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**SALMON VIRUSES AND SOVEREIGNTIES-AT-SEA: A SETTLER COLONIAL POLITICS OF SALMON AQUACULTURE**

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

ANTHROPOLOGY

by

**Darcey Evans**

June 2024

The Dissertation of Darcey Evans is approved:

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Peter Biehl
Vice Provost and Dean of Graduate Studies

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2024

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## Abstract

### Salmon Viruses and Sovereignties-at-Sea: A Settler Colonial Politics of Salmon Aquaculture

**Darcey Evans**

This dissertation examines the settler colonial, multispecies, and microbial politics of Atlantic salmon aquaculture in what is now British Columbia, Canada. Salmon aquaculture production systems enable 18 million Atlantic salmon to be raised in nets that are anchored to the seafloor in the coastal waters of British Columbia each year. Aquaculture is recognized as the fastest growing method of food production worldwide and is often positioned as a "blue revolution" capable of providing sustainable, affordable seafood in the midst of salmon population declines. In British Columbia, however, the raising of Atlantic salmon in critical Pacific salmon migration routes has engendered concerns about emerging industrial uses of the waterscape and the ability for farm-borne viruses to move between species. By investigating how industrial aquaculture is encountered, negotiated, and resisted on-the-ground, particularly by Indigenous communities in whose waters the practice is occurring, I instead propose that aquaculture is not a radical departure or a revolutionary break from the past, but is steeped within and dependent upon histories of colonialism, industrialization, and capitalism that have long transformed salmon and waterscapes into sites of state and economy-building.

Stemming from ongoing uncertainties regarding the potential for pathogens to transfer between Atlantic and Pacific salmon, this dissertation particularly focuses on

historic, scientific, and political controversies that surround salmon viruses. In the absence of state monitoring for salmon pathogens like Piscine orthoreovirus (PRV), Indigenous leaders and their allies travel to sites of aquaculture production to monitor the daily operations of farms and gather underwater video footage from within farm sites. Campaigns to enact stronger fish health protections and document the spread of viruses and pollution also become part of broader political movement aimed at reclaiming territory and restoring Indigenous forms of governance within coastal waterscapes. While pathogens come to reflect and reinforce colonial structures of dispossession, I argue that Indigenous-led efforts to track pathogens throughout salmon bodies and ecosystems are shifting power dynamics in ways that offer new possibilities for the "blue revolution."

This research brings scholarship on pathogens and industrial landscapes into conversation with enduring concerns about the material consequences of environmental injustice and colonialism. In situating aquaculture as part of an under-explored extension of settler colonial logics, structures, and governance into marine space, I suggest that the dominant framing of settler colonialism as land-based leaves large openings for understanding how colonialism and sovereignty are enacted in water-centered and maritime regions. Illuminating how industrial aquaculture and efforts to track pathogens take place within a broader politics of asserting sovereignty "at sea" reveals how historical inequalities and ongoing power dynamics become inscribed within oceans, with important implications for understanding contemporary ocean politics in the 21st century.

## Acknowledgements

This dissertation could not have happened without Tsahaukuse George Quocksister Jr., Hereditary Chief Gigame of the Liǧʷiłdaxʷ Nation. In his role as Hereditary Chief, George gave me permission to research and write about salmon farms and the impacts that closures to commercial fisheries are having in his territories. George invited me to the government consultation meeting briefly mentioned in Chapter One and the aquaculture "reconnaissance" trips discussed in Chapter Four, both of which were foundational experiences that shaped how I came to understand aquaculture in British Columbia. George has spent much of the last decade working tirelessly to document and evict the salmon farms in his territories. The way that George always emphasizes that Liǧʷiłdaxʷ territories are unceded and that coastal waters are part of Liǧʷiłdaxʷ homelands helped me to see the connections between aquaculture and broader histories in which Indigenous nations have been dispossessed of marine space and resources. As I have told George many times before, he inspires many people around the world, including the next generation of land and water protectors.

I am greatly indebted to the people of the Cove, particularly "Liz," "Sam," Shauna, "Thomas," Mark, "Sarah," and Mike, although there are many others. (Since the interlocuters in quotations appear within the content of the dissertation under pseudonyms, I have referred to their pseudonyms here.) This dissertation would not have been possible without their kindness and generosity. I am so grateful that Mark decided to strike up conversation with the stranger sitting alone in the pub in 2017

and for the ways that my life has been changed by their friendships ever since. The meals, comradery, and laughter that we shared together and the way that they embraced me as part of their community continue to stay with me. *Gilakas'la.* I raise my hands to you all.

I often say that the ability to be immersed in a PhD program is an opportunity that shifts generations. The people and landscapes of the University of California, Santa Cruz provided an intellectual home in which I could wonder, experiment, and grow. In particular, my dissertation advisor, Mark Anderson, has been a thoughtful and unwavering source of support throughout my time in graduate school. From discussions during graduate seminars, and collaborating as a Teaching Assistant, to observing my teaching methods as a Graduate Student Instructor, and his presence in the audience during conference presentations, Mark has served as a mentor throughout most if not all aspects of my academic growth while at UCSC. He has always made academia feel slightly more accessible and UCSC feel slightly more like home. Andrew Mathews has also been in conversation with me since my first year at UCSC, always encouraging me to think about the specificities of time and place. His efforts to build community outside of the classroom helped to bring anthropology "to life," and I am thankful that we have had the opportunity to connect over dinners, events, and landscape walks. When I began to delve into the mysteries of sea lice and salmon viruses in the Cove, it was his lessons about materiality and landscapes that echoed in my mind. Heather Anne Swanson came into this project at a critical time. Her feedback helped to re-excite me about dissertation writing at times when I needed

it most, her generosity with her time infused our conversations with a sense of kindness as well as collaboration, and her knowledge about salmon worlds expanded how I think about aquaculture. I am a more thoughtful scholar because of our time together.

Kristina Lyons, Jon Daehnke, Mayanthi Fernando, Karen Barad, and Anna Tsing were also formative to shaping my intellectual growth throughout my time at UCSC, introducing me to the questions that open through feminist science studies and helping me to better attend to landscapes and multispecies relations alongside questions of history, justice, and power. Jude Todd, author of excellent Valentine's Day poems, provided grammatical editorial feedback on early drafts. The content within this dissertation also benefits from the insights of Daniel Schniedewind, who provided feedback on drafts of several chapters. Our sharing of writing and co-organizing of conference panels reminded me of the importance of collaboration and that building intellectual kin is a worthwhile endeavor that must be actively pursued. I am incredibly grateful to Daniel and Brian Walter for their time and advice whilst pursuing the academic job market. Our time together at the AAA Conference in 2023 made me feel, really for the first time, that I had a place among a cohort of rising junior scholars. I am excited to be part of a future for anthropology alongside such kind and thoughtful colleagues. Camelia Dewan and Elizabeth Sibilia also provided feedback on early drafts, particularly for Chapter Three. Their insights pushed me to think more deeply about the ways in which toxicity can be made through movements and flows and the ways that structural violence manifests and can be evidenced

within bodies, salmon or human. The invitation to be part of their co-edited Special Issue opened many more doors and I appreciate the opportunity to have been included within their work. My early advisors, Erin Dean and Maria Vesperi, inspired my original fascination with anthropology. They helped me to see how anthropology can be can tool through which to understand the world— an approach I continue to carry forward with students today.

For close to two years, this dissertation came into being while working part-time with Save California Salmon (SCS), a truly grassroots environmental justice organization based in the Klamath River Basin in Northern California. The SCS staff and partners, particularly Carrie Tully, Regina, Chichizola, Pua Sopoaga-Faleofa, Margo Robbins, Kate Lowry, Cutcha Risling Baldy, and Kaitlin Reed provided an important reminder of why I fell in love with salmon and went to graduate school in the first place. Advocating for more equitable water policy systems and Indigenous-centered K-12 curricula in California alongside such hardworking, hopeful, and funny colleagues taught me how my personal and professional lives can flourish when I stay grounded in the communities in which I live and work. They prompted me to be alert to the ways in which concepts like environmental justice, Indigenous sovereignty, and settler colonialism come to travel, have meaning, and are mobilized beyond the academy, enabling me to embrace the overlaps between academic and community organizing work more intentionally. Finally, they reminded me of the revolutionary potential held in people-powered movements. When I think of the removal of the Klamath dams, I am reminded that another world is possible.

I have also had the pleasure of learning from several others in the Klamath River Basin, particularly Frank Lake and colleagues during the Klamath Basin Tribal Youth Program. Our time together shaped me in ways that continue to be realized. My small Karuk language community, fostered by Florrine Super, Crystal Richardson, and Susan Gehr, also helped me to stay rooted and at home in California. *Yôotva*. I am so grateful for you all.

It is not an exaggeration to say that James Folk has been there for every single day of my graduate school journey. James shared in my excitement when I was first accepted to UCSC, supported me throughout fieldwork from the other end of the phone, and served as an eager audience for presentation drafts, workshop rehearsals, and mock interviews. Re-learning a love for anthropological ways of noticing through his eyes reminds me that anthropology is for everyone, ivory tower be damned. It is such a joy to share in curiosity for the world with James.

And finally, these acknowledgements would not be complete without recognizing my parents, Christine and Mike, who have taught me confidence, humility, and self-love for as long as I can remember. My success in formal education would not have been possible without their constant selflessness. From sitting with me at the school bus stop in the pre-dawn hours, to long nights solving algebra equations together at the kitchen table, and ensuring I had the extra support I needed in order to pass undergraduate requirements, they have always made my educational success a priority— even emphasizing the importance of indulging in a little fun along the way. Over the years, they have taught me that if I believe in myself and

approach the world with an open heart and mind, anything is possible. I am blessed to have such supportive kin standing behind me.

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## Preface

## The View from the Dam

*Figure 1: Iron Gate Dam, Klamath River, Northern California, 2013*

Although this dissertation is about salmon aquaculture in what is now British Columbia, I often say that this dissertation begins in the Klamath River Basin— a watershed that flows through the high deserts, fertile valleys, coniferous mountains, and fog-drenched coastal redwoods of what is now the borderland between California and Oregon. From 1918 until 1962, six dams were built along the Klamath River, intending to provide hydroelectric energy and water management to a region rapidly urbanizing in the first half of the 20th century.

The view from Iron Gate Dam, pictured above, is a testament to the last century of land and waterscape transformation in the North American West. Water

infrastructure born as part of a nation-building project and an ethos of development and management are made material through the concrete bifurcation of the river. Behind the dam, the river swells into a 4,600 square mile reservoir that floods the banks of the river's historic channel. Water trickles through the spillway. Below the dam, the waters of the Klamath River are tinged an unusual shade of green. The river is shallow and stagnant, almost visibly evaporating under the hot California summer sun. Algae thrives in the interface where concrete and water meet.

Iron Gate is the first and last dam that an adult salmon swimming up the Klamath River will encounter while migrating upstream. Pacific salmon and the Klamath River help to create each other; neither would be distinctly itself without the other. But, the dam does not have fish passage and salmon of the Klamath lost access to over 300 miles of river upon the construction of Iron Gate. An appropriate name for a dam, I have always thought.

The warm, shallow, algae-filled water gradually makes its way downstream to human and other-than-human communities who have always made a life in relation with the river. Among the human communities downstream of Iron Gate Dam, living alongside a tributary of the Klamath, are the valley villages of Etna, Fort Jones, and Quartz Valley Indian Reservation. To the best of my family's current knowledge, the proposition to create a reservation for Shasta and upriver Klamath (Karuk) peoples in this valley emerged in the 1850s. Life on the river was violent. Deadly. Enveloped in gold rush and genocide. After an incident "on the Klamath River among Indians above the Scott River" resulted in the death of "twelve whites" in 1855, it was

considered that Native peoples should live separately from the white miners working the river. One month after the incident, the Captain Judah wrote to Major ED Townsend and the Assistant Adjutant General, emphasizing the need to relocate Native peoples away from the river:

> It appears to be the unanimous decision of the miners in this section of the State that no male Indian will hereafter be permitted to reside among them or frequent their vicinity under the penalty of being shot down. Even were this not the case, it is evident that the future recurrence of difficulties between the white men (particularly the miners) and the Indians can only be prevented by the complete isolation of the latter (HM Judah 1855, 98-101 in Davies and Frank 1994).

There was a valley, not too far away, but "entirely out of the range of white men" and just a few hours' distance from the nearby military Fort, where the Indians could be placed "under the close supervision of its commanding officer" (HM Judah 1855, 98-101 in Davies and Frank 1994). Little arable land made the valley unattractive to settlers, but there was a stream and resources enough to get by. It was to become "a temporary if not permanent location for the Scott's Valley and Shasta Indians" (HM Judah 1855, 98-101 in Davies and Frank 1994). Such military correspondences are some of the earliest records of attempts to create what is now Quartz Valley Indian Reservation. My family were among the Reservation's Karuk members when Quartz Valley Indian Reservation was federally recognized under the Indian Reorganization Act in 1934 and my immediate paternal family continued to live in and around the valley until the 1960s, only departing for California's Central Valley in search of more stable employment opportunities.

Like my father, brother, aunts, cousins, and many more members of my extended family, I have been a citizen of Quartz Valley Indian Reservation for much of my life. Participating in the Klamath Basin Tribal Youth Program, organized by the US Fish and Wildlife Service and US Forest Service for undergraduate students enrolled in the federally recognized Tribal nations of the Klamath Basin, afforded me the opportunity to develop relations and become acquainted with the peoples and landscapes of my ancestry in a much more engaged and sustained way than I had previously been able while growing up in places geographically distant from the Klamath Basin. As part of the program, we traveled the length of the river, meeting with Indigenous Elders, community leaders, scientists, fishers, and landscape managers along the way. We learned about Karuk dip net fishing at Katimîin, the Karuk center of the world, helped Elders to gather acorns and basketry materials in post-cultural-fire forestscapes, and fileted salmon to be cooked on redwood sticks. We visited Tribal governments, dams, fish hatcheries, and river tributaries among much more, and participated in salmon and forestry surveys and habitat restoration projects throughout the river basin. It was during this experience that I saw Iron Gate Dam impede the flow of the river, the toxic algae that made its way downstream, and tributaries of the Klamath run dry in the triple digit heat.

One of my favorite stories from the Klamath teaches me that salmon are a knowledge-keeper. As the story goes, when the salmon return from the ocean each year, they do not travel alone; they bring with them the stories, songs, histories,

ceremonies, and knowledges from up and down the river and from the generations who have gone before. The salmon connect us to each other and to our ancestors.

I thought of that story often as I conducted research on salmon aquaculture in British Columbia. British Columbia is also a place made through salmon migrations. The Cove, the name I have given to the place where the fieldwork for this dissertation is mostly based, is located along what used to be the most abundant sockeye salmon migration route in North America. However, during my field research in 2019, sockeye salmon were nowhere to be found. We waited with baited breath, week by week, for the Department of Fisheries and Oceans to reveal how many salmon were being counted in the government test nets, for a clue as to how many salmon might make it back through the coastal passages to their spawning grounds in nearby rivers, for a sign that commercial or food fisheries would soon be opened. For the most part, however, the salmon did not return; at least nowhere close to the anticipated numbers.

In California and BC, salmon migration routes were changing before my eyes. As we waited for the salmon to return in the Cove, I thought of the salmon in the story from the Klamath, who carried stories and songs from the entire river basin on their backs, the same salmon who might soon make it to the base of Iron Gate Dam. I thought of the salmon who wash ashore on the Klamath, their bodies spotted with salt-like flecks, a sign of infection by a parasite that thrives in the warm, shallow water caused by the dams. I thought of my friends who lived upstream of Iron Gate, who had never known salmon to return because of the series of concrete dams that stand in the salmon's path.

Feminist scholarship of the 1980s offered "strong objectivity" (Harding 1986), "situated knowledges" (Haraway 1988), and "standpoint theory" (Harding 1991), reminding the academy that it matters who is doing the research, that the *who* behind the research influences the types of relationships that are able to be built, the questions that are asked, and the corresponding results and analysis. More recently, Donna Haraway (2016) has also urged us to consider which concepts think concepts, or as my graduate colleagues at UCSC put it so nicely in the 2024 Department of Anthropology Graduate Student Conference Call for Papers, "what thoughts think thoughts and what relations shape further relations." In this case, perhaps, what stories think other stories. It seemed to matter that I began to know Cove salmon through Klamath salmon; their stories seemed intertwined, familiar in an unfamiliar way.

Dams in California and aquaculture facilities in British Columbia have more in common than I quite realized at first. Both are symbols of economic development, technological advancement, and a move towards modernity. Both rely on settler projects of state-making, landscape-shaping, and Indigenous land and water dispossession as a precondition for their existence. Both are imagined as sustainable correctives in an unsustainable world. They also both result in emergent forms of salmon disease— but more on that later.

I have now been involved with water and salmon advocacy for much of my adult life. These experiences have taken me to fishing sites, ceremonies, Karuk language classes, university and high school classrooms, government offices, and

Bureau of Indian Affairs headquarters in Oregon and Washington DC. In the Klamath Basin, I moved rocks and riparian debris into streambeds in order to create varied habitats and direct the flow of water into cool pools of thermal refugia. Salmon can be encouraged to return through such simple acts of "stream-scaping." In Oregon, I surveyed rivers that flow from Klamath headwaters to assess salmon spawning suitability, just in case the salmon were ever to return. In Washington State, I worked with federal agencies to support the ability for Indigenous nations to create their own climate change research, adaptation, and mitigation programs, and I collaborated with nonprofits to investigate the efficacy of the Pacific Salmon Treaty and the use of Indigenous fishing technologies such as fish traps as methods for sustainable commercial fishing in the 21st century. In British Columbia, I supported the efforts of Indigenous leaders and fishers in the Cove, who traveled to sites of aquaculture production in order to gain an understanding of the ecological impacts that aquaculture might be having beyond farm boundaries. And, when I returned to California after completing dissertation fieldwork, I worked with an environmental justice organization based in the heart of Karuk homelands to advocate for educational, water, and fisheries policy reform in California. We testified at meetings of the State Water Board, held rallies for dam removal, created policy briefs for proposed water infrastructure projects, hosted science and media trainings for Indigenous youth, and created the Advocacy and Water Protection in Native California Curriculum.

Amidst the most isolating days of the COVID-19 pandemic, this work provided a critical reminder of the importance of community and that, in Salmon Nation, community often extends beyond the boundaries of the human. People and salmon are intertwined. For these reasons, I often say that this dissertation begins in the Klamath River Basin.

## Introduction

## Building a Blue Future

In a dark room, milt and eggs from adult salmon are swirled together and placed into an incubation room, where 10,000 fertilized eggs in trays line the walls. The 10,000 eggs held in the incubation room of the sprawling warehouse are just a fraction of the total number of eggs being cared for in the hatchery facility—this building alone in fact houses 14 million eggs, the total number of eggs an aquaculture company will need for the entire year. Before entering the incubation room, the mandatory rubber boots worn by staff and guests are dipped into antiseptic baths that sit at the entrance to each building—this is a biosecurity protocol intended to protect the precious fertilized eggs from bacteria and microbes that might be found outside of the warehouse walls.

For the next 800 temperature cycles, roughly correlating to the first year of the production process, the trays are gently submerged in continuously circulated fresh water drawn directly from the local aquifer until the eggs hatch and grow into alevins, parr, fry, and then smolts. While undergoing incubation, some of the fish are treated with thermal or pressure shocks that generate three sets of chromosomes within the fertilized egg—known as triploid splicing—in order to remove the reproductive capabilities from any future fish that might emerge. Newly spawned alevins are transferred to a different warehouse where they will grow with a stony matting that lines the bottom of their trays, mimicking the gravel and substrate usually found

along riverbeds. The next stage of the salmon's life journey begins when the fish swim to the surface in search of food, at which point they are ready to be transferred to freshwater tanks and undergo the process of smoltification.

In rivers around the world, smoltification is usually triggered by seasonal variations in sunlight and temperature, but industrial production processes rarely have time to wait for seasonal nuances. Instead, within the windowless warehouse, light and temperature regimes are manipulated— sometimes called photomanipulation— to enable smolting to become a faster and year-round process (Morera et al., 2021). No seasonality required. Smolting is a massive physiological transformation that enables the salmon to transition from a life in freshwater to one immersed in salt— internally, their kidneys, gills, and livers develop new enzymes that enable the ability to live in and process saltwater; externally, their backs become darker and their sides become silvery (Morera et al., 2021). Hatchery managers and technicians monitor these enzymes closely, for they are a critical indicator as to when the fish is ready to be transferred to a saltwater grow-out site— a fish can face serious developmental challenges if not moved to saltwater quickly enough once the process has begun (Morera et al., 2021). After successfully completing saltwater tolerance tests, a specialized boat that carries a large "well" for circulating seawater will dock near to the facility and transport the smolts to seawater grow-out sites where they will continue to live for another 14-18 months (FAO 2004; Morera et al., 2021).

Approximately 118 of such saltwater grow-out sites are anchored in the coastal straits that encircle Vancouver Island, British Columbia, 104 of which are

owned and operated by three multinational seafood corporations based in Norway.[1] Each salmon aquaculture grow-out facility anchored within the BC coast will be home to roughly 500,000 Atlantic salmon at a time. The salmon are held in a series of 8-12 circular or square nets that encompass the size of an American football field across the water's surface. Underneath the surface, each net extends into the water column another fifty feet, enclosing thousands of cubic meters of water, and the entire facility is anchored to the seafloor by a mooring system consisting of anchors, ropes, buoys, and weights. Under the near constant care and monitoring of technicians and managers, the salmon will be fed a diet of pellets made from other fish harvested mostly from South America and Africa (FAO 2004), meat and poultry biproducts, and grains including wheat, soy, and corn (Huon Aquaculture 2021). The pellets will be enhanced with insecticides, fungicides, and a carotenoid pigment that gives the salmon's flesh its distinctive pink color. The fish will be vaccinated and given antibiotics to protect against and prevent the spread of diseases and they will be subject to chemical and hot-water-bath treatments intended to keep sea lice parasites, fungi, and bacteria at bay until they grow to a marketable size of 2-5 kilograms. Like many agricultural correctives, the chemical treatments administered to farmed salmon are derived from chemical weapons programs developed during World War II (Staniford 2004, 147). At harvest time, around three years after the eggs were first fertilized and incubated, a vessel will dock alongside the pens and suck the fish

[1] Statistics as of 2019 as reported by Fisheries and Oceans Canada in "*Regulating and Monitoring British Columbia's Marine Finfish Aquaculture Facilities, 2019.*" https://www.dfo-mpo.gc.ca/aquaculture/management-gestion/mar-rep-rap-2019/index-eng.html

aboard through large pipes before transporting them to processing facilities, where they will be gutted, filleted, smoked, canned, frozen and integrated into somewhat elusive global salmon supply chains. For Atlantic salmon grown within the waterways of coastal British Columbia in 2019, 95% were exported to the US (British Columbia 2020).

Salmon aquaculture production systems enable 18 million Atlantic salmon to be raised in the coastal waters of what is now British Columbia each year. Similar production systems, mostly owned and operated by the same handful of Norwegian-based seafood corporations, also take place in Norway, Chile, Ireland, Scotland, Iceland, Tasmania, Eastern Canada, the Faroe Islands, and the US, collectively raising 9 out of 10 of all Atlantic salmon on earth and creating 2.7 million metric tons of Atlantic salmon each year for human consumption (FAO 2022). In 2014, the production of farm-raised seafood outpaced the collective global harvesting of seafood from oceans for the first time and the United Nations' Food and Agriculture Organization (FAO) declared aquaculture to be the fastest growing method of food production worldwide, with farmed Atlantic salmon leading the way.

Salmon are, as anthropologist Marianne Lien (2015) describes, "newcomers to the farm," with their production in tanks and nets, overseen and managed from egg to grocery store shelf, marking the most recent turn in the long history of other-than-human domestication. The transition to farm-raising salmon has engendered transformations in ecologies, economies, and social relations worldwide. From New Brunswick (Marshall 2001; Knott and Neis 2017) to Chile (Pitchon 2015) to

Tasmania (Lien 2007), coastal waters that have historically supported diverse groundfish, herring, lobster, crab, salmon, prawn, clam, urchin, and scallop fisheries become alienated from fishers and communities who live within the seascape as the anchoring of farm infrastructures reshapes coastal waters into pockets of long-term, single-user tenures (Sullivan 2006). Atlantic salmon have affirmed their 19th century status as world travelers, with viruses, parasites, and as one nonprofit director described it to me, "whole communities of life" travelling alongside them.

In British Columbia, Atlantic salmon are not only newcomers to industrial farm sites, they are also relative newcomers to the Pacific coast, a region shaped in profound ways by the existence, movements, and bodies of Pacific salmon. Pacific salmon co-constitute ecologies, economies, and human communities across and beyond the coastline, from the northern tip of Alaska, throughout Vancouver Island's coastal straits, inland to the Rocky Mountains, and into the foggy redwood forests of Northern California. The territories of more than four hundred Indigenous nations comprise this bioregion, creating a world of diverse, enduring relations with Pacific salmon. In Karuk territories in Northern California and in Liǧʷiłdaxʷ territories in BC, the Elders from whom I learn teach me that salmon are generous beings. They give their lives for future generations and, after death, their bodies nourish the soils and streambeds from which future life will emerge. Yet, salmon also exist within the iterative violences of long-term extraction. From the early settlers who chose fish-abundant sites as appropriate homesteads (Todd 2018) to the canning technologies that first enabled salmon to become BC's most valuable export in the 1880s (Stewart

2017), salmon have been subjects of colonial and political-economic processes that have transformed their bodies, genetics, population structures, habitats, and homelands. With the advent and rise of Atlantic salmon farming in British Columbia and Washington State, the coastal waters around Vancouver Island and Puget Sound become one of the only places in the world where Atlantic and Pacific salmon come into such close encounters. Amidst a world-ending reality of Pacific salmon extinction, the arrival of Atlantic salmon aquaculture adds another layer to sedimented salmon-world disruptions that stretch across generations, ecosystems, and species boundaries.

Atlantic salmon and Pacific salmon, the ecologies and economies they are integrated within, and the people who care for them, coexist uneasily in coastal British Columbia. This dissertation emerges from this uneasy coexistence. In a small fishing community in Liğʷiɬdaǩʷ territories that I call the Cove, salmon aquaculture has become a point of departure for broader anxieties about the future presence of Pacific salmon, the exclusionary and power-laden politics that inform how coastal waterscapes are governed, and the forms of "feral proliferation" (Tsing et al., 2019) that emerge through the introduction of monocrop, plantation-like ecosystems within the waterscape. Here, the practice of raising salmon in pens anchored to the seabeds of coastal waters is not just a technological feat capable of "making salmon" (Taylor III 1999) in massive quantities, but is also a practice that brings together fish, viruses, cameras, nets, tides, maps, seabeds, lease agreements, and English common law in an unlikely agglomeration that transforms a wide variety of human and other-than-

human communities throughout and beyond the coastal straits. Questions about the types of worlds being brought into being, the types of relationships and practices that inform them, and at what and at who's expense, emerge from these uneasy encounters between people and fish and the communities of life that travel with them.

In efforts to sit within the uncertainties, contradictions, and uneasy encounters that unfold alongside Atlantic salmon aquaculture on the Pacific coast, this dissertation centers around three key themes. First, I seek to trouble commonplace narratives that position salmon aquaculture as a "blue revolution," a sustainable solution for producing abundant seafood in the midst of species population declines. References to the "blue revolution" promised by aquaculture draw on the transformative aspects of farming salmon: salmon are available at previously unavailable times of year; they have become cheaper and are consequently more accessible to a wider variety of consumers; their bodies can grow at faster rates and tolerate greater stress; supply chains are more stable, and their production has become more traceable, with a farmed salmon able to be traced from farm to fork in an era when traceability standards matter to ideas of sustainability. The practice of managing salmon throughout every phase of their life cycle might mean that the fish and production processes generated through aquaculture are a far-reaching change from the salmon and production processes of the past. However, in tracing histories of Indigenous dispossession that enable coastal waters to be claimed by the state and leased to aquaculture corporations, institutional processes that legalize the importation of Atlantic salmon eggs, and conflicts over space, jurisdiction, and

pollution that aquaculture engenders, I demonstrate how the relations that accompany farmed salmon are more familiar than might first be apparent. I highlight how aquaculture in British Columbia emerges not as a radical departure, a revolutionary break from the past, but as steeped within and dependent upon histories of colonialism, industrialization, and capitalism that have long transformed salmon and waterscapes into sites of state and economy-building.

Second, I explore the nexus between pathogens, porosity, and politics as the intensive farm-raising of salmon shifts the microbial compositions of coastal waterscapes. Pathogens and parasites are able to proliferate rapidly when hundreds of thousands of the same species of fish are held relatively stationary at high densities within the net-pens. The porosity of aquaculture facilities also means that parasites, microbes, and viral particles are able to move in and out of the netted walls, enveloping other-than-human life far from aquaculture facilities within the relations of industrial production sustained on the farm. Salmon bodies can sometimes be revealing of these pathogenic proliferations but, as viruses travel through tidal patterns, salmon bodies, and ecological encounters, pathogens associated with aquaculture facilities come to make the multifactorial causes of salmon declines ever more indeterminate. While much of the scientific and governmental debate around aquaculture pathogens centers on the capabilities (or lack thereof) for certain viruses to cause harm, I reorient focus to the ways in which evolutionary processes are accelerated through industrially-created conditions of density and simplification. I suggest that pathogens, as forms of "vital seepage" (Blanchette 2019) that emerge in

association with aquaculture practices, emerge not necessarily as discrete microbes, but as expansive political agents, molded as much by colonial histories and industrial practices as by the movements of fish and water.

Finally, I situate Indigenous movements to document pathogens and evict salmon farms as part of a broader endeavor to assert Indigenous presence and governance within the waterscape. In the midst of ongoing territorial dispossession and precarious ecosystem transformations, Indigenous nations and communities throughout BC and Washington State find creative ways to resist industrial encroachment and pollution within coastal waters. Stemming from ongoing uncertainties regarding the potential for pathogens to transfer between Atlantic and Pacific salmon, Liǧʷiłdaǩʷ citizens, other Indigenous leaders, and their allies take on the role of "virus hunters" to document salmon farms and the presence of aquatic pathogens within salmon bodies and waterscapes. By travelling to sites of aquaculture production and monitoring the daily operations of farms, gathering underwater video footage from within farm sites, and collecting chunks of flesh, fat, feces, scales, and water that drift through the mesh pens, Indigenous-led efforts to enact grassroots forms of environmental and pathogen monitoring intervene in the politics of knowledge and processes of industrial production that have long held farmed salmon and their pathogens behind closed physical and conceptual doors. Prior to Indigenous-led pathogen testing programs, for example, only aquaculture companies and government agencies had the access and authority to test farmed salmon for pathogens, but they were neither testing for pathogens like Piscine orthoreovirus

(PRV) nor investigating the effects such pathogens might have beyond farm boundaries.

For Indigenous nations and communities in British Columbia, however, monitoring the operations of industrial aquaculture facilities is about much more than hunting viruses or documenting pollution alone. Efforts to track viruses and other forms of pollution throughout salmon bodies, waterscapes, supply chains, and ecosystems are also part of a long-term care for land and waterscapes that gives rise to movements to reclaim marine space and protect territory and other-than-human kin. Direct-action, legal, and legislative campaigns that seek to document viruses and remove salmon farms from waterways become a project of sovereign and territorial reclamation that is actively reshaping how ocean-based development and ocean governance occurs in North America. I emphasize how, particularly through Indigenous monitoring, management, and transition plans that are currently determining if, how, and under what terms aquaculture operations are able to continue, Indigenous nations and communities are intervening in the politics of the "blue," offering radical new potentials for what the "blue revolution" is and can be.

## Blue Colonialisms and Sovereignties-at-Sea: A Multi-Scalar Approach

This dissertation bridges concerns with violence and settler colonialism with attention to justice in multispecies worlds, often at the level of the salmon body and blood cell. Researching aquaculture and the forms of pathogenicity it provokes necessarily entailed attending to the ways in which aquaculture processes become evident in and

through fish bodies—for paying attention to the bodies of fish is one of the only ways that coastal residents are able to track the repercussions that aquaculture might be having beyond farm boundaries. For fish raised within the farm, an intergenerational life-history of hatcheries and net-pens has changed their bodies so dramatically that their behaviors, genetics, and morphologies now show signs of their industrial constitution (e.g. Gross 1998). Beyond the farm, viruses, parasites, and bacteria multiply across the coast in unexpected ways, and salmon with abscesses, strange colorations, hemorrhages, and swollen organs appear in fishing nets and river beds.

Nevertheless, recognizing the harms that pathogens and parasites can cause at the bodily level is not enough for understanding how the materialities of bodies, microbes, and waterscapes and emerging forms of multispecies sociality take place alongside relationships of violence, inequality, and power. Aligned with Indigenous environmental justice scholarship that advocates for a "more-than-body" understanding of harm (e.g. McGregor 2009; Tuck 2009), this dissertation takes up Reena Shadaan and Michelle Murphy's (2020) provocation to place damaged bodies and landscapes within the multiple, interweaving forms of structural violence that underlie and perpetuate such harms. A decolonial, feminist framework for reckoning with environmental injustice in the US and Canada, they argue, must account for structures of settler colonialism and racial capitalism that underlie the production and uneven distribution of toxic materials. To relegate harm only to the molecular or bodily level would be to obscure the structures of violence that reproduce toxicity across space and time.

Socioeconomic, political, and environmental injustices and the forms of violence they produce are at once deeply place-based yet fundamentally structural. On one level, violence is the viral particle that manifests within the salmon blood cell. At the same time, the viral particle is only made possible through capitalist, colonial, and human-exceptionalist frameworks that prefigure waterscapes as already belonging to the settler state and salmon only as object and commodity. Fish bodies, pathogens, and settler colonial desires for territorial acquisition become enfolded within the contours of each other.

Historian Patrick Wolfe famously characterizes settler colonialism as a "structure, not an event" because the colonizers "come to stay" and operate through a logic of elimination in which Indigenous peoples and their political, economic, and cultural systems must be continuously erased in order to legitimize the presence of settlers and the settler state (Wolfe 2006). According to Wolfe, these eliminatory logics are fueled by an insatiable need to access and occupy territory with "territoriality" now understood as settler colonialism's "specific, irreducible element" (Wolfe 2006, 388). Yellowknives Dene scholar Glen Coulthard (2014) reiterates that settler colonial polities are predicated and dependent on dispossessing Indigenous peoples of their lands and self-determining authorities in order to maintain ongoing access to lands and resources. He adds, however, that settler struggles for and over land are not only concerned with land ownership in a materialistic register, but are also concerned with eliminating Indigenous relationships *with* land that are "deeply informed by what the land as system of reciprocal relations and obligations can teach

us about living our lives in relation to one another and the natural world in nondomiating and nonexploitative terms" (2014, 13).

In coastal British Columbia and other watery and maritime places, the forms erasure, territoriality, and property-making on which settler colonialism depends often take place in and through fish and waterscapes. The dominance of land in histories and practices of North American colonization is described by geographers as a "European terrestrial bias" (Steinberg 1999), despite that rival empires were "first in conflict over where they dropped their anchors, not where they dragged their ploughs" (Lipmann 2015, 88). The seascapes of BC's coast have always been shaped by Indigenous practices of cultivation and tenure. However, since at least the mid 19th century when the Hudson's Bay Company linked Vancouver Island to geographically distant markets eager for minerals, fish, and timber, coastal waterscapes, fish, and seabeds have been divided and managed in ways that extend colonial forms of governance into ocean spaces. Salmon provided a raw material and resource needed for realizing settler economies and governance systems, while coastal waterscapes have been enveloped within property-making arrangements that have caused seascapes to become sites of conflicting sovereignties since British Columbia was first founded.

In contrast to Euro-Western conceptualizations of land and sea as physically and ontologically separate, Indigenous peoples in British Columbia— as in the Torres Strait Islands of the Pacific and the Klamath River of Northern California— commonly join land and sea in "continuous, integrated '-scapes'" (Mulrennan and

Scott 2000). Considering that Indigenous peoples of the Pacific have never defined their territories in terrestrial terms alone (Hau'ofa 2008; Mawani 2016), Pasifika writer Craig Santos Perez (2015) proposes that "territories" should be understood as "terripelagoes" that include both land and sea. Monica Mulrennan and Colin Scott (2000) suggest that "maritory" should have the same conceptual salience as "territory" (683). Hoopa, Karuk, and Yurok scholar Cutcha Risling Baldy (2018) describes that for Hoopa in the Klamath River Basin, "worldview is 'water view'" (Yazzie and Risling Baldy 2018, 2).

In the watery borderlands of British Columbia and Washington State, Snohomish historian Joshua Reid (2015) is unique in documenting how people of the Makah Nation shaped marine space in and around what is now the Olympic Peninsula of Washington State as a primary method of establishing power amongst other Indigenous nations and colonial authorities. Reid describes how settlers in Makah homelands found themselves within a definitively Indigenous seascape that was at once shared and contested; specific individuals and families were recognized as the owners and caretakers of certain sites and the ways in which people conceptualized, organized, lived in, and moved throughout the Strait of Juan de Fuca produced "Makah spaces" that were both terrestrial and marine (Reid 2015, 138). The critical place that marine waters held within Makah conceptualizations of home and territory were also articulated during treaty negotiations, as when Makah Chief Ćaqá·wiƛ told the United States: "I want the sea. That is my country" (Reid 2015, 127). Reid proposes that Chief Ćaqá·wiƛ presented "a Makah perspective on marine space,

namely that local waters were sovereign tribal space" (Reid 2015, 16). Such examples reveal limitations in dominant framings of settler colonialism as being primarily land-based and generate openings for further inquiry into how colonization, conflict, and governance are understood in water-centered and maritime regions, both historically and in contemporary contexts. They also prompt us to expand how we think about territory, not just as the "terra" of land, but also as encompassing seascapes, the watery places of coasts, estuaries, rivers, and oceans. These seascapes become places where Indigenous and state claims to territory come into friction and where the settler histories that inform Canada's contemporary political landscape become visible in the mooring lines and anchors of aquaculture facilities.

The transformation of coastal waters into state territories to be claimed is part of a historical, political, and economic process that exceeds settler colonial formations alone. The 1982 United Nations Convention on the Law of the Sea, for example, which extended the jurisdictional limit of territorial seas to 12 nautical miles and legally entrenched state claims to exclusive economic zones 200 nautical miles from the coastline, illuminate how the territorialization of oceans and coastal areas has become an accepted and actively pursued component of global environmental governance. In the 21st century, the territorializaiton of seascapes has acquired new meanings and continues to become manifest in new ways. Scholars, activists, and alliances like the World Forum of Fisher Peoples situate aquaculture and other forms of marine development within a troublesome trend of "ocean grabbing" in which appropriation of marine space and resources has detrimental impacts on preexisting

community livelihoods and socio-ecological relations of waterscapes (Knott and Neis 2017; Barbesgaard 2018). From the laying of internet cables to the construction of offshore wind facilities (e.g. Howe and Boyer 2019; Vargas 2020), the appropriation of seascapes and questions about how property is made in marine waters are currently topics of global concern. Particularly through proposals, projects, and practices that seek to expand "green economies" within "blue worlds" (Kontovas et al., 2022), oceans are reimagined as under-developed economic frontiers. Seabeds become emergent sites of profiteering. Aquatic worlds, and the communities who care for them, are ever more disrupted.

The expansion of ocean-based development schemes also raises questions as to the relationships between state-making and private capital in pursuits to create a sustainable, green, "blue" future. The anchoring of aquaculture facilities in coastal waters serves a purpose besides making fish alone. Whether in Canada, Norway, or Chile, state-based jurisdictional and territorial claims to waterscapes are strengthened through leasing agreements with aquaculture companies. Ocean grabbing helps the state to manifest its own sovereign claims to territory while corporations benefit from the "architectures of theft" (Schreiber 2006, 31) that make such state claims to territory possible. Thus, while the violence of the viral particle is generated through industrial processes, such industrial processes are mediated by a state committed to strengthening its own territorial and jurisdictional claims— claims that, at least in settler states, only come into being through Indigenous erasure.

In the Cove and elsewhere on the BC coast, though, long-term practices of care for land and waterscapes, efforts to reclaim land and waterscapes as ancestral territories, and ongoing commitments to sovereignty and self-determination challenge the logics of land-as-(state) property and fish-as-commodity on which aquaculture relies. When Indigenous community members across the coast travel to farm sites to document disease and pollution, serve farms with eviction notices, and assert their own abilities to make decisions about how waterscapes are used and governed, they are not only pushing back against aquaculture as a practice, they are also pushing back against the state's refusal to see waterscapes as Indigenous. While processes of property-making and environmental transformation resonate with stories of dispossession in coastal communities worldwide, the politics of aquaculture in British Columbia are somewhat unique in that waterscape materialities and Indigenous political movements intertwine to reveal state and corporate claims to territory as especially precarious.

The challenge that Indigenous rights and sovereignties could pose to the state's ability to appropriate and industrialize waterscapes was recognized from the very beginning of the development of the aquaculture industry in BC. In a 1980s report, the Science Council of Canada warned that "Indigenous rights to fish" could hamper the "full development" of the aquaculture industry; they urged the state to "consult with Indian people" (Morton 2021, 41). That this warning was seemingly dismissed and overlooked is just one example that highlights the ways in which environmental and political injustices are structurally produced and sustained. In

attending to these contingencies, we see how aquaculture inscribes historical inequalities and ongoing power dynamics within oceans as part of a systemic colonial disruption to Indigenous lands, waters, bodies, and sovereignties. At the same time, however, generations of Indigenous advocacy mean that British Columbia and Washington State are now the only places in the world where aquaculture corporations are actively deconstructing their facilities and leaving waterways. While emergent pathogens illuminate how processes of industrialization and state-making become visible in the bodies and blood cells of fish, campaigns to enact stronger fish health protections and document the spread of viruses and pollution also reassert Indigenous presence in a political and social milieu of erasure and suggest how diverse communities worldwide might reclaim seascapes and craft more survivable futures for many entangled forms of life.

Atlantic meet Pacific Salmon in the Salmon Capital of the World

The Cove exists in tandem with Pacific salmon. All five species of Pacific salmon (pink, chinook, sockeye, chum, and coho) migrate through the waters that surround the Cove on their migrations to and from the Fraser River, which once produced more sockeye salmon than any other river in the world. The Fraser River forms one of the watersheds within the Salish Sea— an inland sea that connects the coastal fresh and marine waters of British Columbia with Washington State. The Strait of Georgia, which flows to the midway point of Vancouver Island's east coast, and the Strait of Juan de Fuca, which connects southwestern Vancouver Island with Washington

State's Olympic Peninsula, combine with Puget Sound to create an interconnected estuarine ecosystem that traverses the US-Canada border. The Cove is situated at a point where multiple bodies of water meet and flow into each other. At the Cove, the Strait of Georgia narrows and gives way to the Kwakwa̱ka̱'wakw Sea, with coastal passages, channels, and archipelago island chains stretching to the northern eastern tip of Vancouver Island.

*Figure 2: Example of narrow channels and waterways that surround the Cove*

The waters that surround the Cove are very different from the rocky white-tipped surfing waves of Vancouver Island's west coast. Instead, sheltered on one side by Vancouver Island and by the mainland of North America on the other, the water that flows through the straits of Vancouver Island's east coast seems to move more in ripples than waves— at least on a calm day. But, the appearance from the surface can be deceiving. Millions of gallons of water are funneled through some of the narrowest

passages of the entire Pacific salmon migration route, forming some of the largest and strongest tides found on the BC coast. Despite the narrowness of the channels, circuits of international trade capitalize on these fast water flows. Tanker traffic, cargo freighters, cruise ships, tug boats, and fish boats transit through the marine highway— sometimes called the Inside Passage that connects Asia, Alaska, Vancouver, and the US— at all hours of the day. Proclaimed as the "salmon capital of the world," the waters that surround the Cove are now a place where the industrial production of farm-raised Atlantic salmon overlaps with Pacific salmon migration routes.

The powerful waters that surround the Cove are at the heart of Liğʷiłdaxʷ homelands. Liğʷiłdaxʷ peoples are citizens of several independent yet connected nations— now organized into the We Wai Kai, We Wai Kum, and Kwiakah First Nations— who share a common history, ancestor, and language dialect, *Liq'wala*. In Liq'wala, the word Liğʷiłdaxʷ— translated as "unkillable thing" (according to Curtis 1970 [1915], 308)— refers to a large seaworm that cannot easily be killed; if it is cut up, the separate pieces will swim away and survive (Cullon 2017, 3). Liğʷiłdaxʷ are seafaring salmon people. Historical accounts from colonial explorers, Hudson's Bay Company officers, and early anthropologists record that the Coveside Passage that connects the Cove with surrounding straits was firmly under Liğʷiłdaxʷ control well into the 1840s (Taylor 2009, 35). Not only did the abundance of fish make for an excellent community base (Inglis and Assu 1989), but establishing a strong presence at the Cove was also strategic— following the opening of the Hudson Bay

Company's outpost in Victoria in 1843, Liǧʷiłdaǩʷ scouts kept a 24-hour lookout over the narrow passages just north of the Cove, monitoring the people and goods that moved through the coastal passages and collecting a toll at the main transit point through the islands (Mauze 1992; Taylor 2009, 35).

Living in the overlap between Kwakwa̱ka̱'wakw and Coast Salish worlds and moving throughout the straits off the coast of northeastern Vancouver Island, salmon are interwoven within Liǧʷiłdaǩʷ social, political, and economic organizations, tenure systems, and technologies. In Liǧʷiłdaǩʷ cosmology, salmon are a transformer that can take multiple physical forms, including human. When salmon enter the human world, they wear a mask that enables them to take the physical shape that humans recognize as salmon. When they return to the Undersea Kingdom, they remove their mask and transform back into human form (Boas and Hunt 1905, 302-307; Cullon 2017, 13; Furst 1989; Goldman 1975). Salmon in the undersea world "live in human form, in human-like ways," suggesting that "the root form of salmon and humans are the same" (Cullon 2017, 130). As such, salmon are *nawalak*$^{w}$, powerful beings capable of transforming and travelling between worlds (Goldman 1975, 180; Cullon 2017, 99). The salmon actively choose to don their salmon masks and enter the human world (Boas and Hunt 1905, 302). When they do so, they bring wealth and prosperity to the human world, but they will only enter into this relationship as long as proper respect is offered. Such respect can take many forms. Songs, prayers, and protocols governing how salmon are caught, handled, and cooked are examples of this principle of respect (e.g. Boas and Hunt 1921, 611; Cullon 2017, 108). One of the

most well-known forms of respect comes in the form of the First Salmon Ceremony, in which the salmon-persons are invited and welcomed back to the human world (Boas and Hunt 1905, 302-307). The bones of the first salmon are returned to the ocean, enabling the salmon to resurrect in the Undersea Kingdom and tell the other salmon-persons that human-persons are deserving and that it is good to travel to the human-person world (Boas and Hunt 1905, 307; Cullon 2017, 129). These relationships cultivate "a partnership that contributes to the overall well being of the fish, the humans, and the world they share" (Cullon 2017, 23).

The relationship between human-persons and salmon-persons has always been subject to change, but has changed in ever more violent ways since the arrival of settlers on Vancouver Island in the mid-19th century. Shortly thereafter, salmon acquired a prominent status as the primary export of the Hudson's Bay Company at Fort Victoria and became entrenched within logics and practices of capitalist production. Throughout the 20th century and continuing today, salmon came to exist simultaneously as masked persons travelling between worlds and as a commodified resource needed for nation and economy-building. By the turn of the 21st century, salmon were being reconfigured once again, this time by a rapidly expanding aquaculture industry. Liğʷiłdaxʷ and other Indigenous fishers continue to navigate human-fish relations within structures of salmon governance that devalue Indigenous relationships with other-than-human beings in favor of economic, scientific, and legislative frameworks that are unable to account for salmon as relatives to whom we are responsible and with whom we share responsibilities (Risling Baldy 2021, 166).

Since the first net-pens were constructed in the passages around the Cove in the 1970s, salmon aquaculture has ushered in new concerns about how the seascape is used and governed, microbial changes within aquatic ecologies, and the ability for Indigenous nations to continue entering into reciprocal and co-constitutive relationships with their salmon kin.

When I first arrived in the Cove in the summer of 2017, I knew little about the specifics of salmon aquaculture but I had long been interested in the subject as I watched Pacific salmon in the Klamath River and throughout California edge closer to extinction year after year. At the same time as I was travelling to the Cove, chinook salmon were forecast to return to the Klamath River in record low numbers, compelling the Yurok Tribe— who had a total harvest allocation of 600 salmon, less than 1 fish for every 10 Yurok citizens— to make the difficult decision to host the annual Klamath Salmon Festival without locally-caught salmon for the second year in a row. The question bounced around at the back of my mind: could aquaculture provide a sustainable source of salmon for human consumption, relieving fishing pressures from river-returning salmon and enabling populations to rebound?

I had not travelled to the Cove with the specific intention of studying aquaculture but arrived as a volunteer with the annual Indigenous gathering, Tribal Journeys, in which thousands of Indigenous peoples from dozens of nations across Canada and the US paddle the waters of the Salish Sea in ocean-going canoes to visit a host nation for a week-long celebration of songs, dances, feasts, gifts, stories, and relationship-building. Maps like the one below detailing canoe routes and landing

sites helped me to envision the coastal straits within Salish Sea as— like the Klamath River— an ancestral highway within a definitively Indigenous waterscape, as places where Indigenous cultures and sovereignties are actively inscribed within the sea.

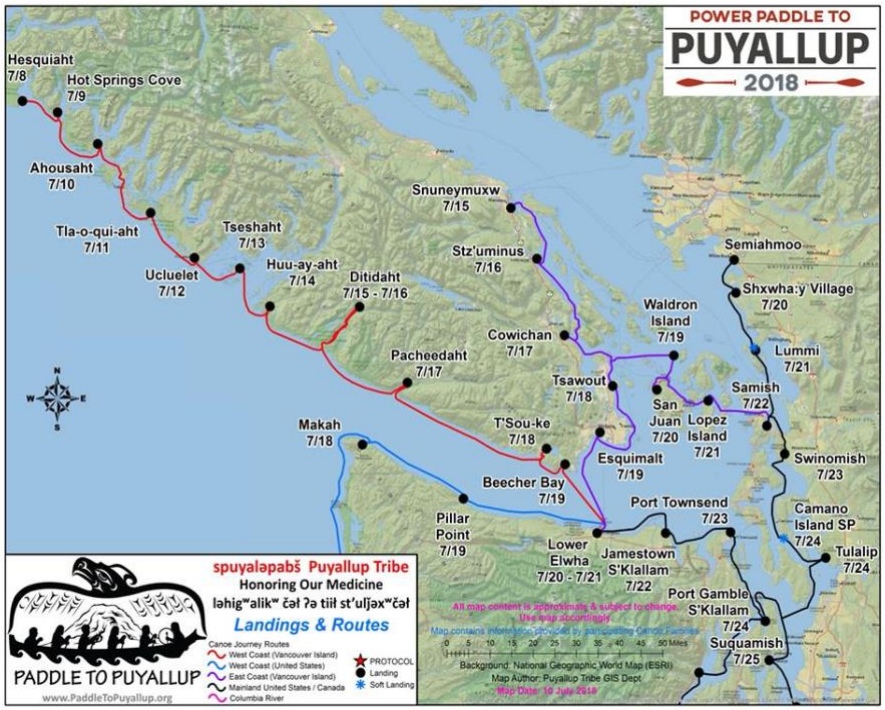


*Figure 3: Example of the types of maps produced by Tribal Journeys organizers, showing canoe routes and landing sites across some of the Salish Sea*

Returning to the Cove after a day of volunteering in the kitchen preparing sandwiches and watermelon slices for the 5,000 guests who had arrived in Liǧʷiłdaxʷ territories for Tribal Journeys, I joined Cove residents, Sam and Liz, for dinner in the local island pub. Sam is a respected Liǧʷiłdaxʷ fisher who comes from an intergenerational family of Liǧʷiłdaxʷ fishers who trace their ancestry back to Wekai, the original ancestor of Liǧʷiłdaxʷ people. He does not point to a particular moment in which he "started" fishing— he has fished for as long as he can remember, casting lines and

nets with his parents and siblings from beaches and bays around the Cove since early childhood, working on his father's boat as soon as he was able, and going on to become a prolific commercial seine boat skipper since the 1980s. His wife, Liz, comes from a musical, rock-and-roll kind of family, and when she was not working as a youth services councilor, you could sometimes find her practicing songs for her all-female amateur rock band. We became friends over our shared apprehension for the future of Pacific salmon. Sam expressed frustration that it was becoming ever more difficult for he and his family to continue making a living as commercial and food fishers, and I echoed that similar dynamics were taking place within fishing communities on the Klamath River. We also shared similar experiences witnessing the proliferation of fish diseases in our respective waterscapes. In the Klamath River, a lethal parasite, *Ichthyophthirius multifiliis* (colloquially referred to as "Ich"), penetrates the gills, skin, and fins of fish, feeding on red blood cells and thriving in the warm, shallow waters generated by the six dams that impede the flow of the river. In the Salish Sea, fishers like Sam observed that raising Atlantic salmon in Pacific waters also brought viruses to the coastal straits that were previously not seen in this part of the world. I remember one of our first conversations going something like this:

"Do you know why all the starfish are disappearing?" Sam asked, "There used to be thousands. Now there are none!"

"I don't know," I responded, "but I can try and look into it for you."

"Well what do you think about those salmon farms?" he followed up.

"I don't really know enough about them to say," I responded, shrugging, and not thinking too much more about it.

The next day we travelled aboard Sam's commercial seine boat to check his crab traps anchored in a nearby bay. Yet, as we made our way through the straits to and from the bay in which he sometimes keeps his crab traps anchored, it seemed that things just were not the same as they used to be. At this point in early August, Sam and other fishers in the Cove waited anxiously for the Department of Fisheries and Oceans to announce openings for commercial and food fisheries. He always followed the fishing regulations determined by federal agencies, yet mainstream discourse too often placed blame for fish population and ecosystem collapses on commercial and Indigenous fishers like himself. In recent decades, though, Sam has seen many fishers retire or leave the industry, while those that remain are often barely able to cover the costs of fuel, docking, and boat upkeep, especially if they endeavor to remain independent and avoid working as contract laborers for multinational seafood corporations. The ability for relatively small-scale fishers like himself to continue in the industry only seemed to worsen following the introduction of transferable fishing quotas and limited licensing regimes in the latter half of the 20$^{th}$ century. Despite such efforts to restructure the industry in ways that seek to protect fish populations into the future, communities like the Cove are now home to fewer fish, and fewer fishers, than ever before.

A crisis within the world's oceans pervades the current moment. A 2022 study made international headlines when researchers approximated that 90% of all marine

life could be at critical risk of extinction if global atmospheric temperatures increase by 3 degrees Celsius (Boyce et al., 2022). According to acclaimed marine biologist Daniel Pauly, global fisheries reached their "peak" by the end of the 1980s (e.g. Pauly et al., 2003). Global catches of Atlantic salmon are near to nonexistent as less than 4 million remain worldwide (NASCO 2019). However, there is more to the crisis than ecological precarity alone. Environmental, economic, political, and social crises are interwoven (see Chapter One).[2] Even abundant fish populations would not necessarily rectify inequalities in access and allocation, transparency and community-involvement in governance, financing and ownership structures, or the return of decision-making authorities to Indigenous governments (Area C Harvest Committee et al., 2021). Within the world's oceans and fisheries, crisis is no longer confined to a particular, bounded moment, but has become a pervasive, constant state of being.

Back on the deck of Sam's seine boat, nestled within concerns about salmon extinction, corporate ownership of the fishing fleets, and disappearing starfish, aquaculture emerged as one among many components that added to and made ever more complicated the ongoing crises within salmon worlds. However, unlike the crises occurring in the sometimes nebulous "out there" of the open ocean, aquaculture had material, tangible effects within the waterscape that could be seen, tracked, smelled, and heard. Too often, these days, the fish in Sam's net were covered in parasitic and potentially lethal sea lice— a phenomena that was relatively rare before

[2] See also: McCay (1995), Apostle et al., (1998) and Mansfield (2004) for these interconnections in fisheries scholarship

salmon farms operated in the area. Community members across Vancouver Island and throughout the Fraser River reported finding fish with mushy flesh, enlarged organs, and a strange yellow coloration— all signs of unusual viral disease. Residents in Washington State told me about the putrid smells that pervaded their home when bivalves, fish feed, dead crabs, feces, and seaweeds were left entangled, rotting in the nets on hot summer days and the sounds of gunshots that would keep them awake at night when sealions found themselves too close to the net-pen facilities. But were lice, pathogens, and offensive smells simply the cost of bringing a steady supply of salmon to grocery store shelves, and steady, reliable jobs to a rural area that could no longer depend on capture fisheries alone? Were concerns about viruses and lice merely misplaced, as studies and press releases from the aquaculture industry reassured us? What legal mechanisms enabled state-issued leases of foreshores and seabeds, when most coastal areas are generally considered to be common property and are thus supposed to be restricted from privatization? The future of both human and other-than-human communities in the Cove seemed uncertain, with the consequences of raising Atlantic salmon in Pacific waters raising more questions than answers as viruses, lice, salmon, nets, and people negotiated an uneasy coexistence in the coastal straits of Liǧʷiłdaxʷ territories.

