care of our territory so the following generations will know how to be self-reliant. We will remember our own history and as well, use our traditional teachings to take care of everyone and everything on this earth”.

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FROM THE EDITOR

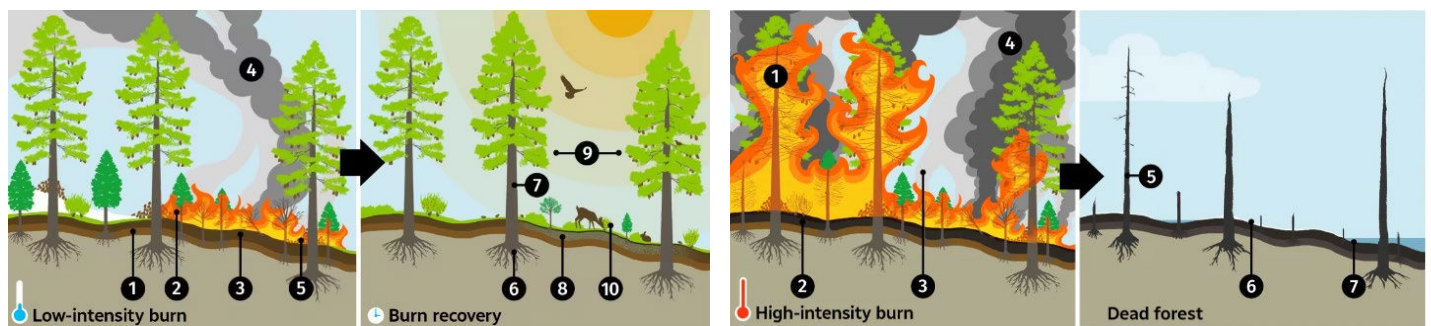
Happy September Everyone!

On behalf of the Environmental Stewardship Department team, we hope everyone is having an amazing summer and has had a chance to get some rest and relaxation. ESD prides itself on being a strong representative voice for Musqueam and Musqueam’s lands, water and territory and we look forward to continuing to represent and serve the community. We hope everyone continues to stay safe and enjoys the rest of summer.

Happy fall and all the best,

Yeganeh Asadian, M.Sc., P.Ag., Environmental Stewardship Manager

CULTURAL PRACTICES HELP FIGHT CLIMATE CHANGE



Low-intensity fire

- 1 Mineral soil
- 2 Ladder fuels (e.g. branches)
- 3 Duff layer intact
- 4 CO² release
- 5 Fine fuels (e.g. twigs, dead leaves)
- 6 Carbon storage
- 7 Thicker bark
- 8 Nutrient-rich mineral soil
- 9 Fire break
- 10 New plants

High-intensity fire

- 1 Canopy destroyed
- 2 Duff layer burned
- 3 Nutrients evaporate
- 4 CO² release
- 5 No CO² capture
- 6 Ash
- 7 Hydrophobic soil

As climate change continues to worsen, we will need to deploy all of the solutions available to mitigate emissions and adapt to a changing climate. The knowledge and leadership of First Nations can substantially advance these objectives. While solutions can come in many forms, three examples highlight the benefits of Indigenous climate action. Cultural burns can help protect our forests from ever worsening fires while traditional clam gardens can protect marine organisms from extreme heat. Indigenous led conservation and carbon offsetting can reduce our emissions, helping to move us closer to net zero.

A formerly common cultural practice being recognized for its environmental and climate benefits is the use of cultural or controlled burns. These burns aim to switch our approach to forest fires. Historically, forest fires have been viewed as a negative occurrence, despite the benefits they provide. Fires help release nutrients from leaf litter back into the soil, create openings in the forest canopy that promote new growth, and help species like pine reproduce. Yet, for more than a century we have been very effective at extinguishing forest fires as quickly as possible. This has led to unnaturally dense forests and

a buildup of fuels like dead trees, branches and leaves. Some of these flammable materials act as “ladder fuels”, helping low intensity surface fires reach the leaves and branches of the tree, also known as the crown, creating high-intensity crown fires. In ways like this our suppression of fire has now made fires much more severe than they would be under natural forest conditions.

Unlike lower intensity surface fires, high-intensity crown fires deplete nutrients in the soil, release vast quantities of emissions, and create hydrophobic soil that repel water, creating conditions for future flooding. They also kill all the trees and shrubs they encounter, leaving behind a barren landscape. This differs from surface fires where many trees survive and shrubs regrow quickly from roots unimpacted by the flames.

The historic western approach to forest management differs strongly from the traditional practices used by First Nations for millennia. Unlike the high-intensity fires we often see today, cultural burns by First Nations were low-intensity surface fires set during the spring or fall when mild conditions are more favourable and the risk of a large crown fire is reduced.

