

**BEING THOROUGH: CUMULATIVE EFFECTS IN RESURGENT GITXAALA**

by  
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Being Thorough: Cumulative Effects in Resurgent Gitxaala

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## Abstract

Gitxaala Nation is currently under increasing social and political pressure from both the provincial and federal governments, as well as from multi-national natural resource corporations. In this region, decisions are being made today about our future energy sources, the ways we value people, places, and beings, and about whose voices matter. Based on data from ethnographic fieldwork and semi-structured interviews, conducted by the author with 19 Gitxaala harvesters, this thesis examines cumulative effects (CE), as perceived by interviewees, to two valued components identified by Gitxaala: food security and access to resources. Focussing on the case studies of red laver seaweed and salmon, I put these effects in conversation with the effects of ongoing settler colonialism and anthropogenic climate change. Taking a desire-centered approach to this project, I highlight Gitxaala management strategies by applying an Indigenous resurgence framework to the inquiry of local pathways of effects (PoE) and the influence of community action in altering these pathways.

Through these analyses, I come to the following conclusions: Seaweed is largely affected by processes such as warming waters and a shorter winter season, caused by global climate change. Gitxaala harvesters' capacity to pick seaweed is limited by their economic situation, and the time they are able to dedicate to managing and harvesting the seaweed as a result. Salmon is also impacted by anthropogenic climate change, while overfishing and habitat destruction create further challenges for local salmon populations. The exclusionist construction of the commercial fishing industry, and the diminishment of intergenerational knowledge transfer are two fundamental obstacles to harvesting Gitxaala is facing today. Supporting Gitxaala citizens' intergenerational engagement in respectful harvesting, habitat monitoring and language development are key ways to alter PoEs to the territory and people today and into the future. Finally, I urge anthropologists to apply CE to studies of localized experiences of change and resurgent action in an effort to be *magonsk*, meaning "thorough", in their research.

## **Lay Summary**

Gitxaala Nation people are very involved in monitoring and managing the ecosystems in their territory. Today, these practices are especially important because so many natural resource companies want to run projects through Gitxaala territory. Understanding how current and future changes affect the Nation's territory and people is necessary for further developing effective community management programs. This thesis examines the processes influencing Gitxaala First Nation territory and people today and into the future. Based on information gathered through interviews with Gitxaala harvesters, I focus on effects to Gitxaala's access to locally harvested food and resources, especially seaweed and salmon. I put these effects in conversation with the influence of settler colonialism and climate change on the region. Key ways to support effective community management are by emphasizing intergenerational engagement in respectful harvesting, habitat monitoring and language development.

## **Preface**

This thesis is an original intellectual product of Katrin Schmid, based on fieldwork conducted by the author, Katrin Schmid, from May to August 2019. Drafts of this thesis were reviewed by her supervisor, Dr. Charles Menzies, and committee member Dr. Patrick Moore, as well as Dr. Caroline Butler from Gitxaala Fisheries and an external reviewer. The fieldwork discussed throughout was approved by the UBC Behavioral Research Ethics Board (BREB) under the title “Gitxaala Nation Environmental Perceptions”, BREB number H19-01068. This research project was further approved by Gitxaala Nation and Gitxaala Environmental Monitoring.

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## List of Abbreviations

CE:	cumulative effects
CEMI:	Cumulative Effects Monitoring Initiative
EA:	environmental assessment
GEM:	Gitxaala Environmental Monitoring
LNG:	liquefied natural gas
MaPP:	Marine Planning Partnership
PoE:	pathways of effects
UBC:	University of British Columbia
VC:	valued components



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Colin Nelson: Thank you for your patience and sense of humor, and for taking the time to explain so much. Thank you for teaching me how to navigate a boat (but please don't fall asleep!), and for sharing the music!

Helen Gladstone and Norm and Chris Wood: Thank you for showing me around, for teaching me how to pick seaweed, and for letting me tag along on various adventures around the village. Maybe we can work on balancing water bottles on our heads again someday.

