Stó:lō Relationalities: Exploring Infrastructures of Climate Adaptation along the Fraser River

by

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A thesis submitted to the Faculty of Graduate and Postdoctoral Affairs in partial fulfillment of the requirements for the degree of :

Master of Architecture

in

M. Architecture 3-year stream with Collaborative Specialization in Climate Change

Carleton University
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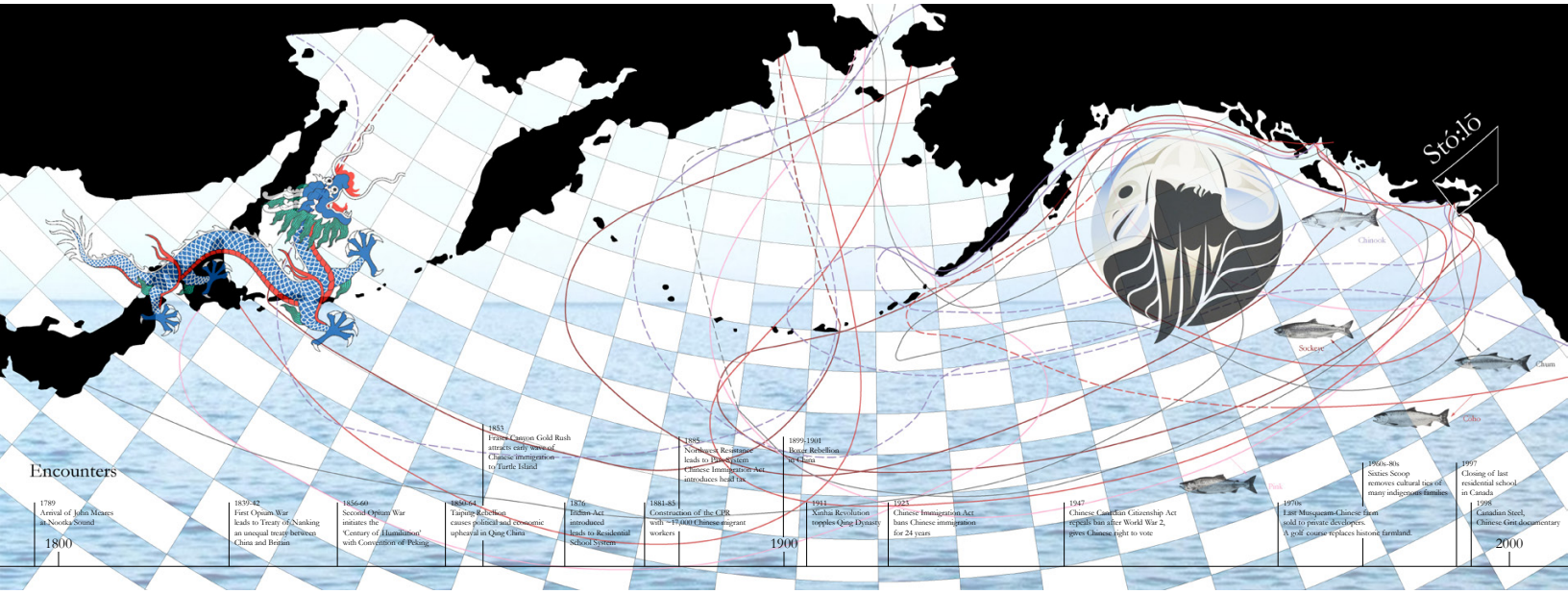
Abstract

Stó:lō, or the Fraser River in British Columbia, is a site of many intersecting forces, from the urgency of climate change caused by flooding and ecological degradation to the material and political hierarchies produced by settler-colonial infrastructures. All of which is imposed onto a rich landscape of indigenous life and history.

This paper's approach follows three phases—encountering, entangling, and engaging—of indigenous culture from a non-indigenous (Chinese Canadian) perspective. The process analyzes, practices, and builds on connected histories of indigeneity, migrant labour, and modern colonial conditions. 'Mapping' also becomes integral for macroscopic and embodied interpretations of the Stó:lō, followed by the design of a socio-ecological infrastructure addressing climate change from a cultural angle.

The paper concludes by reflecting on place-knowing for architectural practice, engagements with indigeneity, LANDBACK, and the cultural dimensions of climate change, suggesting further steps for related projects.



Acknowledgements

I acknowledge the land on which I conduct research, the traditional, unceded territories of the Algonquin nation, on which Carleton University operates. I also acknowledge the land that is the rich subject of my research in this thesis document, the unceded territories of the Coast Salish First Nations, whose longstanding traditions endlessly fascinate me. Both cultures are and will remain invaluable for bringing a better future to our modernizing world.

The work presented in this document would have been impossible without the help of K. Jake Chakasim, whose indigenous perspective guided me throughout the thesis journey.

Friends and family were also essential for the financial and social support they provide. Both my parents support me throughout, and as first-generation immigrants to British Colombia, inspired me to look into the heritage of migrant labour in the region. My mother also helped with translation work.

Lastly, I acknowledge the greater world we live in. Where everything, mundane to sublime, joyful to tragic, continuously teaches me in the most inconspicuous of ways. The world nurtures within us a sense of who we are, and encourages me be a student of life.

Contents

Glossary

CPR, Canadian Pacific Rail

Critical Regionalism, an architectural movement positioning local cultures to mediate the impact of universal civilization. See Kenneth Frampton, "Towards a Critical Regionalism: Six Points for an Architecture of Resistance," *Anti-Aesthetic. Essays on Postmodern Culture* (1983)

Critical Relationalism, a critique of critical regionalism for neglecting existing power dynamics in the places it represents, elaborated in Benjamin Klasche and Brian Poopuu's "What relations matter?" *International Studies Quarterly*, February 2023.

Epistēmē, science or knowledge in classical (Greek) philosophy, contrasted to medieval doctrina.

Halkomelem, main language of Stó:lō.

IPCC, Intergovernmental Panel on Climate Change

Kmastel, dipnet

Kwaietek, seagull

Lands Sovereignty, agency based on indigenous cultural practices and ecological processes

Peló:lhxw, Pilalt First nation

Physis, nature, Martin Heidegger writes that "Physics … observes nature (physis) insofar as nature exhibits itself as inanimate."[1]

Poiēsis, presencing, as Heidegger writes, "Enframing conceals that revealing which, in the sense of poiēsis, lets what presences come forth into appearance."[2]

Praxis, exercise or practice of an art, science, or skill, or the practical application of theory

Qwó:ntl'an, Kwantlen First Nation

Séma:th, one of the seven upriver Stó:lō Tribes – Sumas in English

Sqémél, pit house

Stó:lō, river

Siyak, salmon weir, also written as tsiakq in Charles Hills-Tout's *The Salish People*

Siyá:m, respected leader, plural Si:yá:m

Skauk, raven

Skelau, beaver

S'ólh Téméxw, Ts'elxwéyeqw scholar Wenona Victor describes it as "an encompassing term used to describe 'Our World,' that incorporates all life found therein, including past, present, and future, includes territory, spiritual realm, and all our relations."[3]

Stl'álaqem, spiritual beings that inhabit S'ólh Téméxw, or Slalakum in *The Salish People*

Sqáyéx, mink, transcribed as Kaiq in *Indianische Sagen von Der Nord-Pacifischen Küste Amerikas* (1895), Skaiaq and Skwam in *The Salish People*.

Sq'éwqel, Seabird Island

Sulia, a spiritual form manifest as an object, Hills-Tout describes a sulia as a spirit or "mystery being" that inhabits objects and grants its owners certain powers.[4]

Sumqeameltq, Sky Born of the Sq'ewlets First Nation

Sx̱wōxwiyám, ancient, important stories of the Stó:lō, including X̱ex̱á:ls.

Technē, making or doing as in practical knowledge

Tel Swayel, Sky Born people, written as Tel Sweyil in *The Salish People*.

Terra nullius, vacant land, notion of which informed the 'doctrine of discovery' legitimating European sovereignty over indigenous land.

Ts'elxwéyeqw, Chilliwack indigenous people

X̱á:ls, singular term for X̱ex̱á:ls, Wenona Victor refers to X̱á:ls as the youngest of the four siblings

X̱á:ytem, "a sacred site of the stó:lō nation located east of the town of mission in the fraser valley."[5]

X̱ex̱á:ls, the four offspring of Red Headed Woodpecker and Black Bear who travelled S'ólh Téméxw making the world right.

Xwelítem, Colonial settlers, usually Europeans arriving in the 18th and 19th centuries without land or resource rights, translates into English literally as "starving person."

Dr. Wenona Victor's dissertation, *X̱ex̱a:ls and the Power of Transformation: The Stó:lō, Good Governance and Self-Determination* (2012), was an invaluable resource for clarifying many of the Halkomelem terms in the glossary. The rest of the document defines more specific terms.

1 Martin Heidegger, "Science and Reflection," *The Question Concerning Technology, and Other Essays*. Translated by William Lovitt, First edition., Harper & Row, 1977, 171.

2 Martin Heidegger, "The Question Concerning Technology," *The Question Concerning Technology, and Other Essays*, 27.

3 Victor, Wenona MaryLyn, *Xexa:ls and the Power of Transformation*, Ph.D Dissertation (Criminology), Simon Fraser University, 2012, xvii.

4 Ralph, Maud, ed., "Sulialism," *The Salish People: The Local Contributions of Charles Hill-Tout*. Vol. 2. Vancouver: Talonbooks, 1978, 109.

5 P. R. R. Stewart (2015). *Indigenous architecture through indigenous knowledge: dim sagalts'apkw nisi* [together we will build a village] (T). University of British Columbia, 73.

Illustrations

Fig. 0.1. Jin Me Yoon, *Souvenirs of the Self (Lake Louise)*, 1996

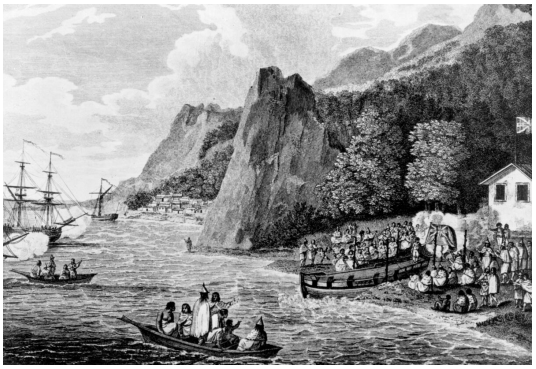
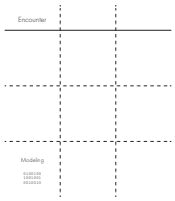


Fig. 0.2. *John Meare's vessels arrive at Nootka Sound, 1788*



Positionality

"Often my work deals with sites and places, and how those places have sedimented histories. I focus on tourism, militarism, and colonialism, and how those things are interwoven and entangled at those sites."

"I wanted to use my body to interrupt a certain narrative of what Canada was [...] So then also question what those presupposed narratives are open it up because we're in an entangled world. The histories are very much entangled with each other and to say, 'how are these stories told, [and] by whom?'"[6]

- Jin Me Yoon

I must acknowledge my own positionality when studying this topic of indigeneity. It is a key aspect of the overall methodology and enables constructive dialogues on the topic. Like Jin Me Yoon, a Korean-born multi-media artist working in Vancouver, my ancestry is not indigenous to the lands in which I work, both of the Coast Salish people along the Stó:lō and the Algonquin people of Ottawa. I am a second-generation immigrant whose parents come from China. I received a bachelor's from the University of Toronto, with a liberal arts education in architectural studies, far removed from the places I work with here. Although not explicitly a fine-art thesis, this thesis draws parallels to the artistic approach of Jin Me Yoon, who is explicitly interested in spatializing entangled histories of landscape and redirecting conventional narratives of historical developments. These narratives tend to produce fascinating characters in my research, from the transformative spirits encountered in trickster stories to indigenous persons suppressed by colonial structures and the invisible labour force that remains foundational to those colonial structures. In my research, I resonated with the largely overlooked figure of the Chinese Canadian railroad worker, especially as they embody a parallel history entangled in the colonization timeline.

6 Jin Me Yoon, "Jin-me Yoon | Scotiabank Photography Award 2022," *Steidl*, Apr. 10, 2023, online video, 2:39.

Fig. 0.3. Chinese workers on the Canadian Pacific Railway - or the *Great Northern Railway's track gang*

Fig. 0.4. *C.I.5 (Chinese Immigration) certificate for Ching Ng after having paid a head tax of 500 dollars, March 1918.*

Chinese Canadian historian Dr. Henry Yu notes: "The Chinese have been here since the first moments of contact with First Nations people with people coming from other places in the world." In 1788-89, Chinese workers arrived with Captain John Meares as labourers who set up a fur trading post at Nootka Sound. Harley A. Whyte, a Nuu-chah-nulth historian and tour guide, notes that Chinese labour built an early Spanish fort in his ancestral territory. In 1858, hundreds of Chinese gold miners moved to the Fraser River from California for the gold rush. Chinese labour was also instrumental in constructing the Pacific railway, employing 17,000 workers for railway construction as a part of a multi-racial force consisting of Chinese, First Nations, Kanaka, Black and White people.[7] Until the beginning of the 20th century, the Chinese population in the region made up 15-25% of the non-native population, making them demographically significant in British Columbia's history.[8][9]

Indigenous and Chinese cultures share a certain degree of invisibility in modern Canadian history. Although the two groups come from different places, recent historical work points to instances of personal contact at every stage of colonization. From the fleeing of Chinese workers on Meare's ship to interior Salish First Nations in 1789. To work partnerships while mining,[10] on Musqueam farms,[11] in salmon canneries,[12] and support during railway construction. In one case, First Nations people nursed railway workers who were left to die along the tracks.[13] In fact, *Sxwóxwiymelh* is a Stó:lō site marking the death of a large number of Chinese workers to the

7 Chow, Lily Siewsan. 2012. "The Forgotten Ties: Relationships between First Nations People and Early Chinese Immigrants in British Columbia, Canada (1858-1947)." C. International Conference of Institutes and Libraries for Chinese Overseas Studies (WCILCOS) (5th: 2012). May 16.

8 Chinese Canadian Historical Society of BC, "1788," part of Cedar and Bamboo series, video documentary, online video, 9:36.

9 For an introductory account, I recommend George Chiang's *The Railroad Adventures of Chen Sing* (2017), published online by Friesen Press.

10 Chow, "The Forgotten Ties."

11 Cheryl, Rossi. "Musqueam: Chinese Garden on Musqueam Land Brought Cultures Together." *Vancouver Is Awesome*, 26 Sept 2013.

12 Lily Chow, *Chasing Their Dreams*, Caitlin Press, 2000, 20-37

13 Suzanne Ma, "A Tour of The Deep Relationship Between B.C. Chinese Immigrants, First Nations," *Huffpost*, 29 Nov 2012.

Fig. 0.5. *Bill Paul, of Lytton First Nation, holds up a shovel left behind by Chinese miners in the 1800s along the banks of the Fraser River.*

flu.[14] Both groups also faced discrimination in the forms of the Pass System (1885) and the Chinese Exclusion Act (1885), beginning with a head tax on immigration, leading to an outright ban in 1923. The relationships appear in disparate, personal stories, indicating a friendly, respectful relationship between the two groups. The positionality of this thesis builds on this foundation, suggesting a more complicated narrative of the cultural realities of colonial Canada.

14 Justine Hunter, "A forgotten history: tracing the ties between B.C.'s First Nations and Chinese workers," *The Globe and Mail*, May 9, 2015, https://www.theglobeandmail.com/news/british-columbia/chinese-heritage/article24335611/

Establishing a territory

Climate Change

In November of 2021, the Sumas Prairie near Chilliwack flooded, forcing hundreds of people to abandon their homes, highways to close, and causing the death of thousands of livestock in what the agriculture minister Lana Popham describes as the "largest agricultural disaster in BC."[15] The role of climate change here is indisputable, as the Intergovernmental Panel on Climate Change (IPCC) report from 2022 states, "It is an established fact that human-induced greenhouse gas emissions have led to an increased frequency and/or intensity of some weather and climate extremes since pre-industrial time," and that "heavy precipitation will … become more frequent and more intense with additional global warming."[16] On flooding, the same report establishes a direct link between flash floods like the one in Chilliwack and environmental factors such as extreme precipitation, glacier lake outbursts, or dam breaks. In a Canadian context, Vincent et al. note a rapidly warming national climate since the 1960s resulting from increased atmospheric CO_2 and methane concentrations, with potential amplification effects from the melting of permafrost. A consequence is "the increasing frequency and intensity of unusual and … extreme weather events."[17]

Fig. 1.1. Jenna Hauck, *A flooded property in Abbotsford along Boundary Road on Wednesday*, Nov. 24, 2021

While the IPCC and Geoscience Reports above focus on the immediate problems brought forth by climate change at global and national scales, it is important to recognize historical patterns of climate change specific to the Fraser River itself. In a provincial report, Dirk Septer documents various types of flood events occurring in southern British Columbia from 1808 to 2006,

15 CBC News, "One year after flooding disaster, recovery continues for Fraser Valley farmers," *CBC News*, Nov. 08, 2022.

16 Seneviratne, S.I., et.al. 2021, "Weather and Climate Extreme Events in a Changing Climate. In Climate Change 2021: The Physical Science Basis." Contribution of Working Group I to the *Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1513–1766.

17 Vincent, L.A., et. al., 2018, "Changes in Canada's climate: Trends in indices based on daily temperature and precipitation data," *Atmosphere-Ocean*, v. 56, p. 332–349.

Fig. 1.2. Edward Brothers, *Flooded C.P.R. culvert #51A in the Fraser Valley*, 1894.

Fig. 1.3. Micky Jones, *Three white horses caught in the Fraser Valley flood of 1948* - When the dykes gave way, horses and cattle were stranded in rushing floodwater in Barnston Island. The horses were later rescued by First Nations people on the island.

including fall and winter rainstorms or rain-on-snow events, summer rainstorms and floods, spring run-off, ice jam floods, storm surges, tsunamis, glacial outbursts, and dam burst flash floods.[18] Septer's findings reveal that flooding events occur seasonally, impacting local infrastructures and businesses. Major flooding from this period included the flood of May 1894, which remained above 20 feet for 33 days and above 24 feet level for 17 days.[19] Damages occurred all along the river, from Richmond to Hope, and the rail service was suspended. Following the flood, Premier Theodore Davie and Prime Minister John Thompson agreed that "plainly the lesson of the floods is the necessity of a comprehensive system of dyking which will include the whole inundated area of the Fraser Valley."[20] The second largest recorded flood occurred in May 1948 and similarly devastated agriculture and infrastructures. In response, Premier Byron Johnson declared a state of emergency, mobilizing thousands of soldiers and volunteers for rescue and construction operations.

However, the 1894 and 1948 floods are relatively recent events in the history of climate change along the Fraser River. For its First Nations, the Stó:lō has always been a formidable natural force, a source of abundance for its communities. The river constitutes an interconnected ecosystem over 1300 kilometres long and a home for migrating salmon from 9,500 to 9,000 years ago.[21] As salmon began to inhabit the watershed, the landscape evolved, creating unique local conditions for the spawning and return of salmon. The historical interrelationship between indigenous culture and salmon has been damaged by habitat loss and fisheries. This erosion of a traditional, millennia-old culture mirrors the ecological degradation caused by climate change today.

18 Dirk Septer, 2007. *Flooding and Landslide Events Southern British Columbia 1808-2006*. Province of British Columbia. Ministry of Environment, Victoria, B.C.

19 Fraser Basin Council, "1894 Fraser River Flood," *Lower Mainland Flood Story Map*, Floodwise.

20 Ibid.

21 Shaepe, D. M. 2001, "The land and the people: glaciation to contact," In *A Stó:lō-Coast Salish Historical Atlas*. Vancouver and Chilliwack: Douglas and McIntyre and the Stó:lō Nation.

Fig. 1.4. Shelly, W.B., *Decorated fishing boats near the Pattullo Bridge for the visit of King George VI and Queen Elizabeth*, May 31, 1939.

Fig. 1.5. *Detail of the combined use of cast and wrought iron in the Whipple bowstring arch at Claverick, New York.*

Establishing a niche

Infrastructure

The thesis began by considering the role of historic bridges in Vancouver's urban landscape, specifically the Patullo Bridge near my home. Research into this area expanded quickly to consider modern infrastructural developments around the Fraser River and its ecological effects. Industrial bridge infrastructure in North America originates in European precedents from the 18th through to 20th centuries, reflecting material and formal changes in civil engineering technologies that responded to increasing economic demand.[22] This thesis remains interested in the relationship between modern infrastructural design and existing landscapes. The process assumes the possibility of alternative infrastructural engagements with the Fraser River. It also assumes the potential for climate adaptation through more locally responsive buildings, whether through local materiality or engaging with indigenous cultures.

Nowadays, the Euro-centric qualities of contemporary modern development on Turtle Island are more than self-evident. These developments favour settler colonial typologies that dominate the landscape as opposed to holistic means of climate adaptation. Kenneth Frampton, in "Industrialization and the Crises of Architecture," describes this tendency, writing that "while architecture [in the 19th century] as theory tended towards the dematerialization of mass … civil engineering proceeded to work upon nature and to subject, for the first time, its untamed wastes to a measured infrastructure of metaled roads and embanked canals." Civil engineering exerted an unprecedented influence on built environments in the form of public works on roads, canals, and railways since the 18th century, providing a language of **"embankments, cutting locks, metalings, aqueducts, viaducts, bridges, and dams."**[23] Frampton's essay primarily

22 Emory L. Kemp, and Jet Lowe. "The Fabric of Historic Bridges." IA. *The Journal of the Society for Industrial Archeology 15*, no. 2 (1989): 3–22.

23 Kenneth Frampton, "Industrialization and the Crises in Architecture" (1973), in K. Michael Hays, ed., *Oppositions Reader* (New York: Princeton Architectural Press, 1998), 45.

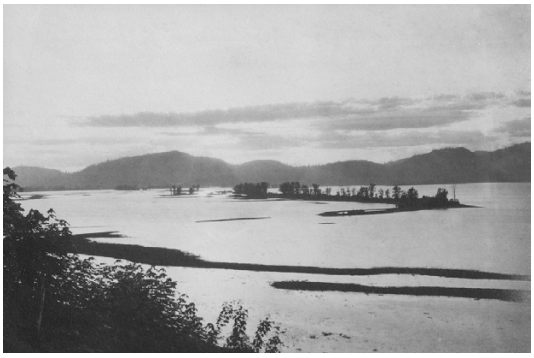


Fig. 1.6. *Old Sumas Lake, early 1900s*

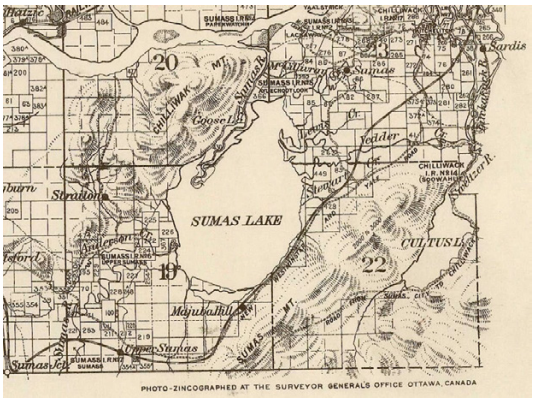


Fig. 1.7. *Government map from 1913 showing the location of Sumas Lake which was later drained to become Sumas Prairie.*

covers the theoretical implications of this new language, but the same developments also have very concrete impacts on the lands on which they are constructed. Collin Duffield argues in the *Stó:lō Coast Salish Historical Atlas* that "numerous salmon-bearing streams and wetlands have been degraded and destroyed [...] Polluted agricultural and urban run-off has reduced water quality, and water flow has been altered by [the rapid drainage of rainwater], rather than filtering slowly into the ground to provide steadier, cooler flows."[24]

The draining of the Sumas Lake near Chilliwack marks an explicit example of infrastructural colonialism in the 1920s. An elaborate system of pumps, dykes, and canals drained the historic lake to create land for agricultural use. The same land was the major site of flooding in 2021. Yet prior to its transformation, the same place acted as a spawning route and rearing habitat for salmon, a stopover for migrating birds, and an ecosystem for many types of waterfowl, fish, plants, and animals. Jody R. Woods describes the transformation as "the greatest, single loss of a productive waterway in S'ólh Téméxw." **It is important to note that built infrastructure does not need to be destructive to natural land processes.** Pierre Bélanger identifies a new role for landscape in infrastructure design in *Landscape As Infrastructure*, writing, "Once the sole purview of the profession of civil engineering, infrastructure [...] is taking on extreme relevance for landscape planning and design practices in the context of the changing, decentralizing structures of urban-regional economies."[25] More importantly, First Nations communities have lived alongside the Fraser River for millennia, with documented sites of human occupation dating from 10,000 to 8,000 years ago as near the end of the most recent ice age.[26] These communities have been, and continue to be, engaging with the landscape in less

24 Collin Duffield, "Transportation Infrastructures, 1866-2000," in *A Stó:lō-Coast Salish Historical Atlas*, 96.

25 Pierre Belanger, "Landscape As Infrastructure." *Landscape Journal*, vol. 28, no. 1, 2009, 91.

26 D. M. Shaepe, 2001, "The land and the people: glaciation to contact," in *A Stó:lō-Coast Salish Historical Atlas*, 12-13.

intrusive and ecologically sensitive ways, living off the river with fishing tools such as weirs, baskets, traps, dip nets, gill nets, and spears. Traditional methods for salmon preservation also included wind drying along the Fraser Canyon or by salting and smoking. Buildings included the pit house and long house typologies. These non-colonial forms of the built environment remain crucial precedents for a design moving forward.

