

LISTENING TO UNTOLD STORIES

Curation of a radio program on the Fraser River Estuary



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EXECUTIVE SUMMARY

WHAT IS AN ESTUARY?

Estuaries are geographical regions characterized by the convergence of saline water from the ocean and freshwater from rivers, forming transitional zones abundant in nutrients. These ecosystems are among the most productive in the world. Nevertheless, due to human interventions like damming, diversion, and depletion, estuaries face immense pressures. The Fraser River Estuary in southwest British Columbia is one of Canada's most significant estuaries, attracting millions of migrating birds yearly and providing a critical habitat for salmon stocks to spawn. Unfortunately, this ecosystem is threatened by climate change, water pollution, and habitat destruction, which act cumulatively, causing biodiversity loss, decline in ecosystem services, and the loss of cultural heritage.

RADIO-PROJECT

To address these environmental and social challenges, inclusive and holistic management approaches, research, and co-creation of knowledge are necessary. Yet, navigating such pursuits is complex, given the divergent viewpoints of various stakeholders involved. In this context, radio programming can be seen as a means to inform, engage, and inspire action around the Fraser Estuary by exploring approaches, perspectives, and knowledge systems around this precious ecosystem.

OBJECTIVES

The project's primary objective is to curate and create a *12 to 24-hour radio program* sourced from new content and rebroadcasting material received under permission from contributors. The project's secondary objective is to answer the research question: *How can radio programming be used to connect science and society and protect the Fraser Estuary?*

In summary, the project objectives are:

- 1. To create a 12 to 24-hour radio program on the Fraser River Estuary.**
- 2. To write a radio program guide and to secure images for the purpose of social media promotion.**
- 3. To identify how radio programming can contribute to connecting science and society.**

APPROACH

Through an abductive approach, a curatorial concept was developed. This concept contains four main clusters (1) STEM Research, 2) Art, Culture, and Recreation, 3) Indigenous Rights, Knowledge, and Stewardship, and 4) Past, Present, and Future Perspectives. Based on these interconnected thematic clusters, different materials, contributors, and interviewees were sourced, carefully addressing each area to ensure that the diversity of context and content is addressed.

The secondary research objective was explored by drawing on a literature review as well as a participatory inductive research approach using informal conversations and practicing reflexivity.

RESULTS & OUTLOOK

The final program consists of 18 hours and 49 minutes of audio material, showcasing various perspectives and conservation approaches related to the Fraser Estuary. The audio content encompasses interviews, conversations, podcasts, performances, poetry, and music, featuring relevant stakeholders such as artists, scientists, and indigenous peoples. Various environmental recordings capture the voices of migrating birds, insects, waves, and winds, allowing the sounds of all living beings in this ecosystem to be heard. The content and audio formats are tailored to attract a broad audience and generate far-reaching societal interest in the Fraser Estuary. The purpose of

the radio program is to build connections and highlight the importance of collaboration, cooperation, and different ways of knowing. The radio program is featured on Tuesdays from August 2023 to August 2024 on Other Sights' Currents and Waves Radio Platform.

The research findings suggest that while radio programming supports unidirectional communication, it is distinguished by a low barrier to participation in scientific and societal debates. It is also a medium that allows engagement in subject matter more profoundly and extensively, counteracting the tendency of fast-paced social media. Finally, radio allows science to be used in unconventional ways, such as monitoring recordings as art installations and cultural content, which goes beyond the typical way science is applied in society, thereby blurring the lines between science and society.

1 INTRODUCTION

1.1 Fraser River Estuary

The Fraser River is one of the most significant waterways in Canada, draining a watershed of around 217,000 km². It originates in the Rocky Mountains and winds through 1370 km of terrain until it flows into the Salish Sea near Vancouver (Morrison et al., 2002). This area, where the river meets the ocean, is called the Fraser Estuary, which forms a complex and ecologically important area that supports various life forms, including orcas, migrating birds, fish, bats, insects, plants, and humans (Canham et al., 2021; Chalifour et al., 2021). The Fraser Estuary consists of various zones, including tidal marshes and mudflats, each playing a distinct role in supporting this vibrant and interdependent network of life. The different zones offer abundant food sources, facilitate nutrient cycling, and enable detritus flux, all leading to high biological productivity (Bradfield & Porter, 1982).

Although the Fraser Estuary has a thriving ecosystem, over the years, it has been significantly impacted by human activity. Since the beginning of the 20th century, humankind has transformed rivers by building dams, diverting, and depleting their resources worldwide. Albeit the Fraser River was untouched for a long time, being the foundation for complex social constructs of many indigenous peoples, when European settlers came, the river was colonized, connected globally, and exploited for commodity gain (Evenden, 2004). Particularly in the Lower Fraser River Basin, mining, fishing, and lumbering industries led to a 70-90% decline in wetland losses since the European settlement (Boyle et al., 1997; Evenden, 2004).

Unfortunately, the impacts of humans on the Fraser Estuary carry onwards into our modern-day life, as this ecosystem faces immense threats from human activities such as climate change, water pollution, and construction, like the plans for Robert Banks Terminal 2 (Healey, 2011). These cumulative impacts lead to extreme habitat and biodiversity loss, leaving 102 species at risk of extinction within the Fraser River Estuary (Kehoe et al., 2021). Additionally, given the colonial context, essential questions of land and water rights, sovereignty, and environmentally just decision-making are at stake (Cameron, 2022; Stephens & Church, 2017). These issues place enormous challenges on finding strategic management plans, effective governance, and social engagement that includes multiple forms of knowledge and expertise.

1.2 Practical Scope and Research Objective

A large part of the public is not informed about the environmental and social issues surrounding the Fraser Estuary and the ways in which they can get involved to help mitigate these problems. Therefore, leveraging radio programming can prove to be an impactful strategy to increase awareness and share diverse viewpoints on the Fraser River Estuary, with the goal of safeguarding this vital ecosystem through a holistic approach.

Thus, this Sustainability Scholars project comprised a *practical component* and a *research component*:

The practical goal was to curate a **12- to 24-hour radio program** on the Fraser Estuary, exploring its marvel beauty from various perspectives, like science and art, and providing directions to safeguard its precious ecosystems for humanity and nature's benefit. The scope was to source content from existing material for rebroadcasting and generating anew. Additional responsibilities included obtaining program descriptions, biographies, and photographs from contributors.

The research objective was to explore what role radio programming can play in mobilizing support to protect the Fraser Estuary. This intricate and dynamic ecosystem is used by both people and wildlife, necessitating an investigation into the role science communication can play in conserving this watershed for prosperity and survival. Thus, the guiding research question of this study was: **How can radio programming contribute to connecting science and society in protecting the Fraser Estuary?**

2 APPROACH

2.1 Practical Component: Curating a Radio Program

A comprehensive three-phase project plan was formulated to develop an engaging 12 to 24-hour radio program for Other Sights *Currents and Waves* radio. The plan carefully outlined the methodologies to be employed and established a timeframe for completion. The audio content was acquired through two distinct approaches: through recording new material and through identifying existing material for rebroadcast, for which contributor permissions needed to be obtained. During the radio program's creation, contributors provided brief descriptions of program episodes, biographies, and accompanying images, which the scholar edited.

Phase 1 Research and Conceptualization:

The first phase (May 2023) was subdivided into a research and conceptualization step. For the research step, official reports, published papers, and grey literature on the Fraser River Estuary were used to:

- Explore the format and auditory style of *Currents and Waves* Radio
- Identify the target audience
- Research what types of audio formats exist and their respective functions
- Research the environmental, cultural, and socioeconomic perspectives on the Fraser Estuary

The data was then utilized to conceptualize a framework inductively. For this, the written data acquired from the literature review was coded. A code denotes the presence of a particular concept or value within a story, text, or note. There were 27 codes in total, which were organized into four major themes: (1) STEM Research, (2) Art, Culture, and Recreation, (3) Indigenous Knowledge, Rights, and Stewardship, and (4) Past, Present, and Future Perspectives. These clusters are not to be seen as thematically distinct. Instead, they are all interconnected through overarching and connecting themes. However, while the clusters in this framework should not be regarded as separate realms, they were used as a guide to incorporate diverse worldviews, viewpoints, and ideas about the Fraser Estuary that were found in written form and translated into auditive material. This framework was then deductively used as a guidebook to identify new and rebroadcasting contributors.

Phase 2 Securing and Recording:

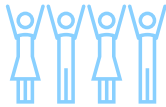
In the second phase (June 2023), the scholar searched for existing content that could be rebroadcasted with contributor permission and recorded new material with identified and selected interviewees. The process of finding existing material happened through searches on Google, SoundCloud, Apple Podcast, Spotify, and other platforms by entering search words like "Fraser," "Estuary," or "River Salmon BC." After finding a suitable podcast, video, or audio material, the scholar listened to it to ensure its relevance and placement within one of the clusters. Afterward, the scholar contacted the main contact person through email, offering an honorarium based on the type of material. The scholar was responsible for managing the financial aspect of the project. An Excel sheet was utilized to keep track of all people contacted, finances, and follow-ups. The scholar followed up if no response was received after two weeks. After obtaining contributor permission, the materials were shared, and the scholar requested program descriptions, biographies, and photographs for promotional purposes.

