



# ENVIRONMENTAL STEWARDSHIP

## NEWSLETTER

VOLUME 7, ISSUE 2

### VISION

č̣hi:yaýəstəł ct tə ɬniməɬ xʷməθkʷəy̓əm kʷ s xaɬtəmət ct tə sɬa:nɬ təməxʷ. stəne ʔə tθeʔ wə ɬəqəlləxʷəs ʔaɬ kʷθə m̥is yəʔeyəqtaɬxʷ wə scəkʷəlaməxəs kʷθə nəxʷskʷəyχθət. nəʔeməstəxʷ ct ceʔ kʷθə sɬa:nɬ syəθ ʔiʔ ʔəw haɬkʷəx tə snəwəyəɬ kʷ s xaɬtəmət ct kʷθə məkʷ wet ʔiʔ kʷθə məkʷ stem.

*"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 December Everyone!

On behalf of the Environmental Stewardship Department we hope everyone has had a relaxing Autumn. As we approach the new year, it is a good time to reflect on all that has happened over the last year and how we can continue to have a positive environmental impact. We look forward to continuing to work on initiatives and projects to achieve this and leave a positive impact for the community. Stay safe and have an enjoyable holiday season.

Happy Holidays,

Sarah Skapski, Interim Environmental Stewardship Manager

## USING ARTIFICIAL INTELLIGENCE TO MONITOR SALMON STOCKS



Salmon are a vital species for many reasons. They are a key commercial species contributing to BC's economy and providing thousands of jobs, especially important in remote regions where jobs are limited. Salmon also play a key role in healthy ecosystems and are of utmost importance for many First Nations. Monitoring the return of salmon when they migrate upstream to spawn is an essential part of understanding the health and status of salmon populations. Accurate information of populations is needed to inform conservation and management actions and is used to guide decision making, including determining how many salmon can be sustainably harvested.

In small to medium sized streams, spawning salmon are mainly counted by teams of volunteers or technical staff. This method is labour intensive, time consuming, and often error prone. In central and northern parts of the coast salmon often spawn in remote areas and often streams can only be accessed by boat. This adds to costs, logistical constraints, and is more resource intensive. This can be especially problematic for First Nations, whose resources are often limited and whose capacity is also needed for other work and projects. Issues are also compounded by the sheer size of BC's coastline and the huge number of streams.

In some cases, the salmon are monitored with in-river video. While using underwater cameras reduces the amount of field work needed, it is still extremely time consuming, labour intensive and error prone since all of the recorded video must be watched, and the data manually counted and calculated. According to Will Atlas of the Wild Salmon Foundation, it can take technicians “four or five months reviewing the video before [they] have the final count”. This limits the information’s usefulness in making timely decisions.

In order to overcome some of these challenges, researchers are developing a new AI tool to assist in monitoring spawning salmon. Since 2020, two environmental organizations, the Pacific Salmon Foundation and Wild Salmon Foundation, have been working with Simon Fraser University and First Nations on developing an AI tool to assist with monitoring. The computer-vision deep learning model, called ‘Salmon Vision’, identifies and counts salmon as they pass by video cameras located in streams. The pilot project focused primarily on sockeye salmon in Heiltsuk territory. This in part because the Nation and DFO had minimal information about the health of salmon stocks in the area, raising questions surrounding the health of the populations and levels of sustainable harvesting. “A central part of managing and conserving salmon is monitoring the number of adult salmon that return to the river to spawn”, says Will Atlas of the Wild Salmon Foundation.

During the initial pilot project, the research team collected and labelled 530,000 images and video clips which were used to develop and train the model. The images and videos were gathered from the Gitanyow Fisheries Authority and the Skeena Fisheries Commission, who recently started using underwater cameras to monitoring spawning salmon.