Occupying a Niche

Technology

Therefore, this thesis aims to reconsider traditional methods for infrastructural design, more specifically, how agencies provided by these methods anticipate solutions to the overarching climate crisis.

Fig. 1.8. *Vedder Canal, and the Sumas Prairies near Chilliwack in the evening.*

Climate change often refers to fluctuations in the average weather patterns of particular places. These changes influence processes and effects within our Earth system. According to the Canadian Confederation of Earth Sciences, anthropogenic climate change, has had several amplifying effects: "First, as the climate warms evaporation increases, raising atmospheric concentrations of water vapour, itself a GHG [Greenhouse Gas] — and adding to warming." Second is "the wasting of ice sheets in Greenland and Antarctica and of ice caps and glaciers in mountains worldwide." Third, "the thawing of near-surface permafrost releases additional GHGs (primarily CO_2 and methane) during the decay of soil organic matter formerly entombed in frozen ground."[27] The impacts of climate change range from the incremental, steady melting of glaciers and ice sheets to the increased frequency of unprecedented, extreme weather events such as hurricanes, water shortages, and flooding. The role of greenhouse gases and the greenhouse effect has been known to the scientific community since the early 19th century when Joseph Fourier

27 Burn et al. 2021. The Canadian Federation of Earth Sciences Scientific Statement on Climate Change – Its Impacts in Canada, and the Critical Role of Earth Scientists in Mitigation and Adaptation. Geoscience Canada, 59.

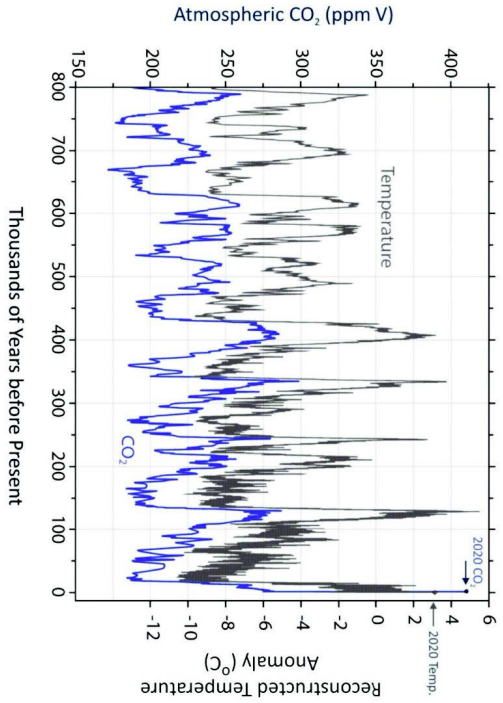


Fig. 1.9. *Co-variation of atmospheric CO_2 concentration and climate over the last 800,000 years, as determined from deep ice cores collected in Antarctica.*

proposed that the atmosphere was responsible for maintaining Earth's habitable surface in the *Mémoire sur les temperatures du globe Terrestre et des espaces planétaire* (1824).[28] The radiative properties of carbon dioxide were later discovered independently by American scientist Eunice Foote and Irish scientist John Tyndall in 1856 and 1859, respectively.[29] Nowadays, the scientific community of the global north relies on vast and detailed computer models to simulate climate change. These models rely on slightly different algorithms representing different physical interactions between the atmosphere, oceans, landmass, and the biosphere.[30] The same Earth Science article stresses the exceptional role of fossil fuels in anthropogenic climate change as a primary energy source since the early Industrial Revolution, featuring in all sectors of the global economy, from manufacturing to forestry to construction, transportation, and domestic heating. "The return of the fossilized carbon to the atmosphere through the burning of fuel in the past 250 years accounts for about 80% increase in atmospheric CO_2 concentration."[31] As a result, "human activities today generate greenhouse gases at a rate far exceeding the capacity of vegetation or oceans to absorb them." Another article by the American Association for the Advancement of Science confirms this view, citing global temperature increases since the 1950s, reversing a general cooling trend observed for the last 2000 years. The more resolute language found in IPCC policy documents reflects a strong consensus regarding climate change in the scientific community. In 2022, the organization revised the current state of climate from "extremely likely" to be human-influenced to "unequivocal that human influence has warmed the atmosphere, ocean, and land."[32]

28 Fourier, J.-B.-J. (1824). Mémoires de l'Académie Royale des Sciences de l'Institut de France VII. 570–604 (*Mémoire sur Les Temperatures du Globe Terrestre et Des Espaces Planetaires* – greenhouse effect essay published in 1827)

29 Burn et al, 62.

30 Ibid.

31 Burn et al, 63.

32 IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the *Sixth Assessment Report of the Intergovernmental Panel on Climate Change.*

Fig. 1.10. Brandon Gabriel, *Ruskin Dam Piers, 2019*

While acknowledging anthropogenic impacts on climate change, the scientific consensus does not explicitly address historical and cultural dimensions behind changes in Earth's ecology. Dipesh Chakrabarty, in *Intimations of the Planetary* (2021), argues for two narratives, globalization and global warming, being connected by "the phenomena of modern capitalism … and technology, both global in their reach. After all, greenhouse gas emissions have increased almost exclusively through the pursuit of industrial and postindustrial forms of modernization and prosperity."[33] The recent history of climate change, according to John MacNeill, has been "a time of extraordinary change" in human history. "The human population increased from 1.5 to 6 billion, the world's economy increased fifteen-fold, energy use increased from thirteen to fourteen-fold, freshwater use increased nine-fold, and the irrigated areas by fivefold."[34] Chakrabarty continues this analysis by noting the uneven distribution of capitalist development "inflected by class, gender, and race," even involving attempts to deny less developed nations the "carbon space" to industrialize.[35]

"Yet the history of capitalism alone, as it has been told until now, is not enough for us to make sense of the human situation today."[36] Climate change derives as much from socioeconomic institutions and technological processes at a planetary scale as from histories of political economy that cause it.[37] Peter Haff's notion of the "techno-sphere" draws a significant comparison here, referring to "the set of large-scale networked technologies that underlie and make possible rapid extraction from the Earth of large quantities of free energy and subsequent

33 Dipesh Chakrabarty, "Introduction: Intimations of the Planetary." *The Climate of History*. Duke UP, 2021. 4.

34 Andrew S. Goudie and Heather A. Viles, *Geomorphology in the Anthropocene* (Cambridge: Cambridge University Press, 2016), 28. See also the larger discussion in J. R. McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, MA: Harvard University Press, 2014).

35 Chakrabarty, "Introduction: Intimations of the Planetary," 4.

36 Ibid.

37 Peter Haff, "Technology as a Geological Phenomenon: Implications for Human Well-Being," in *A Stratigraphical Basis for the Anthropocene*, ed. C.N. Waters et al. (London: Geological Society, Special Publications, 2014), 301–2.

power generation [...to] the existence of modern governmental and other bureaucracies, high-intensity industrial and manufacturing operations [...] and the myriad additional "artificial" or "non-natural" processes [modern civilization depends on.]."[38] Haff's thesis argues that technology has become essential to biological humanity. Carl Schmitt, in his "Dialogue on New Space" (1958), articulates the techno-sphere as a type of "unencumbered technology" managing a "maritime existence."[39] Unlike "terrestrial existence," which depended on "house and property, marriage, family, and hereditary rights," a maritime analogy of the planet meant that life is crucially dependent on the proper functioning of technology. "If technology fails, life faces disaster."[40]

Fig. 1.11. Katsushika Hokusai, *The Great Wave off Kanagawa*, 1831. - Notice how the boats seem to rock off the waves in an unsteady way.

Embedded within this model is an anthropogenic understanding of technology, particularly as neutral instruments serving as a means to an end. Martin Heidegger describes this in *The Question Concerning Technology* (1956), "We ask the question concerning technology when we ask what it is. Everyone knows the two statements that answer our question. One says: Technology is a means to an end. The other says: Technology is a human activity. The two definitions belong together. For [...] The manufacture and utilization of equipment [...] and the needs and ends that they serve, all belong to what technology is. The whole complex of these contrivances is technology. Technology itself is a contrivance, or, in Latin, an *instrumentum*.[41]" He continues arguing that this ubiquitous definition applies to modern technology: "But this much remains correct: modern technology too is a means to an end. That is why the instrumental conception of technology conditions every attempt to bring [people] into the right relation to technology. Everything depends on our manipulating technology in the proper manner as means. We will, as we say, "get" technology

38 Haff, "Technology as a Geological Phenomenon: Implications for Human Well-Being," 302.

39 Carl Schmitt, *Dialogues on Power and Space*, ed. Andreas Kalyvas and Frederico Finchelstein, trans. and with an introduction by Samuel Garrett Zeitlin (Cambridge: Polity, 2015; first published in German, 1958), 72, 73–74.

40 Chakrabarty, "Introduction: Intimations of the Planetary," 6.

41 Martin Heidegger, "The Question Concerning Technology," 5.

Fig. 1.12. Jose Fusta Raga, *False Creek and Downtown Vancouver,* Nov. 2007.

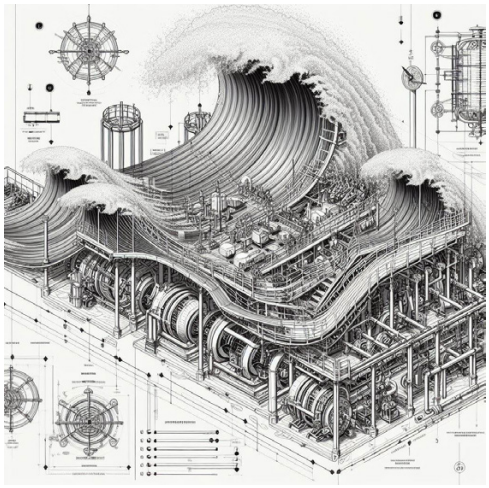


Fig. 1.13. *Mechanized waves technical drawing*

"spiritually in hand." We will master it. The will to mastery becomes all the more urgent the more technology threatens to slip from human control."[42]

Heidegger does not assume this to be the *only* configuration relevant to our modern technological conditions. "Only the true brings us into a free relationship with that which concerns us from out of its essence. Accordingly, the correct instrumental definition of technology still does not show us technology's essence [...] What is instrumental in itself? Within what do such things as means and ends belong?"[43] The essay discusses different types of causality (material, formal, final, and efficient) stemming from Aristotelian philosophy yet concludes that the same language is insufficient in describing the essence of technology. The limitation of this view, according to Heidegger, comes from a tendency to use causality in terms of moral and ethical outcomes.[44] This view denies a more primal meaning to causality found in classical philosophy, which he attributes to the Greek term *poiesis*, where "Every occasion for whatever passes over and goes forward into presencing from that which is not presencing is *poiesis*, is bringing forth [Her-vor-bringen]."[45] For Heidegger, *physis*, or an intrinsic understanding of nature, is the highest form of *poeisis*. *Technē*, the Greek root of the term "technology," also stems from *poiesis* and links to the word epistēmē, both terms related to knowing in a broader sense.

Heidegger's footnotes on technology remain significant as a frame of reference for climate change and the need for climate adaptation. The market for climate change is saturated with technological solutions to the wicked problem but rarely touches upon the roots of the issue. That is our relationship to the land and its own agency outside our technical, ethical,

42 Ibid.

43 Heidegger, "The Question Concerning Technology," 6.

44 Heidegger, "The Question Concerning Technology," 9. "Today we are too easily inclined either to understand being responsible and being indebted moralistically as a lapse, or else to construe them in terms of effecting. In either case we bar to ourselves the way to the primal meaning of that which is later called causality."

45 Heidegger, "The Question Concerning Technology," 10.

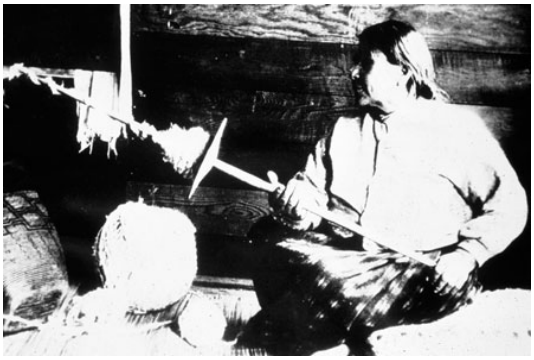


Fig. 1.14. *A woman named Selisya spinning wool, photographed at the Coast Salish village of Musqueam,* 1915. - How Heideggar envisions *technē* and *poeisis*, derived from classical philosophy, already exists in indigenous ontologies.

or moral epistemes. As John McMinn and Marco Polo describe it, "For the non-architectural public, there is … perception about sustainability as either highly engineered and technical or to include solar earth-bermed houses from the 60s."[46] This generalized view denies many local cultural characteristics central to sustainable design. Indigenous cosmologies offer opportunities to introduce a type of poesis correcting these preconceptions. Human sovereignty, after all, depends on land sovereignty as the two systems are intimately connected. Global capitalism demonstrates that human agents can impose their own visions and values onto the land and one another, but how does one address the epistemic tensions that arise from these structures? There is no coherent answer to this question, but perhaps we do not really need one given the incoherence innate to Heidegger's *poeisis*. Nevertheless, Indigenous cultural practices along the Stó:lō, such as fishing, salmon drying, making tools and blankets, and potlatches, among many practices long suppressed by the Indian Act, suggest an active engagement with land-based processes at a geographic scale. **These practices demonstrate the deep connections between human praxis and land sovereignty.** The following thesis project structures around explorations of these agencies through mapping and making, depicting oral histories, and in an architectural intervention along the Fraser River. In a sense, Heidegger's poeisis emerges here in *bringing forth* a cultural past to address present-day issues framed by personal histories connected to my Chinese Canadian heritage.

46 John McMinn et. al., "41 to 66: Building Identity," *Canadian Architect,* Jan. 1, 2006.

Fig. 1.15. Andy Everson, *Idle No More!*, 2012

Defining land sovereignty

Land sovereignty in this thesis refers both to indigenous cultural practices that contribute to environmental stewardship and the ecological processes that they engage with. It distinguishes from Westphalian sovereignty founded on state structures represented by a sovereign ruler in notable ways.[47] Harald Baulder and Rebecca Mueller argue, "It also entitles the state to manage its external affairs as long as the sovereignty of other states is respected. As a political instrument, Westphalian sovereignty [...] emphasize territorial control rather than personal bondage."[48] This model of sovereignty established and justified settler colonialism through the doctrine of *terra nullius*, which denied indigenous people any existing sovereignty over the land they resided. Although this doctrine was not applied in its totality, it has led to the writing of "self-serving histories of discovery, conquest, and settlement that wipe out any reference to the original relations between indigenous peoples and Europeans" in Canadian and American discourse.[49]

By comparison, indigenous or land sovereignty frames the term much more broadly than the Westphalian political system. Baulder et al. note that the concept evolves as it responds to ongoing political struggles and transformations of political authority. For Kwakwakwa'wakw scholar Sarah Hunt, land sovereignty resides in a space of ontological difference distinct from the colonial system and where indigeneity expresses itself, **"The ontological differences are difficult to explain yet that is where their power lies – in the spaces between intellectual and lived expressions of Indigeneity."**[50] Legally speaking, indigenous sovereignty appears in the United Nations Declaration on the Rights of Indigenous Peoples, which states that "Indigenous peoples

47 Harald Bauder & Rebecca Mueller (2023) Westphalian Vs. Indigenous Sovereignty: Challenging Colonial Territorial Governance, *Geopolitics*, 28:1, 158.

48 Ibid.

49 Baulder et. al., "Westphalian Vs. Indigenous Sovereignty," 159.

50 Sarah Hunt, "Ontologies of Indigeneity: The Politics of Embodying a Concept", *Cultural Geographies*, vol. 21, no. 1, Simon Fraser University, 2014, 30.

Fig. 1.16. *Thousands gather in Metro Vancouver, British Columbia, for Indigenous-led "Protect the Inlet" mass mobilization against the Kinder Morgan Trans Mountain Expansion pipeline.*

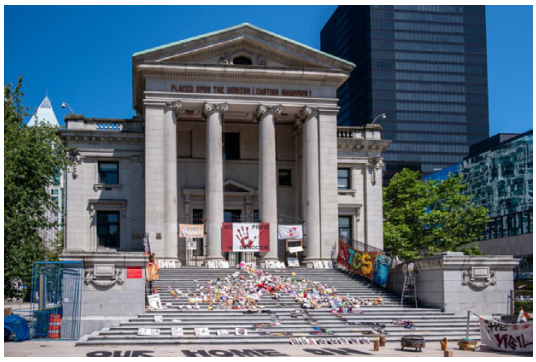


Fig. 1.17. Jeffrey Whyte, *Symbols left at the Vancouver Art Gallery in memory of the children who died at the Kamloops Residential School,* July 23, 2022.

have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social, and cultural development." Indigenous peoples also "have the right to autonomy or self-government in matters relating to their internal and local affairs, as well as ways and means for financing their autonomous functions."[51] The emphasis on the local agency is significant here since it challenges an established hierarchy by sovereign Westphalian states that exert internal and external control and self-determined indigenous nations. Such is the "uneasy relationship" between Westphalian and Indigenous forms of sovereignty.

This thesis prioritizes land sovereignty over state sovereignty in its method. Although, one might ask why this is the case. Why would one privilege indigeneity over modernity? A clear argument notes the many historical injustices created by the latter system. Beyond this, the need for land sovereignty is now increasingly apparent in a globalized, climactically destabilizing world. Climate change adaptation can benefit from a broader sense of sovereignty. "Indigenous Place Thought," an indigenous ontology proposed by Haudenosaunee and Anishnaabe scholar Vanessa Watts, "is based on the premise that land is alive and thinking, and that humans and non-humans derive agency through extensions of these thoughts."[52] Watts rejects the "hierarchies of agencies" since they segregate between flesh and things, suggesting that "if we think of agency being tied to spirit, and spirit exists in all things, then all things possess agency."[53] This extends to what Dwayne Donald refers to as "ethical relationality," which "seeks to understand more deeply how our different histories and experiences position us in relation to each other" and fosters discourse between colonizer and colonized to develop an "ethic of historical consciousness" concerning the Anthropocene.[54]

51 United Nations. 2007. *United Nations declaration on the rights of indigenous peoples.* New York.

52 Vanessa Watts, "Indigenous Place-Thought and Agency amongst Humans and Non-humans" (First Woman and Sky Woman go on a European Tour!)," *DIES: Decolonization, Indigeneity, Education and Society* 2, no. 1 (2013): 21.

53 Vanessa Watts, "Indigenous Place-Thought," 30.

54 Dwayne Donald, "On What Terms Can We Speak? Lecture at the

Literature Review

The indigenous history of the Stó:lō is rich, diverse, and impossible to describe comprehensively. A master's thesis alone will never cover the full breadth of pre-colonial and modern indigenous culture, and broad generalizations risk turning embodied lived Indigenous ontologies into "mere trinkets" for academic pontification. For Métis anthropologist and theorist Zoe Todd writes, all indigenous groups, including First Nations in S'ólh Téméxw, had "self-complete, non-state systems of social ordering successful for tens of thousands of years." The relation of this thesis project and indigenous history is not to represent Indigenous voices, as they already articulate themselves effectively in many other channels, but to learn about their traditions piecemeal to illustrate an alternative, more ecologically harmonious, relationship with the land. The following section covers pre-modern history through select Sxwōxwiyam, or trickster stories, followed by a modern timeline. Sxwōxwiyam are the oral histories describing a distant past "when the world was not quite right."[55] They describe the time when animals and humans could speak to one another and assume one another's forms.

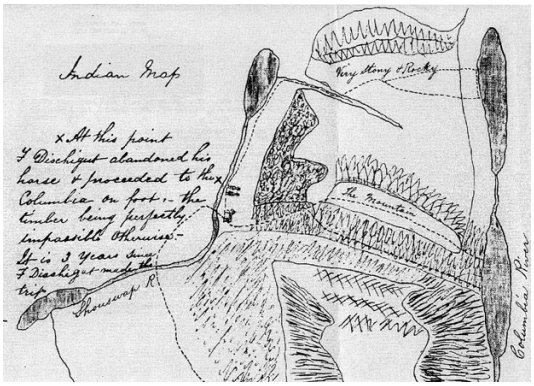


Fig. 2.1. *"Map of proposed road," 8 August 1862, BCARS, Colonial Correspondence* - This map was produced by a colonial officer W.G. Cox advised by indigenous guides, it shows several native routes at the head of Okanagan Lake. It traces an indigenous sense of place within a colonial diary.

The Salmon Myth

Related by the Pilatlq tribe, the salmon myth is among many trickster stor*ies involving salmon in Coast Salish culture*. Salish cultures do not separate humans from salmon, as the Salish matriarch Lee Maracle writes, "In the oral records of Indigenous people, animal, flora, and the business of war and mass suicide tend to travel in tandem." In a pre-dominant Western paradigm, ecology and sociology are conceived as separate disciplines, but in oral societies like the Coast Salish, memory is conceived as the recollection of unfolding, connected events in a process that is "at once historical, sociological, political, legal, and philosophical."[56]

University of Lethbridge," 2010, 43:54.

55 Albert (Sonnie) McHalsie et. al., "Making the World Right through Transformations," in *A Stó:lō-Coast Salish Historical Atlas*, 12.

56 Lee Maracle, *Memory serves: oratories*, NeWest Press, 2015, 46.

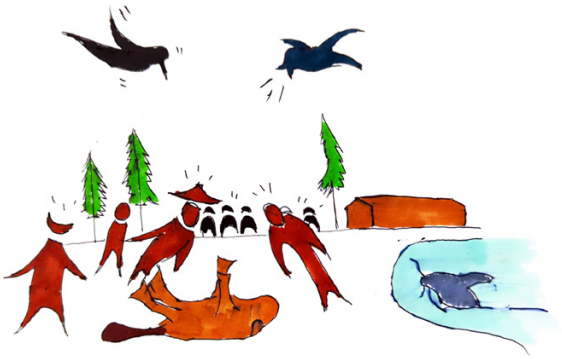


Fig. 2.2. *Skelau, Beaver, feigns death to trick the Salmon people*, sketch

"Very long time ago, there were no salmon in the river except the steelhead [...] So one day Skelau (Beaver) said to the people, "Let us leave this country and go for a trip down," Tseukt (Woodpecker), Tschkel (bird not identified), and Smatq (Bull-headed fish) agreed and the four started off together."

"[They arrive at a village at night], and Skelau says: "Look at the smoke; it has all the colours of the rainbow. This is where the Salmon people live. Now I am going to steal the chief's baby and carry him off, and then we shall get lots of salmon." So he presently crept towards the settlement, taking kwatel (Mouse) with him. Skelau threw himself down in the pathway on his back and feigned to be dead. Kwatel made his way to the canoes and gnawed holes in them, and also [weakened the handles so it would snap in two.]"

"At daybreak one women left the house to get some water, and as she went to the stream she came upon Beaver lying upon his back in the path apparently dead. She had never seen anything of this kind before, and became alarmed, and cried out to the others to come and see the *slalakum*. They all rushed down to see the strange thing. No one knew what it was, and all expressed surprise and fear, and all expressed surprise and fear, the more timid bidding the rasher not to go too close. [...] one ran down from the village and pushed the crowd aside, saying, "Let me see him; I think I know that person." This was Keuq, the steelhead salmon, who [warned], "You must be careful with him; he is a very crafty fellow. Give me a knife and I will cut him open, and you shall see what he has in mind; he is here for no good purpose." As he was about to cut Beaver open Tseukt and Tsckel came flying over their heads, making a great noise and attracting everybody's attention. They all left Beaver and endeavored to capture the birds. The latter pretended to be lame and enticed the people to follow them."

"[While everybody was distracted, Skelau] quickly made his way to the house. Inside he saw a baby hanging from the swing-pole. In a moment he snatched it down, and making straight for the river

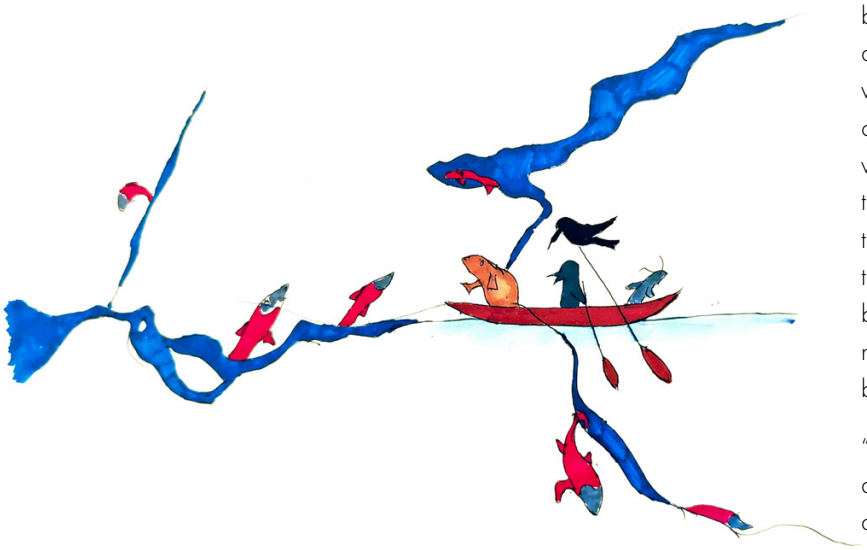


Fig. 2.3. *Skelau tricks salmon into their first annual salmon run on the stó:lō*, sketch

plunged in and carried it off. [Tseukt and Tsckel also went for the canoe and paddled off with Beaver and the baby.] The Salmon people then rushed for their canoes and gave chase to them. But no sooner did the paddlers bend to this work than the paddles snapped one after the other. The water, too, forced its way through the holes in the canoes made by Kwatel, so that they could make but poor headway. [A few had managed to gain upon the fugitives by paddling with the edge, but theirs also snapped after Kaiatlia (snail) cried] "Paddle with the flat of your paddles and you'll get along faster."