Annabelle Wood: Thank you for letting me stay in your home, and for showing me what it takes to host a feast. I have never had to make that much jello in such a short amount of time!

Cecil Hill: Thank you for sharing your knowledge, experience, and enthusiasm. It's contagious. And thank you for reminding me to be *magonsk*.

Carol Vickers: Thank you for slurping soup with me! Your knowledge and commitment to your community are an inspiration.

My heartfelt thanks to Daniel Davis, Greg McKay, Matthew Hill, Clyde and Elliot Moody, Tim Innes, Margaret Hill, Gideon Innes, Ken Innes, Clarence Innis, Bill Stewart, Keith Lewis, Robert Beynon and Ronnie Shaw. Your knowledge and dedication to explaining your perspectives, experiences, concerns and ideas are the drivers of community engagement, and the foundation of this project.

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I am grateful to my friends and colleagues Jonathan Eaton, Fumiya Nagai, Joan Bratty, Raphael Deberdt, Lara Şarlak, Malika Hayes, Rosalie Gunawan, Maya Daurio, Chris Smith, Eric Simons, Amanda Sorenson and Vicky Sears. Your support and cheekiness encouraged and sustained me throughout these two years. To the best roommates AND friends I could have asked for, Mia Au and Olivia Adams, thanks for being there, always. To my best friend, Elias Alexander: your generosity, kindness, and flair make every day with you a better day. Thank you for being my rock. To my family - thank you for your care and support from afar, through thick and thin.

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## Glossary of Gitxaala Sm'algyax Terms

The spelling and translation of these terms is taken from Charles Menzies' ethnography of Gitxaala, *People of the Saltwater* (2016), and the Sm'algyax Living Legacy Talking Dictionary (2019).

<i>adaawx:</i>	oral history of house group/clan/nation
<i>ayaawx:</i>	customary law
<i>bax laansk/sbax laansk:</i>	pulling together
<i>gyisiyaask:</i>	when the wind blows offshore
<i>hoon:</i>	salmon
<i>hak'wn:</i>	giant mussel, horse mussel
<i><u>K</u>'amksiwah:</i>	white people
<i>la'ask:</i>	red laver seaweed
<i>laxyuup:</i>	territory
<i>magonsk:</i>	to be thorough; to make sure; to research
<i>Sm'algyax:</i>	Tsimshianic language
<i>syt güülum goot:</i>	being of one heart
<i>walp:</i>	house group

## 1. Introduction

We've been up since 5 a.m.

We're both new to this. But for her it's something she's been wanting to do for years. For me, this is an opportunity to help out, and to experience part of a process first hand. We're perched on a massive rock, its edges rounded by the waves over time. Our feet are floating in oversized rubber boots, our life-vests forcing our arms away from our bodies like an over-stuffed teddy bear. I can feel the barnacles and mussels jabbing at the soles of my boots, reminding me how painful a slip would be. My hands tug at a black strand I've wrapped into my fist. A satisfying snap releases the strand of seaweed from its purchase on the rock face. I run it through my hand, checking the ends to pinch off any blond tips, then throw it into my bucket.

We move along the rocks, shifting our weight carefully as we haul our full buckets behind us. As we make our way back to the skiff, she stoops over a tidal pool, reaching her hand into the water to pull out the biggest mussel I have ever seen.

The *hak'wn* we picked to eat immediately. But she also picked one to clean and take home for her grandchild, whose name is *hak'wn*, to show him the strength and beauty of his namesake. This *hak'wn* was more than a giant mussel, it had barnacles growing on the outside of its shell, algae coating its surface. Back home, after the shells had been boiled, they split open, revealing their iridescent interior. While the shells were laid out to cool off, I picked one up, holding it up to the light. Inside, there nestled a small sea star.