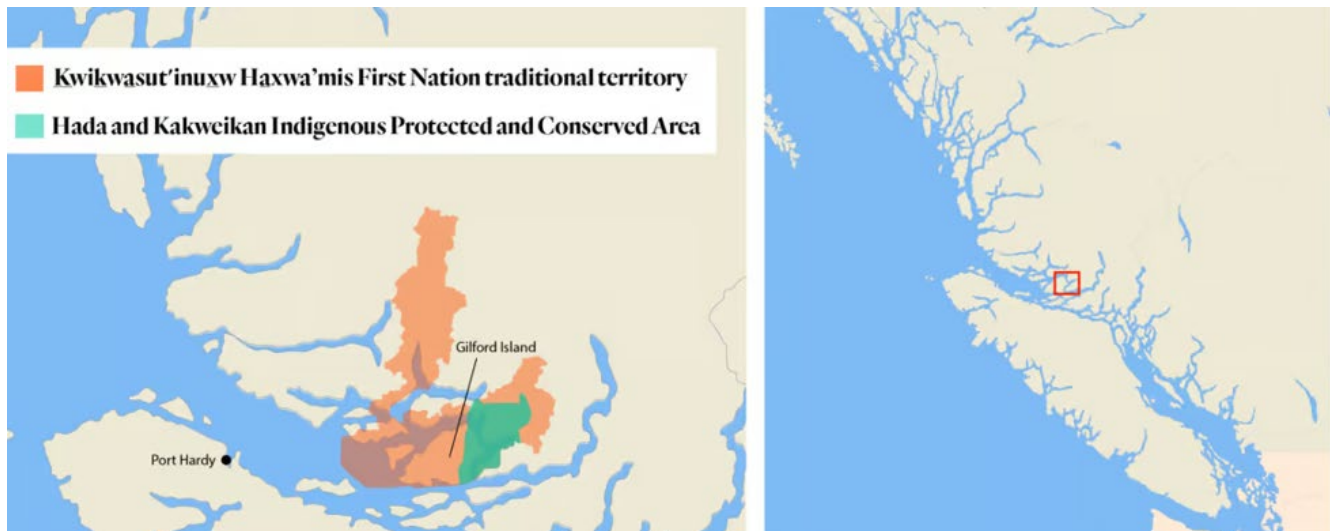
The powerful artificial intelligence uses this inputted information to learn how to differentiate and identify fish. In this case, the tool can identify and differentiate 12 species of fish, including all five native species of salmon. The AI model was roughly 90% effective at identifying coho and 80% effective for sockeye. However, it is currently less effective at identifying pink and chinook salmon. This is due largely to the fact that these species change in appearance when they spawn. Increasing the amount of data used to train the AI model can overcome this challenge since AI models become more effective the more information they have available.

While Indigenous Knowledge was not used to develop the AI model, it was used to make it more effective. Weirs based on Indigenous practices were built to guide the movement of salmon passed the cameras so no fish are missed. Indigenous Knowledge was also used to determine when to set up cameras and where within streams.

The availability of accurate real time data provided by this type of technology can provide numerous benefits including making more timely decisions, preventing overharvesting and providing the information needed to recover unhealthy populations. Once this technology is refined it is also likely to reduce monitoring costs and can be widely deployed, increasing the amount of information available to decision makers. One of the most important benefit for First Nations is the amount of time it saves. In the case of Heiltsuk, staff were able to spend 60% of their time on other important projects to the Nation between April and October, instead of spending all of it monitoring salmon.

The success of the pilot project has led to a continuation and expansion of the work. Researchers plan to expand the use of the tool to assist 12 First Nations and develop a web application where anyone can upload videos to use the AI tool. While still in its infancy, the pilot project has shown that AI is a powerful new tool in the sustainable management of salmon.

## NEW INDIGENOUS PROTECTED AND CONSERVED AREA DECLARED IN COASTAL BC



On November 16, the Kwikwasut'inuxw Haxwa'mis First Nation (KHFN) declared that 40,000 hectares of land and water located within their traditional territory is now the Hada & Kakweikan Indigenous Protected and Conserved Area (IPCA). Documentation published to their website states the Nation's intentions are to restore, maintain, protect and manage the sensitive habitats and food sources within the area.

One way the Nation is planning on fulfilling their role as stewards is with a full review of the parks, tenures and other land use authorizations issued by the Crown without KHFN's free, prior and informed consent.

In a response to questions posed by The Narwhal, the B.C. Ministry of Water, Land and Resource Stewardship noted that "the government respects and acknowledges the efforts of Kwikwasut'inuxw Haxwa'mis First Nation to protect ecosystems within their territories" and that "where possible, our preferred approach is for Indigenous-led stewardship interests, such as IPCAs, to be addressed through government-to-government collaborative processes like modernized land use planning".

The idea of an Indigenous Protected and Conserved Area was brought forward by The Indigenous Circle of Experts in their report *We Rise Together*, where they define an IPCA as "lands and waters where Indigenous governments have the primary role in protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems".