Low-intensity surface fires thin out the forest creating gaps in the crown that promotes healthy new growth of grasses and shrubs, which often survive the low intensity fires and sprout new growth. This creates habitat and food for a large diversity of animals including big game like elk, bison, and big horn sheep. The surviving trees also grow larger, with thicker bark, which increases their resilience to future fires. Low intensity fires also promote carbon sequestration since large trees remove more CO₂ than small ones and carbon sinks in the soil are not disrupted. Large fires not only release huge amounts of emissions, but the forest takes years to become a sink again.

Cultural burns were used for many purposes, including but not limited to stimulating growth of berry patches and medicinal plants, creating grazing land for prey species, and creating fuel breaks around villages and camps. Allowing First Nations to expand their use of traditional cultural burns would not only provide cultural benefits to Nations but meaningfully reduce the threat of fire. This would save money, lessens damage to property and potential loss of life, reduce emissions, and improve forest health and resilience.

Clam gardens are another formerly common cultural practice that have been built and used by Coast Salish peoples for thousands of years. Clam gardens involve constructing a large linear rock wall extending across the intertidal zone, roughly at the low water mark. This creates gently sloped intertidal terraces or shelves that provide excellent habitat for clams and other marine life. The gardens also provide habitat for other species like octopus, sea cucumbers, chiton and snails that utilize the walls themselves. Because they benefit more species than just clams, some Nations refer to them as sea gardens rather than clam gardens. Once built, the gardens were actively maintained through weeding, selective harvesting, and predator deterrence. In some areas these gardens were extensively used. In one area of Quadra Island, researchers at SFU and Wei Wai Kum and We Wai Kai First Nations found that clam gardens had been built on a third of the shoreline. Roughly 113,000 square meters of beach terraces were created, enhancing clam habitat by 36%. This involved not only expanding existing clam beds but building new ones on rocky outcrops and rocky slopes. Professor Dana Lepofsky explains, “it’s not just that people were making already productive clam beaches more productive, it’s that they also regularly created highly productive clam beaches where no beach – and no clam habitat – existed before”.

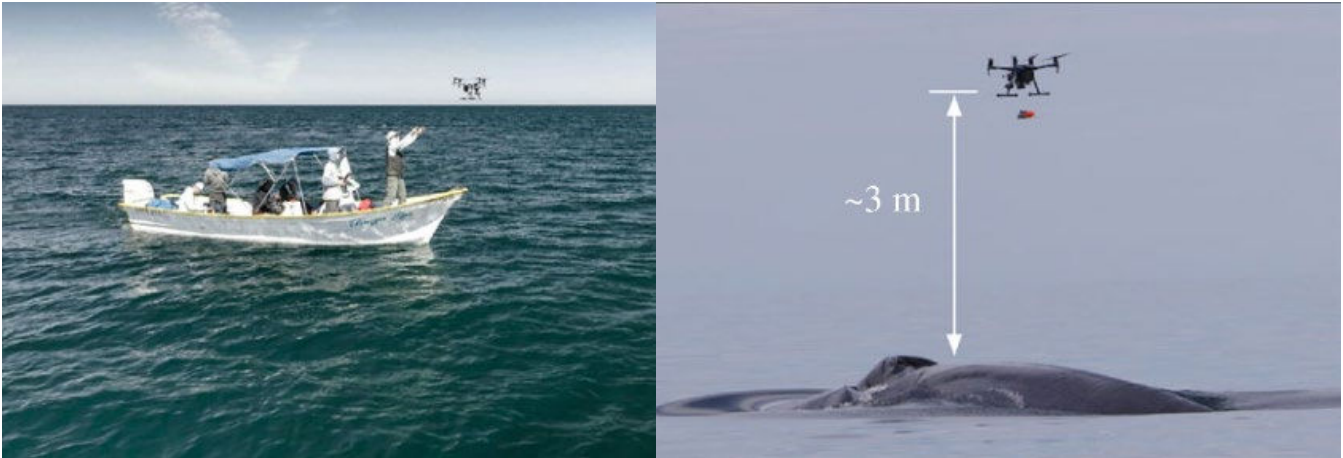
Despite their age and minimal to no maintenance for decades, some clam gardens on Quadra were found to still be up to 3 times more productive than natural clam beds. Despite their extensive use and productivity, clam gardens have not been given much attention in recent years. However, this is starting to change as Nations push to restore the use of cultural practices. Research is also being focused on clam gardens because of their potential use as a climate adaptation. Clam gardens provide excellent habitat for clams and other organisms because as the tide goes out, the rock walls slow the water from receding which helps maintain a cool, wet environment. This important feature of clam gardens helps make them resilient to extreme heat, like the heat dome in 2021 which killed roughly a billion sea creatures. Researchers are attempting to quantify this climate benefit with the help of Penelakut First Nation on Russell Island near Saltspring. Using small tents, researchers are recreating the conditions of the 2021 heat dome. Early results show that clam gardens are very effective at protecting marine organisms living in these vulnerable intertidal areas. In this way, expanding the use of clam gardens can not only promote reconciliation, improve food security, and reintroduce important cultural practices, but can also be an effective, cost-efficient way to adapt to a changing climate. For Ken Thomas of Penelakut, it is confirmation of First Nations' ability to sustainability use resources.