*Magonisk*. Gitxaala citizen Cecil Hill's words came to my mind as I peered into the *hak'wn*. You have to be "thorough". Only by being *magonisk* can one begin to recognize the many systems at play, and the consequences of changing relationships. I thought about my research project. I would have to be *magonisk*, to successfully explore the drivers of cumulative effects to Gitxaala

First Nation territory and people. The idea of being '*magonsk*' stayed with me through my research and led me to conclude that anthropological studies of climate change would benefit from applying cumulative effects to their lens of inquiry. In what follows I contextualize my research and lay out the key conclusions. I assert that supporting Gitxaala citizens' intergenerational engagement in harvesting, habitat monitoring and language development simultaneously supports Gitxaala's capacity to positively respond to local cumulative effects.

### **Gitxaala Nation: Context of Place and Time**

The Gitxaala are a First Nations people whose traditional territory is made up of the waters and multiple islands off the Northwest Coast of British Columbia, Canada, near what is now known as Prince Rupert. For much of the world this may seem a far-off place, an area that is drawn in at the edge of the map, an area that has little to do with daily life on a global scale. Yet situated as it is at the mouth of the Skeena River, and along one of Canada's sea routes to Asia, this region is currently under increasing pressure from both the provincial and federal governments, as well as multi-national natural resource corporations. In the past five years, Gitxaala Nation has been asked to review numerous natural resource projects that aim to establish themselves in the territory. In this region, decisions are being made today about our future energy sources, about the ways we value people, places, and entities, and about whose voices matter when it comes to acting on these decisions. For many Gitxaala people, who rely on food and other resources harvested directly from the territory, these local-global processes are critically important.

No strangers to change, Gitxaala have lived in the coastal region of the Skeena watershed for "at least five millennia", according to both oral histories and archeological findings (Menzies 2016, 1). Over this time, Gitxaala territory and people have been continuously undergoing significant transformations. Changing climates and natural disasters are recounted in

Gitxaala *adaawx*, oral record. Stories tell of much cooler periods and of specific events, such as the time of a great flood, during which Gitxaala people tied their canoes at the top of Noble Mountain, on Pitt Island. Today, Noble Mountain looms 840 meters above sea level. The Nation's capacity to navigate large scale transformations is based in their intimate awareness and knowledge of their territory, built through generations of ecosystem management, respectful harvesting and consumption, knowledge exchange, and simply dwelling on the land. Maintaining these systems of management is integral to Gitxaala Nation's sovereignty from a social, political, economic, cultural and environmental point of view.

Alongside their adaptation and management of underlying (ecological) systems, Gitxaala's history is one of encounters and exchanges between peoples and entities. The division of the *laxyuup* (territory) into house (*walp*) territories ensured that the Nation's citizens are invested in the management and health of ecosystems in their region. As such, *walp* territories provide a socio-political structure of accountability between members of each *walp*, the entities and habitats in those regions, and Gitxaala Nation itself (Menzies 2016).

However, colonialism brought with it an entire swath of changes, first and foremost through the dispossession and dislocation of Indigenous peoples from their traditional territories. Gitxaala *adaawx* tells of the Nation's first encounter with *K'amksiwah*, or white people, at the end of the 1700s when Captain James Colnett and his crew sailed to Banks Island (Menzies 2016). From this event of first European contact, Gitxaala have always been involved with non-Indigenous peoples in the area through trade, kin connections, collaborative projects, or in defense of their livelihoods, territory and knowledge (Fee 2010; Menzies 2015; Menzies and Butler 2008). European imported diseases took a severe toll on Gitxaala people, as with so many Indigenous peoples in North America (C. Harris 2002). This led the Elders of that time to come together to discuss the

centralization of their population as a way to maintain their strength as a Nation. As told by Gitxaala citizen Matthew Hill, after scouting out various areas of the territory, the Elders agreed upon Lach Klan, on what is now Dolphin Island, as the main place of residence for Gitxaala. By pulling together, *sbax laansk*, Gitxaala people changed the dynamics of their lives. Although pulling together in Lach Klan means they no longer live in winter villages spread from the Skeena to Aristazabel Island, people continue to use their hereditary lands throughout their territory. Kitkatla, the English name for the reserve village on Dolphin Island, is where 400-500 of the approximately 2000 Gitxaala citizens live today.