When I returned to the Cove the following year to begin my formal period of extended fieldwork and residents would ask me whether I thought viruses associated with the aquaculture nets could be harming the Pacific salmon that followed their ancestral migration routes past the farms, I wanted to have a more robust response for

them than simple, noncommittal shrugs of "I don't know." And, after learning of my near-decade of experience working on salmon conservation initiatives in California, they often did ask me, and sometimes seemed disappointed when I could not provide definitive answers. My research focus on salmon aquaculture, and particularly on the politics of the virus, Piscine orthoreovirus, emerged as much through community concerns as through my own intellectual interests.

During my fieldwork in 2018-2019, the salmon blood virus Piscine orthorevirus (PRV) seemed to be at once everywhere and nowhere. Scientific papers report that PRV is "ubiquitous in farmed salmon" (e.g. this phrase is repeated in: Vendramin et al., 2018; Løvoll et al., 2012; Kibenge et al., 2017; Zhao et al., 2021; Bjørgen et al., 2019). A 2018 report by nonprofit scientists in Washington State had recently detailed that 100% of escaped fish from a farm in Puget Sound were positive for the virus.[3] The virus itself, though, remained elusive. Without largely inaccessible genetic testing, fishers could not be sure whether the yellow and emaciated salmon in their nets were infected with PRV or other aquaculture-related viruses, whether a salmon became infected with such pathogens while migrating past the farms, or whether PRV played a role in a salmon's untimely death. By the time I came to call the Cove home, First Nations and their allies throughout coastal Vancouver Island and the Fraser River migration route had already spent years documenting the presence of viruses and other forms of industrial waste that emanated from farm

[3] "Contrary to agency claims, escaped Atlantic salmon were infected with a highly contagious and harmful virus: Lab results show 100% of escaped Atlantic salmon tested were infected with virus of Norwegian origin," Press release by the Wild Fish Conservancy, Feb 15th 2018.

facilities. First Nations and environmental organizations had already taken the Department of Fisheries and Ocean's failure to take PRV seriously to federal court three times, each time with federal judges ruling that DFO's refusal to test for or mitigate the spread of PRV went against their mandate to protect Pacific salmon. When Washington State recognized PRV as an "exotic" disease-agent in 2018, it effectively brought an end to the Atlantic salmon aquaculture industry in Puget Sound since federal regulations prohibit the transfer of fish if they are known to carry either a foreign or disease-causing pathogen. And yet, in Canada, the government seemed to approach PRV as a non-issue, maintaining that it was not necessary to test for the virus or attempt to prevent its spread, in agreement with industry statements that "the virus is common but the fish on our farms are not sick."[4]

At times, researching the political and ecological dynamics of aquaculture encouraged me to become what Celia Lowe (2017) might call a "viral ethnographer," tracing human-animal-virus relations and the forms of multispecies sociality that enable viruses to participate in multiple human and other-than-human worlds. As part of ongoing campaigns to enact stronger fish health protections and document the spread of viruses and pollution associated with salmon farms, First Nations and their allies throughout Vancouver Island and the Fraser River migration route search salmon spawning rivers and travel to sites of aquaculture production to monitor the daily operations of farms, gather underwater video footage, and sometimes collect

[4] "PRV Report Speculative, Not Supported by Science or Reality on the Farm," Press release from BC Salmon Farmers Association, 7 May 2018.

water and waste samples and serve the farms with eviction notices. While living in the Cove (September-December 2018, April-September 2019), I participated in and helped Sam and his cousin George, Hereditary Chief Gigame of the Liǧʷiłdaxʷ Nation, to organize what Cove residents called "reconnaissance trips" that attempted to document the operations of and forms of pollution emanating from salmon farms in Liǧʷiłdaxʷ territories. We travelled to nearby farm structures and documented farm size, expansion, and construction. George, sometimes accompanied by family members, other Indigenous leaders, journalists, and well-known environmental activists, boarded the farm structures with GoPro cameras attached to their heads, chests, and long poles, seeking to gather images and film footage from above and below the water's surface that would help to make visible the conditions of life and death in and around the net-pen facility.

In preparation for a court-mandated announcement regarding a revised federal PRV-testing policy, I travelled to the Minister of Fisheries' office in Vancouver every Friday for a month as part of Indigenous-led efforts to urge the Department of Fisheries and Oceans to enact new PRV testing requirements. I participated in events like the Paddle for Wild Salmon, in which we canoed a stretch of the Fraser River to raise funds for the legal fees incurred by Dzawada'enuxw First Nation as they sought to evict salmon farms from their territories and reclaim marine space as part of their ancestral title lands. I also travelled to the Supreme Court of British Columbia in Vancouver, watching from the gallery as part of organized calls for "court support" for Indigenous Elders and youth who had been arrested for various water and salmon

protection activities. Their infractions against the settler state included violating injunctions and crossing into exclusion zones dubbed "no man's land" that surrounded farm facilities, hanging banners that read "Fish Farms Out" from company vessels and buildings, and occupying the offices of provincial politicians. The courtroom became a site for settler violence as defendants were charged and often found guilty of crimes including breaking and entering and civil and criminal contempt of court.[5] Seeking to understand how the US and Canada legislate aquaculture within a waterscape that is ecologically connected yet bisected by the US-Canada border, I also spent three months (January-March 2019) working with the aforementioned nonprofit in Washington State that spearheaded the effort to document PRV in and remove Atlantic salmon farms from Puget Sound.

Throughout this time, I interviewed scientists, fishers, and community members about PRV and broader changes within fisheries and aquaculture industries. I attended public hearings and press conferences regarding aquaculture lawsuits and licenses. I toured hatcheries in California and Washington and a proposed on-

[5] I began to see the courtroom as a site for settler violence at the outset of my fieldwork, while volunteering at Kwekwecnewtxw (the Watch House Village), constructed outside the gates of the Kinder Morgan oil company in order to monitor the activities of the corporation as it prepared to double the capacity of the Trans-Mountain Pipeline. While my time at Kwekwecnewtxw does not explicitly enter into this dissertation, my experiences here did greatly influence how I came to see the violence inflicted by Canada as a settler state. As part of similar calls for court support, I watched from the gallery as dozens of mostly Indigenous Elders were sentenced to several weeks-to-a-month in jail for simply standing in front of the Kinder Morgan property gates. That pipelines and salmon farms were often discussed in the same breath— both positioned as forms of extraction that profit at the expense of Pacific salmon worlds, both protected by state legal and scientific systems that prioritize private property rights and deny harm, and both contemporary examples of how Canada operates at the expense of Indigenous lifeways and sovereignties— also enabled me to see salmon farms as one component within a broader matrix of extraction, state-making, and violence that exceeds aquaculture alone.

land recirculating aquaculture system facility in California. I participated in historical waterscape tours operated by the local historical museum. And, I collected reports and public relations materials disseminated by organizations and agencies such as the BC Salmon Farmers Association, the Department of Fisheries and Oceans, and the Washington Department of Fish and Wildlife.

As such, the chapters that follow provide an account of Atlantic salmon aquaculture grounded in and emerging from the communities and perspectives of Indigenous leaders, fishers, community members, environmental advocates, government bureaucrats, and scientists who primarily care for Pacific salmon, and are deeply troubled about the impending potential for Pacific salmon extinction. This has involved following salmon through rivers and fishing nets to city streets, kitchen tables, courtrooms, professional conferences, and government consultation meetings, and it involved immersing myself not only in ethnographic research, but also in genomic sequencing debates that take up the pages of virology journals, archives of late 20$^{th}$ century local newspapers, and YouTube videos and photographs that show fish swimming in nets. In doing so, I provide an account of salmon farming rarely from the farm itself but from the social-ecological and political relations that surround the practice of aquaculture, which sometimes means travelling far beyond the physical locations of the net-pens themselves.

## The Promise and Peril of a Blue Revolution

Aquaculture in its current industrial form emerged as a response to the protracted, seemingly endless crisis occurring within salmon fisheries. In 1970s British

Columbia, small family-owned facilities experimented with raising Pacific salmon in nets. The practice of farm-raising salmon in nearshore nets was already becoming a commercial success in the fjords of Norway, where decades of experimentation and government investment honed methods for raising Atlantic salmon amidst rapid declines of salmon returning to Norway's rivers (Liu 2013; Lien 2015). Governments across North America, Europe, and Japan had already experimented with rearing salmon fry in hatcheries since the late 19th century, and while hatcheries enabled a certain level of continuity among ocean-based fisheries, it was still difficult to know whether the salmon reared in a hatchery on land would return a few years later once released.

The practice of aquaculture proposed promising solutions to these dilemmas. A steady, reliable source of fish could be provided for human consumers while reducing fishing pressures on free-swimming, river and hatchery-born salmon. New employment opportunities would become available in rural coastal communities struggling in the wake of economic downturns within fishing and forestry sectors. The governments of BC and Canada would find new revenue streams from leasing Crown lands to aquaculture companies and taxing exports of farm-raised fish as they travelled to high-paying consumers in Asia and the US. The province would also save millions on social assistance programs that were providing financial support to out-of-work fishers and fish processors. British Columbia could reaffirm its status as a leading salmon producer within the global seafood industry and ties between Canada

and Europe could be strengthened by drawing upon the technical expertise and foreign investment provided by industry pioneers in Norway.

Moreover, while carbon, methane, and nitrous oxide emissions from livestock agriculture are implicated as serious contributors to global climate change, aquaculture is cited as being the "greenest" form of animal-based protein production (RIAS Inc., 2016; Braden 2016). Raising salmon in ocean-based pens supposedly uses less energy, water, and land, and produces less GHG emissions, than any other commercially-raised food animal (RIAS Inc., 2016). The turn to aquaculture offered much more than millions of salmon fillets. In an industry and ecological context characterized by the increasing "precarity of the present" (Hébert 2015), aquaculture offered an avenue for stabilization, a way to fix salmon in time and place under the constant care of human hands, a way to circumvent the complex questions that plagued offshore fisheries, and a way for humans to protect salmon swimming in the oceans while continuing to eat salmon, too.

The "blue revolution" proposed by aquaculture combines the agricultural revolution of the Neolithic with the green revolution of the 20$^{th}$ century, bringing the modern era of food production to the supposedly wild and previously uncultivated ocean (notwithstanding that visions of a wild and uncultivated ocean overlook centuries of Indigenous mariculture practices that have shaped seascapes worldwide— see Historical Primer). The "seductive" (Trouillot 2003), "salvational" (Howe and Boyer 2019) promise of a green, globalized, mass-produced form of animal protein licenses aquaculture practitioners to remake salmon in their own

image. Standardized, genetically altered, sterilized salmon offer a pathway into the future, a way to "advance food security and availability worldwide" (The Economist 2003) by "feeding a growing world population."[6] Yet, when rubber meets the road or, in this case, when nets and salmon meet the ocean, the seduction sometimes fails to fully entice.

Bill is an avid commercial and recreational scuba-diver who is sometimes contracted by aquaculture companies to dive in and around the grow-out nets. This usually involves checking the nets for holes, removing debris, inspecting the anchors, and monitoring conditions on the seafloor. Sometimes he does this in collaboration with a friend who owns an aquaculture support services business that aids with farm assembly, net hauling, equipment towing, and anchor installation. Bill was usually hired, though, for mort removal— an unpleasant job that requires removing dead salmon ("morts") that sink to the bottom of the nets. Each of the 1000 or so nets on the coast needs several divers to remove morts about twice per week, meaning that mort removal can provide a steady form of work for those looking to build careers as commercial divers.

When we met to discuss his experiences working in the aquaculture industry, Bill was certain that aquaculture held promise for the future of food production, yet he seemed to struggle reconciling his own personal experiences as a mort diver with the industry's place in a broader seafood economy. "You have to dive into a net-pen full of farmed fish and make your own conclusions," he told me, encouraging me to

[6] For example, see: https://mowi.com/about-us/

get scuba-certified. “You have to see the fish in that very, very closed environment, and that kind of schooling, and the way they’re fed. It’s very feed-lotty. That’s my personal opinion. But, ultimately, the globe needs a reasonably priced protein, a different, cheaper source of protein. The conversion of feed to meat is infinitely better than chicken or beef, without even taking into account the ground that they take up. I think generally the globe *needs* farmed fish. Or cheap protein might be a better way of saying it.” He paused, before continuing: “Done well, it really is the future. The future is aquaculture.”

Yet, Bill refuses to go mort diving anymore because the thick slime and terrible smell that comes from the dead fish would linger on his diving equipment for days and sometimes weeks afterwards. He also found it a frustrating and unpleasant experience to work amidst an abundance of fecal matter. “That’s the other thing you see when you go diving at these fish farms, there’s just shit all over the place. The whole area is thick with fecal matter. It all comes out of the nets, and you’re just swimming through it. Unless you’re in the water looking at it, you’d never see it, you’d never even know it was there,” he recounted, shuddering. Another drawback, he stated, stems from how the food for farm-raised fish is produced. “The problem in my mind is how to make fish food out of soy products. They’re eating krill or other ground-up fish products, so you’ve got mercury and all those other heavy metals transferring through the food chain. And, they’re fishing down the food chain to feed these farmed fish. That’s my main disagreement.” Despite his discontent that krill and other fish were being harvested to feed salmon within the farms and his unsavory

experiences mort diving, Bill still held faith that technological advancements would provide better ways for monitoring morts, disposing of waste, and producing fish food. “But, you can’t change my mind,” he concluded, “Aquaculture is the future. The world needs cheap protein. We can’t just keep farming beef the way we are. We can have wild fish and farmed fish. We just need a better way of doing it.”

Occurring early in my fieldwork, my meeting with Bill left me conflicted. Some residents in the Cove had already emphasized the need for me to account for “both sides” of the aquaculture conflict (although I quickly learned that debates and perspectives could rarely be separated into neat binaries). The need and the potential offered by aquaculture to at least partly transition away from beef and poultry production seemed difficult to refuse. Similar to the position that anthropologists Cymene Howe and Dominic Boyer (2019) found themselves in while studying wind power production in the Isthmus of Tehuantepec, Mexico, I entered and left the Cove committed to sustainable and equitable fisheries and methods of food production. Yet, as Howe and Boyer propose, it matters how such initiatives, projects, proposals, and transitions are brought into being; they warn us that “old practices of extraction and exploitation can easily inhabit new spaces of sustainability, preserving a status quo that continues to seek cheap resources and vast tracts of exploitable land” (15). A wide-ranging reimagining of social, political, and economic relations must accompany sustainable transitions, they argue, so as not to repeat “expenditures, inequalities and exclusions of the past” simply with a new form of production (143). Their attempt to balance the reality of anthropogenic climate change and the need for

global decarbonization with demands for Indigenous sovereignty and other-than-human lives in the Isthmus of Tehuantepec to be taken seriously helped me to reimagine the place and role of aquaculture, accounting for the ways in which farm-raised seafood can offer promises, potentials, and opportunities for some while also attending to the exclusions and forms of violence on which such opportunities depend.

Nevertheless, I was left with the lingering questions: If, as Bill assured, the world needs cheap protein and the future is aquaculture, then what kinds of worlds and what kinds of futures are envisioned, mobilized, hoped for, and brought into being through these practices? And whose worlds and whose futures come at this expense?

The "protein fix" (Brent et al., 2018) offered by aquaculture is just one component of building what political leaders call the "blue economy"— an attempt to combine ocean governance and economic development to realize the full potential of ocean-related sectors. Canadian policy-makers position Canada, as a "a nation of three oceans" and as a "maritime nation" with the "longest coastline of any country in the world," as especially well-suited to advance the blue economy. As Prime Minister Justin Trudeau told attendees of the Sustainable Blue Economy Conference co-hosted by Canada, Japan, and Kenya in Nairobi in 2018: "A blue economy is about harnessing the potential of our oceans, seas, lakes, and rivers – resources that Canada

is privileged to have in abundance."[7] Bernadette Jordan, Minister of Fisheries, Oceans, and the Canadian Coast Guard from 2019 to 2021 similarly praised the potential held within Canada's oceans when she told technology and business media outlet *Innovating Canada*: "I want Canadians to understand the incredible opportunities that lie within our oceans. The blue economy — the economy driven by sustainable, ocean resources — is worth more than $31 billion annually. That's not just fishing — that's marine transportation, ship building, tourism, and so much more."[8] Her successor, Joyce Murray, similarly opens Canada's Blue Economy Engagement Strategy Report by stating: "Canada's blue economy should be second to none…. Our blue economy has so much potential. Combined, Canada's ocean industries generate over $30 billion a year, yet that is one per cent of our national GDP. With a Blue Economy Strategy, we can do better."[9]

Such claims reimagine the place and role of marine worlds. Oceans are not just a place of unfolding crisis, but also become, as the UN puts it, "a powerful source of solutions" (Ruffo 2022). In Canada, the Department of Fisheries and Oceans invokes Joe Biden's 2020 presidential campaign slogan when stating that advancing the blue economy will help Canada to "harness its ocean growth potential by building

[7] "Statement by the Prime Minister on the Sustainable Blue Economy Conference**,"** Office of the Prime Minister of Canada, Justin Trudeau, Ottowa, Ontario, Nov 28, 2018: https://www.pm.gc.ca/en/news/statements/2018/11/28/statement-prime-minister-sustainable-blue-economy-conference

[8] "The Honourable Bernadette Jordan on Canada's Blue Economy." *Innovating Canada*. https://www.innovatingcanada.ca/environment/the-honourable-bernadette-jordan-on-canadas-blue-economy/#:~:text=I%20want%20Canadians%20to%20understand,tourism%2C%20and%20so%20much%20more.

[9] "Engaging on Canada's Blue Economy Strategy: What We Heard." 2022. Fisheries and Oceans Canada. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41030503.pdf

back better— and bluer" after economic downturns during the COVID-19 pandemic (Canada 2021). Offshore energy, freight shipping, marine tourism, seabed mining, and aquaculture promise "triple benefit" solutions— coastal communities gain access to new economic opportunities, investors capitalize on revenues generated by less carbon intensive forms of food and energy production, and "the environment" writ large is intended to benefit from transitions to renewable energies, farm-produced seafood, and conservation initiatives like the development of marine protected areas (Brent et al., 2018). As in the statements from Canada's political leaders quoted above, the ocean becomes a zone of potentiality and opportunity waiting to be harnessed, a space of nation, state, and economy-building, and a place central to the making and maintaining of Canada's futurity. In these framings, Canada *is* its oceans and its oceans *are* Canada.

As Zoe Brent and colleagues (2018) point out in their Issue Brief for the Transnational Institute, however, emerging forms of governance and infrastructural improvement that progress under the rubric of the blue economy often come at the expense of already established users of seascapes; small scale fishers and workers engaged in capture fisheries industries have overwhelmingly "not been invited to the blue party" (20). Millions of people around the world who continue to rely on and work within ocean spaces and industries are subject to discourses and policy decisions that position their practices and livelihoods as "doomed," subject to "inevitable decline," and as past-oriented, swimming, fishing, and sailing in the way of a sustainable, technological, blue future (Ertör 2023). Brent at al., (2018) go on to

warn that “in the euphoria of self-congratulatory celebrations following blue fora—where policymakers clink glasses with investors, conservation NGOs and wind energy titans before gulping down highballs of this ‘blue fix’— there is a tendency to ignore the social and ecological hangover that this cocktail will most certainly cause” (3). The “blue fix cocktail” (Brent et al., 2018) is redefining how state governance and economy-building take place within ocean waters, too often with inequitable and disproportionate effects for those who already live and work within such watery places.

As seen in Canada’s embrace of the blue economy, economic growth and the future of British Columbia is tied to the increasing appropriation and regulation of ocean space (Silver 2014). Yet, in North America, this trajectory is only made possible through the continued rejection of Indigenous territorial and self-governing rights, particularly in coastal, marine, and water-based homelands where the rights of Indigenous peoples are even less well developed than they are on land (e.g. see Ginn 2006; Mulrennan and Scott 2000). If, as Glen Coulthard proposes, settler colonial structures demand to be “territorially acquisitive in perpetuity” (2014, 152), then such practices that seek to advance “the blue” in the name of state and economy-building are, at least in North America, part of an under-explored extension of settler colonial logics, structures, and governance into marine space.

In this arrangement, blue economy industries are able to make use of settler political structures in which oceans are emptied of Indigenous life-worlds and exist at the ready for the making of cheap protein, even if their operations also exceed and

exist outside of settler contexts. Particular material affordances make British Columbia especially desirable for ocean development— cold waters, strong tidal patterns, sheltered inlets, and relatively stable salinity levels, for example, create ecological conditions well suited for raising salmon in net-pens. Political and legal structures in which coasts and seabeds are enveloped within the jurisdiction of the state, a state apparatus ready to do the work of dividing and leasing seascapes into "sites" that can be developed, and a historical denial of Indigenous title rights to territory are also part of these material affordances that make British Columbia enticing to industries like aquaculture.

Yet, when government claims to lands, waterscapes, and seabeds are tenuous, the ability to legitimate the work of multinational corporations also works to legitimate state sovereignty (e.g. Ferguson 2006; Emel 2011). In seeking access to lands and resources through the state, transnational corporations become implicated within the dynamics of settler colonialism in Canada, even if the state and corporations might be "ocean grabbing" for different ends. Whether with regards to aquaculture, wind energy, seabed mining, or freight shipping, the state remains open to various forms of blue development in part because facilitating such initiatives becomes a place from which the state is able to reassert its own territorial and jurisdictional claims. Settler social and political formations aid corporations in their pursuit of accumulation while, as Anna Stanley (2019) argues, private capital becomes marshalled to "reproduce and extend the jurisdictional power of the settler state" (1138). Even so, the blue economy and the forms of erasure and exclusion on

which it relies are fragile and not yet fully determined. Aquaculture nets, wind turbines, and the structures that govern them are not always yet fully cemented within the seabed. There still remains opportunity for things to emerge otherwise. And, as people like George taught me, perhaps the future is not aquaculture, no matter how enticing cocktails of the seductive blue fix might appear.

## A Hereditary Chief Changes the Terms of the Conversation

As I settled into the rhythms of life in the Cove, Sam and Liz gave me the same suggestion several times: "You should talk to George." I was familiar with George's name. A lifelong fisher, commercial skipper since the age of 18, and keen pool player, George is Hereditary Chief Gigame of the Liǧʷiłdaxʷ Nation. His salmon aquaculture and Indigenous rights advocacy, in which he filmed underneath the waters of farm facilities with GoPro cameras and rallied at local, provincial, and corporate headquarters, reached my laptop screen in California through videos posted on YouTube and Facebook long before I focused my research attentions on salmon aquaculture in and around the Cove.

Just as I was arriving in the Cove for Tribal Journeys in the summer of 2017, George was leaving onboard a vessel provided by the international activist organization, Sea Shepherd Conservation Society, guiding the vessel and its crew through the passages of Liǧʷiłdaxʷ territories as they conducted visual audits of salmon farm facilities. He had not intended to dedicate the next few months of his life living on board the 80ft retrofitted pleasure-turned-research sailboat, eating a vegan

diet, and living in close quarters with campaign organizers from around the world. However, after seeing small fish schooling in and around a farm site, boarding the farm, and filming what turned out to be herring seemingly trapped within the pen, he became committed to documenting the underwater goings-on of aquaculture facilities. If there were hundreds of herring in one pen, he suspected that there were probably going to be more elsewhere. His prediction was correct. Farm after farm, George continued to find and document herring and other creatures swimming in and out of the facilities' nets— the first time that differing species of fish had been documented as making their way inside of the aquaculture facilities.

The camera footage also provided the first opportunity for local biologists, environmental organizers, and community members to see the Atlantic salmon raised through the practice of aquaculture while the fish were still alive. Photos and video footage of fish with lesions, deformities, and visual signs of disease soon became international news. We grew to recognize the small, energetic herring that darted in and out of the netted walls covered in seaweed and shrimp capelins. Scientists and community organizers counted sea lice on nearby salmon and collected scales, chunks of flesh, and feces that flowed from beyond the net-pens, testing the biological materials for the presence of viruses like PRV. When I was living in the Cove over a year later, George left town for a couple of weeks again— this time to travel up the Fraser River with an Indigenous-led salmon-centered advocacy group. The widely publicized event drew thousands of participants for a several-weeks-long journey of celebrations, crafts, feasts, rallies, and community forums along the salmon migration

route. George had also hoped to hold public viewings of the video footage he had gathered in salmon farms in community halls along the way. When he returned, we met over lunch to discuss how it went. The October afternoon was unusually warm, and although I arrived ten minutes early, George was already there, sitting in a booth facing the entrance, sipping on a strawberry milkshake.

For all intents and purposes, the journey and the accompanying events were a huge success. However, not everyone was receptive to his efforts to center aquaculture as part of the agenda. Sometimes when he brought up his experiences documenting fish farms, people would talk over him, trying to change the conversation. When speaking with media outlets, the cameras would sometimes cut and the interviews would sometimes abruptly end. Or, when he would watch the news broadcast back later, he noticed how his calls to evict salmon farms were often conveniently edited out of the footage.

Amidst our conversation, he pushed a plastic envelope full of documents to my side of the table, encouraging me to take quick photographs. One detailed four generations of his maternal family tree. One was an eviction notice addressed to the federal government of Canada, the provincial government of British Columbia, and two aquaculture companies, stating that he and the Hereditary Chief of the Awahoo Nation were evicting salmon farms from their territories. The notice reads: “This is an eviction notice to all salmon farmers in the unceded waters and territories of the Awahoo Tribe of the Liǧʷiłdaxʷ Nation… Canada has embraced the UN Declaration of Rights of Indigenous people. We have the right to look after our food sources. The

salmon farms are infringing on our way of life by breaking the natural cycles of life that have sustained First Nations' people for time immemorial." Other letters were addressed to local and provincial politicians, recounting how Liǧʷiłdaxʷ people were undergoing a third year of sockeye fishery closures and reminding them of their campaign promises to close farm facilities across the coast. Another was a printed email from the Hereditary Chief of Musgamagw Dzawada'enuxw, granting George permission to board and inspect the salmon farm facilities in Musgamagw Dzawada'enuxw territories and another printed email invited Sea Shepherd back into Liǧʷiłdaxʷ territories in 2018 for a third year of monitoring efforts.

Still trying to maintain our conversation, I mentioned that perhaps local news stations might be hesitant to air his critiques of aquaculture because the industry was an important source of local employment. Before answering, he looked over is right shoulder, and then his left, doing a visual 360 degree scan of the restaurant. In his response, he seemed skeptical of the employment rates provided by the industry when there seemed to be very few workers present at the farms. This time, he looked over his shoulder just in time to see a couple on the other side of the restaurant make their way to the exit, towards us. "Quick," he said, ushering the documents back towards his side of the table and tucking them behind his arm. After the couple approached our table and made some brief chit chat, the conversation came to an end as the woman told George, "keep up the good work, George, we'll get those fish farms outta here." But George did not seem to think their intentions were genuine. "Those people, pretending they're with me, that they want the fish farms gone," he said, shaking his

head after they left. “Why pretend? I’ve been fighting on this since 2016, and fighting hard. Going up against politicians, these powerful companies. Sometimes it feels like I’m just getting a whole lot of people angry at me and going nowhere fast.”

George’s efforts to document the underwater worlds of salmon farms, build alliances with other Indigenous leaders, nations, environmental organizations, and communities, and make the waterways of Liǧʷiłdaǩʷ territories slightly more livable for underwater salmon-people, in many ways, inform the heart of this dissertation.

When I looked back on the documents I had haphazardly photographed in the booth of the breakfast diner— eviction notices, letters to corporations and politicians, emails that granted permission to and requested assistance from other Hereditary Chiefs of the coast— I realized that the documents that he shared with me were technologies of contemporary Indigenous governance, deeply shaped by histories of protocol and adapted to address ongoing concerns that George and other Indigenous leaders had about how aquaculture was being practiced within their homelands. The documents invoked the UN Declaration on the Rights of Indigenous Peoples, the importance of salmon and other aquatic beings as sources of food, and the rights of Indigenous peoples to harvest and consume their historical foods. They referenced the lack of treaties between Liǧʷiłdaǩʷ and Canadian or Crown governments and asserted the rights of Indigenous nations within unceded territories, with territory referring to more than land alone. And, they spoke back to state and corporate power, placing the waters that surround the Cove firmly within Liǧʷiłdaǩʷ jurisdiction, undermining state authority to permit and lease segments of the waterways in the first place.

However, the contents of the documents, and the fact that they were even necessary in the first place, also spoke to the violences of settler colonialism, a world in which waters are polluted by viruses and delousing chemicals and Indigenous nations are no longer able to survive from harvesting or consuming their traditional food sources; a political landscape in which George's letters and eviction notices too often went disregarded by politicians who went back on campaign promises yet who still held more sway with the state than Hereditary Indigenous governance. The violences of settler colonialism were made clear in the mundane reality of the everyday when George could not enjoy a brunch in his hometown without repeatedly looking over his shoulders, nervous that someone might be listening, that something bad might occur if the wrong person were to overhear him talking about his life experiences.

The pursuit to document the fish inside the netted pens anchored along the coast and track viruses through the collecting of biological debris was about much more than rectifying a polluted waterscape. It was also about calling attention to how fish, the viruses, and communities of life that travel with them are entangled with the eliminatory and territorially acquisitive compulsions of settler colonialism. And, it was also about demonstrating that other forms of sovereignty and other ways of relating to land, waterscapes, and other-than-human communities continue to exist, no matter how much the settler state might try to erase such ways of living and being. The relations that accompany the making of farmed salmon also emerged as relations

entrenched in violence and inequality, relations that depended on the making of certain worlds and certain futures, sometimes at the expense of other possibilities.

Chapters and Arguments

Throughout this dissertation, we will explore the relationships, conflicts, and ontological puzzles that arise through the farming of salmon and the creative ways that people come to live with, negotiate, and resist salmon farming as an industry.

First, the Historical Primer provides a brief political, historical, and legal context important for understanding the structure of settler colonialism in British Columbia and Canada today. I describe how the lands and coastal waters of what is now British Columbia came under the jurisdiction of settler governments, the changing roles of salmon and fishing labor in the making of British Columbia and its industrialized fisheries, and legal cases of the late 20th and early 21st centuries that reshaped what Indigenous rights mean in Canada. I contend that these settler histories that create what is now known as British Columbia and the state of Canada are some of the original conditions of possibility that enabled the practice of aquaculture to emerge in the coastal straits a century later. As I suggest, these practices of colonization are critical for recognizing how the practice of aquaculture is situated within a *longue durée* of contestations over fish, water, land, and rights.

Chapter One dwells within the senses of anticipation, anxiety, and uncertainty that unfolded in the Cove throughout the spring and summer of 2019 as fishers and community members waited in suspense for the seminal seasonal salmon to return.

Unfolding chronologically throughout a disaster of a fishing season, I seek to capture— however partially— the sometimes surprising ways that the absence of salmon trickles into everyday life and the uncertainty that is generated bureaucratically as fishers wait patiently for government agencies to announce that fishing can take place. On-the-ground "scenes of anticipation" that describe the moods and atmospheres of the Cove during a particular moment in time are linked with macro-level political-economic trends in order to explore the tensions that arise in the struggle for aquaculture and capture fisheries, Atlantic and Pacific salmon, to coexist. Cove residents themselves move between these scales of analysis, offering a form of empiricism that documents the multifactorial conditions of ecological collapse in ways that are local and limited but also emplaced and specific. As Cove residents struggle to make sense of life within a waterscape that is always changing, salmon and the ecologies that accompany them emerge as somehow different, transformed by human hands, industrial practices, and feral proliferations within the waterscape.

Chapter Two draws upon historical newspapers, government reports, and industry publications to narrate a story of how contemporary, industrial-scale aquaculture came to be on the BC coast, beginning in the nets of small, makeshift, family-operated farms of the 1970s. Salmon aquaculture in British Columbia was almost a failed experiment, an industry that seemed to be headed for liquidation before it ever really began. However, geopolitical and economic exchanges between Canada and Norway, the legalization of Atlantic salmon egg imports, and the creation

of new leasing structures that enabled community members and companies to lease segments of the foreshore and seabed enabled aquaculture practitioners in BC to solidify their place within an emerging so-called "blue revolution." I argue that the forms of property-making that transform waterscapes into sites able to be leased and developed by aquaculture corporations facilitates a state-industry relationship that helps British Columbia and the state of Canada to manifest their jurisdictional and territorial claims. In serving as a "landlord" to aquaculture corporations, the anchoring of infrastructure also works to anchor settler state claims to territory within the waterscape.

Chapter Three dives into the politics and contradictions that surround the salmon blood virus, PRV. As introduced above, unresolved questions as to whether PRV could transfer between Atlantic and Pacific salmon, if it could cause disease in Pacific salmon, and if its presence within the waterscape was connected to net-pen aquaculture seemed to be omnipresent as I interviewed microbiologists, government scientists, and environmental organizers, attended aquaculture press conferences, and tracked debates in virology journals and public media. Amidst these uncertainties, I suggest that the unpredictable movements of microbes through supply chains, ocean currents, and patterns of multispecies sociality come to confuse scientific and legal designations over which forms of life do or do not belong in the Strait. PRV becomes caught in a fraught balance between classifications, and categories of life are thrust somewhere in between healthy and unhealthy, wild and domestic, and endemic and

exotic, revealing how such categories are not necessarily settled or stable but mutate along with the virus itself.

Chapter Four is inspired by the efforts of George and other Indigenous leaders who travel to salmon farms across the coast in order to document the underwater worlds of and forms of pollution that emanate from farms in their territories. In the absence of state testing for PRV, I suggest that Indigenous-led attempts to enact alternative methods of viral monitoring constitute a form of Indigenous "sousveillance," or surveillance-from-below. In gathering film footage of fish within the farms and attempting to read the waterscape for traces of viral ecologies, I argue that we engaged in a form of sousveillance that was only made possible through assertions of Indigenous sovereignty within unceded water-based territories. While practices of "watching back" help to make the lives of farmed salmon tangible to purposefully distanced publics who only know salmon as processed fillets, the politics of sovereignty that make such images possible sometimes become obscured as images and videos of fish swimming in nets come to circulate in newsreels, YouTube videos, and Facebook feeds. Only by centering sousveillance as sovereignty, I suggest, can images and videos of fish within pens yield revolutionary potential to unmake the salmon farming industry.

The Conclusion presents two alternating, emerging futures for the blue revolution: one in which the state reaffirms its commitments to industrial salmon and ocean development through techno-fixes that seek to improve how salmon are farmed, and one in which Indigenous science and sovereignty are able to change how

blue development projects unfold. Counter to narratives of exclusion and erasure on which the blue revolution has historically depended, Indigenous nations are reclaiming seascapes and setting the terms of engagement concerning if and how aquaculture continues to operate. The institutionalization of Indigenous oversight, monitoring, and "consent" and reclaiming of waterscapes by Indigenous peoples worldwide brings radical new potentials to the blue revolution, offering a revolution that does not further entrench a circular, familiar course, but sets into motion a departure, a transformation in the relations and practices that define the past.

**Land, Water, Fish, and Rights in Settler Colonial British Columbia: A Historical Primer**

> "This is an eviction notice to all salmon farmers in the unceded waters and territories if the Awahoo Tribe of the Ligwilda'xw Nation… Canada has embraced the UN Declaration of Rights of Indigenous people. We have the right to look after our food sources. The salmon farms are infringing on our way of life by breaking the natural cycles of life that have sustained First Nations' people for time immemorial."
>
> — George and Hereditary Chief of the Awahoo Tribe, Eviction Notice Addressed to the Federal Government of Canada, Province of British Columbia, and Aquaculture Companies, 2018

> "This is unceded First Nations territory. There has been no treaty or purchase of this territory by the Crown or the Canadian Government under international law. The Liǧʷiłdaxʷ Nation holds unextinguished Aboriginal Titles and Rights over our unceded lands and waters. I have rights to know what is going on in our territorial waters. I have a right to be steward of our food fish. I have a right to inspect farm fish pens in our unceded traditional territorial waters. The owners of this farm are trespassing."
>
> —George in Letter to Provincial Politicians, 2018

Introduction

At the Parliament of British Columbia, a hand-carved totem pole stands adjacent to Queen Victoria's statue; together, they memorialize British Columbia's Indigenous and British histories. Standing inside of the Parliament Building in the winter of 2018, British Columbia Premier John Horgan announced a radical revision to aquaculture operations in the northwestern waters of Vancouver Island: following a "consent-based" government-to-government process between Kwikwasut'inuxw Haxwa'mis, 'Namgis, and Mamalilikulla First Nations and the Province of British Columbia, ten salmon farms in the region would be removed in order to create a

Pacific salmon migratory corridor devoid of aquaculture facilities. Moving forward, aquaculture companies would only be able to continue operating in Kwikwasut'inuxw Haxwa'mis, 'Nąmgis, and Mamalilikulla waters if they entered into agreements with such nations. What came to be known as the Broughton Aquaculture Transition Initiative would not have been possible without decades of direct-action and litigation that, like in the quotes above, positioned aquaculture as a threat to historical food sources and nationhood continuance and asserted the legal and international rights of Indigenous peoples in unceded territories.

Most accounts of aquaculture in British Columbia start in the 1970s or 1980s (and indeed this is where I begin my history of aquaculture recounted in Chapter Two). However, the emergence of aquaculture in the late 20th century entered into a world already transformed by multiple and overlapping forms of colonial and capitalist development. As I describe in the Introduction, when I first began researching aquaculture in British Columbia, I understood the conflicts that surrounded the farm-raising of Atlantic salmon not as questions of food production or rural development (although they certainly were these, too), but primarily as involving questions of Indigenous rights and sovereignty. This was in large part thanks to the public efforts of Indigenous leaders like George, who helped to build an international effort to document and survey the health of salmon within farms, and Ernest Alfred, who initiated a 284-day occupation of salmon farms in the Broughton Archipelago. Starting in 2017 and lasting for 284 days, from August, throughout the cold and wet coastal winter, and into March the following year, a small collective

lived in makeshift shelters on board the metal walkways of the farm, preventing the nets from being restocked and disrupting the daily operations of the farm. Continuing since 1998, nations including Liǧʷiłdaxʷ, T-Souke, Musgamagw Dzawada'enuxw, and ’Nam̲gis have served farms with eviction notices, ordering the companies to leave their territories. In 2018, Musgamagw Dzawada'enuxw First Nation filed the first federal lawsuit to reclaim marine areas as part of their Indigenous title lands, initiating the first case that would extend claims of Indigenous title beyond the shoreline. Throughout the course of my fieldwork, Indigenous organizations like the Union of British Columbia Indian Chiefs and Wild Salmon Defenders Alliance, nations such as ’Nam̲gis, and many Indigenous fishers in the Cove situated Atlantic salmon aquaculture as a threat to constitutionally protected Indigenous fishing rights and asserted that, by operating without consultation or consent in unceded territories, aquaculture companies, the Province, and Canada were acting illegally.

Understanding the weight of how and why these claims came to be, and the paradigm-shifting institutionalization of Indigenous consultation and consent put forth in the Broughton Aquaculture Transition Initiative, involves unpacking some of the colonial processes that founded Vancouver Island and British Columbia. Many of the conflicts surrounding aquaculture infrastructures and the applicability of state jurisdiction also involve the rights of Indigenous nations within unceded territories—what have come to be known in Canada as Aboriginal rights and titles to land. The meanings and implications of Aboriginal rights and title in BC are especially messy. British Columbia is the only place in British North America where treaties with

Indigenous nations were almost entirely neglected (Roth 2002), meaning that neither British nor Canadian governments have entered into agreements, treaties, or negotiations with Indigenous nations regarding most of the lands and waters that now comprise British Columbia.

Aligned with anthropologist Dara Culhane (1998), I take as my starting point that Indigenous nations hold unsurrendered title to their territories and what remains less clear is how the Crown and the contemporary state of Canada acquired the lands and waterscapes that would become British Columbia. As such, this Historical Primer introduces how histories of dispossession, capitalism, and nation-building serve as preconditions for aquaculture's development— histories that predate the arrival of net-pens by over a century. First, I provide a brief overview of Indigenous forms of marine cultivation, management, and governance within the Strait of Georgia region, not only to make clear that colonists entered into diverse and complex worlds that were in many ways organized around the sea, but also in order to better comprehend the levels of violence that were inflicted as Indigenous peoples were purposefully dispossessed of these fish and marine waterscapes. It is important to resist beginning Indigenous histories within what is now Canada with stories of colonization, even if historical records and archaeological studies provide an imperfect and incomplete understanding of Indigenous lives within the seascape. When Hudson's Bay Company officials, British aristocrats, and settlers first came to the coasts that would be claimed as Vancouver's Island, they found themselves within a definitively Indigenous seascape— a watery milieu in which social, ecological, and political

relations were structured according to systems of Indigenous protocols and governance. However, as the waters that flow between Vancouver Island, Washington State, and the BC mainland became international shipping routes, sites of resource extraction, and an international borderland, salmon and the waterscapes they move through became central to the building of British Columbia, central to the making of new colonial governments and the industries on which they relied.

I then describe how the founding of Vancouver Island and British Columbia as Crown colonies brought fish and oceans firmly into processes of imperial state-making. Vancouver Island came to occupy a unique place within colonial imaginations and histories of westward expansion (Clayton 2000; Gough 2012). Bountiful waters and forests and poor agricultural soils coalesced with anxieties over American expansion to create a colony deeply shaped by emerging networks of global trade and the forms of capital and labor needed to sustain a resource-based economy. Throughout the 19th and 20th centuries, the need to bolster the Province's new aquatic borders and economies brought the coastal straits and the fish within them into new property arrangements that divided fish, waters, and seabeds between federal and provincial governments. In doing so, the coastal straits that surround Vancouver Island became key sites of dispossession and settler nation-building.

Moving into the 20th century, I center how salmon canneries transformed economic, racial, and labor relations across the coast and integrated the Cove within an international network that tied Europe, North America, and Asia together through the processing and consumption of fish. Fisheries and aquaculture production systems

of today were, in many ways, put into motion through the regulatory schemes and processes of commodification that the canning industry helped to create. The critical role of Indigenous peoples as laborers within the canning industry also changed the shape of emerging forms of Indigenous political action. As industrial workers, Indigenous fishers uniquely placed their marginalization from the fishing industry within histories of land and water dispossession, giving rise to strikes, speeches, letter writing campaigns, and unionization efforts that placed fisheries within broader movements for Indigenous rights and self-determination (Norrgard 2020; Wright 2008). Instead of Indigenous labor remaining marginal to processes of settler colonialism as has often been theorized (e.g. Wolfe 1999), histories of canning demonstrate how settler colonialism across the North American West was instead dependent on Indigenous labor and created relationships that would go on to influence the future of Indigenous, settler, and government relations across the coast.

By the turn of the 21st century, we see how attempts to reclaim fish and territory became part of an on-the-ground affirmation of Indigenous sovereignty that fundamentally altered the legal and political landscape of British Columbia. In a Province founded on the overt denial of Indigenous rights and title, court cases of the 1970s and 80s wrestled with the problem of how to interpret British Columbia's anomalous colonization and settlement (Culhane 1998, 98). Speaking back to the conditions of British Columbia's creation, the land rights claims put forth by numerous nations in BC at the turn of the 21st century transformed the legal possibilities of Indigenous rights within and beyond Canada. When certain rights

became institutionalized and enshrined in settler law, organizations like the Union of British Columbia Indian Chiefs were able to advocate against aquaculture in new ways—asserting, for example, that the province was not meeting its legal obligations to Indigenous nations when it continued to grant licenses for aquaculture without proper consultation or consent (UBCIC 1998b).

As described in the previous chapter, the dominant framing of settler colonialism as land-based leaves large openings for understanding how colonization, conflict, and governance take place in water-centered and maritime regions. Tracing parts of British Columbia's settler colonial history through fish, seabeds, and marine waterscapes helps to illuminate how the raising of Atlantic salmon in net-pens anchored to the seabed is a recent turn within long histories of ocean grabbing that continue in attempts to erase Indigenous presence, lifeways, and governance from the land and waterscape. Such a historical context becomes critical for distinguishing how political conflicts over aquaculture are also rooted within historic and ongoing contestations over land, water, fish, and rights. At the same time, when seabeds and waterscapes are lucrative sites of property-making and profiteering in the 21st century, thinking with colonial logics, methods, and practices in BC hints at how fish, waters, and seabeds become sites of state-making beyond British Columbia and Canada alone.

Indigenous Seascapes

The coastal straits of what is now British Columbia have been made and remade, shaped and crafted, in correlation with Indigenous practices of marine cultivation and ecosystem stewardship. Indigenous peoples across North America have long served as "architects of abundance" (Johnston 2022), shaping land and waterscapes, human and other-than-human ecologies, through specific, intentional acts of cultivation and stewardship. While the waterscapes of the Pacific coast have always been noted for their bountiful aquatic ecosystems, the scale, scope, and role of Indigenous peoples in actively creating these ecologies of abundance is only recently coming into view.

Practices of transplantation, cultivation of clam gardens, and the regulation of fish traps reveal how certain forms of marine cultivation and tenure created social, ecological, and moral structures that governed human and other-than-human relationships according to specific protocols. Across the coast, salmon eggs, smolts, and adults were transferred and transplanted between streams to address localized shortages (Thornton et al., 2015). Tlingit communities in what is now Alaska transplanted herring while Kwakwaka'wakw nations on Vancouver Island transplanted Pacific eulachon under the care and supervision of "stream masters" who held recognized rights to specific areas (Thornton et al., 2015). Over generations, practices of transplantation sometimes created thriving populations in places where there were none prior (Lepofsky and Caldwell 2013). Kelp fronds were harvested from rocky reefs and transported to sheltered locations where, weighed with rocks, they served as spawning habitat that attracted herring (Krumhansl et al. 2017; Kobluk

et al. 2021) In the meeting place between land and sea, estuarine root gardens have been documented among Quileute, Quinault, Makah, Kwakwaka'wakw, Nuu-chah-nulth, Nuxalk, Heiltsuk, Haida, Tsimshian, and Tlingit peoples, demonstrating a widespread coastal practice in which soils were tilled and slopes were terraced to provide a variety of foods and habitats for humans and other-than-humans of the intertidal zone (Deur 2005; Turner et al., 2013; Mathews and Turner 2017). Harvesting eelgrass rhizomes, for example, enhanced the regrowth of eelgrass shoots, subsequently attracting eelgrass-hungry animals like geese and ducks (Mathews and Turner 2017). These mariculture practices were not just concerned with harvest, but were also about creating and enhancing landscapes; creating ecologies of abundance in and from which multiple forms of life could thrive.

Clam gardens demonstrate the nexus between cultivation and tenure that characterize Indigenous seascapes. Clams could be cultivated through the clearing of beaches and the strategic building of rock walls at the low tide line. Not only did the clearing and the tilling of the sediment promote the growth of clams, but the structure itself also provided habitat for octopus, crabs, sea cucumbers, algae, and small fish (Mathews and Turner 2017; Caldwell et al., 2012). Such terraced beach "gardens" sometimes extended over a kilometer in length with meter-high walls and were divided by dozens of posts that demarcated plots associated with particular families from each other (Deur 2005; Mathews and Turner 2017). These carefully tended gardens were considered a form of property, were managed under the guidance of clan chiefs, and were subject to rules governing inheritance (Deur et al., 2013; Dick et

al., 2022). Clams were used and consumed in such large quantities that the disposal of clam shells in turn changed the composition of soils, bringing much-needed calcium deposits to calcium-starved soils and increasing the growth and resilience of the iconic western red cedar trees (Mathews and Tuner 2017). Such practices go beyond categorization as conservation or management of a pre-existing resource, but exemplify how coastal ecologies emerged through intentional forms of cultivation (Thornton and Deur 2015).

These systems of cultivation and stewardship created a moral ecology, or what Thornton et al., (2015) call a "moral-ecological paradigm," as is also evidenced in fishing technologies and protocols. With over 1,200 registered fish trap sites between Southeast Alaska and Oregon as of 2017 (Cullon 2017), fish traps and weirs are prolific, technologically advanced fishing technologies in which fish migrating upstream are funneled through a series of wooden chambers into a holding area. In the overlap between Liǧʷiłdaxʷ and K'omoks territories, a large-scale trap fishery designed to harvest herring and salmon operated for at least 2000 years (Greene et al., 2015). Built and rebuilt over generations, the structure was at least 300 meters in length and consisted of up to 200,000 individual stakes (Greene et al., 2015). The traps were crafted in ways that minimized harm to the fish, enabled small, juvenile fish to avoid capture, and provided a safe pathway for other fish ascending the river (Langdon 2006; Thornton et al., 2015). WSÁNEC´ willow reef nets were similarly woven in rings that would allow some salmon to escape as a way of ensuring their return, with technologies like fish traps and reef nets being as much about escapement

as they were about catch (Claxton 2008). Certain families were responsible for the care of particular species and leaders from these families acted as wardens or guardians, specifying when fishing could begin or when it should be delayed (Dick et al., 2022). Under the direction of such guardians, traps were also removed upon a plentiful harvest so that the fish who followed could continue upriver, reflecting a care for and commitment to upstream neighbors as well as to the fish themselves (Arnold 2008). Salmon could also be encouraged to return through the scaping of streams, with many river paths showing signs of human modification (Menzies 2012, 174). These cultivation methods not only enhanced salmon abundance, but also enhanced the accessibility, resilience, and predictability of aquatic species, with humans themselves becoming central to the overall function and stability of the ecosystem (Thornton and Deur 2015).

Practices of transplanting, caring for, and cultivating provided an approach that might be characterized as one of more-than-management, what Thornton et al., (2015) go on to suggest is a "cultivation of relationships, rather than the management of resources" (191). For salmon, herring, clams, and even the traps, weirs, and nets used to harvest them were not secular, "natural resources," but living, moral beings, with spirits, decision-making abilities, and the capacity to act according to principles of respect and insult (Thornton et al., 2015). Disrespectful behavior, such as overharvest or an ill-cultivated stream, would insult the salmon and cause them not to return (Thornton et al., 2015). As such, salmon coerce people into living in good relation with them, or, as Dick et al., (2022) describe it: "If the species and habitats

were honoured through acts of management, they would—as sentient actors on the landscape—reciprocate to their human caretakers" (549). Cullon (2017) suggests that fishing technologies like traps might be reimagined as entry-points or doorways that welcome fish as they move between salmon-person and the human-person worlds (see Introduction). If humans and fish exist in a relationship of respect and reciprocity, she suggests, then fish traps were less machine-like in a hierarchy of human domination, but were operated and governed in ways that "respected the personhood and self-determination of fish"; after all, fish could consider whether humans had acted appropriately when choosing whether or not to enter the trap (Cullon 2017, 29).

Maintaining these proper relations involved adhering to systems of governance that structured inter-personal as well as fish-human relationships. Although root and clam gardens, fishing grounds, and the physical traps, nets, and weirs themselves were often subject to usufruct rights wherein sites and technologies could be shared amongst families, communities, and kinship networks, sharing with those outside of such networks generally only occurred according to specific parameters—to repay debts, for example (Thornton et al., 2015). Socioeconomic and ecological stability were intertwined. At the same time, however, sometimes ensuring proper relations meant defending and protecting territory. As a collective or perhaps better thought of as a collective of collectives, nations like Liǧʷiɬdaxʷ successfully defended their territories from outside encroachment when settlers began arriving upon the coastal shores. Adept navigators and strait-seafarers, often paddling by

canoe under the cover of night, Liğʷiłdaǩʷ watchmen and warriors not only enacted a toll at a main point of transit through the islands as described in the previous chapter, but they also defended their territories against Royal Navy gunboats, engaged in strategic alliances in order to engender territorial privileges, and defied the orders of missionaries in order to harvest the salmon needed to sustain their communities (Taylor 2009, 37).

The establishment of infrastructures like clam gardens and fish traps demonstrates that forms of cultivation and governance within marine waterscapes were more-than-ecological; they were also spatial, social, and moral, in turn creating complex networks of hierarchy, trade, kinship, and warfare that structured human and other-than-human life within the coastal straits for countless generations. Understanding the marine seascapes of the BC coast as definitively Indigenous, as shaped, claimed, and cared for by hundreds of unique Indigenous nations since time immemorial, speaks back to historical narratives that portray Indigenous peoples as opportunistic beneficiaries of a "naturally" abundant ecosystem. Recognizing seascapes as Indigenous also demands that we situate historical processes in which fish traps were outlawed and waterscapes were claimed as state property as key to creating settler colonial British Columbia.

## British Columbia, The Anomaly

In 1843, the Hudson's Bay Company (HBC) constructed a new post at the southern tip of Vancouver Island with the intention of developing trade routes for furs, food,

and fish that spanned from England to Hawai'i. Intended as a fur trading outpost rather than a colonial settlement and held by the British Colonial Office as a commercial preserve, Fort Victoria became the HBC's commercial headquarters on the Pacific coast and salmon purchased from Indigenous fishers soon became the Company's primary export (Clayton 2000; Norrgard 2020). At the time of Fort Victoria's colonial founding and settlement, the Salish Sea and the islands within its passages were enveloped within 19th century geopolitical struggles (Stewart 2017). Spain and Britain had already engaged in decades-long disputes about which European nation could lay claim to the region's waterways and islands (Stewart 2017). To the south, the Oregon Treaty of 1846 established that the territories of the United States extended through the mid-channel that separated Vancouver Island from mainland Washington State and the Royal Navy desired to strengthen its position in the northeastern Pacific in order to secure the trade routes now firmly under HBC control (Stewart 2017).

Britain declared Vancouver Island a British colony through a Charter of Grant in 1849 and, crediting its already established infrastructure, profitable trade, and relations with Indigenous peoples, awarded its lands and management to the Hudson's Bay Company (Mackie 1992; Clayton 2000; Gough 2012). With the Charter of Grant also came a declaration that the new colony was to fall under British law, bringing the island into a new type of colonial relationship with Britain. Operating under the premise that Vancouver Island was now under the jurisdiction of the Crown, James Douglas, Chief Factor of the Hudson's Bay Company at Fort

Victoria, initiated a land purchase process with fourteen Indigenous nations living predominantly around the Company's Victoria Fort the following year. The language of the agreements was almost identical for all fourteen nations, only changing with respect to the persons signing, the payment amounts, and the territories under concern. The agreements stated that "the land itself… with small exceptions, becomes the entire property of white people for ever" and in return specified that each nation was "at liberty to hunt over the unoccupied lands, and to carry on our fisheries as formerly."[10] As W̱SÁNEĆ scholar Nicholas Xumthoult Claxton (2008) points out, the treaty protection to continue fishing as formerly protects much more than fisheries alone: since fisheries were governed by specific people, families, and protocols and such techniques of governance were central to W̱SÁNEĆ's identity as an independent nation, the treaty protection to fish as formerly also necessarily protected the broader systems of governance and jurisdiction through which fishing took place.

It had long been established within British colonial law that title to lands in which Indigenous peoples were already living could not be obtained through conquest or occupation, but could only be claimed through legal succession (Roth 2002). The Royal Proclamation of 1763 which was to guide British settlement in what is now North America stated that only the Crown could buy land from Indigenous nations and such agreements were a prerequisite to settlement (Tennant 1990; Culhane 1998). The Proclamation stipulated that colonial governments were forbidden from

[10] The very short full text for each of the agreements can be found at: https://www.rcaanc-cirnac.gc.ca/eng/1100100029052/1581515763202

surveying or granting settlers access to unceded lands and that settlers were forbidden from claiming land unless it had first been purchased by the Crown (Borrows 1994; Culhane 1998; Clayton 2000; Roth 2002). As such, the Proclamation implied that no lands would be taken from Indigenous peoples without their consent and that Indigenous rights and title claims to land were protected until "ceded" by treaty (Borrows 1994; Norrgard 2020).

With the gold rush in 1858 came a growing emphasis on creating a colony suitable for settlement. Fearing that the US would soon lay claims to the newly discovered gold country, Queen Victoria established a new colonial government on the mainland, declaring it a Crown colony and changing its name to British Columbia with HBC Chief Factor James Douglas as its first governor. Victoria, still a small English outpost of a few hundred HBC employees, farmers, and their families, swelled to a city of over 30,000 seemingly overnight (Marshall et al., 2019). Yet, Vancouver Island was a colonial settlement that almost failed before it began. HBC officials in London, against the guidance of Douglas and other early settlers already stationed on the Island, established a premium price for land: 1 pound per acre, with a minimum purchase of 20 acres (Mackie 1992, 7). Settlers would also have to pay their own way from Britain and every purchase of 100 acres or more required the accompaniment of 5 single men or 3 married couples (Mackie 1992, 7). When land was available for one third of the price or almost for free just south of the border in the US, it was imagined that the exorbitant price of land on Vancouver Island would attract a landed aristocracy from Britain and spur ordinary people to engage in wage-

labor in order to be able to afford land (Mackie 1992, 8). The high price of land on Vancouver Island reflected London's desire to establish Canada as the "Britain of the North," complete with colonial governance, social hierarchy, and purposefully made in contrast to the "lawless American frontier" (Mawani 2007).[11] However, the plan, at first, was almost a resounding failure.