Following the exploration and categorization of existing material for rebroadcasting purposes, the cluster framework was utilized to identify which viewpoints and voices were not yet represented by the collected material. A Google search was utilized again to discover suitable interview partners and persons striving to safeguard the Fraser Estuary through science, art, indigenous, or socio-economical work. After contacting possible interviewees and obtaining their availability, the recording was completed at UBC Studios or at the event locations of the contributors. The recordings at UBC Studios were done in their DIY Audio Suite using the software Audacity, and the field recordings were done with an Olympus LS-10 recorder and a Rode Video Mic Pro microphone.

Phase 3 Editing and Assembling:

In the third phase (July 2023) of the practical component, the new audio materials were edited, and the final radio program was assembled. The new material was edited in Descript and in Garage Band by Apple on the scholar's laptop. The final audio files were curated to rotate between clusters to appeal to a wide range of audiences and to ensure that if listeners just tune in for a short time, they are exposed to different types of content. Once the sequence was determined, all files were uploaded to Radio King, the radio platform, into the library, where a playlist was created and inserted into the Tuesday program schedule.

2.2 Research Component: Radio Programming to Connect Science and Society



The final radio program explores various aspects of the Fraser Estuary, ranging from long-term biodiversity monitoring and conservation management approaches to Indigenous land and water sovereignty. Although incorporating many perspectives is a choice of the scholar, the question of how radio programming itself can contribute to connecting science and society remains an interesting research question. The research component of this report asks: How can radio programming be used to connect science and society in promoting the protection of the Fraser Estuary? This question was answered by a theoretical exploration, by drawing on a literature review on science communication, as well as by creating the radio program and utilizing a participatory research approach generating data from informal conversations and the newly created radio interviews.



For the literature review, the search engine Google Scholar was used to gather literature on science communication using keywords like "science communication," "communication studies and mediums," "environmental communication." Literature discussing audio or visual mediums was chosen, preferably to understand the significance of radio programming in this specific case of the Fraser Estuary. In the second step, radio interviews with researchers, artists, and indigenous people, as well as informal conversations with contributors, were used to build theories on the potential opportunities of radio broadcasting to connect science and society.

3 Untold Stories

3.1 Practical Component: Curatorial Concept

Part of the practical component's result is the *Curatorial Concept* shown in **Figure 1**, which is an outcome of 'Phase 1 Research and Conceptualization' of the radio program. The following cluster descriptions contain a brief summary of the literature research and each two examples of the final program. In summary, by covering these four clusters, the Fraser River Estuary was explored utilizing different lenses, which is important to foster a holistic approach to protecting this ecosystem.



Cluster 1: STEM Research

This cluster focuses on exploring the Fraser Estuary environment from a STEM (Science, Technology, Engineering, Mathematics) perspective. The Fraser Estuary is a unique ecosystem where freshwater and saltwater meet. This diversity creates a habitat for various organisms, from microscopic plankton to species to marine mammals. It is a globally significant bird migration area, crucial for salmon spawning, and a significant part of their life cycle. However, to understand how human impacts alter this ecosystem, the ecosystem must first be fully understood. For example, changing climatic patterns are shaping the hydrological behavior of the river, which leads to increasingly greater variability in annual streamflow, which in return can impact salmon migration and other species (Déry et al., 2012). For migrating birds, it was found that shorebird abundance is closely associated with the nutritional quality of intertidal biofilm, which is one of the main food sources (Drever et al., 2023). All these insights are obtained through extensive monitoring and documentation by many scientists studying this ecosystem. They are part of the foundation of our understanding and help inform management.

Consequently, this cluster investigates ongoing research to comprehend the ecosystem's biology, chemistry, and physical properties. It highlights the expert perspectives, methodologies, and technologies used to investigate the Fraser Estuary and how this research informs conservation efforts. Examples in this cluster include the rebroadcast of 'A Prospectus for Conservation,' which explains which management approaches can be adopted for biodiversity conservation and why conservation efforts should target multiple species rather than just one. Another example in this cluster is the newly created interview on 'Biomonitoring at the UBC Farm,' which explains which long-term biomonitoring methods exist, how to analyze large amounts of data, and what conclusions can be derived from these findings.



Cluster 2: Art, Culture, and Recreation

The second cluster explores the cultural, artistic, and recreational influences and uses of the Fraser Estuary. Nature and the natural environment have long served as a source of inspiration for scientists, artists, and inventors. For example, biologists have been inspired by insects and animals to create robots and other machines (e.g., octopus arms, insect legs, and elephant trunks) (Trivedi et al., 2008). Likewise, artists have been stimulated by nature to create art through various mediums, like canvas, paper, photography, or music. The stunning landscapes of deserts, rainforests, and shores evoke a strong sense of personal connection and a desire to protect these precious locations. However, studies have shown that not only nature inspires art, but that art about nature inspires our behavior by fostering emotional attachment and empathy towards the environment. Thus art can play a crucial role in shaping pro-environmental attitudes (Curtis, 2009). Exploring the Fraser Estuary through the perspective of artists' art may change listeners' interaction with this ecosystem, as the Fraser Estuary is also used as a place for recreation, meditation, and walks.

The objective of this cluster is to incorporate poetry and music that draws inspiration from the Fraser River Estuary, with the intention of fostering an appreciation for the aesthetic qualities of this ecosystem. This cluster features the Fraser Estuary as a place for recreation and connectivity to nature. In addition to including the perspectives of local poets, musicians, and artists, this cluster also delves into the auditory expressions of other forms of kinship present in our environment, such as insects and birds. Examples in this cluster include the rebroadcast of the piano music 'Soundtrack from Soul of the Fraser Documentary.' The music is inspired by the stunning landscapes and vibrant communities surrounding the Fraser River Estuary, intertwining the natural sounds of the Estuary (chirping birds, rustling leaves) with the rich and dynamic tones of various instruments (strings, piano). Another example of this cluster is the newly created material 'Homage to the Fraser Estuary.' The guitar composition elicits a sense of joy, serving as a contrasting element to the poetry and eliciting an emotive response associated with unexplored terrain.

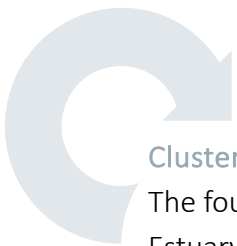


Cluster 3: Indigenous Rights, Knowledge, and Stewardship

The third cluster explores the Fraser Estuary from an Indigenous knowledge holder's perspective and explores their ongoing stewardship and connection to this watershed. The Fraser River was named after Simon Fraser, a fur trader born in New York who voyaged down the river in 1808 (Fraser, 2007). However, the river has a much older history than its name given by Simon Fraser. Indigenous communities have been inhabiting the River and the Salish Sea since time

immemorial, which is also reflected in their language. For example, the Coast Salish Indigenous living along the lower 170 km of the Fraser River in British Columbia are called Sto:lo. Sto:lo means 'people of the river' and is a combined name for all Halq'emylem-speaking people (Mohs, 1994). These people have lived and built social constructs around the river, especially around salmon. Thus, the estuary has long been a gathering place and a source of sustenance connecting communities (Evenden, 2004). Indigenous knowledge and traditional practices continue to shape the relationship between the land, the river, and the Fraser Estuary, highlighting the inseparable ties between culture and nature.

This cluster investigates Indigenous connections, environmental knowledge, rights, and stewardship and seeks to include community members' perspectives on their connections to and work in and around the Fraser Estuary. It investigates how Indigenous communities are working to safeguard the Estuary and what can be learned from their strategies. One example of the final program covering this cluster is the rebroadcast of the episode 'Conservation in the 21st Century' from the Connected Estuary Webinar (Raincoast Foundation Webinar Series), exploring indigenous-led initiatives for conservation. Another example covering this cluster is the newly created interview on a public art project called 'Sovereign Waterways.' This project is an art installation by three artists from the x^wməθk^wəyəm (Musqueam), S_kw_xwú7mesh (Squamish), and səliwətał (Tsleil-Waututh) nation at the Blue Cabin, which is a floating art residency. The project centers around sharing the values and art of these indigenous nations.



Cluster 4: Past, Present, and Future

The fourth cluster is concerned with the past, present, and future perspectives of the Fraser River Estuary, exploring its history and future socioeconomic developments. Part of the historical past of the Fraser River is a gold mining rush in the early 1860s, where miners developed a substantial mining industry along the Fraser River up until the end of the nineteenth century. These activities heavily influenced the vegetation, which is evidence of the long-standing effect of this industry up until today (Nelson & Kennedy, 2011). Currently, the Fraser River Estuary Basin is inhabited by a population of two million people, serving as a gateway to western Canada, with urban centers, industrial activities, hydroelectric projects, and transportation infrastructure being established by humans over time. The region's flat terrain, loose soil, and abundant construction materials, such as wood, made it ideal for developing cities (Bendell-Young et al., 2004). Thus, the Fraser Estuary is an incredibly fertile and productive area, supporting industries such as hunting, fishing, and harvesting. It also enables agriculture in the region to thrive and contributes to food security (Evans-Ogden et al., 2008). All this led the estuary to be at present-day exposed to many risks like

pollution, climate change, and habitat degradation, all posing risks to the fragile balance of this unique ecosystem (Bendell-Young et al., 2004; Hall & Schreier, 1996). This is further exaggerated by the plans to build Robert Banks Ferry Terminal 2 (RBT2). The Vancouver Fraser Port Authority is leading the development of RBT2, which will be a container terminal on Canada's western coast (*Roberts Bank Terminal 2 Project*, n.d.). Supporters of this project claim that it will greatly benefit Canadian trade. At the same time, those against it argue that it poses a significant threat to endangered species and violates existing laws on species conservation.