With the restructuring of land ownership through the reserve system, Gitxaala people were allocated small parcels of land, usually fishing spots, as reserves on their otherwise expansive traditional territory (C. Harris 2002; Menzies 2016). This dispossession is one example of core differences in understandings of land usage and ownership between Indigenous peoples and settler societies. Indigenous land ownership is not identified by use, or rather, land ownership is not restricted to land use in the industrial sense of the word (Menzies 2012; 2006). While Gitxaala citizens manage and use their land, and have done so since time immemorial, settlers were largely impervious to this fact, seeing instead only how they themselves would have cultivated the land, and therefore deeming it under-utilized (C. Harris 2002). Not only were these assumptions incorrect, they are focussed on a flawed conception of land ownership that denies the fundamental reality of Indigenous peoples describing the extent of their territories, and settlers blatantly ignoring them.

Today, the territory is a site of much competition, with multiple natural resource companies vying for the right to run their projects through the region (Menzies 2015). Proposed, permitted and operational projects come from all manner of resource-based industries, including a wind and

tidal energy project, mining, forestry<sup>1</sup>, and several liquefied natural gas (LNG) pipelines, export terminals and shipping routes. Such projects are accompanied by many potential changes, the effects of which are seldom fully understood by the overseeing regulatory bodies. However, Gitxaala people are highly aware of the sensitivity of their coastal and marine ecosystems, and their dependence on the balance within and between these systems. They have been committed to habitat management for as long as they have been Gitxaala. But faced with one request after another, the Nation needed to have a firm, coherent, and representable understanding of the methods they themselves use to evaluate and manage cumulative effects to their people, systems, and resources. Gitxaala Fisheries was set up and later followed by Gitxaala Environmental Monitoring (GEM). Today, these agencies support the Nation in environmental monitoring, assessment and management processes.

This thesis is made up of five main sections, interwoven with interview excerpts. I began this first section by describing the historically situated context of my research with Gitxaala by giving a brief overview of the Nation's history and involvement in harvesting. Next, I explain the parameters of my fieldwork project with GEM and give background information on the theoretical discourse of Indigenous cumulative effects, climate change studies, and Indigenous resurgence to which this thesis speaks. Moving on to the main body of this paper, section 3 consists of two case studies of the intricacies of impacts affecting Gitxaala's valued components<sup>2</sup> in daily life. These cases, on seaweed and salmon, are constructed around main topics and concerns that were explained to me during interviews. Community members' ideas and strategies for mitigating specific effects to Gitxaala at a community level are then presented. These ideas targeted three

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<sup>1</sup> Gitxaala Nation currently has a forestry program.

<sup>2</sup> "Valued components" (VC) are understood here as aspects of importance and concern to the Nation, identified by the Nation. Within cumulative effects assessments, these VCs are examined and monitored in consideration of past, current, and future effects on them.



main groups of people within the Nation: younger folks and their educators, harvesters, and the community at large. The discussion of these strategies sits within an Indigenous resurgence perspective of implementing the knowledge and experience of Gitxaala citizens to further strengthen the Nation. An illustration of how these strategies could intercept or modify pathways of effects<sup>3</sup> (PoE) is offered through in-text references to specific points or pathways in the PoE, which can be found in the Appendices.

The main concepts of this thesis: cumulative effects, climate change, and Indigenous resurgence, are combined to investigate the drivers of cumulative effects impacting Gitxaala's access to resources, specifically seaweed and salmon, as well as community members' responses to these effects. Indigenous climate change studies, and the wide-angle lens of cumulative effects are applied when considering the obstacles currently impeding community action to effectively mitigate such effects. Community inspired ideas and solutions to these obstacles are presented and discussed as expressions of Indigenous resurgence.