"When Skelau and his friends got up the Fraser as far as the Coquitlam River they took off the baby's skilatl (undergarments). One of these, a dirty one, they threw into this stream. Hence they went on to the Chilliwack River, and into this they cast another skilatl, this time a clean one. They went on the Harrison River and dropped another there, and thence to Yale, on the Fraser, where there was a tsiakq (fish-weir). On the lower side of this they dropped the child; whereupon the water began to rage and boil. The four adventurers now separated and went up different creeks and became slalakum."

"From this time onwards the salmon have visited annually the streams mentioned; but because the dirty skilatl was thrown into the Coquitlam, the salmon taken in that river are bad and difficult to dry. At the Harrison something kills the salmon, and they die in great numbers there In the Chilliwack, on the contrary, they are good and fine, and are easily dried and cured."[57]

The salmon as a metaphor for change against the river current is significant within this thesis. Susan Point's artwork, *Salmon Spawning Run* attributes significance to salmon as givers of life, indicators of wealth, and the cycle of life.[58] My own process also works against the stream to understand and go against cultural division.

57 Maud, Ralph, ed. "Salmon Myth," *The Salish People*, 61-63.

58 Susan Point, "Salmon Spawning Run by Susan Point," *Mint Museum*, Dec. 04, 2014, online video, 3:48.

Fig. 2.4. *Red-headed woodpecker,* sketch

Fig. 2.5. Xä:ls transforms crying children into the stars, sketch

Xexá:ls

The story of Xexá:ls, or the transformers, is an origin story shared by First Nations communities along the watershed. It describes the Xexá:ls, or three sons and one daughter of Red-Headed Woodpecker and Black Bear, who left the family after Black Bear's second wife, Grizzly Bear, killed Red-Headed Woodpecker. They subsequently traveled down the Harrison River to the confluence with the main Stó:lō (river), traveling upriver, then westward, performing transformations on living beings to rectify their actions. People who acted wrongly became stones, static landscape features scattered alongside the river, and people who acted generously were transformed into valuable resources like the cedar tree, sturgeon, and beavers, becoming ancestors to the Stó:lō people. Those who chose not to transform were fixed into permanent forms, as with other land features like rivers and mountains. Xexá:ls establishes the transformations making up the present landscape, describing a simultaneous mythological and biological connection between the indigenous people and the land.[59] The following are very few among many stories of Xä:ls:

1.

"The middle son was called Qoā'kotlkotl. The youngest son was always crying, and because he couldn't be calmed down, his mother asked him why he was crying. So he answered, "I would like us to move down to the lake." The deity [Gottheit] had inspired this wish in him. [Black Bear] told her husband the child's wish and they moved down to Sk'tsas. When they arrived there, Woodpecker built a house. Then Grizzly Bear began quarrelling with her husband and finally killed him. Qoā'kotlkotl made himself a cap from beaver fur and the four children left their mother and together wandered up along the Fraser River towards the sunrise. From there they turned back and wandered east once more. They had received

59 Albert (Sonnie) McHalsie, "Making the World Right through Transformations," 12-13.

Fig. 2.6. *Xä:ls transforms a seal, hunter, and his harpoon into stone,* sketch

Fig. 2.7. Sketch of *Sumqeameltq, Tel Sweyil 'sky-born' of the Sq'éwlets First Nation,* sketch

the name Qäls[60] and transformed everyone they met into stones or other things. Kaiq, Mink, accompanied them on their travels."

4.

"Qäls went on and met a group of children who were weeping because their parents had left them. He transplanted them into the sky and they became the Pleiades [stars]"

10.

He went on and met an old man with a small head, named Kewuq. He asked him, "Do you always stay near your house?" "Yes," he answered, "I don't care for travelling about." So Qäls transformed him into a river salmon, which always stays in fresh water.

18.

Qäls wandered on. A bit farther up the Harrison River they saw an old man who was harpooning seals. When they got there, a seal had just surfaced, and the old man held his harpoon in readiness to strike. Qäls came up on him from behind and the old one, the canoe on which he was sitting, and the seal were changed immediately into stone."[61]

Additional stories of *Tel Sweyil,* or "sky-born" people, tell of the first peoples in the ancestry of local Stó:lō communities. Sky-born people carried special knowledge and caused transformations as well. Sometimes they fought against Xexá:ls and were transformed themselves.[62]

60 Boas transcribes "Xexäls" as "Qäls" in the *Indianische Sagen von Der Nord-Pacifischen Küste Amerikas.*

61 Boas, Franz ed. "Qäls," *Indianische Sagen von Der Nord-Pacifischen Küste Amerikas* (1895), 92-101.

62 Albert (Sonnie) McHalsie et. al., "Making the World Right through Transformations," in *A Stó:lō-Coast Salish Historical Atlas,* 12-13.

Fig. 2.8. *Fort Yale at the peak of the gold rush, summer 1858*

Fig. 2.9. *Cemetery site at St. Mary's Residential School in Mission, B.C*

Post-contact

Post-contact history of the Stó:lō people involved the smallpox epidemic, the legacy of residential schools, changes in land use, and the establishment of Indian reservations. The smallpox epidemic of 1782, introduced via the fur trade, killed at least two-thirds of the indigenous population in less than six weeks, prompting the migration of Stó:lō communities towards the main river to consolidate in the face of devastation. Other instances of migration responded to government policies encouraging agricultural land, landscape transformations such as the draining of Sumas Lake, and the establishment of Hudson's Bay Company Posts, among others.[63] The legacy of residential schools involves an extensive school system set up in order to "indoctrinate them [indigenous children] into Euro-Canadian and Christian ways of living and assimilating them into mainstream white Canadian society." The system was responsible for undermining Indigenous, First Nations, Métis, and Inuit cultures across Canada, disrupting families for generations, and severing ties to Indigenous culture. In British Columbia, residential schools such as St. Mary's Roman Catholic Boarding School left "lingering, injurious legacies of abuse" for some of its students. The segregated spaces within the school, as Jody R. Woods argues, also reflected colonial divisions between race, gender, and age. More recent 'discoveries' of 215 unmarked children's graves at Kamloops Indian Residential School on Tk'emlups te Secwépemc First Nation on 27th May 2021, speaking to the intergenerational violence enacted by the residential school system.[64] Since then, 182 more unmarked graves have been found at St. Eugene's Mission School,[65] and 158 graves at St. Mary's Residential School,[66] alongside many more found in B.C. and other provinces.

63 Keith Thor Carlson, "Stó:lō Migrations and Shifting Identity, 1782-1900," in *A Stó:lō-Coast Salish Historical Atlas*, 30-31.

64 Courtney, Dickson, and Watson, Bridgette, "Remains of 215 children found buried at former B.C. residential school, First Nation says," *CBC News*, 29 May 2021.

65 Migdal, Alex, "182 unmarked graves discovered near residential school in B.C.'s Interior, First Nation says," *CBC News*, 30 June 2021.

66 *CBC News*, "Stó:lō Nation identifies 158 child deaths, potential unmarked graves at former residential schools, hospital," *CBC News*, 21 September, 2023.

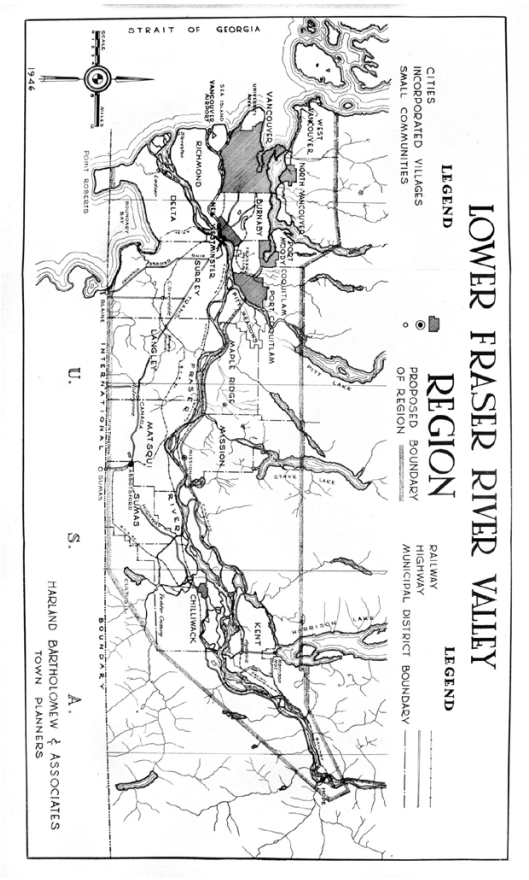


Fig. 2.10. *Map of Lower Fraser Valley showing roads, municipalities, and boundaries,* 1946.

Changes in land use include the rapid urbanization of the land, the Fraser Gold Rush of 1858, and the rise of salmon canneries since the 1880s. The rapid urbanization of the land began with horse-and-buggy roads in the 1860s and 1870s, initially built on existing Stó:lō travel routes, then expanded to provide market access for an expanding agricultural economy, facilitating land clearing, development, and settling. Settlements increasingly concentrated in the Lower Mainland and Fraser Valley floor.[67] Between 1881 and 1885, the construction of the Canadian Pacific Railway connected western and eastern Canada, built on land acquired through the *Dominion Lands Act* (1872) with land granted under the Crown and subsidized by the federal government,[68] Its completion was officially commemorated in the photo "Last Spike." Colonization companies, also relying on the Dominion Act, initiated the settlement of lands surrounding the CPR, spurring the rapid urbanization visible today.

33,000 Xwelítem arrived for a gold rush along the lower Fraser and Thompson Rivers in 1858. Between 1827 and 1857, only a few dozen Xwelítem lived in S'ólh Téméxw as workers for the Hudson's Bay Company. Miners often viewed indigenous people as an impediment to their mining ambitions, creating frequently disrespectful and abusive relationships. As Keith Thor Carlson writes in the *Stó:lō Coast Salish Historical Atlas*, "whisky was widely distributed, they raped Stó:lō women, and large-scale conflict erupted between Aboriginal men and organized regiments of American militia in the Fraser canyon." The gold rush physically marginalized the indigenous people onto small plots of reserve land, marking "the beginning of the end of effective self-governance and land management" for Stó:lō society. Indigenous people on reserves continue to be externally governed by the Indian Act today.[69]

67 Collin Duffield, "Transportation Infrastructures, 1866-2000," 96.

68 Eli Yarhi et. al., "Dominion Lands Act," *The Canadian Encyclopedia*, Aug. 11, 2023.

69 Carlson, "The Fraser Gold Rush, 1858," in *A Stó:lō-Coast Salish Historical Atlas*, 92-93.

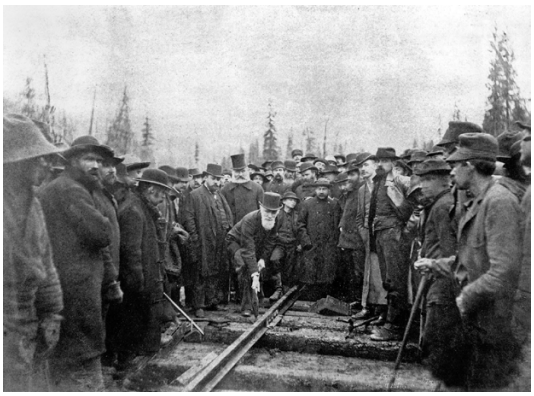


Fig. 2.11. Alexander Ross, *The Last Spike of the CPR*, Nov. 07, 1885

Fig. 2.12. "Choice Fraser River Salmon, The Anglo British Columbia Packing Co. Ltd., ABC Brand."

Industrial canneries in BC opened in the 1880s near prime fishing sites owing to the expertise of aboriginal practices. Canneries housed Stó:lō, Chinese, Japanese, and Xwelítem men and women in segregated spaces within enclosed complexes. Canneries became increasingly important to the regional economy, offering wage work for indigenous men and women who exercised skilled labour. A personal account of the canneries describes its ubiquity:

"Well, actually I wasn't employed, it was my family [...] My mom found out that the family could go down to Steveston and have a place to live and be employed [...], so they went down there, and my mom and younger sister and my brother worked in the canneries down there [...] I used to visit weekends, summer holidays, I would go out there and they were all busy working in the salmon canneries, or fishing, whichever. [...] This was their livelihood: working in fishing and working in the cannery."[70]

– Patricia Campo

The post-contact history of Stó:lō reveals that the dominant historical narrative was directed toward an increasingly industrialized and commercialized landscape. The introduction touches upon this, but the arrival of John Meares at Nootka Sound as a maritime fur trader also foreshadows a commercial priority. The Dominion Lands Act (1872), Indian Act (1876), and Chinese Exclusion Act (1923) are a few policies contributing to a political environment that was both exclusionary and exploitative, implicated by broader national policies in the area meant to protect Canada from other countries and preserve the identity of a "White Canada Forever."

70 Patricia Campo, Interview by Sarah Eustace, Mrs. Campo's house, Lakahamen Reserve, 20 November 1997, Prepared for the Stó:lō Nation. *Stó:lō Nation Archives*, Chilliwack.

Methodology

How does one relate to a river? Environmentally through climate change? Culturally through history? Artistically through praxis? The method behind the thesis examines these questions with three connected instances related to indigeneity: **encountering**, **entangling**, and **engaging stó:lō**. The following chapters discuss these instances in detail.

This approach mirrors the structure of *modeling, interpreting, and designing Indigenous Knowledge-in-Action* outlined in Jake Chakasim's article, "On Models - The Consummation of Plastic Emotions." *Modeling*, as the article states, refers to "abstracting some aspect of reality and incorporates select empirical data into the abstraction – ideally from seeing, hearing, touching, smelling, and observing." Modeling aims for a type of authenticity that balances empirical data and theoretical validity. *Interpretation* is an iterative process that circulates "between theoretical propositions [...] and tends to inform all aspects of design representation and planning related activities." Interpretation ranges from investigating "people and relationships to place (or artifacts)" and features widely in ethnography and discourse analysis. *Design* explores new possibilities through "systematic processes and procedures to new datasets related to design experiments." The resulting artifact (object or model) "is a mixed variable with design parameters."[71] This approach loosely defines the thesis that privileges the making of conceptual drawings and objects under the guidance of Jake Chakasim himself.

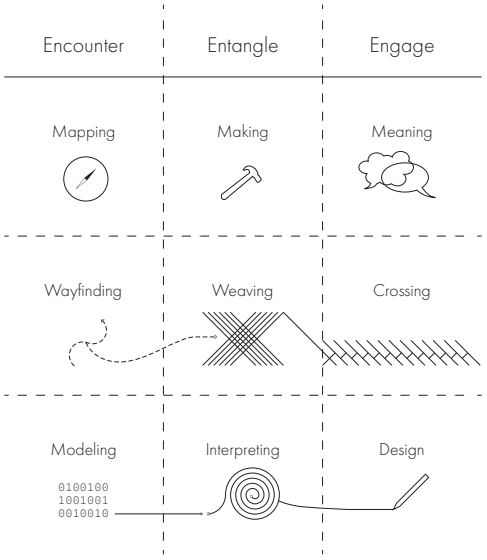


Fig. 3.1. Methodology matrix

71 K. Jake Chakasim, "On Models – The Consummation of Plastic Emotions," *e-flux*, November 2022.

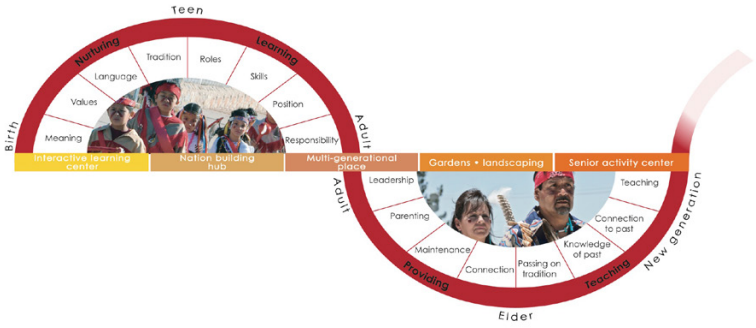


Fig. 3.2. *Seven Generations Model proposed by the Indigenous Planning and Design Institute.* - It is based on an Iroquois philosophy where one decisions today affect the world seven generations into the future.

Encountering stó:lō

The methodology behind this thesis stems from a network spanning multiple disciplines. Although this document is formally an architectural thesis directed towards climate change, inspirations behind its methodology stem from a range of encounters with indigenous and modern theorists through public talks by Kahstoserakwathe Paulette Moore and Dr. Theodore (Ted) Jojola, David Fortin, and the writings of Dr. Lugigyoo Patrick R. R. Stewart, contemporary art practices locally and internationally renown, traditional land-stewardship practices, and the scientific-policy consensus. All these discussions constitute a type of theoretical 'encountering' of indigenous culture, illustrated in the process of 'mapping' various historical relations at macroscopic and local scales.

On the National Day for Truth and Reconciliation (Oct. 2) of 2023, Carleton University hosted a lecture series on 'Place Knowing,' Indigenous Planning, and 'Filmmaking Through an Indigenous Lens.' The event screened the film *Alaska Full Run,* followed by a lecture by Ted Jojola on the design ontologies behind the Indigenous Design and Planning Institute (iDPi). Upon reflection, the key takeaway was that **place-knowing can be more productive than place-making**. While climate change and the colonial condition of our built environment aim to create technological solutions and spaces *ex nihilo,* indigenous rematriation processes remind us of millennia-old traditions that do not treat land as an empty abstraction but rather as a long, communal process. The iDPi framework expresses interest in the design and planning practices of diverse indigenous communities that were "banned or usurped by Euro-western agencies."[72] Central to this is the '7-Generations Model,' which is based on collective, intergenerational ownership as a form of land tenure "in a manner that is informed by the past, is invested in the present, and builds a vision toward the future."[73]

72 Indigenous Design and Planning Institute, "About," *University of New Mexico*, Accessed Mar. 11, 2024.

73 Ibid.

Fig. 3.3. *The inside of the Canada Pavilion at the 2023 Venice Biennale* - curated by Architects Against Housing Alienation led by David Fortin and Adrian Blackwell

Fig. 3.4. *Vincent Massey* - governor general, Order of Canada, chair of the Royal Commission on National Development in the Arts, Letters, and Sciences (Massey Commission)

Another talk by David Fortin *On Relationality and Housing and Design*, hosted online at the Daniels School of Architecture, provided insights that give this thesis project its direction and priorities. The talk discusses the context around the Canadian Pavilion at the 2025 Venice Biennale and projects by *Architects Against Housing Alienation*. Both cases focus on the issue of homelessness in the developed world, which the organization tackles from a critical perspective towards modern design movements and their identities. The *Massey Commission/ Report* (1949-51) established the cultural foundation for a distinctly Canadian modernism which led to the National Council of the Arts. The same nationalist worldview transforms into the Critical Regionalist discourse, where the Massey report argued that settler-colonial culture represented a "more advanced civilization" whose techniques displaced indigeneity from the national culture. Fortin's response to Critical Regionalism was, therefore, to question the priorities of our cultural foundations today, where architecture "needs a renewed frame of values" that recognizes the topographic and political nature of the ground.[74] This reframing becomes an urgent demand in a world of climate change and social inequality, where cosmetic relations are simply insufficient for understanding and tackling these issues. As Fortin recalls from "What Relations Matter?" "Previous relational approaches have not sufficiently problematized their epistemological commitments, i.e., how they know which relations matter in any given instance. Or alternatively, which knowledge do they rely on when thinking about relations? [...] This is problematic because if we do not become epistemically relational [...], then we fall into the trap of contextual visions, even if these are relational."[75]

74 Léa-Catherine Stack and Véronique Patteeuw, "Critical Regionalism for Our Time," *Architectural Review*, 2019.

75 Benjamin Klasche and Birgit Poopuu, "What Relations Matter?" Article Navigation, *International Studies Quarterly*, Volume 67, Issue 1, March 2023, sqad010, https://doi.org/10.1093/isq/sqad010

Fig. 3.5. *Encountering a cultural landscape - Debra Sparrow. Susan Point, Shawn Hunt, Brandon Gabriel, Olafur Elliasson, and Chinese Railroad workers.*

Hence, **"It matters who conceptualizes the reactions we centre in our analyses of our worlds, and thus which corners and issues of the world we see and problematize," because without recognizing the specific, particular relations in the knowledge we produce, we continue to develop in denial of the land we work on.** This issue brings another conceptual precedent from Dr. Lugigyoo Patrick Stewart, whose Ph.D. dissertation implements a more inclusive approach to discussing architecture. He writes his dissertation as if spoken by himself personally and by a group of "talking sticks," which includes indigenous architects and designers from all over Turtle Island in a conversation.[76] As a result, his dissertation features a performative quality, where words change with tonality and emphasis, and language is fluid in the manner of English modernist writers like Samuel Beckett, James Joyce, or Gertrude Stein. The open, creative use of rhetoric and conversational approach is a refreshing source of inspiration. The embodied, performative qualities of Dr. Stewart's thesis inspire an embodied approach to understanding indigenous culture underlying the overall thesis process.

Documenting this "encounter" involves 'mapping' of the Stó:lō landscape synonymous with 'modeling' Indigenous knowledge in action. I understand mapping as a 'wayfinding' around the cultures along the Stó:lō, situating myself in the macroscopic studies and regional story maps. Macroscopic themes include scientific climate change, infrastructural developments, and indigenous communities, while 'story maps' of specific sites incorporate images of local ecologies, history, and figures from trickster stories and findings from site visits.

76 P. R. R. Stewart, *Indigenous architecture through indigenous knowledge: dim sagalts'apkw nisi [together we will build a village] (T)*, University of British Columbia, 2015.

Entangling stó:lō

The second phase, entangling, consists of iterative forms of 'making' to interpret indigenous knowledge. Activities in this phase operate more personally and engage with tactile qualities through craft and textures inspired by contemporary art practices that materialize climate change through indigenous and technological lenses. Stewardship practices based on traditional land relations are a means of decolonizing modern development. Objects made in this section include several weaving exercises, as well as crafted objects such as a basket, blankets, paddles, a shovel, and resin blocks.

Fig. 3.6. Olafur Elliasson, *Riverbed, 2014*

Over the year, the thesis project explored multiple artistic precedents to inform the mapping and design process. Olafur Eliasson and Dilip Da Cunha both presented starting points for thinking about rivers in an artistic practice focused on materiality and geographic projections. However, more local artists such as Brian Jungen, Sonny Assu, Brandon Gabriel, Susan Point, Shawn Hunt, and Deborah Sparrow shifted the scope of the mapping exercise to incorporate place-based cultural symbolisms as well as diverse ways of making both vernacular and contemporary. For example, Jungen, Assu, and Hunt combine indigenous icons with modern materiality. Jungen's *Shapeshifter* (2000) uses white, plastic lawn chairs arranged in the form of a whale skeleton as a statement on ocean pollution.[77] Assu's works, such as *Coke Salish* (2003) and *1884/1951* (2010), combine pop-culture imagery with Coast Salish objects to explore his own indigeneity and contemporary conditions concerning the Indian Act.[78] Shawn Hunt incorporates new technologies into his art. He worked with Microsoft Garage to make a 3D-printed transformation mask using HoloLens technology to retell indigenous stories.[79]

Fig. 3.7. Brian Jungen, *Shapeshifter*, 2000

77 NGC Staff, "Patio Chairs and White Whales: Brian Jungen's Shapeshifter and Vienna," *National Gallery of Canada*, Feb. 15, 2017.

78 Sonny Assu, "Artist Talk at Emily Carr," 2013, *Emily Carr University of Art and Design*, Sept. 20, 2013, online video, 1:16:00.

79 Shawn Hunt, "Transformation Mask | Shawn Hunt + Microsoft Vancouver," *Microsoft Vancouver*, Jul. 09, 2017, online video, 5:39.