The lack of arable land on Vancouver Island thwarted London's desire for an agricultural economy, but a commercial, resource-oriented economy was quickly able to build the wealth settlers needed to buy land (Mackie 1992, 4). Masts, shingles, whale oil, fish, coal, and lumber were sent to Hawai'i, Alaska, and the US in exchange for foodstuffs that could not be sustained by the island's relatively small agrarian lands (Mackie 1992, 39). Soils might not have been productive for farming, but stories of rivers and shorelines bursting with fish still made the coast an attractive site for settlement (Stewart 2017) and access to land was mediated by the provincial government, who disposed of it under the assumption that it belonged to the Crown (Muszynski 1996). The two colonies of Vancouver Island and British Columbia operated side-by-side for eight years until they were united as one and, enticed by promises of a coast-to-coast railway, entered into confederation with Canada in 1871.

[11] Mackie (1992) states that the land purchase system "worked for those with money. It resulted in a conservative, atavistic, hierarchical, and land-based political culture dominated by those who could afford to buy land, most of whom were former and active Hudson's Bay Company employees… it resulted in the creation of a stratified colonial society where political power was vested, as in Britain, in the ownership of land. Unexpectedly, it worked also in the sense that wealth derived locally from commerce, resource development, and company wages could buy political power as efficiently as wealth derived from the profits of agricultural land (31-32).

However, the provincial government proceeded to settle, colonize, and claim British Columbia in ways that violated the terms set out by British colonial law (Culhane 1998, 16). Since 1864 when James Douglas retired as Governor of the Colony of British Columbia, all successive governments refused to recognize the Royal Proclamation of 1763, claiming that the Proclamation was never intended to apply to the "then undiscovered" British Columbia (Tennant 1990; Culhane 1998, 81). With the refusal of the Proclamation also came the refusal to recognize any form of Indigenous rights or titles to land. British colonial policy recognized a limited and highly circumscribed form of Indigenous land rights. The Royal Proclamation importantly recognizes the organization of Indigenous peoples into distinct nations, the political legitimacy of such nations, and that Indigenous lands can be collectively or communally held (Culhane 1998, 55). At the same time, however, under the terms of the Proclamation, Indigenous forms of land title are restricted to use rights, such as rights to use the land for hunting and fishing as seen in the Douglas Treaties, and are imagined as being more akin to "perpetual leases" rather than an accepted form of land ownership (Culhane 1998, 55). By limiting Indigenous land rights to occupancy and use alone and bestowing the Crown with the ability to "extinguish" Indigenous title, the Proclamation also de facto subordinates Indigenous sovereignty to Crown sovereignty (Reid 2010).[12] And, while it limits the ability for settlers to encroach on

[12] The Royal Proclamation also exists in tension with the earlier Doctrine of Discovery. Under the principle of terra nullius embedded within the Doctrine, lands could be considered empty and underlying title could be claimed if people inhabiting the land were not practicing Christianity or were not making use of lands in accordance with European legal expectations (Reid 2010). According to a Supreme Court of Canada ruling in 2014, "the doctrine of terra nullius (that no one owned the land prior to European assertion of sovereignty) never applied in Canada, as confirmed by the Royal

Indigenous lands, it also subsumes Indigenous peoples and their lands as being part of Crown dominions (Reid 2010).

Nevertheless, the principles of the Royal Proclamation, namely, that the provincial government was under obligation by order of the Crown to "extinguish" Indigenous title by way of treaties and the creation of reserved lands, were followed by governments in Canada east of the Rockies and by the federal government (Muszynski 1996; Tenannt 1990). In British Columbia, however, the province has consistently taken the position that Indigenous forms of jurisdiction and occupation are incommensurable with British forms of property ownership; thus, Indigenous nations have no legal claims to land or claims to compensation for land (Stewart 2017). According to British Columbia, land was not owned prior to European presence, and no forms of sovereignty existed before British sovereignty (Tennant 1990; Culhane 1998; Norrgard 2020).

As the only area of British North America where treaties were almost entirely neglected, Indigenous peoples that exist within the boundaries of the province today find themselves within what Christopher Roth (2002) calls "the British Columbia anomaly." Even the legitimacy of the treaties negotiated by James Douglas have been called into question. Continuing throughout the 20th century, representatives within

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Proclamation of 1763" (Tsilhqot'in Nation v. British Columbia). The doctrine of terra nullius has nevertheless legitimized the government's failure to enter into treaties with First Nations within the boundaries of British Columbia (Culhane 1998, 48). The Supreme Court's 2014 statement overlooks the fact that the Doctrine of Discovery was an already entrenched principle of international law by the time of the Royal Proclamation's drafting in 1763. As Jennifer Reid (2010) points out, the rights recognized by the Proclamation are double edged, in part because of their reliance on assumptions outlined in the Doctrine of Discovery.

British Columbia's judicial system asserted that the Douglas Treaties were merely land purchase agreements—not treaties at all—and therefore did not contain enforceable rights and were not binding on the Crown (Harris 2009, 147). After all, the negotiations initiated by Douglas were conducted in a manner that did not adhere to normative protocols of treaty-making. The Stevens Treaties negotiated just south of the border in Washington State, for example, recorded speeches made by Governor Stevens, included signatures by a military officer and several settler spectators, and guaranteed the "right of taking fish" (Vallance 2015). The official "minutes" outlining the treaty process also document that official treaty meetings were preceded by a series of informal talks and discussions with each nation, provide evidence of attempts to explain the documents in English, Chinook, and relevant Indigenous languages, and include description of Indigenous ceremonial protocols that accompanied the treaty-making process, signifying that the Indigenous interlocuters had some sense that they were engaging in serious, formal, negotiations (Vallance 2015). The Douglas Treaties, conversely, do not record any speeches or words offered by Douglas during the meetings, contain no indication that any effort was made to ensure that Indigenous signatories understood the concepts or offers that were being presented, were only witnessed and signed by HBC officials, provide no indication of any accompanying pageantry or ceremony as a way of emphasizing the importance of the situation, and only refer to a weaker and less-enforceable idea that signing nations were "at liberty" to hunt and fish (Vallance 2015).

Although the notion that such agreements were not Crown-binding treaties has since been dismissed (Harris 2009), nations like W̱SÁNEĆ continue to assert that they were agreeing to peaceful relations with the HBC representatives, not the sale or surrender of their lands to the British Crown.[13] Other critiques of treaty-making in British Columbia and elsewhere point out that treaties were made between parties that did not speak each other's languages (Foster and Grove 2008), that many treaties were written as land-sharing rather than land-cession agreements (Hill 2008; Claxton 2008), and that the concept of land as a transferable commodity to be traded would have likely been foreign or even incomprehensible to the Indigenous signatories (Foster and Grove 2008). Treaties like those signed between Britain and Haudenosaunee in the 17th century recognized each nation as sovereigns and allies with neither becoming subject to the other (Hill 2008, 31). However, by the time the British expanded their claims to the Pacific coast some one-hundred years later, Indigenous-Crown relations had shifted to an assumption that Indigenous peoples were now subjects or even wards of the Empire (Muszynski 1996; Hill 2008). As Indigenous peoples have asserted ever since, they never entered into any such relationship with a foreign power (Muszynski 1996, 93). Although 94% of all land in British Columbia is claimed and legally designated as Crown land, Indigenous peoples throughout much of BC continue to remain steadfast in their position that their lands are unceded and are thus claimed and occupied illegally.

[13] For an introduction to W̱SÁNEĆ critiques of the Douglas Treaties see: https://wsanec.com/the-douglas-treaties/#:~:text=The%20written%20version%20of%20the,with%20the%20Federal%20Government%20today.

Creating Canada's Oceans and Fisheries

The creation of British Columbia as a Crown colony not only enveloped the lands from the coastline to the Rockies within systems of British colonial law, it also fundamentally changed the ways in which marine space, particularly the straits that flow between Vancouver Island and the mainland, would come to be imagined, managed, and exploited. According to English common law at the time of British Columbia's creation, the Crown not only became the owner of most terrestrial land, the Crown also acquired certain "submerged lands," that is, land beneath tidal waters (Ginn 2006). The common law position held that running or percolating water could not be owned but the land beneath it could; by extension, proprietary rights could be applied to submerged lands rather than the water itself (Ginn 2006, 275). In Britain, this mostly applied to the lands under the tidal portions of rivers and later expanded to include the seabed out to 3 and then 12 nautical miles. In Canada, similarly, the seabeds and subsoils of the territorial sea became vested in the Crown.

British Columbia's maritime governance emerged partly as a result of conflicts with American fishers. The threat of American expansion loomed large and settlers in Victoria feared that the Americans next door might "wrench the keys to the Gulf of Georgia from our hands" (Stewart 2017, 74). That the border sliced through Indigenous territories, fishing grounds, and networks of kinship and mobility mattered not to colonial officials; "illicit" trans-border fishing troubled governments on both sides of the border (Wadewitz 2006). Indigenous nations who lived within the

borderland and had long fished on each side of the political divide soon became immersed in an increasingly volatile situation in which the waterways needed a heavy military presence in order to secure the new international border and stop American fishers from harvesting fish with a newly bestowed Canadian identity (Stewart 2017). P. Mitchell, Canada's first minister of the new Department of Marine and Fisheries warned in his 1869 annual report that Americans fishing in "colonial waters" posed a jurisdictional threat to Canada (Muszynski 1996, 98). Among Mitchell's first actions was to declare fisheries as a form of common property with the right to fish being a right that could be enjoyed by all British subjects (but British subjects alone). In asserting, "We claim for our people the same exclusive right to control the fisheries within the three mile limit that we do to control the mines, or the timber, or the soil of our country," (Muszynski 1996, 99; DMF Annual Report 1870), Mitchell reveals how settler claims to fish— akin to coal extracted from mines or timber harvested from forests— were central to the overall project of fueling colonization and fortifying Canada's jurisdictions and boundaries. In claiming that fish within three miles of the coastline properly belonged to the settlers of Canada, as was already an established facet of international maritime law, Mitchell certified that the property falling under the jurisdiction of the new state of Canada extended into the ocean (Muszynski 1996, 98).

Proprietary claims to seabeds and fisheries were reiterated a few years later when the Commissioner of Fisheries echoed that "the soil of public navigable waters belongs to the Crown, and the right of fishing belongs to the public" (Muszynski

1996, 100; DMF Annual Report 1875, xxxvi). By equating claims to fisheries with state claims to mines or timber stands, fish and seabeds solidified their position within an intimate relationship between property, state-making, and resource extraction. It remains worth noting that the "we" doing the claiming in Mitchell's statement is that of a white colonial government acting in correspondence with the mandates set out by the Crown, and the referral to "our people" likely referred to an imagined white, Euro-Canadian public and excluded any who might contradict the jurisdictional authority of the state.

Indigenous forms of marine territoriality that had long distinguished how fish and waterscapes were to be governed came into conflict with public rights to fish and access tidal waters, which have been enshrined in English common law since at least 1215. At this time, the Magna Carta placed limits on the Crown's ability to privatize fisheries and oceans and consequently generated "public rights of fishing and navigation" in tidal waters in England and its colonies (Scott 2008; Saunders and Finn 2006). While fisheries in Canada and around the world largely continue to be operated and managed under the rubric of being "common property" of their respective states and national citizenries, to be "common property" or "held in common" does not mean that they lacked governance. Rather, the creation of a "commons" also created a socio-legal category of "users" who inhered certain rights to use and move throughout the commons. In settler states like Canada, user rights were often delineated by race and nationality and came at the expense of Indigenous peoples and lifeways. The ability to participate in the harvesting of fish, for example,

has never been freely available to all; usually, systems of state licensing and legislations that delineate where, when, and how fish are caught greatly restrict harvesting abilities to specific people, places, and times (Marchak 1988; Schreiber 2008). Confederation with Canada meant that access to British Columbia's fisheries was now a legal privilege to be granted by the federal government (Schreiber 2008; Norrgard 2020). Fisheries were opened to certain publics while Indigenous claims to certain fishing grounds were subject to ever stricter regulation (Norrgard 2020).

Access to fisheries also became a key consideration in demarcating the size and location of reserves. As part of the governmental reserve commission that operated from 1876 to 1898, Indigenous nations were assigned specific tracts of land and specific fishing sites (Muszynski 1996; Schreiber 2008). It was intended that waters, beaches, and foreshores adjacent to reserves would be secured for Indigenous fishers; yet, the fact that coastal nations would still have access to fisheries and marine space was used as justification to allocate especially small land bases (Stewart 2017). It quickly became provincial policy that because Indigenous peoples in coastal BC were primarily fishing peoples who resisted agriculture as a primary economic and food-generating activity (notwithstanding that the rocky soils of the coast were not amenable to intensive agriculture), they were denied large tracts of land (Harris 2009; Silver et al., 2022; Reid 2015). Even Ottawa insisted that British Columbia was allocating far too little land for Indigenous nations living on the shorelines of the coastal straits (Stewart 2017). For the provincial government in Victoria, however, this was another example of Ottawa's failure to understand conditions on the Pacific

coast, where Indigenous nations would continue to fish instead of farm (Stewart 2017). Here, Ottawa also misunderstood Victoria's approach to colonial state-making. Whereas the federal government upheld an approach to colonization based on segregation, wherein treaties and large reserves would keep Indigenous peoples separate from settler society, British Columbia focused more on assimilation, wherein small reserves, a lack of treaties, few legal rights, and a dependence on wage labor would assimilate Indigenous peoples into the settler population (Muszynski 1996; Stewart 2017).

While certain areas of the waterscape were theoretically reserved for Indigenous nations, the continued rise of urban and industrial development and the establishment of commercial and sports fisheries slowly encroached upon the ability for such nations to have decision-making powers over their beaches, foreshores, or fishing sites. While settler law ruled against the pre-emption of "inhabited" land, designations as to what could be considered inhabited often excluded seasonal places of harvesting, hunting, and fishing (Stewart 2017). Because clam gardens that were cultivated over thousands of years, fields of camas that benefited from routine fire, and rivers to which salmon returned were only used or inhabited at certain times of year, more often than not they were classified as empty and unused in preemption documents (Stewart 2017).

Newly accessible by railroads and steamships, elite American and British tourists were lured to the coastal straits to partake in the respected past-time of sports fishing, with fly-fishing clubs gaining exclusive access to stretches of rivers and

coastlines through the granting of Crown land leases (Schreiber 2008, 92). Few other places offered year-round fishing and access to all five species of Pacific salmon. Fishing soon became a source of conflict as seasonal salmon migrations brought settlers and tourists to the same rivers and waterways that Indigenous peoples had been fishing since time immemorial (Schreiber 2008). At the behest of communities under their purview, a handful of Indian Agents petitioned for the need for Native fishing rights to be protected by law for fear that Native peoples would soon no longer be able to sustain themselves in the face of intense fishing competition and habitat destruction (Schreiber 2008). The federal fisheries department, however, argued that the common law position upholding the public right to fish prevented the Crown from "granting" exclusive fishing rights to Indigenous peoples (Schreiber 2008; Harris 2009).

Indigenous fishing practices were again curtailed when competition amongst commercial, sports, and Indigenous fishers intensified in the late 19th century. Indigenous methods of fishing such as fish traps and weirs were outlawed and destroyed under the pretext that they threatened salmon stocks and challenged the common property standing of the waterscape (Schreiber 2008). By 1888, Indigenous fishing was restricted to "the purpose of providing food for themselves" (Schreiber 2008, 89). The principle that Indigenous peoples retained a right to access fish through the Crown's long-standing obligations towards Indigenous peoples slowly transformed into rhetoric that regarded the ability for Indigenous peoples to

participate in fisheries as a "special privilege" that could be granted and taken away at the will of the federal government (Harris 2009; Schreiber 2008).

Although Indigenous peoples were forbidden from using fish traps, the same limitations did not apply to white fishers or cannery owners, who quickly adopted the trap as a method for increasing harvest while decreasing labor costs (Wadewitz 2006; Arnold 2008). Traps were permitted through the granting of a federal license but "only whites were eligible" (Harris 2009, 155). Commercial traps proliferated in Washington State, numbering over 500 by 1909 (Wadewitz 2006). Settler fisheries in Alaska, too, came to depend on trap technologies (e.g. Arnold 2008). In another anomalous situation, however, there were never more than twenty settler traps in operation in BC (Millerd 2002). The Department of Marine and Fisheries expressed concern that there were not enough sites for all who wanted to establish a fish trap (Millerd 2002). The industry was supposed to be one of open access and traps "mocked the Anglo tradition of an open fishery" by creating property rights and monopolizing choice of fishing locations (Arnold 2008, 61). Allocations of property rights in the form of fish traps came to be viewed by the public, fishers, and politicians alike as a form of privatization within the "ocean commons" (Millerd 2002; Arnold 2008, 61). By 1920, the Department took the stance that trap licenses would not be issued except in waters adjacent to British Columbia's borders with the US (Millerd 2002). One canning company became licensed to operate traps on the border of Alaska, and one company was permitted to operate five traps near to the southern border with Washington— after 1904, these were the only commercial

saltwater fish traps permitted in all of Canada (Fitzgerald 2015). Operating traps within Canada's borderlands was a strategic choice, intended to intercept the fish in the name of Canada before they entered US waters (Fitzgerald 2015). Yet, whether officials in Ottawa refused to license fish traps at the same rates as their US counterparts because of commitments to open access and the "Anglo tradition of an open fishery" remains unclear.

The abilities for Indigenous peoples to access and participate in fishing was further constrained by land use policies that encroached upon Indigenous lands and waterscapes. Ports, harbors, and other forms of infrastructure were needed to support the growing canning and shipping industries. Ferry terminals needed to be built in order to dock passenger steamboats and ferries that brought settlers and tourists to the shorelines. Timber harvests that were transported by boat needed storage space. Owners of houseboats and float homes questioned the applicability and legitimacy of Indigenous authority in marine spaces and foreshores (Stewart 2017). Under the common law doctrine, the foreshore was deemed to be under the possession of the province, unless public harbors were built in which case foreshore rights were assumed by Ottawa. In practice, "public rights to fisheries and navigation" meant that it was almost impossible to fortify any kind of marine space or foreshore from outside encroachment, whether such encroachment came in the form of sports fishers, float home owners, or tug boats hauling timber (Stewart 2017). Except in the rare instances where Indigenous rights to beaches had been explicitly mentioned in the creation of a reserve, the province eventually gained control of most beaches in front of reserves

(Stewart 2017). The Department of Marine and Fisheries "continued on the water what the Indian Reserve Commission had begun on land" (Stewart 2017), that is, carving and parceling the waterscape into a jurisdictional patchwork that persistently chipped away at the abilities for Indigenous peoples to assert control over space or resources.

In October 1896, a salmon-angling world record was set off the mouth of a river on the westward edge of the British Empire. Sir Richard Musgrave, an Eton and Cambridge educated Anglo-Irish aristocrat, caught a 70lb/32kg chinook salmon with a rod and line— the largest salmon known to be caught with such a method. Amidst swift currents and guided by a Liğʷiłdaǩʷ fisher known as Tom aboard a dugout canoe carved from a single cedar tree, the hooked salmon dragged the duo three miles down the coastline in an intense two-hour battle between men and fish. The same day, Musgrove and his other sporting companion also caught two 50lb salmon, two smaller 10lb salmon, four water fowl, and several trout. As local historian Diana Pedersen remarks, "to anglers accustomed to fishing for Atlantic salmon from the banks of domesticated British streams and rivers, this fantastic account held more allure than any tale of hunting lion in Africa" (2011, 5). News of the catch and the bounty of the east coast of Vancouver Island travelled to wealthy sportsmen in Britain and throughout the Empire via sporting magazines. Soon, anglers from across the Empire made their way to Vancouver Island in the hopes of besting Musgrave's

catch.[14] At the time of Musgrave's fishing expedition, settler life around the Cove was sparse, with a few homesteads and much of the surrounding land leased by timber companies (Pedersen 2011). This was all about to change, though, with the emergence of the canning industry in the Cove.

Canning, Fish, and Labor in an Industrializing Coast

In 1904, brothers William, Harry, Reginald, George, and Herbert Pidcock, first-generation Canadians born to English immigrants turned Cove residents, opened the Coveside Cannery, integrating the Cove into what was already BCs most profitable industry. The Pidcock family had settled on the island over twenty years prior when their father received appointment as the region's Indian Agent and slowly built the Cove into a commercial center with a store, sawmill, and logging operation (Taylor 1999, 51). Located near to the river that Musgrave helped to make famous, on the migration route of all five species of Pacific salmon, and far enough up Vancouver Island to avoid the fierce competition for fish and labor that plagued the Fraser River mouth, the Cove was the perfect place to build a cannery. Using handlines from dugout canoes as was the Liǧʷiłdaxʷ way, the Pidcock brothers fished from long before sunrise till long after dark to supply fish to their cannery, sometimes catching over 700 fish throughout 18-hour days (Taylor 1999, 66; Taylor 2009, 143).

[14] Narrative adapted from Pedersen, Diana. 2011. "The Fish That Made Campbell River Famous." *British Columbia History, A Journal of the British Columbia Historical Federation* 44 (4): 5–16.

While under the Pidcock's ownership, the Coveside Cannery was perhaps the only cannery in the world whose catch was taken entirely by hand (Taylor 2009, 143). Liǧʷiłdaxʷ men quickly became the cannery's leading fishers. Liǧʷiłdaxʷ fishers had already been working for canneries across the coast and embraced the opportunity to make a living closer to home (Greene 2010, 33; Inglis and Assu 1989; Taylor 2009, 143). However, facing managerial difficulties, the Coveside Cannery was soon sold and then sold again to W.E Anderson, gold-rush mine-claim-owner who added the fish operation to his growing list of investments in aviation, mining, sawmilling, and logging. Already possessing the wealth needed to integrate new mechanized fishing and canning technologies, Anderson acquired a fleet of five seine boats with crew from Scotland, Russia, Prussia, Norway, Nova Scotia, and Germany (Taylor 2009, 143). Although Liǧʷiłdaxʷ fishers knew the waters around the Cove better than anyone, federal law prohibited Indigenous fishers from working on mechanized boats (Taylor 2009, 147). Anderson remade the Coveside Cannery into a regional economic powerhouse that employed hundreds of Liǧʷiłdaxʷ fishers and canners, attracted workers from all over Canada and Europe, and sent fish caught in the Cove to markets throughout the US and British Empire.

The canning industry came to the Cove relatively late in the trajectory of canning in BC. Emerging in the 1870s at the same time as British Columbia's confederation with Canada and P. Mitchell's claims to state jurisdiction over fisheries, canning reshaped and built a future foundation of social, political, and economic relations across the Province. Sockeye salmon quickly became the

particular focus of canners' desires because they rivaled the color, texture, and taste of red kings, already established as the most profitable canned commodity in the US (Muzsynski 1996, 111). By the time the Pidcock brothers opened the Coveside Cannery in 1904, most mid-sized residential and commercial communities along the Strait played host to at least one cannery, with over 50 canneries already operating at the mouth of the Fraser River alone (Stewart 2017, 141). Shipped by rail across the rest of North America and leaving the Strait by boat destined for markets in England, Hawai'i, and across the Empire, canning entrenched Vancouver Island's place within the global trade networks first put into motion by the HBC. With over 56 million pounds of salmon canned in BC in 1905, canning technologies also enabled salmon returning to British Columbia's coast to become the most valuable fishery in the Dominion of Canada (Stewart 2017, 140).

The canning industry could not have reached this history-making status without Indigenous peoples, both in the Cove and across the coast. Indigenous workers comprised the primary canning labor force in the first decades of the industry and remained the largest source of employment for Indigenous peoples throughout much of the 20th century, particularly in rural areas (Wright 2008). Fishing and canning labor had long been organized according to racialized and gendered hierarchies, with Indigenous, Chinese, Japanese, and white labor largely held separate to the benefit of cannery owners.[15] However, access to capital and state regulations

[15] In the Cove, Liğʷiłdaǩʷ and white men fished for the cannery, a Chinese crew scrubbed and butchered the fish, Liğʷiłdaǩʷ and other Native and white women trimmed the fish to fit the cans, and the Chinese crew cleaned the cans, added salt, soldered lids, and sealed the cans ready for transport (Taylor 2009, 143).

disproportionately burdened Indigenous fishers as fishing and canning became more competitive and capital-intensive (Wright 2008). When fishers were paid per fish or per pound of fish they delivered to the cannery, being forbidden from working on mechanized boats and being confined to techniques like handlining greatly undermined their earning potential. At the same time, when the Department of Marine and Fisheries restricted Indigenous fisheries to being that of subsistence harvesting alone— itself a regulation aimed at prioritizing commercial interests— Indigenous fishers also lost the ability to fish commercially outside of the canning industry (Schreiber 2008; Wright 2008).

Later, even when the prohibition on the use of mechanized boats was repealed in 1923, Indigenous peoples were still forbidden from using reserve land as collateral and were therefore excluded from securing the bank loans needed for boats, nets, and equipment. As a result, Indigenous fishers became largely dependent on cannery-owned vessels (Muszynski 1996; Wright 2008; Norrgard 2020). Financed by company credit, sometimes under loans which were to be paid back at the end of the season, and often stipulated to deliver the entirety of the catch to the lender, employment via contracts with canneries enveloped Indigenous fishers within precarious systems of exploitation.

The critical labor provided by Indigenous peoples in the canning industry provides an important counter-point to common theorizations of settler colonialism. Foundational writings on settler colonialism by scholars like Patrick Wolfe (1999, 2006) and Lorenzo Veracini (2010) have importantly illuminated the logics of

Indigenous elimination and insatiable hunger for territory that animate settler colonial projects. The logic of elimination espoused by Wolfe and Veracini separates Indigenous peoples from the space of labor; Indigenous peoples, according to Wolfe, are "outside the mode of production" since "ideally, they don't exist" (Wolfe 1999, 27). Indeed, a particular emphasis on elimination as opposed to labor exploitation has been interpreted as a key difference that characterizes settler colonialism as a distinct formation. That Indigenous labor also helped to shape settler colonialism in North America shows how, while still being a unique and distinct formation, colonization in North America was still connected to and implicated within colonial projects elsewhere.

As mentioned above, British Columbia was somewhat unique in regarding integration into wage labor economies as a civilizing project that could assimilate Indigenous peoples into settler society. By undermining, regulating, and outlawing land-based subsistence and trade, settler colonial dispossession pushed Indigenous workers into the settler economies needed to build Canada (Camfield 2019). The fur trade, coal mining, sawmilling, and salmon canning all depended on an Indigenous labor force. Yet, as Camfield notes, because dispossession and elimination were never fully realized, many Indigenous communities were able to maintain some forms of independent subsistence and production, even if such activities occurred outside the boundaries of settler law. On one hand, by maintaining their own forms of subsistence and trade, Indigenous peoples resisted British Columbia's desire for Indigenous peoples to become fully integrated within and dependent on settler

economies; on the other, such partial independence was used as justification by cannery, sawmill, and mine owners to pay Indigenous workers exceptionally low wages (Camfield 2019). Wolfe recognizes that Indigenous labor has been central to the making of settler economies, but he suggests that such labor represents a contradiction to rather than an integral component of the settler colonial system (Wolfe 1999, 27). It could be tempting to place the central role of Indigenous labor in British Columbia as part of the province's "anomalous" situation. However, to do so would also overlook the primary place of Indigenous fishers and processors in Alaska, Washington, Oregon, and California, the domestic labor provided by Indigenous women in "outing" programs in the San Francisco Bay Area (Keliiaa 2019), and the Haudenosaunee ironworkers who helped to build New York City (Simpson 2014).

At the end of the 19th century, cannery owners flexed their political clout to maintain racialized systems of labor control when they advocated that fishing licenses be limited in number in order to restrict newcomers from entering the industry. In 1889 when such limited licensing regimes went into effect, the Department of Marine and Fisheries made 450 drift net licenses available for the purpose of catching salmon; 350 of these licenses went to canneries, greatly limiting number of independent fishers able to participate in the industry and giving canneries incredible power to determine who was able to secure a license (Norrgard 2020). The monopoly on fishing licenses that enabled cannery owners to pay low prices for fish led to the first major strike in British Columbia's history in 1893 (Norrgard 2020). When

cannery owners refused to increase daily payments and the price paid per fish to the demands proposed by the Fraser River Fishermen's Benevolent and Protective Association, 8000 fishers and cannery workers, thousands of whom were likely Indigenous, withheld their labor (Norrgard 2020, 130). In northern watersheds like in the Naas and Skeena where the fishing industry relied even more heavily upon Indigenous workers, strikes became an increasingly common tactic to negotiate labor power, with 4 strikes held within a 10 year period between 1894 and 1904 (Wright 2008).

At meetings in Vancouver, Indigenous fishers like Chief John of the Capilano and Chief Cranberry Jack expressed frustration that cannery owners purposefully stoked racialized divisions in order to keep fish prices low while the profits of their fishing efforts were rarely felt within their own communities.[16] Unlike white strikers, Chiefs Capilano and Jack also held Indian agents and the Department of Indian Affairs responsible for such injustices, asserting that the state and its agents were failing in their responsibilities to Indigenous peoples and their interests (Norrgard 2020, 132). Early attempts at labor organizing and unionization by the Association specifically targeted white and Indigenous fishers, purposefully excluding Japanese fishers and going so far as to insist that Japanese fishers be denied licenses (Norrgard 2020). Financial and employment barriers also caused Japanese workers to be

[16] According to Norrgard (2020), Chief John of the Capilano (who was most likely Joe Capilano, Squamish Chief) stated that cannery owners "carried their money away to another country" (citing *Vancouver Daily News Advertiser,* July 25, 1893.) The same argument is made over aquaculture.

particularly reliant on cannery-owned vessels (Wright 2008). However, when Japanese workers were intentionally excluded from organizing efforts, canneries responded by turning even more heavily to their labor (Wright 2008). The number of Japanese fishers within the industry was thus able to remain relatively stable during periods of instability when Indigenous fishers struggled to find employment, at least in northern watersheds like the Naas and Skeena (Wright 2008). Relationships of dependency fostered by racial capitalism and settler colonialism often operate in multiple directions.

In the Cove, Liǧʷiłdaxʷ fishers working for the Coveside Cannery successfully advocated that cash payments replace the customary payment of aluminum tokens that could only be spent at the cannery-owned store (Inglis and Assu 1989). Liǧʷiłdaxʷ fishers also compelled Anderson, owner of the Coveside Cannery, to urge the federal government to change regulations that prohibited Indigenous men from being seine-boat skippers, successfully negotiated with Anderson for higher fish prices, and formed the Pacific Coast Native Fishermen's Association to advocate for Indigenous fishing and labor rights within the coastal straits (Inglis and Assu 1989; Wright 2008). Liǧʷiłdaxʷ fishers were perhaps able to influence cannery operations in the Cove because of their longtime status as respected fishers and influential community members. Liǧʷiłdaxʷ families continued to comprise one of the largest segments of the Cove's population and the Band Council took an active role in community decision-making, including founding their own logging venture and bringing running water and electricity to the reserve before such

facilities were available elsewhere in the region (Taylor 2009, 155). It also helped that the Pidcock and Anderson families slowly came to be accepted as Cove locals, raising families, investing in schools, and living and working in close range with the workers at their service.

However, even in an instance wherein cannery operators were able to maintain seemingly positive relationships with Indigenous fishers, troubles remained. Cannery owners like Anderson held exclusive rights to fish in delineated areas around their canneries and exclusive rights to own seine boats within their allotted areas (Taylor 2009, 142). By the 1930s, commercial fishing was occurring in the waters around the Cove for at least 10 months of the year, and any remaining waters were reserved for sports fishers. Liǧʷiłdaǰʷ people were forbidden from fishing in waters already allocated to commercial or sports fishers and were forbidden from fishing commercially outside of canneries (Stewart 2017, 98). The Progressive Native Tribes of BC, another political organization formed to advance Indigenous political rights, wrote to the Superintendent General of Indian Affairs in Ottawa to ask for exclusive use of the waters around the Cove for Liǧʷiłdaǰʷ peoples (Stewart 2017, 98). The Minister of Fisheries refused the request, though, citing the need to protect the "public right to fisheries," even in waters like the Cove that were adjacent to reserves (Stewart 2017).

Within this context, Chantel Norrgard (2020) and Miriam Wright (2008) argue that fishers' work-centered experiences within an industrializing fishing economy coalesced with histories of land theft and dispossession to shape political

action throughout the 20th century. Whether organizing and participating in strike activities, directly urging cannery owners to revise work and payment systems, or petitioning the federal government to protect the place of Indigenous fishers within the industry, multiple forms of fisheries activism blossomed at the turn of and throughout the 20th century. According to Norrgard and Wright, such forms of activism illuminate how Native fishers navigated overlapping colonial and capitalist systems to ground labor and work-related movements within broader struggles for sovereignty and self-determination. When Indigenous fishers on the Skeena River wrote to the Department of Fisheries in 1960 emphasizing that Indigenous workers had been pushed from most commercial industries besides fisheries, and being alienated from this, too, was not only threatening their livelihoods, but was also "against the principle of the Crown" (Wright 2008, 61), Wright highlights how fishers' claims to fishing rights were embedded within their experiences building British Columbia's commercial economies. Here, fisheries regulations were not just a question of individual access, but were also part of a structural relationship between Indigenous peoples and the Crown. Remember that in instances where treaties were negotiated, treaty rights to fish inhere more than access to fish alone. Methods of fishing, distribution, and governance are also part of the "liberty to carry on… fisheries as formerly" (Claxton 2008). That fishers involved with strike and letter writing campaigns went on to become leaders in rights-centered and land claims movements exemplifies how labor struggles born of the era of industrialization were

also linked to an enduring care for land and waterscapes that informed how efforts to reclaim territory and self-governance would come to take shape.

Events in the Cove fit within a coast-wide trend wherein the canning industry gave rise to new forms of settlement, immigration, employment, wealth creation, and labor activism. Moreover, canneries brought capitalist modes of production to the fish that live and move throughout British Columbia's coast, spurring relationships of industrialization, commodification, and social stratification that aquaculture and fishing industries continue to entrench in contemporary times. Canneries helped to give birth to the boom-and-bust cycles that characterize Canada's resource economies; at the same time, however, the forms of political mobilization, alliance-building, and Indigenous leadership that emerged around the fishing and canning industries would live on to inspire and inform a wide range of sovereignty struggles continuing into the 21st century.

## Rights and Title in Settler Courts

Questions of Indigenous rights acquired new meaning when Canada passed the Constitution Act of 1982, which, in Section 35(1) states: "The existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed."[17] The entrenchment of what the document refers to as "Aboriginal and treaty rights" within the Canadian Constitution marked and gave rise to tremendous shifts within Canada's legal landscape (Harris 2009, 145; Culhane 1998). These shifts

[17] For full text of Section 35 see: https://laws-lois.justice.gc.ca/eng/const/page-13.html

would be particularly acute in British Columbia, where the province had long held that the rights outlined within the Royal Proclamation did not apply to the lands or nations within provincial boundaries. Under the Indian Act, Indigenous nations were forbidden from pursuing land claims or engaging in any organizing or fundraising that might lead to land claims from 1927 until 1951. Consequently, histories and legalities of Indigenous rights were largely unknown to members of the judiciary when land claims cases started to be heard in courts in the 1960s (Harris 2009). At the time of the new constitution's patriation,[18] British Columbia continued to refuse recognition of any form of Indigenous title, instead asserting that all title claims were vested in the Crown (Harris 2009, 143). Section 35(1) of the Constitution Act of 1982 opened the door to land claims and rights litigations that now had the weight of the Constitution behind them.

The brief reference to Aboriginal and treaty rights only found its way into the Constitution following decades of litigation and direct-action organizing once the Indian Act amendment forbidding the pursuit of land claims was repealed in 1951 (Blomley 1996). Partly as a response to the province's outright denial of Indigenous title, blockades proliferated across BC's logging roads, public routes, and rail lines in the 1970s and 80s more than anywhere else in Canada (Blomley 1996). In 1974, the Native People's Caravan travelled from Vancouver to Ottawa to hold the federal

[18] According to the Centre for Constitutional Studies at the University of Alberta, ""patriation" is a Canadian term that describes the transformation of Canada's Constitution from an act of the British Parliament to an independent Canadian Constitution that was amendable by Canada The word itself is taken from 'repatriation,' meaning to return something to its own country."

government accountable for broken treaties and conditions of impoverishment in Indigenous communities (Skelly and Baker 2020). The following year, Indigenous peoples in BC also occupied Department of Indian Affairs offices across the province, pressuring the state into land claims negotiations and urging a redistribution of federal funds away from government agencies and directly to Indigenous governments (Nickel 2016). Indigenous peoples in BC and across Canada helped to constitute the forms of international and hemispheric political mobilization that define the Red Power era of the late 20th century. Indeed, it could be inferred that the province only recognized Aboriginal title in 1991 in response to and because of widespread direct-action movements that disrupted the flows of goods and people across the province in preceding decades (Blomley 1996).

Nevertheless, while the Canadian Constitution Act might have "recognized and affirmed" "treaty and aboriginal rights," it neither created nor defined such rights. Indigenous rights do not originate in any document, agreement, or treaty; they arise from the occupation of Canada since before assertions of British sovereignty (Ginn 2006). Indigenous rights precede any state document, treaty, or law. However, the practicalities of what these rights legally entailed remained elusive for settler courts, especially outside of treaty contexts. Section 35 was envisioned as an "empty box" that further litigations and negotiations could fill, leaving the courts to determine what constituted an "existing treaty and aboriginal right" on a case-by-case basis (Culhane 1998, 101). Perhaps unsurprisingly when considering the central role of fish and fish industries on British Columbia's coast, one of the first "rights" to be debated

under the terms of the new Constitution concerned the fishing rights of Musqueam Nation.

On May 25th 1984, Musqueam fisher Ronald Sparrow went fishing in the delta of the Fraser River, as Musqueam people had always done, using a drift net measuring 45 fathoms— a net deemed too large under the recently imposed 25 fathom restriction (Elliott 1991). Sparrow was arrested and charged with contravening the Fisheries Act by fishing with a net that was too long. Sparrow and Musqueam Nation argued that Musqueam people retained the right to fish within their ancestral territories and this right to the land and its resources had not been extinguished by way of treaty, thus Sparrow was practicing an existing Aboriginal right as outlined under the new Constitution Act (Culhane 1998, 102). Although the trial judge and the British Columbia County Court found Sparrow guilty of violating the terms of his fishing license, the British Columbia Court of Appeal overturned the conviction, sending the question of Musqueam fishing rights to the Supreme Court of Canada (SCC) (Harris 2009; Elliott 1991).

The Supreme Court heard evidence regarding the use of fishing sites pre and post European settlement, the role of salmon consumption in subsistence, ceremonial, and social circumstances, and the importance of salmon in establishing inter-nation relationships and trade economies. Six years after the original arrest, the Supreme Court ruled in favor of Mr. Sparrow: Musqueam Nation's rights to fish had not been extinguished and therefore constituted an "existing" Aboriginal right now legally protected under the Constitution Act (Culhane 1998, 102; Harris 2009, 151). This

existing right specified that Musqueam and other coastal nations have unique rights to fish for food (subsistence), social, and ceremonial purposes— what would come to be known as FSC fisheries. With this ruling, the Sparrow case also established an initial framework from which to interpret Indigenous rights, with broad implications beyond Musqueam fishing practices alone. Importantly, the Supreme Court established that assertions of Crown sovereignty do not de facto extinguish Aboriginal rights and title, as had been the position upheld by British Columbia for over a century. The Supreme Court maintained that the Crown needed to make its intention to extinguish Aboriginal title explicit and where this had not been done, Aboriginal rights and title continued to be in effect (Culhane 1998, 103). Critically for fishers on the coast of BC, though, the case did not revisit the question of Musqueam rights to fish commercially. Across the border, Indigenous fishers in Washington State had secured the right to half of the state's allowable catch under the Boldt Decision in 1974; yet, in Canada, Ottawa still refused to recognize any unique Indigenous fishing rights beyond a right to a food, social, and ceremonial (FSC) fishery (Stewart 2017, 106).

While the case regarding Mr. Sparrow's ability to fish with a 45-fathom net worked its way through the federal court system, another case regarding title rights to land was being heard in British Columbia. In *Delgamuukw v. British Columbia* (1987), Gitxsan and Wet'suwet'en Nations sued the federal and provincial governments for legal recognition of ownership of and jurisdiction within their ancestral territories— a vast area encompassing 22,000 square miles of northwestern British Columbia (Roth 2002). Since they had not entered into any negotiations that

would cede, sell, or surrender their lands, and since they had lived within the same territories since before the arrival of European settlers, they asserted themselves as the proper owners, governors, and care-takers of the lands in question; in settler terms, they asserted Aboriginal title and rights to the land (Culhane 1998, 26). After more than four years at trial and one year after the Supreme Court's landmark decision in *Regina v. Sparrow*, British Columbia's Supreme Court reached a decision: "No Aboriginal title or rights had pre-existed European settlement… and even if they had, they had been extinguished by the simple fact of Britain asserting sovereignty" (Culhane 1998, 29). Gitxsan and Wet'suwet'en claims to Aboriginal rights and title were "accordingly dismissed," wrote Chief Justice Allan McEachern in his Reasons for Judgement.[19] The Province upheld its original position that Aboriginal rights never existed within British Columbia.

Part of the trouble stemmed from notions of what constituted proper land ownership in the eyes of the court. Chief Justice Allan McEachern suggested that Gitxsan and Wet'suwet'en Nations had been too "primitive" in the 18th century to have property laws or institutions of governance that could be considered on developmental par with the concepts of property upheld by British law (Culhane 1998, 16) — a familiar stance that followed precedence set by other provincial judges.[20] Again, the appeals process directed the case to Canada's Supreme Court.

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[19] For full text of the Reasons for Judgement see: https://specific-claims.bryan-schwartz.com/wp-content/uploads/docs/Delgamuukw_BCSC_1991.pdf or https://www.canlii.org/en/bc/bcsc/doc/1991/1991canlii2372/1991canlii2372.html

[20] For example, in cases like Calder v. R. the Supreme Court of British Columbia ruled that Nisga'a people were too "primitive" in the 19th century to have held concepts of property (Culhane 1998, 81).

Six years later, the federal Supreme Court did not determine whether Gitxsan and Wet'suwet'en Nations held title to the lands in question, neither reversing BC's ruling nor awarding the case to Gitxsan and Wet'suwet'en Nations; they did, however, overturn several of Judge McEachern's reasons for judgement (Roth 2002). Perhaps most importantly, the federal Supreme Court upheld and extended their position in *Sparrow*, decreeing that the Royal Proclamation does in fact apply to British Columbia and that Aboriginal title within the Province was never extinguished and is therefore still in existence (Roth 2002). The federal Supreme Court also confirmed that Aboriginal title: 1) involves more than a right to use land in traditional ways; 2) is title to the land itself; 3) inheres a right to use the land for a broad range of activities; 4) includes the right to exclude others, and 5) is connected to pre-contact occupancy and continuity of use of a given area (Ginn 2006, 279).

Such an understanding expanded Indigenous title rights to include jurisdictional authority over how lands or territories are used, the first time that Canada had ever recognized Indigenous jurisdiction within unceded territories in this way. As such, the decision transformed Indigenous, government, and Crown relations concerning third party and private property interests. In particular, it specified that the Crown has a responsibility to negotiate with Indigenous title-holders when third parties have interests in developing, expropriating, mining, or otherwise transforming lands that might fall within an Indigenous title claim area. Additional cases like *Haida Nation v. British Columbia*[21] and *Taku River Tlingit First Nation v. British*

[21] For full text of this case see: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/2189/index.do

*Columbia*[22] further specified that the Crown maintains this responsibility to consult even if the existing Aboriginal title claim has not yet been confirmed in court. In a province founded and settled on the premise that Indigenous rights to lands and resources do not exist, cases like *Sparrow* and *Delgamuukw* radically shifted political possibilities for Indigenous nations in British Columbia.

While such cases enshrined into law a broader ideological shift wherein the Crown was no longer regarded as bestowing rights but was more recognizing that complex social and political systems and claims to land already existed prior to European arrival, they did little to transform the foundational role of the Crown in Canada. Underlying title to all lands (and certain submerged lands) in Canada continues to be vested in the Crown. As was decreed in 1763, the Crown still retains the ability to infringe upon or extinguish Indigenous rights and titles to land and therefore continues to operate from a place of self-imposed superiority.

Rights-centered discourse and legislation also involves multiple translations that fundamentally alter the politics and praxis of Indigenous nationhood. Firstly, legal rights often (even if inadvertently) become married to sometimes static and past-oriented notions of culture. When Justice McFarlane wrote that "the nature and content of an aboriginal right is determined by asking what the organized aboriginal society regarded as an integral part of their distinctive culture" in the court's Reasons for Judgement in *Delgamuukw v. British Columbia* (McNeil 1997, 145), he codified the ability for settler courts to decide what does or does not count as an "integral" and

[22] For full text of this case see: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/2190/index.do

appropriate component of culture when designating legal rights. As Culhane cautions: "The prospect of the Supreme Court of Canada determining what is and what is not 'Aboriginal culture' is foreboding indeed" (1998, 105).

Secondly, Indigenous peoples consistently talk about the ability to hunt, fish, and gather in ancestral territories, engage in landscape management practices in ways that support cultural renewal, and partake in decision-making principles according to their own laws and governance systems as forms of responsibility, relationality, and respect; however, courts do not have ways to account for principles of relationality and respect in settler legal systems (e.g. Corntassel 2008). Such responsibilities must be translated into the language of property and rights in order to be legible to the state (Nadasdy 2002). This translation is evident in the statement issued by the Union of British Columbia Indian Chiefs in 1998, following the reimagining of Indigenous title that followed the *Delgamuukw* decision:

> There remains a significant difference between what Indigenous Peoples see as being our "Original Title" to the land and its resources, and the Canadian legal notion of "Aboriginal Title." Our goal is to move from a formal legal recognition of Aboriginal Title into a meaningful assertion "on the ground" of our Original Title. The *Delgamuukw* case is only a legal decision which does not acknowledge the fullness of our relationship with the Land or the complete measure of our inherent jurisdiction over the Lands and Resources (UBCIC 1998a).

As the UBCIC signifies, Aboriginal title, in its position inferior to the Crown, with its inchoate duties to consult, and its foundation within settler law, is not the same as Original Title, which is realized through the political actions of people on the ground,

is based in each nation's individual laws, and operates whether or not it is recognized by colonial governments.

Finally, such forms of incommensurability stem, in part, from differing notions of what it means to have decision-making authorities within a given area. In European legal traditions, such decision-making authorities stem from concepts of property and ownership. Yet, as authors like Paul Nadasdy (2002) and Jeff Corntassel (2008) have pointed out, European property traditions are not always an appropriate way to conceptualize Indigenous relations to lands, waters, and other-than-human forms of life. Only when land becomes a commodity can it be owned in ways that European property traditions might recognize (e.g. Moreton-Robinson 2015; Nichols 2018). When Wet'suwet'en land claims were being debated in British Columbia's Supreme Court, Chief Justice McEachern heard evidence regarding the transference of land through matrilineal descent groups called houses, oral records of territorial boundaries and place-names, and the differing names, crests, and land areas associated with each house; together, such forms of political and social organization regulated land tenure and political, social, and economic life across all of Gitxsan and Wet'suwet'en territory (Roth 2002). However, McEachern still concluded that: "Ownership… at the time of British sovereignty… was nothing more than the right to live on and use the land for aboriginal purposes… These aboriginal interests did not

include ownership of or jurisdiction over the territory. Those claims of the plaintiffs in this action are dismissed."[23]

When the recognition of rights is always conditional, premised on strictly demarcated notions of culture and saturated with mistranslations that fundamentally alter ways of engaging with the world, Indigenous scholars like Glen Coulthard (2014), Taikake Alfred (2005), Jeff Corntassel (2008), and Leanne Simpson (2008) urge Indigenous nations across the world to reject the colonial politics of recognition. Instead, they argue, Indigenous nations should build and practice self-determination on their own terms. Following Frantz Fanon (1991), Coulthard (2014) proposes that the recognition-based approach to Indigenous self-determination has not only failed, but is a means through which colonial relations and state power are produced and maintained. When authenticity and tradition become the rubrics against which rights to self- determination are judged, and when rights-and-recognition-based politics operate through terms dictated by and to the benefit of the state, Coulthard explicitly urges Indigenous communities to "transcend the fantasy that the settler state apparatus is somehow capable of producing liberatory effects" (Coulthard 2014, 23). Alfred (2005) similarly suggests that instead of facilitating the realization of self-government and land restitution, recognition politics do little besides further entrench state supremacy (aka white supremacy) in law and practice. At the same time,

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[23]Delgamuukw v. British Columbia, 1991 CanLII 2372 (BC SC)**:**
**https://www.canlii.org/en/bc/bcsc/doc/1991/1991canlii2372/1991canlii2372.html**

discourses of rights, liberties, and multicultural inclusion work to absolve settler responsibility and guilt, obscuring ongoing relations of power and domination (e.g. Hartman 1997). This is what Culhane (1998) calls the fundamental contradiction, paradox, and deceit of Canadian political liberalism, and I would perhaps extend to encompass liberalism more broadly: "an abstract philosophical commitment to humanism… coexists with an enduring concrete material practice of inequality" (49). Rights are recognized "in name only," (Corntassel 2008) while Indigenous lands continue to be mined, drilled, developed, appropriated, and polluted without consent, land-based practices continue to become increasingly difficult in an era of rapid environmental change, and land and water defenders who enact Original Title on the ground face arrest and criminalization.

Canada has embarked on a supposedly renewed relationship with Indigenous peoples under the umbrella of "reconciliation" in the 21st century. First appearing in official discourse in 1998 and becoming an official objective of Indigenous-state relations under the government of Prime Minister Justin Trudeau, government attempts at reconciliation involve official apologies, monetary settlements, upholding duties to consult with Indigenous nations with regards to decisions that might impact their lands and communities, and reforming state systems like policing, child welfare, education, and healthcare to be more responsive to Indigenous peoples and their needs. However, Indigenous scholars, activists, and lawyers maintain that reconciliation can never truly be achieved as long as Canada and the provinces maintain that they are the rightful owners of lands and waters and as long as the

Crown reserves the ability to infringe upon or extinguish Indigenous title rights. As Secwépemc land defender Kanahus Manuel and Shiri Pasternak (2018) highlight, the limitations of reconciliation are revealed daily when Canada continuously prioritizes extraction and development at the expense of Indigenous rights and title. In British Columbia, these frictions come to the fore in decisions to dam the Peace River and flood the territories of 39 First Nations whose lands are protected by treaty, to double the amount of diluted bitumen moving through the lands of dozens of nations including Secwépemc, Wet'suwet'un, and Musqueam by doubling the size of the Trans Mountain Pipeline, to log the only remaining old-growth forests on Vancouver Island, and to raise Atlantic salmon in pens anchored to the seafloor within the bays and inlets of the coastal straits. These are instances in which assertions of Indigenous rights and title are able to call into question the legitimacy and existence of Canada's resource economies. As the UBCIC stated in 1998, Indigenous communities and nations will continue to enact Indigenous rights and title on the ground, even if legal recognition of such abilities continues to fall beyond the purview of colonial courtrooms.

## Conclusion: Aquaculture in the *Longue Durée*

Practices and processes of settler colonialism in British Columbia have long been enacted on and through fish and marine waterscapes. The coastal waters of ʾNa̲mgis, Liw̓iłdax̌w̓, K'omoks, W̱SÁNEĆ and other Indigenous territories have always been subject to systems of marine stewardship and tenure that cultivated human and other-

than-human relationships according to principles of respect and reciprocity and in ways that upheld aquatic beings as autonomous decision-makers. However, ever since the HBC claimed its monopoly over Vancouver's Island, the lands and waters that would become British Columbia have been linked to distant markets eager for minerals, fish, and wood. The reclassification of the seafloor as "submerged lands" enabled the coastal straits to become subject to property claims and colonial systems of governance. By extension, as marine space came under the divided jurisdictions of the provincial and federal governments, the bounties of Vancouver Island's seascapes were secured for the good of Canada and the waterscapes and the lives of those within them became imbued with a new colonial identity. Such claims to colonial sovereignty over marine space were historically situated within attempts to secure Canada's new borders and bring Canada's new province in line with established facets of British law. Bountiful rivers and coastlines enabled Vancouver Island's seascapes to acquire a particular place within the colonial imagination, although the scope and role of Indigenous peoples in actively creating this abundance has consistently been overlooked under a settler colonial structure of erasure.

In an era of unprecedented fish population declines, it is important to recognize how aquaculture fits within and is built upon earlier iterations of salmon capitalism. Salmon themselves have been subject to multiple and overlapping waves of colonization in ways that link settler state claims to territory and jurisdiction with salmon bodies, movements, and populations. Aquaculture enters into a political context characterized by violent histories of exclusion in which appropriation and

regulation of fisheries and ocean space have long served as catalysts for settler claims to jurisdiction within Indigenous territories. Throughout the 19th and 20th centuries, salmon became the subject of a double fetishization—first as a resource that could be extracted, an economy-building commodity made through racialized labor, and second as a trophy, a symbol of class, status, and superiority. Cultural categories became bureaucratic divisions that persist today (a theme that reemerges in Chapter Three), as is evidenced in in the division between FSC, commercial, and sports fisheries. Perhaps even more critically, aquaculture facilitates the continuation of salmon-as-resource, enabling salmon to reaffirm their place as an extractable and exportable commodity, central to building Canada's economy. Aquaculture practices that remake salmon into a standardized, mass-produced form of protein are part of a fish production system still wrestling with the legacies of canneries and the limited licensing schemes, economic dreams, and fish-to-market schemes they helped to create. Coastal waters continue to provide the raw materials needed for producing salmon while fish are exported to markets in the US and Asia and the profits from such endeavors pad the stock portfolios of investment firms and shareholders elsewhere— colonial relationships renewed for the contemporary era and a familiar business model in more ways than one.

The foundational assumption that the Crown holds jurisdiction over "submerged lands" and thus proprietary rights can be applied to lands beneath tidal waters rather than to the water itself is also key to the structure of aquaculture tenure systems. Aquaculture companies operate through the granting of Crown land leases

wherein they acquire rights to lease and anchor farm infrastructures to certain portions of the seabed (see Chapter Two). Fishers and community members who become restricted in their abilities to use, live in, or move throughout the waterscape point out that aquaculture facilities consequently infringe upon public rights to fisheries and navigation that have been sanctified in English common law since the 13th century.

At the same time, public rights to fishing and navigation are wielded as reasons as to why Indigenous nations might not be able to claim specific areas of the waterscape as part of a title claim area. Remember that in the *Delgamuukw* case, the Supreme Court of Canada affirmed that the right to exclude others is a component of Indigenous title. Dianne Ginn (2006) suggests that this characterization of Indigenous title as exclusive might pose the most challenging obstacle for Indigenous nations attempting to assert title rights to seabeds, marine spaces, or tidal portions of rivers, since recognition of Indigenous title and therefore exclusivity in these areas would contradict common law positions of public rights to fishing and navigation and international rights to innocent passage (266). In ways that resonate with the prohibition and violent destruction of fish traps in the 19th century, Indigenous title rights again come to be seen as a threat to the common property standing of the waterscape. Yet, whether through the Crown land leases that enabled elite sports fishing clubs to gain exclusive access to certain areas of the coast, the granting of exclusive user rights and fish trap licenses to cannery owners, or more recently the granting of Crown land seabed leases and exclusive user rights to aquaculture

companies, the rules that govern common property and public rights have always been subject to exceptions, contradictions, and inconsistences in ways that buttress state power. Such fractures and contradictions in how legal systems are made and mobilized are commonplace practices through which structures of settler colonialism are maintained (e.g. Raibmon 2008).

In British Columbia, where most lands and all coastal waters remain unceded, and where most nations including Liǧʷiłdaxʷ and ’Nam̱gis have not entered into treaties with the Crown or any other foreign power, salmon aquaculture becomes a site through which broader historical and ongoing contestations over land, water, and resources come to the fore. As demonstrated in the quotes that open this chapter, George and other Indigenous leaders throughout the region argue that the government does not have the authority to grant aquaculture tenures in unceded waters and territories in the first place. Calls for consent, consultation, and on-the-ground assertions of Indigenous rights and title to be taken seriously in the development of the aquaculture industry are based in histories of advocacy that have always pushed Canada’s legal system to affirm that rights continue to be in existence and that the Crown has a responsibility to negotiate with Indigenous title-holders.