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<sup>3</sup> Pathways of effects are conceptual models that illustrate the influence of human activities on ecosystems, highlighting multilayered consequences to systems and emphasizing human responsibility for management of such effects (Government of Canada 2012).

## **2. Research and Conceptual Framing**

In this section, I situate myself both as an individual and as a researcher. First within an ongoing collaborative project taking place in a settler colonial state, then in relation to three core conceptual fields of discourse.

### **Research Context**

#### **GEM and UBC Collaboration**

Gitxaala Nation and the University of British Columbia (UBC) have collaborated on research since 1998, when Charles Menzies initiated a joint project between the two on First Nations forestry employment. Since then, ongoing collaborative projects have included traditional ecological knowledge documentation, climate change research, and film and curriculum development (Menzies 2016; Menzies and Butler 2019). Gitxaala Environmental Monitoring was established in the early 2000s when natural resource extraction industry proponents became increasingly interested in the territory and the Nation recognized the need to develop community-based research protecting their territorial interests (Menzies and Butler 2019). In an effort to continue community centered research projects, GEM has worked with many student interns from UBC over the last decade.

From the beginning of May until the end of June 2019, as one in a long line of graduate student anthropologists, I too was a student intern at GEM, doing research for an ongoing GEM cumulative effects project. This project was designed in collaboration with GEM and co-supervised by the GEM and Fisheries and Marine Program staff. Throughout the project, I worked closely with community researchers in preparing question design, finding interview participants, and conducting the interviews. I signed a protocol agreement with GEM, an agency of the Nation, to the effect that all publications relating to this research are to be approved by the Nation. Because

the results of this project are anticipated to be used in their ongoing research on cumulative effects, the wording of my questions was heavily influenced by the priorities of Gitxaala community members and Gitxaala government. A requirement for my participation in this collaborative project was that I write both a thesis for UBC and a research report for GEM. This report will add to the information being collected on the cumulative effects to Gitxaala territory.

## **Methods and Research Approach**

My methods for this project are grounded in ethnographic research. Before arriving in Prince Rupert, I spent time reading what other voices have already said about Gitxaala, in online archival materials, books, and journal articles. I watched ethnographic films, such as *Bax Laansk* and *View from Gitxaala* (Menzies and Rashleigh 2014; Menzies 2003), in which I saw my first images of the territory, and heard Gitxaala people speak for themselves. As part of my research assistantship for Dr. Charles Menzies, I was able to watch the video recordings of the Enbridge bitumen pipeline hearings, in which Gitxaala members provided evidence against the industrial proposal, sparking my interest in the community's strategies for dealing with change (Gitxaala Nation v. Canada 2016).

During May and June 2019, I conducted participant observation as an intern at the GEM office, as a visiting researcher to Kitkatla and Prince Rupert, and as a nosy novice in the boats of Gitxaala harvesters. I was based in Prince Rupert and worked in the GEM office for the majority of the time. I spent one week in Kitkatla village itself. In total, I spent two and a half months on different islands and areas of the territory.

The expanse of this research was made possible by Senior Manager of Planning and Community Research, Caroline Butler, as well as Gitxaala Youth Coordinator Ursula Nelson, and Head Start councillor Evan Aster, who both worked as research facilitators for the project. Their

positions in and relationships with people in Gitxaala, allowed me to conduct semi-structured interviews with 19 members of Gitxaala Nation, all of whom have been involved in harvesting activities throughout their lives. These interviews took place in the GEM office and the Git Lax Moon residence in Prince Rupert, as well as in Kitkatla's Old Band Office, and, in one instance, in camp chairs in Schooner Bay. Interviewees were between the ages of 32 and 83, with 16 participants over the age of 40. All but three of the people I interviewed are male. This was to be expected, due to the gendered division of harvesting labour in which most fishing and hunting is a male pursuit.