First Nations are also playing an increasingly big role in reducing and preventing greenhouse gas emissions. A key way is through Indigenous-led conservation in areas containing major stores of carbon. Canada's boreal forest, for example, is the world's largest forest ecosystem, storing an estimated 208 billion metric tons of carbon. This is one of the world largest and most important stores of terrestrial carbon. First Nations are successfully protecting massive tracts of land in this region, ensuring the valuable carbon stores remain intact. Three Indigenous communities in the Seal River watershed in northern Manitoba are working to protect 12 million acres of boreal peatland. These forest, wetlands and tundra landscapes hold 1.7 billion tons of carbon, equivalent to 8 years' worth of Canada's annual greenhouse gas emissions. The governments of Manitoba and Canada recently announced their support for a feasibility study, an important step in the creation of protected areas. Another proposed protected area, the Ramparts River and Wetlands, known locally as Ts'udé Niljné, will be over double the size of Yellowstone National Park, once finalized. Indigenous-led conservation projects like these not only provide significant benefits for climate action but also project ecologically and culturally significant areas.

In addition to conservation, Indigenous groups are also fighting climate change through carbon offsets. Historically, the forest industry has focused almost entirely on extraction with little no consideration given to tourism, ecosystem services, carbon, or intangible values. However, this is slowly starting to change. A different way of viewing forests was central to the Great Bear Rainforest agreement. This agreement, more specifically the Atmospheric Benefit Sharing Agreements, give First Nations in the region the right to sell carbon offsets in their territories. Each year Nations can sell one million tonnes of carbon offsets and receive 80% of the revenue from their sales. This helps put a value to preventing carbon emissions and the more intangible benefits healthy forests provide. Across the country, First Nations are increasingly getting involved in carbon offsets as a way to combat climate change and advance sustainable economic development.

Though means like these, First Nations are using their traditional knowledge and expertise in ecosystem management to fight climate change. While progress has been made, much more still needs to be done to reduce the barriers Nations face in implementing cultural practices like these.

EMERGING TECHNOLOGIES PROTECT WHALES WHILE RESPECTING THEIR SPACE



A new method of tagging is being adopted that has proven to be a game changer for whale monitoring groups. The new method utilizes drones, which reduces human contact and interference with whales, helps increase coverage, and reduces the number of boat strikes that occur.

The drone-tagging technique was developed by the conservation organization “Ocean Alliance,” who has been partnering with the National Oceanic and Atmospheric Administration (NOAA) of the United States to adopt it. The process involves a drone taking off from a research vessel and flying above a surfacing whale. A tag with suction cups is then dropped from the drone with sufficient height to “stick” onto the back of the whale. This process is harmless to the whale and considered much less invasive than conventional methods. Before drones, tagging would involve driving a small boat alongside a whale and using a long pole to stick a tag on. This approach is loud and obstructive, causing unnecessary stress to the whales. Because of added stress, the whale may decide to submerge before the crew can attach the tag. In addition, stormy weather would often prevent researchers from being able to tag, unable to launch the smaller boat crews out from research vessels. With drones, researchers and monitors can reach out from further away, and under rougher weather conditions. Crews can be much smaller, and resources can be focused on tagging a larger number of whales.

But why are whales being tagged in the first place? Data collected from these tags is used to study whale’s behavior and movement patterns to prevent entanglements and ship strikes, as well as to understand their reaction to noise. And as the climate is changing, the areas what whales occupy is also changing. We do not fully understand all of the impacts that are affecting whales. Mass stranding events, for example, are not well understood. Understanding the whales’ movement patterns can help provide data that changes human behavior and infrastructure, helping to ensure that harmful interactions with whales are avoided. As oceanic habitats continue to decline, it is hoped that these methodologies will help inform researchers, monitors, and eventually decision-makers on how best to protect whales.

The program is being used on North Atlantic right whales along with 6 species on the East Coast, with over 70 individuals being tagged so far. With this success, it is not difficult to imagine the method being adapted to whale species in the Salish sea. “It’s exciting to have developed a system that works across multiple species and field environments and that is already proving to have a positive impact on the

world of marine mammal research,” said Chris Zadra, drone program manager at Ocean Alliance. As conditions rapidly change and we move to protect species such as the Southern Resident Killer Whale, it is hoped that creative solutions will empower monitors and researchers to protect these species, and the ecosystem at large, for generations to come.