Fig. 3.8. Shawn Hunt + Microsoft Vancouver, *Shapeshifter,* 2017

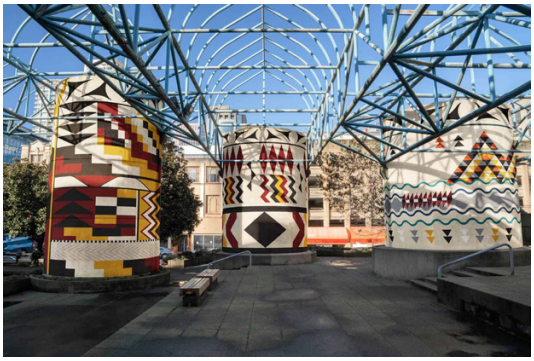


Fig. 3.9. Debra Sparrow, Janice and Angela George, *Blanketing the City IV,* 2021

Fig. 3.10. Bonnie Devine, *Battle for the Woodlands,* 2014

Furthermore, public artworks by Susan A. Point, Brandon Gabriel Kwelexcwecten, and Debra Sparrow place traditional motifs into public urban spaces. Point's *Salmon Runnels* (2003) draws on fluid animal motifs built into concrete buttresses, while the rain imprints the concrete with green algae, naturally enlivening the concrete form and public space. Brandon Gabriel's *Ruskin Dam Piers* (2019) showcases five creation stories specific to Qwó:ntl'an (Kwantlen) First Nation. His work reminds us of the ecological significance of banal infrastructural spaces like the Stave River Estuary under the Ruskin Dam. Despite the damming, the place remains resilient and is a nature retreat for nearby city dwellers. Debra Sparrow is an acclaimed Musqueam weaver and graphic designer. *Blanketing the City* (2018) is a public installation by Chief Janice George, Angela George, and herself that wraps weaving patterns onto the pillars of Cathedral Square in Downtown Vancouver. In Sparrow's words, "What it's always been about is bringing it back into the world,"[80] and how her ancestors faced the loss of their vision:

""without a vision, people perish" and our vision was [uprooted] by history and yet it didn't fully disappear but we brought that vision back because this vision is not only of our ancestors but ... of our people today ... this is about how we tell the story of Musqueam, Squamish, and Tsleil-waututh."[81]

Another inspiration was the Anishnaabe artist Bonnie Devine. She is not a Coast Salish artist, but her exhibition *Battle for the Woodlands* (2014) effectively de-centers colonial mapping practices by drawing moments of contact and displacement and using craft to remind visitors of the AGO of indigenous presence on the land.[82]

80 Debra Sparrow, "Interview: Blanketing the City Artist Debra Sparrow," *Vancouver Mural Festival,* 2016.

81 Ibid.

82 Devine, Bonnie, "Bonnie Devine's Woodland," *Art Gallery of Ontario,* Dec. 11, 2015, online video.

Fig. 3.11. sa'hLa mitSa - Dr. Susan Pavel, *Touching Bliss*

Fig. 3.12. *Coast Salish Loom* - this one is from the Snuneymuxw First Nation in the Nanaimo area of Vancouver Island

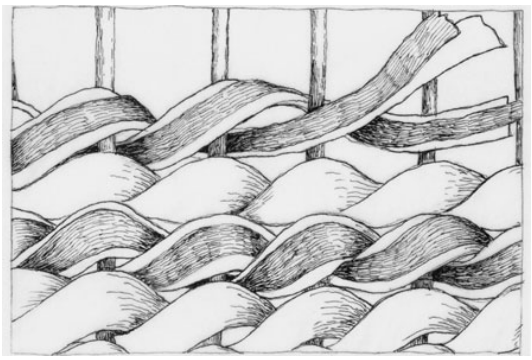


Fig. 3.13. Kenneth Greg Watson, *Cedar twining diagram*, 2008.

Stewardship Praxes

Additionally, traditional practices form the basis of material explorations and architectural design in the thesis. These include the practices of weaving and the siyak (salmon weir). Weaving includes both blanket weaving with yarn and the making of baskets and mats using cedar bark. Traditionally, weaving with yarn involved gathering wool from mountain goats, gathering materials for natural dyes, and turning wool into yarn using a spindle, all prior to the actual weaving process using a Salish loom.

"I went with my grandmother to collect cedar root, cherry bark, and all the other flowers [...] Collecting is essential even for my grandmother, you have to go and collect enough flowers ... onion skins ... cherry bark ... nettles..."

- Siyameqwot Vivian Williams [83]

Salish blankets performed a ceremonial role, worn as a person passed through different stages of life ceremoniously. Blankets, headdresses, and sashes offer wearer spiritual protection while they perform their tasks.[84] The weaver endows these ceremonial objects with "purity of purpose and spiritual strength."[85] In modern times, blankets perform a similar role of celebrating different stages of one's life, but also reclaiming spaces as in Debra Sparrow's *Blanketing the City* and act as a form of remembrance.

Cedar weaving is another important practice in this thesis process. Weaving with cedar also involves an elaborate process of gathering and processing the bark of cedar trees, turned into strips, and then twined into hats, baskets, bracelets, and mats. The practice is technically challenging but can potentially produce intricate ornamental, even spatial objects. Traditionally, weaving was passed down intergenerationally by women. Nowadays, First Nations or any expert

83 Siyameqwot Vivian Williams, "On Collecting | The Salish Weavers Guild," *Vancouver Art Gallery*, Nov. 19, 2020, online video, 11:02.

84 Tepper, Leslie Heyman, et al., "The Weavings," *Salish Blankets: Robes of Protection and Transformation, Symbols of Wealth*. University of Nebraska Press, 2017, 57.

85 Ibid.

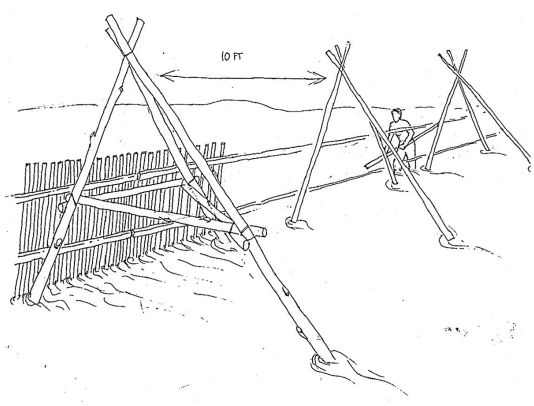


Fig. 3.14. Grant Callegari, *Design for the Koeye River weir* - Sketches were based on historical images of fish weirs from around the Pacific Northwest.

Fig. 3.15. *Coast Salish canoe and fish weir*

Fig. 3.16. Grant Callegari, *Heiltsuk kids learn more about their Nation's traditional fishing practices at the fish weir on the Koeye River*

share this knowledge through seasonal workshops. This thesis project involves a workshop in Seattle where I learned how to weave a cedar basket with a deer's antler.

The *siyak*, or salmon weir, is a building typology for fishing on shallow streams and for monitoring salmon runs. Salmon weirs consisted of tripod structures with a built-in platform and fences made with various locally harvested and modern materials, including cedar, alder, and willow.[86] Weir fisheries harvested vast amounts of salmon. In 1904, a federal fisheries officer reported that Babine fishers at the Upper Skeena caught 500-600 salmon daily, amounting to 750,000 yearly.[87] A "Mythical Account of the Origin of the Siyak" relates that the ancestors of the Ts'elxwéyeqw (Chilliwack) people were taught how to construct weirs by Tamia, the wren. "He bade the limbs of the young cedars twist themselves into withes, stout branches to sharpen one of their ends to a point and place themselves firmly in the bed of the stream, fastened at the top by the withes, two feet being downstream and one up." The tripod structure carries a platform that extends across the stream, "He then called upon other boughs to wattle themselves in the low legs of these tripods, till the weir or dam thus formed spanned the whole stream, at the foot of which the salmon soon congregated in great numbers."[88]

Chinese Canadian social practices

Chinese Canadians played a major role as the labour force for colonial infrastructures such as the CPR. They were also involved in many other parts of the economy, such as canneries, mining, farming, and even cooking. This section focuses on some of the social practises developed by the Chinese community as they worked on the railway because of its prominent role in the landscape.

86 Harris, D. C. 2001. *Fish, Law, and Colonialism: The Legal Capture of Salmon in British Columbia*. Toronto, Ontario, Canada: University of Toronto Press.

87 Ibid.

88 Maud, Ralph, ed. "Mythical Account of the Origin of the Siyak," *The Salish People*, 56.

Fig. 3.17. *Chinese workers canning salmon, 1900*

Work Camps

"My father, come from Guangdong province and that being very very warm, he was not prepared for the cold winters, and I think all the other Chinese who came here were not prepared for the cold winters. So they came here with thin clothing, Chinese slippers, and they still had their pigtails [Manchu queues]. The railway did not supply them with any … working gloves, hats, or any working-type clothing. […] they did not have shoes, proper shoes, they worked with their slippers. And when the winter came and there was snow, they continued to work, and my father told me it was so cold that he had to wrap a burlap sack around his foot to keep warm. [It was] the worst conditions you can think of. And of course there was not sufficient food, they had little campsites, which they have a little … outdoor campfire with these pots on top of some rocks cooking their dinner."

– Bevan Jangze, businessman

Fig. 3.18. *Chinese railway work camp*

"…he worked twelve hours a day [and] six days a week. He got paid $0.75 a day, whereas the white man … was paid $1.50 a day. The white man was supplied with food and lodging, whereas the Chinese were not given any food or lodging."

– James Pon, retired nuclear engineer[89]

Work camps were very modest tent structures built by Chinese workers out of necessity near railway towns. These were makeshift structures where they slept, cooked food, and practiced traditional medicine. Food was imported, stored in bulk, and prepared by a designated cook while the rest of the team performed gruelling labour. Archaeological findings include pottery storing pickled and dried fruits, vegetables, meats, and rice wine. Other samples include local berries foraged from nearby. Meals mostly consisted of congee and simple stews, although a large variety of foods arrived through specialized train-car shops. The working conditions of Chinese workers in Canada mirror those in the US, where migrant labour was also integral to the transcontinental railway.[90]

89 *Canadian Steel, Chinese Grit.* Directed by Karin Lee, 1998, Vancouver, Moving Images Distribution.

90 Shoshi Parks, "Inside the Diet that Fueled the Chinese Transcontinental Railroad Workers," Nov. 30, 2022, *Atlas Obscura.*

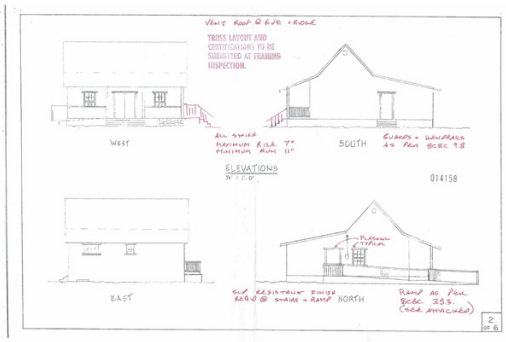


Fig. 3.19. *Elevations of Lytton Joss House, 1883-1928*

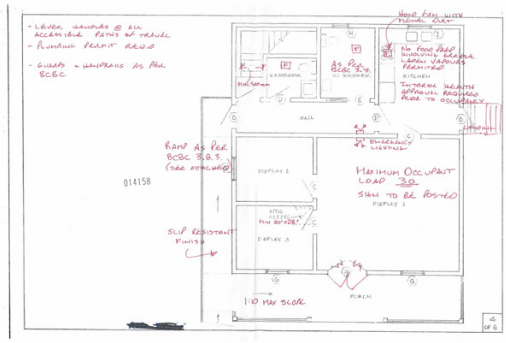


Fig. 3.20. *Floorplan of Lytton Joss House, 1883-1928* - the central complex consisted of shrine displays, smaller rooms were for guests and caretaking.

Fig. 3.21. *Lytton Joss House before 2021 wildfires*

Joss Houses

Joss houses are temples or shrines used as "places of worship, spiritual sustenance, and physical healing," as well as a gathering space for those working and travelling in the area. Shrines were dedicated to folk heroes, historical figures, Confucian, Taoist, Buddhist deities and local protector gods. A joss house in Lytton, B.C. is representative of many other ones built along the Fraser River corridor, the Okanagan, and at Kootenays. The Lytton Joss House was dedicated to Kwan Yin (goddess of mercy), Shen Nong (patron of herbal medicine), and Zhu Rong (protector against fire, disease, and anger). It is important to note that individuals who "worshipped" these deities were not "praying" in the Abrahamic sense of the term, rather "commemorating" or paying respects is more appropriate to traditional Chinese culture.

The space provided essential spiritual support for Chinese Canadians in very difficult times. They also provided social and medical support for injured railway workers. Lytton Joss House featured a wood frame construction with rooms for the main shrine, guests, caretakers, and community meetings. In 2017, it became a new Chinese History Museum, but it was unfortunately burned down by wildfires in 2021. The firestorm destroyed 1600 artifacts,[91] but the museum is undergoing restorations, and more artifacts remain to be found.[92]

This section will output a series of small to medium-scale experiments involving stewardship praxes. The artifacts explore Indigenous and Chinese Canadian culture on the site through weaving, carving, and digital fabrication methods for paddle-making and ornamentation. The making of artifacts involves an iterative process that materially interprets both histories.

91 Correia, Cory, "Chinese history museum featuring 1,600 artifacts destroyed in Lytton wildfire," *CBC News*, Jul 05, 2021.

92 *BC Historical Foundation*, "Fire destroys Lytton Chinese History Museum," Oct. 10, 2021, online video.

Fig. 3.22. *Salmon Runnels on the Richmond Oval*

Fig. 3.23. *Detail view of channel*

Fig. 3.24. *Riverside facing salmon runnels*

Engaging stó:lō

Lessons learned from Architecture Precedents

At last, some buildings by indigenous architects specific to the region form significant points of reference. Indigenous architecture is itself a broad topic, and so is architecture for climate change. Both terms are hard to define, however Douglas Cardinal asserts that "Indigenous teachings can be the foundation for re-planning and re-designing our cities."[93] Architecture for climate change can likewise be rooted in land-based practises and ecological processes to address the problem beyond purely technical or economic terms that practically "greenwash" design. What follows are short discussions of three buildings: the *Salmon Runnels* (2008) *by Susan Point, X̱á:ytem Pit House and Longhouse* (2006) by Patrick Stewart, and *Sq'éwqel Community School* (1988) by Patkau Architects.

Susan Point's *Salmon Runnels* (2008) is a public art installation at the Richmond Olympic Oval. The design of the concrete runnel includes images of salmon, the heron, and bird images.[94] The heron being the bird of Richmond. The channels also carry rainwater, producing a green hue on the concrete and guiding the rainwater to the river. As Kathryn Bunn-Marcuse writes, "the work expresses the life in the delta and along the Fraser River. In this piece, Point harnesses the practical need to move stormwater in the runnels for the fifteen buttresses on the north side of the Richmond Olympic Oval. No longer simply evoking the running of water across a façade [...] the buttresses are carved with leaping salmon, herons, water, and sand patterns under the stream of runoff from the roof."[95] The City of Richmond also notes that Point's buttresses express a contemporary version of the Salish house post form, where her motifs "would add meaning that is authentic to the site."[96]

93 Douglas Cardinal, "From Earth to Sky," *TVO Today* Docs, 2 Jun. 21, 2021, online video, 10:00.

95 Kathryn Bunn-Marcuse, "Susan Point: Primacy and Perspective." *Susan Point: Spindle Whorl*, University of Washington, 2017, 62-71.

96 City of Richmond. "Report to General Purposes Committee. RE:

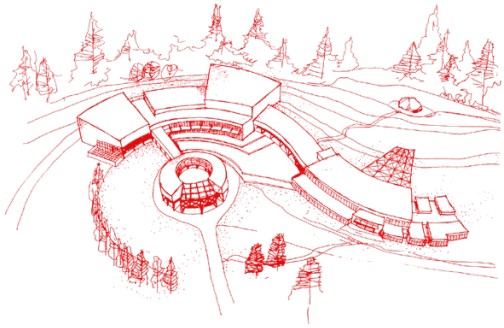


Fig. 3.25. Patrick Stewart, *X̲á:ytem Longhouse Interpretive Center,* 2006

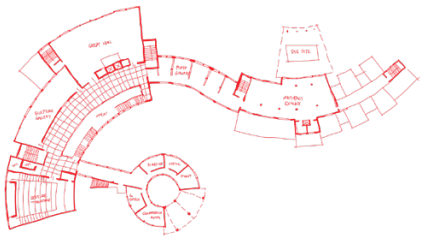


Fig. 3.26. Patrick Stewart, *X̲á:ytem Longhouse Interpretive Center Plan*

Fig. 3.27. Patrick Stewart, *X̲á:ytem Longhouse Interpretive Center Pithouse Entrance*

Patrick Stewart's *X̲á:ytem Pithouse and Longhouse* (2006) revisit traditional housing typologies. *Sqémél*, or pit houses, were semi-underground timber structures used typically as winter homes for extended family.[97] Most sqémél have circular plans with 8-10 m diameter, but variations include oval, square, or rectangular forms. The typology dates back to 4700 years ago.[98] Patrick Stewart's design involves two 90 square meter pithouses, touted as the "first ever architecturally designed, structurally engineered, geotechnically surveyed pithouse ever built."[99] His design also renovated an existing longhouse on the archaeological site of X̲á:ytem, a National Historic Site of Canada designated in 1992. Habitations approximately 5000 years old have been found at X̲á:ytem, as well as a transformer rock associated with the story of *X̲á:ls*.[100] The longhouse is another, more well-known housing typology. Also called plank houses, some defining features include a shed/ gable roof, plank siding, a post-and-beam structure, long and narrow form, traditional materials such as cedar, and minimal exterior ornamentation.[101] The pit houses are attached to the existing longhouse to make a complex cultural center.

Richmond Oval:Buttress Runnels–Artist Designs" July 4, 2006.

97 Patrick Stewart, "Xá:ytem Longhouse Interpretive Center," *Patrick Stewart Architect,* Accessed Mar. 8, 24.

98 David M. Schaepe et. al., "Changing Households, changing houses," in *A Stó:lō-Coast Salish Historical Atlas,* 46.

99 Patrick Stewart, "X̲á:ytem Longhouse Interpretive Center."

100 Albert (Sonny) McHalsie et. al., "Making the World Right through Transformations, in *A Stó:lō-Coast Salish Historical Atlas,* 6. Described in detail in *You Are Asked to Witness: The Stó:lō in Canada's Pacific Coast History,* story involves three chiefs who disobeyed X̲á:ls, who transforms them into the sacred stone.

101 *Vancouver Heritage Foundation,* "Traditional Coast Salish Plank Houses," Accessed Mar. 08, 2024.

Fig. 3.28. *Sq'éwqel Community School Entrance*

Fig. 3.29. *Wood frame arcade based on salmon drying rack*

Fig. 3.30. *Architectural reference model of school*

Sq'éwqel Community School (1989), formerly Seabird Island School, is a K-12 Independent School on Seabird Island, Aggasiz, co-designed by the Seabird Island Band and Patkau architects. The construction of the building was also done by members of the local indigenous community.[102] The wall and roof claddings use cedar shingles, and the building's orientation diverts harsher winds from the north and contains gentler winds from the south.[103] The form draws inspiration from timber-built Salish longhouses, designed through iterative hand drawing and physical model-making.[104] Patkau's first-hand account of the building notes how the physical model, made by an architecture student at the University of Calgary, directly translated into the building through construction by the indigenous community.

Sitedness

A common theme within all three of the architectures discussed is the importance of site. In many ways, each precedent demonstrates that architecture happens "where the building touches the ground." This relation is most explicit in Point's *Salmon Runnels*, where the concrete channel directly interfaces the riverside with the building and rainfall. The traditional typology and transformation site of Stewart's proposal speaks to a historical and spiritual sited-ness connecting the building to place-based roots. Patkau's school also displays a degree of sitedness from the local community involved in the construction and co-design of the building, who remain active users of the building today. All these qualities of a site factor into the design of climate infrastructure in this thesis project.

102 *Naturally Wood*, "Lalme' Iwesawtexw | Seabird Island Community School," Accessed Mar. 8, 24.

103 *Patkau Architects*, "Sq'éwqel Community School," Accessed Mar. 8.

104 *Naturally Wood*, "Lalme' Iwesawtexw | Seabird Island Community School."

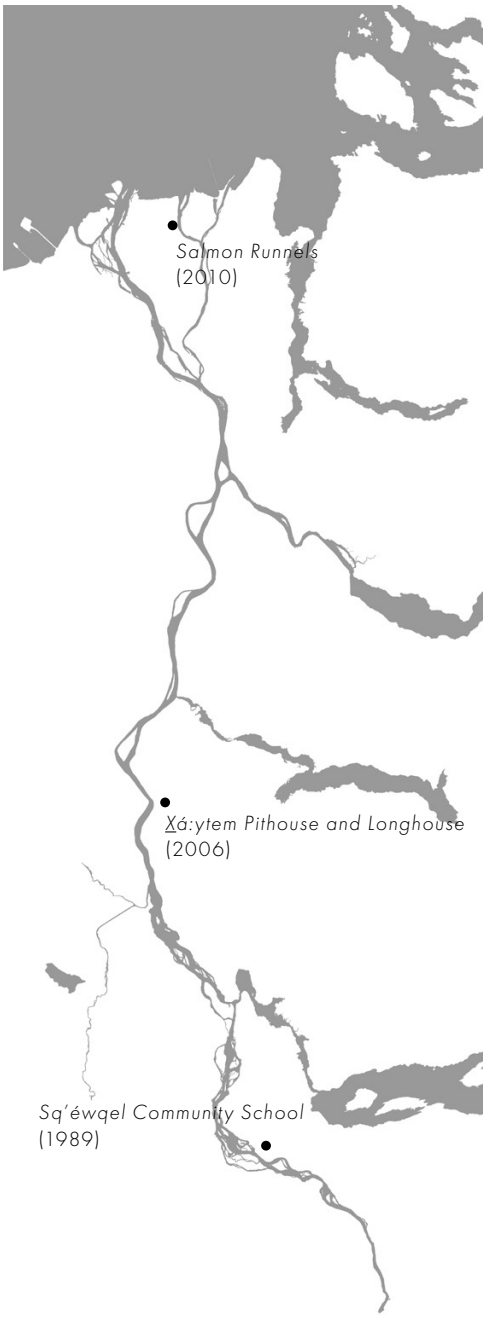


Fig. 3.31. *Map of locations of precedents as they interface stó:lō*

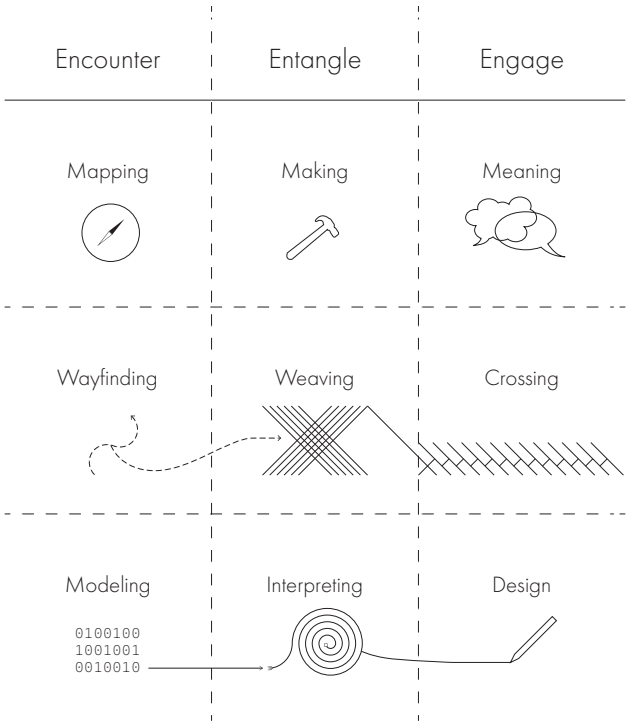
Interpretative Thresholds

Another theme in precedents is the notion of interpretation or the sense of space represented by the building. Susan Point's channels interpret using animal symbolism to give meaning to the riverside. Stewart's pit house and longhouse complex is programmed as an 'interpretive center' that interprets culture, language, songs, and stó:lō spirituality for a modern audience.[105] Patkau's school is also interpretive in its use of architectural modelling to represent indigenous knowledge, as well as the active role of its indigenous builders who engaged with the model to realize the building.

105 Patrick Stewart, *Indigenous architecture through indigenous knowledge: dim sagalts'apkw nisi*, 44.

Results

The following section documents and reflects upon the findings of the thesis project. The text elaborates on the process behind the production of maps, drawings, artifacts, and design documents. Reflection pieces present key takeaways from each part of the methodology. Concluding statements reflect on the methodology as a whole, a reference diagram is below.



Encounter | Mappings

Macroscopic studies of climate change, community, and infrastructure in stó:lō.