To analyze my data I transcribed each interview, identifying main themes from the conversation to further examine. Due to the relatively large number of interviews, I grouped sections of each interview referencing chosen themes together in one document to maintain an overview of the data. Most sections of interview mentioned overlapping themes, and most themes were spoken of by multiple interviewees. I used NVivo 12, a qualitative data analysis software program, to organize my thematic coding. From the grouped themes, I selected the most common ones for a case study and took care to include the main relationships to other themes mentioned in the interviews. To further structure the multitude of impacts and consequences brought forward, I summarized people's responses in the form of PoEs, which can be seen in the Appendix. While I am aware this inevitably leaves out many key points and interactions, for the purposes of this thesis, I chose to focus on those topics that were discussed most often.

Throughout this entire process, Charles Menzies' guidance on conducting research respectfully and in the interest of the Nation has been instrumental to the way I approach this project (Menzies 2001; 2004). As a non-Indigenous woman, I am acutely aware of the fact that I am writing from the perspective of an outsider from a privileged and dominant demographic.

## **A Brief Explanation of Main Concepts**

A massive body of research has been conducted with First Nations over time, and Gitxaala has been no exception. Due to the many researchers entering the territory, Gitxaala citizens understandably have “research fatigue” on a variety of topics. For this reason, it was especially important to everyone involved in constructing this research project that the main topics of interest are of benefit to the community. In this section, I give a brief explanation of the topics leading both my line of inquiry and analysis.

### **Cumulative Effects**

In this thesis, I apply the overarching framework of cumulative effects to explore the drivers of change in Gitxaala, centering cumulative effects as my main analytic structure. Cumulative effects frameworks is an analytic method that highlights interacting effects, and the method is gaining popularity among academics and practitioners (Hodgson and Halpern 2019). Gitxaala Nation has been working with, and further developing, cumulative effects assessments (CEA) for the past five years. Working in collaboration with the Marine Plan Partnership Initiative (MaPP)<sup>4</sup>, Gitxaala Environmental Monitoring recognizes cumulative effects as:

“Changes in environmental, social, economic, health and cultural values as a result of the combined effect of present, past and reasonably foreseeable human actions or natural events” (Marine Plan Partnership Initiative 2016).

At the time of my writing, there is little anthropological literature available on the intersection of cumulative effects and Indigenous peoples. Although CE analyses have generally been geared towards practitioners rather than academics, I find the lack of participation curious given both the subject matter and approach prioritized by CEA – humans and their environments,

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<sup>4</sup> Using CEA, MaPP works together with the provincial government and 16 coastal First Nations to create marine management and regional action plans (Marine Plan Partnership for the North Pacific Coast 2020).

their interactions and relationships, engaged with in a holistic manner. However, simply because the language differs does not mean anthropology has passed over these topics (see, for example, Anderson 2017; Cooke 2017; Gendron 2016; Ignace and Ignace 2017; Menzies 2015).

So why is it important to think through cumulative effects? Anthropologist Anna Willow argues that recognizing humans as part of socio-ecosystems is an integral first step to successfully applying a cumulative effects lens to localized effects of change (Willow 2017). Yet understanding humans' influence and roles in ecosystems is no foreign idea to many Indigenous people – though, again, the concept is often expressed in other terms. Professor of Educational Foundations Margaret Kovach describes such understandings as an expression of “holistic epistemology”, in which the emphasis is laid on inter-relationships between people, places, languages, and other entities (Kovach 2000, 62).