IMPORTANCE OF TREES FOR SALMON



The trees of the Pacific Northwest stand proud as icons of the area. Their image has become well known throughout the world appearing in company logos, promotional travel videos, and historic works of art. They are not just globally recognizable symbols though, they also serve as a vital component of everyday life for another iconic species in the area, wild salmon.

A recent publication in the *Canadian Journal of Fisheries and Aquatic Sciences*, titled *Forestry influences on salmonid habitat in the North Thompson River watershed*, studied tributaries in British Columbia by researchers at Simon Fraser University and Fisheries and Oceans Canada (DFO). Their findings indicate that streams with high levels of tree harvesting in their riparian areas also have water temperatures with a higher maximum average, reaching up to 18.8 °C. This is nearly four degrees above the ideal temperature for some species of salmon.

All fish are highly temperature sensitive animals. They are known as poikilothermic creatures with heat being a key determining factor for their metabolic functions and consequently their behavior. As heat levels rise the rates at which salmon eat begins to decline. If the temperatures continue to get hotter it eventually reaches a point where fish are unable to live. As adults, salmon spend the majority of their time in the sea - where water temperatures are also noticeably rising. Before they reach the ocean though every salmon begins their life in a freshwater stream. Some species of salmon are even known to wait over a year before they begin their journey into the marine environment.

The paper calls for changes to the mechanisms which govern the forestry industry. Under our current regulations streams which are considered less than 1.5m in width have no riparian area protection, even if they contain fish. The trees are able to be harvested which causes waters warm, harming many species including salmon. In order for us to better adapt to global climate change we will need to adjust our forestry practices.

FALL EVENTS AROUND VANCOUVER

** Please note that all events are in accordance with BC Health & Safety Guidelines regarding COVID-19**

❖ **2023 Laver Cup, September 22nd to 24th**

The Laver Cup will head to Vancouver in 2023, with the renowned sporting city set to stage the dynamic team tournament at Rogers Arena from September 22-24, 2023. The three-day Laver Cup competition pits six of the best players from Team Europe, captained by tennis legend Bjorn Borg, against six leading players from Team World, led by Borg's professional rival, John McEnroe. For more info visit <https://lavercup.com/>.

❖ **Great Outdoors Comedy Festival, September 15th and 16th**

The Great Outdoors Comedy Festival (GOCF) is bringing comedy superstars Kevin Hart and Russell Peters to Vancouver, closing out the 2023 Canadian summer series. Vancouver's Stanley Park will be taken over for a wildly hilarious weekend of standup comedy, with Russell Peters on Friday, September 15 and Kevin Hart on Saturday, September 16. Visit <https://greatoutdoorscomedyfestival.com/> for more info.

❖ **Vancouver Civic Theatres presents National Geographic Live, September 12th and October 24th**

The National Geographic Live speaker series at the Orpheum aims to thrill and educate guests with striking photography, captivating video and compelling stories shared by some of the world's most renowned adventurers. The two upcoming shows will cover mountain climbing and lesser-known felines of India, respectively. For more info visit <https://www.destinationvancouver.com/event/vancouver-civic-theatres-presents-national-geographic-live/23378/>.

❖ **Vancouver International Film Festival 2023, September 28th to October 8th**

The annual Vancouver International Film Festival showcases exceptional cinema in one of the world's most beautiful cities. The spectacular 2023 roster will include some of the best cinema from around the globe, talks, conferences, live performances and other unique events that celebrate film and film culture. Visit <https://viff.org/festival/viff-2023/> for more info.

❖ **Cirque du Soleil: Kooza, Weekly until December 31st, 2023**

Between strength and fragility, laughter and smiles, turmoil and harmony, the show explores themes of fear, identity, recognition and power. The show is set in an electrifying and exotic visual world full of surprises, thrills, chills, audacity and total involvement. For more information visit <https://www.cirquedusoleil.com/kooza>.

❖ **Celebrate the Night, October 20th**

This free family-friendly festival will transform Memorial Peace Park into a wonderland of lights, lanterns, artwork, storytelling, Halloween pumpkins, crafts, games, food trucks and a popular fireworks finale. This year's theme is "Light and Shadow" and includes a Light Labyrinth created by the Secret Lantern Society. Come join the fun and be part of this magical experience! For more info visit <https://www.destinationvancouver.com/event/celebrate-the-night/20756/>.

For many more events taking place in Metro Vancouver this winter, visit Destination Vancouver's website at <https://www.destinationvancouver.com/events/calendar-of-events/>.

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