An IPCA must also meet three criteria as outlined in the report: "They are Indigenous-led; they represent a long-term commitment to conservation; and they elevate Indigenous rights and responsibilities".

The Hada & Kakweikan IPCA has yet to receive a statement of support from the provincial government, who have not voiced their stance on any IPCA created in the last five years.

## MASS TIMBER – A NATURAL ALTERNATIVE TO CONCRETE



Mass timber is a relatively new building material that has been quietly growing as an alternative to concrete and steel. It is made from laminated wood compressed together to form beams that are able to support buildings as high as 25 stories. While it was initially thought that mass timber could only be used for buildings under 6 stories, designers continue to break records and expand on the potential of building with wood. While concrete production results in huge amounts of CO<sub>2</sub> being emitted, mass timber has the potential to be carbon-negative, sequestering massive amounts of CO<sub>2</sub> within its wood structure. Provided that the wood is sustainably sourced, this emerging building material has the potential to transform the way homes and offices are built around the world.

### The Expanding Potential of Mass Timber

British Columbia is widely considered to be at the forefront of mass timber design. In 2010, the Olympic Oval in Richmond awed the world with its beautiful wood structure, using mass timber as a major component. In 2017, UBC held the record for world's tallest mass timber building, the Brock Commons Tallwood House, at 18 stories. The Tallwood House showed that tall mass timber buildings were feasible. And as BC designers pushed the envelope, others followed suit. Countless high-rise structures can now be found in Europe and the United States, and the record for the tallest mass timber building is regularly broken. The current record holder is the Ascent MKE building in Milwaukee, Wisconsin, USA at 25 stories and 86.6 meters, which is claimed to sequester about 7,200 metric tons of CO<sub>2</sub>. Several large projects are also planned in Metro Vancouver, including an overpass and a 12-story student housing tower in Burnaby. In Vancouver, the Pacific National Exhibition (PNE) Amphitheatre is expected to be the largest timber roof structure in the world when it is completed.

While the benefits for large scale buildings are apparent, the area where mass timber really has a chance to shine is in multi-family housing. In a traditionally constructed building, wood is measured and cut on-site and concrete is mixed on-site as needed. Traditional construction takes a long time and produces a lot of wasted material. Mass timber, on the other hand, is designed and prefabricated offsite. At the construction site, the parts are put together like an IKEA set. While this creates considerable design costs, they can be offset through economies of scale. Building large numbers of multi-family housing would mean that well-designed structures could be constructed at incredible speed. For example, the

Tallwood House at UBC was built at a rate of two stories a week and was completed in 66 days. If it was made with traditional materials, the building would have taken around 6 months to finish. To top it all off, it is claimed that 2,423 metric tonnes of CO<sub>2</sub> were sequestered by switching to mass timber from concrete. The UBC Tallwood Building demonstrates the potential of mass timber to meet the growing need for housing, and do so in a more sustainable manner than current construction methods.

### Benefits of Wood Over Concrete and Steel

Designers that play to the strengths of mass timber can create beautiful buildings that would simply not be possible with concrete. The wood material is well suited to curved shapes, leading to visually distinctive designs such as the VanDusen Botanical Garden building in Vancouver. Admirers of the Olympic Oval often cite the intricate wave pattern of the roof structure. The wood framework of family units and office buildings is often highlighted rather than hidden. Designers often mention the healing effect of being surrounded by natural wood. While it is difficult to quantify, replacing a cold, concrete environment with a bright, natural wood one may have significant positive effects on mental health, especially for urban residents who may not have access to natural spaces.



Figure 1. VanDusen Botanical Garden in Vancouver, British Columbia.

When building any large building in BC, it is important to consider their resistance to earthquakes and fires. Because mass timber is significantly lighter than concrete, there is less weight to be pushed around in the event of an earthquake. In addition, wood is much more flexible than concrete and steel. The end result is a structure that is highly resistant to collapse in the event of “the big one”. Mass timber is also fire-resistant, handling heat much better than traditional wood structures. Because mass timber is made of compressed laminated wood, there are no air bubbles, which makes it take longer for fire to burn through. Wood also has some advantages over steel. When wood burns, it chars, creating an insulative layer that protects the core. Engineers are taking advantage of these characteristics, designing buildings to stand even when damaged by fire.