The inherent paradox of the Crown “recognizing” and retaining the ability to “extinguish” Indigenous rights and title prefigures the place of Indigenous nations within an unequal power relationship. Yet, efforts to evict salmon farms, track viruses, and reclaim marine territories demonstrate how Indigenous nations engage with state entities without ever being fully captured by them. While references to the

UN Declaration on the Rights of Indigenous Peoples and the lack of treaties between Crown and Liǧʷiłdaxʷ governments in the chapter's opening statements are not an overt "refusal" of settler systems of power (e.g. Simpson 2014), neither are they a politics that depends on state recognition. Indigenous leaders, communities, and nations assert that such rights and jurisdictions exist (e.g. see Conclusion), whether or not they are recognized by the Crown or Canada. Such political assertions are sometimes mobilized through the language of sovereignty, although even sovereignty remains an imperfect concept to fully comprehend how long-term care for land and waterscapes and relationships of inter-dependence (both human and other-than-human) enable Indigenous nations to live outside of legal "rights" and state-like forms (e.g. Cattelino 2008; Bauder and Mueller 2023).

Premier John Horgan's announcement in the winter of 2018, detailing that aquaculture operations in the Broughton Archipelago would be closed following a consent-based government-to-government process, was couched in the language of UNDRIP, reconciliation, and Indigenous title and rights. The agreements, heralded as "the first-of-their-kind," had the weight of colonial history, and centuries of Indigenous advocacy and resistance, behind them. However, the processes unfolding in the Broughton are unique. The state does not always respond so positively to Indigenous advocacy, resistance, or assertions of title and rights. When we travelled to sites of aquaculture production in order to observe the day-to-day operations of aquaculture facilities, George and other Indigenous leaders stated that they were simply moving throughout and existing within their ancestral territories, monitoring

what was happening within their homelands (see Chapter Four). That such actions were met with threats of arrest and legal injunctions that prevented anyone from coming within a certain distance of aquaculture facilities makes clear that aquaculture is, like the anchors fastened into the seabed, moored to ongoing structures of settler colonialism that rely on dispossession, capitalism, and nation-building to serve as preconditions for its development. With this stipulation in mind, let us return to the Cove to see how a varied collection of community members encounter, understand, and wrestle with aquaculture in contemporary circumstances.

## Chapter One

## Aquaculture Amidst Uncertain Fish Futures

*May 2019*

COMMERCIAL - Salmon: Seine - Area B - 2019 Licence Issuance Information, June 7, 2019

> 2019/2020 Salmon by Seine licence issuance for Area B is now available through the National Online Licensing System (NOLS).
>
> Harvesters will use the National Online Licensing System (NOLS) to go online to view, pay for and print their commercial fishing licences, conditions of licence, and/or receipts.
>
> It is a condition of licence that the licence document and conditions of licence are on-board while actively harvesting.[24]

*Figure 4: Juvenile Pacific salmon in the waters of the Cove*

During the springtime, the waters of the Strait of Georgia swell with thousands of young, juvenile fish. The salmon are freshly smoltified and their finger-sized, silver

[24] https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=221921&ID=all

bodies crowd in schools near the shoreline, feeding in the nutrient-rich waters before they ride the current through the straits and out to sea. I watch them from the dock in the Cove, training my eyes to focus on the correct depth— not too deep— to be able to detect their small bodies against the grey-green rocks below. There are hundreds, no— thousands! The tiniest disturbance on the water's surface causes hundreds of them to flit in another direction. I drop a leaf onto the water to see their reaction— it sends them scattering in every direction. George seems to think that there are different fish here every day, each wave heading on to the next bay or inlet, slowly embarking their migration out to sea. Others seem to think it is the same group of fish, feeding in the waters of the Cove, growing bigger, before they travel north through the Strait in a few weeks.

I especially like to sit with them at dusk. Silhouetted against the sun setting behind the wheel of the seine drum of the *Silver Fin*, thousands of fish jump to the surface each evening, splashing as they catch insects and flies at the water's surface. Listening carefully, the waters echo with the sound of thousands of faint pitter-patter sounds, similar to the sound of rain, as the fish momentarily leave the water and then plop back in. Seals and otters skulk around the edges of the Cove and eagles perch on tree branches, all eagerly seeking out their next meal. I imagine this scene replicating in coves and inlets throughout the coastline. This is just one stop along one of North America's largest and longest salmon migration routes.

As the smolts ready to begin their out-migration to sea, for some, the presence of the fish brings hope for the season to come. The drizzle and wind chill of March

and April give way to newly budding wildflowers, the tips of conifers emerge with bright green sprouts, and the fiddlehead ferns are almost ready for harvest. The light of daytime stretches a few more minutes each day and soon the snow that caps the mountains on the horizon will start to melt and feed the streams during the dry summer. As my friend Liz likes to say, "spring fever is in the air, and everyone has it."

Tara already has her hands full managing the little fish and chip window at the end of the dock but there is much to do to prepare for the grand re-opening of the seasonal fishing lodge that she also helps to operate during the summer. Soon the sports fishing tourists will emerge from their hibernation on the mainland and will descend on the Coveside Passage in pursuit of their latest catch. The Cove became a famous sports-fishing destination during the 1920s when catching a prized and elusive 30-pound chinook salmon could earn initiation into the region's exclusive "Tyee Club," so-named to revere the "tyee" chinook salmon that helped to make fishing in these channels so famous. These days new-inductees are less common since the famed 30-pound chinook has become a relative rarity, but many sports fishers still travel to the Cove and fish aboard classic row boats (use of sonar or motor-operated boats is not allowed to meet club requirements) in hopes of joining a century-old registry of respected anglers. Club membership does not matter to most sports fishers, though, who are simply excited to be able to catch that night's dinner. Before guests can arrive, however, cooks, hosts, cleaners, and guides need to be hired, the whole place needs to be de-cobwebbed after the long winter, and much of the landscaping

and electrical equipment needs maintenance. Usually Tara has plenty of time to finalize these preparations during the spring, but the warmer-than-average seasonal temperatures already have tourists flocking to the coast and it has been hard for Tara to escape the daily duties of managing the fish and chip window.

Sarah, a former oil field electrical engineer and everyone's favorite prairie-chicken,[25] has just signed a lease to rent the available space in the village to start a one-woman seafood wholesale business. Everyone on the island is looking for a fresh, affordable source for seafood and Sarah has a truck big enough to transport half a dozen totes at a time and friends of friends all over Vancouver Island with the best deals. The small storefront space is barely large enough to fit more than three people, but it has the electrical outlets needed for a refrigeration appliance and a deep freezer, and that's the important thing. The hotel restaurant she works at during the summer closes during the winter off-season so she's hoping that selling seasonal seafood goods— chums in the fall; shrimp and spot prawns in the spring; sockeye, halibut, and ling cod in the summer—will provide a year-round form of income and enable her to transition from waitress and bartender to small business owner. She has just passed her health inspections, so The Fish Hook is officially in business. She doesn't have any seafood for sale yet, but her partners photography of local fish boats lines the walls and toques embroidered by a local sewing club and hand-made jewelry crafted by a tourist-turned-full-time-island-resident are among the first items available for purchase.

[25] Affectionate nickname for people from the prairie regions of Canada

Sam can often be found down at the dock. It's good I came to visit now, he tells me, because soon he will be out fishing and could be gone for a few weeks or maybe more. He potters around his boat most days, listening for unusual engine sounds, cleaning the deck, and eagerly awaiting news of fishing openings. It's still early, he'll know more next week, but the *Silver Fin* needs to be ready just in case he has to depart on short notice. The *Silver Fin* is a still-in-use seine boat built for the hard work of commercial fishing. Built in 1947 and purchased by Sam at the 1986 Vancouver Exposition, the *Silver Fin* is a practical and versatile vessel built to withstand winter storms in the Bering Sea, strong enough to haul in tens of thousands of fish at a time, and its wooden hull more rust-resistant than its contemporary aluminum counterparts (Haig Brown 2008). Sam has skippered the boat from Vancouver to the Alaskan border, from narrow archipelago inlets to the high seas, and he is one of a very small handful who are still independent owner-operators of commercial drum-seine boats. He reckons there are about 50 seiners still in operation— down from around 500 a few decades ago. As fishers in the Cove never let me forget, the *Silver Fin* is a testament to the histories of the last century of fishing on the BC coast. The *Silver Fin*'s engine and electrical systems have just been inspected and tomorrow his cousin who also helps as a deck-hand will be helping him to re-polish the deck. For now, the *Silver Fin* remains tied up amongst the other fish-boats and house-boats in the Cove, and serves an alternate purpose as an informal water-front gathering place for friends who stop by in the hopes of being invited on board for an afternoon beer. People are always coming and going at this time of year,

but you can sometimes tell who is in town from the presence or absence of certain boats tied up at the Cove. When the *Silver Fin* is absent from its usual docking space next to the *Ocean Breeze*, folks are sure to ask where Sam is off fishing this time.

As we sit on the deck of the *Silver Fin*, truck after truck stacked high with the distinctive blue tote containers used for transporting seafood return to the island on the evening ferry. It's currently prawn season and the trucks will be heading up to the other end of the island, where a local seafood processing company has become a major player in the regional seafood economy. Here the prawns will be processed and packaged. Some will be sold wholesale to restaurants and hotels, others will go to grocery stores, and others still will be hand-delivered to resident's houses who have pre-ordered seasonal seafood boxes. Many of the young men on the island are currently employed by the processing company as seasonal prawn fishers and at certain times of the day the large groups of young men tend to take over the passenger lounge of the ferry, boasting loudly amongst themselves about their longest shifts or comparing how many days-in-a-row they have been working before the prawn season comes to a close.

For Thomas, one of Sam's cousins, the presence of the fish is accompanied by memories of fishing seasons passed and an acute awareness of the ecological and bureaucratic changes that have transformed salmon worlds throughout much of the last century. Thomas, like most of his male family members, made a successful lifelong career out of fishing in the late 20$^{th}$ and early 21$^{st}$ centuries. However, fewer and fewer salmon have been returning to the Fraser and other rivers, bringing fewer

and fewer fish through the waters around the Cove. Fewer returning adult salmon mean even fewer juvenile salmon will out-migrate in the spring seasons that follow. While I am enamored by the thousands of juvenile salmon that seem to surround us wherever we are in the Cove, for lifelong and intergenerational Liǧʷiłdaxʷ residents like Thomas, the current numbers of migrating juvenile salmon are just a fraction of what they used to be. "We live in paradise," Thomas tells me, engaging in one of his most common past times— looking out of his living room window towards the Strait. His living room window provides a view of the main thoroughfare residents use to enter and leave the village. Behind the road on which cars come and go are the zodiacs, fish boats, cruise ships, tour boats, and water taxis that transit through the Passage at most hours of the day. "It used to be thick with all the baby salmon this time of year. Now you just see them around in patches," he tells me while we sit on the couch, watching the sun set behind the mountains on Vancouver Island.

For others, still, the presence of the young fish heightens concerns around the impacts that aquaculture facilities might be having beyond the immediate shoreline. George, another of Sam's cousins and Hereditary Chief Gigame of the Liǧʷiłdaxʷ Nation, seems sad when he talks about the new fish and the uncertain futures they will endure. "These poor baby fish," he says as we sit in his living room surrounded by family photos, "all these channels are poisoned from the virus in these farmed fish pens. If they don't get eaten or stuck in the pens, they're going to get all virus-ed up. Who knows how many of these fish will return in two or three years? This virus is killing our fish." George was referring to Piscine orthoreovirus (PRV), a

virus associated with the open-net farm pens of Atlantic salmon that are scattered throughout his homelands. Since adult salmon pass through the Cove in annual cycles on their return to the nearby rivers, the juvenile fish currently in the Cove are precursors for what future fishing seasons might bring. When George noted that the virus might impact the region's juvenile salmon, but we wouldn't know until several years later when the fish did or did not return, the temporal and spatial relations of the salmon migration route becomes ever more complex in ways that compound each year.

Nicknamed the "salmon capital of the world," the Cove has been shaped in profound ways by the presence and movements of Pacific salmon. From the fishing expeditions of Musgrave and the Coveside Cannery that helped to establish the Cove as a place for industry, trade, and settlement in the early 20th century (see previous chapter), to the members of the commercial fleet who continue to call the Cove home, Pacific salmon have always been integral to human and other-than-human worlds in the Cove. Since the 1970s, however, another type of salmon has also made a home and transformed life in these coastal straits: Atlantic salmon. Millions of Atlantic salmon are raised each year in nets that are anchored to the seafloor in the channels and passages that surround the Cove. The Cove now wrestles with its status as both the self-proclaimed Pacific salmon capital of the world and the epicenter of the Atlantic salmon aquaculture industry on Canada's west coast.

## Scenes of Anticipation

This chapter unfolds chronologically throughout the spring and summer months of 2019, offering insights into some of the anxieties, tensions, contradictions, and uncertainties that surround the rise of farmed Atlantic salmon coupled with the dramatic decline of Pacific salmon in and around the Cove. Such anxieties were a visceral, embodied response to the everyday witnessing of ecological collapse. Through a life lived within the rhythms of the coast, fishers and community members advance a form of evidence and analysis that is situated, local, and limited, but also place-based, specific, and detailed. In the opening above, we are invited into the Cove amidst the excitement and preparation of spring, yet we also catch a glimpse of how springtime is now accompanied by senses of loss as fewer and fewer salmon return to the Cove and an awareness that this disappearance might be related to the aquaculture facilities that are anchored in the Pacific salmon's migratory pathways. As the season progresses, we are taken to kitchens, boat decks, and salmon rivers. Fishers and coastal residents disentangle the knotted webs of salmon ecologies, discerning how aquaculture fits within the multiple and overlapping stressors that Pacific salmon face while also reckoning with the tensions between aquaculture, commercial, and Indigenous fisheries.

The sense of anticipation that came to characterize the season, at least in the early days, was also generated bureaucratically through the fisheries notices distributed by the Department of Fisheries and Oceans that open each section. Fishers waited eagerly each week for such announcements, hoping to garner a sense of when

opportunities to fish might become available— especially for sockeye, the most important Pacific salmon for commercial and subsistence fisheries. They readied their boats and warned their loved ones to be ready for their immanent departure to the fishing grounds. As the notices portray, though, this was no normal fishing season (if there ever was such a thing). In July, Indigenous fishers were told to wait four more weeks to allow fish to return to the spawning grounds, to enable a proper estimation of how many more sockeye might soon follow. Commercial and recreational fishers were told that they might be able to begin fishing towards the end of the month. By August, so few sockeye had returned that commercial and recreational sockeye fisheries were no longer even being considered. By September, the DFO announced that there would be no opportunities to fish for sockeye that year. We watched a social and ecological crisis unfold, yet we were not exactly sure what we were experiencing, or what the extent of it might be, as it unfolded in real-time. Hang tight, just a few more weeks.

The crisis that unfolded through a summer of uncertainty and anticipation is also embodied in this chapter's writing form and structure. This chapter resists a neat narrative organization, offering partial snapshots into the everyday forms of analysis that take place in the kitchens and boat gallies of the BC coast. My own analysis and contextualization that follows each ethnographic section exists as just one of several that occur throughout the everyday scenes of life that animate the chapter. While not quite polyvocal, the somewhat disjoined narrative style is an attempt to move towards polyvocality, an attempt to embody a feminist writing ethic and ethnographic method

that does not "replace one model or agreed-upon fiction with another" but "turns on partiality… releas[ing] multiple voices rather than competing orthodoxies" (Hall 1989). This is what landscape ecologists or anthropologist Anna Tsing might call a "patch" (Tsing et al., 2019), a study of the particular that alerts us to unevenness and specificity without losing sight of the broader assemblage, ecology, or landscape. My interlocuters explicitly attend to multiplicity within the "patch," generating a form of emplaced empiricism that creates evidence of socio-ecological transformation. As we move between these everyday scenes of anticipation and analysis, the broader assemblage that comes into view involves corporate structures of fishing licenses and quota ownership and the historical legacies of canneries and paper pulp mills as much as it involves aquaculture and declining fish populations. These transformations can be traced through employment statistics, ecological surveys, macroeconomic trends, and the genetics of Atlantic and Pacific salmon, and they can also be evidenced through the "stuff that seemingly intimate lives are made of"; the "bodies, dreams, dramas, and social worldings" (Stewart 2007) of everyday life. In combining these approaches, perspectives, and scales of analysis, I offer a way to move between the structural and the intimate, a way of making sense of aquaculture amidst uncertain fish futures.

## Aquaculture Beyond the Farm

In sheltered bays usually not too far from the shoreline, a collection of square or circular nets floats at the water's surface. The tips of the pens are usually connected

by floating metal walkways and are accompanied by distinctive green buildings perched atop barges that house monitoring equipment, employee offices, and short-term living quarters. Buoys encircle the nets. The faint whirring of generators and mechanical equipment hums in the background, interrupted by splashes where fish jump at the surface. “Quaint” and “quiet” were the words I most frequently heard coastal residents in British Columbia use to describe the appearance of salmon farms on the coast. A salmon farm is often a surprisingly unspectacular and ordinary place— at least as experienced from the water’s surface.

There are, however, many things that cannot be seen from the surface of the water. Muscles, mollusks, shrimp caprellids, and seaweeds live on the nets. The nets are surrounded by other nets intended to keep predators at bay, but herring, juvenile salmon, and wrasse are still able to swim in-between the mesh holes. From the surface it is also impossible to discern how many fish or other creatures might be gathered outside of the pens, or what life (or lack thereof) might be surrounding the farm on the seafloor. Life in and around and these “underwater worlds of fish” (Lien 2015, 28) swells and recedes in tune with seasons, currents, and tides. Each farm becomes its own unique multispecies assemblage comprised of millions of lifeforms that connect to vast ecosystems through commonplace modes of other-than-human movement and encounter.

Regulations are intended to mitigate or limit the interactions between life within and beyond the farm. Farms are supposed to be a certain distance apart, and they have to be a certain distance from salmon bearing rivers. The additional layer of

predator exclusion netting attempts to limit the ability for sealions or whales to come into contact with the Atlantic salmon within the pens. Not all farms can be stocked at the same time, intending to limit the ability for sea lice and pathogens to reproduce, mutate, or spread between facilities or to nearby aquatic life. Regulations on stocking and density are even more stringent during the springtime in efforts to prevent inter-species transfer of parasites and viruses as the juvenile salmon make their way through the coastal straits. But the ever-present apprehension remained: What would happen when the small, finger-sized smolts in the Cove encountered these facilities and their associated viruses and parasites on their migration out to sea?

Anthropological studies of contamination, toxicity, and intensive agriculture have long illuminated how the repercussions of and relations produced by processes of industrial production often extend beyond the factory floor or monocrop plantation. While industries can attempt to manage the human, animal, and microbial worlds within their confines, hog saliva (Blanchette 2019), chemical compounds (Nash 2006), and viral particles (Lowe 2010) prove unruly and hard to contain, no matter how bio-secure farm practices endeavor to be. With regards to intensive forms of plant and animal agriculture, efforts to raise one form of life often cause other forms of life to multiply. Avian influenzas emerge from chicken farms and become global in reach as they jump species boundaries between poultry, birds, and humans (Keck 2019; Lowe 2010). Porcine viruses kill hundreds of thousands of pigs per farm per week and become at risk of travelling through farmworkers' fingernails and aerosolized manure (Blanchette 2015). Fungi thrive in the strawberry fields of

California's central coast (Guthman 2019). Viruses, bacteria, fungi, and so-called pests become forms of "feral proliferation" that appear that appear in the wake of industrial experimentation and ecological simplification (Tsing et al., 2019). These forms of "vital seepage" (Blanchette 2019) present particular questions and complexities; not only do they seep beyond the farm, they are also lively and hard to predict. Viruses mutate. Bacteria and pests develop new evolutionary adaptations and resistances. Microbes can have unexpected consequences when transported to new geographies and when enveloped within new webs of relations. Seemingly endless opportunities for ecological reconfiguration appear when such forms of vital seepage become enveloped within the aquatic worlds of the coastal straits.

Viruses have particularly captured the attentions and imaginations of coastal residents living with aquaculture on the BC coast. In one example, Infectious hematoma necrosis (IHN) virus emerged across the BC coast in 2001, first appearing in farm sites anchored on the northeastern end of Vancouver Island, then on the central coast, then on the west coast of Vancouver Island, eventually infecting 25% of all Atlantic salmon being raised on the BC coast that year (Morton 2004, 222). Herring swam amongst decaying chunks of flesh that flowed from the farm sites (Morton 2004, 224). Coastal fishers and community members became especially concerned for the region's sockeye, who are particularly prone to potentially fatal liver disease after contracting IHN. An estimated 12 million Atlantic salmon died or were culled as a result of the 2001-2003 IHN epidemic (Saksida 2006). In the years since, all Atlantic salmon destined for BC's net-pens are required to be vaccinated

against IHN to prevent such catastrophic losses from happening again. But, biosecurity protocols are not a guarantee. Over 1 million pounds of Atlantic salmon were culled in Washington State due to IHN in 2012 (see Chapter Three). Infectious salmon anemia (ISA)— more colloquially known as fish flu— almost brought an end to the aquaculture industry in Chile in 2008 when the virus was documented in over 100 farm sites, resulting in an industry-wide three-month shut down and mass dismissals for 37% of the Chilean workforce (Soluri 2011). Influenza viruses— like swine and avian flus— are dangerous in animal agriculture. They spread and mutate rapidly and, in some cases, boast a near 100% mortality rate. Any country that confirms the presence of ISA is legally obligated to report their findings to the World Organization for Animal Health (OIE), usually resulting in trade restrictions. Pathogen-related culls are an unfortunate and all too common cost of doing business.

Piscine orthoreovirus (PRV) became a virus of interest when Atlantic salmon in net-pens in Norway began dying in unusually large numbers with hemorrhages and lesions on their livers and hearts at the turn of the 21$^{st}$ century (Kongtorp et al., 2004). Within 10 years, the previously never-before-seen disease caused by PRV was recognized as a leading cause of farmed salmon mortality worldwide and, of much distress to the industry, it was difficult to know where and when the disease was developing since fish might not show changes to their bodies or behaviors until months after infection. Yet, PRV has not generated the same response as other pathogens within industrial animals and, at least in BC, it has not spurred massive efforts to cull infected animals or even monitor its range. Even when a 2018 report by

nonprofit scientists confirmed that 100% of farmed Atlantic salmon just across the border in Puget Sound were testing positive for PRV,[26] the Department of Fisheries and Oceans and aquaculture companies in BC refused to test for the virus, insisting that PRV infection has "never been associated with an elevation in mortality."[27] For Liǧʷiɬdaxʷ fishers like George and Sam and for salmon advocates like Robert who we will meet in Chapter Three, though, the presence of pathogens within the farm pens matters less than the potential repercussions such pathogens might have once they leave the netted mesh walls of the aquaculture facility. The awareness that PRV might not be confined to the farm but might also be colonizing the blood cells of Pacific salmon as they journeyed past the farm sites spurred a slate of lawsuits and grassroots virus and environmental monitoring efforts by the time that the smolts were migrating through the Cove in 2019.

Springtime is now sometimes also accompanied by a sense of trepidation. Viruses and the diseases they engender also emerge alongside and can be exacerbated by other forms of feral proliferation. Warmer weather and warmer waters also enable sea lice parasites and harmful forms of algae to multiply rapidly. Sea lice are a crustaceous parasite that feeds on the blood, flesh, and mucus of salmon. Sea lice parasites find plentiful hosts on the bodies of salmon within the nets of a salmon farm

[26] "Contrary to agency claims, escaped Atlantic salmon were infected with a highly contagious and harmful virus: Lab results show 100% of escaped Atlantic salmon tested were infected with virus of Norwegian origin," Press release by the Wild Fish Conservancy, Feb 15th 2018.
[27] "Exploring PRV and HSMI in Europe and British Columbia—Workshop Report," Press Release by BC Salmon Farmers Association, March 29 2018.
"Washington Department of Fish and Wildlife Review of Wild Fish Conservancy's Feb 15 News Release on Presence of Virus in Escaped Atlantic Salmon," Press release from Washington Department of Fish and Wildlife, Feb 16, 2018.

and transfer to Pacific salmon as they migrate through the channels in which farms are anchored (Krkošek et al., 2005). Each spring and summer, videos of lice attached to wriggling fish bodies circulate on social media, situating lice as a visible and visceral extension of aquaculture's modes of production.

While the juvenile salmon were rearing in the waters of the Cove, juvenile salmon on Vancouver Island's west coast were already being afflicted with lice infections at unprecedented rates. Samples collected by local environmental groups found that more than half of the juvenile Pacific salmon in Ahousaht and Tla-o-qui-aht territories were afflicted with sea lice, some of whom had 20, 30, or even 50 lice attached to their small bodies (Bartlett 2019). One louse alone is potentially lethal to a juvenile salmon. Attempts to monitor sea lice within the waters of northeastern Vancouver Island found that one aquaculture facility alone can amplify the abundance of sea lice over 33,000 times what would be considered a normal lice population rate (Volpe and Shaw 2008). Moreover, such heightened levels of lice were detectable more than 70 kilometers away from the farm's location, creating a "lice footprint" that extends throughout the Pacific salmon migration route (Volpe and Shaw 2008; Krkošek et al., 2005). Sometimes, the methods used to mitigate lice infections can serve as new vectors for disease transmission (Nylund et al., 1994; Kibenge 2019), or other species like the bacterium *rickettsia* can inhabit the bodily lesions left behind by sea lice (Gerhart 2017). Even a fish that never encounters a salmon farm can become at risk of pathogenic or parasitic infection as it meets fish

who meet lice who meet other fish that meet viruses who meet other fish who are already weakened by warming oceans and polluted rivers.

Unlike lice, however, that can be visibly seen, inspected, counted, and tallied with an alert human eye, microbes and pathogens usually exist beyond the scale of human visibility. Difficult to see, sense, and quantify through the time-honored practices of keeping watch from shorelines and boat decks, such forms of vital seepage instead necessitate new forms of noticing, new ways of becoming attuned to the changing microbial compositions of the waterscape. Sometimes this means being alert for unusual fish behaviors or scale colorations. Fish weakened by viral infection might appear to be emaciated and lethargic or have unusual scale colorations. However, fish weakened by viral infection are generally less likely to make it back to the coastal straits at all, making their life histories, microbial companions, and potentially related disappearance another mystery of the sea. While we waited in anticipation for what the coming spring and summer fishing seasons might bring, George worried-out-loud from his living room that the cumulative effects of aquaculture might combine with the other stressors salmon already face to be "killing off these wild stock baby fish twice as fast." The once familiar cycles of salmon migrations correlate with senses of hope, futurity, and intimate engagement with other-than-human worlds. However, as other-than-human communities within the coastal straits become less predictable, less familiar, and are slowly shaped and transformed by the vital seepage of aquaculture production, salmon migration routes

also become ecologies filled with risk and anticipation— with potentially deadly consequences.

*July 2019*

DFO Fraser River Sockeye Update, July 12, 2019

> Currently, First Nations food, social and ceremonial (FSC) sockeye fisheries are closed due a 4 week window closure… Very limited fishing opportunities directed at Chinook salmon for ceremonial purposes have occurred to date.
>
> The start-up of sockeye directed FSC fisheries is not anticipated before late July or early August.
>
> Commercial and recreational fisheries are not anticipated to begin until the end of July or August.[28]

DFO Southern BC Recreational Fisheries Update

> 00:01 hours July 15 to 23:59 hours July 31, 2019, 1 Chinook per day with a maximum size limit of 80 cm.[29]

Thomas called me today. “What are you doing tomorrow?” he asked, sounding more excited than usual.

“I don’t know yet, why?” I responded, eager to hear the reason for his call.

“We’re having spring tomorrow. Pete caught 7 springs and he brought me a couple. You should come over for dinner.”

I spent time with Thomas most days. He lived a couple of doors down from where I was staying in his late brother’s house. On Friday nights, his garage became

[28] https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=223126&ID=all
[29] https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=223139&ID=all

reborn as a neighborhood pool hall to the tune of AC/DC and Creedence Clearwater Revival. Pool remains a lively and competitive pastime in the Cove, with Thomas, Sam, and George all making various claims to being the best pool player on Vancouver Island. When I first joined the weekly pool night I did not know how to hold the cue or how to aim for an appropriate ball. Thomas seemed to enjoy teaching me and soon we became close friends.

By July, once a week, at a predetermined time, our weekly dinners had become a staple in the summer routine. Sometimes we would share a coho, baked with butter and sliced lemons. Sometimes I'd bring potatoes or carrots roasted in the way my mother taught me. Sometimes other friends and neighbors joined, too. The day before our dinner, we would go into the deep freezer in the garage-pool hall to choose a fish for thawing, and Thomas would make the same joke while looking at his supplies below: "hmm… what looks appetizing today?" The supplies of fish in the deep freezer had either been gifted from friends and family or provided through the band's food distribution program. Thomas's friends were often generous in sharing their fish catches with him. Each autumn, Thomas, his son, and his granddaughters smoke dozens of chum salmon, making *gawas*, in Thomas's backyard smokehouse. Thomas gifts ziplock bags full of the tough yet juicy salmon jerky to friends and family throughout the community and sometimes they repay him in the form of fresh fish when the opportunity arises.

Tomorrow would be different, though— the sports fishery for chinook just opened last week and this would be our first fresh chinook of the season. Thomas had

been describing the different tastes and textures of various salmon to me for weeks. Sockeye were bright red and had the "fishiest" flavor, chums were notoriously tough, and springs, generally considered to be the most flavorful, had more of a buttery profile than the others. He was excited for me to be able to taste the difference.

When we convened around the dining table the following afternoon, I mentioned that I was not sure if I had ever eaten a fresh chinook salmon before.

"I probably grew up eating Atlantics," I said.

"I will never eat one of those things in my life," Thomas responded resolutely. "One of my friends caught some once, ones that had escaped. He asked if he could come over and cook one at my house, so I said okay. So I come home and here he is cooking, and I walked in the door and the stench was unbelievable. It smelled so bad! Get that shit out of my house! I told him, and I made him take it out the back door. It took me days to get rid of that smell! Ugh!" he said, shuddering but laughing at the same time.

"Yeah, they're gross," our friend and dinner companion, Luke, agreed. "You can totally tell the difference. They smell different, look different, taste different. They're not the same at all."

We speculated about the causes of the smell, and Thomas hypothesized that it might be from the food they are fed. "When you eat shit, you probably smell like shit!" he said while chuckling.

Thomas generally didn't like to talk about the salmon farms. Whether they came up on the nightly news, in casual conversation with passers-by while waiting for

the ferry, or whether the subject was purposefully broached because of my presence, his response was always the same: “I never wanted those things here.” That was often all he would say about the matter. He would say it with such a matter-of-fact tone and sense of finality that the topic was often quickly dropped or he would just sit quietly, waiting for the conversation to change. His typical quietness on the subject touched me in an unusual way. I never pushed the topic with him.

As we sat watching the evening news after dinner, a friend popped their head through the sliding glass door that led to Thomas’s living room. “I came to bum a smoke,” she said, sitting down on the couch next to Thomas. After some general catching up, the conversation quickly turned to fishing. Her husband, brother, and son would usually spend most of the summer fishing and sometimes she would go too, helping to cook meals and provide general maintenance around the boat. She was worried, though. Opportunities for commercial and even food fishing this season had been particularly unpredictable, if opportunities materialized at all. The increasing uncertainty was making it difficult to plan budgets and even made organizing birthday celebrations and trips to the grocery store unexpected sources of stress. As people congregated on the dock, outside of the grocery store, and behind the gas station, rumors passed between lips about when and where an opening might be coming, did-you-hear-so-and-so went all the way to Prince Rupert and only caught 50 fish, did-you-hear-so-and-so has decided to retire.

“There are just no openings. I don’t know what I’m gunna do. I guess I’ll just go crazy for another 2 or 3 weeks… maybe I’ll actually stay home this summer,” she said dragging on her smoke, clearly frustrated.

“We’ll have to see what happens within the next week or so,” Thomas responded, insinuating that there was still potential for the season to prove fruitful. The Department of Fisheries and Oceans could open commercial or food, social, and ceremonial (FSC) fisheries at any time.

“I don’t get too hopeful anymore,” she responded. “There have been too many times when it just hasn’t happened, so we just sit around and wait.”

“I know what you mean,” Thomas said. “I keep thinking, fuck, what am I gunna eat?”

“Did you hear that Joe is talking about retiring?” she asked, to which Thomas responded with wide eyes and raised eyebrows. “Yep. He’s talking about selling the boat. We can barely even food fish anymore. They’re not making enough money for it to even be worth it.”

Thomas looked at the floor, shaking his head.

“It’s Joe’s birthday next week,” Thomas’s friend continues, “if he’s gunna be home for it I would like to have a little get together for him, but I don’t know if he will be here yet. I’ve been wanting to go to town to do a big shop at Costco, but I’ve been holding off waiting to see if the fishing is gunna open. I don’t wanna buy all that food and then everyone leaves so I’m stuck with it all, it will just go bad!”

The small island grocery store provides a generous although expensive supply of food stuffs so island residents often take bi-weekly or monthly trips on the ferry to town to stock up on goods hard to find or expensive on the island. However, during the summer months, the island hosts so many visitors that it can often be a three-hour wait in each direction to be able to board the ferry; a quick appointment or grocery-store run in town often becomes an all-day commitment.

Thomas seemed pensive after his friend left. No longer paying attention to the news reports of heatwaves and wildfires that played in the background, he lit another cigarette while looking out of the window towards the small, once bustling community dock. “There was so much fish around years ago. Oh god. Thousands. I’ve seen them on the water out there,” he says suddenly, still looking out of the window with his gaze centered on the waters beyond the skiffs scattered on the shoreline. “One time there was a school of sockeye, from that point over there to all the way past us over there,” he continues, sweeping his arm from left to the right. “You should’ve seen the fish! Holy shit, man! They were just like a river. So I got on my skiff because it was quite a ways out. The whole place was just green from all the sockeye. They made it through the Narrows. The fishery opened just a day late and all those fish got through and made it down here. Way over a million in that big school. It was just unbelievable. Everywhere I looked. They were just bubbling like hot water. Sockeye really bubble. All you could see was bubbles. Then there was the coho- millions of them! You could see big schools of them just over there. One thousand to two thousand in every school! Those days are gone.”

"I hope not," I said.

"One year there were spring salmon that were just like the sockeye," he continues, seeming to disregard my comment. "They were all coming this way. We were all out on the dock over there, and I was wondering what all these people were talking about. I thought maybe they were talking about killer whales. They were so excited. Not too long later, you could see all of these spring salmon shooting out of the water chasing after this big mass of herring. They were coming so fast. They chased the herring all the way up to this dock here. We all caught a spring salmon down on the wharf that day. Everybody."

Salmon Declines and a Changing Fishery

Pacific chinook salmon, sometimes nicknamed spring salmon (or "springs" or "springers") in reference to the seasonal timing of their adult in-bound migrations, are a specific and much beloved type of Pacific salmon. Unlike pink salmon, who are smaller, known for their abundance, and travel in huge schools, chinook are the largest, least abundant, and sometimes regarded by anglers as the most prized species of Pacific salmon. It was a gelatin mold of a chinook that travelled between British Columbia and England after Musgrave's famous fishing expedition in 1890, and it is the allure of catching a famous 30-pound chinook and gaining initiation into the region's prestigious "Tyee Club" that still draws hundreds if not thousands of sports fishers to the Cove each spring and summer. Sockeye are also an especially treasured type of Pacific salmon, even if only because of their relatively recent status as the most important commercial species. But, with most chinook and sockeye fishing still

closed as of mid-July 2019, the ability to be gifted a springer was cause for a commonplace celebration of sharing dinner with friends.

The will-there-or-won't-there uncertainty of fishing openings added to the sense that the rhythms of everyday life were interrupted and out of balance. Commercial and food fishers, sports fishing guides, and recreational anglers in the Cove waited patiently for the federal government to announce that fishing for certain species was permitted in specific places with specific gear types and between specific times— waiting for what is more colloquially known as an opening in the fishery. However, with most populations of Pacific salmon trending severely downwards, fishing openings have become fewer and smaller, with fishing often restricted to a few days or hours at a time. The momentous decline of Pacific salmon exists uneasily alongside the rise of farmed Atlantic salmon. That aquaculture companies were growing, exporting, and profiting from the sale of millions of Atlantic salmon while fishers in the Cove struggled to make ends meet amidst the reality of potential Pacific salmon extinction only exacerbated sentiments of restlessness, marginalization, and frustration.

The Fraser River historically produced more sockeye salmon than any river in the world. In the early 20th century, sockeye returns to the Fraser averaged between 15-20 million per year (Fisheries and Oceans Canada 1998), but as logging, mining, dam building, landslides, and urban development transformed ecosystems throughout the 20th century, fish returns became ever more erratic and difficult to predict. Industrial fisheries also exponentially increased harvesting capacity at-sea post World

War II, with technological developments enabling fleets in places like the US, UK, Japan, and Russia to travel further and catch and process more fish than ever before (McGoodwin 1990; Carothers and Chambers 2012). The number of commercial vessels operating in the US, for example, nearly doubled between the 1960s and 80s (Wingard 2000). By the late 1990s, however, salmon abundance declined so dramatically that the Fraser River sockeye salmon fishery— once among the most important salmon fisheries in the world— was closed for the first time in a century (Noakes et al., 2002). The phenomena was neither specific to sockeye salmon nor limited to British Columbia. Fish catches have steadily declined on a global scale since the late 1980s (e.g. Pauly et al., 2003), sparking fisheries restructuring programs inspired by the market logics characteristic of the late 20th century.

In Canada, federal fisheries management plans were reimagined in 1969 with the introduction of the Davis Plan, which attached fishing licenses to vessels instead of fishers, limited the number of fishing licenses available in attempts to decrease fleet sizes, and created a market for buying and selling licenses (Gamage 2021; Haas et al., 2016). The Mifflin Plan of 1996 further ascribed market logics to the ability to obtain fishing licenses in attempts to restrict entry into the industry and squeeze "inefficient" (read: small, less mechanized) boats from the fleet. Many of these smaller, less mechanized boats were owned by Indigenous fishers (Wright 2008). The Department of Fisheries and Oceans reduced the number of days and hours "open" for fishing, fishing became regulated by species and gear type, and licenses became more expensive, with each fishery requiring a separate license that could cost

upwards of $200,000 (Haig Brown 2008). The Mifflin Plan did not regulate or cap the number of licenses a vessel, cooperative, or company could hold. For the first time in Canada's commercial salmon fishery, a vessel could "stack" licenses, creating an opening for the largest seafood companies and processors to accumulate fishing licenses at a time when there were fewer licenses available overall (Haas et al., 2016; Gamage 2021).

As a result, a small handful of companies and individuals hold 50 or more commercial fishing licenses, whereas the vast majority of companies and fishers hold 2 licenses or less (Silver and Stoll 2019). In the mid-20th century, Indigenous fishers comprised one third of the commercial fishing fleet but by the 1970s, only 12% of British Columbia's commercial fishers were Indigenous (Wright 2008). The total Indigenous fishing fleet throughout the Strait of Georgia in the 1970s amounted to less than 40 boats: 5 seiners, 20 gillnetters, and 13 trollers (Stewart 2017, 105). By 2017, 6563 commercial fishing licenses were registered to 2377 unique license holders on the BC coast (Silver and Stoll 2019). 430 of these licenses were registered to one company alone— Jim Pattison Enterprises (Silver and Stoll 2019). Of these 6563 licenses, 212 were allocated to salmon seiners. One salmon seine license went to Sam, while 87 or 41% went to Jim Pattison Enterprises (Silver and Stoll 2019).[30]

[30] Jim Pattison is somewhat notoriously known as the "2nd richest person in Canada" with a net worth of over 11 billion CAD. He is also the CEO, sole owner, and chairman of Jim Pattison Group, the largest privately-held company in Canada. As part of their food operations, Jim Pattison Group owns the largest fishing and fish processing company in Canada— Canadian Fishing Company— as well as major food retailers like Save-On-Foods, giving the firm a hand in multiple aspects of the food supply chain. Besides food operations, Jim Pattison Group is also active in media, broadcasting, advertising, automotive sales, and product packaging.

Since seiners harvest around 50% of the commercial salmon catch (Nelson and Turris 2004), salmon seine licenses are particularly lucrative and therefore especially prone to monopolization.

Access to fisheries also became organized according to a quota system wherein the total allowable catch was divided into fishing quotas that could also be bought, sold, traded, and leased. Whereas licenses regulate people, quotas divide fish between license holders. In the decades since limited license and catch share regimes (like fishing quotas) were first implemented, private property and free market principles wherein licenses and quotas can be stacked, bought, sold, and transferred has similarly resulted in a systemic transfer of fishing privilege from individual vessel owners to large corporations (Haig Brown 2008; Silver and Stoll 2019; Haas et al., 2016). In British Columbia, this enables "armchair fishermen" and investors to own more than half of all halibut quotas, meaning that fishers must usually lease the quota from an investor or company in order to participate in the fishery (Pinkerton et al., 2016). In New Zealand, 12 companies held 86% of the total catch quotas by 1996 (Stewart et al. 2006; Carothers and Chambers 2012). In Iceland, the 5 largest fishing companies held 33% of all fishing quotas by 2009 (Icelandic Ministry of Fisheries 2011). More than 80% of all quota programs worldwide structure fishing access as a tradable commodity (Bonzon et al. 2010).

With ever increasing costs and increasingly limited opportunities to go fishing, fishers across the coast retired or left the industry following the introduction of the Mifflin Plan, selling their licenses to the federal government under the Plan's

license buy-back scheme. More than half of all salmon licenses in BC were retired within four years of the Mifflin Plan going into effect (Haas et al., 2016; Grafton and Nelson 2005). In ’Nam̲gis territories north of the Cove, 11 of the 14 licenses lost under the Mufflin Plan belonged to Indigenous fishers, meaning that 79% of the jobs lost in the community were those held by Indigenous people (Ommer 2007, 49; Cullon 2017). The impacts of such fisheries reforms are especially egregious when considered within broader histories of land and water dispossession as described in the previous chapter.

Commercial fish catches for all species of Pacific salmon declined dramatically following the introduction of license and quota regimes (Walters et al., 2019). Since fish declines were largely blamed on overfishing, reductions to the fishing fleets and stricter harvest limitations were regarded as a necessary intervention by many bureaucrats and concerned environmentalists. To be sure, enforcing catch limitations might benefit fish stocks, but transforming access to the catch into a tradable commodity has less clear ecological benefits while engendering a suite of social transformations (Carothers and Chambers 2012). Fishing communities across the coast experienced “permit drain” (Hébert 2015) wherein fishing rights followed a “rural-to-urban migration” (Carothers and Chambers 2012) as licenses, permits, and quotas moved out of the hands of fishers and into corporations. Women, often the primary workforce in processing facilities, also became subject to increasing levels of unemployment (e.g. Karlsdóttir 2008). Fewer

youth and young adults entered the industry. Residents moved away from rural coastal communities.

Meanwhile, the influx of farmed salmon within global markets complicated trends in salmon prices. Mifflin Plan fleet restructuring went into effect at the same time as farmed salmon hit retailers and restaurants across Europe, North America, and Asia in previously unprecedented numbers. Fresh salmon's transition from a seasonal, high-value delicacy to ubiquitous year-round commodity caused global salmon prices to plummet in the 1980s and 90s (Volpe and Shaw 2008). Even where salmon populations were strong in places like Alaska, fishers struggled to compete within volatile economic cycles (Hébert 2015). Closures of docks, maintenance yards, bait shops, fuel stations, and processing facilities followed suit and waterfront land soon became more profitable if redeveloped for residential use (Haig Brown 2008).

However, reductions in the commercial fishing fleets and in the size of commercial fish harvests have not resulted in rebounding salmon populations. Harvest rates for chinook spring salmon, for example, have declined by 80% since the mid-1990s yet populations are trending lower than ever before (Walters et al., 2019). The early 21st century was especially hard for migrating sockeye salmon. First in 2005, then in 2007, and then again in 2008 and 2009, little to no commercial sockeye fishing occurred along the Fraser River migration route (Cohen Commission 2012, 8). Recreational anglers were only permitted to catch sockeye salmon on a total of five days in the years between 2007 and 2010 (Cohen Commission 2012). Yet, populations continued to dwindle, each year setting a new record low. In a courtroom

in Vancouver, scientists, bureaucrats, fishers, and aquaculture representatives debated the causes of the declines before a federal judge for over one-hundred days. Perhaps ocean conditions were too warm, perhaps pollution and degradation made rivers unconducive for spawning, perhaps there was not enough food in the ocean, or perhaps, as some suggested, there were just too many seals (Cohen Commission 2012). Neither the Salmon Enhancement Program, in which hundreds of millions of salmon are reared and released from hatcheries, nor the turn to raising salmon in net-pens has succeeded in rebuilding Pacific salmon populations to stable or even sufficient numbers.

Throughout much of recent history, the dilemma of fish declines has been portrayed as a problem of too many boats chasing too few fish in a supposedly inevitable tragedy of the commons (Árnason 1993; Hannesson 2006; Carothers and Chambers 2012). As Carothers and Chambers (2012) point out, though, the "'race for fish' is not a technical problem created by individual, unconnected human behavior… but rather a political economic problem created by larger-scale processes of global capitalism and industrial fisheries" (44). Common environmental and economic narratives often fail to situate contemporary fisheries within global processes of inequality that prioritize the production of cheap commodities through large-scale and industrially-dominated extraction (Mansfield 2010). When individual, inevitable human greed is conceptualized as the problem, privatization is assumed as the solution, leaving other alternatives unimagined (Carothers and Chambers 2012).

Sometimes, these dilemmas are mulled over in fisheries consultation meetings held in hotel conference rooms. In the autumn of 2018, I attended one such meeting in which scientists and bureaucrats sought feedback from Indigenous fishers regarding whether certain populations of fish should be listed as species-at-risk. If the population in question were to be listed under the Species at Risk Act— Canada's equivalent of the Endangered Species Act— all commercial fishing around the Cove would be closed during the autumn months— the primary time for chum salmon fishing. The smell of coffee and pastries lingered in the windowless room as Indigenous fishers testified as to how weeks upon weeks of fishing closures and vast reductions in salmon harvests were having snowballing repercussions throughout their communities and nations. From the inability to financially support boat repairs and crew members, to the inability to access foods and cultural resources, additional restrictions to salmon fisheries were interpreted as a direct infringement on Indigenous rights to fish. Fishers in the room further contextualized fishing closures within a long history of governmental intervention into Indigenous livelihoods while critiquing the state for simultaneously promoting the industrial growth and ecological devastation that causes harm to salmon stocks in the first place. As one fisheries manager put to the facilitators: "We're going to infringe on the rights of every First Nation on Vancouver Island but we're not going to infringe on the privileges of foresters? We're not going to infringe on the privileges of salmon farmers? It's not even considered! The window of closure applies to food fisheries under the guise of conservation. Does that mean we stop harvesting trees? Does that mean we cease all

mining? All of the measures are focused on reducing harvest, but harvest is only one piece of the puzzle here."

The young fishery manager's words reflect a widespread injustice wherein Indigenous livelihoods and the ability to access foods continuously come under threat and are even blamed for the multiple crises currently occurring amongst marine ecosystems while other violent and extractive industries remain beyond attempts at state reform or retribution. Commercial logging increases stream temperatures and disrupts ecological mechanisms for mitigating floods and landslides; yet, the option to stop logging is never presented as a possibility. Limiting industrial growth is not on the table. Scientists and fishers and policy-makers alike agree that the causes of salmon declines are complex and multifactorial. Yet, such complex problems continue to engender single-factor solutions: closures to seasonal fisheries. What is deemed "doable," what is imagined as possible, is always framed according to logics of settler capital growth. Fishing for specific species at specific times in particular places using particular fishing techniques is connected to each nation's unique history and identity. The ability to assert rights and titles in court is partly premised on whether nations continue these culturally and nationally specific practices. The political, economic, cultural, and biological health of such nations is connected to the ability to continue fishing. In such a context, the inability to engage in fishing— particularly as part of food, social, and ceremonial (FSC) fisheries as is guaranteed to Indigenous nations under Canada's Constitution Act— is seen at best as a severe

misplacement of priorities and at worst as a further instantiation of settler colonial logics that seek to erase Indigenous peoples and their lifeways.

At the same time, pervasive discourses that position fisheries as always in a state of perpetual decline, as a livelihood continuously on the brink of disappearing, and as a practice predominantly of the past, overlook the ways in which fishers continue to reinvent themselves and find novel ways to negotiate between on-the-ground realities and macroeconomic trends (Hébert 2015). Fishers have plenty of ideas about how fisheries can be made to be more livable and made to work for the benefit of those involved, without needing to turn to further corporatization or industrialization in the form of aquaculture. For one, a 2021 report titled *"The Future of B.C. Commercial Salmon Fishing"* produced by 150 active fishers and associations including the Native Brotherhood of B.C. and the United Fishers and Allied Workers Union states that "fishermen are adamant that quota investors, foreign corporations, processors, or fish buyers should not own licences, and that harvesters should own and operate their own fishing licences" (Area C Harvest Committee et al., 2021). Fishers envision and work towards a future that is not defined by industrial aquaculture per se, but a future in which licenses are returned to the hands of harvesters, in which fishers have access to and ownership of licenses through resources like community-fishermen license banks, in which decision-making processes are more transparent, their involvement in governance is taken more seriously, and in which they are able to sell directly to consumers and serve as a connection between communities and the foods they eat (Area C Harvest Committee

et al,. 2021). The future of the commercial salmon fishery is not a conundrum that can be rectified solely by producing more salmon and multiple pathways exist beyond a restricted either/or dichotomy between capture fisheries and aquaculture. Previously unimagined alternatives must be made actionable.

However, under settler and global capitalism, Indigenous fishers continue to be dispossessed from a fishery that is now at risk of extinction, their harvesting practices become subject to even stricter governmental limitations while state agencies continue to approve gold and copper mines along salmon-bearing rivers, and aquaculture companies post record profits alongside record sea lice infestations. It is not so easy to simply replace Pacific salmon and their webs of relations with Atlantic salmon raised in a net or a lab. For Liǧʷiłdaxʷ Elders like Thomas, the idea of simply turning to pen-raised Atlantic salmon is not even within the realm of possibility, even if only because he will "never eat one of those things in his life." When Thomas does not know where his next meal of fresh salmon will come from and when his ability to make *gawas* with his son and granddaughter that will then be gifted throughout the community become jeopardized, it is not just the loss of fish that is transforming life on the coast, but it is also the loss of relationships that accompany the fish that generate a sense that perhaps things are not the same at all, perhaps something fundamentally different is being brought into being.

*August 2019*

DFO Fraser River Sockeye Update, August 16th, 2019

> Currently, First Nations food, social and ceremonial (FSC) Sockeye directed fisheries in all areas remain closed. Due to the very low abundance of Fraser Sockeye to date, the start-up of Sockeye directed FSC fisheries will continue to be delayed.
>
> The marine and Fraser River areas that originally planned to open to Sockeye retention in late July or early August will remain closed to Sockeye retention until further notice.
>
> Commercial and recreational Sockeye fisheries are not being considered at this time.[31]

The lack of fish is on everyone's mind. It is shaping up to be a decent year for springs, which are currently being sold for $50CAD a pound, but sockeye are nowhere to be found. People seem especially nervous since sockeye are one of the main food fish staples. A new boat has docked in the Cove, which, in itself, is not a particularly unusual occurrence. What is unusual, though, is the size of the boat. Huge! Docked next to Sam's, it dwarfs the *Silver Fin*. Paul has been working on the boat in Port Alberni, but they are barely breaking even. Any money they are making is being spent on fuel and food, but Paul brought some halibut to share with friends, so Sam invited a handful of us for a halibut and elk burger dinner on the *Silver Fin*.

"It's not looking good out there," Steve said, as we sat huddled in the galley, waiting for the halibut to sear. "There's no fish!" Steve operates the local water taxi, shuttling tourists around the island, sports fishers to their water-front fishing lodges, and residents back and forth across the Coveside Passage, offering a slightly bumpier but often more convenient mode of inter-island connection than is offered by the

[31] https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=224470&ID=all

public ferry. These days, much of his work involves transporting farm workers to and from aquaculture sites. Workers usually spend several days and nights living in bunks aboard or near to the site. When it comes time for a crew change, Steve can spend the whole day— from before sunrise to sunset— transporting workers between the Cove and various farm sites anchored around nearby islands.

"It's getting so that we can't even food fish," Sam responded, while wondering where his winter supplies of fish will come from this year. He might not get to go fishing this summer after all but he at least seems confident about the fall's chum fishery.

"Sarah opened her business on the wrong year. There's no fish!" Sam says while laughing, although I got the sense it was not entirely lighthearted as he repeated the same phrase as Steve.

While The Fish Hook has been getting by through sales of shrimp and prawns and frozen chums from the fall, Sarah has had trouble finding products for her new business. She currently has sockeye for $21 CAD a pound, but she has to drive all over Vancouver Island in search of fishers willing to sell fish directly to her. Sam's brother and nephew just got back from a fishing trip, but they didn't have much luck, either. His son is heading north soon too, but Sam encouraged him not to over-do it. His destination was a 16-hour sail away, and Sam worried that he'd use too much fuel and be too tired to fish when he got there.

As we move to the deck to enjoy the last of the evening light, we watch as seals poke their eyes and noses above the water line before disappearing under the

surface once again. “Seals like to spy on you,” Sam says, giving me a nudge with his elbow. “They’re always wondering what we’re up to. There’s a lot of them around tonight. They’re wondering if we are gunna share our halibut with them.”

The smile suddenly disappears from his face. He looks at me out of the corner of his eye and tells me that there will be no fish left in the future. There was no chuckle after this comment. “The world’s going to die if we don’t figure this out.” He raises his shoulders and gestures with his hands as if to say, but what can we do about it? “Everything is going to die if we don’t have the wild stocks,” he continues resolutely. I remain quiet, still watching the seal as it dives and twists in the water.

“There’s not enough fish for all of the things that need to feed on them,” Steve says, walking up behind us, also watching the seal. “They fish the herring and all the things in the ocean feed off the herring. They fish the krill, and that’s where everything starts. And they’re dragging that to feed the farm fish. It’s not just salmon. There’s no more rock cod, no more perch.” Steve’s work with the water taxi puts him in a unique position to be able to keep his eyes and ears on all sorts of happenings within the Strait. Not quite a commercial fisher and not technically employed in aquaculture, he is privy to the conversations and complaints of both fishers and farmers, tourists and residents, and all sorts of people in between. Whizzing between bays, lodges, farm sites, hotels, docks, beaches, and towns, he notices when fish and fishers are absent from their usual fishing grounds and where and when something is amiss within the social life of the waterscape.

"A lot of these fish started disappearing when they invented the buzz bomb for the tourists. Those cleaned all the rock cod out because they take 50 to 60 years to grow. Then the pulp mill killed a lot. They were pumping out so much poison. They had a big 5- or 6-foot pipe that went way out into the middle of the channel, then all of that poison would be flushed by the tides. Then when the pulp mill closed, they opened up more fish farms," Sam responds.

"I don't even know why we have these net-pens here. Why are we farming Atlantic fish in Pacific waters? There are so many things wrong with that," another friend, Henry, interjects.

"You can't even count that as eating salmon. It doesn't have the same omegas, there's no nutrients. It's just a fish that is easily farmed," Steve offered.

"Well you're eating fish, but you're not eating salmon."

Henry has a reputation as one of the best chefs on the island and has worked in several of the nearby upscale hotel kitchens that catered to tourists during the summer season. Farmed Atlantic salmon were never on his menus, though. However, like many coastal residents, he felt somewhat ambivalent about aquaculture, holding faith in the potential for farm-raised fish to provide a sustainable and healthy food source for human consumers. His refusal to eat, cook, or serve farmed Atlantic salmon seemed to be rooted more in the ecological devastation caused by net-pen aquaculture than in a broader political or philosophical refusal. As he often repeated: "If they farmed fish on land, I'd be the first person to switch to it."

"People don't even know what wild salmon tastes like anymore. That's why they eat it. They've probably never tasted wild salmon," Sam said in seeming disbelief. "It's killing the proper fishery. All these jobs have been lost. There used to be 4 or 5 thousand working in the canneries. There were 5000 boats just off the Cove here. That's how busy this whole Cove was. Think of all the things that we were used to seeing around here. The net loft, a full gas barge, bait places, herring pens… "

"That Jimmy Pattison just bought everything up. He bought the fleets. All the boats! Every car dealership, every radio station, TV channels. Unless you're an independent boat and you sell to a small or independent processor or something, Pattison owns everything now."

"People are always talking about how bad the fish farms are but no one ever talks about the drag net fishers. They just pull up everything from the ocean floor. Everything. Destroy it all," Henry complains, still thinking about the salmon farms.

"What about all those boats in Alaska?" Sam responds, switching the conversation again. He has fished side-by-side with the Alaskan boats, each confined to their respective side of the border, yet each following different catch allowances. "They fill their hatches all the way to the top. They're catching all our fish! Millions of those fish would be going back to the Fraser River, but they never even make it across the border." While fishers in the Cove were spending the summer at home, restless and frustrated, US boats bound for Alaska continued to transit north through the Strait. I could sometimes see them from Thomas's living room— huge, metal, commercial fish boats, topped with US flags, often met with huffs and tuts of

annoyance when they sailed past Thomas's house. How salmon harvests are divided between the US and Canada remains a contentious, international political issue. As one retired fisher once put it: "Canada and the US can't agree on anything except the fish are theirs." Yet, our concerns that afternoon were, for the most part, more immediate. Would Sarah be able to keep her new business afloat? Could farmed salmon be considered salmon at all if they did not have nutrient or omega compositions comparable to the free-swimming Pacific salmon of the Cove? Would Sam be able to take the *Silver Fin* out fishing and build up a supply of fish for his deep freezer before the winter?