The aim of this cluster is to explore the history and future of the Fraser Estuary. Examples include the rebroadcast material like the Future Ecologies Podcast 'FE2.4 Terminal' exploring the impacts of RBT2 on killer whales and other species. Another example is the workshop 'Salmon-centric Planning,' which was generated anew and encourages adopting new salmon-centric perspectives in the future, embracing to formulate decisions based on the requirements of salmon rather than solely prioritizing human life. This implementation of novel views has the potential to prompt a new approach to the management of the Fraser Estuary, thereby influencing the trajectory of our future.

STEM RESEARCH

This cluster focuses on ongoing research to better understand the biology of the Fraser Estuary ecosystem. It covers research methods, monitoring techniques, and current knowledge of climate change and other environmental stressors impacts.

PAST, PRESENT AND FUTURE

This cluster revolves around the past, present, and future of the Fraser Estuary, touching upon economic mega-projects in the near future like Robert Banks Terminal 2.



ART, CULTURE AND RECREATION

This cluster highlights topics related to human culture and creativity. It encompasses various formats, including music, poetry, and arts about the Fraser Estuary, as well as education and recreation initiatives.

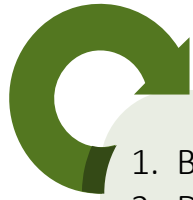
INDIGENOUS RIGHTS, KNOWLEDGE, AND STEWARDSHIP

This cluster explores the long-standing relationships of Indigenous peoples with the Fraser Estuary and dives into their wealth of knowledge about the natural world.

Figure 1: Curatorial Cluster Concept

3.2 Practical Component: Radio Program

The finished radio program is the result of the practical component's 'Phase 2, Securing and Recording' and 'Phase 3, Editing and Assembling' phases. 18 hours and 49 minutes of radio program were obtained in total. There are 18 primary sections in the program, some of which contain subsections. The entire program will be available on [Currents and Waves](#) between September 2023 and September 2024. Included in the program are recorded conversations, podcasts, interviews, institutional lectures, ambient environmental soundscapes, sound walks, poems, acoustic music, soundtracks for documentaries, and ceremonial processions. [Appendix A](#) contains the written program guide with program descriptions, durations, and broadcast times. The promotional images can be found on the [Other Sights Instagram page](#). Contributors provided the program descriptions, biographies, and images, while the scholar edited and made modifications. **Figure 2** provides a summary of all radio program components designated to their respective primary clusters.



1. Biomonitoring at the UBC Farm (New)
2. Destruction of the Fraser River (From Bigger Than Me Podcast)
3. A Prospectus for Conservation (From UBC Forestry Webinar)
4. Birds on the Pacific Flyway (From Raincoast Conservation)
5. Caring for Whales (New)



1. Soul of the Fraser Soundtrack (From Documentary)
2. Homage to the Fraser Estuary (New)
3. Summer Solstice MOTHLIKE silvery/blue (New)
4. Soundwalk South Dyke Trail Richmond (New)
5. STAR Traveller (From Jay Peachy Gallery)



1. Conservation in the 21st Century (From Raincoast Conservation)
2. Sovereign Waterways (New)
3. Salmon Returns Series (Rebroadcast)
4. Pollution is Colonialism (From Media Indigena Podcast)
5. Climate justice with Indigenous communities (From UBC Forestry JEDI Podcast)
6. Protecting from Floods (New)



1. FE 2.4 Terminal (From Future Ecologies)
2. Salmon-centric Planning Workshop (New)
3. Call of the Seawolf (New)
4. RBT2 Resistance (New)
5. The Salmon People Episodes 1-5 (From TSP Podcast)

Figure 2: Rebroadcast and New Content in their Respective Clusters

3.3 Research Component: Science Communication

EARLY 20th CENTURY

The concept of science communication emerged in the early 20th century to improve the public's ability to make rational judgments and incorporate scientific information into their livelihoods. Scientific literacy, defined as mastery of basic textbook facts, became increasingly important throughout that historical period. At the time, science was defined as probabilistic reasoning and experimental design, and the goal was to create an appreciation of S&T, which ultimately was suggested to lead to good societal results as illogical ideas like astrology and numerology would be rejected (Bucchi, 2013). As a result, science was regarded as rigorously separate and independent from society. In this understanding of science, the public was seen as passive and ignorant, needing science to enlighten them. This meant that communication was viewed as a technique to fill knowledge gaps, implying that communication was primarily one-way, from the scientists to the illiterate public. Thus, science at the time was very authoritative (Burns et al., 2003).

1960s to 1970s

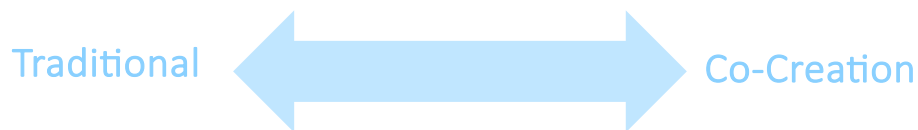
The criticism that arose from this perspective of science communication is that it does not consider the receiver's context (e.g., personal attributes, characteristics, experience, worldviews, beliefs, and values). In the 1960s and 1970s, many public scientific debates emerged over several important subjects (e.g., nuclear power), and people began to mistrust science. It was then that this critique of science communication was picked up, and the emphasis shifted to marketing science instead of enlightening the public. This science PR included that the cognitive and emotional dimensions of the public were included and recognized in communication. Yet, this approach was still very pragmatic, and there was still a clear divide between science and society (Gregory & Lock, 2008).

Late 1990s to early 2000s

This changed, in the late 1990s and early 2000s, when a conversation and collaboration approach to scientific communication arose, with a significant shift that science must include societal values and interests. This prompted a call for developing platforms and ways to address uncertainties, ambiguities, and complexity associated with research and science early on. Science communication, in this view, should be open and inclusive, and science and society should have a shared collaborative responsibility for the future.

As a result, science communication is inherently political rather than unbiased. Scientists, activists, and politicians all take an interest and position in how science is communicated and its outcomes. Science communication, in this understanding, suggests that society and science are both critical for solving complex future issues related to S&T (Trench & Bucchi, 2010)

Based on this historical overview, the history of science communication can be seen as a dimension ranging from traditional science communication to co-creation. The more conventional view of science communication is primarily focused on educating and enlightening the public about science and its fields of applications. Knowledge is typically perceived as unequal in this situation, and thus the emphasis lies on transmitting scientific information. Therefore, science and society are seen as separate. By contrast, co-creation means that knowledge is viewed as equal between experts and the public, and various perspectives are considered and integrated from diverse domains. Here science and society are viewed as bridged or even blurred with each other. Between these two ends, science communication exists on a spectrum (Davies & Horst, 2016).



3.4 Research Component: Connecting Science and Society

On the basis of these models of science communication, it is possible to assign communication mediums (e.g., exhibitions, video, audio) and settings (e.g., museum, radio, personal) to a particular model. For instance, museum exhibitions shifted from depicting only objects (traditional model) to interactive workstations where visitors can participate in science-making and discuss complex problems (co-creation). The radio can be conceptualized initially as the more traditional category of science communication, which employs the deficit communication model, defined as the transmission of scientific knowledge to the public, with the audience regarded as a passive receiver of information. Here, the audience receives certain auditive information but does not participate in discussions. Scholars criticize this model for failing to bridge the gap between science and society and maintaining them separately. The author questions whether radio programming is restricted to keep the domains apart as opposed to connecting them. Although the authority over content rests solely with the curator, radio programming has three characteristics that make it an ideal medium for connecting science and society meaningfully.

01

First, radio programming offers a conversational introduction to science with minimal entry barriers, as audio content can be consumed passively and actively (e.g., while multitasking). One can listen to the radio while having a cup of coffee in the morning or traveling to work, and thus science and research become a passive part of daily life. This gives the radio an advantage over other locations where science is "consumed," such as museums, which require advance planning. This reduces the barrier to interaction between science and society. This is further supported by the radio's conversational and easy-to-understand tone. Science is typically presented in formal contexts such as classrooms, museums, and formal presentations. All these infrequent occurrences cast science in an authoritative light. In contrast, the conversational nature of radio may permit the presentation of "science in the making" as opposed to "science as the truth." Integrating ongoing and unresolved research with scientists in a conversational manner, as opposed to a formal presentation, could lead to a fundamentally different level of audience engagement with science. Thus, the radio may facilitate the bridging of domains.

02

Secondly, radio programming offers a distinct advantage due to its temporal capacity. In contemporary society, characterized by the prevalence of social media as a primary means of communication, attention spans are diminishing, and information is often covered superficially and non-exhaustive. Radio programming counteracts this trend and distinguishes itself by offering extended durations for in-depth exploration of topics, promoting sustained attention, and facilitating concentrated focus. This can help to facilitate a more nuanced societal 'master narrative' on environmental issues.