Fig. 4.1. *Environmental study of s'ólh téméxw*

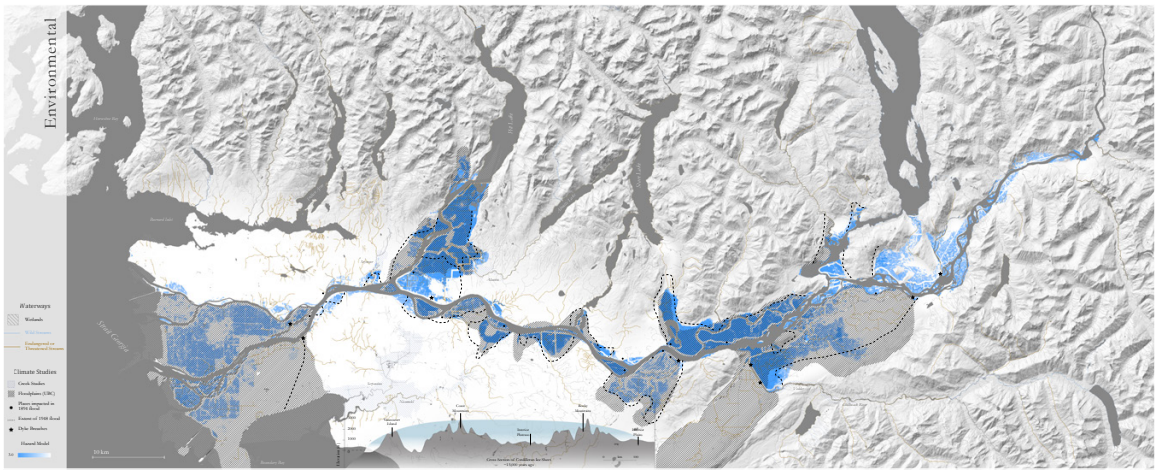


Fig. 4.2. *Indigenous communities and migration in s'ólh téméxw*

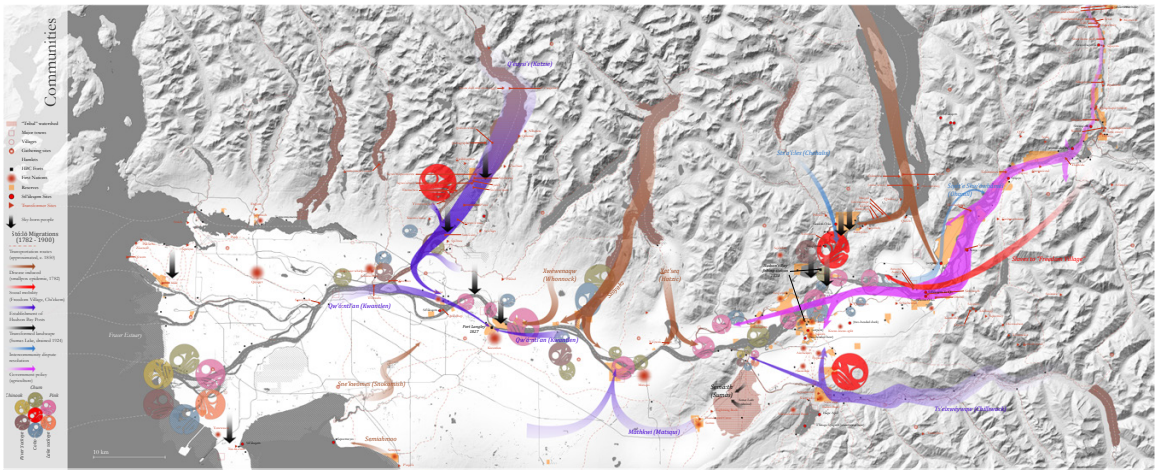
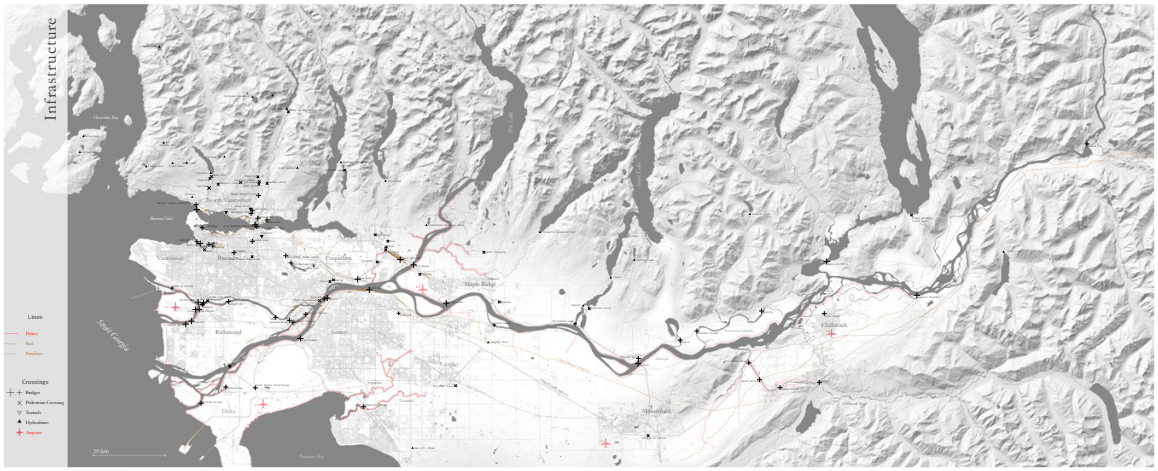
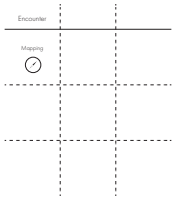


Fig. 4.3. *Infrastructures along stó:lō*





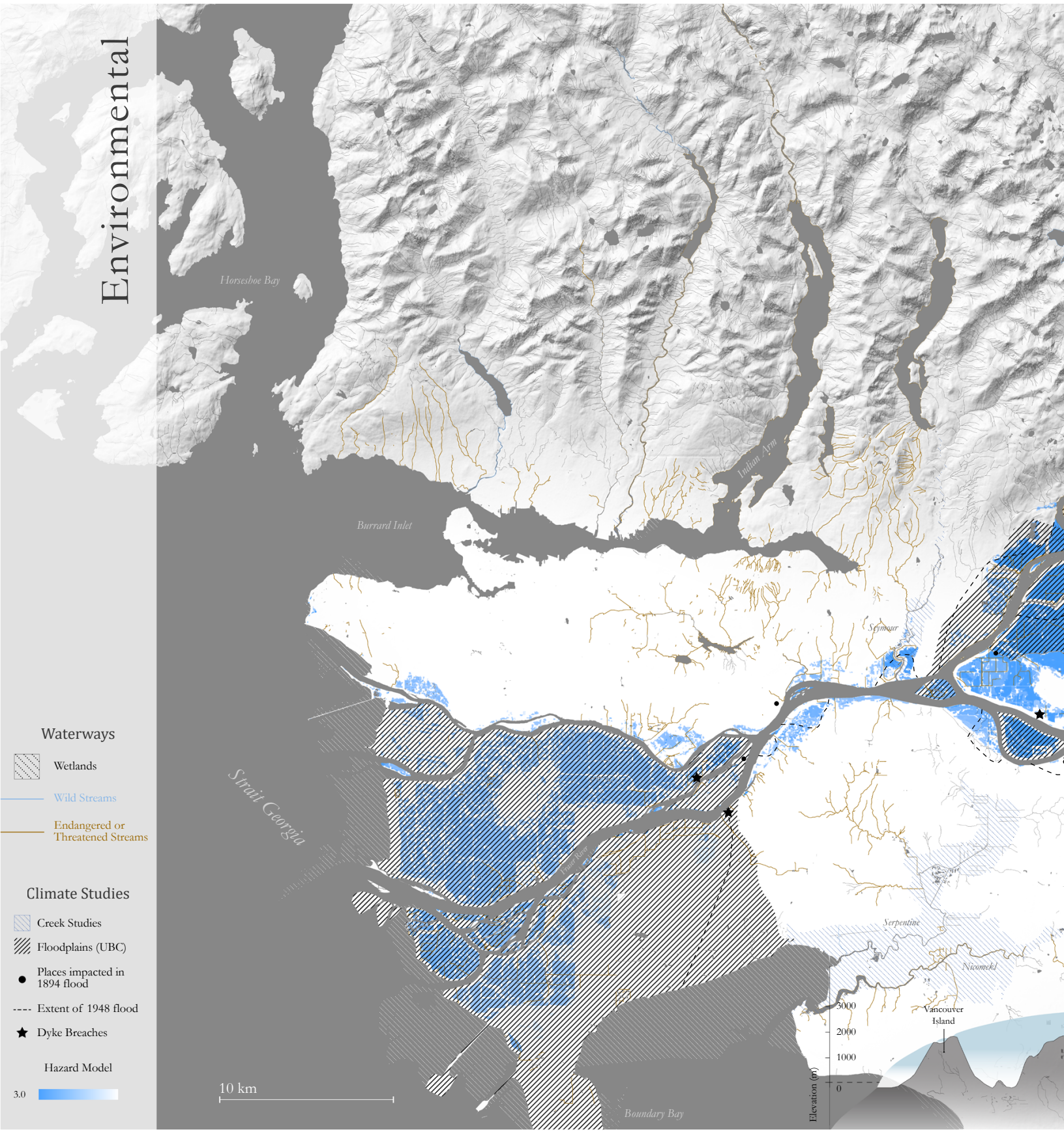


Fig. 4.1.1. *Estuary detail of environmental study*

A long history of flooding along stó:lō dates back to 12,000 years ago, near the end of the Pleistocene ice age.

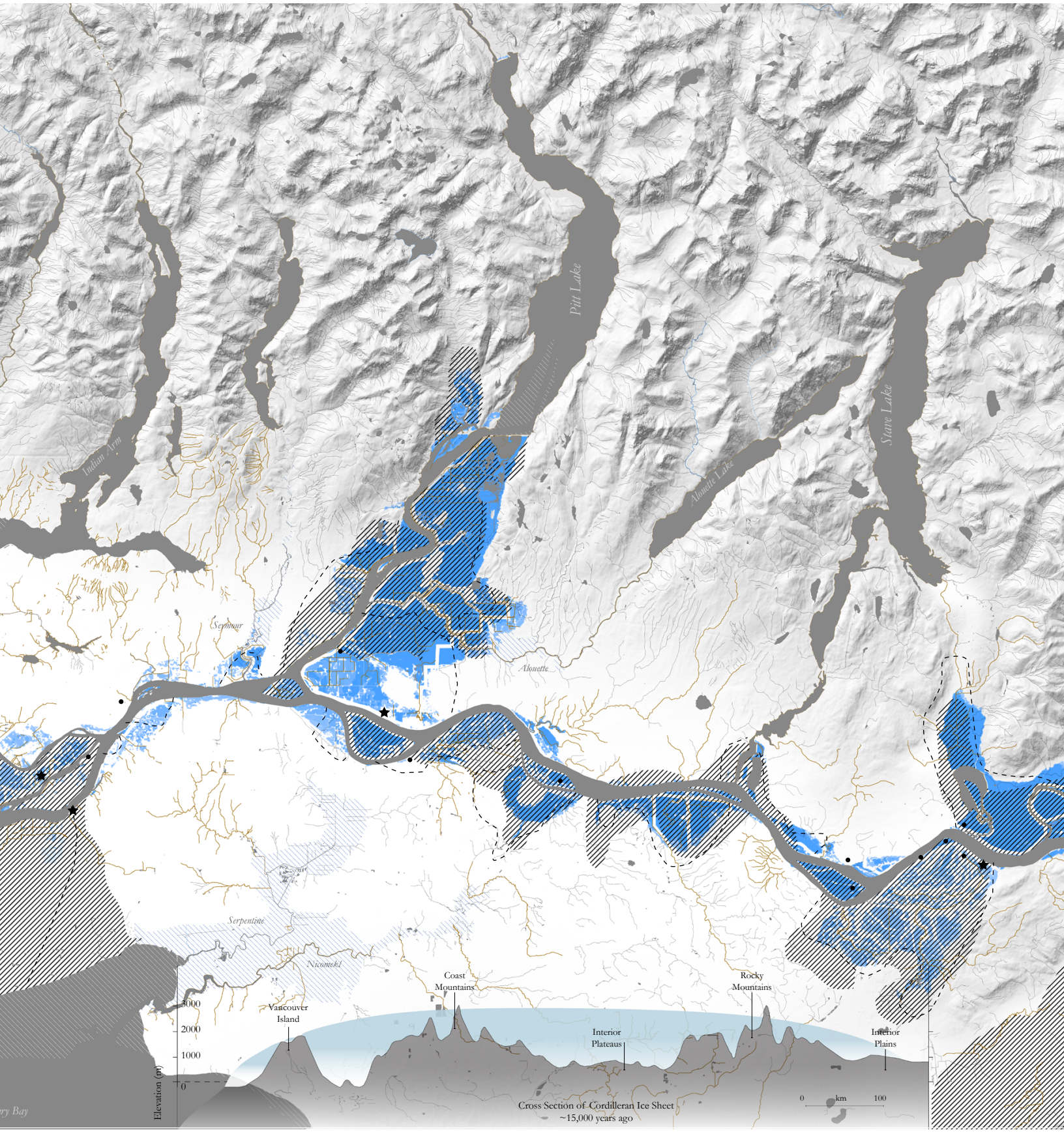


Fig. 4.1.2. *Central detail of environmental study with tectonic section*

Major floods in recent memory, 1894 and 1948, stem from and produce from changes in land use, especially for agricultural land.

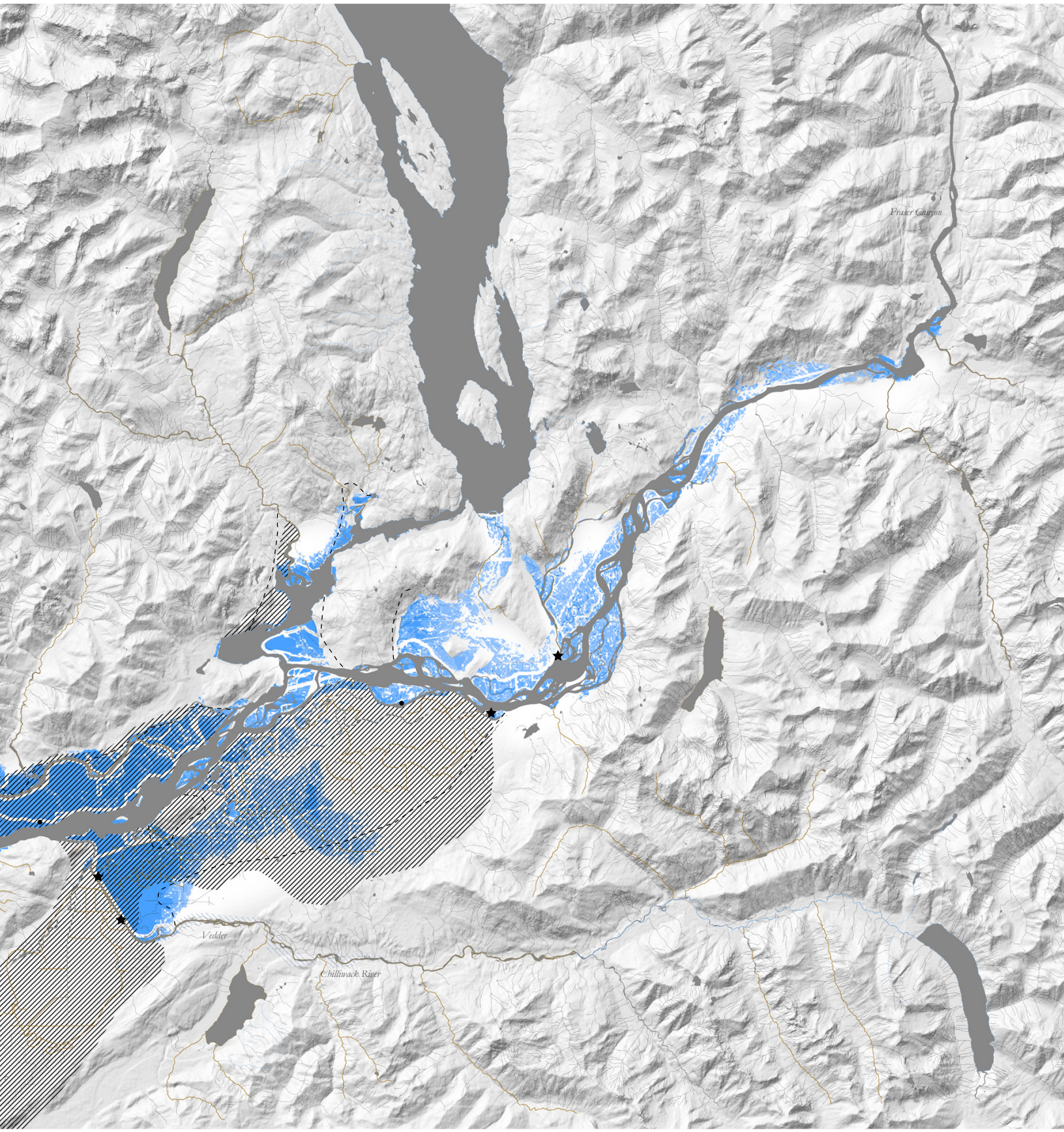


Fig. 4.1.3. *Seabird island detail of environmental study*

A recent 2021 flood in Chilliwack is also a reminder of colonial reclamation of the Sumas Lake, drained in 1923 for farming, reflooded due to climate change.

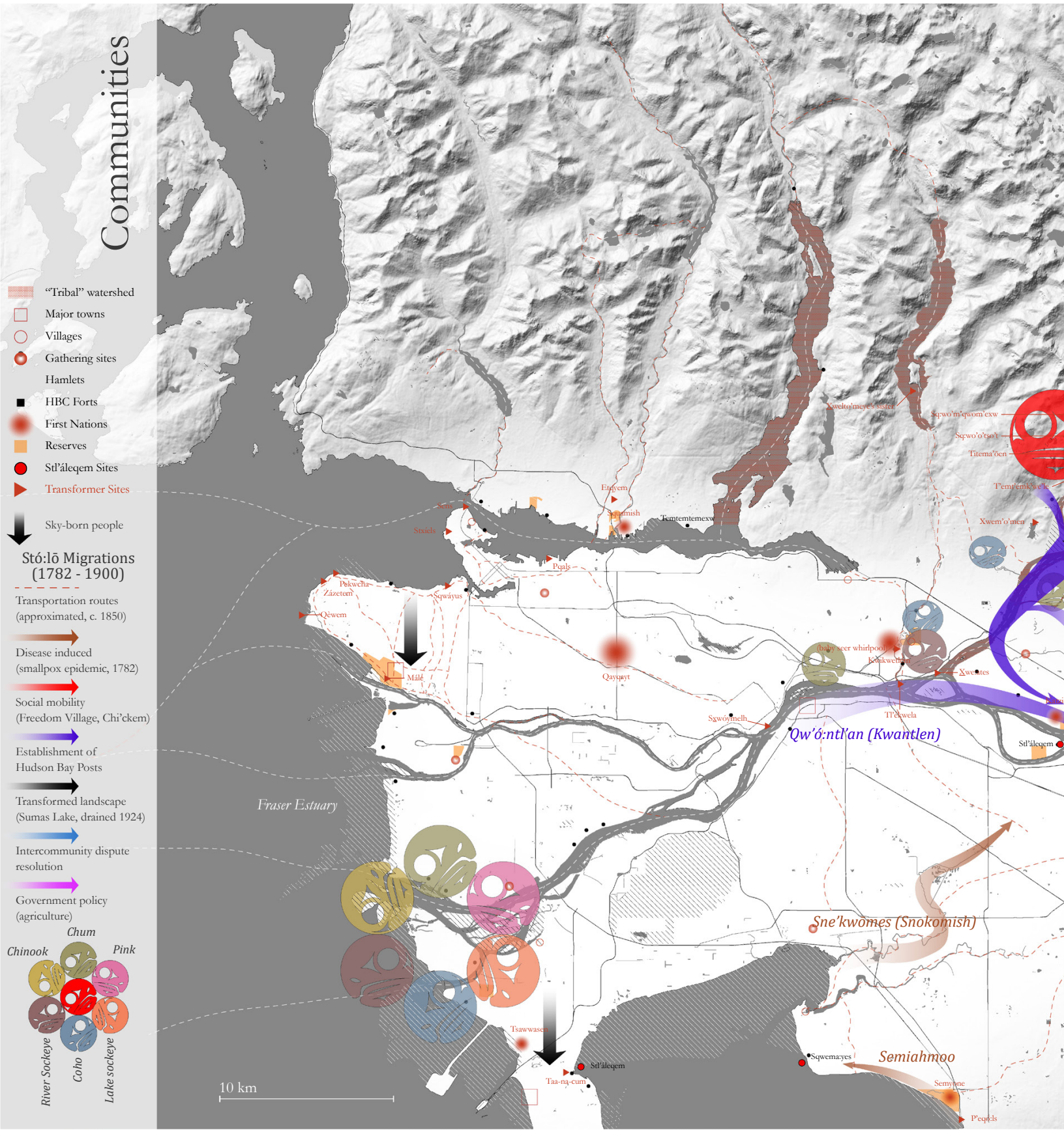


Fig. 4.2.1. *Estuary detail of community and migration study*

The many oral histories, including Xexá:ls, Tel Swayel, and Stl'álaqem, speak to a long established community established by the Coast Salish people.

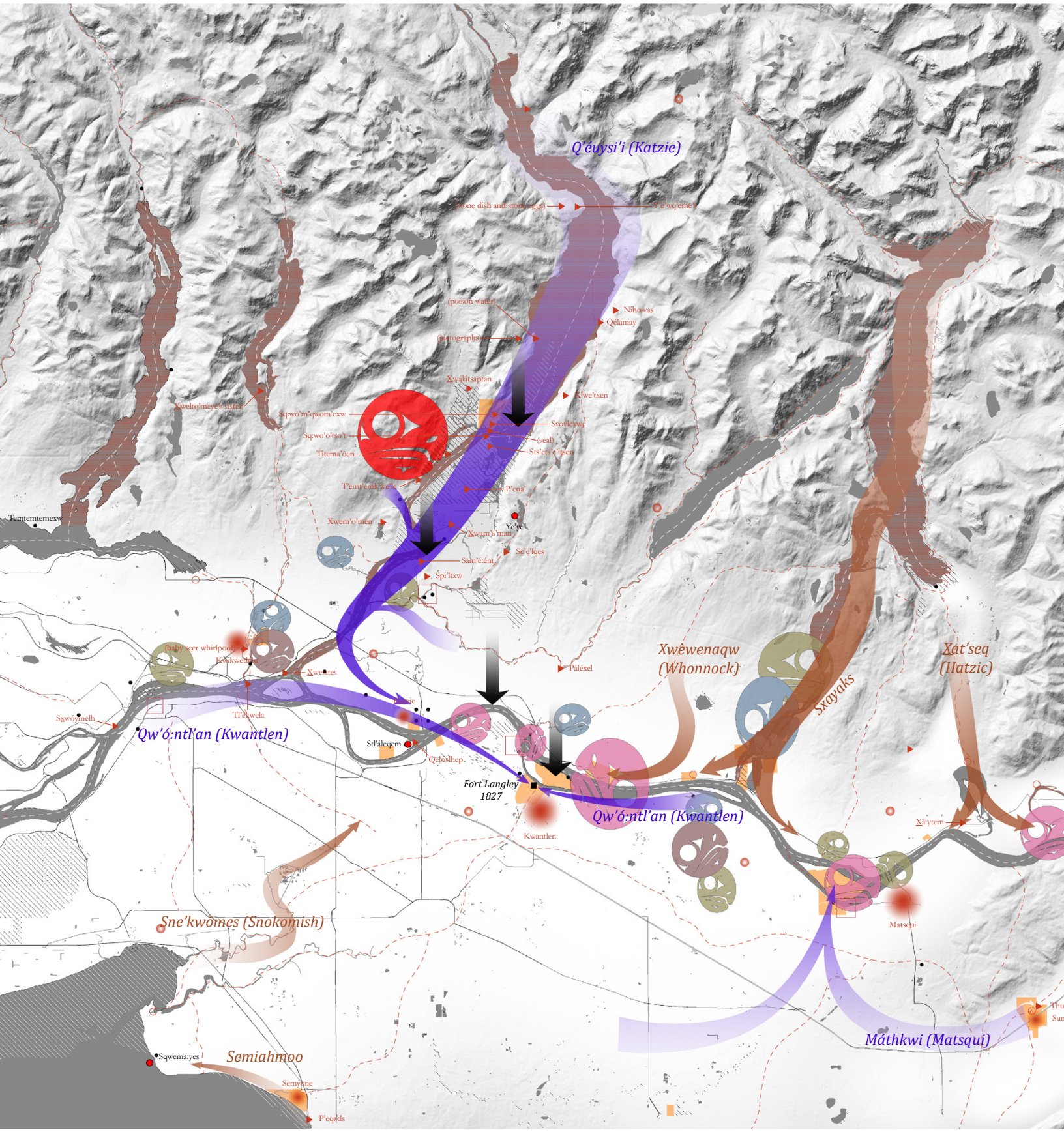


Fig. 4.2.2. *Central detail of community and migration study*

The tragic histories of migration, notably from the smallpox epidemic of 1782, forced Indigenous communities to convene closer to the main river.