Everyday Analyses

Our dinner on the *Silver Fin* placed us within salmon worlds already transformed by multiple and overlapping stressors. From booming populations of hungry seals and the legacies of pulp mill pollution to destructive techniques used by sports and commercial fisheries, salmon farms become a heightened burden when salmon are already subject to multiple waves of colonization and industrialization that continue to shape aquatic worlds in the coastal straits. In the midst of industrial legacies and changing ecosystems, fishers and coastal residents bear witness to the multifactorial conditions of ecological collapse and offer insights into the everyday forms of analysis, the "everyday adaptations" (Castro and Sen 2022), that are a commonplace aspect of daily life across the boat decks and docks of the coast. Conversations like these were so common, such a pervasive aspect of everyday life—especially while

waiting for fishing openings during the spring and summer months—that I gradually stopped paying much attention to them, sometimes brushing them away as just casual dinnertime conversations.

However, such reflections also illuminate logics that animate the everyday, the quotidian interpretations, adaptations, and analyses that are part of living a life in sync with the rhythms of salmon. Brianna Castro and Raka Sen (2022) propose that everyday adaptations are "the shifted ways a person works, eats, lives, and thinks in response to climate realities" (10); they are the "small, incremental changes made in our daily lives to accommodate the ecologies in which we live" (56). On the deck of the *Silver Fin*, such everyday adaptations were evident in the fact that we ate halibut and elk instead of salmon, that Steve now shuttles aquaculture workers instead of sports fishers in his water taxi, and in the choices of fish that Henry chooses to include or exclude from his restaurant menus. Everyday adaptations and everyday forms of analysis go hand in hand, and making sense of disappearing fish also means accounting for the logging practices that give rise to pulp mills, local economies that give rise to convenient yet violent forms of fishing, and, importantly, questioning why the salmon produced through aquaculture are just not quite the same as the salmon with whom they live in relation. Every person here is doing their own form of analysis and each provides a different insight into the social worlds that surround salmon ecologies, each highlighting the complexities that one-factor solutions like those espoused in governmental meetings tend to miss.

These everyday forms of analysis also offer insights into the ways that coastal residents understand the differences between the Pacific salmon with whom they have always lived and the Atlantic salmon who are relative newcomers to the region. While references to farmed salmon as being "not the same at all" could perhaps be explained away as dinnertime small talk, they also gesture to longstanding debates about the essential difference of salmon raised in net-pens. To be sure, Atlantic and Pacific salmon are more than just different species, they also belong to different genus categories. Atlantic salmon are genetically closer to trout than they are to Pacific salmon; they do not die after spawning but can repeat spawning and migration cycles several times throughout their life. They also tend to move more quickly from fresh to saltwater and have a more fish-oriented diet than Pacific salmon species (Hansen and Quinn 1998). They are almost entirely different creatures that have been biologically and geographically separate from Pacific salmon for millions of years. This could be, at least in part, why fishers in BC find the smells and tastes of Atlantic salmon to be so different to the smells and tastes of the Pacific salmon they are accustomed to.

That being said, the process of raising salmon in net pens— or the process of domestication, however incomplete— has also changed Atlantic salmon so fundamentally that biologist Martin Gross (1998) suggests that they might no longer fit the descriptor of "Atlantic salmon," *Salmo salar*. Instead, referring to Atlantic salmon as "one species with two biologies," Gross suggests that a new biological entity— *Salmo domesticus*— is needed in order to account for the ways in

which domestication continues to change salmon within genetic, physical, and behavioral registers. Selective breeding practices, for example, have changed the Atlantic salmon genetically, with industrial desires for faster growth, increased body size, greater stress and temperature tolerance, and more efficient egg production now reflected in their genetic composition (Gross 1998). Sometimes, salmon destined for net-pens are also bred to have three sets of chromosomes to prevent the ability to reproduce in the event of an escape. Indeed, the very thing of a farmed salmon is regarded as so different that when farmed salmon escape in Norway they are considered to be "alien" despite still being members of the same species of Atlantic salmon that comprise such an important component of Norwegian heritage, history, and ecology (Lien 2015). Here, Atlantic salmon become "alien" not because they have been moved to new and unexpected places, but because humans have intervened in their very constitution as a being (Lien 2015, 153).

Categories of salmon multiply along with the practices that constitute their being. The category of wild salmon (a relatively recent concept) has also emerged to describe free-swimming, river-born salmon— salmon imagined to proliferate beyond the hand of human intervention and throughout the course of deep geological time. What exactly makes or constitutes a wild salmon is not always clear, though, and might change depending who you ask. Sometimes wildness is located in the genes (Lien 2015, 9), with genetic tests distinguishing one population of salmon from another and determining the "wildness" of a fish's ancestry. Sometimes wildness is connected to a salmon's autonomy, its ability to complete its life cycle without human

interference (Lien 2015, 155). However, with a majority of all salmon worldwide now first bred in hatcheries and placed as fry into rivers by human hands and others moved by ship, plane, and truck above dams, around streambed obstacles, or to colder, more suitable waters, this marker of wildness is increasingly difficult to attain. That many rivers continue to have returning salmon populations is a testament to the dedication of local communities who care for streambeds by clearing waste, rearranging debris, and fighting for stronger pollution policies (Lien 2015, 159; Swanson 2015). Participating in projects that help to make salmon habitats more livable in the Klamath River has taught me that sometimes salmon can be encouraged to return through acts as simple as rearranging rocks to direct stream flow into pools of cold water or moving logs and twigs from riparian edges into river channels to create sheltered spaces protected from river flows and hungry predators (see Preface). These fish might not exhibit visual markers of their human involvement, but neither are their lives completely removed from the active care of people.

Other times, wildness extends beyond the salmon itself and incorporates the complex webs of ecological relationships that salmon are enmeshed within. BC resident and well-known aquaculture researcher and activist Alexandra Morton describes salmon as "only half a creature" because "salmon and their river are one organism" (Morton 2021, 136). Where the salmon ends and the land begins is not a question easily answered; they inform each other, they are co-constituted in what Ned Rozell might call "salmon tea," a river ecology "infused and saturated with salmon" (Mueller 2017, 62; Rozell 2004). To alter these ecologies of salmon relationality

might fundamentally change, as Spô'zêm First Nation Chief James Hobart put it, "what salmon are." As he described at a press conference held by the First Nations Wild Salmon Alliance, "I have a hard time saying farmed *salmon* because if you've ever tasted or looked at one of these animals, it's not salmon. You cannot pass those off as salmon. It's a disservice we're doing to the world to call those things salmon. I hope one day we can rebuild the stocks to be strong enough that people understand what salmon *are.* There's nothing that can replicate all of the benefits a wild salmon can bring. They're part of the ecosystem and we're part of that same ecosystem— we owe it to them." In the everyday forms of witnessing, analysis, and adaptation that that take place in kitchens and on boat decks across the coast, such categories and boundaries become known through the unexpectedly unpleasant smell of "escaped" Atlantic salmon cooking in Thomas's kitchen, through the lack of omegas and nutrients found within the flesh of a pen-raised salmon, and through the assertion that farmed salmon belonged to the category of "fish" but were excluded from being considered salmon at all. For making sense of salmon extinction also means making sense of these distinctions; it involves an analysis of what makes Pacific salmon unique and worth fighting for, even at the everyday scale of smells, tastes, and textures. For when Sam takes seriously the prospect that "everything is going to die if we don't have the wild stocks," the fate of much more than humans alone is at stake.

*September 2019*

DFO Fraser River Sockeye Update, September 3rd, 2019

> First Nations food, social and ceremonial (FSC) Sockeye directed fisheries in all areas remain closed.
>
> Due to the very low abundance of Fraser Sockeye it is unlikely there will be any directed Sockeye fisheries for the remainder of the year.
>
> Commercial and recreational fisheries for Fraser Sockeye and Pink salmon are not being considered at this time and will likely not occur in 2019.[32]

The excitement of spring slowly lulled into a fishless summer. Pre-season forecasts had predicted that almost 5 million sockeye would return to the Fraser River, most of whom would travel through the waters of the Cove. By the end of August, however, less than half a million sockeye had returned. Almost all sockeye fishing had ceased, if it ever even began. Indigenous food, social, and ceremonial (FSC) fisheries remained closed. Stoppers-by at Thomas's mourned that they had not harvested a single sockeye. Thomas's deep freezer was almost empty. The seine and gillnet boats remained tied up at the dock. Sam never left for his much-anticipated fishing trip. The absence of the fish was also felt in other, more unexpected ways. The pub— usually filled with tourists at this time of year— was full of locals who were supposed to be out fishing. By the end of August, the United Fishermen and Allied Workers Union, the region's preeminent labor union for workers in the fishing sector, urged the federal government to declare the 2019 fishing season an official disaster. Fishers were asked to report their earnings-to-date to the Ministers of Fisheries and Agriculture. It is telling that of the seven earning options available on the form, six

[32] https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=225082&ID=all

were dedicated to reporting income lower than $25,000. Many fishers did not even earn the $2,500 needed to qualify for employment insurance (Area C Harvest Committee 2021).

The waters sounded different, too. They were quiet compared to the excitement of spring. Elongated summer nights no longer reverberated with the pitter-patter sound like gentle rain, but were interrupted by unexpected, sporadic splashes— like those of a skipping stone— as lone fish jumped. Each splash that never happened was a reminder of how few the fish have become. The quietness of the waters seemed ominous. Instead of ripples teeming with life, the stillness and quietness were a sign that something was wrong. It felt like waiting by the window for a loved one who never appeared. The feeling lasted weeks which slowly turned into months. At the north end of Vancouver Island, a friend writes on Facebook: "The Broughton is silent, no splashing." We didn't know it at the time, but we were in the midst of what would soon come to be known as the worst Pacific salmon return in Canada's history.

However, it was not just that the fish were disappearing, but the fish that were returning were sometimes different, too. Descending from the north and scattering through the archipelago island chains that speckle migration routes leading to the Cove, adult salmon were arriving in rivers— albeit in much smaller than hoped for numbers. Many, however, were a strange shade of yellow and were dying before spawning. Their bodies floated limply at the water's surface. Sometimes fry rearing in the river or birds perched on rocks fed on the dead adults. Writing of the fish she encountered not too far from the Cove, biologist and aquaculture activist Alex

Morton observed: “They were robust good-looking fish, except for the blush of yellow. However their organs told another story. Their gills were exceptionally pale, they should have been bright red. Their livers were a strange yellow colour. The normally small, crisp-edged spleens were huge and swollen.”[33] Emergent yellow salmon are part of a worrisome trend. Almost exactly six years earlier, in the early autumn of 2013, sports-fishers reported hundreds of dead pink salmon washed ashore along the banks of the Fraser River. The humps on males were yellow, as were the eggs inside females. “The cartilage of their heads was yellow; their spines were yellow; their heart and liver were yellow; and their spleens were swollen and misshapen, a sign that they were fighting disease” recalls Morton (Morton 2021, 301).

The search for yellow salmon soon became an urgent call to action. Salmon advocates took to social media, urging those who lived near salmon spawning rivers to pay careful attention to the returning salmon. Detailed instructions directed residents to photograph yellow coloration or pre-spawn mortality in salmon, along with dates, locations, and if possible, gills and organs. But the opportunity to document pathogenic presence was fleeting. Soon after death, the bodies would decay amongst the decomposing litter of autumn, and the clinical, bodily signs of disease, along with the genetic material desperately sought to prove its presence, would be degraded beyond diagnostic use.

[33] Alex Morton, “When Salmon Turn Yellow It is Cause for Concern,” September 2019: https://alexandramorton.typepad.com/alexandra_morton/2019/09/when-salmon-turn-yellow-it-is-cause-for-concern.html

The very same week, the Department of Fisheries and Oceans held a Special Meeting on Fish Health to discuss the potential danger of the virus, PRV. Fish virology research published just a handful of months prior observed that Pacific chinook salmon infected with PRV exhibited liver problems, poor oxygenation, and troubles within the red-blood cells, resulting in a pale and yellow coloration (DiCicco et al., 2018). In a hotel in downtown Vancouver, a conference room mostly filled with government and university scientists debated whether the strain of PRV found in BC was the same as the strain found in Europe, how to go about taking samples from farms, and how biosecurity practices could prevent viruses from travelling from one farm to another. Alex Morton, who was invited as a scientific advisor to ’Nam̲gis Nation, reported back that the entire conversation focused on the potential presence of PRV within aquaculture facilities— no one seemed to be thinking about the potential harm that PRV could pose to Pacific salmon beyond the net-pens. For those who attempt to track the presence of the virus within the Strait, the yellow color hints that the fish might have encountered PRV-infected salmon or waters at some point during its life. The yellow color is taken as a sign of the meeting between Atlantic and Pacific salmon; it becomes a visual manifestation of viral encounters, and a sign of the pervasive presence of the aquaculture industry, even in sometimes surprising and seemingly unconnected places.

## Conclusion

This chapter has taken us through four interrelated scenes that occurred between May and September of 2019, during what came to be known as the worst Pacific salmon

return in Canada's history. In these scenes, we experience hope and anticipation for the fishing season to come, followed by the anxiety and disappointment that arises when the fish do not return. We gain an insight into the sometimes-unexpected ways that disappearing fish manifest in daily life— from an inability to plan birthday parties and grocery lists and the unusual presence of locals at the pub, to an inability to access food and financial security in a rural, under-employed, and food insecure community. We begin to perceive how fishers and coastal residents distinguish between Atlantic and Pacific salmon, how the practice of raising salmon in pens might fundamentally alter what a salmon is, and how aquaculture fits within broader political, economic, and ecological transformations.

These macro-level trends in political economy and ecology are often articulated within the context of corporate control of fisheries. For Sam, Thomas, George, and other fishers in the Cove who have been active in the fishing industry for decades, the ability to fish and access foods is shaped by corporate models of license and quota ownership as much as by declining fish populations. In BC and across the world, the ability to fish has been structured as a right that can be bought, sold, and traded since the mid-late 20$^{th}$ century, pushing Indigenous and small-scale fishers from the industry as large corporations amass the majority of fishing licenses and quotas on a global scale. In the Cove, aquaculture is often situated as just one more corporate turn, one more method through which access to fish can be privatized and placed in the hands of corporations while Indigenous livelihoods and subsistence practices continue to come under ever stricter scrutiny. As the "*Future of B.C.*

*Commercial Fishing"* report points out, not even rebounding salmon populations would rectify inequalities in access, allocation, and decision-making. The world into which aquaculture enters already struggles to reckon with multiple forms of resource extraction and wealth generation that have transformed life within the coastal straits since the Hudson's Bay Company first lay claim to Vancouver Island.

Access, allocation, and decision-making become ever more complex in the face of extinction. As hinted by the scenes in this chapter, people have always been doing the work of analyzing and making sense of multifactorial salmon declines. Today, the presence of aquaculture and the forms of vital seepage that leak and mutate beyond the farm add another factor to this mix. Yet, as will become even more apparent in the chapters that follow, cumulative waves of extraction, industrialization, and colonial violence make causal chains difficult to ascertain, whether with regards to the impacts of PRV or the repercussions of buzz bombs. Uncertainties multiply. In moving between the structural and the intimate, in seeking to provincialize a neat narrative form, and in highlighting the connections between fisheries and aquaculture that my interlocuters make, this chapter has introduced us to a changing and uncertain life on the coast, a life that continues to unfold in profound ways in relation with farmed Atlantic salmon.

## Chapter Two

## The Troubled Promise of a Blue Revolution: Salmon Eggs and Ocean Leases in the Making of BC's Salmon Aquaculture Industry

In 1984 in a small, secluded inlet flushed with strong tides amidst the coastal crevices of BC's Sunshine Coast, Brad Hope raises tens of thousands of chinook and coho salmon in eight nets roughly the size of two tennis courts. The fish range in size. Some are just small fingerlings that, energetic and fast, dart around the pens searching for food and avoiding the larger fish. Others weigh up to eighteen pounds— large enough to fetch a premium price when harvested. These larger, adult chinooks stay near the bottom of the pens, only coming to the surface to swiftly eat the pellets that rain down from the surface before diving back to the bottom, out of sight. Hope used to be an agricultural farmer in Winnipeg but, upon moving to the coast, found that the rocky soils were not amenable to farming the land. After five years of experimentation and aided by the full-time efforts of his wife and son, the Hope family instead works towards the goal of raising half a million pounds of salmon each year.[34]

Hope's dream of farming the sea was beset with challenges. First, a fresh water supply, unpolluted sea water, and sheltered pen sites were necessary, but finding such locations on the rural and intricate coast was the easy part. Securing a

[34] This account is adapted from Geoff Meggs' 1984 article "Aquaculture: 2," May 18, 1984, *The Fisherman*.

reliable supply of quality fish feed was much more difficult. The only available feed came from fish food manufacturers in the US via Vancouver and had to be shipped to their location which was only accessible by boat. Sourcing a large number of high-quality eggs also proved problematic. Hope and other aquaculture practitioners were reliant on excess government eggs produced through the Salmon Enhancement Program since federal laws generally prohibited the import of eggs. However, by the time these eggs arrived at Hope's farm, they were often in such poor condition that most were unviable or only produce small, lethargic fish. Hope planned to soon be self-sufficient in egg production thanks to the two thousand broodstock fish he now had on-hand. Machinery and equipment also had to be transported to their small landing barge, a fresh water supply system was necessary in order to preserve the incubating trays of alevins before they were ready to enter the salt water, a dry storage scheme was needed to store the feed, and innovative methods for keeping the nets securely anchored and afloat amidst all types of weather needed to be engineered. Hope estimates that $300,000 of immediate cash is needed upfront. Even then, he warns potential would-be aquaculturalists, it would likely be years before a farm is able to produce a return on investment. Unexpected troubles can arise at any time. During what should have been their first harvest, a heat wave triggered hydrogen sulphide gas to seep from the mud beneath the pens and kill most of the fish within their care (Keller and Leslie 2004, 188). Hydrogen sulphide is commonly emitted during processes of decay; in this case, however, the unusual abundance of biological materials decaying on the seabed beneath the farm combined with

unusually warm temperatures to make the gas much more lethal than usual. In 1983, the Hopes' were on track to reap record harvests, but a tear in the net allowed several thousand of their fish to escape. Disease can often be a problem, too. Such losses are frustrating. Since, at least for now, most of his eggs are sourced directly from the government through tax-funded programs, Hope feels a moral obligation to ensure that the fish the eggs produce are able to survive. [35]

Even if the eggs are able become full-sized, marketable salmon, there was then the trouble of finding purchasers who would buy farmed salmon, then a largely unknown product that was met with skepticism from commercial buyers and consumers. After Unilever's flagship farm further west produced soft, "unpalatable" salmon that were unable to be sold and caused the start-up subsidiary to go into bankruptcy, commercial buyers were resistant to purchase farmed salmon. Hope believes the government could be doing more to support entrepreneurial families like his. Canada could build its own feed mill so aquaculturalists were not reliant on US imports. Subsidies would make it easier to afford the multitude of up-front costs. In Scotland, one third of start-up costs were covered by government grants and one-third could be paid for using low-cost loans. In rural areas of Scotland, government subsidies could cover up to 90% of initial costs. In Norway, financial backing was often provided through the state's nationalized electrical utility, Norsk Hydro.[36] Yet, the governmental response in Canada had been lukewarm and investment and

[35] This account is adapted from Geoff Meggs' 1984 article "Aquaculture: 2," May 18, 1984, *The Fisherman*.
[36] This account is adapted from Geoff Meggs' 1984 article "Aquaculture: 2," May 18, 1984, *The Fisherman*.

financing remained major difficulties. Since the Constitution of Canada does not allow for private ownership of fish— considered "wild animals" and common property of the state and its national citizenry— investment institutions in Canada were, at first, reluctant to finance salmon farms because the fish could not be seized in the event of a default (Miller 1998, 11). Unlike conventional agriculture, aquaculture ventures also lacked secure titles to the marine environments in which they were operating and relied on leases of state-owned Crown lands for their site locations (Conley 1997; Saunders and Finn 2006; Marshall 2001; Owen 1998). Lacking physical ownership of space and fish-collateral, only one insurance company worldwide, a subsidiary of Lloyd's of London, would insure aquaculture operations (Benson 1985, 1/16). Yet, Brad and June Hope were capitalizing on a growing movement that was taking root in their community, across Canada, and on a diversified international scale. If, as a reporter laments in *The Fisherman*, a publication of the United Fishermen and Allied Workers Union (UFAWU), that "one of the soberest lessons of the late 20th century is learning that the productivity of the open ocean, enormous though it may be, is finite" (*The Fisherman* 1974, 24), then, as we have seen, aquaculture was proposed as a modern revolution, a techno-scientific feat capable of circumventing the ocean's limitations.

This chapter is concerned with the historical, political-economic, and technical contingencies that created the conditions of possibility for Atlantic salmon farming to emerge on the Pacific coast. Drawing particularly upon historical newspapers, government reports, and industry publications, I detail the

multidirectional trans-Atlantic flows of people, knowledge, capital, and salmon that make the salmon farming industry possible. While pioneering families like those of Brad and June Hope joined a chorus of voices in the 1980s that were optimistic about what the emerging industry could offer, coastal newspapers and publications like those disseminated by the UFAWU (what continues to be the region's preeminent fishing union) reveal that a diverse collection of seemingly disparate people shared warnings about what the importation of eggs, emergence of fish disease, and changing property relations might mean for the political, ecological, and spatial relations of the coast.

The first half of this chapter focuses on the early emergence of aquaculture and the circulation of such critiques as expressed by government workers, fishers, and community members throughout Vancouver Island's eastern straits. The second half of the chapter explores the spatial conflicts that unfolded as areas of the foreshore and parcels of the sea-bed came under the tenure of aquaculture operations. We will see how the transformation of the foreshores and seabeds into sites to be leased to industrial activities not only changes the socio-ecological compositions of the waterscape, but also wields the trans-Atlantic geographies that make salmon aquaculture possible to anchor settler state claims to territory in the seabed.

## A Note on Sources and Arguments

This chapter makes particular use of historical newspapers and industry reports, describing how aquaculture was pursued and resisted differently by fishers,

community members, local politicians, and government bureaucrats. In particular, *The Fisherman* provides a unique insight into a specific moment in time in which environmental crises, emerging technologies, and a growing international emphasis on the mobility of trade and capital came to a head within the fishing industries and aquatic ecosystems of British Columbia. Founded in 1937 upon the joining of the Salmon Purse Seiners Union of the Pacific and the Pacific Coast Fisherman's Union, *The Fisherman* is the oldest and most widely circulated fishing publication on Canada's west coast and became the voice of the United Fishermen and Allied Workers' Union (UFAWU) when the union officially formed in 1945 (Muszynski 1996).

Fishers and shore workers on the BC coast have a long history of organizing around labor inequalities, despite and sometimes to the benefit of structures of racial capitalism and settler colonialism that segregated workers along gendered and racial distinctions. Indigenous and white fishers frequently organized and collaborated across the managerial divides that kept them separate, but the United Fishermen and Allied Workers Union emerged as distinct from Indigenous-centered organizations such as the Native Brotherhood of British Columbia. The UFAWU initially focused on recruiting white workers and organized workers by labor type (e.g. gillnetters, seiners, fishers, shoreworkers, permanent, seasonal) (Muszynski 1996, 182). While white fishers and shoreworkers were primarily concerned with securing higher wages and less precarious contracts, Indigenous fishers were also concerned with their ability to access and steward historical fishing sites, harvest fish for their own

consumption, and fish and trade outside of the commercial economy. Thus, commercial fishing was just one among many nested and overlapping interests advanced by associations like the Native Brotherhood (Muszynksi 1996, 182; Newell 1993). Since the Native Brotherhood organized around an array of issues beyond commercial fisheries and therefore was not considered a fishing union proper, by 1952 the UFAWU stood alone as the "single functioning industrial union anywhere in the fishing industries of North America" *(The Fisherman* 1979, 10). Amidst this status, the union faced political resistance. In 1953, the union was suspended and refused entry into the Canadian Labour Congress for two decades because of its communist affiliations (Muszynski 1996). *The Fisherman* continued to be published, though, and the union re-asserted itself in the late 20th century in a fishing and labor milieu vastly transformed by fishing license restructuring, free trade agreements, hatcheries, and early iterations of aquaculture (Meggs 1991; Musynski 1996).

It is within this context that journalists like Geoff Meggs and other fishers-turned-organizers-turned-journalists reported on the emergence of aquaculture within the pages of *The Fisherman* from the beaches, foreshores, conference rooms, and boat decks of the coast. Other, more mainstream publications like *Sunshine Coast News* circulated amongst communities at the southern outlet of the Georgia Strait— what would become the original center of salmon farming in BC— providing distinct, local perspectives into the processes of change that accompanied the legalization of Atlantic salmon egg imports and the introduction of new forms of foreshore leasing.

Historical newspapers and government reports from the late 20th century captured my interest in an unexpected way. While these textual archives exhibit a familiar state and public embrace of aquaculture for ushering oceans and fisheries into a new, modern era, they are also filled with critiques, warnings, and disconcertments about what aquaculture would mean for the people, ecologies, and economies of BC. Emails between government bureaucrats, letters to the editor written by local community members, and reporting from the region's preeminent labor union for fish workers reveal that aquaculture on the BC coast was contested and uncertain, with cautions about the ability for viruses to jump between species with unexpected consequences present from the very beginning.

Yet, Indigenous peoples, nations, voices, and perspectives are overwhelmingly missing from this textual archive. Very few articles within *The Fisherman* seem to address the unique concerns that Indigenous peoples across the coast brought to disputes over how, why, and where net-pen aquaculture would come to be practiced. The lack of consultation over the building and anchoring of industrial infrastructures, the potential for further alienation from historic fishing grounds, and the threats that the raising of Atlantic salmon might pose to aquatic cultural resources were all distinct points of friction put forth by Indigenous peoples, with organizations like Union of British Columbia Indian Chiefs making these discontents clear since at least the 1990s.

On one hand, this speaks to the need for further research on this topic, both through ethnographic and archival methods and the need for digitization of

Indigenous publications from the mid-late 20th century, such as The Native Voice.[37] On the other, the absence of Indigenous peoples and their perspectives and concerns from fishing and community publications speaks to the ongoing erasure of Indigenous peoples from public and political life; this erasure is also related to the broader arguments about infrastructure, territory, and settler colonialism that this chapter seeks to make.

Journalists and community members presented potent critiques within the pages of *The Fisherman* regarding the ways in which aquaculture would restructure the spatial and property relations of the coast, particularly through an erosion of the legal status of coastal waters as being "common property" and a "public domain." These contestations continue today. The 2018 campaign to remove net-pen aquaculture from Puget Sound hinged on the need to "take back our public waters from the commercial net-pen industry." In one interview I conducted with residents of Puget Sound, a community member lamented that "our public waters are too big of a place to be taking this risk." However, these historical and contemporary observations often stop short of examining how and why the waterscape attained this "public" legal status or the forms of dispossession on which this legal status depends. This is not particularly surprising— the idea that coastal zones are "public" or "held in common" is foundational to the structures of fishing and navigation that have been entrenched in Western law since the 13th century (see Historical Primer). The public

[37] The Native Voice was the "official organ" of the Native Brotherhood of British Columbia, issued from 1946-1997 and digitized records are publicly available for the years 1947-1955.

status of coastal waters is so deeply embedded in settler social and political life that when I would ask people how and why this legal structure came to be, I often received responses that echoed the words of one community member in the Cove, who simply stated, "I don't know. It's just the way it is. It's always been that way."

Notwithstanding that the temporality of "always" can be traced to particular historical moments, as in the writing of the Magna Carta and the declaration that Canada "claim[s] for our people the same exclusive right to control the fisheries within the three mile limit that we do to control the mines, or the timber, or the soil of our country" (see Historical Primer), reporting in media like *The Fisherman* helped to normalize this state of affairs as the taken-for-granted, hegemonic social and political order. In the story I relay here, settlers, fish, courts, eggs, newspapers, state agencies, legal contracts, property relations, pathogens, and physical infrastructures work together not only to produce an aquaculture industry, but also to produce the ongoing structure and lived condition that is settler colonialism. If, as I propose throughout this dissertation, settler colonialism is the ongoing "background" (Rifkin 2017) and context that animates the pen-raising of salmon in BC, then this context is actively produced in the erasure of Indigenous peoples from public and political discourse that emerges from within the pages of newspapers and in the legal mechanisms governing egg importation and sea floor and foreshore usage.

## An Experiment in Artificial Propagation

The emergence of aquaculture on the BC coast is often traced to a 1980s moment in which crises gripped fishing and forestry industries and neoliberal reforms

emphasized foreign investment and the strengthening of export economies (Liu 2013; Keller and Leslie 2004; Young and Mathews 2011; Stewart 2017). However, much like the histories of settlement and land theft recounted in the Historical Primer, the technical and political foundations that would enable a salmon aquaculture industry to emerge in the bays of the coast had been in play for over a century before the first net-pens were haphazardly constructed. Federal authorities started experimenting with methods of fish culturing in the late 19th century when the seemingly "inexhaustible" resource of fish— that only a few years prior had been deemed "scientifically impossible" to overfish— suddenly seemed much more finite as catches plummeted coast-wide.[38] As logging, mining, landslides, and urban development transformed ecosystems throughout the early 20th century, salmon populations became ever more erratic and difficult to predict. The need to "make salmon" (Taylor III 1999) engrossed federal agencies charged with managing fish stocks.

One response to the increasing unpredictability of Pacific salmon returns involved attempting to acclimatize Atlantic salmon in BC rivers as was already underway in California and Washington State (MacCrimmon and Gots 1979; Popular Mechanics 1923). Transnational networks of salmon shipping had previously attempted to transport Pacific salmon eggs from San Francisco to Chile, although the eggs arrived in such poor condition that the endeavor was generally regarded as

[38] British biologist, Thomas Huxley, famously recounted to the 1883 International Fisheries Exhibition in London that overfishing anywhere was "scientifically impossible" and that "all the great sea fisheries are inexhaustible." His perspective would go on to inform British imperial fishing policies in the Strait of Georgia and elsewhere (Stewart 2017, 137).

unsuccessful (Soluri 2011). Salmon from California were also transplanted in Paris via the French Society for Acclimatization (Soluri 2011). Transporting Atlantic salmon to BC seemed an obvious extension of this exchange. In 1905, over 200,000 Atlantic salmon eggs, fry, and smolts were introduced into various BC waters as part of government-sponsored campaigns to increase fish populations and spur recreational angling opportunities for British settlers who preferred Atlantic salmon (MacCrimmon and Gots 1979; Shore 2017; OECD 2017). By 1935, this number would increase to somewhere between 8 and 14 million (Ginetz 2002; OECD 2017).

In Norway, meanwhile, small-scale fishers, community initiatives, and fledgling government programs were refining technologies for hatching, cultivating, and releasing salmon fry into rivers (Lien and Law 2011). The ability to rear and release specific numbers of salmon smolts at designated times and have them predictably return to such hatchery facilities became an enticing management solution at a time when salmon were at the center of conflicts in governance across multiple scales. In BC, thousands of fishers were out of work due to inconsistent catches. Governments in Victoria, Ottawa, Olympia, and Washington DC each held interests in British Columbia's salmon fisheries. Tense negotiations between the US and Canada over a potential Pacific Salmon Treaty sought to determine on which side of the border each state's fish were being caught. Through hatcheries, inter and intra-national conflicts could be avoided and fishers would have plentiful stocks to harvest, eliminating the need for social assistance programs that supported fishers during years of low returns. A rapidly growing forestry industry would not need to be subject

to more intense regulations in order to protect salmon-spawning streams. The national identity of certain salmon would also no longer be questioned as fish moved between Canadian and American waters.

Under the organizing principle of hatchery-based "enhancement" and a management approach that assured "no net loss" to fish numbers, fish managers assured that if one population declined, it could easily be replaced by a new generation of hatchery fish (Stewart 2017, 152). The conceptual foundation of enhancement programs assumed that salmon runs could be managed independently of one another and that population decreases related to pollution, development, or habitat loss could be mitigated by smolt-production in hatcheries (Gayeski et al. 2018). By 1975, hatchery-based enhancement was institutionalized through the creation of the Salmon Enhancement Program (SEP)— the largest and most expensive government project aimed at increasing salmon populations undertaken in Canada to date (MacKinley et al., 2004). Yet, despite massive government investments, salmon catches did not double in ten years as was the stated goal (MacKinley et al., 2004); in fact, fish catches abruptly declined once again. Hatchery fish were subject to the same rates of poor survival as their river-born counterparts and few returned to the facilities from which they were released (Gayeski et al. 2018). Negotiations with the US over an international salmon treaty proved laborious and were at a stalemate. A new method of making fish was needed.

From Fishing to Farming: A Settler Progress Narrative

With the technical processes of raising juvenile salmon in place, the farming of the seas became positioned as a logical progression in the civilization of human-kind. Instead of releasing smolts and eagerly awaiting their return, the raising of fish in net-pens enabled the fish to be held in place and monitored at each stage of life, from egg to market. As famous oceanographer Jacques Cousteau memorably claimed in a 1978 issue of *National Geographic*: "For man, the future lies in doing in an ocean environment that which he has already done for thousands of years on land- namely, the controlled rearing of animals within a contained area for the purposes of food production" (Marden 1978). Journalists in BC would similarly go on to assure: "Aquaculture duplicates within an aquatic environment the revolutionary step forward in the struggle for survival man took thousands of years ago when he gave up hunting and became a herdsman" (*The Fisherman* 1974, 24). The "blue revolution," praised for mimicking the agricultural revolutions of the Neolithic, brought the ocean into the supposedly inevitable transition from hunting to farming that agriculture had brought to land (Stewart 2017, 160). Aquaculture, it seemed, was the next chapter in the entwined story of people and salmon in BC.

Rhetoric that places the practice of farming the sea as the next-step in a chain of evolutionary progress is firmly situated within enduring narratives that position sedentary, agricultural practices as more advanced than those comprised by nomadic or seasonal cycles of movement. Environmental historians have made clear that the raising of animals has never been an endeavor concerned with subsistence alone.

Within histories of North American settlement, agriculture— and the raising of animals in particular— involved reshaping landscapes, ecologies, and food ways according to Christian settler desires (e.g. Anderson 1994, 2004; Cronon 1983). Agriculture became a physical embodiment of "civilization," a material antithesis to the imagined savagery in which settlers found themselves (Anderson 1994). Unfarmed land was "terra nullius," wasted and empty, waiting to be swept into the swift embrace of colonization (Hurley 2022). If, as Hurley suggests, the ocean was "lands unclaimable opposite," difficult to cultivate and settle because of a material resistance to property boundaries and enclosure, then aquaculture not only helped to stabilize numbers of salmon available for consumption, it also helped to bring coastal waters more firmly within the claims of the state, making them slightly less wild, slightly more civilized.

However, even international corporations with seemingly unconstrained financial, technical, and political resources struggled to make their salmon farming operations a success. In 1969, Union Carbide financed Washington State's first salmon farm near Seattle (Keller and Leslie 2004). After initial success raising 12-inch coho and being acquired by the Campbell Soup Company (Nash 1973), the start-up later went out of business and transitioned to providing rainbow trout eggs for other aquaculture markets. In BC, forestry giant Crown Zellerbach imported chinook eggs from the US to grow in pens near their pulp mill beyond the northern end of the Strait (Keller and Leslie 2004, 83). Yet, when the Department of Fisheries and Oceans learned of Crown Zellerbach's unpermitted egg imports, they ordered the

foreign fish to be returned to their place of origin and the subsidiary created to manage Zellerbach's salmon farming operations declared bankruptcy soon thereafter (Keller and Leslie 2004, 83). The homesteading efforts of Brad and June Hope represent one of the first successful attempts to raise salmon in captivity on the Pacific Coast. "For the first time," Geoff Meggs reported in a May 1984 issue of *The Fisherman*, "eggs produced from public stocks have been used to produce a private brood stock. And for the first time, substantial harvests of salmon will take place without fishermen, without the fish ever swimming beyond the confines of their small pens."

The transition to aquaculture was also enveloped within a broader politics of land and water governance, food production, and economy-building within a geopolitical arena. The newly elected Conservative government encouraged foreign investment through policies such as the Investment Canada Act and aquaculture became a site of strengthening trade relations, particularly between Canada, Europe, and the US (Keller and Leslie 2004). Canada and Norway were keen on strengthening their economic relationship— both were resource-oriented states with important maritime economies, looking to become global leaders in forestry, oil, and gas production (Byers and Østhagen 2016). Both shared mutual interests in management of oceans and fisheries, global seafood trade, and concerns over the Arctic (Østhagen et al., 2018).

In Norway, however, the growing aquaculture industry faced new political pressures as stricter regulations limited farm size and fish stocking density (Lien

2015). Emerging industry conglomerates and their investors began searching for other sites where cold waters could grow abundant fish without the bureaucratic burdens imposed by Norway's Aquaculture Acts of 1981 and 1985 (Keller and Leslie 2004; Lien 2015). In BC, meanwhile, the Sunshine Coast Economic Development Commission looked to attract aquaculture investors by inviting farm executives from Norway, Scotland, and the US to a small beach motel in 1984 to share their knowledge and technical expertise with interested parties in BC (Keller and Leslie 2009, 190; *Sunshine Coast News* 1984, 13). Panelists suggested tips for marketing farmed salmon to new consumers, attendees were educated on best practices for site selection and net-cage design, and participants, including Norway's largest aquaculture equipment manufacturers, toured Brad and June's farm facilities (Keller and Leslie 2009, 190; *Sunshine Coast News* 1984, 13). The Hopes' farm was praised as "one of the most advanced farms in British Columbia" and within a few months they would fend off takeover offers from a joint aquaculture venture funded by Rockerfeller interests and Booker McConnell, a British-based multinational agriculture, food distribution, and health product firm (*Sunshine Coast News* 1985, 14; *The Fisherman* 1985a, 8).

Similar to the "shadow ecologies" described by Peter Dauvergne (1997) wherein uneven geographic patterns of production render the ecological harms of extraction invisible to those consuming resources from elsewhere, attempts at conservation in one place can have the sometimes-unintended consequence of spurring further degradation in another (Swanson 2015). Touring the archipelagos

and inlets of the Georgia Strait, aquaculture investors from Norway found sheltered bays and cold, nutrient-rich waters not unlike their own. The cold ocean waters surrounding Vancouver Island did not fluctuate too intensely in temperature or salinity, strong tidal currents enabled proper oxygenation and ensured that waste could be flushed from within the net-pens, and the coast's sheltered bays provided plentiful sites where nets could be anchored safely against the stronger winds and waves of the open Pacific Ocean. Also located close to the commercial hub of Vancouver and on important Asia-Canada-US shipping routes for seafood markets, BC became positioned as the perfect place to expand.

Atlantic Salmon and the "Spectre of Disease" Travel West

Despite initial promises that aquaculture would be able to produce an abundance of fish for human consumption and alleviate commercial pressures on wild stocks, chinook and coho salmon held in pens across the coast were still escaping, struggling to grow large enough to fetch market prices, and succumbing to disease. As links between BC and Europe strengthened through the sharing of industrial practices, technical knowledge, and investment capital, farmers on the BC coast increasingly looked to European methods of raising Atlantic salmon in order to recuperate their financial losses and solidify salmon aquaculture as a viable coastal industry. Atlantic salmon held several advantages. They were less territorial and would more happily accept feeding pellets than the Pacific salmon, who would aggressively fight over food, sometimes endangering each other and the nets (Francis 1986). The relative

docility of Atlantic salmon also enabled them to be stocked in pens at higher densities (DPA Group, Inc., 1989). Since salmon change in coloration and the quality of flesh decreases as a fish reaches sexual maturity, fish that are fast to mature, such as coho and chinook, generally receive a lower market price (Conley 1997). Atlantic salmon, however, were considered to be biologically better suited to a livestock-rearing environment as they were slow to sexually mature, providing year-round options for fish harvesting (Conley 1997). Atlantic salmon already received higher prices than Pacific salmon in US markets and could also be made available when Pacific salmon were seasonally unavailable (Leslie and Keller 2004, 95). Most importantly, however, Atlantic salmon could grow to market size at almost twice the speed and were already experiencing commercial successes in Norway, Ireland, and Scotland (Francis 1986).

In 1984, the Department of Fisheries and Oceans quietly approved the limited importation of Atlantic salmon eggs and granted Brad Hope permission to import Atlantic salmon eggs to Pacific Aqua Foods' farm sites on the Sunshine Coast. For the initial import, 130,000 eggs from a hatchery in Scotland were to be shared between three facilities (Leslie and Keller 2004, 95). The Draft Importation of Salmonids Policy proposed a limit of 300,000 imported eggs per hatchery and specified that the eggs would be subject to a 12-month quarantine in order to protect against the introduction of unknown pathogens (Grigg 2012). Problems were encountered early, however, when eggs started hatching right on board the plane (*The Fisherman* 1985b). For the eggs that did arrive, Brad and June's facilities were outfitted with a new freshwater tank that held Atlantic salmon separate from their

Pacific salmon rearing facilities in order to prevent inter-species transfer of diseases. An at-home hatchery was constructed on the first floor of their house and ten new pens were almost ready to be installed (Francis 1986). Soon thereafter, they started construction on what was to become the largest private hatchery in BC and placed an order for an additional 1.2 million eggs (*Vancouver Sun* 1986, C8; *Times Colonist* 1986, B12.)

Although Atlantic salmon had long been global travelers and transplanted to the BC coast, the import of Atlantic eggs had never before been legalized on such a large scale. The potential for new forms of disease to be imported along with the eggs emerged as a key concern of scientists, policy-makers, and fishers. Soon after the initial approval, the Department of Fisheries and Oceans informed the Ministry of Environment that they would "not approve any requests for importation of Atlantic salmon originating from continental Europe until more is known about Hittra disease."[39] Deriving its nickname from extensive outbreaks on the island of Hitra, Norway in 1979 and 1980, the disease quickly rose to infamy as the most serious illness afflicting Atlantic salmon in farms (Holm et al., 1985). The skin and gills of fish began hemorrhaging and once dissected, fish biologists found hemorrhages, swelling, and fluid within the pale organs (Poppe et al., 1986). The cause, however, remained uncertain. Perhaps it was related to nutritional deficiencies (Poppe et al., 1986) or perhaps to a novel form of bacteria (Holm et al., 1985).

[39]Alex Morton. 2013. "Silenced": https://alexandramorton.typepad.com/alexandra_morton/2013/01/silenced.html

Bacterial kidney disease (BKD) had also recently been diagnosed in Norway and was soon after documented as transmitting through infected eggs (Evelyn et al., 1986; Elliott et al., 1989). Another bacterial disease, furunculosis, also appeared in almost all farm sites in Norway and in more than 70 rivers far from farm locations (Egidus 1987; Lillehaug 2018; Johnsen and Jensen 1994; Morton 2004). Furunculosis caused red rings, erupting boils, and popping eyeballs to mark the bodies of salmon within farms in Norway, quickly leading to mass mortalities and government-directed culls of potentially exposed fish, juveniles, and eggs from twenty-eight farms (Egidus 1987; *The Fisherman* 1986b, 20). The officially declared source: a hatchery in Scotland from which the eggs were imported (Egidus 1987). Eggs from the same Scottish hatchery were soon destined for farm pens near the Cove (*The Fisherman* 1986b, 20).

Atlantic salmon disease in Norway quickly became precautionary news for concerned fishers and government bureaucrats in BC who closely monitored how the industry was fairing in Europe as an insight into where their experiments in pen-raising salmon might take them. One month after the DFO paused egg imports from Europe pending more information on Hitra disease, Dave Narver, a biologist at BC's Ministry of Environment, wrote to his supervisors: "I am getting increasingly anxious about our importing of Atlantic eggs… My concern is shared by many of my colleagues in both provincial and federal agencies. The fish health measures agreed to jointly by DFO and ourselves in the fall of 1984 are not foolproof… we are taking a

risk when it comes to the introductions of a virus" (Feb 26, 1985).[40] At the same time, he also wrote to Brad Hope with Pacific Aqua Foods reiterating his unease: "We are deeply concerned with the fact that the risk of exotic diseases is dependent on both the number of imports and their size…. The direction the aquaculture industry wants us to go will insure that we import unwanted diseases that can impact our government hatcheries and wild stocks."[41] Sport and commercial fishing groups also expressed alarm. Robert Bull, President of the Schelt Peninsula Rod and Gun Club, wrote to the Municipality of Schelt emphasizing the ecological uncertainties of raising Atlantic salmon in the Pacific Ocean (Sherman 1991, 15). Near the Cove, the President of the Steelhead Society similarly warned that Atlantic imports could pose a catastrophic danger to Pacific salmon— pointing to the fact that inter-species disease transfer was already documented in Washington State (*The Fisherman* 1985b).

Nevertheless, the BC government announced an Aquaculture Incentive Program to provide fish farmers with interest-free loans (Keller and Leslie 2004, 89). Insurance and tax credits became more readily available (Keller and Leslie 2004, 89). Egg import regulations were weakened, with the quarantine time reduced from 12 months to 120 days, in part to alleviate the industry's cost of dealing with waste

[40] Submission AQU000139 to Cohen Commission, 2011, as archived by the Commission for Environmental Cooperation: http://www.cec.org/wp-content/uploads/wpallimport/files/12-1-exhibit_d.pdf and participants in the Cohen Commission, such as Alex Morton: https://alexandramorton.typepad.com/alexandra_morton/2011/12/the-recent-history-of-atlantic-salmon-egg-imports-into-british-columbia.html?asset_id=6a0120a56ab882970c0154383aa765970c#:~:text=%22%E2%80%A6,salmon%20fisheries%20of%20British%20Columbia.

[41] Submissions to the Cohen Commission, as archived by Alex Morton (2011) Atlantic Salmon: How did this happen to British Columbia?: https://alexandramorton.typepad.com/alexandra_morton/2011/12/the-recent-history-of-atlantic-salmon-egg-imports-into-british-columbia.html

water.[42] At community meetings on the Sunshine Coast, officials from the Ministry of Agriculture and Fisheries reassured frustrated community members of the longstanding yet unharmful presence of Atlantic salmon in BC's waterways (Nicholson 1991, 1). Five and a half million Atlantic fry and smolts had been introduced to the Cowichan River between 1910 and 1930 with seemingly few negative effects (Keller and Leslie 2004, 97). Atlantic salmon hatcheries in Oregon and Washington were having success in producing trophy fish and eggs for private growers (Nicholson 1991, 1). Besides, eggs from the Scottish hatchery in question were guaranteed to be disease-free for seven years and the regulations in place were designed to prevent disease transmission (Keller and Leslie 2004, 97; Nicholson 1991, 1).

Despite governmental efforts to pacify nervous publics that disease transmission between Atlantic and Pacific salmon remained an unlikely but at-worst a small-scale occurrence, residents of the coast who had long acted as informal salmon surveyors began to notice unusual changes in the bodies and behaviors of local fish. In 1989, thousands of chum salmon migrating through the Broughton Archipelago at the northeastern tip of Vancouver Island died at the mouth of the Viner River soon after migrating past the farms (Morton 2004). Their bodies were speckled with never-before-seen grey abscesses and protruding eyeballs (Leslie and Keller 2004, 93). Marine anemia (also known as plasmacytoid leukemia), previously undocumented on

[42] Alex Morton (2011) Atlantic Salmon: How did this happen to British Columbia? https://alexandramorton.typepad.com/alexandra_morton/2011/12/the-recent-history-of-atlantic-salmon-egg-imports-into-british-columbia.html

the BC coast, was diagnosed at over twenty farm sites, including in three farms around the Cove (Keller and Leslie 2004, 116). The Scottish eggs destined for the Cove stirred anxieties when the same hatchery was charged with spreading the bacteria associated with furnoculosis to salmon in farms across Norway. Yet, since so many BC-bound eggs were sourced from the hatchery in question, to preventatively destroy the eggs would have caused bankruptcy for up to twenty of BCs fledgling farms (*The Fisherman* 1986b, 13). Once legalized, the influx of Atlantic eggs was hard to slow. By 2009, 30 million live Atlantic salmon eggs had been imported to BC from five different countries, including the US, Ireland, Scotland, and Iceland (Morton 2021, 152).

However, much more than eggs came along, too. Since hatchery personnel and fish technicians in BC were unfamiliar with the biological specifics of raising Atlantic salmon, farm and hatchery managers from Norway, well-practiced in raising Atlantic salmon, also made a home in BC (DPA Group, Inc. 1986, 94/4-17). Norway-based companies opened Canadian and North American headquarters, bringing employees, equipment, technical expertise, and international investors. "The spectre of disease," although "dismissed as a paranoid nightmare by DFO" (*The Fisherman* 1986b, 13), also travelled with the trans-Atlantic flows of people, capital, and fish biomaterials that make the salmon farming industry possible. Even within the ranks of government, workers like Dave Narver warned that the increasing scale of egg imports might reveal government mitigation procedures to be inadequate and emphasized the potentialities for inter-species disease to impact Pacific salmon

beyond the net-pen enclosures. The transnational flows of salmon eggs and the worlds held within not only reshaped global salmon supply chains but also enveloped water, fish, and microbes within in a sometimes-lethal relationship that continues to blossom within the trade networks and husbandry practices fostered by the global salmon industry. Geographies of aquaculture that connected places like Scotland, Norway, and North America also became geographies of industrial and multispecies entanglement, with the ability for pathogenic microbes to move and circulate between species and oceans complicating official declarations that aquaculture was the future of Canada's fish.

## Leasing the Ocean: Marine Property and the Spatial Politics of Aquaculture Infrastructure

Bjorn Skei used to work in plumbing. Lethargic and bored, he needed a change of pace and a family business feeding hungry fish in the inlet surrounding his float-home seemed like the perfect opportunity for a mid-life career change. It took several years for pens to be constructed, smolt to be purchased, and fish to grow but, at first, everything seemed to go smoothly. That was, at least, until banks decided that they needed more collateral from aquaculture start-ups and the provincial government cancelled the development program that incentivized banks to provide funding. After already investing two or three hundred thousand dollars of his own resources, Bjorn returned to his home country of Norway to seek support from the Bergen Bartz organization who were already operating the Viking Sea Cages subsidiary in BC. Bjorn received the financial backing he needed to bring his fish to market and on the

eve of his fiftieth birthday, Bjorn's family-run business was set to become a million-dollar operation. "Here's a toast to the new gold rush!" proclaimed Bjorn's son, surrounded by friends and family while sitting on the sundeck of their float-home overlooking the bay in which their fish pens were anchored. His father seemed healthier and happier, and his son was grateful for the lifestyle changes that becoming a small business owner had afforded to his father. Described by his friend as an "early prospector who staked a claim which led to the so-called gold rush," the gold, in this case, came in the form of access and rights to foreshore areas leased from the provincial government.[43]

By the time of Bjorn's birthday celebration, there were few if any sites remaining around Schelt Inlet that were not under tenure application. Since the Hope's and their neighbors had constructed the first net-pens in the Schelt area just two years earlier, almost every suitable site in an inlet or bay had been rezoned, claimed, and leased by families, partnerships, and corporations hoping to build aquaculture infrastructures. The transformation of aquatic microbial ecologies was not the only shift stimulated by the widespread turn to the raising of Atlantic salmon. In applying to lease areas of the foreshore from the provincial government, the farm-raising of seafood also transformed the property relations of the waterscape by carving what had long been considered the coastal "public waters" into parcels of exclusive, single-user tenures. As ever-increasing areas of the marine waterscape became incorporated into changing property regimes that granted exclusive user

[43] Narrative adapted from *Sunshine Coast News*, "A Toast to the risk takers," April 14 1986

rights to aquaculture businesses, First Nations, fishers, communities, governments, and aquaculture practitioners became embroiled within a spatial conflict concerning uses and governance of the foreshores, nearshores, and "submerged lands" of the straits. As we shall see, such emergent forms of marine property-making go beyond transforming the physical waterscape into a new type of resource or commodity, subject to trade and profit-making (Marshall 2001, 343)— they also carve the waterscape into patchworks of contending jurisdictions in ways that quite physically anchor settler state claims to territory within the seabed.

## The Foreshore Rush

From the eastern seaboard of Canada to the fjords of Chile and Norway, aquaculture is often interpreted as technology of spatial control that alienates, reterritorializes, and redefines ocean spaces through new forms of marine enclosure that generate competing claims to user rights and jurisdiction (Pitchon 2015; Marshall 2011; Knott and Mather 2021). In Chile, for example, small-scale and independent fishers lose access to marine areas and become incorporated into piece-rate payment systems of wage labor as aquacultural expansion engenders shifts in the productive relations of the sea (Pitchon 2015; Soluri 2011; Gerhart 2017). On the islands neighboring New Brunswick on Canada's east coast, fishing communities are likewise witness to changing coastal property regimes as the increasing allocation of coastal sites for aquaculture means that large areas of the coast are removed from community control and access (Marshall 2001). The economic potential of marine resources has

historically been hedged within other-than-human bodies and communities—in fish bodies and populations, for example. However, aquaculture's dependence on "aquatic space frontiers" (Knott and Neis 2017) transforms the hydrological and physical conditions of the waterscape into an emergent source of economic possibility (Marshall 2001).

In 1974, the Fisheries Research Board of Canada praised Canada's long coastline and its abundance of unpolluted, nutrient-rich, fresh, and salt waters in assessing Canada's underexplored potential for aquaculture production (MacCrimmon et al., 1974). On Canada's east coast, places like New Brunswick's Bay of Fundy were imagined as ideal sites for salmon aquaculture since the "flushing action" of twice-a-day 28-foot tides made for good growing conditions. However, "with its heavily indented coast" that "offers thousands of acres of ice-free protected waters," the Fisheries Research Board Report concluded that no waters across Canada's vast coastline were better suited to aquaculture than the waters between Liǧʷiɬdaǩʷ territories and Vancouver (MacCrimmon et al., 1974; *The Fisherman* 1974, 24).

The BC Site Selection Handbook of 1992 advises that the first prerequisite for a successful aquaculture business is to determine a good site (Pennell 1992). First and foremost, budding aquaculture practitioners should ensure that water temperatures at their potential site be appropriate for the species being raised. It is also critical to consider water depths, short-and-long-term salinity changes, the speed and intensity of currents and tide changes, and access to roads and other on-land infrastructures.

Strong currents are necessary for proper oxygenation, but tidal currents should not recirculate water through the site to ensure that wastes such as ammonia are properly flushed away (Pennell 1992, 7). The potential site should also not be subject to low dissolved oxygen levels, plankton blooms, external pollution sources, or be located near to sea lion, avian, or mammalian predator habitats (Pennell 1992). In British Columbia, the "unique marine geography" of the Georgia Strait was once again promoted as a prime site for aquaculture since the abundance of sheltered locations would provide refuge from harsh ocean storms, yet powerful tidal flows would "provide a flushing" to disseminate farm waste (Stewart 2017, 160). The Site Selection Handbook warns, however, that sites around the Cove require careful investigation since the diversity in tidal activities creates varied temperature regimes. Inlets can become very warm during the summer but areas nearer to the mainstem tidal passages remain much cooler so extreme specificity in site selection is needed. Otherwise, "brisk tidal flows and a moderate temperature regime tending toward the cool side" create a region that "offers many high-quality sites" (Pennell 1992, 12).

In the northeastern region of Vancouver Island, provincial officials arrived in ’Nam̱gis and Dzawada'enuxw territories of the Broughton Archipelago on a flashy out-of-place speedboat with a request to document community input regarding salmon farm placement in 1988 (Morton 2004, 201). The inlets and channels that surrounded the island chains of the archipelago were to be divided into sections of red, yellow, and green according to their suitability for aquaculture development. Red zones marked fragile and important ecosystems or places where aquaculture would

conflict with already established waterscape uses. Green zones indicated areas where aquaculture would be “highly acceptable” (Keller and Leslie 2004, 103). Salmon schooling, resting, and rearing areas, prawn grounds, and places of water and nutrient upwelling were mapped. “The vital organs of the Broughton were circled and notated on chart after chart,” recalls Alex Morton, who lived in the float-home community of Echo Bay, remembering the contrast of the rough wool toques of the residents with the white-starched bureaucratic collars of the government investigators (2004, 201). Morton was initially hopeful that they had succeeded in preserving the most important habitats of the area. They would soon discover, however, that farm after farm would appear in the red zones— places where the province itself had stated no fin-fish applications would be accepted.