03

Thirdly, beyond its conventional scientific utility, science and research find versatile applications in the realm of art and creativity. This idea is reinforced by a quote from one of the contributors, who expressed appreciation for the use of research outcomes in various artistic and recreational endeavors, strengthening the connection to science. This approach highlights the transformative potential of science when used beyond its conventional boundaries, embracing its integration with art and other fields and fostering a deeper appreciation for the connection between science and society.

In summary, radio programming can potentially bridge the gap between science and society. Therefore, radio programming protects the Fraser Estuary and facilitates meaningful engagement among scientists, communities, and policymakers. It is essential to note, however, that it remains predominantly a one-way communication model, requiring careful consideration on behalf of the curator.

4 LOOKING FORWARD

In conclusion, this project involved curating a radio program on the Fraser River Estuary to be broadcast on Other Sights Currents and Waves from September 2023 to September 2024. The final program features content covering four clusters developed as the curatorial concept: 1) STEM Research, 2) Art, Culture, and Recreation, 3) Indigenous Rights, Knowledge, and Stewardship, and 4) Past, Present, and Future. The audio recordings come in various formats, including podcasts, interviews, workshops, ceremonial processions, environmental soundscapes, sound walks, music, and poetry. These recordings comprise a range of viewpoints on the Fraser Estuary, from scientists to indigenous voices, covering studies on migrating birds and artistic expressions of celebrations of life. The conversational style of the recordings ensures a broad audience of listeners. The program aims to broaden people's understanding of the significant ecosystem and stimulate engagement, participation, and stewardship to preserve it.

Besides this practical component of the project, it was asked how radio programming might connect the spheres between science and society. The literature review showed that traditional science communication is more authoritative and understood as educating the public (separating realms). In contrast, modern science communication is conceptualized as including the public perspectives in decision-making (bridging realms). Even though radio programming can be understood as one-way communication, from creator to listener, hence a more traditional idea of communication, the author suggests that it is still a valuable instrument for science communication. The arguments put forward suggesting this claim are 1) radio programming provides a low barrier access and conversational introduction to science, 2) radio programming has temporal capacity compared to social media and thus can cover topics more broadly, 3) science and research can be used in other (artistic) ways.

In conclusion, it is essential to acknowledge the significance of radio programming when addressing environmental issues like the climate and pollution crises that affect the Fraser River Estuary. Radio programming offers a unique opportunity to explore complex topics from a multitude of perspectives, making it a valuable tool.

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Appendices

Appendix A: Radio Program Guide

The herein following appendix is the Radio Program Guide that can be found on Currents and Waves. This program guide entails the order, time stamps, and more information on the respective sections. Biographies and program descriptions stem from contributors, with editing and minor changes by the scholar.



FRASER ESTUARY - TUESDAYS ON CURRENTS AND WAVES

Schedule:

Segment	Featuring	Duration
Section 1: Introduction		
Part I: Biomonitoring at the UBC Farm Interview	Dr. Matthew Mitchell	25m 05s
Part II: Environmental Recordings from the UBC Farm	Dr. Matthew Mitchell	1h 11m
Section 2: Introduction		
Destruction of the Fraser River (From Bigger Than Me Podcast)	Dr. Marvin Rosenau, Aaron Pete	2h 43m
Section 3: Introduction		
Soul of The Fraser Original Soundtrack (From Documentary)	Greg Andersen	13m 57s
Section 4: Introduction		
FE4.2 Terminal (From Future Ecologies Podcast)	Mendel Sulski, Janie Wray, Adam Huggins, Misty MacDuffee, Steven Stark, Marko Dekovic	1h 01s
Section 5: Introduction		
Part I: Nature Inspired Music Interview	Mathew Sloan	14m 44s
Part II: Homage to the Fraser Estuary -Acoustic Guitar with Poetry	Mathew Sloan	4m 40s
Section 6: Introduction		
A Prospectus for Conservation (From UBC Forestry Webinar)	Dr. Tara Martin, Dr. Santa J. Ono	43m 10s
Section 7: Introduction		
Part I: MOTHLIKE silvery/blue Interview	Amy-Claire Huestis, Omar Zubair	25m 08s
Part II: Summer Solstice - Garry Point Participatory Performance	Amy-Claire Huestis, Omar Zubair, Brigid Coult, Rachel Harris, BC Choral Federation	18m 01s
Part III: Soundwalk of the South Dyke Trail -Finn Slough to Garry Point		57m 50s
Section 8: Introduction		
Part I: Birds on the Pacific Flyway (From Connected Estuary Webinar Raincoast Foundation)	Kristen Walters, Amie MacDonald, James Casey	46m 47s
Part II: Conservation in the 21st Century (From Connected Estuary Webinar Raincoast Foundation)	Kristen Walters, Morgan Guerin, Ross Dixon	54m 42s

Section: 9 Introduction		
Part I: Streamwalkers (From Salmon Returns Series) Jenni Schine	Jenni Schine	16m 58s
Part II: k'wal'uxw petroglyph creation story (From the Salmon Returns Series)	Xulsi'malt Gary Manson	21m 00s
Part III: Field Guides for Listeners (From the Salmon Returns Series)	Jenni Schine	27m 56s
Section 10: Introduction		
Sovereign Waterways Public Art Project	Barbara Cole, Faith Sparrow-Crawford	36m 13s
Section 11: Introduction		
Salmon-centric Planning Workshop	Julia Kidder, FERC Sustainability Scholars	24m 15s
Section 12: Introduction		
The Call of the Sea Wolf	Dane Pedersen	24m 18s
Section 13: Introduction		
Part I: Pollution is Colonialism Episode 1 (From Media Indigena Podcast)	Rick Harp, Dr. Max Liboiron, Dr. Candis Callison	47m 43s
Part II: Pollution is Colonialism Episode 2 (From Media Indigena Podcast)	Rick Harp, Dr. Max Liboiron, Dr. Candis Callison	57m 07s
Section 14: Introduction		
STAR Traveller (From J Peachy Gallery)	Jay Peachy	27m 32s
Section 15: Introduction		
Episode 1: The Unlikely Detective (From The Salmon People Podcast)	Sandra Bartlett, Chris Bennett	35m 51s
Episode 2: The Gold Rush (From The Salmon People Podcast)	Sandra Bartlett, Alexandra Morton	36m 25s
Episode 3: Camp Sea Lice (From The Salmon People Podcast)	Sandra Bartlett, Alexandra Morton	27m 46s
Episode 4: The Game Changer (From The Salmon People Podcast)	Sandra Bartlett, Alexandra Morton	32m 16s
Episode 5: Hiding the Scientist (From The Salmon People Podcast)	Sandra Bartlett, Alexandra Morton	44m 04s
Section 16: Introduction		
Supportive networks for racialized minorities and climate justice with Indigenous communities (From UBC Forestry JEDI Podcast)	Dr. Danielle Ignace, Estefanía Milla-Moreno	34m 29s
Section 17: Introduction		
Biodiversity and RBT2 Resistance	Sharon MacGougan, Jay Peachy	48m 05s
Section 18: Introduction		
Part I: Caring for Whales (Foreshore Immersive)	Kim St. Pierre	Will be included on Aug 26, 2023
Part II: Protecting from Floods (Foreshore Immersive)	Tirath Dave	Will be included on Aug 26, 2023
Part III: FERC Sustainability Scholars in Conversation (Foreshore Immersive)	Tirath Dave, Kim St. Pierre	Will be included on Aug 26, 2023

This daily program runs for 19 hours and then repeats

Further information on the artists and works, in order of broadcast appearance:

Section 1: Interview with Dr. Matthew Mitchell and Environmental Soundscapes at the UBC Farm

Part I: In this interview, **Dr. Matthew Mitchell** speaks about his research as a Research Associate in the Faculty of Land and Food Systems at the University of British Columbia. Broadly, his research focuses on how to manage human-dominated landscapes, specifically agricultural and urban landscapes, for both people and nature. This includes understanding how the arrangement of different land uses and habitats across these areas affects ecosystem services and biodiversity, quantifying and mapping the benefits these landscapes provide to people, and identifying key management actions that can lead to win-win situations for multiple ecosystem services and biodiversity.

Part II: Environmental Soundscapes at the UBC Farm is a collection of environmental sound recordings by Dr. Matthew Mitchell and his graduate students as part of their ongoing research into how humans impact local ecosystems. Mitchell and his graduate students use special microphones set around the UBC farm and neighboring forest to listen to bird and bat species in the ecosystem. The data provides information about thousands of distinct species, but the sounds also serve as a meditative ambient soundscape into the many voices of the Fraser Estuary. The total of 8x10 minute recordings stems from the first half being recorded at a forested site and the second at the hedgerow agricultural area. They start from 5 minutes before sunrise until 5 minutes after each spring equinox, summer solstice, fall equinox, and winter solstice in 2022. Different sounds make themselves noticeable while wandering through the day and throughout the year.

More information on: <https://ires.ubc.ca/matthew-mitchell/>

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Section 2: Destruction of the Fraser River (From Bigger Than Me Podcast) – Dr. Marvin Rosenau and Aaron Pete

In this podcast episode, **Destruction of the Fraser River**, Aaron Pete sat down with Marvin Rosenau to learn about the current state of the Fraser River. The river has been impacted by over-fishing, larger dykes, and floods. Marvin is a biologist that has spent years studying fish populations and habitats. In this conversation, he explains the damage and risks the Fraser River faces.