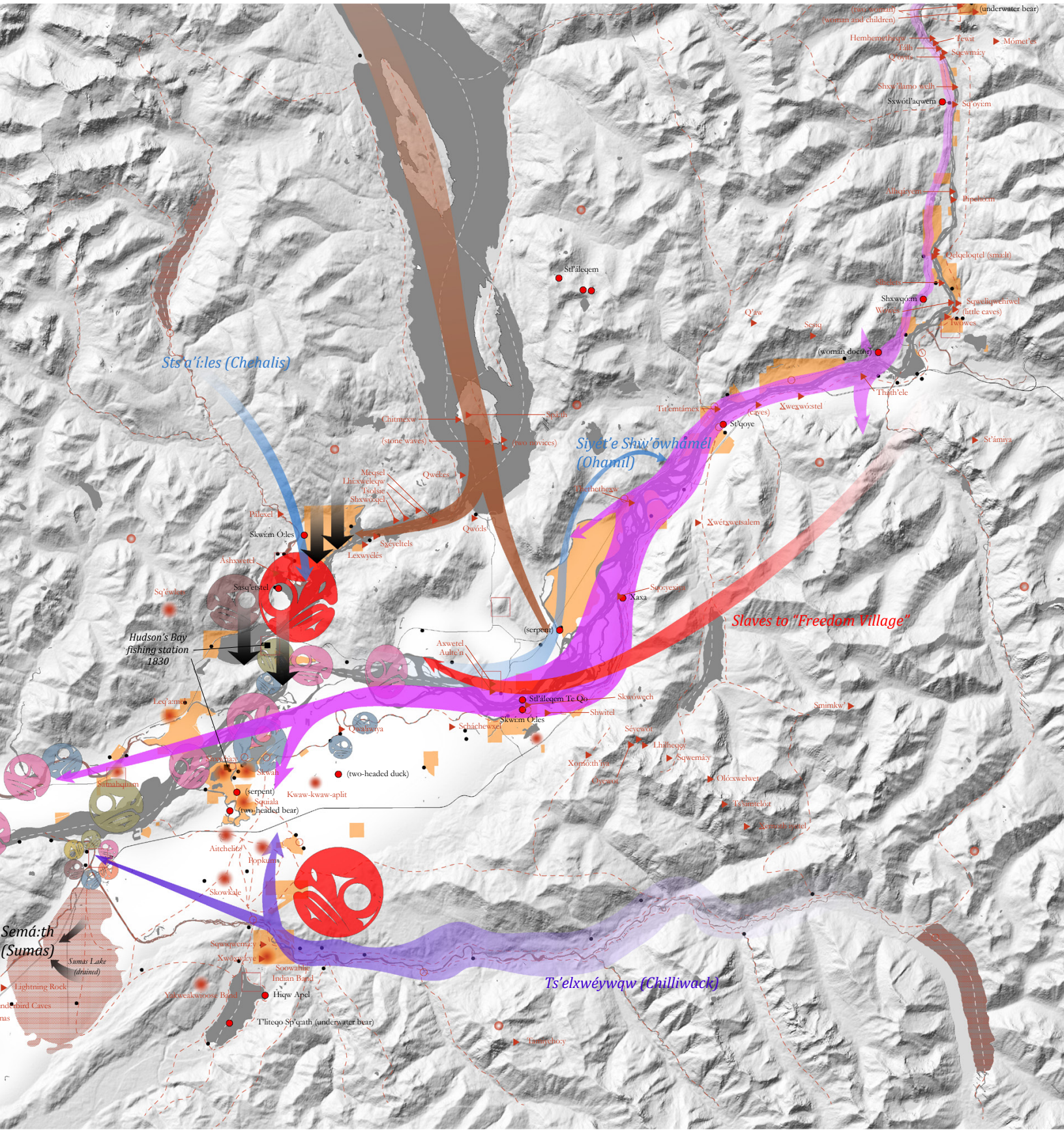


Fig. 4.2.3. *Seabird island detail of community and migration study*

This map speaks to both the creation and decimation of community in the recent history of the river.

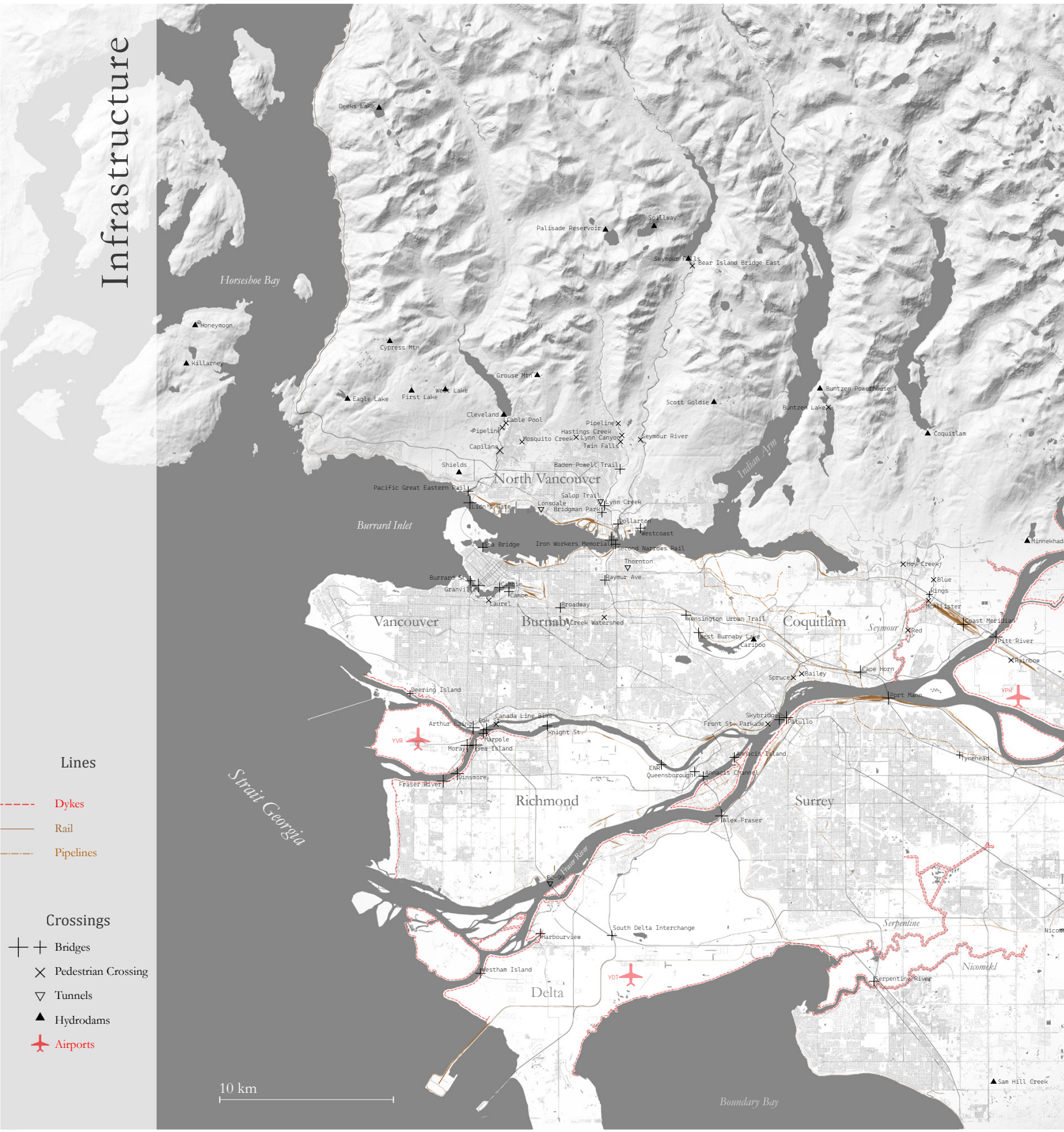


Fig. 4.3.1. *Estuary detail of infrastructure study*

Indigenous fishing infrastructure existed along the stó:lō since time immemorial. These relations were increasingly restricted during the 19th century under colonial laws.

Fig. 4.3.2. *Central detail of infrastructure study*

Kenneth Frampton writes that 19th century civil engineering relied on the language of " "embankments, cutting locks, metalings, aqueducts, viaducts, bridges, and dams."

Fig. 4.3.3.*Seabird island detail of infrastructure study*

The same language prevails today in our contemporary world, perpetuating a colonial relationship to Stó:lō.

Encounter | Wayfinding

A series of story maps tracing research covering diverse topics – including oral histories, public art, archeology, infrastructure, and architecture – at key 'touch-down points' along the river. I visited these places during a road trip on 26th December 2023. Public works such as the *Salmon Runnels* by Susan Point, *X̱á:ytem Pithouse and Longhouse* by Patrick Stewart, Ruskin Dam, and *Sq'éwqel Community School* by Patkau Architects served as anchoring points throughout the journey.

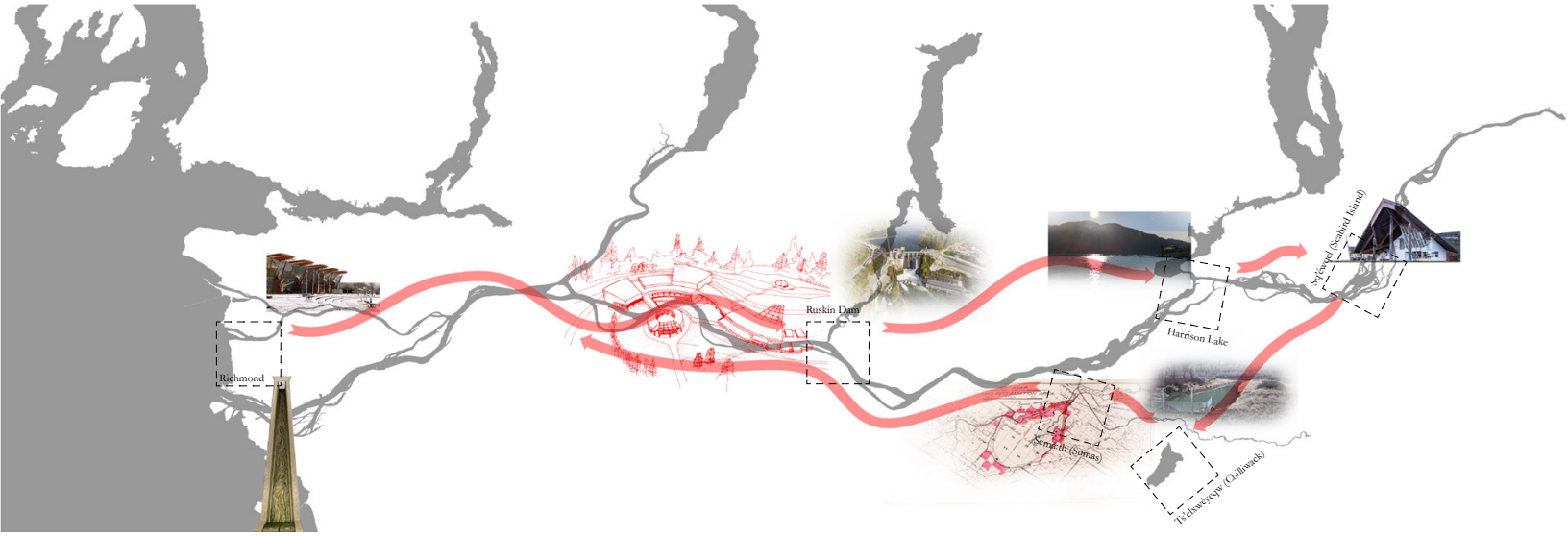
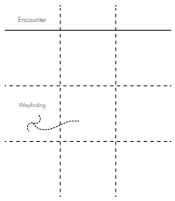


Fig. 4.4.1. *Map of travel route on 26th December, 2023*



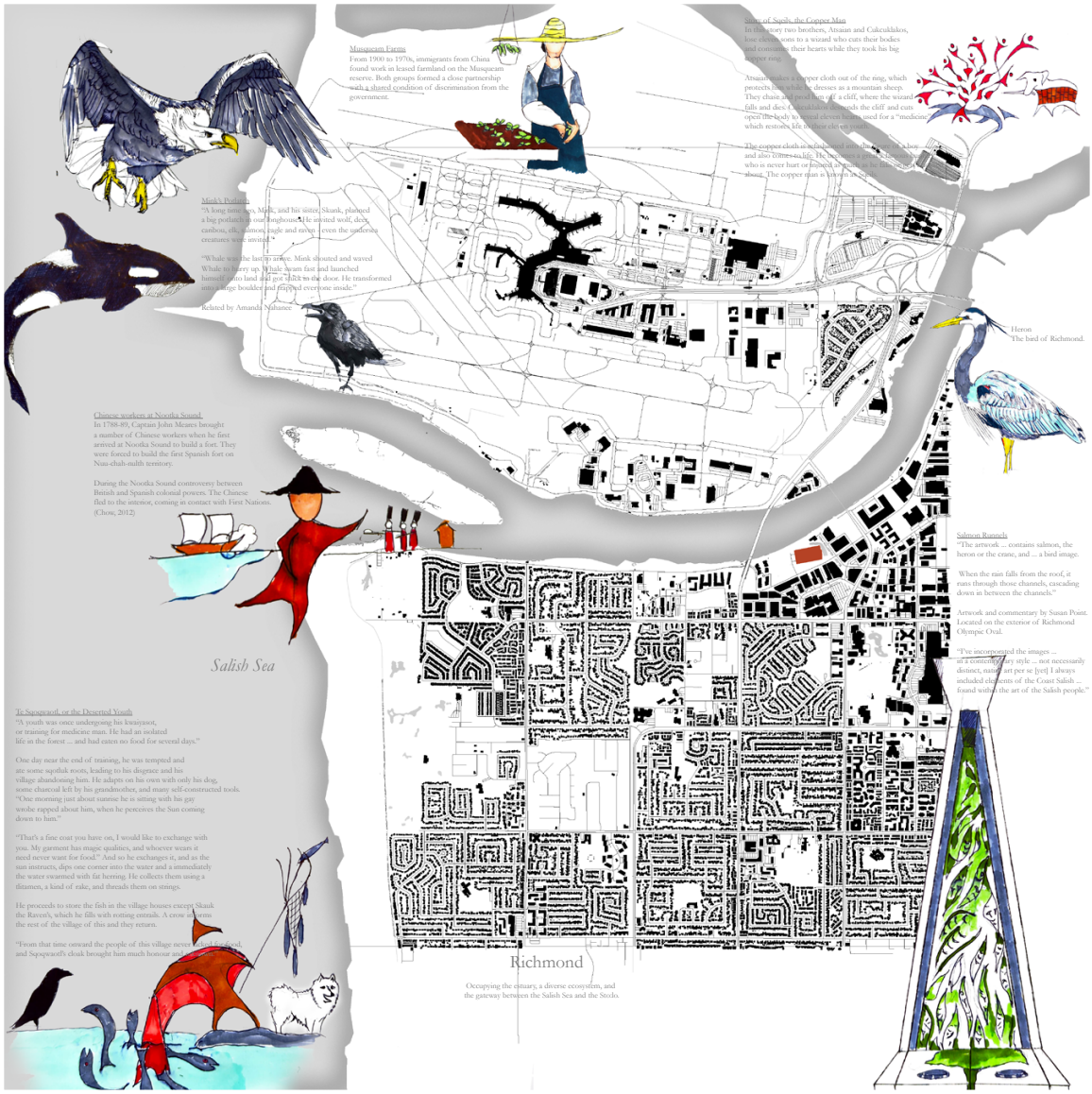


Fig. 4.4.2. *Story map of river estuary in Richmond*

The gateway between the Salish Sea and Stó:lō, marked by Susan Point's Salmon Runnels on the piers of the Richmond Olympic Oval.

Nowadays, Richmond is home to a large immigrant community.

The history of immigration extends to the nearby Musqueam reserve, where Musqueam-Chinese farms represent relationships

Fig. 4.4.3. *Story map of the Stave estuary and Ruskin Dam*

A hydropower dam, Ruskin 2, divides Hayward lake from the Stave River.

A public artwork by Brandon Gabriel depicts tricksters and animals significant to the place on 12- by 35-feet long steel piers.

Some of those stories, and more from the Kwantlen people, appear in this map.

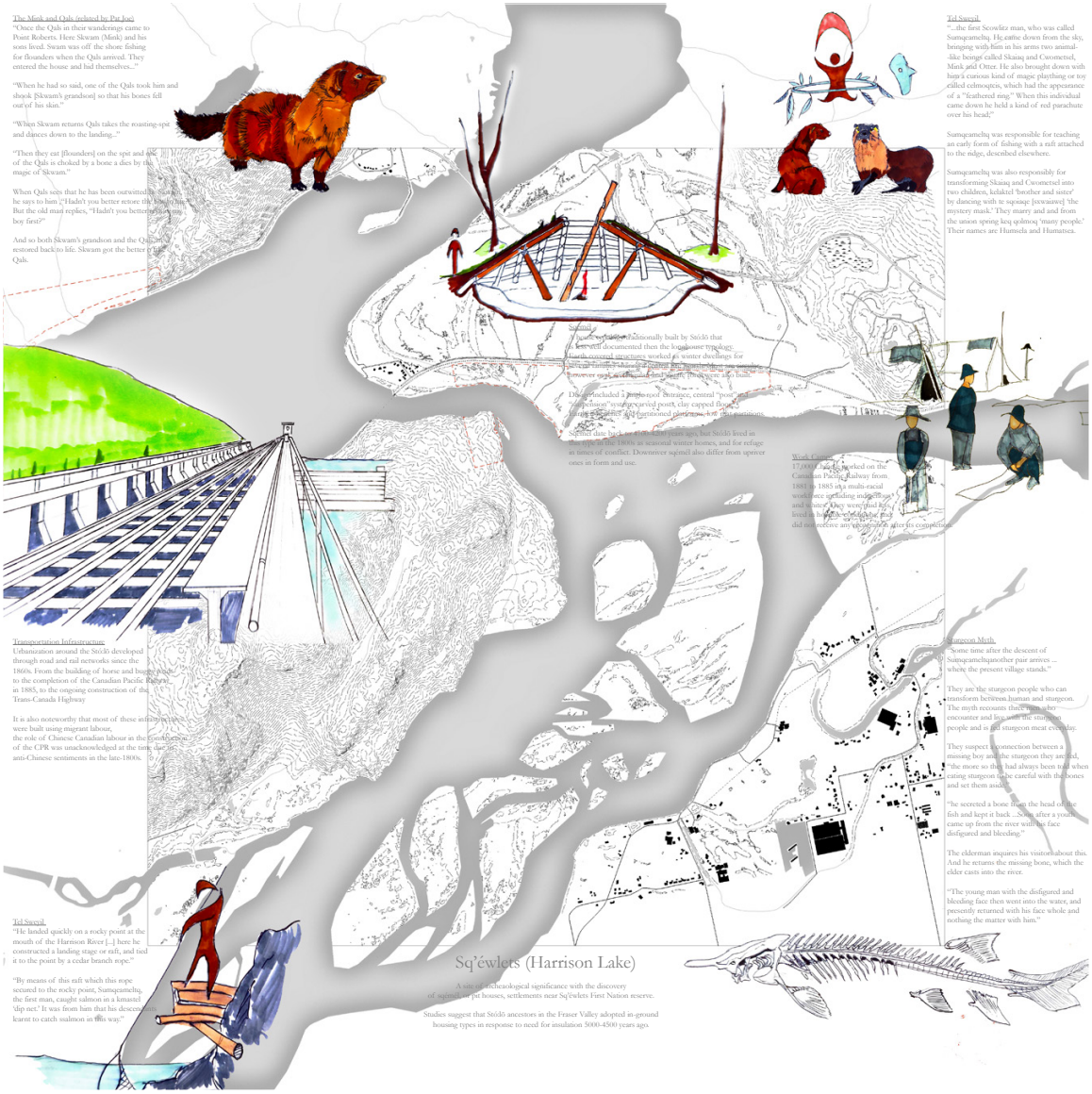


Fig. 4.4.4. *Story map of Sq'éwlets (Harrison Lake)*

A site of archeaological significance with the discovery of sqémél, or pit houses, settlements near Sq'éwlets First Nation

Studies suggest that Stó:lō ancestors in the Fraser Valley adopted in-ground housing types 5000-4500 years ago.

Harsh working conditions of Chinese railway workers exhibit the resilience of migrant labour, as well as an industrial, economic relationship to stó:lō.

Fig. 4.4.5. *Story map of Sq'éwqel (Seabird Island)*

A pre-contact settlement with many sqémel (pithouse) settlements.

The Canadian Pacific Rail and Transnational Highway cuts through the island.

Sq'éwqel was severely depopulated due to smallpox epidemic at the beginning of contact era,and in 1878 the colonial government established an "agricultural reserve" to incentivize farming over fishing.

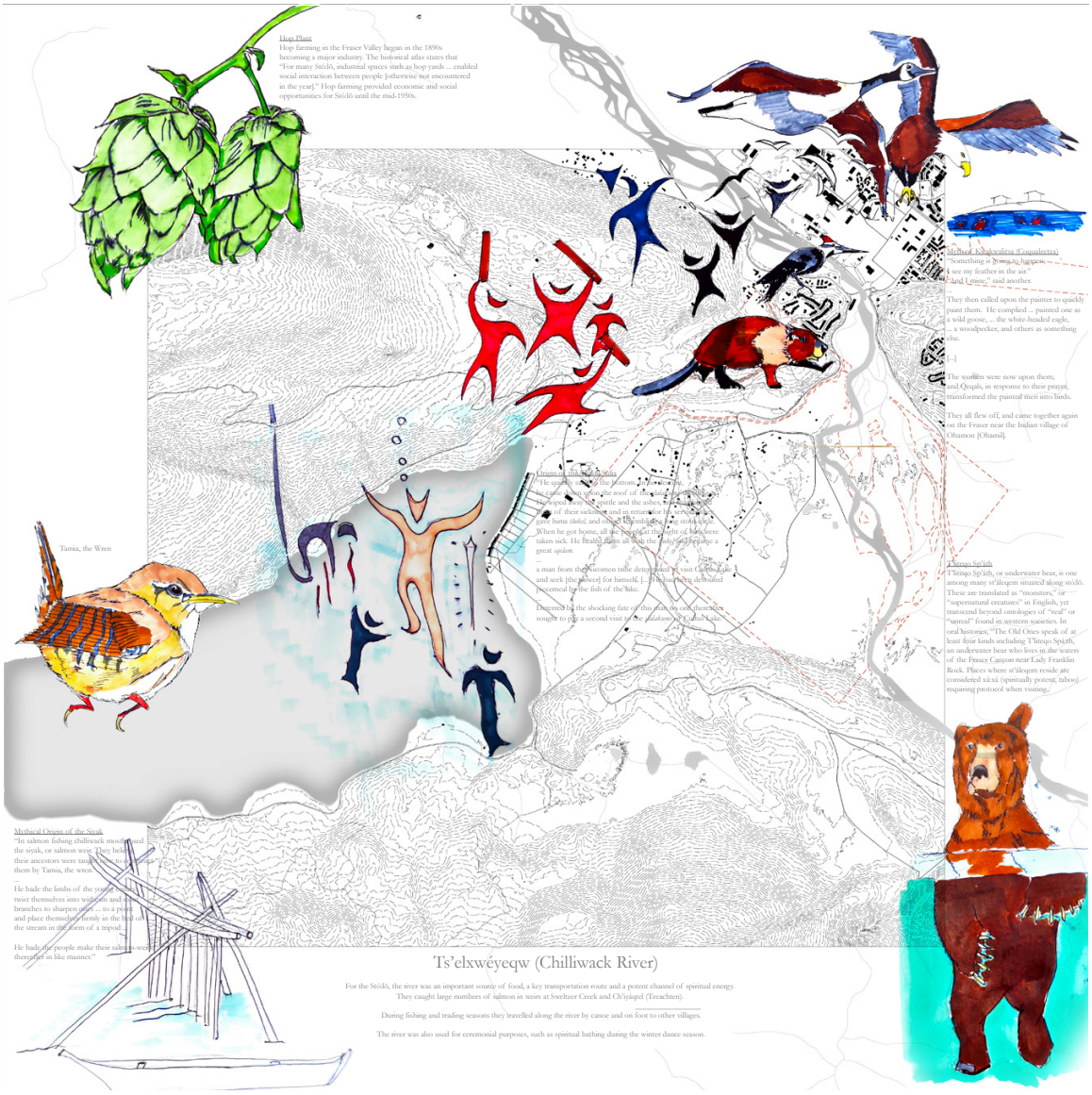


Fig. 4.4.6. *Story map of the Ts'elxwéyeqw (Chilliwack River)*

Historically the Chilliwack River had many salmon weirs that caught a large number of salmon.

The Chilliwack River itself is associated with a sxwōxwiyám explaining how Xexá:ls created it, making it a sacred transformer site.

From 1926 onwards, the Chilliwack-Vedder river system encouraged many non-indigenous sort fishermen to treat the river as their exclusive, leisurely domain.