Morton did not have an easy time trying to remedy the mistake. With one foot in agriculture and one foot in fisheries, aquaculture becomes a sector with a mixed identity. The province was in charge of farms and the foreshore, yet oceans and fish habitat remained under federal jurisdiction (Morton 2021, 38). The Ministry of Agriculture and Fisheries denied blame for approving salmon farm sites in critical Pacific salmon migration channels, stating that the Ministry of the Environment was in charge of approving salmon farm locations. The Ministry of Environment stated that they depended on the Department of Fisheries and Oceans to determine whether a salmon farm’s placement would impact Pacific salmon. DFO field officers told Morton that they had advocated against salmon farms being located in these sites, but their supervisors had not listened and some of the field officers had resigned from

their jobs in retaliation (Morton 2004, 202). Ultimately, however, the colorful zoning maps were deemed to be guides, not regulations, and had little definitive sway on salmon farm placement. Additionally, any site that had been applied for prior to the completion of the study had been grandfathered in; in Morton's words, "the industry had anticipated these restrictions and had applied for every bay that was remotely suitable" (2021, 43). Over the next decade, the Broughton Archipelago would become the center of BC's farmed salmon production. The small community of Echo Bay was almost disappeared as the province stopped granting residents the foreshore tenures needed to tie their houseboats and float homes to the shore, one by one.

The Fisheries Research Board and Site Selection Handbook exemplify how forms of property-making involve and rely on material preconditions and affordances. Within contemporary ocean development schemes, tidal patterns, salinity, temperatures, water depths, and winds become part of a matrix of marketization wherein certain areas of the waterscape become a marketable resource (Marshall 2001). Biophysical characteristics and a conceptualization of "ocean-as-infrastructure" (Lien 2023) interweave to enable the waterscape to be reconstructed into "sites" for aquaculture development. Dorothee Schreiber (2003) points out that the transformation of the straits into a series of discrete and isolatable sites further contributes to the epistemic and physical separation of the straits from Indigenous nations, reconfiguring the waterscape in ways that satisfy colonial agendas (88). In a familiar refrain, leases to aquaculture (and forestry, oil, and gas) industries are regarded by the province as operating in what are deemed to be empty and

underdeveloped territories (Schreiber 2003, 88). However, as the arteries of the coast are reconceptualized as a series of neatly bounded sites able to be categorized into zones of red, yellow, and green according to their biophysical capability and appropriateness for aquaculture, the waterscape itself is transformed into a material resource to be extracted for the benefit of settler society writ large. As seascapes become reimagined as places that can be cultivated and enclosed, aquaculture comes to enact the "daily work of settler occupation," for "as the citizen-farmer works the oceanscape, the oceanscape becomes ontologically his" (Hurley 2022, 976). The aquaculture farm-steads of Brad and June Hope and Bjorn Skei become part of an expansive "bureaucratic fish-oriented Little House on the Pacific" (Hurley 2022, 975), a process that is taking place in coastal waters on a worldwide scale.

Back on the Sunshine Coast just as Brad and June Hope were raising their first batch of hundreds of thousands of Atlantic salmon smolts, fishing alliances were recognizing that the creation of property rights within what was deemed to be the coastal commons was contributing to a further shift in the productive relations of the seascape (Marshall 2001; Joyce and Satterfield 2010). Salmon farm leasing zones were overtaking gillnet drift areas, prawn fishing grounds, and key seine tie-up spots, alienating salmon, prawn, and rock cod fishers from harvesting grounds (*The Fisherman* 1986e, 3). At a time when the province had received more than 700 aquaculture lease applications and had approved more than 140 sites (*The Fisherman* 1986c, 8) at a rate of more than one per day (Karjala 1986, 17), leaders from the UFAWU called for a moratorium on the issuing of aquaculture permits. It was

reckless, they argued, to install pens and hatcheries stocked with Atlantic salmon within half a mile of tributaries known to be home to tens of thousands of returning pink, chum, and coho salmon (*The Fisherman* 1986e, 3). It was also paradoxical to build Atlantic salmon farm hatcheries on rivers that were undergoing government-funded efforts to enhance local Pacific salmon stocks (*The Fisherman* 1986e, 3). Furthermore, with the Department of Fisheries and Oceans and the Ministry of the Environment undergoing budget cuts of up to 60% (Karjala 1986, 12), no government agencies were monitoring changes to water quality in small bodies of water like inlets or investigating sites to determine feasibility before decisions were made (Keller and Leslie 2004, 90; Grierson 1988, 11). "They are issuing leases like they are going out of style," said UFAWU secretary-treasurer Bill Procopation at a press conference in Vancouver in October 1986, "the explosion of foreshore leases in key fishing areas is threatening to drive fishermen from the grounds" (*The Fisherman* 1986e, 3). Indeed, in a special report for *The Fisherman* a few months earlier, Devin Karjala warned that "speculative land-grabbing of the public domain," actively promoted by real estate developers, was benefiting some of the largest global food corporations, including Sea Farm AS of Norway, Royal Seafoods AS of Norway, and Saga Seafoods AS, who aimed to make one particular site in BC the largest grow-out site in the world (Karjala 1986, 12). The "giveaway of BC's foreshore… in prime recreational, sport fishing, and commercial fishing areas" was being made possible through the certifications granted by foreshore and ocean floor leases. Such leases were often the

main asset held by the smaller subsidiary companies created to take charge of aquaculture operations in BC (Karjala 1986, 12).

Crown Lands and The Problem of Property

What historical and legal mechanisms enable British Columbia to lease parcels of the foreshore and seabed? As I attended marches and rallies across Vancouver Island, I consistently heard Indigenous leaders assert that the province does not have the legal authority to issue leases for aquaculture infrastructures, yet when I asked bureaucrats, community members, and environmental activists how this legal system came to be, I did not receive answers that illuminated anything much more than, "It's Crown land. The province can lease Crown land." Part of the assertion that the province does not have the right to lease coastal zones stems from the unceded nature of the waterscape— these territories were never ceded by formal treaty between Indigenous governments and the Crown. Even in instances where treaties do exist, they do not grant the Crown authority in the nearshore waters in which aquaculture occurs (Schreiber 2006). Tracing the legal histories that support the claiming of coastal zones as Crown lands, able to be leased and developed, involves a complex foray into settler colonial history. The forward turn of the blue revolution might have continued unabated until aquaculture infrastructures filled every nook and cranny of the winding coastline if it were not for the complicated matters of making property within public, government-claimed Crown lands and governing fish and oceans within federal and common law systems of governance.

Since British Columbia's colonial founding as a Crown colony, proprietary rights in the foreshores, and later the seabeds of the territorial seas, have been vested in the Crown. Waters within three miles of the coastline have been claimed as part of national territories since 1870, bringing coastal waterscapes into emerging facets of colonial law (see Historical Primer). The common law position held that running waters could not be owned, but the "submerged lands" beneath them could, with allowances under common law for Crown grants of private rights in such submerged lands (Saunders and Finn 2006). Aquaculturalists apply for a grant or lease of Crown lands under British Columbia's Land Act, which includes within the definition of land: "land covered by water, both tidal and non-tidal, and the water column superjacent to it" (Saunders and Finn 2006). The same legal structure enables lands held by the Crown to be leased for timber harvesting and oil and gas development (Yellowhead Institute 2019). As such, aquaculture companies are not owners of the lands and waters from which they operate but are subject to precarious leasing agreements in order to rent space from the provincial government.

But, were the submerged lands of the Strait of Georgia and the other straits that run between Vancouver Island and the mainland under the jurisdiction of the Province of British Columbia or the state of Canada? The question is not trivial, for whether the seabeds are deemed to be provincial or federal Crown lands determines to whom rents are paid and which level of government has rights to subsurface minerals, oil, and other resources found within the seabed. Beyond the low-water mark, the federal government is usually considered the owner of the submerged lands

within Canada's marine waters (West Coast Environmental Law 2020). The question in this case concerned what constituted the boundaries of British Columbia at the time of its confederation with Canada. The 1858 Imperial Act that defined the boundaries of the Colony of British Columbia somewhat ambiguously defined British Columbia's western boundary as the "Pacific Ocean" (Marston 1986). Whether this included the Strait of Georgia, and the other straits that flow between Vancouver Island and the mainland and the islands within them, was not entirely clear since British Columbia and Vancouver Island were separate colonies at the time of the Imperial Act's writing (Marston 1986).

When the two colonies merged a few years later, the coastal straits between Vancouver Island and the mainland were reimagined as "internal waters" (Herman 1982) and "within the jaws of the land" (Gault 1985)— legal categorizations that enveloped the waterscapes firmly within the territorial jurisdiction of the province. Consequently, when the Supreme Court of Canada was tasked with determining whether the seabeds of the coastal straits were property of the province or the federal state in 1984— at the same time as aquaculture leases were being issued at unprecedented rates— the court determined that "the lands under the waters between mainland British Columbia and Vancouver Island are the property of the province since the submerged lands were part of the Colony of British Columbia when it entered Confederation in 1871."[44] The decision reaffirmed that British Columbia has

[44] Supreme Court of Canada, Reference re: Ownership of the Bed of the Strait of Georgia and Related Areas, [1984] 1 S.C.R. 388, May 17 1984. https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/5267/index.do

the power to legislate over the seabeds in the Strait of Juan de Fuca, Strait of Georgia, Johnstone Strait, and Queen Charlotte Strait, bestowing the province with unusually expansive coastal jurisdiction (West Coast Environmental Law 2020).

However, the inability for aquaculture ventures to own the foreshores or submerged lands in which they were anchored remained a key source of contention for aquaculture practitioners, banks, and lending institutions, who preferred the financial assurances offered by property-rights as were held in more traditional forms of agriculture (Saunders and Finn 2006). In 1982, a legal report prepared for the Minister of Fisheries asserted that: "The single most important legal issue confronting an aquaculturist concerns the nature and extent of his property rights. Every industry (I can think of no legal exceptions) is premised upon property rights which are on the whole clear and well-defined. Financing is dependent upon the security of these rights. Aquaculture is unique in that it depends almost exclusively on property rights, both real and personal, which are either structured against the aquaculturist or are equivocal as to his position" (Wildsmith 1982, 93; Saunders and Finn 2006, 115). Reports like "Fencing the Last Frontier," the second installment in a series on "How to Farm the Seas" produced by the Canadian Aquaculture Institute would go on to argue that the full development of aquaculture was "hampered by a property rights system essentially developed for the hunter/gatherer nature of the wild fishery" and that private property rights equivalent to terrestrial freehold property, "analogous to the way in which land has been alienated for agriculture" were needed in order to ensure aquaculture's success (Neill 2003, V, 22). Such positions embody the settler

progress narrative that envelops seascapes within an agriculture-centric developmental trajectory. In this equation, historic capture fisheries, Indigenous and community claims to and uses of the seascape, and international rights to navigation are barriers to realizing the full economic efficiency of aquaculture; barriers to the full modernization of the ocean.

Nevertheless, in practice, the perceived legal transformation of nearshore areas from "public domain" to "private industrial use" was met with anger and resistance by Indigenous nations, commercial and sports fishing alliances, environmental groups, and multiple government bureaucrats alike (*Sunshine Coast News* 1986b). Citizens of Edgemont expressed frustration that legal leasing mechanisms left little space for local governments within decision-making structures (*Sunshine Coast News* 1986b). In the town of Sandy Hook, residents were surprised to find that areas they considered to be protected from industrial development due to residential land use conflicts were quickly being leased since the "bylaw prohibiting commercial activity in the area had been amended to exclude fish farms" (Grierson 1988, 11). Log handling and transportation and oyster and shellfish aquaculture leases also came into conflict with the changing property regimes of the coastal zone (Evans 1986, 1). Since 95% of timber was transported through the coastal waterways and forestry remained the primary industrial user of the Crown foreshore (Evans 1986), the forestry industry, too, became nervous that growing zones of aquaculture development would impede upon their established uses of and movements through the marine waterscape.

Contemporaneously, bureaucratic changes intending to foster the growth of the industry were making the application and approval processes easier— perhaps related to the burgeoning new revenue stream generated through site application fees and leases. A simplified permitting policy ensured that "anyone wishing to establish a farm would automatically receive a one-year "Section 10" foreshore lease" from the Ministry of Lands, Parks, and Housing (Keller and Leslie 2004, 100). Licensees would then be required to prepare a feasibility study and a development plan in order to receive a 10-year operating license and 30-year site lease. Lease-holders were not supposed to begin development of the property while holding a Section 10 lease, but, without any prohibitions against doing so, applicants often spent tens of thousands of dollars to develop properties before lease applications had been approved (Keller and Leslie 101; *Sunshine Coast News* 1986b, 17). Section 10 leases also importantly granted applicants, often transnational aquaculture firms, exclusive rights to the area while they conducted their assessments (*The Fisherman* 1986d, 14). Vast areas of the foreshore were effectively privatized through what were intended to be short-term, non-binding, and intermediary permits.

"It's obvious that Section 10 permits are intended as a political tool to alienate resources," said Gerald Amos, Chief of the Kitimat Band Council at a 1986 conference of the Offshore Alliance of Aboriginal Nations, an Indigenous coalition formed to advance Indigenous sovereignty in the politics of offshore development (*The Fisherman* 1986d, 14). In small rural and island communities north of Vancouver Island on BCs central coast, residents were often not made aware of the

growing interest in lease applications. Usually, the only form of public announcement came in the form of a small advertisement in a local newspaper. However, in many rural areas (now uncoincidentally home to First Nations reserves), like Nisga'a homelands of the Nass River Valley, there were no local newspapers (*The Fisherman* 1986d, 14). At the conference of the Offshore Alliance held in the fishing town of Prince Rupert to discuss how Indigenous land claims intersected with fisheries, logging, and oil and gas conflicts (Prince George Citizen 1986), Nisga'a Tribal Council representative Harry Nyce reiterated that the government's failure to advertise leases was alienating long used Nisga'a fishing and gathering areas from community members. "This is pre-emption of traditional lands," he told reporters, "traditional Indian harvesting areas are being lost to foreign investors" (*The Fisherman* 1986d, 14).

As with all projects of land commodification and resource and infrastructure development in Canada, the state ownership and subsequent private leasing of the waterscape is reliant on ongoing conditions of colonialism in which Indigenous presence and governance systems are erased in order for the physical landscape to be divided, claimed, and settled. Since colonial officials across BC overwhelmingly sold and settled land without first entering into treaty negotiations (Foster and Grove 2008, 105), neither Canada nor British Columbia legally own the lands and resources that they continue to "lease, license, and permit away" (Yellowhead Institute 2021). Yet, the leasing, licensing, and permitting of Crown lands has long acted as a catalyst for economic growth in Canada (Yellowhead Institute 2019, 25). The vast majority of

resource extraction— including forest logging, mineral mining, river damning, railroad building, and oil drilling— are all premised on the leasing and licensing of Crown land (Yellowhead Institute 2019, 25). As resource geographers have long argued, certain modes of state sovereignty are not made through enforcing exclusivity over territory and resources but are made through the relations and interdependencies involved with ensuring a flow of capital (e.g. Agnew 1994, 2005; Appadurai 1996). In these analyses, nation-state sovereignty is composed, at least in part, through the establishment of relationships with non-state actors, such as mining companies who seek access to lands and resources through the state (Emel et al., 2011). In such cases, the sovereignty of the "landlord state" is produced by manufacturing the legal, fiscal, and proprietary conditions needed for capital accumulation (Emel et al., 2011). As James Ferguson (2006) has famously argued in the context of Sub-Saharan Africa, the ability to legitimate the extractive work of transnational firms simultaneously works to legitimate state sovereignty.

In North American contexts, the commodification of the waterscape and international collaboration between transnational companies, government agencies, lease holding agreements, fish, knowledge, and finance fulfills another role, too. Not only do changing property relations within ocean spaces reflect a broader ontological shift wherein marine spaces become places of territory that can be shaped and claimed through forms of labor and extraction that put the oceans to productive use, they also help British Columbia and Canada to manifest their jurisdictional and territorial claims. If, as Anna Stanley (2019) suggests, infrastructure in Canada can be

understood as “a materialization of the settler-state’s jurisdictional claims,” then the increasing opening of ocean spaces to new forms of infrastructure and development must be understood “in relation to state struggles to exercise control over Indigenous lands and resources” (1141). “User rights” that grant private companies access to develop and extract resources only do so by alienating Indigenous peoples further from land and waterscapes (Yellowhead Institute 2019). As British Columbia and the state of Canada increasingly look to secure their dominion over ocean spaces in order to harness the potential of the blue revolution, marine infrastructure, development, and industrialization become entangled with settler state struggles to secure a tenuous relationship between territory, jurisdiction, resources, and capital. In a waterscape that might otherwise look, to unfamiliar eyes, to be empty and unclaimed, aquaculture infrastructures make visible that a certain place is being used, claimed, or occupied (Schreiber 2003). Consequently, the anchoring of infrastructure within the seabed also works to render state jurisdiction over the “submerged lands” of the waterscapes visibly evident. In other words, the anchoring of infrastructure also works to anchor settler state claims to territory within the waterscape.

## Resisting Colonial Water Logics

While transformations in spatial and property relations became a source of contention for communities and government workers across the coast, attempts to “fence the last frontier” acquire especially problematic meanings for Indigenous nations since losing access to coastal areas through the introduction of tenure rights could have vast implications for future attempts to legally reclaim territory. Since land claims

settlements usually require that First Nations can prove “continuous and historic access” to a site, the introduction of aquaculture leases can have long-term consequences for Indigenous nations who hope to one day legally reclaim beaches, foreshores, or coastal waters as part of ancestral territories. The ecological consequences of farm raising salmon become a particular form of violence, too, for Salmon Nations for whom Pacific salmon are kin. Environmental impacts are always more-than-ecological when harms to Pacific salmon and aquatic ecologies also become threats to cultural survival and distinct ways of being.

While these unique political concerns are rarely mentioned within the pages of local media publications, conflicts over the spatial and ecological repercussions of aquaculture inspired emerging forms of Indigenous intervention by the turn of the 21st century. By 1997, seventeen farm sites were anchored in Ahousaht territories, fourteen of which were constructed in “red zones” deemed unsuitable for aquaculture (Environmental Assessment Office 1997). One such bay was a key place for herring to spawn; however, herring had not been returning to the bay since the advent of industrial activity in the area (Fraser 1997a, 12). Al Keithlah, Ahousaht fisheries manager, worried that migrating salmon fry would not find herring within their ancestral feeding bay but would instead be eaten by the larger salmon held within the pens (Fraser 1997a, 12). Schools of energetic herring, salmon fry, and clam beaches struggled to co-exist with the 400,000 farm-raised salmon held within each net-pen (Fraser 1997a, 12). In a waterborne form of protest, more than one hundred Ahousaht citizens surrounded a farm in twenty-five boats, aiming to persuade the province to

revoke and relocate the farm's lease (Fraser 1997b, 26). Although the tenure for the site had technically expired several months earlier, the provincial government continued to extend the lease on a month-to-month basis while corporate mediators were hired to find a settlement for the dispute (Fraser 1997b, 26).

The next year, community members from the southern end of the Strait joined five dozen citizens from T'Sou-ke and neighboring nations as they similarly travelled on a flotilla of canoes and fishing vessels to evict Prime Pacific Seafarms from T'Sou-ke territories. Frank Planes, Hereditary Chief of T'Sou-ke Nation, stapled a small, typed eviction notice to the farm's floating office anchored 200 meters off the shoreline. Asserting that the farm had poisoned the waters and sea life of the harbor, the T'Sou-ke Nation was striving to reclaim control over the waterways within their ancestral territories (Hunter 1998). The same year, the Union of BC Indian Chiefs (UBCIC) announced a zero-tolerance policy for salmon farms. Citing pollution, inter-species transfer of disease, and comparing the net-raising of salmon to the intensive production of cattle and potatoes, the UBCIC emphasized that the province acts illegally when it issues permits and licenses for salmon farms on Indigenous title lands without the involvement or consultation of Indigenous nations (1998b).

Such actions that involved travelling to sites of aquaculture production seeking to evict salmon farms in an exercise of Indigenous sovereignty changed the terms of the conversation around salmon aquaculture at the end of the 20$^{th}$ century. The UBCIC and Ahousaht and T'Sou-ke Nations pressured Canada and the province to respect the rights of Indigenous nations within unceded territories at the same time

as landmark legal cases like *Delgamuukw v. British Columbia* were reaffirming the rights of Indigenous peoples to govern and make decisions about unceded territories and resources as sovereign nations under Canada's relatively new Constitution Act (see Historical Primer). In particular, *Delgamuukw* and subsequent cases like *Haida Nation v. British Columbia* specified that when projects, proposals, or initiatives involve Crown lands, the state of Canada must consult with and may have to compensate First Nations whose ancestral lands and rights might be affected. The *Delgamuukw* decision thereafter became a point of reference for Indigenous nations when asserting that they have a legal right to be consulted before fish farms are approved or constructed.

In a volatile political landscape in which Indigenous nations across BC were increasingly succeeding in advocating for and proving infringements upon Indigenous title rights in settler courts,[45] salmon aquaculture emerged as more than a question of environmental degradation, but also became fundamentally political in ways that struck at the heart of BC's land governance policies. By challenging the political mechanisms of leasing, permitting, and dividing the waterscape that enabled the construction and operation of salmon farms, provincial claims to the land and

[45] Important court cases during this time include: Delgamuukw v British Columbia (1997); R. v. Sparrow (1990); R. v. Van der Peet (1996); and Calder v. Attorney General of British Columbia (1973). Collectively, these cases affirmed on the part of the settler government that "Aboriginal title to land existed outside of, and was not simply derived from, colonial law" (Calder), provided a series of criteria outlining how infringements upon Indigenous rights could be proved in court (Sparrow), and that "Aboriginal title is different from merely land use and occupation, as it had previously been defined, but also incorporates Aboriginal jurisdictional authority over how the land is used" (Delgamuukw). This was the legal context in which the first fish farm occupations and evictions took place.

waterscapes were revealed to be tenuous if not overtly illegal under both settler and Indigenous laws since both legal systems recognize Indigenous jurisdiction within unceded territories. Like the logging roads and railways that become sites of blockades, occupations, and embodied forms of direct action (e.g. see Blomley 1997; Pasternak et al., 2013), the leasing and land use structures that govern resource and infrastructural development in marine waters cause the coastal straits to become places where frictions over territory and jurisdiction come to the fore.

## Conclusion

Stories of aquaculture on the BC coast are often traced to a period in the 1980s in which resource management crises, emerging technologies, and shifting trends in global trade and state governance enabled tenacious families and those with access to the foreshore to take part in a growing movement of net-raising salmon. The history of aquaculture's expansion can be interpreted as an iteration of globalized food production systems that move technology, capital, genetic material and, in this case, fish, around the world in complex patterns (Lien 2015, 39). In North American contexts, the emergence of aquaculture should also be understood as reflecting and reinforcing settler state struggles to assert jurisdiction over marine space. The colonial water logics that transform Indigenous marine territories in the Strait of Georgia into Canadian public property envelop maritime waters within projects of state-making and cause aquatic infrastructures and the forms of pollution that emanate from them to become catalysts for competing claims to territory, sovereignty, and jurisdiction.

The relatively recent incorporation of the waterscape into regimes of state property-making helps to naturalize settler governance over the coastal straits and entwines private capital and the development projects it funds with state futurity. For the waterscape to become "Crown land" or a "public commons," Indigenous presence and governance systems must first be conceptually, structurally, and physically erased. Salmon aquaculture enters into a political context in which the waterscape is presupposed as already belonging to the settler state, flattening Indigenous relationships with and responsibilities to ancestral territories. As Gerald Amos, the Offshore Alliance, UBCIC, and Ahousaht and T'Sou-ke Nations made clear, Indigenous nations and coalition organizations have always remained acutely aware of the ways in which the aquaculture reorganizes the political, economic, and ecological relations of the waterscape.

At the same time, the legal mechanisms of leasing nearshore waters and seabeds also contributes to the process of dividing, claiming, and making use of waterways in ways that maintain settler socio-political orders. As processes of industrial landscape-making transformed ecologies throughout the 20th century, salmon farms ensured that industrial and settler development could continue unabated; rivers could be dammed, forests could be logged, and waterways could be polluted. Ecosystems did not need the same kinds of care or protections when there was always a steady, predictable, on-demand source of salmon at hand and a government agency ready to do the work of sustaining them. As Geoff Meggs wrote four years after his initial report on the Hopes' first successful harvest: "For fisheries

policy-makers the appeal of aquaculture does not lie in its ability to produce food. They like the fact that it opens the way to maintain existing fish production while wild stocks fall victim to dams, logging, offshore drilling and a host of other problems" (1988, 21). Yet, the "architectures of theft" that "maintain the relations of power that make salmon farming possible" (Schreiber 2006, 31) are once again revealed to be incomplete when assertions of Indigenous sovereignty pose a challenge to the legal structures of land and waterscape ownership that are foundational to the Canadian state.

Although the success of salmon farming operations was never guaranteed, the ambitious experiments in new methods for making fish have, in many ways, succeeded. In 1984, ten farms in BC were producing around 20,000 fish (Stewart 2017, 161). By 2017, this number would increase to almost 20 million fish held within 116 farms (Fisheries and Oceans Canada 2017; Monterey Bay Aquarium 2021). Instead of the family-owned businesses the province originally envisioned would comprise the backbone of the sector, though, 94% of farm facilities were owned and operated by multinational seafood corporations. Following inaccurate counts, poor record keeping, and heavy causalities due to harmful algae blooms and bacterial kidney disease (Keller and Leslie 2004, 106), Brad Hope would eventually be dismissed from his position as company president at Pacific Aqua Foods. The company he founded within his watery backyard followed the general trend of foreclosures, consolidations, and buy-outs that characterized the early decades of the industry. Notwithstanding the bankrupt start-ups and fish lost to disease and technical

error, over a century of experiments in artificial propagation would coalesce with rocky soils, cold salty waters, foreshore and seabed leases, fish eggs, and legislative shifts to enable farmed Atlantic salmon to become BC's largest agri-food export commodity within ten years. Despite the multitude of challenges, the blue revolution was underway.

## Chapter Three

## Pathogenic Becomings and Potentialities: Piscine orthoreovirus and the Contested Politics of a Fish Virus

*March, 2018*— On Tuesday, March 6th, 2018, ’Namgis First Nation files a Notice of Application in Federal Court seeking a judicial review of the Department of Fisheries and Ocean’s (DFO) policy to not test farmed Atlantic salmon for the blood virus, Piscine orthoreovirus (PRV), before transferring the fish into ocean net-pens. Three days later, on March 9th, ’Namgis First Nation then applies for an injunction that would prevent the aquaculture company that is operating in their territories from transferring Atlantic salmon smolts into net-pens until a decision on the judicial review has been reached. ’Namgis territories encompass parts of what is now northwest Vancouver Island, reaching from the headwaters of the Nimpkish River almost to where the coastal straits give way to the open ocean. Almost 1 million Atlantic salmon smolts are scheduled to be placed into net-pens in their territories this summer. The Court quickly denies the injunction— the fish can still be transferred into net-pens— but agrees to review the legality of DFO’s PRV testing policy. This is not the first time that PRV testing practices have come under scrutiny. In 2015, a federal court established that not testing for PRV contradicted fisheries regulations that make it illegal to transfer a fish into open water if it is known to carry a disease agent. At the same time as the ’Namgis filing, a parallel case put forth by

environmental organizations and biologist Alex Morton is also attempting to enforce the 2015 decision.

*September 2018*— Six months later, the plaintiff's and their lawyers arrive at court for a week of hearings. Lawyers working on behalf of ʾNa̲mg̲is Nation assert that, by operating without consent in ʾNa̲mg̲is ancestral territories and by refusing to test for PRV, the Canadian government is failing its mandate to protect Pacific salmon and is not upholding principles of consultation and self-determination outlined in Canada's Truth and Reconciliation Commission and the UN Declaration on the Rights of Indigenous Peoples. The Department of Fisheries and Oceans is mandated to ensure that "Canada's oceans and other aquatic ecosystems are protected from negative impacts"[46] and is forbidden from issuing aquaculture transfer licenses if the fish "have any disease or disease agent that may be harmful to the protection and conservation of fish" (Fisheries General Regulations, Section 56). The crux of the matter concerns whether PRV poses a significant threat to or acts as a disease agent in Pacific salmon. If so, the virus could be considered a source of irreparable harm to already declining Pacific salmon populations (which DFO is mandated to protect) and therefore could also be considered an infringement upon Indigenous rights to fish. Lawyers working on behalf of the Department, however, reiterate longstanding arguments that the harms of PRV remain unproven. They attempt to reassure the

[46] Fisheries and Oceans Canada: Mandate and Role. (https://www.dfo-mpo.gc.ca/about-notre-sujet/mandate-mandat-eng.htm)

Court that PRV does not cause disease in Pacific salmon, that it occurs naturally in Pacific waters, and its presence in the region predates the introduction of Atlantic salmon farms.

*February 2019*— The Judge rules in favor of ’Nam̱gis Nation and environmental groups, stating that to not test for PRV goes against the precautionary principle; moreover, in excluding ’Nam̱gis First Nation from decisions that happen within their territories, DFO had failed in its duty to consult. The Court gives DFO four months to review and revise its PRV testing policy.

*May 2019*— Winter slowly wanes into spring and the excitement and promise held within. The spring and summer months buzz with excitement in coastal BC. The first juvenile salmon emerge from freshwater rivers in the interior and slowly make their way through the Strait and out to sea. The waters of the Cove reverberate with pitter-patter sounds as the finger-sized smolts feed and grow in the nutrient-rich bays of the coast. Fishers, packers, wholesalers, and retailers hold their breath in anticipation of the first adult salmon returns. Bears, like the crowds of beach-flocking tourists, awaken from hibernation and sometimes find their way into troublesome situations in backyards and community gardens. We patiently wait for nearby salmonberries to swell and redden— a sign that they are ready to be harvested. Salmonberries are also an indicator of what the season’s salmon migrations might bring. Healthy, thriving berries signify that abundant salmon runs will soon arrive. But by the spring of 2019,

this anticipation is also speckled with senses of uneasiness and anxiety. Recent fishing seasons have not been kind. Many cannot financially face another year of fishing closures, expensive quotas, or boat repairs. Increasingly common conditions of summer drought, sightings of emaciated bears and orca whales, and the ever-impending threat of wildfires and their heavy blankets of smoke create a nervous sense of apprehension for the season ahead.

Heightening tensions, the court-mandated decision date on whether or not farmed salmon smolts will be screened for PRV prior to being placed into the ocean is soon to arrive. In preparation for the announcement, salmon advocacy groups rally every week for a month on the city streets of Vancouver, urging federal agencies and passers-by to support stronger virus surveillance programs. Sto:lo Elders and leaders of the Wild Salmon Defenders Alliance convene Indigenous communities and their allies from along the Fraser River to make the trip downstream, to the Minister of Fisheries' office in North Vancouver, where freshwater from the Fraser meets the saltwater of the straits. Others travel from the northernmost tip of Vancouver Island, taking multiple ferries and following the route of the Georgia Strait to the mouth of Burrard Inlet. Others, like myself, travel from the heart of BC's aquaculture industry, where the Salish Sea meets the Kwakwaka'wakw Sea and waters moving in and out of the Strait entangle to form some of the strongest tides on the coast. Together, we gather on the city streets built on the reclaimed banks of the Burrard Inlet, with poster boards depicting scuba divers next to billowing plumes of bloody water overlain with the words "Nothing to See Here Except PRV." A banner precariously tied between

two trees outside of the Minister's office reads "Make the Salish Sea Fish Farm Free." Wooden carvings of salmon bodies painted the distinctive red of adult migrating sockeye are painted with the words "Test Me for Piscine reovirus." Others hold signs reading: Fish Farms = Virus Pollution. Using drums to guide the beat, Elders lead us in a chant of "Follow the rule of law. Test for PRV."

*Figure 5: Banner and signs outside of the Minister of Fisheries' Office as part of campaign to enact new PRV testing requirements, May 2019.*

*Figure 6: Signs created part of campaigns to enact new PRV testing requirements.*

PRV: A Contested Fish Virus

Piscine orthoreovirus has become one of the most contentious and politically fraught salmon viruses ever to be documented and debated on the BC coast. Since PRV was first confirmed in Salish waters in 1992 (Mordecai et al., 2021), the danger— or lack thereof— posed by the virus has become a sticky and insistent question for those who are alarmed by increasingly dire Pacific salmon migration returns. Encouraged by lawsuits like those put forth by ’Namgis First Nation, forewarned by scientists from other salmon farming regions, and prompted by decades of disappearing and diseased salmon, a diverse amalgamation of scientists, activists, fishers, and community members contended that, through the global trade networks that underlie the raising

of industrial salmon, PRV had been "imported" to the Salish Sea. Pacific salmon, having never before been exposed to the virus, were at serious risk of contracting and spreading a potentially deadly pathogen. Virology journals and local nonprofits continued to report that PRV is "ubiquitous among farmed salmon," further fueling movements to track PRV beyond farm boundaries. Government and industry studies and press releases, meanwhile, assured nervous publics that PRV is endemic to Pacific waters, that it occurs naturally, and that it does not cause harm to Pacific salmon. We struggled to make sense of the conflicting information.

In this chapter, we will see how scientific and legal controversies over the origin, spread, and potential danger posed by PRV became deeply entrenched in both the US and Canada by the time of the 2019 salmon seasons. Like the virus itself, this chapter moves across the US-Canada border to investigate PRV and the institutional responses it engenders from multiple places and perspectives. In the decades before my fieldwork, salmon farms in BC and Washington State operated alongside each other. By 2018, however, state agencies, scientists, environmental advocates, and community members throughout the watery borderland became embroiled in bitter contestations over how to classify PRV, its origins, and its associated disease conditions. In order to better comprehend the political response to PRV in BC, I travelled to Washington State, where a recognition of PRV as an exotic virus, introduced to the region from Northern Europe, was in the midst of bringing an end to the Atlantic salmon farming industry.

In Washington, I spent three months working with the nonprofit that led some of the first non-governmental PRV testing efforts in North America. For the scientists and staff members doing the daily work of environmental and policy advocacy, shifting state categorizations of PRV engendered a broader questioning of the meanings behind scientific classificatory systems, especially when such categories are revealed to be malleable and imperfect. For community members in Puget Sound who live with aquaculture facilities on their doorstep, paying attention to viruses meant tracking technicalities in lease agreements, stocking and harvesting schedules, and keeping a careful watch over what can be seen from the surface of the water. In laboratories, the presence of PRV becomes known through computer screens, genome profiles, and dissected fish organs. But, for the neighbors of aquaculture facilities in Puget Sound, pathogenic presence is inferred through massive and unexpected culls that move hundreds of thousands of dead fish through their community as fast as possible. In British Columbia, however, uncertainty surrounding PRV's pathogenicity and an inability to definitively disentangle PRV from the other causes of Pacific salmon mortality worked to uphold an industrial status quo. Business could continue as usual so long as uncertainties remained.

Knowledge-practices that attempt to locate microbes and pathogens in space and time become mobilized to legitimize and legalize certain forms of life on the Pacific coast. Yet, the unpredictable movements of microbes through supply chains, ocean currents, and ecological interactions troubles the normative relationships of causality on which state regulatory systems depend. Processes of microbial evolution

are revealed to be shaped by changing material practices and political-economic processes. When industrial aquaculture comes to interweave with patterns of water and salmon movement and the heterogeneous aquatic worlds within, novel pathogenic proliferations come to confuse scientific and legal designations over which forms of life do or do not belong in the Strait. PRV emerges not necessarily as a discrete microbe, but as an expansive political agent, molded as much by colonial histories and industrial practices as by the movements of fish and water. In a tense balance between classifications, categories of life are thrust somewhere in between healthy and unhealthy, wild and domestic, Pacific and Atlantic, and endemic and exotic, in ways that urge us to resist seductions of separation and containment and instead move towards an understanding of microbes within their webs of relations, however messy and complex they may be.

PRV: Only a Potential Pathogen

Eager to learn more about the day-to-day processes of studying fish viruses and hoping to gain some clarity on the scientific debates that encircled PRV's species-transferring and disease-causing capabilities, I met with Adam, a molecular biologist who works for an aquatic science laboratory that specializes in fish health research. As of late, he has come to focus on developing more sensitive techniques for identifying aquatic pathogens, including PRV. A handful of such independent, third-party labs have arisen in recent years. Neither governmental nor explicitly industry-sponsored, organizations like these are keen on fulfilling a promise of non-biased results to those who contract their services— usually, government agencies,

aquaculture companies, and academic institutions. In a nondescript corner of a strip mall, I was buzzed into the windowless façade of the building after staff were able to confirm my identity and my reason for visiting. Paper signs taped to the entryway warned me of biohazardous materials inside. Here, technologies like PCR sequencing machines, freezers, and microscopes come to inform international discussions on what constitutes salmon health.

Arriving around lunch time, the lab seemed devoid of others except for a young woman who sat in a blue lab coat, unsealing vacuum-packed bags of juvenile Pacific coho salmon and placing each one individually under the microscope. She was counting and identifying sea lice, a potentially lethal parasite that swarms fish in and around farms, and hoped to examine at least one hundred more fish before the workdays' end. The silvery, finger-sized fish currently under inspection did not appear to have any lice, which was good, she told me, because it made her job much quicker. Salmon and sea lice often travel together and, like pathogens, lice also move with ocean currents, appearing along the coastline in tune with the rhythms of water and fish movement. Since lice are rarely found on Pacific salmon that are not exposed to salmon farms, but are known to reproduce "exponentially" inside farm enclosures, lice levels on Pacific salmon become an indicator of the interactions and encounters between Atlantic and Pacific salmon. Lice become a marker of fish and ecosystem health. Such tallying endeavors that count and classify lice are used to represent the overall adequacy of aquaculture's environmental regulations. If an average of too many lice are found, stricter aquaculture regulations might be proposed.

We found Adam in his office, peering intently at rows and columns of colored boxes on his computer screen— what I had come to learn was a visualization of a genome profile. I introduced my interest in the complicated narratives that surround PRV, and he was quick to tell me in quite certain terms that he does not think that PRV is a problem. “It’s found in healthy fish as well as sick fish. The strain here is endemic and predates the farms” he explained, shrugging his shoulders. “Just because a fish has the virus does not mean it will develop into disease. People are afraid of importing a foreign disease, but they don’t know if it’s foreign, if it causes disease, or if it transfers to wild fish,” he went on to state matter-of-factly, but with a hint of exasperation, as if he were a little fed up of talking about it. After revealing my lack of technical knowledge about polymerase chain reaction (PCR) testing, our conversation turned to the methods and merits of molecular diagnostic techniques and the challenges that PRV, as an unusual and durable double-stranded RNA virus, poses to standard protein-extraction procedures. “So this is the process you go through when diagnosing something like PRV?” I asked. He paused, before correcting me. He does not make a diagnosis— that’s up to a veterinarian. His job at the lab is to run the appropriate tests and identify whether a pathogen is present in a particular sample. From this, inferences about the virulence of a disease-causing agent can be made, but that is not his particular task. A fish sample will actually go through a complex chain of custody before a virus is deemed present or fish are judged as at-risk of disease. A separate sampling company will collect the samples from a farm, along with metadata such as the location, time of year, and water quality conditions; he is responsible for

screening for the presence or absence of a particular pathogen, and a veterinarian will diagnose whether a pathogen's presence infers a risk of disease. Each link in the chain is kept separate from the others in order to ensure impartiality.

Within a few moments, our discussion touched on many of the questions that have come to define the politics of PRV: In which species and geographic locale did it originate? Could it transfer between species? Would it cause widespread disease? When did it first appear in the Salish Sea? And was its presence and proliferation connected to net-pen aquaculture? Such queries were not straightforward since, as Adam signaled, the virus is found in healthy fish as well as sick fish, and it remained disputed as to where and when the strain of the virus found in the Salish Sea first emerged. Perhaps there was a specific strain of PRV unique or endemic to the North American Pacific Coast. Perhaps it was present in the region long before the arrival of net-pens. Perhaps, as he seemed to hint, all the concern over PRV was misplaced.

He was certainly not alone in this position. His referral to healthy fish was familiar, echoing statements made by the BC Salmon Farmers Association, who state that "the virus is common but the fish on our farms are not sick."[47] The Washington Department of Fish and Wildlife similarly proposed that "fish with PRV are healthy, and show no signs of disease."[48] (It is worth noting that these statements equate health not with lack of viral infection, but by lack of viral progression to disease.) His

[47] "PRV Report Speculative, Not Supported by Science or Reality on the Farm," Press release from BC Salmon Farmers Association, May 7, 2018.
[48] "Washington Department of Fish and Wildlife Review of Wild Fish Conservancy's Feb 15 News Release on Presence of Virus in Escaped Atlantic Salmon," Press release from Washington Department of Fish and Wildlife, Feb 16, 2018.

juxtaposition between an endemic versus foreign disease was also familiar, as much of the controversy surrounding PRV's potential danger hinged on whether PRV originated in Atlantic salmon in the Atlantic Ocean and was, by extension, a relatively recent introduction to Pacific waters, or whether PRV had long been present in the Salish Sea and was unconnected to the rise of aquaculture in the region. The conversation left me uneasy, and provided an uncomfortable reminder that the knowledge— and ensuing politics— of PRV were anything but settled.

Viruses are an Achilles heel of industrial aquaculture, and of agriculture more broadly. Pathogens pose a foundational challenge to the logics of confinement, concentration, and separation that have always been integral to agricultural industrialization. While biosecurity measures attempt to imagine and enact industrial plants and animals as existing within meticulously controlled, surveilled, and confined spaces, the spread of viruses exposes this impossibility (see also Keck 2019; Blanchette 2015). Moreover, in revealing limitations within the biosecurity apparatus, the movement of plant and animal pathogens comes to trouble state infrastructures and regulatory regimes, destabilizing the foundations of state authority (Wald 2011). Interventions at the international level often attempt to arrest the movement of viruses; most recently, one needs only think of the foot-and-mouth crisis among cattle, or trepidation over H1N1 and H5N1 transmitting from birds and pigs, each of which led to the closing of international trade borders and the culling of millions of farm animals. State borders are at once threatened and reified and pathogens become a catalyst for articulating safety, security, and belonging at the level of the nation-

state (Wald 2008). The tensions between statehood, borders, and belonging are certainly evident in PRVs "outbreak narrative" (Wald 2008), with scientific consensus slowed by confusion over the virus' national or regional origin and the threat posed by PRV centered on its "foreignness." Yet, as mentioned in Chapter One, PRV has not generated the same response as other pathogens within industrial animals. In part, this lack of intervention stems from the uncertainties regarding PRV's potential pathogenicity that Adam described.

Defining a Problem: The Disputed History and Knowledge of PRV

PRV was an accidental discovery. In a small fjord in central Norway in 1999, pathogens— a longtime trouble for aquaculture operations— were materializing in unexpected ways. Salmon farmers began to notice that the salmon in their care were lethargic and dying rapidly— and in huge numbers. It was almost impossible to discern what the problem could be from looking at the outside of the fish, but once the fish bodies were opened and dissected, farmers and scientists found hemorrhages and lesions on the livers and hearts, mushy flesh, and soft, buttery muscles (Kongtorp et al., 2004). The disease was characterized as heart and skeletal muscle inflammation (HSMI) and the search for its cause intensified as it spread from pen, to farm, to fjord, soon appearing throughout salmon farms in Norway, Scotland, and Chile (Di Cicco et al., 2017).

Salmon farmers in Pacific waters began to notice worrisome trends, too. In 2008, an aquaculture company submitted four tissue samples of Atlantic salmon to

BC's agricultural pathologist, requesting that the lab conduct molecular viral testing to look for signs of cellular damage caused by disease (Morton 2021, 191). In the case files, the pathologist noted that the patterns of bodily inflammation were consistent with those caused by HSMI in Atlantic salmon in Norway, but thus far HSMI had not been identified in BC (Morton 2021, 192). The final report characterized the mystery illness as "HSMI-like" but subsequent testing was not conducted to confirm the pathologist's suspicion. Three years later, a strange illness also appeared in farms of Pacific chinook salmon in Tla-o-qui-aht territories on the southwest coast of Vancouver Island. These were the only farms home to Pacific chinook salmon in the region and here the salmon were turning yellow and dying (Morton 2021, 201). Within 10 years, the previously never-before-seen disease was recognized as a leading cause of farmed salmon mortality worldwide. A decade after its first appearance in central Norway, scientists studying RNA samples from heart tissues of HSMI-infected Atlantic salmon inadvertently discovered something curious in every positive sample: a novel reovirus, soon termed Piscine orthoreovirus (Palacios et al., 2010).

While other forms of reovirus were known to infect birds, mammals, and reptiles, at this time there were no reoviruses known to infect fish. The discovery of a piscine or marine form of orthoreovirus spurred the generation of a new genus within the Reoviridae family. This in itself generated debate among scientists at the outset of PRV's genetic mapping. In an era when evolutionary pathways of pathogens can be traced via "genetic fingerprints" and are then corroborated with worldwide genetic

catalogues, it is relatively rare for "new" pathogens to be identified (Siah et al., 2018). However, once microbiologists started to look for the virus, they soon found it most places Atlantic salmon were farmed. The documentation of a previously unknown, potentially life-threatening, and highly contagious virus among farmed salmon shocked an industry that was already operating in Canada, Chile, Tasmania, the US, and the UK.

While the exact mechanisms of virus transmission are still under investigation, fish catch PRV through direct contact with other virus-carrying fish or by coming into contact with waters where the virus is present. As Robert, a nonprofit director in Washington State explained it to me, PRV spreads quickly amongst farmed Atlantic salmon in the densely-stocked pens and is continuously shed from a salmon's body once contracted. Once within the water column, it can survive for several days in seawater and, spurred by the ocean currents that flow freely through the mesh-like nets, its movements are amplified by tides, boats, and the movements of fish, people, and water. In Norway, PRV gradually became accepted as a causative agent of disease in Atlantic salmon. In the Salish Sea, however, the stability of PRV as a disease agent has been under constant scrutiny since laboratory exposures of Pacific salmon to PRV have not always yielded the same expected signs of illness.

The challenge became to understand connections and disparities in the virus as it appeared in differing places. Tracing viral strains currently involves sequencing the virus' genetic material— its genome— and comparing genetic mutations within an ancestral virus family tree. Three strains or "variants" of PRV have been identified

and differentiated according to genetic properties such as nucleotide sequences and genome segments: PRV-1 in Atlantic salmon in Norway, PRV-2 in farmed coho salmon in Japan, and PRV-3 in in rainbow trout in Norway and coho salmon in Chile (DiCicco et al., 2018). While a "cause-and-effect" relationship has been documented between PRV-1 and HSMI in Atlantic salmon and PRV-2 and erythrocytic inclusion body syndrome (EIBS) in coho (Takano et al., 2016), the strain of PRV present in Pacific waters, and its abilities to cause disease, remain disputed because of an unclear relationship to other identified strains and to an associated disease condition.

In what was the first attempt to characterize the virus outside of Norway, Molly Kibenge and a team of Canada-based microbiologists collaborated with scientists in Chile to investigate genetic diversity among PRV samples from BC and Chile and determine their relationship to known PRV sequences from Norway. In taking samples from farmed Atlantic salmon in several locations in BC and Chile, they learned that PRV sequences from both places shared a genetic ancestry to samples characterized in Norway, and were even able to pinpoint the virus' genetic connection to the Lofoten Archipelago and Trondheim regions of Norway (Kibenge et al., 2017). The virus' genetic information was not identical in each place, though. Due to differences in nucleotide sequences and amino acid identities, they suggested that strains of PRV in BC and Chile formed sub-genotypes of "Norwegian" PRV-1, classified as PRV-1a in BC and PRV-1b in Chile (Kibenge et al. 2013). Evolutionary modeling further indicated that that genetic divergence in BC and Chile was relatively recent, most likely occurring in the early 2000s. This extended the range in which the

virus had been categorized from a relatively localized region of the Norwegian coastline to both North and South America and, through a process similar to matching fingerprints, suggested that the strain of PRV circulating in waters and fish in the Salish Sea was a relatively recent introduction and had strong genetic connections to the strain of PRV circulating in Northern Europe.

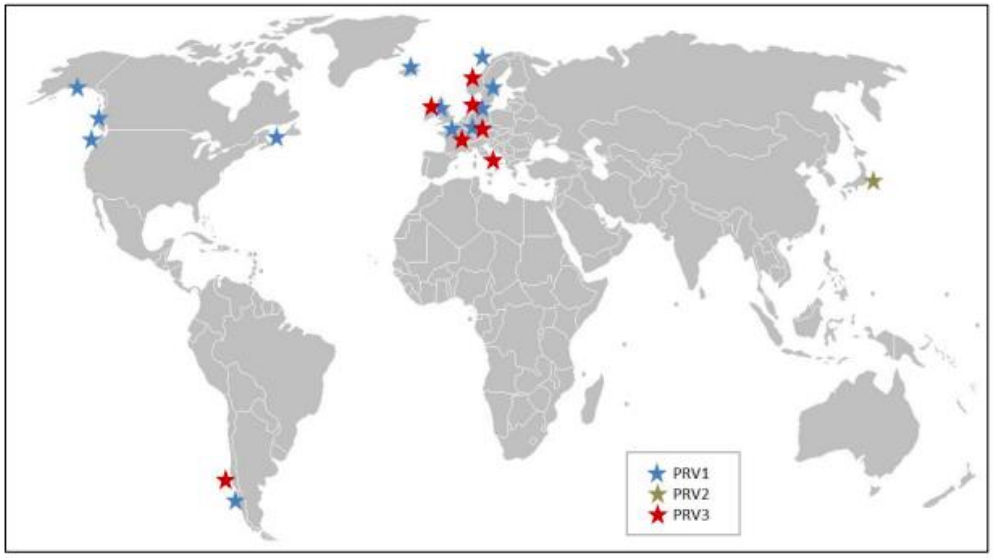


Figure 1. Detection of PRV in natural and farmed fish populations by country and/or geographic region.

*Figure 7: Geographical Representation of PRV Detection. Image and original caption from: Polinski, Mark and Kyle Garver. 2019. "Characterization of piscine orthoreovirus (PRV) and associated diseases to inform pathogen transfer risk assessments in British Columbia". Prepared for the Canadian Science Advisory Secretariat by Fisheries and Oceans Canada, National Capital Region and Pacific Region, Pacific Biological Station. Research document 2019/035. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/4080530x.pdf.*

As hinted above, however, others doubt the pathogenicity of PRV, and particularly of the strain found in the Salish Sea. Governmental laboratory trials

found that PRV is highly infectious, transmitting persistently among fish, between species, and resulting in a 100% infection rate; however, the team ultimately concluded that PRV was non-pathogenic since infection did not lead to the development of disease (Garver et al., 2016). Such trials prompted state governments in the US and Canada to determine that PRV is of low risk to Pacific salmon and that PRV in BC acts in a "benign" manner (Myers 2017; Siah et al., 2018). State-wide disease response is inferred from what can be learned from such genetic materials and laboratory experiments, leading to important classifications of microbes as pathogenic— or not. However, those who are skeptical of a reliance only on a lab-based imagination of disease argue that such trials are hardly a proxy for the unpredictable and largely unknowable lives of Pacific salmon in the open ocean.

It was not until 2018, when Emiliano Di Cicco and a team of researchers working within Canadian state agencies, nonprofits, and universities studied the developmental pathways of PRV that new insights emerged concerning the differing effects that PRV seems to have in Atlantic and Pacific salmon. Observations of disease progression indicated that while PRV led to lesions in heart and skeletal muscle tissue in Atlantic salmon, it instead led to lesions in the kidneys and livers of Pacific chinook salmon. Genome samples from both Pacific and Atlantic salmon across thirteen farms on the BC coast again specified that the PRV strain present in BC shares a high sequence identity to those in Norway and Chile, seemingly confirming that both Atlantic and Pacific salmon in BC are carriers of PRV-1a, and that there are no consistent differences between the strains of PRV found in Atlantic

and Pacific salmon in BC (632). Lesions in the kidneys and livers of chinook salmon were identified as "jaundice/anemia disease" due to the yellowing of the abdomen, eye, and internal organs, yellow fluid or bile in the liver, and potential progression to liver and kidney failure (Di Cicco et al., 2018).

The different bodily reactions to viral exposure seem to stem from differences in Atlantic and Pacific salmon's abilities to tolerate PRV in red blood cells. In farmed Atlantic salmon, PRV stays within the red blood cells. In Pacific salmon, however, the virus breaks down the cell wall of red blood cells and causes "cell death"— the cells loose functionality and burst, or "rupture en masse" (Di Cicco et al., 2018). This eventually prohibits the intake of oxygen, impacting most bodily functions including the ability to breathe, and greatly increases the likelihood that the fish will be unable to survive at-sea or complete its migration cycles (Morton et al., 2017). Such observations hinted for the first time that PRV might cause pathologically different diseases in Atlantic and Pacific salmon, highlighting the unpredictability of microbes as they circulate between species.

It is not often that genomic fish research grips the imaginations of a region but these studies emerged at a time when summers turned into autumns which slowly turned back into summers with commercial fisheries still closed, Pacific salmon returns still continuing to plummet, and salmon turned yellow in color continuing to wash up along riverbeds. While fishers in the Cove waited in anticipation for what the spring and summer fish migrations might bring, even Pacific salmon caught far from the farms became specters of the potentially ever-present yet largely unknown

presence of disease. Official narratives of biosecurity and disease prevention often fail to convince many coastal residents whose long histories of encountering disfigured or diseased fish bodies make them skeptical that laboratories and city conference rooms can properly account for the discolored and lice-speckled fish bodies they find in fishing nets and on shorelines. As the emerging PRV research circulated in media, among friends, and in fisheries consultation meetings, some felt that they finally had an answer to the mystery of the disappearing and yellow fish, while others sensed the focus on PRV and aquaculture more broadly was too easy an explanation for coast-wide if not global salmon declines.

Fish Pathogens, State Secrets

By 2019, denials of inter-species virus transmission and reassurances that state virus surveillance programs would prevent disease outbreaks felt eerily familiar. After all, state and industry actors have vested interests in confirming pathogens like PRV as benign and non-pathogenic. To confirm PRV's disease-causing capabilities would set into motion a suite of responses and repercussions. Changes to farming operations, testing practices, and supply chains would be mandated. It is likely that all farmed salmon eggs and smolts within BC would be culled, and the future of the industry would be jeopardized region-wide. Such was the case in Washington State. When Washington legally prohibited the transfer of PRV-infected Atlantic salmon in 2018, salmon farms throughout Puget Sound were emptied and unable to be restocked because aquaculture companies could not find an egg supplier that could provide

PRV-free Atlantic eggs. In addition to the massive loss of life that occurs during a cull, it is an expensive proposition for government agencies, who are then required to buy the culled fish at market prices (Morton 2021, 125). A pathogen-related cull for just one farm could cost government agencies an estimated $12 million.[49] The classification of PRV as pathogenic or not thus becomes an international legal question with high regulatory and economic stakes.

Perhaps because of the political and economic stakes of knowledge production, it remains extremely difficult to monitor the health of farmed fish and the aquatic pathogens they carry. Only aquaculture companies and government agencies have the access and authority to test farmed salmon for pathogens but, at least in BC, they are not testing for PRV. Since the farms are designated as private property and visitors are deemed a biosecurity hazard, accessing fresh, live farmed salmon is rarely possible. Max Viatori (2016) argues that the information embargoes and practices of ignorance-making that occur regarding the potentials for virus transmission between Atlantic and Pacific salmon reflect the state's power to decide which kinds of scientific information are made public and which are kept secret. In this case, viral transmission becomes an official secret of the state, with the performance of secrecy working to produce state power. The ability to withhold information, deny observation, and delimit expertise in ways that dictate the terms of public engagement are in themselves instantiations of politically institutionalized power and environmental injustice. Akin to the knowledge politics that enable state systems to

[49] This is an estimate of 600,000 market-size salmon at $20 per fish (Morton 2021, 125).

refute evidence of harm from uranium exposure (Brown 2019; Voyles 2015) or deny climate change (Callison 2014; Norgaard 2011), the co-productions of both knowledge and ignorance often go hand-in-hand (Mathews 2011). For community members who must circumvent state and industry restrictions, this sometimes necessitates that tissue samples be collected from dead salmon that drift out of the pens, sampling water and feces surrounding the farms, and taking samples from farmed salmon for sale in restaurants and grocery stores. Sometimes this also involves fast pursuits of birds who pick a fresh farmed salmon out of the water, tracking barges that leave the farm to see where they deposit totes of dead fish, or simply keeping an eye on the daily operations of the facilities.

In Washington State, around 75% of farmed Atlantic salmon production occurs in relatively urban waters near Seattle. For a handful of residents on the southeastern tip of a Seattle commuter-island, a series of net-pens dominates the view from the windows of their multi-million-dollar waterfront homes. Such is the case for Sadie and John, who have become aquaculture "watchdogs" in and for their community. They track permits and lease agreements through government agencies. They attend and organize local community meetings. And, they create a robust archive of photographs and videos that document the facilities' operations, sending such files to the nonprofit in Washington where I worked, in the hopes that their everyday practices of noticing are able to generate evidence of operational patterns that exceed what is monitored and tracked by the state. In the words of Robert, the

nonprofit's director, Sadie and John served as his "eyes and ears on the ground," monitoring the aquaculture facilities when it seemed like no one else was around.