Dr. Marvin Rosenau is an instructor in the Fish Wildlife and Recreation Program (FWR) at the British Columbia Institute of Technology (BCIT). At BCIT, he teaches Fish Ecology and Management as well as Environmental Monitoring at the second-year level. Marvin has had a 35-year history of working in freshwater fisheries in the province of British Columbia. This includes stints as a consultant, in academia, with the International Pacific Salmon Fisheries Commission, and with the provincial Ministry of Environment. Marvin worked extensively on the lower Fraser River white sturgeon during the 1990s as a BC fisheries program biologist and as a Director and member of the Science Committee with the Fraser River Sturgeon Conservation Society. He has a BSc (Honours) and an MSc from the Department of Zoology, University of British Columbia, and a DPhil from the Department of Biological Sciences at the University of Waikato in Hamilton, New Zealand".

More information on: <https://biggerthanmepodcast.com>

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Section 3: Soul of The Fraser Original Soundtrack (From Soul of The Fraser Documentary) – Greg Andersen

Soul Of The Fraser Original Soundtrack is a project that came together as part of a collaboration between the filmmakers Brendan Chu, Jakob Dawson, and Christopher Jenkins at Nerv Productions and Composer Greg Andersen from Sound Shepherds. The music is inspired by the landscapes, animals, and people living in and around the Fraser River Estuary. The music weaves together the location sounds from the estuary (birds, wind, leaves) with the swirling and swelling textures played by the instruments (strings, woodwinds, piano). The five tracks are titled: 1 Did You See Them, 2 Will Anyone Take Over, 3 Natures Riddle (feat. Henrique Andrade), 4 Richmond (feat. Henrique Andrade), 5 Birds Flowers People Concrete (feat. Henrique Andrade).

Greg Andersen is an award-winning composer, mixer, pianist, and record producer working in immersive audio, contemporary classical music, film music, jazz, and live performances. Greg's mentors and teachers have included Keith Hamel, Jocelyn Morlock, Bradshaw Pack, Pat Carrabré, Alan Matheson, Alexander Jenkins, and Dorothy Chang. Greg has performed live concerts as a bandleader and pianist, produced albums for Canadian artists, and worked on over 30 multimedia productions over the past four years, including award-winning films *Rematriation* (VIMFF Best Environmental Film 2022) and *Darkside* (Best Score at CIFF, Best Score at SOCAN Emerging Screen Composer Awards 2022). Greg's work mixes his training as a jazz pianist (Capilano University Jazz program), composer (Bachelor of Music in Composition at UBC), and innovator of emerging sound technologies (Dolby Atmos) to all his projects. In 2022, Greg co-founded Sound Shepherds Studio Inc., a sound and music studio that seeks to bring big-budget technology and workflow to productions with a focus on art over profit.

More information on: <https://www.soundshepherds.studio>

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Section 4: FE4.2 Terminal (From Future Ecologies Podcast) – Mendel Sulski, Janie Wray, Adam Huggins, Misty MacDuffee, Steven Stark, Marko Dekovic

This episode **FE4.2 Terminal** journeys to the heart of the Salish Sea: the Fraser River Estuary, home to over half of the population of the Province of British Columbia, thousands of endemic species, and one world-famous pod of orcas. But as the human population of the region has grown, wildlife populations - including salmonids, orcas, and over 100 species at risk - have been plummeting. As economic imperatives press up against ecological thresholds, a mega-project that has been in development for over a decade is poised to further alter the character of the estuary, with massive implications for the health of Salish Sea and its many residents. In this episode, we ask: can we find ways to hear each other through all the noise?

Made for audiophiles and nature lovers alike, **Future Ecologies** is a podcast exploring our eco-social relationships through stories, science, music, and soundscapes. Every episode is an invitation to see the world in a new light — weaving together narrative and interviews with expert knowledge holders.

More information on: <https://www.futureecologies.net>

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Section 5: Homage to the Fraser Estuary through Acoustic Guitar Sounds and Poetry – Mathew Sloan

Part I: In this interview, **Mathew Sloan**, a fingerstyle guitarist born and raised in Thunder Bay, Ontario, speaks about his emerging career as a musician. In addition to writing instrumental music, he has also used other mediums, such as poetry, to bolster his messages on the conservation of land and the meaning land holds in his life. Mathew has traveled extensively through Europe, Asia, and America and has performed for audiences worldwide. His first album, *Peregrine*, recorded in Seoul and produced in Montreal, was an homage to his hometown, the seed of all his travel. He is currently working on his third album, *Ahumm*, a traditional Phoenician word meaning brother of the sea. This album will be a look back at all the good memories he has cultivated throughout his time in Vancouver.

Part II: This part features an **acoustic guitar track alongside a poem** from Mathews coming new album. "Through poetry, I express my experience with the change in landscape happening in the Fraser Estuary. With the emergence of new developments and industry importing/exporting, my broken heart cries out to the Mother to renew the land back to the state it once was. The poem is accompanied by an instrumental guitar piece that I've written for this land. It is meant to be joyful (contrasting the poem), evoking a feeling of the land untouched. Both of those ideas of the chaos of capitalist endeavors and the serenity of land untouched meet in this recording. The beginning of the instrumental represents the sound of birds singing. Their calls can oftentimes meld into one continuous string of melody. The middle is me sitting on the forest floor, bathing in the beauty of this land. And the end, a foreshadowing of the future."

More information on: Instagram @mathew.music

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Section 6: A Prospectus for Conservation (From UBC Forestry Webinar) – Dr. Tara Martin

A Prospectus for Conservation is a presentation given by Dr. Tara Martin in the Faculty of Forestry of the University of British Columbia. The traditional approach to conservation science is to observe and model the impacts of threats (logging, mining, fishing, climate change) on species and their habitats, publish the findings, and hope that policymakers will take action. Tara Martin believes this approach is not enough and that scientists must go further to offer practical solutions. Since 2018 Tara's research has been transforming how conservation research happens in British Columbia and beyond. Using a tool called Priority Threat Management, Tara and her team have combined robust empirical data with expert knowledge to offer prospectuses for conservation. In this talk, Tara used her recent work on the Fraser River Estuary as an example of this innovative approach. With 102 species at risk in the estuary, Tara and her colleagues have studied the impacts of current and future development projects and created a clear action plan – with price tags – for conserving every one of them.

Dr. Tara Martin is a Professor of Conservation Decision Science in the Department of Forest and Conservation Sciences. She leads the Martin Conservation Decisions in the Faculty of Forestry, where she supervises graduate students and works with a wide range of collaborators and supporters. Tara is a member of the International Union for Conservation of Nature Climate Change Specialist Group and co-leads the Climate Adaptation Theme. She holds a PhD in Ecology from the University of Queensland, Australia.

More information on: <https://www.taramartin.org>

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Section 7: MOTHLIKE silvery/blue – Amy-Claire Huestis, Omar Zubair, Brigid Coult, Rachel Harris, BC Choral Federation

MOTHLIKE silvery/blue, is an artistic story cycle, which took place on the Autumnal Equinox in 2022 at Brunswick Point and on the Summer Solstice 2023 at Garry Point Park. The cycle is a community performance featuring dance, art, and music. Many contributors have guided this project, which was done in consultation with Hwlitsum First Nation and supported by the Richmond Art Gallery.

Part I: In the interview, **Amy-Claire Huestis** and **Omar Zubair** discuss the creation of the silvery/blue cycle in MOTHLIKE, delving into its deeper meanings. They also touch upon their anticipation for the Summer Solstice event. As artists, they offer insights into their personal backgrounds and what inspires their creative process.

Amy-Claire Huestis lives on the stóləw (Fraser) river estuary at she-shum-qun (Canoe Pass in Ladner). In her experiential practice she suspends a state of wonder in relation to nature and its mysteries. Thinking through how we might develop kinship to other species, she makes work through ritual and deep attention to the landscape over time. Her work involves collaboration with artists and communities of scientists and

conservationists. Her collaborations and partnerships have included North Pacific Cannery Museum, Aadmsteti: Stinging Nettle Net, Time Lapse Dance, Henry Andersen Elementary School, Birds Canada, UCLA Art/Science Center, and many beloved artists and individuals. Amy-Claire is full-time faculty at Kwantlen Polytechnic University.

Omar Zubair is a Pakistani American composer based in New York City. He has helped found composer collectives across the country in order to promote radical empathy and empower active listening. He is engaged in the process of integrating a pan-cultural musical sensibility with his work, to peer deeply into foundational empathetic resonances. Until 2020, Omar was a member of the experimental theatre company, The Wooster Group. His work has been shown in the Pompidou Centre, Paris; Whitney Museum of American Art, New York; Disney Concert Hall, LA; World Stage Festival, Toronto; and National Theatre of Norway, Oslo. After writing his first book *Disorientation Therapy* in 2007, Omar Zubair found that the closer to the core of being he looked, the blurrier it became, so he began to listen to it instead. And ever since, listening has become his primary compositional technique - whether creating a theatrical score for The Wooster Group or building a sound installation for a national historic landmark, whether sound designing for a blind choreographer so that she can continually orient toward the audience or improvising with a dance class at Julliard to coax authentic movement out of each student, whether making music to help people grieve at a funeral or celebrate at a wedding. He lets the ear hear twice before acting once. He has helped found composer collectives across the globe in order to promote radical empathy and empower active listening.