### Implementation is Key

While there are many benefits to mass timber construction, there are some caveats. Contrary to many claims, mass timber is not cheaper than concrete, especially in North America. Although BC is a leader in mass timber design, and despite the heavy logging presence, many projects in BC have their parts shipped from Europe where the material has been widely adopted. This is simply because there is not enough mass timber being manufactured locally. Due to the prefabricated nature of mass timber construction, cost is heavily dependent on having a large supply chain. As it stands, there are not enough North American manufacturing plants to keep up with demand. But that fact is slowly changing, as the number of mass timber plants have grown from only 4 in 2016 to 38 today. And that number is expected to more than double by 2027.

In BC, we have seen the impact of the logging industry. Old growth forests have been decimated and continue to be cut at an alarming rate. Caution about the environmental benefits of mass timber has been raised by different environmental groups. Wood for mass timber needs to come from responsibly managed forests, and not from old growth, to be considered sustainable. Since September 2022, there have been more than 800 mass timber projects in the United States alone, with 700 additional buildings currently under construction. Mass timber is projected to take up as much as 10 percent of the North American lumber supply by 2035. With this anticipated growth in demand, responsibly sourcing materials, and having a plan to reuse the wood when the building eventually comes down, will be important to provide the substantial benefits mass timber can provide while minimizing the potential impacts to our planet.

## WINTER EVENTS AROUND VANCOUVER

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

❖ **Capilano Canyon Lights, November 17<sup>th</sup> to January 21<sup>st</sup>**

Explore an enchanting winter wonderland: Cross the world-famous bridge, lit end-to-end with a changing multi-colour display, and sway high above the illuminated Capilano River. Journey into a glittering rainforest and walk high above the forest floor on a transformed Treetops Adventure. For more info visit <https://www.capbridge.com/events/canyon-lights/>.

❖ **PNE Winter Fair, December 8<sup>th</sup>, 9<sup>th</sup> and 14<sup>th</sup>-23<sup>rd</sup>**

Embark on the ultimate journey to meet Santa Claus by solving puzzles and cracking riddles, ride the PNE Holiday Express, wander through Winter Lights, go skating, or try the Ice Bumper Cars. Then warm up with the culinary extravaganza at the Holiday Eats & Treats. Visit <https://www.pne.ca/winter-fair/> for more info.

❖ **VanDusen Festival of Lights, November 24<sup>th</sup> to January 7<sup>th</sup>**

Explore over one million magical lights at VanDusen Gardens' annual Festival of Lights. Get in the holiday spirit with the infamous Dancing Lights, explore themed light areas, and savour tasty treats from a variety of food vendors. For more information visit <https://vancouver.ca/parks-recreation-culture/festival-of-lights.aspx>

❖ **Vancouver Christmas Market, November 16<sup>th</sup> to December 24<sup>th</sup>**

Combining colourful décor, authentic gifts, enticing food and drink, and family entertainment, this festive celebration creates the perfect atmosphere to mix and mingle with friends and family, have a quick lunch or after-work drink, find a festive photo op, and take in a wide variety of holiday entertainment! For more info visit <https://www.vancouverchristmasmarket.com/>.

❖ **Vancouver International Wine Festival, February 24<sup>th</sup> to March 3<sup>rd</sup>**

Festival-goers can browse 149 wineries from 12 countries, including 71 wineries from theme country Italy. There are also wineries travelling from France, Spain, Croatia, Greece, Argentina, Australia, Chile, and New Zealand and sake brewers from Japan. For more information visit <https://www.destinationvancouver.com/event/vancouver-international-wine-festival/23648/>.

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/>.

## CONTACT US

For further inquiries regarding the newsletter and our green initiatives, please contact:

**Sarah Skapski**

Interim Environmental Stewardship Manager

[sskapski@musqueam.bc.ca](mailto:sskapski@musqueam.bc.ca)

**Ryan Kadoranian**

Environmental Stewardship Major Projects Coordinator

[rkadoranian@musqueam.bc.ca](mailto:rkadoranian@musqueam.bc.ca)

**Marc-Andre Hervieux**

Environmental Stewardship Analyst

[mhervieux@musqueam.bc.ca](mailto:mhervieux@musqueam.bc.ca)

Office: 604.263.3261

Website: <https://www.musqueam.bc.ca/departments/iga/environment/>

Instagram: @envirostew

Facebook: Enviro Stewardship