Perched on a hillside overlooking the Passage with floor to ceiling windows, their house was built to emphasize the view. On a clear day, the snowcapped peaks of the Olympic Mountains and towering Mount Rainier would dominate the horizon as seen from their kitchen, living room, and master bedroom. The farm pens were already anchored in the Passage when they moved into the house, but they were only one small piece of an otherwise fabulous and uninterrupted view across Puget Sound. At first, Sadie thought the pens looked quite quaint. The farm generally seemed quiet, like there was never very much going on. There were no signs or fences and often there were no people. All in all, the production facility just appeared to be a quiet, public dock. Besides, they were used to living with industrial activity. The seemingly small and quiet pens appeared insignificant when compared with the types of urbanization and industrialization they were accustomed to living with in Houston, Texas. Much has changed since they moved in to their dream retirement home 8 years ago, though. Able to observe the everyday operations of the farms from most of the rooms in their house, the net-pens have come to dominate surprising aspects of their everyday lives.

Failures, breakages, and fish escapes prove to be all too common. In the 1990s, there were three major escapes from the nets in the Passage; each time, the company assured the public that the nets would be rebuilt stronger than before, that improved equipment and monitoring techniques would ensure that such an incident

would never happen again. However, one Friday night, Sadie and John were awakened by the squealing brakes of a large 18-wheeler truck as it navigated downhill on the small, winding neighborhood road. An anchor from the facility had become unmoored. A supply ship held the pen in place while new, emergency equipment was trucked in. When Sadie contacted the Department of Ecology and Department of Natural Resources to report the breakage, the Department of Ecology told her that the farms are not required to report "near misses." Reflecting on the experience, Sadie pointed out, "Wouldn't they be able to establish a pattern of vulnerability if they were made to report these "near misses"?" Sure enough, only two months later, an entire farm site collapsed when a net broke free from its mooring lines, releasing a quarter of a million Atlantic salmon into the waters of Puget Sound. Coincidentally, the farm collapse provided the first opportunity for non-governmental testing for PRV in Washington State. Working with fishers from Lummi Nation who abandoned their usual chinook fisheries to chase Atlantic salmon around the waters of Puget Sound, Robert and his nonprofit team tested samples from the hearts, gills, and kidneys of escaped Atlantic salmon. 100% of the samples returned as positive for PRV.[50]

Sadie and John had a similarly frustrating experience with institutional erasure and ignorance when trying to research the history of disease in the pens anchored in their backyard. In 2012, not long after they had moved to the island, the nets in the

[50] "Contrary to agency claims, escaped Atlantic salmon were infected with a highly contagious and harmful virus: Lab results show 100% of escaped Atlantic salmon tested were infected with virus of Norwegian origin," Press release by the Wild Fish Conservancy, Feb 15th 2018.

Passage were the site of a serious outbreak of Infections hematopic necrosis virus (IHN) that resulted in over 1 million pounds of salmon being culled. Harvest season and unexpected culls take a particular toll on the community. During routine harvesting, fish are removed from the net pens over the course of several weeks. During a cull, however, hundreds of thousands of fish are removed from the pens as quickly as possible. In either case, generators, machinery, boats, workers, and spotlights are put to work in the middle of the night in order to get the fish to the processing facility by dawn. Dead fish, bivalves, seaweeds, and other forms of life that might find their way inside of the nets get shoveled overboard, turning the waters around the farm into a feeding frenzy for birds and sealions. The bright lights that shine into their bedroom, whirring of boats and machinery, yelling of workers, calling of sealions and birds, and the gunshots used to scare them away make their home almost unlivable during a harvest or cull. Then there are the smells. A cull or mass die-off can result in thousands of dead fish being transported through the community.

"You wouldn't wanna be behind one of those trucks," John told me, laughing but shaking his head. "You wouldn't wanna be anywhere near here! They'd slop that stuff all over the road. The smell of dead rotting fish would linger for weeks!"

"The interesting thing about that whole thing," Sadie interjects, referring to the IHN outbreak, "is that none of this is recorded in Department of Ecology records. It's like that whole fish disaster never happened. Nowhere were they required to report that incident. It's like it never existed. It's like Orson Wells. War of The Worlds. It never happened." Sadie pauses, before remembering something else.

"And! The same vessel that they use for harvesting the fish is the same vessel that they use to re-stock the fish. I really wonder how well you have to clean in order to make sure that there's no transfer of anything. They're disinfecting in some way, but how? The Department of Ecology has told me themselves— you can take the nets away and clean them, but you cannot be certain that there will be no transfer of viruses."

"Well," John continues, "they recently had to destroy 900,000 fingerlings because they all tested positive for PRV."

"Yes!" Sadie rejoins, "they had two iterations of PRV last year, too. They had to destroy *another* batch because they all tested positive for the Icelandic/Norwegian strain of PRV." She looks at me over the top of her glasses, "which is now considered exotic, you know."

"They did all this work, getting these pens ready. Hammering and construction lasted months. There were constantly banging away out there. They put in all new nets, but then they had to take them all back out again when the fish turned out to have PRV," John recalls.

Over the years, Sadie and her husband have become adept at navigating the governmental bureaucracy that surrounds aquaculture. In one case, Sadie "went permit hunting" trying to find information about the types of permits the facility had attained. She called the city, but the city told her that any permits would be issued by the county. She called the county, but they told her that they had not been in charge of aquaculture permitting for years. To her frustration, the permits and regulations that

apply to the farm sites dated back to the 1980s and their terms have been grand-fathered in with each legislative revision, meaning little has changed regulation-wise. However, they soon found that reporting anchor breakages, truck spillages, culls, and gunshots to government agencies was not enough. Not only did they need evidence, they also had to prove that these were not isolated incidents and were part of a recurring pattern of operation. "We started pretty carefully documenting all of these incidents, but unless you have evidence, no one is going to believe you," John explained, frustrated. In this situation, evidence was made of photographs and videos. As he went on to say, "You need to have a picture, a video, something, to get anyone to pay attention. That's where the magic happens." Nevertheless, as John put it, government agencies like the Department of Ecology deal with "technicalities." There is no space for smells and sounds, no way to quantify closed windows in July, within the technical thresholds used by the state to determine harm. Sleepless nights for residents are just the cost of doing business. And, as Sadie wondered, "We see the kind of behavior and the kinds of things that go on above the water, doesn't that really make you question what goes on under the water?"

## The Making of a Viral Ecology

The possibilities for pathogenic mobilities amongst complex other-than-human relationships, or as Sadie described, what goes on under the water, preoccupies the minds of fishers and coastal residents who live within the geographies of aquaculture production. Even for Sadie and John, who are able monitor the operations of the

facilities on a daily basis (even if sometimes they wished that they couldn't), the underwater worlds of fish, pathogens, lice, and sealions are out-of-sight, hard to see beyond the immediate shoreline and the first foot-or-so of the water column. And, unlike lice, microbes and pathogens are always beyond the immediate perception of the human eye, making it especially hard to engender changes to industrial practices or state legislations by keeping watch from the shoreline. Under current fish health laws, only if PRV is found to be the causative agent of disease will more restrictive regulations be proposed. However, PRV's pathogenic becoming— its processes of becoming a pathogen— is often more complex than can be accounted for in laboratory trials alone. Within the lively and unpredictable aquatic worlds of the straits, multiple forms of life, unique hydrological and ecological conditions, and ambiguous boundaries between "domesticated" and "wild" ecologies, each become enrolled in the making of viral ecologies that extend far beyond farm boundaries.

Geographer Steven Hinchcliffe (2017) asks what transforms microbes into pathogens, highlighting that the presence of a microbe alone is insufficient to cause disease; instead, changing relations, situations, and encounters can make microbes more or less likely to generate infection (Hinchcliffe et al. 2017). Drawing on Hinchcliffe's work, Julie Guthman (2019) summarizes that in such frameworks "pathogenicity doesn't inhere in an organism (or "causative agent") but in a situation…disease outbreaks are less a product of invasions of hostile species crossing space… than convergences of events that intensify relationships" (Guthman 2019, 32). Pathogenicity is relational and contingent— it emerges through an

intensification of situations, events, encounters, and relations. Understanding PRV through such "topological" framings (Hinchcliffe et al., 2017) of disease etiology helps to reposition attention away from "invasions of hostile species crossing space," to instead cultivate an awareness of the ways in which the pathogenic becoming of PRV is facilitated through changing material practices that find their way inside the bodies of fish.

Studies of industrial agriculture have long forewarned that the methods used to raise plants and animals at industrial scales contribute to emergent forms of disease (e.g. Pew Commission 2008). Even if eggs are screened for known pathogens prior to shipment, processes of raising industrial animals also make farms places where evolution happens quickly. Whether through forms of soil tilling that accentuate the ability for soil-borne fungi to colonize the vascular tissues of strawberry plants (Guthman 2019) or the infamous coffee leaf rust that thrives in the unshaded plantations of modern coffee production (Perfecto et al., 2019), infrastructures of incubation are actively built when other-than-human forms of movement, encounter, and evolution are also enveloped within changing material, biological, and political-economic processes (Gerhart 2017).

Much like the sea lice who find plentiful hosts within the netted walls of a salmon farm, viruses are able to transfer rapidly from fish to fish when hundreds of thousands of fish are kept relatively stationary for months or years at a time. As viral particles are continuously shed from a salmon's body once contracted, free-swimming salmon beyond net-pen boundaries become enrolled in the making of a

more expansive ecology of pathogenicity as they migrate through the waters in which farms are anchored. In the case of PRV's pathogenic potentiality, it also matters where in the channels the farms are placed, the size of the holes on the mesh netting, at what times of year the pens are stocked, harvested, and fallowed, what kinds of stressors the fish have been exposed to, and the presence of other creatures such as herring, sealions, or sea lice. There are, as Hinchcliffe argues, "multiple relations that make disease" (2017, 7). Pathogens, like sea lice, remind us not only that the boundaries of salmon farms are highly porous (Lien 2015, 72), but also that evolutionary processes are accelerated through the industrially-created conditions of density and simplification.

Within the farm, disease transmission can be very hard to mitigate once already underway since fish might not show changes to their bodies or behaviors until months after infection. Medications are most often administered through the fish's food but sick fish do not eat well. However, under the near-constant surveillance of monitoring technologies and human eyes, the bodies and behaviors of fish within the farm are closely monitored. Feeding and medication regimes can be manipulated and disease outbreaks can sometimes be resolved.

Beyond the boundaries of a net-pen, however, the movements of aquatic pathogens throughout the waterscape are largely unknown and become potentially unknowable since sick fish in the ocean are less likely to encounter human pathogen monitoring programs. Their weakened bodies, unable to keep pace with salmon schools, likely become an easy target for a hungry predator. Fish debilitated by illness

are unlikely able to retain the strength needed to find food, evade predators, or complete migration cycles. As Pat Chamut, Director General of the DFO Pacific Region— the highest ranking DFO official on the West Coast— warned in a signed statement to the Pacific Rim and Trade Policy Division of DFO in 1990: "Unlike terrestrial animals, where complete containment and isolation is possible, fish are difficult to contain as well as isolate. Once an infectious agent becomes established in a wild population of fish, it is impossible to eradicate" (Morton 2021, 39). While recent instantiations of swine and avian flus (e.g. Keck 2019; Lowe 2010) suggest that the complete containment and isolation of terrestrial animals remains as much an unfulfilled aspiration on land as it is in the sea, the inherent mobilities of water and salmon pose a particular challenge to state assurances of biosecurity. The desire for simplification is never complete when juvenile Pacific salmon and herring also swim in-and-out of the nets, sealions crowd and break nets, mollusks find a food-rich home on the net itself, and birds and bears carry salmon bodies far beyond riparian edges.

Patterns of water and fish movement and physical geographies that make the archipelagoes of the coast a complex meeting between land and sea might also amplify PRV's pathogenic potentialities. North of the Cove, complex interplays between water moving in vertical and horizontal planes create some of the strongest tides found on the BC coast. Twice each day, flood tides coming in from the ocean meet outgoing waters leaving the Strait. For a few hours, the two water masses meet and move against and alongside each other (Morton 2021, 50). Logs, seaweed, garbage, and fish become sandwiched in the middle, swirling together in an unlikely

agglomeration. Billions of tons of water are flushed in and out of the passage with each tide change (Hume 2004); yet, being nestled between Vancouver Island and the mainland of North America provides shelter from the harsher waves and winds of the Pacific Ocean proper.

I asked several scientists, salmon advocates, and community members why the farms were constructed in these particular channels. Since so much of public discontent centers on the farm's locations within Pacific salmon migratory routes, I perhaps naively wondered why the companies would not relocate to less controversial areas. Their answers were always the same: because of the cold, fast moving waters. As Sadie told me near Seattle, using air quotes to emphasize her words, "the reason they're located where they are is because of the fast-moving water and they [the aquaculture companies] talk about "the flushing action" the ocean currents provide. I think, well okay, but where is all this waste being "flushed" to? Puget Sound is not a toilet bowl!" The constant movement of the waterscape and the strong tidal patterns that flush through hundreds of sheltered bays and inlets are the very conditions that are credited with providing the ideal conditions for marine life of the area to thrive. They also, however, exacerbate the widespread dispersal of industrial waste such as pathogenic particles. While the "flushing action" provided by ocean currents might mean that viral discharge, waste, and chemical residues are flushed from within net-pens themselves, it also means that the more expansive waters of the Strait become enveloped within the making of potentially viral ecologies.

Particular human usages of the Strait might also contribute to PRV's ability to appear in new and unexpected places, for it is not only salmon that migrate through here. As Sadie mentioned, fish must be quite literally shipped to and from the grow-out sites, sometimes arriving on the same vessels on which diseased fish left. Transfer vessels pump seawater through their tanks in order to keep the fish alive, and in the case of Infectious hematopoietic necrosis virus (IHN), Atlantic smolts on board became infected if their transport vessel passed within 40 kilometers of an infected farm (Morton 2021,125; see also Saksida 2006).

The industrial logics that transform local ecologies into industrial externalities-cum-clean-up-methods mean that the processes of raising industrial salmon and the seemingly endless opportunities for pathogenic arrangements are intertwined with the forms of property that rely on the ecological and hydrological particularities of the Strait. In the case of PRV, while the narrowness of the channels in these archipelagoes might provide protection from potentially disastrous winter storms, viral particles are also described as being able to "fill the entire channel" at points which also correspond with the narrowest "bottlenecks" of the entire salmon migration route. Akin to the pesticides that travel through seasonal fog patterns (Nash 2006) or the antibiotic resistant bacteria that disperse throughout vast geographies via cross-continental air currents (Blanchette 2019), disease, instead of being spatially and ideologically confined to certain chemicals or bodies, becomes a quality of certain landscapes (Nash 2006, 154).

Moving away from a conceptualization of disease as localized to certain bodies to instead emphasize an understanding of the ways in which disease is shaped systemically by historical, political-economic processes and practices of property-making changes the politics of PRV's pathogenic possibilities. As fish managers assure, PRV within the farm might not be such a cause for concern; Atlantic salmon are often found to be PRV-positive yet they do not always exhibit signs of viral progression to disease. However, perhaps it is precisely through their flows and movements that pathogens are able to become something else, acquire different qualities, and engender alternative concerns. When ecological relationships are reshaped by processes of commodity production, PRV becomes an industrial virus, its scale and geographic distribution inseparable from the industrial and capitalist processes that underlie its constitution.

Becoming Endemic and/or Exotic: Classifications of (Non)-Belonging

On a crisp March morning, I joined Robert and colleagues from the nonprofit in Washington State where I worked during the winter months of 2019 for a trip to Vancouver to attend a conference on selective fishing technologies. In recent years, their organization has been at the forefront of developing fishing techniques that enable endangered species to be released with a near 100% bycatch survival rate. Fish traps, an Indigenous fishing technology that funnels fish into a series of netted chambers allowing for some fish to swim free without being subjected to intensive handling or air time, offer a promise for sustainable commercial fishing in an era of

fishing closures and restrictions. When Robert founded the organization in 1989, he never expected that years of hard work would be dedicated to research and litigation around net-pen aquaculture, which, at that point was a fledgling and obscure industry in the region. Since 2016, however, and following imperatives from colleagues in BC, researching PRV and litigating for stronger state surveillance of aquatic pathogens has taken up much of his time. Whereas much of the research conducted on PRV has focused on tracing the virus within the bodies of farmed salmon, Robert urges scientists and policy-makers to take the largely untraced and unknown presence of PRV within salmon bodies and coastal waters beyond the net-pen enclosures more seriously. As we drive north towards the US-Canada border, our conversation settles on the differences that PRV exhibits in Atlantic and Pacific salmon, and how government agencies had interpreted and responded to the recent research that PRV causes the red blood cells of Pacific salmon to rupture and burst.

"The issue that we keeping getting into with the government agencies is that they want to see how many fish *die* in the *lab*, but what is very difficult to study in the lab, is that if you're in the wild and you have poor performance on things like how fast you can swim, it significantly increases your chances of becoming preyed upon… which is actually great for keeping the virus under control, but that doesn't work well if the Atlantic salmon in the net-pens are a constant source of amplifying and sloughing off the virus. Those kinds of things can't be studied in a lab. And those kinds of things mean that the virus might not outright kill you, but there are other

ways to cause mortality," Robert describes with frustration. "If their performance is even slightly reduced…" he trails off.

The whirring of the old truck we are driving grows louder, filling the cabin with a somber silence. We all know what it means for a fish to be in the ocean with reduced physical functionality. "Dead fish swimming" they are commonly called. It did not need to be spoken out loud. We sit in quiet for a moment.

"So, do you think that PRV is a problem?" I asked, trying to ascertain the clearest answer possible.

"Absolutely," he says with confidence. "When you actually see what it does physically to the fish… it might not directly kill the fish, it just affects its ability to…" he pauses and sighs, "… function."

"Can you elaborate a little more about what it does to the fish?"

"The simple function of not being able to process oxygen through your red blood cells. I don't care what species you are," he responds with an uncomfortable laugh, "if breathing and red blood cells are part of the process, reducing your ability to process oxygen changes how your muscles and pretty much your whole body can function."

"Would it be a stretch to say that it causes the fish to slowly suffocate?"

"I haven't thought about it that way before, and maybe I shouldn't. The scientists would jump on me for saying that the fish are suffocating. I like 'reduced functionality' better, but the process as I understand it, is similar to not being able to breathe well."

"So maybe I'm understanding this wrong but do the government agencies still deny that PRV is a problem?" I ask, wanting to clarify the state's current positionality a little further.

"They don't deny it's a problem per se, they say it's now endemic. And if it's endemic, you don't need to test for it, you don't need to report it, and you don't need to worry about its spread. It's everywhere, and there is no governmental effort to suppress its distribution. If it's endemic, it doesn't pose a threat. But it can be both endemic and exotic. Endemic just means that it has spread through a large amount of the population— but just because you see it everywhere doesn't mean it's not a problem," he responds, audibly frustrated.

"What do you mean by its *now* endemic? It wasn't always?"

"There's no evidence to show that it's endemic, and often the government agencies say it was here before the net-pens got here but they often don't account for the hundreds of thousands of Atlantic salmon that were transplanted here throughout the 20th century. What we're seeing now, what they're calling endemic, is just a reflection of the virus being here and morphing over time. But the term endemic is often used to imply that it is native, and that's really not what people mean sometimes. Endemic means that it's everywhere, not that it's native."

Changing direction slightly, he continued: "The history of spreading these viruses around the world *through* aquaculture is well founded, both from Europe to here and here to Europe. When you bring a species, you bring more than just that species alone, you bring the parasites, the viruses, whole communities of life come

along with them. That's one of the really big dangers of moving animals such great distances. We don't have the ability to control either the species from escaping or their parasites or viruses. There is a real danger in that. If *we* hadn't found PRV, if there hadn't been the escape, the public would never have known because the state fails to look for it even though we have been encouraging the state to sample the pens for years. They kept assuring us that their procedures would not have allowed PRV to come in. That was the only time that we were able to get our hands on any of the Atlantics, from the escape. The public does not have the *right*…" he pauses, sighing, "to sample those fish, or even be able to buy the fish from the operators. Nor can we even buy the morts that they have in their mort boxes."

Robert gestured to the changing and sometimes conflating meanings of endemism, and somewhat inadvertently raised further questions as to when a virus, disease, or pathogen is considered endemic within a place or among a population. The question of PRV's endemicity— like its potential pathogenicity— becomes a deeper political question that gives folks like Robert reason to pause and contemplate the meanings behind, applicability of, or state-sanctioned uses of scientific classificatory systems more broadly. Unlike ecological frameworks in which endemism comes to describe a sense of geographical uniqueness wherein a species is restricted to a specific geographic area or habitat, epidemiological uses of endemism refer to the constant presence or unusual prevalence of a disease or pathogen within a population. Endemicity is often used to refer to a constantly present, baseline level of disease, or to a disease that exists "naturally" or "perpetually" within an area (CDC 2012; Balzer

2016). With regards to PRV, both definitions seem to interchange, and sometimes get conflated or confused. As Robert pointed out, when PRV is referred to as endemic, this is often taken to mean that its presence is not a threat, that it is supposed to be there, and is associated with notions of place-based uniqueness, native-ness, and belonging. Its presence comes to be interpreted in more of an ecological sense, whereas he supposes that scientific reports are more referring to epidemiological meanings of endemism, wherein the virus is "everywhere."

For industrial animals, disease-causing pathogens are often classified into two main groupings: exotic and endemic. Exotic pathogens are, by definition, "normally absent" from a given place (e.g. Carslake et al., 2011), with the place in question usually defined by national borders (Yadav et al., 2020). Designations between endemic and exotic are especially important because they compel legal action: when diseases are defined as exotic within animal agriculture, it legally requires government action aimed at elimination (Medley and Vassall 2017). As Robert suggested, designations of PRV that shift between endemic and exotic compel alternative political responses. The prohibition of PRV-infected Atlantic salmon from Washington State waters was premised on such a distinction. That aquaculture companies have since been unable to restock their pens because they cannot find an egg supplier that can provide PRV-free Atlantic eggs demonstrates how such classifications can have consequences that can reconfigure and even undo entire industrial practices and supply chains.

The changing status of PRV in Puget Sound highlights how categories of disease are not self-determined but are subject to flux. Pathogens but must go through processes of exchange and negotiation in order to become exotic or endemic. As Graham Medley and Anna Vassall (2017) describe, pathogens considered endemic become more socially tolerated and do not garner the same levels of political intervention as pathogens classified as epidemic or pandemic. Endemic diseases struggle to maintain the same level of attention as others, despite the fact that they often pose a greater burden to community health (Medley and Vassall 2017). An "endemic-style response" to disease sees reduced government interest in management, surveillance, and research, and is accompanied by broader perceptions of low-risk, containment, and the adequacy of individualized rather than systemic responses. However, the transition to endemicity does not necessarily mean that risk is lessened. Instead, risk can actually worsen, particularly for populations who have already been rendered vulnerable. A "lack of political will allows diseases to become entrenched in certain population groups," worsening "the endemic and entrenched nature of the disease"; in this way, labeling a disease as endemic serves as a "self-fulfilling description" because, without systemic attempts at suppression or treatment, the disease likely only embeds itself further (Medley and Vassall 2017). Pacific salmon advocates like Robert, George, and Alex are attempting to arrest or at least slow the self-fulfilling descriptor of endemicity before PRV seemingly reaches an endemic point of no return and its presence within the bodies and blood cells of

Pacific salmon is treated as inevitable and unstoppable. A steady, perpetual, and ever-present spread of PRV is not a proposal they are willing to accept.

For others like Sean, however, the relationships between PRV, aquaculture, and salmon survival are more complicated yet. Sean is a retired government scientist who spent much of his career working as an oceanographer for the Department of Fisheries and Oceans. When Bill, the commercial diver who we met in the Introduction, gave me Sean's contact information, he also included an enticing disclaimer: Sean might contradict "what you think you know." That's why Bill liked him—Sean spent his career refuting the obvious and easy answers that government bureaucrats often pointed to as the sources of salmon declines. When I met with Sean to discuss aquaculture and the fate of Pacific salmon over coffee and pastries in his greenhouse-style sitting room, he reiterated that laboratory-based understandings of PRV's disease etiology had limited applicability for reckoning with the movements and potential harms caused by viruses in the open ocean. Yet, Sean also emphasized that the political controversy over PRV was merely a distraction from other, more complicated questions concerning Pacific salmon survival.

"The fact of the matter," he told me bluntly, "is that the same survival problems are happening everywhere along the coast.[51] If it was just due to dams, or just due to fish farms, survival would be better in areas where there are no dams or no

[51] In Sean's usage here, "survival" refers to the proportion of salmon who return to their spawning grounds as adults.

fish farms. But that's just not the case. There's no doubt that there's a major problem going on, but the proportion of it that's due to aquaculture might be quite small."

However, disentangling which fish might be harmed by aquaculture from those that are harmed by the multitude of other factors influencing the ability for Pacific salmon to return to their ancient spawning grounds becomes ever more difficult in an era of climate change and ecosystem destruction. Questions of causality plague scientists and legislators.

"A lot of people are worried that the fish might be starving, but a fish dying of starvation takes weeks to die," Sean told me. "Similarly, they don't drop dead from a heart attack just from seeing a fish farm. If there's some effect there, it's going to take days or weeks. For any sort of disease to manifest, they have to sicken. Now, where I disagree with some of the industry studies, is that they do viral challenges in the labs and count the mortality rates and so on, but fish in the ocean don't die from being sick, they die from being eaten because they are sick. And that's being missed in a lot of the studies."

Like Robert, Sean was skeptical that the state's reliance on a lab-based imagination of disease could properly account for the unpredictable and largely unknowable lives of Pacific salmon in the open ocean. For Sean, however, the multitude of other known-unknowns and unknown-unknowns potentially posed a greater threat to Pacific salmon than PRV.

"The problem is, we don't know if PRV is a problem or not. The fact that there's a virus doesn't mean we should shut down aquaculture. The real concern is

that there are diseases out there that we don't have a name for. We don't know enough about most of the other diseases to have any degree of certainty on how they might be amplified by salmon farms or the threat that they might pose to wild salmon stocks. And that doesn't even count the diseases that we don't even know about."

The problem of salmon survival, according to Sean, is at sea. "To me, it's always been obvious," he concludes. "The problem is out at sea. Nobody is looking at the big picture."

Locating PRV in Space and Time and the Question of PRV's "Natural" Occurrence

Tracking PRV's emergence and cross-continental movements involves placing genetic materials within particular geographic and temporal relationships. Adam and Robert invoked official state positions when they reiterated that arguments of endemicity focus on whether PRV is "naturally" present in the Salish Sea— a political designation that, at its core, is a question of whether (certain) humans are responsible for PRV's presence (e.g. Lien and Law 2011). Only if it can be agreed that PRV emerged in the region in correspondence with human actions can responses aimed at its containment and elimination be justified. Discerning where pathogens do or do not belong can be complicated, though. As we have seen, genetic material sometimes tells ambiguous and conflicting stories, and the ability for pathogens to morph over time muddies attempts to place PRV within easily bound geo-temporal relationships. Pinpointing exact human involvement is also difficult in a situation in which viral particles can be carried vast distances by fish and tides and the waters of

the Salish Sea have been subject to experiments that seek to transplant and raise Atlantic salmon since at least the late 19th century.

Certain assumptions about belonging in space and time that are inferred when pathogens are designated as endemic or natural also do not hold up well when considered in conjunction with the increasing scales of aquacultural production. Even if, as some scientists suggest, PRV might be endemic or "naturally occurring" in the sense of having an a priori, ahuman presence, the scale and intensity of industrialized salmon farming suggests that Pacific salmon beyond the net-pens are likely being exposed to PRV and other pathogens on a scale not experienced before. Pathogens evolve in a network that is at once highly localized yet global in scope and effect. To recognize that pathogens might emerge through industrial practices, though, would undermine assured governmental techniques of biological control.

Such controversies reveal how endemicity and pathogenicity are not necessarily settled or stable categories, but are fluid, historical processes. While being labelled as endemic might naturalize PRV's presence, the virus' political status continuously mutates along with what can be inferred from its genetic material. Much like how farmed salmon themselves could be considered "between the wild and the industrial" (Lien and Law 2011), the pathogens they carry with them, the "whole communities of life" that travel with them, are similarly thrust into an in-between space that defies easy scientific or legal categorizations. PRV is caught in a precarious and perhaps dangerous balance between categorizations, or is perhaps

caught in the process of revealing the slipperiness and impermanence of the categories themselves.

Unlike some scientific classificatory schemes that attempt to "transcend the specificities time and space" (Lien and Law 2011), controversies over PRV's classifications are, I think, more an attempt to reify the boundaries of time and space. Attempts to temporally and geographically locate the microbe are involved in claims as to what counts as nature and natural within fraught contexts that have long been shaped by histories, encounters, and ecologies of human, other-than-human, and microbial life. For people like George and Robert, it matters greatly where the boundary between endemic and exotic is drawn, and to collapse categories of difference would be to forget long histories of colonization and industrialization that have transported microbes along with projects of empire, practices of simplification and intensification that are remaking aquatic ecologies in their wake, and would naturalize the presence of Atlantic salmon and the whole communities of life they bring with them on the Pacific Coast.

In a waterscape that currently exists on the precipice of the extinction of several of its keystone species, it is important when, where, and how microbes become pathogens that spread throughout watersheds, migration routes, and generations of salmon. No one here is advocating for the "post-modern collapse of inside and outside" (Roberts 2017) or for the dissolution of classifications. The distinctions remain important. Part of the trouble, though, is that through the particularities of PRV and other farm-borne forms of waste, and the ways in which

hydrologic conditions, industrial practices, and "wild" ecologies come to interweave, many seemingly disparate human, other-than-human, and microbial worlds do appear to become endlessly entangled, no matter how hard folks work to ascertain the boundaries between Atlantic and Pacific, exotic and endemic, healthy and unhealthy, or wild and domestic.

Conclusion: Boundaries, Made and Unmade

*June 2019*— On the eve of the much-anticipated government announcement regarding whether or not farmed salmon smolts will be screened for PRV prior to being placed into the ocean, government agencies instead announce that they need more time to engage in government-to-government consultations and reach a decision. Since the lawsuit originally filed by ʾNa̱mgis First Nation sought to prohibit PRV-positive fish from being raised in ʾNa̱mgis territories, part of the court-mandated declaration specified that federal agencies must consult with ʾNa̱mgis Nation as part of the decision-making process. Months went by, but no consultation occurred. An extension is granted.

*October 2019*— Four more months pass. The juvenile salmon have long since completed their summertime out-migrations and amidst the chill of autumn, the next generation of river-bound adults will soon be making their way back through the straits. The court-mandated decision date arrives once again: The Department of Fisheries and Oceans will not be testing for PRV-1a, and they will continue to

approve ocean transfers, even in cases where PRV-1a is identified through non-government testing (e.g. testing conducted by First Nations, universities, or NGOs). Their reasoning? PRV-1a is endemic to BC and does not act as a disease agent.[52] "Sadly, the good faith we demonstrated throughout the consultation process was not reflected in the conduct of DFO officials… Submissions from our experts were ignored. We brought a team of scientists to two full-day meetings… but they didn't bring any scientists and told us DFO didn't consider it was worth 're-hashing' the science with us," Chief Svanvik of ʼNa̱mgis Nation shares in a press release after the announcement. "It's hard to believe, given this approach, that DFO takes seriously the Crown's duty to respect and uphold our constitutionally protected rights." The ʼNa̱mgis First Nation will be taking the matter back to court, for a third time.

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In this chapter, I have outlined how classifications of viruses are political calibrations stemming from tense negotiations about what can or cannot be inferred from the bodies of salmon and the genetic materials held within. The histories of how PRV has come to be regarded as pathogenic or not have contributed to profound instability within and beyond the institutions that are charged with managing fish health—

[52] The statement from the Department and Fisheries and Oceans' Regional Director reads: "DFO has concluded that the transfer of wild fish infected with PRV-1a BC strain into the marine environment is consistent with section 56 of the FGR [Fisheries General Regulations]. Therefore, at this time, DFO will not require hatchery fish to be tested for this virus and will not refuse to issue a transfer license should smolts be found to test positive for PRV-1a BC strain." Section 56 of the Fisheries General Regulations (FGR) reads: "The Minister may issue a licence if **(a)** the release or transfer of the fish would be in keeping with the proper management and control of fisheries; **(b)** the fish do not have any disease or disease agent that may be harmful to the protection and conservation of fish; and **(c)** the release or transfer of the fish will not have an adverse effect on the stock size of fish or the genetic characteristics of fish or fish stocks." Thus, this statement was taken to mean that when DFO refers to PRV-1a as "BC strain" they mean it endemic to BC and is not a disease agent.

creating ruptures in the ways that people interpret signs of disease in the bodies of fish and throughout surrounding ecologies. Conflicting manifestations of PRV continue to trouble and reveal the limits of *only* utilizing a lab-based imagination of disease, with lasting and widespread implications for how broader publics and state governments imagine what pathogens are and the impacts they can have.

Scientific schemes intend to delineate how heterogeneous forms of life come to be interrelated yet distinct. Yet, the supposedly "chaotic, unpredictable, and dangerously interconnected world" (Wald 2008) that is made through and revealed by pathogenic movements threatens to dissolve long held divisions between Pacific and Atlantic, wild and farmed, and healthy and diseased. Insides and outsides, bodies and environments, are revealed as tangled and permeable. While much of public discourse treats such categorizations as mutually exclusive, as Robert pointed out, it is possible to be both endemic and exotic, especially when shifting definitions are at work. Processes of domestication that give rise to industrial salmon and their accompanying microbial communities pose a challenge to the ongoing pursuits of boundary-making on which practices of scientific classification, biosecurity, and virus management rely. Even the individual Atlantic salmon is revealed to be an assemblage, comprised in part by the "whole communities of life" that travel with them. When legal, scientific, and industrial regimes also travel with the genetic material known as PRV, processes of pathogenic movement and evolution become part of a legal process of defining which forms of life do or do not belong in the Strait. Encounters in the Salish Sea are at a conjunctural moment where microbes become pathogenic, boundaries

between “wild” Pacific and “domesticated” Atlantic fish become troubled through microbial exchanges, and what counts as wild or domestic, healthy or unhealthy, endemic or exotic, is unstable.

Courtrooms and laboratories, meanwhile, become the spaces wherein pathogens are known and legitimized, where their presence is deemed natural, legal, or otherwise. Such spaces, however, can rarely account for pathogenic becomings and potentialities in their messy, complex multiplicity. Whereas governmental techniques of virus surveillance and management primarily situate PRV’s potential to cause harm as stemming from its place of origin, there is less recognition that the practice of aquaculture itself contributes to the conditions of possibility that enable pathogens to emerge with ferocity or that practices of settler colonial state-making in the US and Canada are foundational to projects of industrialization and the pathogens to which they give rise. Instead of reinforcing reliance on forms of knowledge-production and legal restitution that serve the interests of the state, nations like ’Nam̲gis and Liǧʷiɬdaxʷ and their allies are involved in calling attention to how reductionist framings of cause-and-effect are inadequate for accounting for the multiple and mysterious ways that PRV and other pathogens continue to manifest within the other-than-human worlds of the Strait. To be sure, legal challenges are only one tactic among many that ’Nam̲gis and other nations have utilized to investigate and halt the movement of pathogens. Faced with the limitations of state institutions and the knowledge-practices that inform them, perhaps ecologies themselves provide

methods for reckoning with the multiple manifestations of PRV, if, as biologist Alex Morton suggests, we can learn to read what the bodies of salmon are trying to tell us.

## Chapter Four

## Operation Virus Hunter, Aquaculture Sousveillance, and Sovereignties-at-Sea

This chapter details Indigenous-led practices of virus "sousveillance" that involve travelling to the physical sites of aquaculture production in order to survey and document the daily operations of farms anchored in the straits. Since 1997, Indigenous nations including ’Nam̲gis, Ahousaht, Musgmagw Dzawada’enuwx, Liǧʷiɬdaǰʷ, and Tla-o-qui-aht have conducted flotillas in which people travel by boat to sites of aquaculture production (Sullivan 2006). Sometimes people board the farm structure in order to serve eviction notices to specific sites, as when members of Ahousaht First Nation boarded and demanded the closure of a farm in Clayoquot Sound following several years of damage to local shellfish populations (Harrison 2009). Other times the boundary of the farm site itself is not breached, but boats might circle the site or anchor nearby in order to observe the site’s operations. Mediated through the use of binoculars, telephoto camera lenses, drones, scuba divers, and underwater cameras, participants might look out for the removal of dead fish, the behavior of fish as seen from the water’s surface, the condition of sea life under and around the farm structure, or signs of industrial debris such as discarded netting or equipment. Other times, still, nations such as Musgmagw Dzawada’enuwx travel to aquaculture sites in order to serve the sites with eviction notices and ceremonially cleanse waters from aquaculture related pollution. Incorporating differing methods and motivations, such endeavors bring widespread audiences inside

the watery worlds of salmon farms, which, only accessible by boat, are otherwise largely invisible to most human communities on land.

In recent years, these instances of aquaculture monitoring have been more specifically aimed at documenting the presence of pathogens like PRV. In particular, George and other Indigenous leaders climb aboard farm infrastructures and use underwater cameras to film fish within the farms. Often, they are looking for things that are not supposed to be there— this might be other fish such as herring, discarded netting, or signs of disease, such as lesions, dis-coloration, or scale anomalies. Only by understanding the potential presence of pathogens and overall health of life within the farm, they assert, can the potential presence of pathogens and pollution beyond farm boundaries be ascertained. Others who do not board the farm itself sometimes use aquarium nets on poles to collect water samples and chunks of flesh, fat, feces, or scales that drift through the mesh pens and into the surrounding waterscape. When possible, such samples are then sent to microbiologists and virologists like Adam (see previous chapter), who will test for the presence or absence of certain pathogens like PRV. Sometimes supported by the international marine conservation organization, *Sea Shepherd Conservation Society*, as part of the "Operation Virus Hunter" campaign, Alex Morton, George, members of his family, and a diverse alliance of fishers, community members, scientists, media-makers, Elders, and youth have become involved with the complex and sometimes risky work of tracking pathogens and other forms of pollution throughout salmon bodies, ecosystems, and waterways.

This chapter draws on my participation in several of what Cove residents call "reconnaissance trips" that surveyed the operations of farms scattered throughout Liǧʷiłdaxʷ territories.[53] By the time of our monitoring efforts in the spring and summer of 2019, George had already spent two summer seasons visiting, filming, and surveying farm sites in collaboration with Sea Shepherd's Operation Virus Hunter campaign. Sea Shepherd describes the campaign as a research mission that "stop[s] at various salmon farms along the coast to conduct audits for disease and other factors."[54] Audits most often took the form of visual inspections. The Operation was primarily interested in keeping a basic record of how many farms were stocked and the age and condition of the fish in the pens. They also experimented with divers and drones to investigate what could be seen outside of the pens from within the water and from the sky (Morton 2021, 208).

By traveling to sites of aquaculture production and attempting to fine-tune methods for sensing the materiality of unruly pathogens that state and industrial biosecurity practices attempt to evade, we were situated within a long lineage of "virus hunters" that have attempted to track pathogens throughout bodies and populations. The National Institute of Health, for example, employed "virus hunters" to travel to tropical locations to report, document, and survey the spread of viruses in the 1960s (e.g. Wald 2008, 36). Frederic Keck (2020) suggests that the term can be

[53] I participated in three of these explicit surveillance trips between May and August 2019, and several more informal food fishing trips that were not about surveilling farms per se, but in which documenting the operations of salmon farms were a secondary component. The experience described here is a composite of the three explicit surveillance trips.
[54] https://seashepherd.org/virushunter/

revealing of the imagined relationships that scientists enact with the humans, animals, and viruses they study. Humans and microbes are brought into an intimate temporal and spatial relationship wherein the human spends considerable time and energy tracking the microbe, which is ultimately collected, documented, and catalogued in ways reminiscent of 19th century naturalists (Wolfe 2011; Keck 2020). In contrast to a "microbe farmer," who might culture and replicate microbes in a lab, virus hunters are more likely to track microbes "in the wild" in attempts to sense the on-the-ground realities of disease within a certain population (Keck 2020, 39; Vaidyanathan 2011). To "take virus hunters seriously," Keck suggests, is to "understand their ontological disagreements with epidemiologists on the public-health impact of monitoring animal diseases" (39). Indeed, as we saw in the previous chapter, the fundamental disagreement between state agencies and concerned publics regarding whether or not PRV acts as a disease agent in Pacific salmon shapes how the virus comes to be interpreted in various spaces. While microbiologists like Adam drew upon experiments that failed to conclusively demonstrate PRV's pathogenicity in laboratory trials, Robert and Alex were more apprehensive that the increasing appearance of emaciated and yellow salmon were manifestations of disease that could not be accounted for in laboratory trials alone. The ontological uncertainty regarding PRV's status as a disease agent and the need to comprehend how pathogens might manifest outside of the lab and within the fleshy materiality of the farm engendered the forms of Indigenous-led virus hunting described in this chapter.

In the absence of state testing for PRV, I suggest that Indigenous-led attempts to enact alternative methods of viral monitoring constitute a form of Indigenous "sousveillance," or surveillance-from-below. In response to the unequal power dynamics that characterize practices and technologies of monitoring, Steve Mann (2013) suggests that sousveillance, in which subjects gaze back at power "from below," can invert who and what is able to be surveilled. Shifting from "sur"veillance to "sous"veillance emphasizes asymmetrical power relationships. Sousveillance is positioned as being done by those "not in a position of power or authority over the subject of the veillance," with examples including recording the activities of police or shoppers recording the activities in a shop, including those of the shopkeeper (Mann 2013). In Mann et al.'s (2013) original formulation, they propose that such an inversion, a reclaiming of the techniques and technologies of monitoring that are so often dominated by state and industrial elites, is "an act of liberation," a "staking of our public territory, and a leveling of the playing field" (347). Bryce Newell (2020) goes on to suggest that "sousveillance… flips the tables on the traditionally panoptic framing of state surveillance and power, offering individual citizens (or noncitizens) some ability to watch back and hold the state accountable" (63). It is in this reclaiming of power through the method of "watching back" and in the repurposing of the tools of social control to engender attempts at state accountability that concepts of sousveillance find resonance with Indigenous-led pursuits to monitor and track pathogens and other forms of industrial waste throughout the waterscape.

As such, in gathering film footage of fish within the farms and attempting to read the waterscape for traces of viral ecologies, I suggest that we engaged in a form of collective knowledge-making that was only made possible through assertions of Indigenous presence and authority within unceded territories of the waterscape. In contrast to the linear models of causation that continue to cause confusion amongst microbiologists and policy-makers as seen in the previous chapter, traveling within the Strait is an attempt to recognize and encounter changes within the waterscape by being in-situ. Instead of attempting to isolate viral particles in a lab, it is an attempt to experience things like microbes within the webs of relationality in which they exist. It is an active process of getting to know and coming into relation with the changing microbial worlds within the waterscape in ways that are alert to long-term and intersecting consequences of settler colonialism on bodies and landscapes. I also see this as an embodiment and enactment of Indigenous processes of knowledge-making that tend to, care for, and are responsive to reciprocal relations between people, place, and all manner of other-than-human beings such as water (e.g. Simpson 2014; Deloria 2001; Wildcat et al. 2014).

While sousveillance techniques of filming fish within pens were motivated by the potential presence and proliferation of viruses like PRV, traveling to and monitoring the daily operations of farms quickly exceeded the hunt for viruses alone. In many ways, we were dissimilar to NIH virus hunters, who sought primarily to capture and isolate pathogens. Instead, when George uses underwater cameras to film fish within the farm, he is not only attempting to learn about the health of fish within

the pens. He is also addressing the disappearance of birds that has followed the disappearance of salmon, whales that no longer return to their ancient migration routes, and clams that are unable to grow underneath layers of chemical and biological waste. Practices of sousveillance are also motivated by concerns about the ability for Liǧʷiłdaxʷ communities to continue living in good relations with marine life of the Strait, the ability for commercial and subsistence fishers to continue operating alongside the practice of industrial aquaculture, and by complex social and legal histories that bring proprietary claims to lands and resources into conflict with Indigenous assertions of jurisdiction within coastal waters.

Since many of the photographs and much of the film footage taken from in and around farm sites is made publicly available (although edited in various ways) via the communication networks of environmental organizations and through the various social media profiles of those involved, the visual materials that these forms of virus hunting and environmental monitoring produced also took on a wide-ranging social life long after we had returned from our travels to aquaculture sites. As photographs and videos of fish within pens, sea lice latched onto salmon bodies, seaweed and shrimp covered nets, and wastewater effluent pipes circulated on Facebook feeds, YouTube pages, NGO email threads, and sometimes found their way onto more mainstream news broadcasts, the cinematic forms of evidence that such sousveillance endeavors produce also help to communicate, visually and viscerally, conditions of life and death within aquaculture facilitates. When industrial salmon tend to live in out-of-the-way and underwater places, the boarding of floating metal structures and

filming fish within the nets brings widespread audiences inside the watery worlds of salmon farms, often for the first time. For people who only know salmon as discrete fillets, the videos, photographs, rumors, news reports, anxieties, government files, and varied forms of activism that also proliferate in connection to virus-tracking endeavors help to make the unfamiliar conditions of life and death within the aquatic worlds of the straits slightly more familiar; they are creative, experimental practices through which coastal residents are invited to come to know and sense farmed salmon as part of a larger collective that is otherwise physically and ontologically removed from view.

As such, sousveillance and grassroots methods of monitoring become an intervention in the politics of visibility and knowledge production, and they are also nested within broader assertions of Indigenous jurisdiction, presence, and futurity within the waterscape. By travelling through the Strait and affirming the waterscape as part of unceded Liǧʷiłdaxʷ territory, sousveillance practices challenge histories of dispossession and property-making that have long removed care and control of the waterscape from Indigenous hands. Exercises in monitoring join with a politics of Indigenous presence, a practice of being in-situ, to craft an alternative engagement with the coastal straits. The seascape emerges as ecologically degraded but also as definitively Indigenous in ways that strike at the heart of BC's land and ocean governance systems— systems fundamentally based in colonial relations and power structures. By situating sousveillance within Indigenous rights to territory, food, and self-determination, images and videos of fish within pens not only yield revolutionary

potential to unmake the salmon farming industry, they also cultivate radical potentials to remake dominant systems of power that shape political and legal life in BC.

Operation Virus Hunter

On a warm summer morning, an unlikely alliance of fishers and island residents, friends and family, some neighbors, and some strangers, clamber aboard the *Silver Fin* for the purpose of monitoring and documenting the operations of salmon farms in the waterways surrounding the Cove. Sam, the boat's owner-operator, is supposed to be out fishing. At this time of year, he would usually be fishing the BC coast on-and-off from early spring to late fall. Today, instead, closed fisheries enable him to direct us to salmon farms in nearby channels.

Sam maneuvers around his boat with ease. His blue-grey eyes, black hair, and agile body belie his 70 years. "Watch your head," he warns us, as we navigate around the ropes, totes, crab traps, wires, fish chute, winch, skiff, and seine drum that dominate the boat's deck. The smell of coffee wafts through the galley as the engine putters to life. As we hastily dock from the Cove, hoping to beat the coming change in tide, we begin outfitting the deck with adornments hand-made for the day's activities. Wooden cut-outs of salmon bodies are posted around the boat. Some are overlain with the words, "Tick, tick, tick, virus bomb," and are turned upside down and have X marks through their eyes, in a graphic and cartoon-like rendition of death. Others read: "Test Me for Piscene Reovirus." One banner reading "FISH FARMS

OUT" and another asking "GOT PISCENE REOVIRUS?" hang from the rigging, large enough to be read by other boats we might pass by.

Sailing north through the Coveside Passage, the view from the water reveals the presence of industries past and present. Rusty metal towers and paint-flaking buildings mark the site of a former paper-pulp mill. Timber-industry workers remember the mill as being an energized hub of the regional timber industry, but Sam instead recalls how many fish within the Strait started to disappear during the heyday of the mill's activity. Rumor has it the now decommissioned plant is soon to be re-made into a liquified natural gas processing facility. Bald patches engraved on hillsides mark signs of clear-cut logging. Areas of thin and uniform trees suggest second or even third growth forest. The largely uninhabited shoreline is sometimes interrupted with the ocean-front properties of upscale hotels, mansions, and fishing lodges. We take particular note of the fish processing plant, which sits on stilts protruding out of the rocky shoreline. The packing company recently made national news for a second time when scuba-divers captured images of massive plumes of blood billowing into the channel via pipes from the facility. The bloody water then tested positive for PRV. The company promised to renew their wastewater treatment processes, but over a year later, scuba-divers again documented PRV-positive blood water spewing from the facility's outflow pipes. For those working to remove industrial aquaculture from Liǧʷiłdaxʷ territories, the plumes of blood-water became a bloody visualization of the vectors behind the spread of pathogens, and an

unpleasant reminder that the effects of raising industrial salmon remain unseen, underwater, and can radiate from far beyond the farms themselves.

The twinned wind and waves are calm. In contrast to the rougher winds and waves of Vancouver Island's west coast, which opens to the Pacific Ocean proper, the narrow channels carved between archipelago island chains in this area create waters that, on a calm day, are more like ripples of silk undulating in a soft summer breeze. After an hour or maybe more, we pause to observe several seemingly uninhabited salmon farms. You can tell they are uninhabited, I am told, by the buoyancy of the floats. The newness of the equipment and the presence of construction machinery sparks surprise and suggests that numerous farms are under construction. George worries-out-loud that lease expirations further north might mean that, instead of closing, farms are merely relocating to this area instead. There are more farms now than when he last visited, and several seem to have grown in size— not the hoped-for markers of an industry serious about addressing environmental concerns before expanding or transitioning to land-based production.

As we continue sailing north through the Strait, we move in and out of the boundaries of marine parks and conservation areas, waters known to fishers for rock fish, ling cod, scallops, prawns, crabs, herring, urchins, and all species of Pacific salmon. At one point, we pass over clam beds that have been cultivated and cared for by Liğʷiłdaǩʷ peoples for at least 4000 years. I sit for a while with Sam in the crowded and compact wheelhouse of the boat. On a laptop, a chart shows our course. X signs mark underwater boulders. Small circles mark where people have previously

fallen overboard. Long lines that stretch beyond the screen mark previously sailed routes. A small blue rectangle and dotted line show our boat and current course. Using an autopilot box connected to a compass, Sam clicks the autopilot needle a little to the left, a little to the right, and the small dashed line follows suit, showing us moving at 8 knots. Sam has fished these waters since his childhood and has an intimate knowledge of the channels and inlets, the safest bays, the dangerous rip tides, of which creatures are where at what time, how to navigate thousands of miles at sea and which shallow shorelines with hidden subsurface rocks to avoid. He has spent a lifetime moving within these waters, and can point to where his father and grandfather moved before him. We sit in amicable quiet in the wheelhouse and I ask him about why he participates in these reconnaissance trips. He responds by speaking of the future; he thinks of his son, who is soon expecting a child. He does it for his unborn grandchildren. He wants a future where Pacific salmon still exist, and where the practice of fishing is able to continue as an intergenerational family past-time, as well as a viable livelihood. Besides, fisheries are closed and there's not much else to do.

The winds and waves pick up as we round into the Narrows. The boat more forcefully sways from side to side and soon we are up to 14 knots. Sam adjusts the autopilot more frequently. As the boat veers towards the right, Sam directs us back towards the left to prevent us from being blown towards the rocky shoreline. This particular channel is well-known for its energetic and dangerous waters. As the narrowest point between the Cove and Vancouver Island, speckled with whirlpools,

cross currents, and submerged rocks, it is certainly not an area for novice skippers. The channel is sometimes affectionately called Wild Fish Narrows, as the majority of all Fraser River salmon swim through here. The winch squeaks as the wind and waves become more aggressive, but the green hull of the *Silver Fin* just slices through the foam tips, keeping its balance as it rocks from side to side. Much to Sam's frustration, our dawdling at the day's outset means that we arrive at the Narrows at the perfectly wrong time. Now we must wait several hours for slack tide. Small, mostly uninhabited islands stretch towards the horizon in every direction, creating a multidimensional layering of land that makes it hard to discern where one landmass stops and another begins. Excitement abounds as someone spots the distinctive yet ephemeral splash of an orca whale's blow. Eagerly watching for more, we learn that a pod is close by— and moving fast— the black fin's rhythmically emerging and disappearing from the water's surface in sync. Barges stacked high with shipping containers and tug boats hauling timber move in-and-out of view. We try to guess what they are carrying or where they might be heading.

As time passes, it becomes clearer that besides a few lone boats that anchor in bays, the waters are bereft of many of the other boats you might expect to find at the height of fishing season. "The waters feel different today…there's no life. It's like a ghost town out here," George repeats several times throughout the day. We note the lack of seagulls, eagles, herons, or ravens. "All these channels are poisoned-up from the virus in these farmed fish pens," George tells us, gesturing to the waters surrounding us. He is often upbeat and regarded as a regular practical joker by close

friends, but today his banter oscillates with being quite serious. In 2017, he spent 6 weeks travelling to different farms across the coast— 40 farms in total— from the Cove to the most northerly tip of Vancouver Island. “Each farm has, at the very least, 500,000 fish, and oh my gosh, they’re such sick fish,” he recalls. “These fish pens are flushing toxic untreated waste, spreading diseases, and illegally catching tons of baby wild fish in our unceded waters! The next year when I go back, all of a sudden I see all of these tall fences around the farms! That’s because of me, they tell me. Well I told them, ‘See ya next year!’ I’m not going anywhere. Most of the workers never came near me. But I knew they had their zoomed-in cameras on me. They must have thousands of pictures of me! They’re making me famous!” he continues, this time with a giggle. With an excited smile, he pulls a folded piece of paper from inside his jacket pocket and shows us proudly— it’s his passport— a letter written and signed by other Hereditary and Elected Chiefs of the region granting us permission to move through their territorial waters.

The Narrows give way to an even tighter Channel, one of the narrowest stretches of the entire migration route of salmon bound for the Fraser River. Here we reach our next destination— a farm site currently under construction. The site had previously been closed due to environmental degradation of the sea floor and clam beds below, but drone footage captured by a local photographer revealed that the farm was being re-constructed, in preparation to be stocked once again. Not only did this betray the explicit requests of Homalco First Nation, who had neither been consulted nor given consent to the farm’s rebuilding in their territory, it also seemed to

contradict the provincial moratorium on establishing new farms. That the company subverted this legal matter through technicalities in 30-year-old lease agreements only further entrenched suspicion and distrust.

After photographing the farm under construction, we continue to the other outlet of the Channel, where we reach our third and final destination. This particular farm has 12 large square pens, only the tips of which are visible from the surface. From where we are positioned, it is impossible to tell how many fish are currently within the pens, but splashes from where fish jump to the surface emerge distinctly from the otherwise placid waters. The fish might be feeding. A curved metal rod spins in every pen, spewing food into the nets. Against the faint whirring of generators and mechanical equipment, a local photographer on board another boat launches a drone. Since it can be hard to grasp the sheer size of a salmon farm from the surface, drone footage is a tool through which people are able to visualize the vast quantities of fish within the nets and capture images of the farm in its entirety. This farm doesn't look noticeably different from any of the other farms that we have passed, or others that we have documented on different trips. There are only limited things that we can see from the surface: green buildings that might house offices, monitoring equipment, and employee bunks, accompanied by net-tips, metal walkways, generators, feeding tubes, tanks, buoys, a few docked boats, construction equipment, and a couple of workers. Another net stretches a few feet above the water to stop the fish from jumping too high and escaping and to stop birds from picking an easy prey. Sometimes the surface of a pen can be filled with algae; but, overall, it can be hard to

discern too many details from what generally looks like a tangled morass of nets, tubing, ropes, and metal. White tanks on truck-beds on a barge might mean that smolts have just recently arrived; blue totes filled with morts (dead salmon) and a pungent smell might mean that a mass die-off is in progress. The large size of the farm incites questions. For those familiar with farm infrastructures in this area, it appears that the farm has doubled in size since their visit last spring. However, this particular channel is also the only place in BC where all three major salmon farming companies operate within a few hundred feet of each other; while this creates a bureaucratic problem of cumulative environmental effects going largely unregistered, it also means that from the boat's deck, it is hard to discern where exactly we might be or which industrial operation we are looking at.

The workers turn their cameras and binoculars to us. Amidst static, a voice over the boat's radio intercom warns us that the Coast Guard are on their way. But George, accompanied by family members and other Indigenous leaders, some of whom arrive on other boats, are already approaching the farm via the *Silver Fin*'s skiff. They strap GoPro cameras to their heads and chests and mount cameras to long poles, which, when submerged, will provide a visible form of access to the underwater worlds within the pens. They are particularly looking for unusual behaviors or bodily signs of disease within the fish in the pens. Disfigured jaw bones could suggest a bacterial infection colloquially known as "mouthrot." Pale gills, protruding eyes, and salmon that appear to gulp for air near the surface of the water could be a sign of Infectious salmon anaemia (ISA), the deadliest pathogen known to

salmon and more colloquially known as “fish flu.” Each of these physical manifestations in the bodies of fish is a marker of something, but what they mark is difficult to decipher because as an industry spokesperson later pointed out, “you can’t diagnose disease with a GoPro camera” (Koch 2019). But the camera footage remains important— it is often the only tool through which people like George are able to see what is occurring inside the pens. Visitors— deemed trespassers on private property and a biosecurity hazard— are generally not allowed to step onto the floating metal structures that are anchored to the seafloor. When so few people are able access to the farms, the video footage brings the watery worlds of the pens into public consciousness, and in scientific and legal realms, the footage serves as a form of physical evidence that lends credibility to eyewitness statements. When George returns to the *Silver Fin,* he tells us that many of the fish in the farm today are slow and sluggish, and some have large, white lesions. “Ghost fish,” he calls them, referring to their white lesions and overall pale coloration.