Part II: The Summer Solstice – Garry Point Participatory Performance is part of the MOTHLIKE silver/blue cycle and was recorded, capturing the nuanced sounds of singers, winds, nature, and community participating. The audio recording follows the mythopoetic story cycle on the beautiful dyke trail, celebrating kinship with birds and the interconnectedness of all things. Silvery Blue is a person, a butterfly (a ghost), the shimmering color of the land. The sounds follow an experimental score, walking, and reading. The procession culminated with the sunset.

Part III: The Soundwalk on the South Dyke Trail is an environmental recording of the witnessed sounds from Finn Slough to Garry Point Park. The walk is in following the *walk the dykes of the delta*, part of the MOTHLIKE silvery/blue Summer Solstice program. A sound walk is meant to capture and concentrate on sounds that otherwise would get unnoticed. Noticeable on this walk are the many industrial sounds clashing with sounds of nature like wind, waves, and birds.

More information on: <http://www.amyhuestis.com> (Amy-Claire Huestis) and Instagram @chaosmopolitan (Omar Zubair)

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Section 8: Connected Estuary (From Raincoast Foundation Webinar Series) – Kristen Walters, Amie MacDonald, James Casey, Morgan Guerin, Ross Dixon

Connected Estuary is a 6-episode webinar series moderated by Kristen Walters that explores what science can tell us about the history, vulnerability, and connectivity of the Fraser Estuary. Fraser River Estuary serves as a crucial environment for nurturing and feeding various species, including humans, fish, birds, and marine mammals, across two hemispheres. This section of the radio program features two of episodes of the webinar. **Raincoast Foundation** is a team of conservationists and scientists empowered by our research to protect the lands, waters, and wildlife of coastal British Columbia.

Part I (From Webinar 5): **Birds on the Pacific Flyway** delves into how the Fraser Estuary is part of the Pacific Flyway's intricate network of bird stopovers. Amie and James discuss how the Fraser Estuary is linked to estuaries and other ecosystems along North and South America's Pacific coasts. **Amie MacDonald** works with Birds Canada as the Motus Wildlife Tracking System coordinator for British Columbia. She wants to use tracking technologies to help with shorebird studies and conservation in the Fraser Estuary and elsewhere. **James Casey** is a former Birds Canada Fraser Estuary Specialist who now works for WWF.

Part II (From Webinar 6): **Conservation in the 21st Century** is a conversation with **Morgan Guerin**, a Musqueam Nation community member, previous Councillor, and Senior Marine Planning Specialist. Morgan is also a visual artist who created materials for the čəsnaʔəm exhibit at the Musqueam Community Cultural Centre, and he continues to offer his knowledge, expertise, and lessons through toolkits for use in schools and other communities. The recording also includes **Ross Dixon**, Raincoast's Communications and Development Director. Ross assisted in the development of the Lower Fraser Conservation Programme in order to create a vision for salmon habitat in the Lower Fraser River.

More information on: <https://www.raincoast.org/estuary-webinar/>

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Section 9: Salmon Returns Series – Jenni Schine, Xulsi'malt Gary Manson

The Salmon Returns Series is an audio program focusing on the essential role of wild salmon in cultures and environments on Vancouver Island and its surrounds, featuring voices from Snuneymuxw territory (Nanaimo, British Columbia, Canada) and Musgamagw Dzawada'enuxw territory (Broughton Archipelago, British Columbia, Canada). Presented works are by Xulsi'malt Gary Manson and Jenni Schine. Curated by Jesse Birch.

Part I: Streamwalkers – Jenni Schine

Streamwalkers (2018) is part of a two-year art residency at the Salmon Coast Field Station in Musgamagw Dzawada'enuxw Territory (Broughton Archipelago, BC). In the fall of 2017, Jenni Schine (sound artist) and Jay White (visual artist) joined stream walkers, Marie-Josée Gagnon and Alyssa Ball from the Mainland Enhancement of Salmonoid Species Society as they counted spawning pacific salmon in the many rivers, streams, and tributaries that lead into the ocean. Marie-Josée Gagnon, M.E.S.S.S. Lead Stream Technician; Alyssa Ball, M.E.S.S.S. Stream Technician; Chris Guinchard, Salmon Coast Field Station Coordinator; Billy Proctor, Echo Bay Elder and Knowledge Holder.

Jenni Schine is a community-engaged researcher and sound artist. She teaches audio production courses in both rural and urban environments and has been affiliated with the Salmon Coast Field Station since 2009. Schine has extended her work into film, radio, electroacoustic composition, and installations. She regularly works with other artists with scientists. Schine is grateful to learn from the many knowledge holders in the traditional territories where she practices. She currently lives on Lekwungen territory in Victoria, BC.

Part II: k'wal'uxw petroglyph creation story (From the Salmon Returns Series) – Xulsi'malt Gary Manson

k'wal'uxw petroglyph creation story (2019) is told in both Hul'q'umi'num' and English, laying out the origin story and rituals surrounding a petroglyph of k'wal'uxw (dog salmon) located in a small bay on the Eastern side of the Snuneymuxw River estuary. In telling this story, Gary conveys the precarious state of the Snuneymuxw dialect of the Hul'q'umi'num' language and the Snuneymuxw peoples' deeply intertwined relationship with the Salish Sea. More than four decades ago the k'wal'uxw petroglyph was removed from its original site and brought to the Nanaimo Museum, where it resided on display until 2008 when it was repatriated to its original location. The petroglyph has returned, and the k'wal'uxw salmon still return in varying quantities, but the language spoken to welcome the salmon back is itself struggling to return.

Snuneymuxw Elder Xulsi'malt Gary Manson was born on the mouth of the Snuneymuxw (Nanaimo) River in 1948. He now lives 100 feet from where he was born. Married to Donna Manson, they have six children and eight grandchildren. Gary is a survivor of residential school, and is deeply connected to culture and land. Gary has worked as an elder in healing circles, is a regular tribal canoe journey participant, and sits as an elder in residence at Vancouver Island University. He is a Hul'q'umi'num' language advocate.

Part III: Field Guides for Listeners (From the Salmon Returns Series) - Jenni Schine

Field Guides for Listeners (2019) is a multidisciplinary project by Jenni Schine (sound artist) and Jay White (visual artist). This stereo electroacoustic composition was originally an 8-channel composition with Diffusion by Giorgio Magnanensi and played on Cedar Speakers built from reclaimed wood, discarded from

mill operations and drifting ocean logs on the Sunshine Coast, BC. The project draws attention to salmon spawning and salmon farming that takes place far from the eyes and ears of many of us. The works are guides for listeners as they help to identify salmon culture in its natural and unnatural environments. We ask: how can we respectfully listen to scientific and land-based knowledge, and how can we make art that is accountable to the place and land that teaches us? This body of work is informed by the ongoing scientific research conducted at the Salmon Coast Field Station and comes from the lands and waters of the Musgamagw Dzawada'enuxw Peoples.

Recorded audio: Bear Bells and salmon stream walkers, Marie-Josée Gagnon and Alyssa Ball; Fish Farm Pellets, recorded by Lindsey Mae Willie, member of the Musgamagw Dzawada'enuxw People during the Midsummer Fish Farm Occupation, November 2017; Row of Red Hummingbird Feeders, Billy Proctor's home; Welcome to Swanson Island, Land of the Mamalilikala and 'Namgis First Nations, permission to use this audio was given by Chief Kwakwabalas, Ernest Alfred who is calling the different visiting tribes ashore at a public Fish Farm Rally on Swanson Island, October 2017. The lead singer on the arriving vessel is Kwikwasut'inuxw-Haxwa'mis, Elected Chief Bob Camberlin, singing a thank you song from Gilford; Dawn in Echo Bay; Sea Licing, voices of Salmon Coast's 2018 sea-licing crew: Emma Atkinson, Chris Guinchard, Peter Harrington, Roger Jolliffe, and Mark Lewis; Pebbles and Gravel.

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Section 10: Sovereign Waterways Interview – Barbara Cole and Faith Sparrow-Crawford

Sovereign Waterways is a public art installation led by led by curators Faith Sparrow-Crawford, Salia Joseph & Jade George from Host Consulting in partnership with Other Sights. The temporary public artworks by artists Calvin Charlie Dawson/Ts'kanchtn, Jonas Jones and Chase Gray for a project that centers the values, relations and visions of x̣ẉṃə̣θ̣ḳẉə̣ỵəm (Musqueam), Sḳẉx̣ẉụ́7̣mesh (Squamish), and sə̣ḷiḷẉə̣ṭə̣ł̣ (Tsleil-Waututh) communities are presented on the exterior and environs of The Blue Cabin Floating Artist Residency. The works address the people that meet on the Fraser River to labor in fishing, tourism, and recreation, visitors to the area, and residents of the recent developments that line the shore.