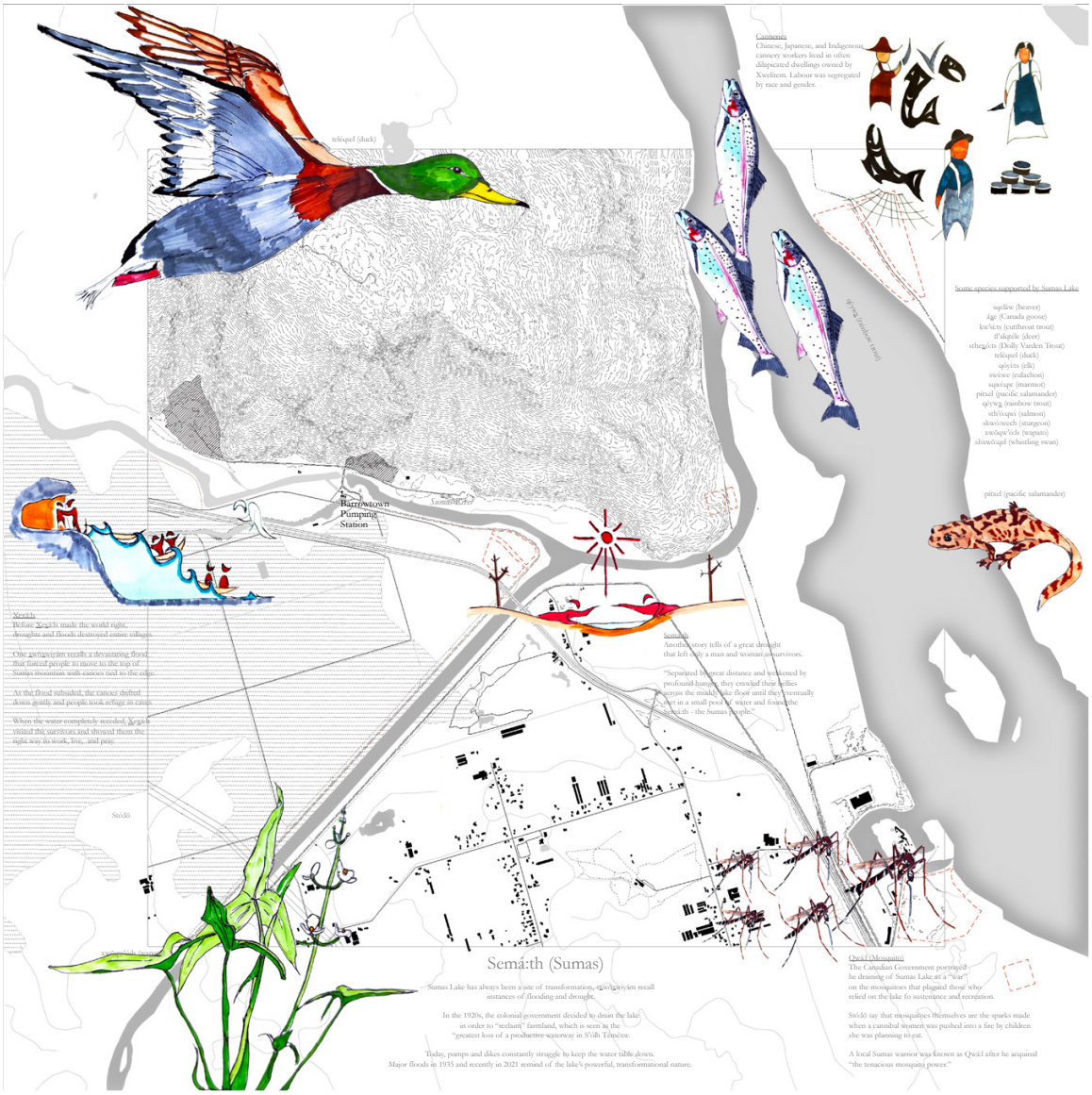


Fig. 4.4.7. *Story map of the Semá:th (Sumas)*

Sxwōxwiyám paint a dramatic picture of the Sumas Lake, capable of transforming through flooding and drought.

The history of salmon canneries along the stó:lō contained a multi-racial workforce providing ubiquitous labour for the regional economy. Work was segregated by race and gender.

Reflections on Encountering Stó:lō

The above maps document an 'encounter' with the culture, infrastructures, and climate change of the Stó:lō. This 'encounter' was a result of careful readings of literature, from the *Stó:Lō-Coast Salish Historical Atlas*, the trickster stories from Charles Hills-Tout's *The Salish People*, Franz Boas' *Indianische Sagen*, to online sources like the *Digital Sq'éwlets* and *First People's Map of BC* by the First Peoples' Cultural Council, the latter including the places of First Nations, artists, public art, and architectural pieces. These sources culturally foreground the mapping of climate change through the historical, recent, and projected models of flooding. It also includes moments where Chinese Canadian history appears with the history of colonization in these places.

A key takeaway from this section was the value of place-knowing at different levels, the **embedded histories of community, migration, erasure, and exploitation layered along the river**. It also became clear that reading landscapes at the macroscopic scale did not convey many of the relations to land I found while researching the topic. This disconnect is a limitation to thinking at such a large scale and primarily in plan view. The use of collage also presented some limitations, as the overlaying of hand sketches usually presents specific moments in certain trickster stories. The entire story, however, can only be conveyed by reading or listening to a storyteller over time. Therefore, scale, representation, and time were the main themes (or issues) emerging from the mapping process. Maps are not entirely tangible representations of land, but 'mapping' is a way of interpreting landscapes. The idea of 'mapping' carries throughout the rest of the thesis process as it tries to understand the culture at a personal level, prompting the 'entanglements' or making as embodied knowledge.

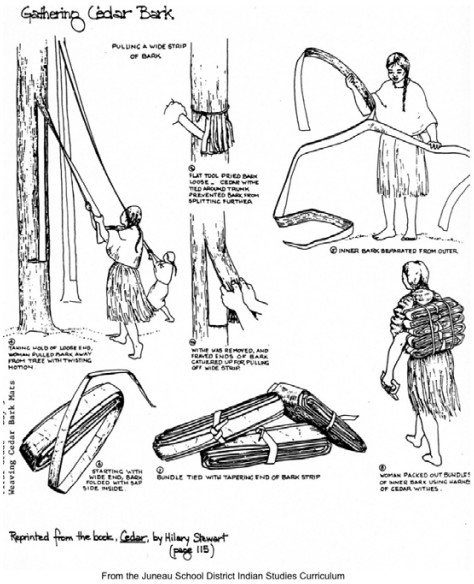


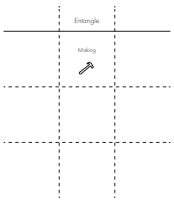
Fig. 5.1. *Gathering cedar bark*

Fig. 5.2. *Mrs. Julia Siddle, Duwamish of the Muckleshoot Reservation, using an awl to make a coiled cedar root basket*

Entangling | Making

On 29th December 2023, I went on a road trip to Washington to attend a cedar weaving workshop taught by a local artist who is self-taught in cedar weaving by attending local workshops herself[1] in Washington. Her work, which I discovered online from her studio, intrigued me because of its vernacular and architectural qualities.

The road trip was long, involving several hours on Highway Five and two ferry rides to reach the small town near Puget Sound. The trip moved around the Salish Sea, which produced unprecedented and sublime views of the sea. The workshop was on the morning of 30th December, and learning to make a cedar basket took four hours. We discussed how to make cedar strips using the bark and how to prepare them alongside other materials, such as deer's antlers, cattails, and reed, used to make the basket. To my surprise, cedar strips needed to be soaked overnight for at least four hours to be pliable enough to weave. Weaving was also possible with any material that could withstand tension, as the artist's work demonstrated using paper to weave intricate, colourful sculptures. Gathering materials also required several days, usually derived from local materials, including the antlers shed by local deer. Despite this, the antlers and reeds used in the workshop were imported using Amazon due to dwindling local supply.



1 The artist has requested to remain anonymous; thus, writing and images avoid identifiable names and locations.

Fig. 5.3.1. *Cedar basket made with deer's antler*

Fig. 5.3.2. *Underside of cedar basket*

Fig. 5.3.3. *Front of cedar basket*

Fig. 5.3.4. *Top of cedar basket*

Initially, my approach was to document the weaving process by writing. However, I realized that the act of weaving was much more effective and meaningful. The learning process was much more experiential as your fingers began to feel the process of weaving as opposed to frequently writing or talking about it. The artist's guidance was essential here, helping me find the spaces for "spokes" or structural ribs and tucking in loose ends of cedar to continue with the weave.

I emerged from the experience with a greater appreciation for weaving as an embodied practice. Before this, as an architectural student, I was always aware of woven forms, the aesthetic and structural qualities of weaving, but not as a process of **making and embodied knowledge**. Woven forms and structures often require massive amounts of lumber to make spectacular forms with questionable sustainability. On the other hand, Indigenous weaving is very conscious of its materials and uses every piece of material mindfully, creatively, even playfully. Another key takeaway was the timescale of indigenous craft, which is often much longer and encompasses much broader timelines than industrial production. **An awareness of broader, "ecological" timescales is embodied in the gathering, making, and use of craft;** I found this enlightening.

Fig. 5.4.1. Bar for warping of Salish loom

Fig. 5.4.2. Two sets of warps on a Salish loom

Fig. 5.4.3. *Early version of weaving sword* - later transformed into a long sturgeon.

Entangling | Weaving

In continuing explorations with weaving, the thesis sought to directly understand the relationship between embodied knowledge and understanding of place. In this case, studies involved the traditional apparatus of the Salish loom, reverse-engineered and built based on historic photographs, and the act of weaving patterns with yarn, learned through diagrams and videos found online.[2] My explorations are very elementary. The piece to the left, "Landscape," depicts abstracted shorelines with a planet-like object inhabiting an empty lake. The piece on the right, "Salmon," depicts a jumping salmon in the middle of vectors of water flow. The loom itself is also symbolic. The posts represent interpretations of two different bodies, indigenous and modern, and the beams represent thresholds within the two posts, the sky, the land, and the water.

Like cedar weaving, blanket weaving is a slow process with many stages. My exploration, however, only presented limited engagement with the whole process. Traditional weaving uses wool gathered from mountain goats[3] and woolly dogs.[4] Pigments for dyes are sourced from local materials such as flowers and onion skins. My weaving instead relied on commercially available yarns and lumber for the loom.

This stage of the thesis was a learning process of how to make the loom and how to weave. I re-iterated pieces of the loom for ease of use and symbolic value. The 'weaving sword' is typically used to differentiate between even and odd number warp threads. I cut a long, rectangular piece of wood that functions as a weaving sword but later re-made this piece into a more elaborate, fish-like form resembling a sturgeon. Weaving shuttles, used to carry an amount of yarn through the warp threads, also

2 See *Fabric of Our Land: Salish Weaving* (2017) exhibition at the UBC Museum of Anthropology, and Tepper, Leslie Heyman, et al. *Salish Blankets: Robes of Protection and Transformation, Symbols of Wealth*. University of Nebraska Press, 2017.

3 Vancouver Art Gallery, "On Collecting | The Salish Weavers Guild."

4 *CBC News*, "Whatever happened to the Salish woolly dog? Learn more about this extinct breed with virtual history lessons," July 21, 2021.

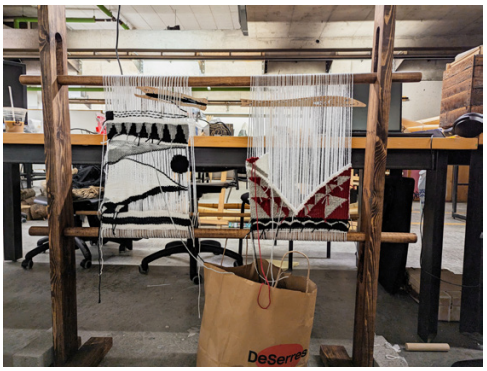


Fig. 5.4.4. *In process photo of weaving with loom*

Fig. 5.4.5. *Detail view of first weave "Landscape" with loose threads*

transformed from an initial design consisting of rectangles with semi-circular cutouts on each end to salmon-like forms that 'swim' through the loom.

The learning process involved trial and error. **It was also an embodied process**, where my strained eyes coordinated with fingers working between threads, sat in awkward positions on the ground, thinking of a pattern in my head. It was more frustrating than anything, but learning patience and new forms of knowledge made the process enjoyable. The 'Landscape' weave showcases initial experimentations consisting of densely packed lines beside porous, net-like sections, patterns such as triangles and circles, and lines that skip every second warp thread. The 'Salmon' weave is an exercise in arranging triangular patterns and a silhouette of a fish. Either way, things were never fully planned but rather generated from making and re-making my own mistakes.

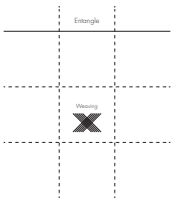
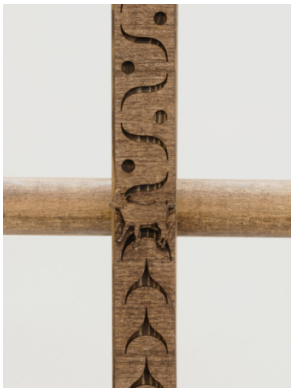


Fig. 5.5.1. *Collaged image of Salish loom with decals*

Fig. 5.5.2. *Landscape* weave

Fig. 5.5.3. *Salmon* weave



Symbolic posts

Inspired by the Ruskin Dam Piers by Brandon Gabriel, this section discusses the decals in the two Salish loom posts. The left post represents an interpretation of indigenous culture, and the right post represents a localized interpretation of modernity. Each post is divided between three domains with thresholds at the horizontal bars: the sky, the land, and the water.

Raven

Placed in the sky domain of the left post. The Raven symbolizes the fluid power of the skies and the cunning yet benevolent nature of the particular bird in trickster stories I have encountered. Raven brought the first sunrise by tricking a chief. In a Squamish story, Raven accidentally kills and devours a Seal girl, the daughter of his brother Seal, causing much sadness.[5]

Goat

Placed in between the land and sky, the Mountain Goat symbolizes perseverance. In traditional yarn-making, people gathered wool from mountain goats by hiking the mountain ranges and hunting them.

Beaver

Placed in the land domain of the left post. In Xexá:ls, Qoā'kotlkotl makes a cap out of beaver fur before beginning their journey.[6] A Pilatlq story believes that Skelau, with Tschkel (unidentified bird), Smatq (bull-headed fish), and Kwatel (mouse), were responsible for bringing the first salmon run by scheming to steal the child of the Salmon people's chief, leading to the annual salmon runs on specific streams.

Two Salmon

Placed in the water domain, salmon are an essential source of nutrients for plants and animals in Stó:lō as they carry nutrients from the ocean to freshwater environments. The Story of Magic Water and Salmon of the Kwantlen people talks about two salmon that appear during a ritual dance and then disappear, forming the salmon sulia, or crest.

5 Boas, Franz ed. "Raven," 160-161.

6 Boas, Franz ed. "Qäls," 92.

Airplane

Represents the skies in the right post. They symbolizecontrol over the skies, globalization, and global warming. Vancouver International Airport hosts air traffic worldwide. Airplanes also consume disproportionate amounts of fossil fuel.

Canadian Pacific Rail

Occupies the threshold between land and sky. Also known as the 'Iron Horse,' the BC portion of the CPR traveled from the mountains of Revelstoke to Port Moody. On my road trip around the river, the railway marked a boundary between water and land, not very accessible for animals or humans.

Chinese Railway Worker

Placed on the land is migrant labour. Chinese railway workers moved to Stó:lō for economic opportunities after China became unsafe during the Taiping Rebellion and faced colonial powers during the Opium Wars. Railway workers, primarily men, had to leave their families, culture, and motherland. A poem from the documentary *Canadian Steel, Chinese Grit* (1998) speaks to this:

离家日已久，	A long time away from home
难免來顾忧。	My family, a great concern. It hurts to leave my parents,
苦别双亲万里游，	To journey ten thousand miles away,
每欲全归同聚首。	Many times I wish to go back and be with them again,
秋过秋，	Autumns come and go
黃白不成就。	I have not succeeded in becoming rich,
但願皇天常綣佑，	I pray Heaven will bless me,
他年衣錦免羁留。	Let me return one day, In splendid clothes without delay.

Cattle

Placed at the threshold between land and water, cattle and agriculture generally contribute to local resource consumption, which stresses indigenous natural and cultural worlds. This 'invasive' activity produces clashes between newcomers and the Stó:lō over resource rights.[7] During my site surveys, I witnessed vast tracts of agricultural land along the river once we left Metro Vancouver. The aforementioned draining of Sumas Lake also reclaimed land for agriculture.

7 Tim Peters, "Invasive Organisms: Tampering with the Transformers' Work," in *A Stó:Lō-Coast Salish Historical Atlas*, 109.

Fig. 5.6.1. *Tripod sketch model on water blocks*, the simple tying of skewers to make this model became a key reference during the Entangling |Interpreting process

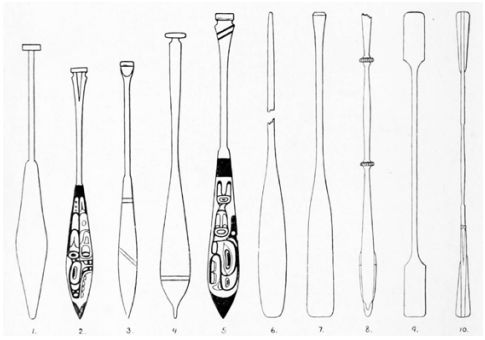


Fig. 5.6.2. *Coast Salish Paddles*

Fig. 5.9.3. *2012 Dragon boat festival, False Creek, Vancouver*

Entangling | Interpreting

An interpretation of the siyak

An architectonic "apparatus" inspired by the tripod of the siyak, or salmon weir. It interprets key components of the typology – tripod, fence, joinery – and incorporates cultural elements such as paddles, a shovel, and weaves. The two downstream legs are paddles, with the third leg resembling a shovel used by Chinese Canadian workers. One of the paddles is hand-carved, while the other is fabricated using CNC milling. The forms of the paddles are also significant. The hand-carved paddle adopts the form of West Coast paddles, specifically a combination of Tlingit (3) and Haida (4) designs. The digitally fabricated paddle recalls dragon boat paddles from the Chinese dragon boat festival. A loom is built into this apparatus, re-interpreting the fence of the weir, and the entire piece stands on resin-cast blocks recalling the clear waters of the Stó:lō. The various explorations in craft, fabrication, and weaving give an embodied sense of Indigenous land-based history and the modern history of Chinese Canadian labour. The work combines traditional and modern techniques and materials to build a narrative of the river through craft. **The resulting 'weirloom' apparatus interprets a 'picture of the river' in a literal, cultural, and ecological sense.**

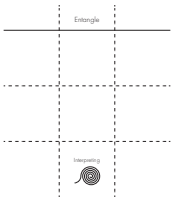


Fig. 5.6.4. In-progress paddles

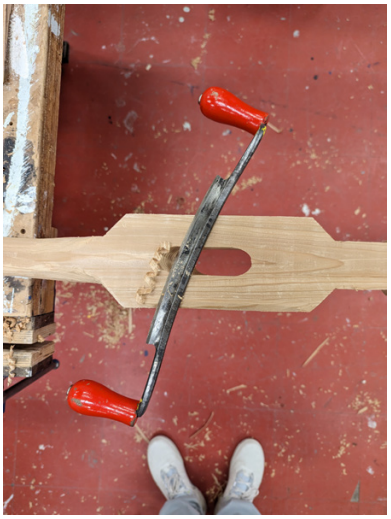


Fig. 5.6.5. Draw knife with cedar shavings

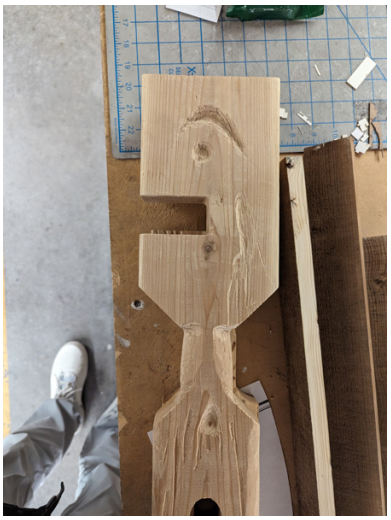


Fig. 5.6.6. Hand chiselled patterns on paddle

On paddles

Making the weirloom involved a series of exercises and experiences involving craft. 'Craft' in this context is both traditional and modern, manual, mechanical, and digital. For example, the hand-carved paddle involved the cutting of a profile from cedar lumber and then carving into its shape with a draw knife. The patterns on the paddle try to carve the circular motifs found in traditional Coast Salish art, but it is admittedly very crude. The work was exhausting and stressed my back. I am so used to sitting on my laptop and getting everything I need much more quickly. Aside from the physical labour, some tactile qualities also stood out. The smell of cedar shavings was pleasant, and thin pieces of cedar shaved off by the knife filled the work area with the aroma. As an architecture student, wood and mass timber have always been fashionable for appropriate projects. However, this sense of materiality is difficult to convey through conventional drawings and renderings. Another difference was the precision of the work, especially when juxtaposed with the digitally fabricated paddle. My woodworking skills are very elementary, so the final form did not correspond to the intended form perfectly, although I found the hand-craft process much more forgiving and flexible than the digital process, which permitted very little room for error.

While the hand-carved paddle was a personal effort, the digitally crafted paddle was a collaborative experience with the FabLab at Carleton University's architecture school involving external technical expertise and machinery. The CNC machine milled the profile and the wedged patterns generated using Grasshopper and depicted flowing water vectors. The actual fabrication process took less than a day. Preparation work was longer and more tedious, accounting for the sizing of the lumber and potential splintering, requirements of the milling machine (clamping space, drill bit size, bed size), and issues around feasibility. For instance, thin edges less than 5 millimetres thick were not feasible because the milling machine was too

Fig. 5.6.7. CNC milled paddle on machine bed

Fig. 5.6.8. Test paddle heads

Fig. 5.6.9. In process photo of architectonic apparatus showing both paddles, loom, twined yarn, and small shovel in back.

aggressive for such fine detailing. Some cutting planes also needed to be extended for edges inside of the lumber. The final piece also had the aroma of hand-carved cedar, but it smelled slightly burnt, and wood powder was left out instead of shavings.

Test pieces for each paddle include smaller pieces that only model the heads of each paddle. Both paddles were stained red to represent the red cedar trees of the West Coast.

On twining

Twining is a more advanced form of weaving where two lines of yarn make up one row of weaving. I used the technique to make a flow pattern. There is no definitive reading of the pattern. It reads as the flow of water, the movement of salmon, or an abstracted inter-twining of cultures on the Stó:lō. On the contrary, the process is clearly defined, involving weaving one row in one colour (dark blue or white) followed by twining the other colour to fill in negative spaces. The resulting pattern is 110 rows of weaves following a pattern found online,[8] and this figure outnumbers all weaving done on the previous loom. Like the previous loom, the weaving also mediates between the legs of a tripod, this time substituting for the fence typically found in salmon weirs.

On casting and metalworking

Casting and metalworking are also embedded within the weirloom. The shovel is the back leg of the apparatus, made using sheet metal and soldering. Its form comes from the shovels used by Chinese miners and railroad workers in the region. The shovel represents the labour behind our industrial relationship with Stó:lō. Resin casting, in parallel, represents the uncanny way we understand 'pure' nature due to synthetic qualities in the making process.

8 See Sandra Rude's "Towel #17" on *Sandra's Loom Blog*, February 16, 2015, https://sandrarude.blogspot.com/2015/02/towel-17-and-postscript.html

Fig. 5.7.1. *Weirloom apparatus with collaged elements*

Fig. 5.7.2. *Detail on hand-crafted paddle*

Fig. 5.7.3. *Detail on digitally crafted paddle*

Fig. 5.7.4. *Twined weave*

Fig. 5.7.5. *Shovel on resin block*

Fig. 5.7.6. *Hand-crafted paddle on resin block*

Fig. 5.7.7. *Digitally crafted paddle head on resin block*

Reflections on Entangling Stó:lō

This thesis section diversified how I 'interpret' cultural history through making, weaving, and crafting. The process matrix suggests a straightforward approach. In actuality, materially interpreting through craft was very messy, with many instances of trial and error. I also found that writing about praxis is difficult since everyone experiences praxis in their own ways, through their own positionalities. **The language behind praxis is more fluid and does not rely on clearly defined expectations a priori**. I rarely thought, "I am going to do this" while performing praxis, but rather, "How does this work?"; "Where are the barriers disrupting the flow of making?" and "Where will this lead me?" For me, praxis can represent silenced histories of craft and labour – in some ways, the thesis gives voice to these stories, but there is also an element of silent incoherence within the process, which I appreciate. This gap is only briefly understood through the cultural threshold interfacing between my background and indigenous ontologies.

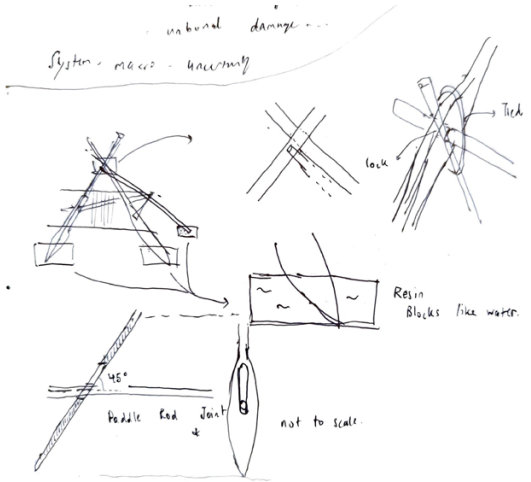


Fig. 5.7.8. *Initial sketches for Weirloom* - Many of the initial concepts presented here were revised throughout the making process.

Engaging | Meaning

What does this all mean for cross-cultural relations with indigeneity? Engaging Stó:lō follows the process of designing a socio-ecological infrastructure. The process synthesizes the lessons from the encountering and entangling sections to suggest a more holistic approach to climate adaptation. *Meaning*, in this context, refers to how cultures interact and how the resulting relationships inform our land relations. These interactions form the basis of an architectural program while challenging the idea of monolithic programs detached from place.