This farm is just one in over one-hundred in the region that are licensed to produce over 3000 metric tons of salmon over the next 12 to 18 months. At a harvest weight of 5kg, that suggests around 600,000 fish at each stocked farm. One small point of production within BCs largest agricultural export industry, which itself is also just one component within the fastest growing sector of food production worldwide, the farm is unspectacular and surprisingly ordinary. Besides the low hum of electrical equipment, the farm is quiet; besides a couple of workers, there are no other people around; and besides the gentle splashing of fish, there are no other

obvious signs of life within the farm that can be seen from the surface. Months from now, the fish will leave here in totes on truck beds which are loaded on to barges which are then bound for processing plants and packing factories.

It can be difficult to know where, exactly, the fish go once they leave the farm, however. Back in Washington State, Robert and his colleagues (see previous chapter) tried to track where farmed salmon were being processed and distributed. They wanted to buy fish close as possible to their time of harvest in order to obtain the most well-preserved samples possible for genetic viral testing. Even better, they wanted to buy hundreds and were willing to pay market prices in order to test as many fish as possible and secure a larger sample size. But, they could not find a way to purchase the freshly harvested fish without going through a retail distributer. They even tried to follow some of the harvesting barges to see where the barges docked, but once the containers on the trucks on the barges entered the windowless, warehouse buildings, it became impossible to know which trucks left carrying fresh fish and which did not. Anchored and floating within what are deemed to be the public waters of the coast, the farm becomes one of the only nodes in the salmon production cycle where virus hunters like Robert and George have a chance to engage with the fish, lively and agentive, before they are integrated into somewhat elusive global salmon supply chains.

*Figure 8: Salmon bodies posted around the boat*

*Figure 9: The Silver Fin approaching a salmon farm*

Protecting Food, Protecting Territory: Tensions Aboard the Farm

One afternoon, George invited me to go through the camera footage with him and transfer video files onto a USB drive so that he would have an easy way to access the videos as he travelled across the province sharing news of what he had recorded within the farm pens. At George's house, warm sun filtered in through the red leaves of the autumnal tree outside of the living room and hummingbirds flitted around the bird feeder hanging near the window. Before we got to work, he took a moment to refill the birdfeeder that was attached to a pulley system that hung from his balcony. It reminded me of the type of pulley or winch you might see on a boat. He made it to keep the bird feed out of reach of the bears, which were a common sight in the neighborhood at this time of year, especially around sunset. As we settled in to the couch with a couple of Pepsis, a laptop, and USB drive, we took a moment to appreciate the rows of family photos that lined the walls. Of particular note: a row of cards neatly hung from a string— thank you cards, he told me, from people who had written to him thanking him for his advocacy work around aquaculture.

One by one, we open each video and decide whether it should be loaded onto the drive. We barely watch a minute of each video before moving onto the next, but each clip briefly brings back memories of different farms he has inspected, different areas of the coast, and different people he has met along the way. "All of these are my pictures and videos, you know. Before I started doing this, no one else had seen inside the pens. We wanted to see for ourselves what was going on inside the farms," he tells me while we wait for a file to slowly transfer. In one video, thick schools of fish,

some with deformities, tumors, and lesions, swim in slow-motion behind seaweed and moss-covered nets. “Oh my gosh, these poor little fish. They had just left that morning with 30 totes of dead fish, I had counted them as they were leaving on the barge…. Look! There’s a baby halibut,” he says, pointing at a fish swimming by on the screen.

“There’s a dead fish… Another dead fish,” he points out a moment later, letting out a sigh. I drag the video file onto the USB drive and we move onto the next. Other videos showed aggression between fish, with larger fish antagonizing and sometimes biting smaller fish who dart about trying to evade an attack. Many fish had white, cloudy, and opaque patches in their eyes— a sign of blindness. Blisters, open wounds, swollen gills, and sores marked signs of disease. Other videos do not display fish at all but focus on the seafloor, where only patches of algae remain in place of the colorful and lively diversity of sea stars, seaweeds, kelps, snails, and sponges that make the Strait one of the most popular cold-water scuba-diving destinations in the world.

We interrupt the video to look for a different one— the first video that George took while inspecting a salmon farm. George had not originally planned to dedicate years, months, or even weeks to the business of inspecting salmon farms, but had only joined the Sea Shepherd vessel as their host and guide as they travelled through Liǧʷiɬdaǩʷ territories. As the boat approached a farm neighboring the Cove with plans to take water samples from surrounding waters, George noticed bubbles rising to the surface from the inside of one of the pens. Rising bubbles were a likely sign of fish,

which seemed unusual, he thought, because the pens at the facility were supposed to be empty. Curious and concerned, George climbed aboard the bow of the boat.

"Hereditary Chief George Quocksister Jr.," he called out to an employee standing on one of the metal walkways, introducing himself. "You are in my territorial waters. I am just asking you a question. What kind of fish have you got in this pen here?"

"There's no fish in this pen," the worker responds.

"No fish? No baby fish or anything in there?"

"No," the worker again responds.

Unconvinced, George decides to take a closer look and uses the boat's inflatable dinghy to approach the farm— his first time doing so— with a GoPro camera strapped to his chest and another attached to a pole. Stepping onto the aluminum walkway of the farm and peering over the edge of the metal frame, he finds the source of the bubbles— thousands of herring and shrimp capelins schooling inside of the pen. He lowers the camera, watching as thousands of small herring dart around frantically in the shallow water under the hot August sun.

The employee approaches George, telling him, "I gotta say my part. You know it's private property and you are not allowed on here, right?"

"Private property in my territorial waters? They haven't even phoned me or anything to ask to be in my territorial waters. This is Norwegian, from another country. There are seven tonnes of our baby fish in that pen. Seven tonnes of our baby fish, which

brings food to our table. You know what I mean? What is that fish doing there?" George responds, gesturing to the pen beside him.[55]

When George returned to the boat, he called the Department of Fisheries and Oceans to report the herring within the pen— it was, after all, fineable offense. The Department, however, did not respond. Pacific herring are a critical link within the marine food chain and are considered a keystone species of North Pacific marine ecosystems. Herring are not supposed to find themselves within the nets of a salmon farm. Although not legally classified as endangered, populations are low enough to prompt almost total closures to the commercial fishery. North of the Cove, government mandates have permanently closed herring fisheries for over thirty years; yet, populations continue to decline (Morton 2021, 227). The Strait of Georgia is the only waterway in BC that still hosts a commercially viable herring population and the aquaculture industry assures the public that fish within the coastal waters do not find their way into aquaculture nets. George's camera footage, however, provided the first public images of herring seemingly trapped within aquaculture properties, spurring a wave of unrest when the story was broadcast publicly one week later via Sea Shepherd's global communications networks.[56]

Farm by farm, pen by pen, George and the Sea Shepherd crew visited forty farms over the next six weeks. At best, they were able to visit three farms per day, but

[55] This interaction is now publicly available at: Sandra Bartlett. "Skull and Crossbones." *The Salmon People*, Canada's National Observer. August 29, 2022. Podcast, website, 39 mins. https://www.nationalobserver.com/podcast/salmon-people/skull-and-crossbones

[56]Although these were the first public images of herring within the pens, it was generally already known that herring find their way inside the farms. For example, one company was fined in 2012 for having herring within their farms.

some farms had up to 16 pens, making the process of inspection slow and somewhat repetitive, especially since George was often the only person to physically board the farm structure. At times, the process of collecting the footage was quite tense. Farm workers often tried to dissuade or prevent George from boarding farm structures or recorded George as he recorded the pens. Phone calls to senior management and the Coast Guard were frequent. Soon it became apparent that herring often found their way inside the nets; in fact, George found large schools of herring inside every pen that he inspected, and even larger schools just outside of the nets (Morton 2021, 226). Similar footage collected by scuba divers corroborated that herring would swarm towards the nets whenever the fish-feed pellets rained down from the surface (Morton 2021, 211, 226). The phone rings, interrupting our viewing. “Uh oh! It’s the cops!” George exclaims with a cheeky smile, getting up from the couch. “What are you doing up so early?” he jokes to the person on the other end of the phone in what was now the early evening, “so did those pictures I sent you come out clear enough or what?”

While this particular encounter between George, the farm worker, and the herring was only one of many, it highlighted two important points that have become central to the movement to inspect and evict salmon farms. First, when George was audibly upset about the “seven tonnes of our baby fish” within the pens, he hinted at the struggles for commercial and subsistence fishing and aquaculture practices to co-exist. At the same time as herring were seemingly trapped within the shallow pens, citizens of Liǧʷiɬdaxʷ Nation had been unable to provide sockeye distributions to

community members for three years. Herring, sockeye, chinook, coho, crab, and other fisheries had mostly remained closed. Pink salmon were absent from their usual migration routes and spawning grounds. Clam beds were smothered by aquaculture wastes (e.g. Heaslip 2008). Leaching of pesticides, medications, and antifouling chemicals made nearby food sources unfit for human consumption (Staniford 2004). Indigenous and other small-scale commercial fishers continued to face marginalization within an industry increasingly dominated by a handful of multinational seafood corporations. As George argued, aquaculture becomes positioned as a danger to that "which brings food to our table."

Beyond region-wide effects on specific species and food sources, the second tension emphasized in George's interaction with the farmworker back on the farm's metal walkway involves differing conceptions of property and jurisdiction that were at work when the employee tried to prevent George from stepping foot onto the floating metal structure. Aquaculture companies attempt to prevent George and other Indigenous leaders across the coast from inspecting their farms under the legal gambit that they are trespassing on private property. However, when George somewhat rhetorically asked, "private property in my territorial waters?" he undercut the very notion of the waters being "public," that is, under the jurisdiction of the state and held in common for settler society writ large. Instead, George and other Indigenous leaders place the act of trespass on aquaculture companies and in doing so provide an important reminder that it is the settler state and its unsanctioned projects of extraction and development that are the outside occupiers. When the establishment of

private property in what are deemed to be public waters is, moreover, technically illegal under Canada's maritime laws, such claims make political reference to the "underlying constitutional flaw" on which the granting of aquaculture permits is premised (Morton 2021, 218). And, by claiming the waterscape as part of unceded Liǧʷiłdaǩʷ territories, such claims also point to the foundational illegality of most occupation, development, and resource extraction in BC.

Sousveillance as a Politics of Visibility, Knowledge, and Power

By directing eyes, camera lenses, and the attention of media and policy-makers towards salmon within the farm, the creation and dispersal of photographs and videos made through sousveillance endeavors helps to render invisible animal practices visible (e.g. Cherry 2016). Since the 18th century when slaughterhouses were removed from public places as part of the West's "civilizing process" (Elias 1978), industrial animals have increasingly lived hidden from public view (Cherry 2016). In what Timothy Pachirat (2011) refers to as a "politics of sight" or what Michael Carolan (2004) calls a "distancing" process, the relations and processes of production that comprise industrial animal industries are purposefully concealed from consumers through physical and social techniques.

It is significant that most people will only ever interact with farm-raised salmon once the salmon are already dead. For most people, farmed salmon are not lively creatures; they are only encountered after being processed, filleted, put on ice, or wrapped behind plastic. Fish that die before making it to processing plants or retail

shelves are usually dissolved in acid or buried under plastic, further removing them from situations of human encounter. As Schreiber et al. (2003) point out, Atlantic salmon are framed by the industry primarily as a product. In the shift from animal to product, the fish within the pen become generic, standardized, and interchangeable to the extent, they argue, that salmon within the farm conceptually cease to be fish (Schreiber et al., 2003, 155). The product that Atlantic salmon become is not only for the taste buds of certain consumers, but is also a product specifically made for global trade and export and is therefore also a product directly aimed at nation and economy building (Schreiber et al., 2003, 155). Sousveillance efforts that travel to the farm and the visual materials that such endeavors produce are some of the only times that widespread audiences and consumers from and beyond the BC coast encounter farmed salmon while they are still alive. They bring the commodity to life and show their relations with lice and herring, feeding pellets and tubes, nets and seaweed and, importantly, each other. The singular, discrete fillet becomes part of a larger, lively collective. This collective involves multiple and ever changing other-than-human worlds of the straits, and it also involves the packing plants, laboratories, grocery stores, and everyday consumers that each interweave to make farmed salmon possible.

To close this gap between consumer and the means of production, to bring the farmed salmon to life, is also to shift long held human-animal and fish-animal divides that influence which forms of life are deemed worthy of care or capable of suffering. As Marianne Lien (2015) describes, the fundamental difference of fish, their status as

an ultimate form of "other," "limits the cues to which we humans can respond and thus makes the sharing of suffering less likely" (Lien 2015, 132). Multi-media materials produced by George and others that show fish wriggling to shake lice free or chasing smaller fish that find their way inside the pens, might be, as Lien suggests, "practices through which we are enabled to know, or sense, fish as sentient beings" (Lien 2015, 132). As such, processes of sousveillance are also engaged in a form of boundary crossing work that disrupts fundamental assumptions of salmon-as-commodity and salmon-as-object (e.g. Tulloch and Judge 2018). Instead, by making the multiple forms of aquatic life within the Strait visible, sousveillance can provide a form of testimony that envelops the watcher into relationships of responsibility (Tulloch and Judge 2018; Peters 2001, 708). Or, as Karen Barad (2007) might put it, sousveillance can engender response-ability, or the ability to respond, especially to "others" in ways that expand subjectivity beyond the human (Barad 2007, 394; Meissner 2014). That sousveillance might engender broader social shifts away from salmon objectification and move towards a reimagining of salmon sentience and human response-ability is evidenced in how the Director of Fish Policy for the animal welfare activism organization, Compassion in World Farming, responded to the videos: "fish are sentient beings that feel pain and other emotions – these salmon are suffering" (Staniford 2018). Whether these "others" are fish, microbes, or lice, bearing witness to conditions of life and death within the pens helps to develop forms of response and solidarity that cross social, political, and species divides.

At the same time, however, the use of GoPro cameras in the contexts described here train the gaze on certain types and framings of suffering. Similar to other forms of animal rights activism that draw upon cinematic traditions to reveal spectacular forms of violence within industrial animal agriculture— such as covert filming of cow and chicken farms— images of disfigured and diseased fish might mobilize a form of "moral shock" (Jasper and Poulsen 1995) and cultivate a sense of the suffering endured by radical others, but much remains beyond the purview of the camera. Thomas's anxiety about what he will eat during the winter months, Sam's awareness that his son might not experience a viable future as a commercial fisher, and Sarah's struggle to find fish to support her independent business are not within the lens of the GoPro camera (see Chapter One). Images of fattened, immobile, or abused chickens within industrial warehouses help to visualize violence against chicken bodies in important ways, but they do not show the violence involved in soybean production in Latin America that is used to make the chicken feed. Piece-rate payment systems that contribute to increasingly hazardous working conditions and worker deaths in Chile (Soluri 2011), commodity chains that transform krill in Peru into fish feed for salmon in BC, and corporate investment structures that send the profits of aquaculture to venture capital giants like BlackRock and Vanguard Group are similarly removed from view. In a focus on the fish themselves, the contingencies and conditions of possibility that make farmed salmon possible— and the political motivations that make such images possible— are often beyond the frame of analysis.

Additionally, while images of fish swimming amidst sea lice, algae, shrimp, and herring provide visible, tangible insights into conditions of life within aquaculture facilities, viruses like PRV are not always visible at the level of a handheld camera. The forms of visual evidence created through sousveilling the pens with drones and underwater cameras might hint at certain health maladies, but discerning which pathogens are present cannot officially be confirmed without expensive and largely inaccessible genetic testing. Even in cases where water, feces, and scale samples are able to yield insights into the microbial companions carried by the fish, Alex and George and their virus hunting colleagues are rarely able to meet the thresholds of proof demanded by the state. The BCSFA dismisses their efforts as "part of a deliberate activist campaign" that is "an attempt to disguise advocacy as science" and "can hardly be taken as unbiased research."[57] The BCSFA asserts that even if fish within the farm are found to be carrying certain pathogens, it does not necessarily imply that the pathogens emerged from the farm itself, that viral infection will induce disease, or that such pathogens could transfer to other creatures beyond farm boundaries.

Even without genetic tests, though, much can be learned through careful observation and making use of the tools available. Oil slicks, decomposing flesh, and uneaten feed pellets move with the tides. The presence of certain equipment like barges, tug boats, sea lice treatment vessels, and the distinctive white trailers used to

[57] "History of False Findings Raises Questions about New Claims" Press release by the BC Salmon Farmers Association, Dec 14 2017.

transport morts can hint at certain conditions within the farm. Fish behavior can be telling, too. Skinny, lethargic, or stationary fish suggest that fish might not be feeding, a potential sign of viral infection. By travelling through the waterscape and documenting farm size, construction work, stocking and harvesting schedules, and counting crates of morts as they leave the farm, as well as the presence of waste, birds, sea lice, sea lions, and herring in and around the pens, our exercise in hunting viruses quickly became a practice in careful noticing that attempted to fine-tune methods for sensing multiple manifestations of change within the waterscape. As coastal residents followed biological debris through waterscapes and yellow salmon through salmon migration routes (see Chapter One), an almost impromptu, citizen-science, crowd-sourcing project, a kind of "popular epidemiology" (Brown 1997), also endeavored to detect and map the embodied, physical, and potentially pathogenic geographies the salmon were enrolled within.[58]

Although practices of sousveillance produce forms of evidence that are not always legible to state fish health management systems, the practice of making visible is also an intervention in the politics of knowledge production that concentrates authority and expertise within the closed-door meetings of corporate offices, courthouses, and genomic labs. Environmental justice movements have long called attention to the experiential, cumulative knowledge held by those who live "downwind" or "downstream" of industrial activity. Monitoring, personal

[58] See Mordecai et al., (2023) for a peer-reviewed publication that details some of the scientific methodologies and results involved with grassroots sousveillance and virus-tracking efforts.

testimonies, and "bearing witness" serve as ways of contesting and reshaping what counts as knowledge, expertise, and evidence (Evans 2002). In British Columbia, these knowledge politics are also interwoven within colonial structures and power relations. The previous chapter laid bare how, through the processes of gathering and circulating knowledge about aquatic pathogens, scientific and legal institutions of the state become vectors through which settler modes of governance reinforce themselves. The relatively simple act of climbing aboard a floating metal structure and filming fish within nets instead cultivates a form of collective knowledge-making that exists alternative to and in contradiction with the possibilities offered by the state. Part of the power of sousveillance rests in the utilization and appropriation of everyday technologies such as wearable cameras to "confront power and turn it on its head" (Newell 2020). By tracing histories, materialities, and ecological connections in an ecology that also always includes humans, the politics of monitoring put into practice through sousveillance not only subverts "practices of authorized seeing" (Jasanoff 2017) and thus "contests settler colonialism and its sense making mechanisms" (Wildcat et al., 2014), but also serves as a catalyst for restoring Indigenous sovereignty through physical connections to ancestral territories and other-than-human kin.

## Sousveillance as Sovereignty

In addition to being enveloped within a politics of food and knowledge production, political economy, and environmental degradation, Indigenous leaders like George go

further in asserting that such forms of environmental harm, and the conditions of possibility that enable them, are also inherently entangled with Indigenous sovereignty. When clam beds suffocate under layers of waste, salmon are "eaten to death" by lice, and chemical correctives make nearby shellfish unsafe for consumption, aquaculture becomes a threat to the physical and cultural continuity of peoples and nations whose commercial, subsistence, and ceremonial practices depend on the ability for aquatic ecosystems to thrive. Furthermore, the ability for aquaculture companies to collaborate with the Canadian state to anchor structures within Indigenous territories without consultation or consent speaks to the broader workings of power as they relate to Indigenous land rights in Canada. The deep intertwinement of aquaculture with Indigenous land rights is clearly evidenced in how George articulates the crux of the problem in letters to provincial politicians:

> This is unceded First Nations territory. There has been no treaty or purchase of this territory by the Crown or the Canadian government. The Liǧʷiłdaxʷ Nation holds unextinguished Aboriginal Titles and Rights over our unceded lands and waters. I am Hereditary Chief Gigame of the Liǧʷiłdaxʷ Nation and I have rights to know what is going on in our territorial waters. I have a right to be steward of our food fish. I have a right to inspect farm fish pens in our unceded traditional territorial waters. The owners of these farms are trespassing in our unceded First Nations territorial waters.

Practices of virus sousveillance and the forms of knowledge generated through them, and, as George puts it, his rights to steward food fish, inspect farms, and be involved with decisions about what happens within the waterscape, are about more than local ecologies and economies alone. In traveling aboard the *Silver Fin*, passport in hand, George is also asserting his ability to simply be within the waterscape, his capacity to

travel freely throughout his ancestral territories and be involved with decisions about what happens within those territories. Such sentiments are echoed across the coast, as, for example, when ’Na̲mgis Chief Ernest Alfred told media that he was not “protesting” salmon farms, but was asserting his Indigenous rights to simply be within his territory and monitor what was happening in his homelands (e.g. Gies 2017).

The ability for Indigenous leaders like George and Ernest to simply be within their ancestral territories, steward important foods, and monitor the operations and impacts of salmon farms are hedged within legal and social histories that concern land use, ownership, and jurisdiction within unceded territories. Remember from the Historical Primer, however, that British Columbia exists as an “anomalous” situation within Canada with regards to Indigenous legal title rights to territory (Roth 2002). Whereas British territories in Canada were colonized according to the principles outlined by the Royal Proclamation— which stated that only the Crown could buy land from Indigenous nations and such agreements were a prerequisite to settlement— BC’s courts maintained throughout much of the 20th century that the Proclamation did not apply to British Columbia since the lands that would become BC had not yet been “discovered” at the time of the Proclamation’s writing (Tennant 1990; Borrows 1994; Harris 2009). Consequently, while treaties were made with Indigenous nations throughout most of the lands under British dominion, a majority of the lands that comprise BC today were never negotiated through treaty and remain legally unceded.

Like the blockades that proliferated across logging roads, highways, and rail lines in the 1970s and 80s that made clear that resource extraction and development were, in fact, taking place within territories known, occupied, and claimed by Indigenous peoples (Blomley 1996), flotillas aboard the *Silver Fin* are an extension of the forms of political action that have always asserted Indigenous rights in the face of state skepticism or outright denial. Within this context, eviction notices, passports, and letters to corporations and politicians can be understood as technologies of contemporary Indigenous governance, adapted to address ongoing concerns that George and other Indigenous leaders have about how aquaculture is being practiced within their homelands. Here, practices of monitoring and forms of popular epidemiology that are often associated with environmental justice movements meet an Indigenous politics of being in-situ, a praxis of Indigenous "resurgence" (Alfred 2005) through physical acts of presence and occupation. When Indigenous peoples across the coast have been restricted to land-bases recognized by the federal government as being too small, historically under the guise that such coastal nations would still have access to and authority within marine areas and resources (see Historical Primer), practices of sousveillance and water-travelling flotillas also transgress histories of assimilation and colonial space-making (e.g. see Barker and Ross 2017). As a form of direct-action that is based in and demonstrates continued connections to land, water, and other-than-human kin, the practice simply of *being* asserts a "re-occupation or reassertion of presence," (Barker and Ross 2017, 201), or what Coulthard calls a "disruptive countersovereignty" (Coulthard 2014). When the

(bio)politics of settler colonialism deems Indigenous presence in places claimed by settler society as a threat (Morgensen 2011), the power of being-in-place not only disrupts the daily operations of the capitalist settler state, but also undoes the forms of Indigenous erasure on which settler societies depend. “The simple act of living,” writes Anna Willow (2011), “becomes a form of resistance” (267).

However, from state and industry perspectives, George’s ability to enter, board, and inspect salmon farms is much contended. In the spring following George’s first season of sousveillance, the company announced that it was seeking an injunction that would prevent the public from coming within 20 meters of its farm facilities in the Strait. Injunctions are court orders that are most often used to restrain a person or company from conducting a certain activity and have become a common form of intervention in land and business disputes (Ceric 2020). In many contemporary cases, an applicant for an injunction is a corporation concerned that people, notably “Indigenous land defenders or environmental activists” will impede business operations by, for example, blocking a road or restricting access to a site (Ceric 2020, 354). In this case, the injunction would restrict scuba divers and photographers, water samplers and speedboats, wildlife watchers and fish boats—anyone who might find themselves using or moving through the seascape— from coming within twenty meters of farm facilities. In particular, the application specified that “anyone aware of this order” would be forbidden from disturbing fish, interfering with farm restocking, or “watching, besetting or circling” within 20 meters of a farm site (Nikiforuk 2018). Buoys would mark the twenty-meter exclusion zone, creating a

perimeter around the structures, docks, walkways, and floating buildings in addition to the pens themselves (Nikiforuk 2018). To cross the perimeter and enter into the exclusion zone would be to commit a criminal offense punishable by arrest and jail time.

The legal injunction has become a common instrument in criminalizing resistance to resource development in BC since the 1980s (Ceric 2020). Yet, the injunction applications that emerged as a response to George and others' practices of sousveillance and monitoring were unique in that they were the first injunctions that would be applicable to marine space. Since public rights to fishing and navigation in tidal waters have been entrenched in English (and hence Canadian) common law since the Magna Carta (Saunders and Finn 2006; Ginn 2006), and since the Constitution of Canada forbids the making of private property in public waters (Morton 2021), the question of whether private companies have the ability to delimit, restrict, or cordon off public access to certain marine areas also struck at the heart of Canada's systems of ocean governance. Such histories that guarantee public access rights to tidal waters are written into aquaculture leases. Under the Navigation Protection Act, for example, site leases granted by the provincial government specifically state that aquaculture operations are not to interfere with public access to the ocean. Consequently, to approve injunction applications and create hundreds of exclusion zones that would prevent any members of the public from accessing or navigating through what are legally deemed to be public waters would set a new precedent for the ability for companies to quasi-privatize marine space.

As lawyer Greg McDade told reporters after the aquaculture company's injunction application, "the result would be an exclusion zone that would prevent Morton and others from documenting what's going on at the fish farms. I've never seen an injunction that tried to prevent people from watching or diving. It should be perfectly lawful to dive in the open ocean outside the nets… Public right of access in the open ocean dates back to the Magna Carta and is a significant issue…. Taking pictures and taking water samples… are perfectly legal activities" (Nikiforuk 2018). Again invoking deeply entrenched legal histories that define ocean governance, Morton reiterated: "One of the few things all countries agree on is the right for boats to move freely over the water. This includes near salmon farms" (Morton 2021, 210).

When Indigenous and other community members are prevented from being present on public roads that lead to logging stands and oil refineries, injunctions have importantly been interpreted as legal devices that serve the "maintenance of settler colonial property relations" (Ceric 2020, 362; see also Bhandar 2018). Property relations within the waters of the coastal straits, however, are much less clearly defined than in the fenced-in estates of oil companies. If nations like ’Namgis claim the coastal waterways in which salmon farms are anchored as part of their ancestral territories to which they hold title rights, they should take their concerns to the courts, not to the farms, the BCSFA wrote in a press release. Yet, as Dianne Ginn (2006) notes, the doctrine of Aboriginal title has developed in relation to dry land and the applicability of title rights in marine and coastal areas remains unsolved according to settler courts.

Injunctions, accusations of trespass, and the politics of being in-situ reveal a disjuncture in the interface between Indigenous and state sovereignties. While the state doubles-down on its claims to jurisdiction through territorial boundedness, Indigenous forms of sovereignty involve more than territorial control alone (Bauder and Mueller 2023). Remember from the Historical Primer that rights to fish, for example, involve more than access to fish alone; since fishing involves inter and intra community relations, as well as maintaining respectful relations with the fish themselves, rights to fish also involve rights to continue systems of fisheries governance and marine tenure (Claxton 2008). As such, Indigenous sovereignties involve "relationships and interdependencies," (Bauder and Mueller 2023), "rights and responsibilities" (Yap and Yu 2018), and are "considered an expression or extension of the relationship that Indigenous people[s] have to their land[s]" (Hiller and Carlson 2018). When practices of sousveillance are also a form of caretaking, a caring for and attending to the shared lives of fish, people, birds, microbes, marine mammals, and all manners of life within the Strait, the act of sousveilling salmon farms reveals the fragile and tenuous legalities on which state forms of property-making rely and becomes embodied assertion of sovereignty that fosters radical potential to remake dominant systems of power that shape political and legal life in BC. That the industry responded by trying to prevent any members of the public from coming within 20 meters of their facilities demonstrates the power, and the fundamental challenge to aquaculture operations, that such sousveilling endeavors can have.

Conclusion

Three months after the company applied for an injunction that would prevent George and others from boarding the farm structures, the company was granted the injunction— at least in part. All members of the public would be prevented from boarding the company's farms or docks, and all users of the marine seascape would be prevented from coming within 10 meters (as opposed to the requested 20 meters) of the company's facilities. In BC, however, since the water itself is under the purview of the federal government but the seabed is under the jurisdiction of the province, people on farm structures, floating on the water yet anchored to the seabed, seemed to exist in a legal "no man's land" in which injunctions and trespass charges are haphazardly enforced and continuously challenged in court (Morton 2021, 272).

Although the injunction was only temporary, once the precedent was set, other companies and their operations in other places soon followed suit (e.g. see Morton 2021, 267). In Scotland, where clandestine filming of salmon farms has also become a tool of environmental and political organizing, the company (the same company as was operating in BC) again responded by seeking a legal exclusion zone that would prevent all users of the seascape from coming within 15 meters of farm sites. At various times since the first marine injunction was granted in 2017, the BC coast has become pocketed with a dizzying array of exclusion zones that temporarily restrict any whale watchers, fishing vessels, tug boats, or divers from entering into certain areas within the channels and bays. Knowing where the boundaries around which

sites which injunctions apply at any particular time can be complicated for even the most familiar coastal skipper.

Although I have described how political practices of monitoring sometimes unfold in Liǧʷiłdaǰʷ waters, these actions are not confined to one particular area but extend to and are conducted by Indigenous nations and their allies throughout coastal Vancouver Island and the Fraser River migration route. Almost exactly two years after George first gathered video footage of herring within the pens anchored near the Cove, citizens of Tla-o-qui-aht First Nation boarded and inspected farm pens in the waters of Clayoquot Sound for the first time.[59] The fish swimming within the nets appeared to be extremely thin and a strange yellow color— all too reminiscent of the visual markers of PRV infection. In addition to the herring that had been recognized elsewhere by George, the footage from Tla-o-qui-aht territories also provided the first documented presence of juvenile Pacific salmon inside a salmon farm. Environmental organizations in Clayoquot Sound have since established a year-round "salmon farm watch dog" program— Clayoquot Salmon Investigation, or "CSI"— that uses similar tactics to monitor death rates, sea lice, and waste associated with aquaculture facilities. As part of their virus monitoring program, staff and volunteers collected flesh, fat, feces, and fish scales from waters around 15 active farm sites in 2019. Genetic testing returned that 14 of the sites were positive for PRV.[60]

[59] *Sea Shepherd Conservation Society*. 2019. "Wild Salmon Recorded for First Time Inside Fish Farms," June 17, 2019. https://seashepherd.org/2019/06/17/wild-salmon-recorded-for-first-time-inside-fish-farms/

[60] "Going Viral: Norwegian Salmon Farm Virus Threatens Clayoquot Chinook." 2020. Clayoquot Salmon Investigation (CSI) Exclusive Report. Clayoquot Action. https://clayoquotaction.org/wp-content/uploads/2020/11/GoingViral-Report.pdf

In the Broughton Archipelago, meanwhile, where George's film footage sparked the 284-day occupation of two salmon farms, 'Namgis, Mamalilikulla, and Kwikwasut'inuxw Haxwa'mis Nations were importantly (and finally) granted permission to screen Atlantic salmon for pathogens themselves before the fish are transplanted into their territories.[61] As a 2022 podcast hosted by Canada's National Observer reflected: "It is hard to overstate the significance of what George did. A Hereditary Chief was gathering video of what was going on below the placid surface of a fish farm. Video that had never been seen before by the people for whom salmon was part of their essence. It was an act that would shift the fight against the fish farms."[62]

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This chapter has detailed some of the methods through which Liǧʷiłdaxʷ citizens like George and Sam and a diverse constituency of community members from in and around the Cove attempt to enact grassroots forms of environmental monitoring by travelling to sites of aquaculture production and filming fish within the farms. I have suggested that such forms of grassroots monitoring and virus hunting constitute a form of Indigenous "sousveillance" or surveillance-from-below that reclaims

[61] While this was an important decision made by the Canadian federal government, and one that at least somewhat recognizes the authority of First Nations to govern their territories, it also places an extreme burden on these First Nations. Employing or contracting molecular biologists and paying for genomic sequencing tests is extremely expensive. In response to the decision, others asserted that the burden for pathogen screening should fall on the federal government, not small First Nations who continue to be politically and economically marginalized. As described in the previous chapter, the decision also stated that even if PRV were to be found, it would not prevent aquaculture companies from stocking those fish anyway.

[62] Sandra Bartlett. "Skull and Crossbones." *The Salmon People*, Canada's National Observer. August 29, 2022. Podcast, website, 39 mins. https://www.nationalobserver.com/podcast/salmon-people/skull-and-crossbones

techniques and technologies of monitoring in order to "watch back" and engender attempts at state accountability (e.g. Newell 2020). Such forms of grassroots monitoring are a form of careful noticing and collective knowledge-making that is only made possible through assertions of Indigenous jurisdiction within unceded territories of the waterscape. Through sousveillance, the farm and the salmon within them are no longer isolated, physically and conceptually removed from view by way of remote locations and invisibilized industrial animal practices, but become part of a broader collective. The partial snapshots into life within aquaculture facilities that sousveillance practices produce have spurred overhauls to wastewater treatment processes, prompted research into whether lice and herring can also be vectors for virus transmission, persuaded a diverse segment of consumers to boycott farmed salmon products, and urged major retailers like Costco to modify their salmon supply chains. Such partial snapshots have expanded the cues to which, as Marianne Lien puts it, "we humans" can respond.

However, I want to end by offering a caution regarding the politics that are at stake as photos and videos of fish within farms circulate through traditional and social media. As these images and videos circulate amongst diverse audiences, the response, for many, is to urge for reform in aquaculture practices. As Bill the commercial and sometimes salmon-mort diver told me: "Aquaculture is the future. We just need a better way of doing it" (see Introduction). A company might pay a fine, implement a new delousing technique, or, as Bill suggested, create fish feed from soybeans instead of herring— all of which are important in their own ways— but otherwise, business

can continue as usual. Consumer boycotts of farmed salmon products and petitions that urge the state to initiate new virus testing programs can have important and immediate effects on everyday aquaculture practices and the profits they generate. They do not, however, help George to reclaim decision-making authorities within his ancestral territories, at least in the short-term.

It is important not to lose sight of the fact that these efforts at environmental monitoring are not only concerned with engendering state and industrial accountability but are also political actions that strike at the heart of BC's land and water governance policies; they push back against settler colonial systems that regard salmon only as commodities to be kept out-of-sight and marine waterscapes as empty and ready-for-the-taking. Beyond the physical act of filming fish within the farm, when George wrote to provincial politicians, placing the act of trespass on aquaculture companies and situating his rights to inspect salmon farms within contexts of Indigenous rights and title, sousveillance also becomes an embodiment of sovereignty that does not let the ongoing "background" (Rifkin 2017) of settler colonialism fall out of view. Yet, while sousveillance footage helps to spectacularize images of fish swimming in nets, the politics of sovereignty that make such images possible sometimes get lost as the images and videos circulate in newsreels, YouTube videos, and Facebook feeds. Herein lies a complex tension. For George, the ability to board and film within farms cannot be disentangled from assertions of Indigenous title and the protection of Liǧʷiłdaxʷ territories and foodways; they are inherently entwined.

Similar to the 20th century blockades described by Blomley (1996), settler publics tend to characterize Indigenous direct-action movements as singular, sensational forms of "protest." Such representations fail to account for the constitutional illegality of the appropriation of unceded territory and the complex ways that Indigenous foodways, territories, and governance systems have been disrupted through centuries of colonization. In such a context, moves towards what might be considered justice must be at once more-than-human and more-than-ecological. As George emphasized on the metal walkway of the farm, sousveillance is about power and space, rights and territory, and entangled fish and human futures. The "right to inspect" only becomes necessary because of a fundamental transgression against a right to self-determination, and because the "right to fish" is not guaranteed in an era of mass extinction or in a settler colonial context predicated on Indigenous erasure. Only by understanding sousveillance as sovereignty can images of fish within pens be understood as entangled with and an assertion of Indigenous political claims to land, water, food, territory, and sovereignty.

# Conclusion

## Reimagining the Blue Revolution

Atlantic salmon aquaculture draws upon historical claims to waterscapes and seabeds and technologies of salmon production and management to remake fish-human relations, microbial ecologies, and spatial and legal politics in BC. As we have moved between boat decks, kitchens, city streets, and fish labs, and heard from Indigenous leaders, fishers, scientists, and coastal residents along the way, we have seen how aquaculture facilitates a transformation in the social, ecological, and political life of coastal waterscapes. Adam, the microbiologist who assured me that the danger that PRV poses to Pacific salmon remained unclear, and Bill, the commercial diver who held faith that aquaculture still held important benefits if only the details of feed production and mort removal could be improved, provided important reminders that the process, politics, and repercussions of aquaculture remain contested and rarely engender easy answers. For Cove community members like Thomas and Henry, the influx of Atlantic salmon to the region also facilitates a reflection on what makes Pacific salmon unique and why farmed Atlantic salmon are just not quite the same as the Pacific salmon with whom they live in relation, even at the level of smells, textures, and fleshy omegas. And, for Liǧʷiɬdaxʷ fishers like George and Sam, aquaculture comes to represent a broader infraction against Indigenous rights and title and a further alienation from fishing economies that provide food, employment, and connections to their nation's history, identity, and territory. For Indigenous peoples

across the coast, aquaculture and fishing have always been nested within the politics of space and territory, subsistence and sustainability, and Indigenous economies and governance.

In each of these examples, the questions that surround aquaculture in BC are never confined only to the farm, but also extend historically, to the hatcheries, canneries, and processes of seascape acquisition that helped to build British Columbia; geographically, to places like Scotland, Norway, and Chile, which each become enrolled in networks of production; and throughout salmon migration routes and human communities on-land, as the politics of aquaculture follow fish through rivers, out-to-sea, and into processing facilities and grocery stores.

Even a focus on PRV and aquaculture itself risks losing, as Sean, the retired oceanographer warned me, "looking at the big picture." In an era of climate crisis and extinction, the future for salmon and other forms of marine life is uncertain. Sometimes the inability to pinpoint causality can serve political purposes, maintaining a business-as-usual status quo so long as uncertainties remain. The inability to definitively disentangle the multifactorial from the specific and a structural limitation in contending with the possibility of multiple, interweaving, and overlapping stressors come to extenuate conditions of harm within the knotted webs of salmon ecologies. Cumulative waves of exploitation and ecosystem transformation disrupt causal chains and make already fractured salmon worlds ever more complex and vulnerable. But, uncertainty need not be a cause for paralysis (Cohen and Chasman 2021). The uncertain futures that Atlantic and Pacific salmon and the

people who care for them currently face on the Pacific coast also provide an opening, a chance to reimagine what the so-called blue revolution is and can be. Yet, which articulations of the blue revolution offer a radical departure, a "great change in affairs," and which entrench a circular, familiar course?[63]

By way of conclusion, let us consider two contrasting futures for the so-called blue revolution, with attention to, as I began to ask in the Cove, the kinds of worlds that are envisioned, mobilized, hoped for, and brought into being through these practices. Neither are hypothetical— both are currently unfolding alongside of each other, and each offers insight into the trajectories that blue futures might take.

In one version of the blue revolution, Canada remains committed to aquaculture in its pursuit for a sustainable, green, "blue" future. As we have seen, Canada's current emphasis on growing ocean-based economies reveals the changing place of the ocean within the making of settler colonial futures— futures like the ones espoused by Bill in the Introduction, wherein oceans are emptied of Indigenous life-worlds and jurisdictions and exist at the ready for the making of cheap protein. Much of the contemporary political and economic debate around aquaculture as advanced by policy-makers worldwide is aligned with Bill's sentiment: "The future is aquaculture…. We just need a better way of doing it." A better way, some aquaculture ventures and hopeful environmentalists suggest, might come in the form of land-based farm facilities— sprawling warehouses akin to the confinement barns

[63] This question draws on two etymological meanings of "revolution"—revolution both as "an instance of great change in affairs" and revolution as in "the act or fact of moving in a circular course," drawing from the Latin "revolvere," meaning to "turn, roll back."

used to raise other industrial animals remade into a private aquarium of sorts. Prime Minister Trudeau's re-election platform in 2019, for example, promised that all aquaculture facilities in BC would be transitioned to "closed containment" production systems on land in efforts to mitigate aquaculture's detrimental ecological (and socio-political) effects. To be sure, such a statement was only made possible because of decades of Indigenous and community advocacy that has urged for the removal of net-pen facilities from coastal waters.

However, a potential shift to on-land "closed containment" as part of building a greener blue revolution risks reinforcing the colonial, commodity-driven, and human-exceptionalist frameworks on which aquaculture has historically relied. While the building of such industrial facilities would continue to take place on lands unceded and claimed by Indigenous nations, Robert, the nonprofit director we met in Chapter Three, also warned me that land-based production facilities would not transform the methods used to raise salmon at industrial scales. Building massive, industrial warehouse facilities would merely relocate fish production behind locked doors and barbed wire fences, protected by the doctrine of private property and around-the-clock (likely armed) security. Production processes and conditions of disease within the farm would be even harder to monitor. As described in Chapter Four, the location of the farms within waters deemed as "public," however problematic, provides Indigenous leaders and community members alike with a unique opportunitiy to keep watch over industrial processes, hold corporations

accountable, and engage with farm-raised fish while they are still alive. They provide an ability-to-respond.

Robert's additional caution that land-based salmon aquaculture facilities would neither inhibit pathogens from evolving and amplifying with ferocity within the farm, nor prevent such pathogens from entering coastal waters through discharged waste water, would likely unsettle many environmental organizations. Moving to land-based production is the hoped-for goal that many organizations who are doing the daily, on-the-ground work of environmental and political advocacy currently strive for. But, doubling-down on production through enclosure and private property enables a further removal of salmon from their relations and watersheds and does little to reimagine salmon outside of a human-centered object and commodity. If, as prolific union journalist Geoff Meggs observed in 1988, the true value of aquaculture for policy-makers stems from its ability to open rivers to damming, forests to logging, and oceans to offshore drilling (see Chapter Two), then a move to land-based aquaculture accelerates a final transformation of salmon into a terrestrial, standardized, mass produced product, made in aquaculture's image. Not only are hatchery-born and farm-raised salmon alienated from rivers, with their migration, spawning, rearing, and smolting cycles taking place in incubation trays, under automated light and temperature regimes, they are now also removed from the ocean, too. One way of responding to the uncertainty and crisis that characterizes oceans in an era of acidification, rising temperatures, and complex ecological interactions involves circumventing the ocean altogether. Yet, when "salmon and their river are

one organism" (Morton 2021, 136), when each salmon is particular down to its tributary, and salmon are constituted through relationships with trees, soils, and riverbeds, then to think salmon outside of these relationships is to not think salmon at all (see also Mueller 2017). Perhaps, as I heard so often in the kitchens and boat gallies of the Cove, something fundamentally different is being brought into being.

In any case, the federal Liberal Party under Trudeau has not made good on their campaign promise and, while research and development for on-land aquaculture technologies continues, no particular effort to initiate a wholescale shift to land-based salmon production has occurred on the BC coast to date. Conversely, the Department of Fisheries and Oceans proposes renewing remaining net-pen aquaculture licenses for another six years when they come up for renewal on July 1st, 2024.

Beyond aquaculture, seabeds and marine waters still prove to be valuable assets in the 21st century. Mining seabeds for rare metals, some of which are needed to fuel solar and wind energy transitions, and technologies that promise to harvest and store carbon from the atmosphere within the seabed at-scale— both of which aid global "net zero" commitments— are but two avenues in which the blue is poised to offer a certain kind of future. It remains an insidious irony that oceans emptied of fish might actually smooth this version of future-making. In such a context, "attending to the blue layers of environmental justice" and questioning the forms that "blue justice" (Ertör 2023) might take for water-centric and maritime communities incites urgency.

But, perhaps there also still remains opportunity for the blue revolution to emerge otherwise. Historical claims to fish and maritime waters and trajectories of

salmon production on the BC coast are currently changing through the long-term care for land, water, and salmon-kin practiced by Indigenous communities and nations. If coastal seascapes were able to be imagined as empty, unused, and devoid of Indigenous governance in preemption documents and governmental and industry reports of the 19th and 20th centuries, then sousveillance, water-travelling flotillas, and a practice of being in-situ have proved this position to be untenable moving forward. Land and waterscapes are being legally, physically, and ontologically reclaimed. Calls for Land Back and Water Back reverberate across North America. This return is not only concerned with reclaiming territory in a material register, but is also about the restoration of relationships (Schneider 2022) and restoring ways of relating to and living with land and nonhuman-persons like salmon within, as Glen Coulthard put it, a "system of reciprocal relations and obligations" (2014, 13).

Salmon aquaculture in British Columbia is currently undergoing a profound transformation. Sousveillance, physical occupation, legal campaigns, and environmental advocacy movements have intertwined to shift the state's system of issuing aquaculture site tenures. Following the 284-day occupation of salmon farms in the Broughton Archipelago, for example, the Province of BC committed itself to addressing longstanding discontents about the location of salmon farms in the region. Stemming from this renewed consultation process with Indigenous nations, the province announced that aquaculture facilities across the coast would be moving to a "consent-based" model by 2022 wherein aquaculture tenures would only be issued "to fish farm operators… who have negotiated agreements with the First Nation(s) in

whose territory they propose to operate."[64] As part of the Broughton Archipelago Transition Initiative, created as part of the new "consent-based process," ’Nam̲gis, Mamalilikulla, and Kwikwasut'inuxw Haxwa'mis First Nations implemented a robust Indigenous monitoring plan that reformed how aquaculture could continue to operate within their territories. They institutionalized their rights to screen Atlantic salmon for pathogens like PRV before the fish are transplanted into their territories and their ability to board farm sites and conduct their own sea lice counts and fish health audits. They hired their own veterinarian to conduct fish health checks and, importantly, specified that aquaculture companies be required to pay associated laboratory costs for pathogen testing. They changed the allowable sea lice threshold for the farms within their territories, reducing the sea lice limit from 3 lice per fish to 2 lice per fish (reducing potential sea lice totals per farm from ~1.5 million to ~1 million). They required that the fish be removed from the farm if the company is not able to comply with lice thresholds during the out-migration period for juvenile Pacific salmon—a stipulation that the Department of Fisheries and Oceans has never required. Companies also became subject to new information sharing requirements, giving scientists outside of government agencies access to data on sea lice treatments, for example, that were previously unattainable.

As of 2022, ’Nam̲gis, Mamalilikulla, and Kwikwasut'inuxw Haxwa'mis Nations had conducted over 200 aquaculture site visits and inspections under the new

[64] "Government, First Nations chart path for aquaculture in Broughton Archipelago," Press release from British Columbia Office of the Premier, Victoria, December 14, 2018: https://news.gov.bc.ca/releases/2018PREM0151-002412

agreements, enabling Indigenous governments to assess how the farms are operated, how many fish die from pathogens, and how the companies respond to these events. Even still, they propose, the regulatory mechanisms of the state that measure potential harm according to a lice-per-fish threshold allow the cumulative impacts of over 1 million lice per farm go unaccounted for. Harm has historically served as the baseline against which industries like aquaculture are measured. Kelly, an aquaculture surveyor from ’Namgis Nation, describes that aquaculture companies were eager to demonstrate that their practices were not harming Pacific salmon as much as community members might fear when ’Namgis monitors began visiting farm sites. However, Kelly saw her position more as one that was primarily concerned with helping Pacific salmon. As she put to the industry: “How is this helping wild salmon that you’re there? How would you change your operation if your focus was ours?”[65]

These recent turns in knowledge production are neither simply an add-science-and-stir framework that enables the continuation of business as usual, nor are they a mere incorporation of Indigenous peoples into the apparatus of settler governance; they are, perhaps, engaged in changing the relations that govern with and through science. The shift in focus from harm to help is part of the “moral-ecological paradigm” (Thornton et al., 2015), a more-than-management approach that has cared for and cultivated ecologies of abundance across the coast since time immemorial (see Historical Primer). While Indigenous and STS scholars have long called attention

[65] Sandra Bartlett. “The Mandate vs the Mandarins.” *The Salmon People*, Canada’s National Observer. October 3rd 2022, Podocast, website. 53 mins. https://www.nationalobserver.com/podcast/salmon-people/mandate-vs-mandarins

to the ways in which techno-scientific knowledge-practices are interwoven within a broader politics of power that upholds settler colonial formations, recent transformations within aquaculture operations demonstrate how Indigenous engagements "with science and technology fields, when done in and on their own terms, can support their communities and territories" (Kolopenuk 2020, 4-5). Indigenous nations are invested— ethically, methodologically, and financially— in exploring techno-scientific applications for improving the quality of life for their communities (Tallbear 2016). "Contemporary Indigenous peoples use Western techno-science to govern. To miss that is to miss a key opportunity to expand Indigenous sovereignty" Kim Tallbear writes, "Science and technology are central to how nation-states govern and generate resources in the 21st century…. Indigenous governance is no exception" (2016, 77). When the apparatus and methodologies of pathogen testing and parasite monitoring become mobilized in such a way, they become part of a long-term stewarding of land and waterscapes that, like stream-scaping practices and fish trap governance principles, have been concerned with care for land and waterscapes and other-than-human kin since time immemorial.

Ultimately, salmon farm operators in the Broughton Archipelago were unable to meet the standards and requirements set forth by Indigenous nations and, net by net, farm by farm, the facilities were removed from their territories. While, thus far, the "consent-based" transition agreements, monitoring plans, and eventual removal of salmon farms from Broughton Archipelago have been a somewhat unique occurrence, the restructuring of the salmon farming industry is setting a new precedent for

Indigenous sovereignty and jurisdiction within unceded and maritime territories. Even in instances where Indigenous nations do enter into agreements with aquaculture companies, their operations will undoubtedly be shaped by Indigenous oversight, monitoring, and consultation in ways that were never previously required or pursued. Mining, forestry, and oil development sectors are also watching how the politics of aquaculture unfold because state mandates for Indigenous consent could affect the entire political economic landscape within Canada, and throughout settler states more broadly. In reflecting on the ways that the "soiled grounds" (Fortun 2014) of late industrialism are "but a sedimented layer upon *longue durée* legacies of ongoing coloniality," anthropologist Kristina Lyons suggests that "the decline of salmon populations may contribute to the possibility for Indigenous legal orders to transform settler colonial legal systems and social imaginations" (Lyons 2018). It seems that this transformation might already be underway in the coastal straits of BC, where seascapes are being reclaimed as Indigenous and the exercise of Indigenous rights and sovereignties are influencing how ocean governance and development schemes unfold.

At the same time, efforts to deindustrialize, reclaim, and protect marine waterscapes are part of a resurgent movement of sovereign and territorial rematriation that exceeds British Columbia and aquaculture alone. In Chile, the Indigenous communities of Antunen Rain and Pu Wapi requested that hundreds of thousands of hectares of marine waters be recognized as Native Peoples' Marine Coastal Spaces in

2024[66]—a legal designation that would formalize the ability for Indigenous communities to use and manage the seascape, provide enhanced ecological protections, and, importantly, make it increasingly difficult for the 300 Atlantic salmon farms anchored in the region to continue operations. Although Chile's Regional Coastal Edge Use Commission denied the request, the communities asserted that their proposal was "just the beginning" of their demands for coastal marine spaces (Garces 2024). In New Zealand, where the state's maritime territory is regarded as being fifteen times the size of its landmass, and where title rights to seabeds, foreshores, and coastal waters are similarly vested in the British Crown, Māori have been advocating for foreshores and seabeds to be redefined as Māori customary lands since at least 1997 (e.g. Hickford 2006).[67] In recent years, Māori have experienced several successes in regaining marine title rights in ways that enable Māori decision-making to be prioritized in resource use decisions (e.g. Buchanan 2021; Leonard 2021).

On Vancouver Island's West Coast, Mowachaht/Muchalaht First Nation is in the process of "buying out" forestry tenures in efforts to turn coastal areas that are slated for old-growth logging into a series of "salmon parks" instead. Further north,

[66] Sometimes also translated as Coastal Maritime Spaces of Native Peoples or Coastal Marine Space of Native Origin

[67] In 1997, eight *iwi* applied to the Māori Land Court to have the foreshores and seabeds of the Marlborough Sounds recognized as Māori customary lands under the Te Ture Whenua Māori Act of 1993. The High Court ultimately ruled that seabed title rights are vested in the Crown and that any Māori customary interest in the foreshore is lost once the Crown purchases dry land in front of it. This changed with the 2004 Foreshore and Seabed Act, which determined that people who had used the foreshore and seabed since 1840 could claim territorial customary rights and apply to the Crown for redress (Hickford 2006).

Kitasoo Xai'xais Nation has created the first Indigenous-led "blue park" in the world, establishing a Marine Protected Area that is managed by their own watchmen and governed according to their own laws and jurisdictions and, as media reported when the Protected Area was internationally recognized with a Blue Park Award in 2024, they did so "without waiting on Canada" (Kwetásel'wet Wood 2024). Haida Nation are similarly active managers of the Gwaii Hanas National Marine Conservation Area according to a "land-sea-people" management plan based in principles of Haida law. And, in what is now California, the Northern Chumash Tribal Council is seeking to protect water-based sacred sites and resources through the creation of the Chumash Heritage National Marine Sanctuary. Unlike protected areas of the 19th and 20th centuries, these Indigenous Marine Protected Areas do not imagine seascapes to be ahuman, acultural places, but center the continuance of Indigenous fishing and harvesting practices as part of their governance.

Such examples illuminate an increasingly common trend in global environmental and ocean governance: an emerging emphasis on growing ocean-based economies such as offshore energy and seabed mining exists in tension with efforts to remove industrial infrastructures from marine waters and return land and water to Indigenous nations. Not only do contrasting articulations of a blue future take place within a politics of asserting sovereignty "at sea," but the turn to the blue can also be seen as entangled with environmental justice and Indigenous political movements on a diversified, international scale.

Such examples also invite us to reimagine the blue revolution. Perhaps the blue revolution does not come in the form of nets anchored to the seabed. Perhaps an alternative, even more radical blue revolution is underway— one in which Indigenous sovereignties are able to shift power dynamics in ways that center relationality, reciprocity, and survivable futures for many entangled forms of life. Perhaps, quite simply, Indigenous resurgence is the blue revolution.

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In 2022, low resolution videos taken from cell phone cameras started appearing on social media. Taken from the shoreline, they panned across the vistas of coastal waters and island chains, following tug boats that sailed through narrow channels. Trailing behind the tug boats, the green buildings and metal gridded structures distinctive of aquaculture facilities seemed to glide across the surface of the water. Salmon farms were leaving the Broughton Archipelago. That year, for the first time in decades, salmon leaving from and returning to the waters of the Glendale, Ahta, Hada, Viner, Kingcome, and Wakeman Rivers would not migrate past millions of Atlantic salmon held in nets. Pink salmon returns to the Ahta River increased by a factor of ten.[68] In Liǧʷiłdaxʷ territories, where salmon farms were temporarily closed pending consultations with Indigenous governments, the average number of sea lice per fish declined by 96% (Routledge and Morton 2023). A press release from the BC

[68] "Amazing Pink Salmon Returns and Salmon Farm Closures," Press Release by Living Oceans Society, September 21, 2023: https://www.livingoceans.org/media/news/amazing-pink-salmon-returns-and-salmon-farm-closures#:~:text=In%202022%2C%20following%20the%20closure,by%20a%20factor%20of%2010

Salmon Farmers Association was quick to assert, however, that "there is no causative link… related to salmon farm activity and salmon returns."[69]

As for the Klamath dams? At the time of writing, they are currently being removed from the mainstem of the Klamath River in the largest dam removal project in world history. Demolition of Iron Gate Dam began on May 1st, 2024. Earthen mound by earthen mound, Iron Gate Dam will no longer stand as an impediment to the movements of water and salmon. Soon, the river will flow free for the first time in over a century, finding its path once more.

Let us hope that the salmon follow.

[69] "No Link Between Wild Salmon Returns and Active Salmon Farms," Press Release by BC Salmon Farmers Association, August 12, 2022: https://www.bcsalmonfarmers.ca/news/no-link-between-wild-salmon-returns-and-active-salmon-farms/

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