The Blue Cabin is a highly visible presence on the water, drawing the attention of thousands of viewers and capturing the public imagination. Sovereign Waterways offers the opportunity to explore, through face-to-face encounters, an enriched and deeper understanding of the ongoing presence and the history of these nations on these lands and waters. With artworks that – through their temporary, rotating display – respond to changing conditions, this project speaks to the pressing need to support the encounters and conversations that will further important dialogues about public spaces on unceded territories. Beginning with Musqueam, Squamish, and Tsleil-Waututh artists, Sovereign Waterways acknowledges the presence of many other nations who have worked and lived along the estuary, including Kwantlen and Tsawwassen nations, and that the river has been and remains integral to many other nations who use the waterways for travel, sustenance, and ceremony including Katzie, Stz'uminus, Semiahmoo, Sto:lo, and Quw'utsun people.

Faith Sparrow-Crawford is a member of the Musqueam Indian Band. She graduated from the University of British Columbia with an undergraduate degree in Critical Indigenous Studies. Faith worked as an executive assistant at Aquilini, supporting the team working on partnership development with MST Nations. She then joined the Musqueam administration as the Self-Governance Community Coordinator, responsible for aiding in the creation of a Musqueam consultation based on community knowledge and engagement. Faith also co-founded Salish Locations Inc., a film location liaison company that works to create more for Indigenous peoples on their own land. Faith has extensive community engagement experience with Musqueam, and experience with city planning, public art engagement, and consulting. Faith is an advocate for sharing the voices and stories of her people on their territory and throughout the world.

Barbara Cole is one of the Lead Producers on the Sovereign Waterways project for Other Sights. Barbara brings a wealth of experience as an artist, curator, educator, and consultant in public art. Her passion lies in challenging perceptions, promoting discourse, and encouraging individual perspectives about shared social spaces. She has also been the Curator of Outdoor Art at the Belkin Art Gallery at UBC since 2017.

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Section 11: Salmon-centric Planning Workshop – Julia Kidder and FERC Sustainability Scholars

This interactive **salmon-centric workshop**, designed for Fraser River Estuary Research Collaborative (FERC) scholars, gives a brief introduction to emergent theories and approaches that center/value non-human communities (namely fish and all species of Wild Pacific Salmon) for the vital role they play in ensuring the health of the Fraser River watershed and its connected ecosystems. The workshop is designed to help participants develop/imagine ways that their research can: a) support Indigenous-led conservation, stewardship models and governance strategies, b) promote a more holistic watershed management protocol and collaborative regional adaptation planning along South Coastal waterways, and, c) improve relationships between human and non-human communities across the Lower Fraser region and beyond.

Julia Kidder (she/her) is a Canadian-Norwegian settler, interdisciplinary-artist and PhD student at UBC's School of Community & Regional Planning (SCARP), and her research - as part of the Pacific Institute for Climate Solutions' (PICS) 'Living with Water' project - focuses on Coastal Climate Adaptation & Indigenous Governance around the South Coast of so-called "BC". Inspired by her former colleagues at West Coast Environmental Law, her research looks specifically at the role of fish in climate adaptation planning, and the barriers and opportunities for achieving legal pluralism in colonized spaces – where Indigenous Laws, expressions of sovereignty and measures of community health have historically (and continue to be) ignored in both academic and policy settings.

More information on:

- Learn about how you can support WCELaw's 'Revitalizing Indigenous Law for Land, Air and Water' (RELAW) program here: <https://www.wcel.org/program/relaw>
- Read about PICS' Living with Water project here: <https://www.livingwithwater.ca/>
- Check out Julia's website at www.juliakidder.com for updates about her research and ongoing collaborations. Instagram: @juliakidder

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Section 12: The Call of the Sea Wolf – Dane Pedersen

Dane Pedersen (she/her) is a PhD student at the University of British Columbia in the Faculty of Forestry. Her research, in partnership with Nazko First Nation, explores climate-informed forest governance and policy in central interior British Columbia. Dane approaches her work through an interdisciplinary, feminist, and decolonial lens. Born and raised on Secwépemc territory (Kamloops, British Columbia), Dane is deeply committed to protecting the lands, waters, and diverse communities of the Pacific Northwest. She is currently based on the traditional territory of Musqueam, Squamish, and Tsleil-Waututh peoples (Vancouver, British Columbia). In her spare time, she enjoys spending time outdoors, reading, traveling, and playing piano.

Dane completed her Master's degree in Natural Resource Sciences at McGill University in 2022, where she studied the transboundary governance network tasked with protecting the Southern Resident killer whale. Her research revealed a highly fragmented network, with low levels of trust and conflict surrounding key topics like whale watching as drivers of the network's siloed approach to conservation. She is currently a University of British Columbia Sustainability Scholar, working in partnership with **Raincoast Conservation Foundation** to consider the possibilities of expanding the **Southern Resident Killer Whale** critical habitat into the Fraser River Chinook salmon tributaries. Her work also addresses critical shortcomings of the Species at Risk Act, the ongoing deliberation regarding **Roberts Bank Terminal 2**, and Canada's colonial approach to species and ecosystem conservation.

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Section 13: Pollution is Colonialism (From Media Indigena Podcast) – Rick Harp, Dr. Max Liboiron, Dr. Candis Callison

Hosted and produced by long-time Cree journalist **Rick Harp**, MEDIA INDIGENA is an Indigenous current affairs podcast connecting the dots of colonialism since 2016.

Pollution is Colonialism: the straight-to-the-point title of a brand-new book by Max Liboiron, Assistant Professor of Geography and Associate Vice-President of Indigenous Research at Memorial University, as well as the Director of CLEAR, or Civic Laboratory for Environmental Action Research. Among the book's core arguments: is that any effort looking to resist environmental harms must trace them back to their ultimate source - the violence of colonial land relations. A violence, the author argues, even well-intentioned environmental science and activism can reproduce. In this first of two episodes featuring the author, we discuss how the world became awash in plastics, with part two dedicated to how we might better grasp and grapple with the larger forces producing this toxic legacy.

Appearing alongside Dr. Liboiron, host/producer Rick Harp and MI regular Candis Callison, Associate Professor in the Institute for Critical Indigenous Studies and the Graduate School of Journalism at UBC.

Pollution is Colonialism Part Two: fresh off part one, host/producer Rick Harp and MI regular Candis Callison once again sit down with author, artist and marine scientist Max Liboiron. And in the back half of this extended conversation, we find out why Land is not so much a noun as it is a verb, and why anti-colonial is not the same as de-colonial, especially when it comes to methods for pollution science, methods which foreground values of humility, equity, and good land relations.

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Section 14: STAR Traveller – Jay Peachy

STAR Traveller is a project following STAR on her Canadian adventure as she explores new places and meets fascinating people along the way. A Dog's perspective in a vast country with many diverse cultures and one that is longing to define itself.

STAR is a Husky Shepherd Cross, who worked with the Canadian Sound Therapy Arts Society which collaborates with community-based mental health organizations. Sidekick to her owner J Peachy, STAR joins along in a creative journey of natural, personal, spiritual and artistic discovery. Along the way she shares her knowledge, spirit and gift of healing to those who are in need. STAR is a regular studio dog on Sound Therapy Radio, which broadcasted on CJSF 90.1 FM in Vancouver. She loves artists, musicians and all creative types.

Credit Roll: <https://www.youtube.com/watch?v=SiZ4DXLDERU>

Peachy identifies as a contemporary outsider artist who is not formally trained through art institutions and creates outside the boundaries of official and mainstream culture. He is active in his art practice and through a number of different mediums. Influenced by the concept of 'Nature Deficit Disorder' through the book *Last Child in the Woods*, by Richard Louv, and as an Arts-Based Environmental Health Advocate, his art speaks to themes as they relate to the psycho, socio and ecological environment. He is an award-winning artist and is recognized for his community engaged social and environmental justice work. Peachy is an award-winning artist and was a semi-finalist in a public stamp design competition for Canada Post. In 2009 he and Katherine Krampol created Sound Therapy Radio, and Arts and Mental Health Radio Show broadcasting on CJSF 90.1 FM, It has since won multiple National Radio Awards and is recognized within the community. Peachy also founded the Canadian Sound Therapy Arts Society and has expanded arts programming to local community television.

More information on:

- <https://jpeachygallery.com/about/>
- Instagram: @wildsalmonshow, @pancakesandpuppetry, @rhs_ole (Resident Artist: Richmond Senior Secondary Outdoor Learning Environment)

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Section 15: The Salmon People Podcast (Episodes 1-5)

The Salmon People podcast is a co-production between journalist Sandra Bartlett and Canada's National Observer and is partially funded by the McConnell Foundation. Some victims don't have voices – Off the coast of BC, wild salmon started dying by the millions. Chris Bennett runs Blackfish Lodge 300 kilometers north of Vancouver. He was leading a group of tourists on a boat tour when he looked into the water and noticed young salmon — called smolt — acting strangely. He'd found a clue. He took it to an unlikely detective: a whale biologist, Alexandra Morton — who'd be pulled into a battle against government, industry, and multinational corporations. A story like this one should have been a hero's tale. An Erin Brockovich moment. But it didn't quite play out that easily. This is the fascinating story of a 20-year battle to save Canada's wild salmon.

Sandra Bartlett is an independent journalist with more than 20 years' experience as a collaborator across all media, including PBS Frontline, ProPublica and Swiss TV on stories such as the under-regulated business of recycling dead humans, the dangerous flaws in America's death investigation system, and an examination of the marketing of the flu drug Tamiflu. Her podcast work includes The Salmon People, Verified: Dust Up and Someone Knows Something. She worked as a reporter, producer and foreign correspondent for the Canadian Broadcasting Corporation and an investigative producer with National Public Radio. She has received national and international awards, including Canada's public service, The Michener Award, the Goldsmith Prize, and the Daniel Pearl Award among others. She had been a board member of the Global Investigative Journalism Network and is a member of the International Consortium of Investigative Journalists.