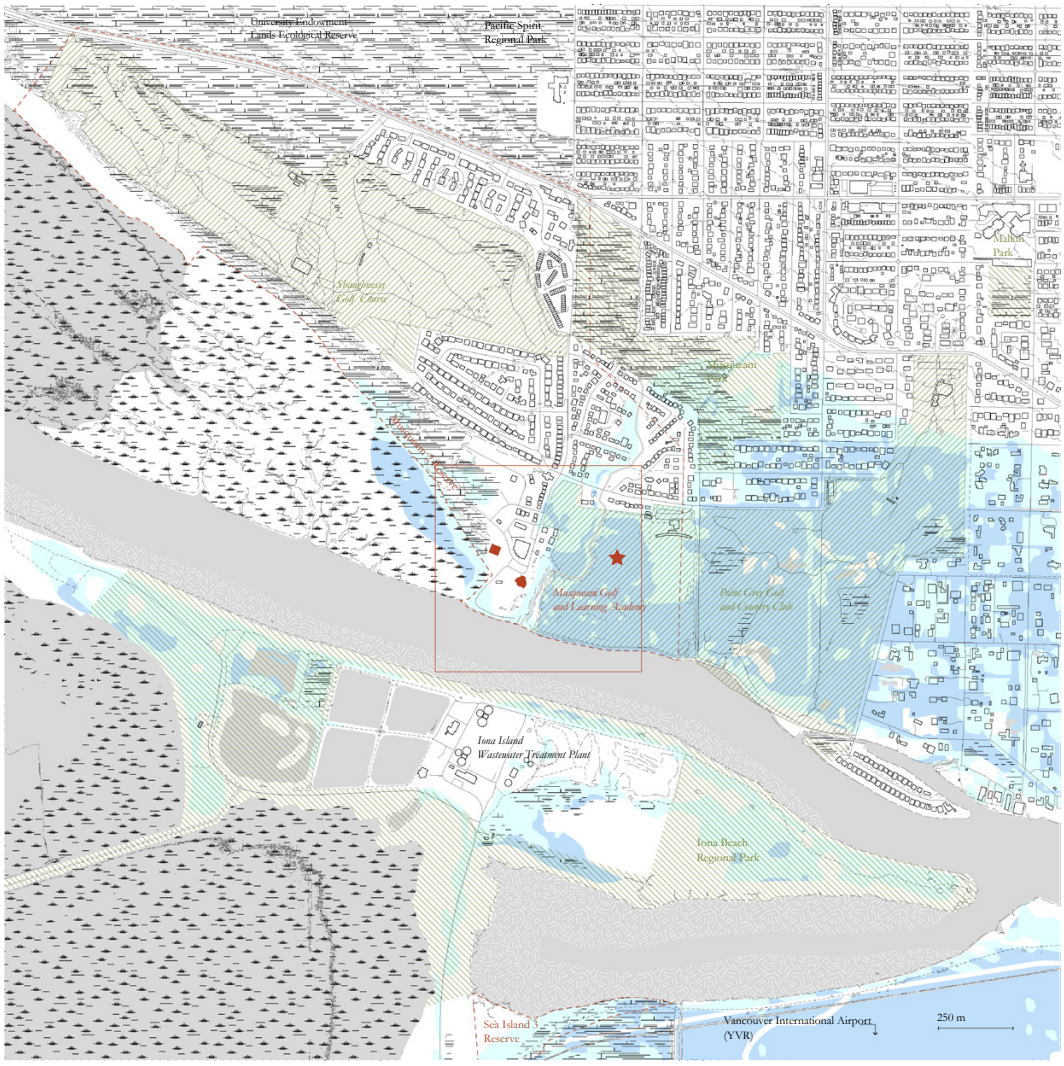


Fig. 6.1.1. Context plan around Musqueam Cultural Center

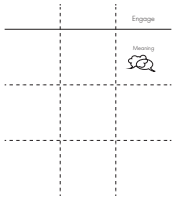


Fig. 6.1.2. Site plan including section cut

Site analysis

The site for a potential climate infrastructure is a creek between the Musqueam Cultural Center and a golf course on the edge of Stó:lō. The Chinese Market Gardens, a heritage site, stands near the west. The Musqueam Cultural Center houses the Musqueam administration on the unceded reserve of the Musqueam people. A part of the building was the Four Host First Nations Pavilion in downtown Vancouver as a part of a cultural program for the Vancouver Olympics in 2010. The Four Host Nations was a society formed representing the Lil'wat, Musqueam, Squamish, and Tsleil-Waututh First Nations in Metro Vancouver. Musqueam land and indigenous people were also crucial to Chinese Canadian history. From the early 1900s to 1970s, immigrants from China worked as farmers on Musqueam reserves, where "Bok choy, su

Fig. 6.2. *Original Four Hosts First Nations Pavilion with Musqueam Center (circular) addition, 2010.*

Fig.6.3. *Map of Musqueam-Chinese Farms, 1950*

Fig. 6.4. *Larry Grant, right, and his younger brother Howard on their father's [Musqueam] farm*

choy, and gai lan [Chinese vegetables] grew alongside Western celery and cabbage."[9] Discriminatory policies marginalized both cultures. The Department of Indian Affairs (DIA) sought to limit the movement of indigenous people by restricting their movement outside reserves. At the same time, immigration policy imposed a head tax and other policies that denied the right to vote, hold certain jobs, practice medicine, and purchase Crown land. The 1907 Vancouver riot expressed the anti-Asian sentiments of the time, directed at Chinese, Japanese, and Indian immigrant populations. In 1909, the DIA agreed to let Musqueam lease some reserve territory to Chinese farmers while benefiting as a financial middleman. Eighteen Musqueam-Chinese leases existed by 1917. Though prohibited from residing on reserve land, many Chinese immigrants nevertheless lived there in bunkhouses. Some farmers even attended First Nations cultural ceremonies and celebrations upon invitation. The Chinese Market Gardens on Musqueam is a testament to this shared history. The abandoned farmhouse serves as a reminder of many market garden farms now replaced with golf courses. The family of Larry Grant, a Musqueam elder, also testifies to a shared history. His father, Hong Tim Hing, arrived from Guangdong, China, and later married Agnes Grant, a Musqueam woman, while working on a farm.

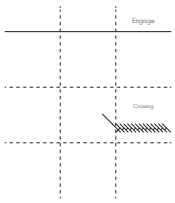
Today, golf courses occupy most of the river shoreline. The Musqueam administration only contains a single road connecting to the river, compared to the many trails offered by the privately developed golf course. The heritage site lies to the northwest of the administration building nearby. The overlooked history of the place points to relationships between people, land, and labour emerging despite unfair conditions. The proposal for a small bridge design over the creek can speak to these past and present relations, suggesting a future based on supportive relationships.

9 Siegel, Leah, "Musqueam-Chinese Farms, Two marginalized communities find solidarity in one another," *British Columbia - An Untold History.*

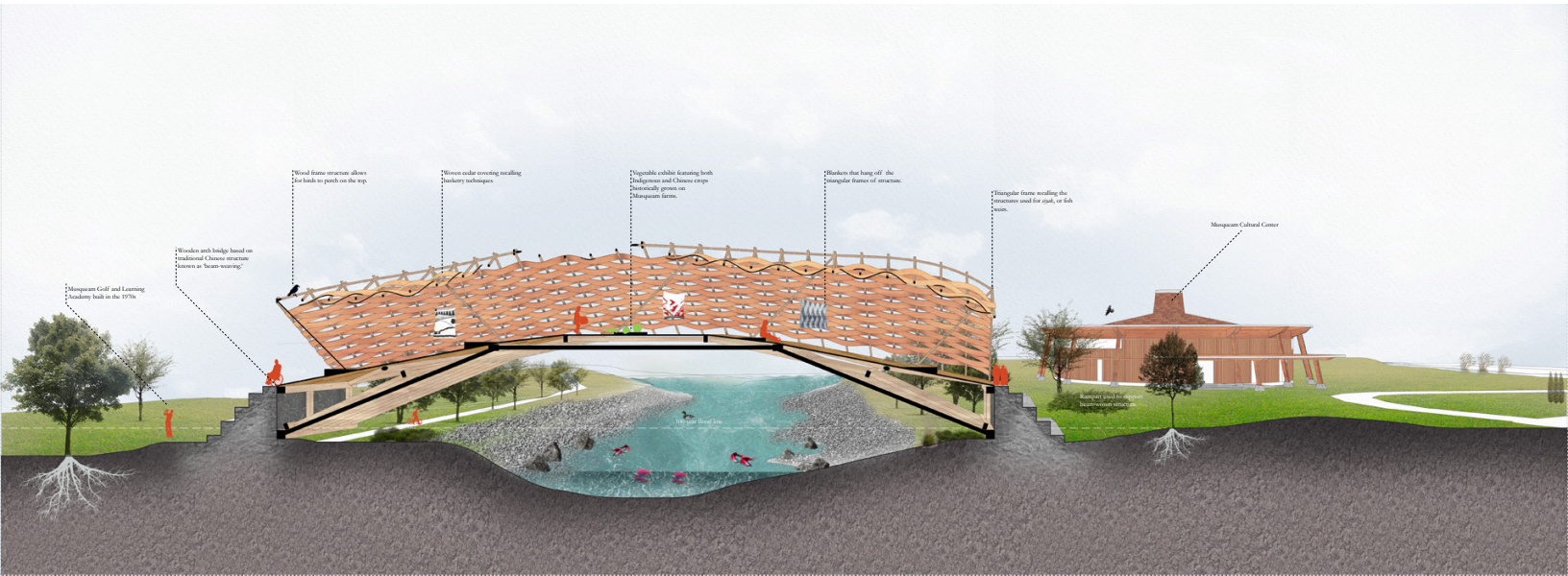
Engaging | Crossing

The idea of a bridge builds on the ongoing interest in infrastructure running throughout this thesis project. The process began by considering the Patullo Bridge near where I grew up, and then I branched out to think about the river more broadly. This section is titled 'Crossing' because it relates to bridge design not just technically but also by bridging between programs, cultures, the water, land, and sky.

The *Musqueam-Chinese Bridge* connects the Musqueam Cultural Center with the private golf course of the Musqueam Golf and Learning Academy. The bridge's pedestrian access makes the typically exclusive golf course more publicly accessible. The bridge also stands above the flood level for a 100-year flood, roughly five meters above the water table of Stó:lō. The stone ramparts will submerge in the process, and the overall structure sits lightly on top of the water like a salmon weir. The internal program relates to the cultural histories of the site, with small vegetable stands containing Indigenous and Chinese crops, places to hang blankets, and resting spaces between major structural components, all within a woven structure. The structure also allows for the nesting of birds and other wildlife, engaging with more-than-human parts of the local sociology and ecology. The following section discusses the structural design, where Indigenous and Chinese structures complement each other to support the socio-ecological infrastructure.



Another consideration behind 'crossing' was the threshold between material and spiritual worlds. The material aspects of the design consist of the mundane activities performed on the bridge and the spatial receptions to its program. Yet spiritual aspects bring forth a symbolic, mythical understanding of the water, where a fish motif appears, for instance, in the shadows cast by the structure or the active water underneath, recalling water dragons revered in Chinese culture.



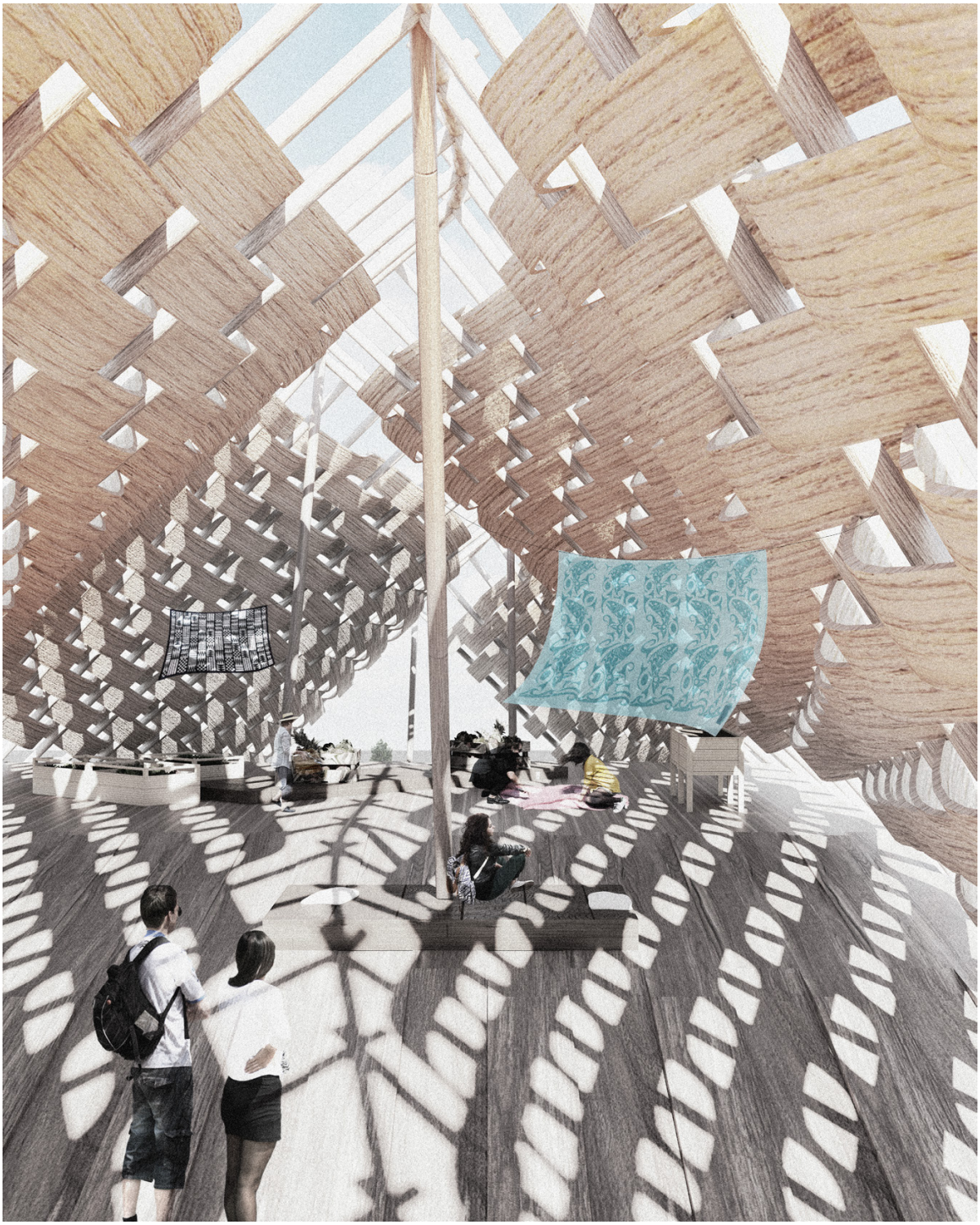


Fig. 6.5.2. *Interior of Musqueam-Chinese Bridge*

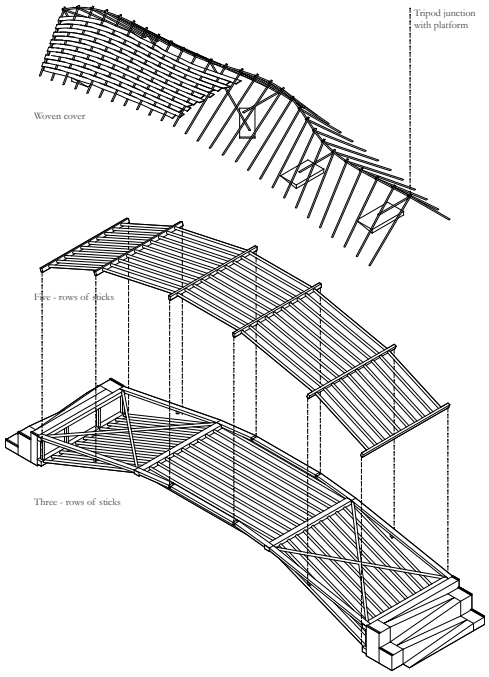
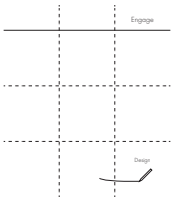


Fig. 6.5.3. *Axonometric of structural design*

Fig. 6.5.4. Zheng Daoju, *Construction of traditional beam-woven structure*

Engaging | Design

The structural design synthesizes the findings of this thesis's previous section. Findings include the analytical knowledge from the encountering, the embodied knowledge from entangling, and the relations produced in the engaging section. The upper structure relies on tripod forms at major junctions, recalling the salmon weirs discussed earlier. Woven wood recalling basketry and weaving techniques covers the exterior, allowing for openings that cast flowing shadows that change throughout the day. The supporting structure uses a technique known as 'beam-weaving,' which is common to traditional bridges in southern China. The design modifies the typical structure by lowering the ramparts that keep the overall structure in place, making it more accessible. Overall, the design suggests a light intervention that reminds its users of our entangled histories of place and our cultural connections to the water around us while demonstrating a fluid relationship to water and climate-induced flooding.



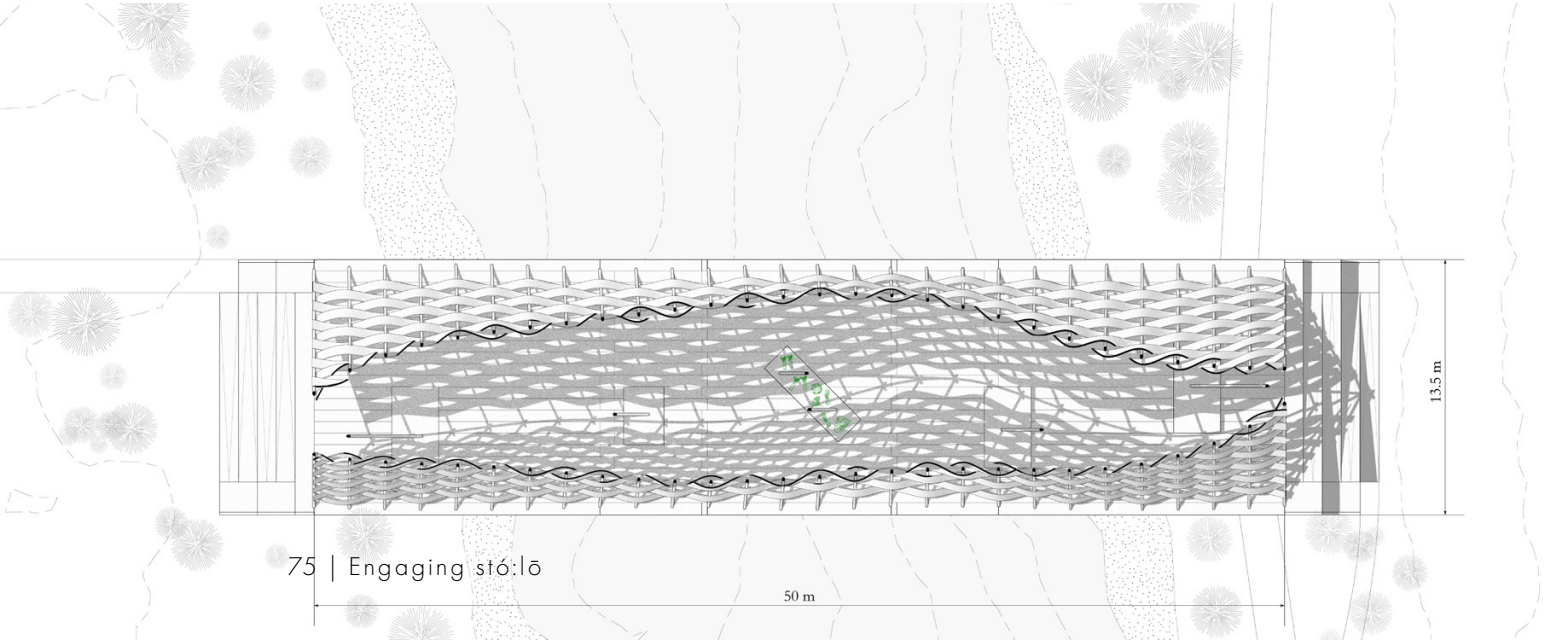


Fig. 6.5.6. *Section of bridge showing cultural thresholds*

Concluding statements

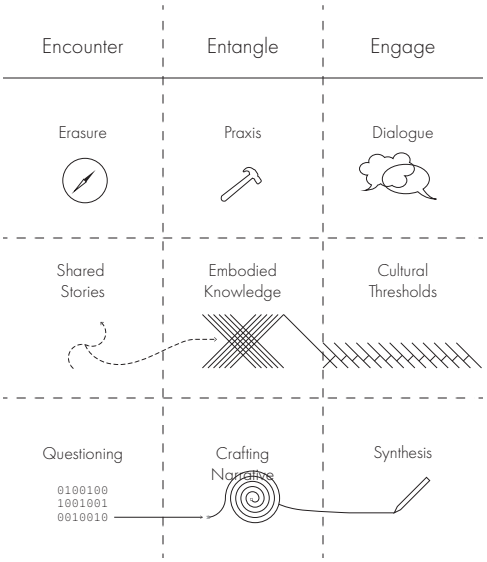


Fig. 6.5.7. *Concluding matrix with keywords*

By **mapping**, this thesis diagnoses the **erasure of culture** along the Stó:lō.

Through **wayfinding**, this thesis expresses **shared stories of place**.

Through **modeling**, this thesis conveys a positionality, **interpretation**, and questioning intent.

By **making**, this thesis explores **praxis** or theorizing place through craft.

Through **weaving**, this thesis introduces **embodied knowledge** and experiential epistemologies.

Through **interpreting**, this thesis proposes an active interpretation of place by **crafting a narrative.**

With **meaning**, this thesis positions land, people, and labour in **dialogue**.

Through **crossing**, this thesis brings awareness to the **cultural thresholds** inherent in how we program land.

Through **design**, this thesis **synthesizes** many of its prior themes to propose a socio-ecological infrastructure.

Post-script

What is the positionality of the architect? The following section comments on the methodology of the thesis as a whole through a series of self-reflexive questions. It recognizes that the thesis process is incomplete and acts as a tiny part of a broader meditation on architecture. The responses here stem from personal experience but perhaps have general applications in architectural practice.

Evaluations

How does changing materiality affect architectural understanding?

This thesis moves between many different materialities: digital, hand-drawing, cedar, yarn, and metal. These transformations in my experience revisited how I understood building, with different materials emphasizing different approaches. Digital imagery stresses precise linework or complexity through collaged (borrowed) imagery. By contrast, hand drawing emphasizes the intentions, narrative or conceptual, behind the images, where each standalone drawing had a deliberate place in the story maps. While making, weaving with cedar stressed the building process over the results. Weaving with cedar strips envisioned architecture as a cyclical process, while weaving with yarn brought out tactile, embodied understandings of the Stó:lō. For me, materiality became a metaphor for relationality to the river. Hence, architecture occurs 'where the building meets the land.' This relation between architecture and the land, often static and extractive, is a keystone of this thesis.

How does the making process inform future engagements with indigeneity?

My approach to this thesis viewed the process as a long series of questions rather than a clearly defined answer. This mindset produced many questions, yet one remained pervasive: "Where do I appear in all this work?" I am reminded of an article by David Fortin, *From Indian to Indigenous Agency: Opportunities and Challenges for Architectural Design*, which criticized the lack of indigenous agency when designing "aboriginal architecture." The problem was that, although the designs included indigenous symbols, the people involved were not indigenous and lacked a critical awareness of the structural violence that still confronts indigenous cultures today. Academic pedagogy can convey this awareness to some extent. Still, the breadth of the issue only appeared to me once my positionality clarified itself concerning the land on which I grew up and the history of hardship faced by many generations of Chinese immigrants, including my parents.

Fortin's criticism anticipates a dominant attitude towards indigeneity in architecture schools. Non-indigenous students and professors, including myself, are eager to "learn from" indigeneity, creating an extractive dynamic where indigenous knowledge accumulates in drawings and papers. Much of this work becomes redundant if we remain unaware of our own roles in the environment – the corrective stems from recognizing the sovereignty of both indigenous culture and one's own culture. The latter comes from taking pains to understand one's own past. A critical sense transforms the approach of "learning from" to a model of "learning with" a different culture through one's position.

Where does the political nature of LANDBACK appear in my research?

This thesis supports LANDBACK by contemplating the nature of water in multiple ways. Instead of conceiving water as a cosmetic element or a climate risk, the research in **this thesis aims to enrich how we understand water as an ecological, cultural, and even spiritual force**. The act of weaving also rethinks the nature of water, where the fluid interactions of overlapping yarn and the movement of weaving shuttles are metaphors for water's moving, interconnected nature. The spindle used to create yarn also speaks to this, where the disparate threads of animal wool twine together to make a condensed piece of yarn. All these analogies suggest a need to re-matriate the land against extractive economic relationships. Resisting these tendencies through cosmology aligns with the political nature of LANDBACK.

Contemporary climate change affects all cultures. How will ecological architecture address this?

Climate change may affect environments worldwide, but cultures also have connections to their immediate surroundings. Ecological architecture can benefit from appreciating our cultural connections to the environments around us, leveraging them for more holistic approaches to climate adaptation.

Fig. 7. *Spindle* - a cosmology for contemporary architecture, turning many threads of wool into a single, continuous piece of yarn.

Conclusion

Many factors limit the findings produced by this thesis. For one, the primary language of research and documentation is English, which meant I relied on secondary sources when studying Coast Salish culture and Chinese culture. Another limitation was time. Even if I had access to primary sources in both cases, a more rigorous understanding with a direct, embodied relationship to these histories requires much more foundational knowledge that needs to be learned over time.

Nevertheless, through this journey I have realized that, for myself and anyone pursuing adjacent interests, it is crucial to appreciate your experiences during the process. Even if no one else recognizes them, those frustrations, intuitions, and lonely insights you may have will always belong somewhere in our world.

"When you live your life and it's an everyday thing that things happen, sometimes you don't think that they would be of interest to anyone. And when you do finally put it down and people accept it and it's really neat."

- Larry Grant, *Telling Stories of Chinese and First Nations Relations*, 2016

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