More information on:

- <https://sandrabartlettca.wordpress.com/>
- <https://www.linkedin.com/in/sandrabartlett/>

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Section 16: Supportive networks for racialized minorities and climate justice with Indigenous communities (From UBC Forestry JEDI Podcast) – Dr. Danielle Ignace and Estefanía Milla-Moreno

In this episode, we spoke with **Dr. Danielle Ignace**, who is an Assistant Professor of Indigenous Natural Sciences in the Faculty of Forestry at UBC and a Research Associate at Harvard Forest. Dr. Ignace is an ecophysiologicalist with a passion for science communication. She studies how climate change and landscape disturbances impact ecosystem function and Indigenous communities.

Intro & outro music by Yoro Noukoussi

Additional music & scoring by Ren Bangert from Cited Media

Additional forest sounds from the Sounds of the Forest soundmap, presented by the Timber Festival

The Podcast from **UBC Forestry Justice, Equity, Diversity, and Inclusion Team (JEDI)** asks what steps do we need to take to make forestry and natural resource conservation more equitable? Join Estefanía Milla-Moreno, PhD candidate in the Faculty of Forestry (UBC), as we learn from stories of Justice, Equity, Diversity, and Inclusion (JEDI) in nature. This podcast is an initiative led by the UBC Faculty of Forestry's Justice, Equity, Diversity, and Inclusion (JEDI) group to share new voices and promote the profiles of diverse scholars within the Faculty.

More information on:

- Dr. Danielle Ignace: <https://www.ignacelab.com/>
- Estefanía Milla-Moreno @<https://eamimo.cl>
- UBC Forestry JEDI: <https://podcasters.spotify.com/pod/show/jediinforestry>

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Section 17: Biodiversity and RBT2 Resistance – Sharon MacGougan, Jay Peachy

In this interview, Jay Peachy speaks with Sharon MacGougan on the **Garden City Conservation Society** and efforts to resist the expansion plans of Robert Banks Terminal 2.

Sharon MacGougan is a retired band teacher with the Richmond School District and lifelong Richmond resident. Sharon is currently the President of the *Garden City Conservation Society (GCCS)*, director of *Tirna-nOg Theatre School* and *Casa Meshiko Cultural Society*; White Crane kung fu instructor, member of the International Council of Dance (UNESCO) and teacher of Aztec dance. Sharon has a deep love of the natural world and is committed to the idea of "good measure", something she learned from her father at a young age. Always give back a little bit more!

The **Garden City Conservation Society (GCCS)** was born out of a movement to save the Garden City Lands (GCL), 136 acres of green space in the city centre that was almost torn up for high-density development but now is Richmond owned park land. The three purposes of the society are:

1. To help steward the natural legacy of Richmond's Agricultural Land Reserve area called the Garden City Lands for agricultural, ecological and open-park uses for the community.
2. To research, educate and act to help steward other natural legacies of the "Garden City", Richmond, in consultation with government and the community.
3. To encourage respect for the legacy name "Garden City" as a community value.

Ongoing projects include:

Stewardship on the GCL: Shore pine, a species native to Richmond, were unable to grow due to yearly city mowing of the Lands. Working with the city, we enabled the protection of these trees and they are now growing well. Working with Dr Mike Bomford of Kwantlen Polytechnic University's Sustainable Agriculture department, we promoted Sphagnum moss research, transplanting, and propagation.

Urban Ecology/Protection and Restoration: As a society we've struggled with the question of how to mitigate ecological loss. It is difficult to protect, but sometimes possible. One recent success was the saving of 54 mature trees at a large development site through the relocation of a park. We later spoke for a biodiverse type of park, which was endorsed by council. We are grateful for this 'win'!

Miyawaki Tiny Forests: We've also decided to 'take action' instead of 'lamenting loss' which launched us into the planting of biodiverse Miyawaki Tiny Forests in Richmond. Our first was November 2022, at Richmond Senior Secondary (the first Miyawaki forest in Western Canada); and six months later, the city planted a Miyawaki forest at Terra Nova Rural Park (the first Miyawaki forest in a city park in Western Canada). We advised on this project. The movement to plant these biodiverse Tiny Forests is growing and we are actively mentoring and/or engaging with partners with the same mission: to get biodiversity into the ground.

RBT2 Resistance: Our society recently presented Minister of the Environment and Climate Change, George Heyman, with an 88-page kit titled *Beyond RBT2*, at an Environmental Roundtable held in Richmond July 6. The kit represents 1,000's of hours of citizen research from several sources and was curated by our society's past-president and elder, Jim Wright. It outlines the weaknesses (bad idea) of RBT2 and illustrates better, less ecologically destructive options. Our goal is to get this kit into the hands of and read by decision-makers.

Moving Hearts and Minds research project: Our society currently is in the midst of a research project on the Fraser Estuary with a UBC Sustainability Scholar, Conservation messaging best practices to advance urban bird habitat protection in the Fraser Estuary. Informally titled, *How to Move Hearts and Minds*; our premise is that—until people know, understand and love, our natural world—not much will change.

Adopt-a Bird Habitat: My property is the first Adopt-a-Bird Habitat in Richmond, part of the city's Beautification program (normally Adopt-a-Street/Park). Our society runs Biodiversity and Birds tours at this location to school groups, cubs and scouts, community groups, decision-makers, all that are interested. The tours are connected to our Miyawaki projects. It's an opportunity to have conversations about biodiversity while "forest-bathing"!

More information on: <https://gardencitylands.wordpress.com>

Sharon MacGougan
President, Garden City Conservation Society
604.618-8866

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Section 18: Listening to the Estuary: Caring for Whales and Protecting From Floods (UBC Sustainability Scholars in Conversation) – Kim St-Pierre and Tirath Dave

Foreshore Immersive revisits the presentation format of past 2016-17 sessions and explores critical ideas and research from artists, writers and thinkers who are all working to address the many uncertainties and challenges of our present time. Foreshore Immersive will assess the ever-changing conditions of public spaces at this phase in the pandemic, survey ongoing urgencies of climate crises, explore ways of applying queer theory to maritime disaster and colonial failure, and celebrate the resurgence of Indigenous-led forms of scholarship and leadership. Foreshore Immersive takes place at Branscombe House and The Blue Cabin in Richmond on the unceded lands and waters of the xʷməθkʷəy̓əm (Musqueam), Tswwassen and Kwantlen Nations. The foreshore describes the land along the edge of a body of water that is repeatedly submerged and revealed by the tide. It is a region of constant flux and unclear jurisdiction. It is the wet part of the beach. Generating questions, confluence, and aggregation inspired by the conditions of the foreshore, Other Sights' past project foreshore was a collaborative pursuit and shared space between Other Sights, Contemporary Art Gallery and Access Gallery during 2016 and 2017 with events and presentations occurring on unceded and occupied territory, specifically that of the Skwxwú7mesh (Squamish), xʷməθkʷəy̓əm (Musqueam), and səliłwətaʔt (Tsleil-Waututh) Nations.

Tirath Dave, B.A.Sc, P.Eng (ON) is an Indo-Canadian settler who is goofy, forever curious, and open to learning. He is currently in the midst of a mild career shift as he transitions from his background in geological and environmental engineering for large corporations to one that aligns with his values of community prosperity and balance with the land and waters that sustain us. Currently, Tirath is pursuing the Master of Land and Water System on Musqueam lands at UBC and working with the Stó:lō Research and Resource Management Centre (SRRMC) in the flood mitigation realm. Tirath enjoys ultimate frisbee, walks, camping, and music festivals.

Tirath's FERC project is a feasibility study of nature-based flood mitigation solutions along the Fraser. The project includes two goals: (1) a comprehensive map that includes current nature-based flood mitigation solutions along the Fraser from Hope to Abbotsford, and (2) detailed feasibility study of potential flood mitigation solutions at a specific location that is of importance to the SRRMC. The project is funded by the Sitka Foundation and completed under UBC Sustainability Scholars' Fraser Estuary Research Collaborative (FERC) Initiative.

Kim St-Pierre is a graduate student in the Master of Land and Water Systems at UBC. She is a french speaking white settler, born in beautiful Quebec City. In her free time, she enjoys spending time with her dog, Mali, spending time outdoors, scuba diving, and martial arts. Her passion for the preservation and recovery of the Southern Resident Killer Whale was sparked while researching and writing an undergraduate thesis on cetacean culture. This interest prompted her to work on regulatory research to inform policy options to mitigate small vessel disruption of killer whale foraging in the Fraser Estuary as part of the FERC and in collaboration with WWF.

Kim's FERC project looks at measures that could be implemented to reduce the threats and disturbances the Southern Resident Killer Whales are facing. The Fraser River Estuary is an important habitat for them due to its importance for Chinook salmon, their preferred prey. The rising popularity of recreational boating in coastal areas is contributing to the growing problem of underwater noise pollution, as recreational boating zones often overlap with the essential habitats of marine species.

****This daily program runs for 19 hours and then repeats****