As a part of the Cumulative Effects Monitoring Initiative (CEMI), an Environment Canada program with First Nations on the North Coast of BC, Gitxaala Nation has identified 33 core values to be assessed and monitored in the region. Two of these values are “food security” and “access to resources”. These values are now being assessed through collaborative initiatives with the Provincial Government, such as MaPP. Within this work, my project was to inform Gitxaala's participation in these CE research programs. For this project, I asked research participants to explain what kinds of effects they have noticed on their local food and resources, including their capacity to access these. Within this line of inquiry, Evan Aster, Ursula Nelson and I focussed especially on effects relating to climate change, however, participants' answers did not. While climate change was identified as an issue of concern, it is not seen as one of the main drivers of proximate change to Gitxaala currently. Instead, settler colonialism and the social injustices derived therefrom are felt more acutely and therefore carry greater weight in everyday conversation. Effects

of environmental change, including climate change, are situated within a broader understanding of human-ecosystem interaction and relationality. Effects of settler colonialism were discussed when talking about environmental change because research participants see direct implications and consequences of colonial and capitalist expansion to the types and rates of changes Gitxaala is experiencing now.

### **Climate Change**

Anthropogenic climate change is a global problem with local expressions that has been created almost entirely by colonizing peoples (Olsson et al. 2014). Gitxaala traditional ways of being are not the causes of the climate crisis, yet they are among the people who will be hit the hardest (Whyte 2017). Anthropology as a discipline has a lot to offer the climate change discourse, most obviously because of the discipline's interest in people's values and knowledges, but also because of its interest in perceptions and reactions (Roncoli, Crane, and Orlove 2009). These fields of inquiry help to transform broad frameworks, such as cumulative effects, into layered webs of meaning with more responsible depictions of how global systemic processes, such as climate change, directly impact the specific lives of people anthropologists work with.

According to ethno-ecologist Darcy Mathews and ethnobiologist Nancy Turner, “[m]arine biodiversity is particularly vulnerable” to climate change, (2017, 169). Being a coastal Nation, Gitxaala is situated in a zone of expedited transformations from climate change, such as rising sea levels, warming waters and air temperatures, as well as shifting seasons (Wong et al. 2014). Their vulnerable circumstance is further accentuated by their largely marginalized political and socio-economic positions as Indigenous people in a settler-colonial state. Potawatomi philosopher of science Kyle Powys-Whyte writes that Indigenous people often understand their vulnerability to climate change effects as an extended result of environmental changes brought on by settler

colonialism (Whyte 2017). The localized impacts of climate change are tied in with the effects of other large-scale influences, such as settler colonialism, capitalist expansion, and industrial resource extraction, to name a few (Turner and Turner 2008). Due to the large proportion of citizens eating locally harvested foods, Gitxaala's reliance on well-functioning ecosystems cannot be understated. Understanding the localized effects of climate change, and their inter-relations with other impacts, helps create a clearer image of what the proximate future may bring, and how locals can effectively prepare for these changes. Such an approach is central to Indigenous climate change studies, which acknowledges the specific susceptibility of Indigenous peoples to the effects of climate change, and supports Indigenous knowledges and approaches to confronting these effects (Whyte 2017). Throughout this thesis, I analyze the effects of climate change on Gitxaala in conjunction with settler colonialism.

### **Theories of Change: Resurgence vs. Revitalization**

“Resurgence” is not a new concept, but it is being discussed in various ways today. Key resurgence scholars, Glen Coulthard, Leanne Simpson and Jeff Corntassel, write on the socio-political aims of Indigenous resurgent movements, emphasizing the need for individuals to learn their traditional ways independently from settler-colonial influence (Coulthard 2014; Simpson 2011; Corntassel 2012). While resurgence has also been identified as “pessimistic”, essentializing and divisive (Lightfoot 2020; Nixon 2018), I chose to frame this thesis within the resurgence discourse because it calls for transformation powered by community-focussed movements that hold the settler-colonial state accountable to the changes they have pledged to be making (see Truth and Reconciliation Commission of Canada 2015; Ministry of Aboriginal Relations and Reconciliation 2020).



According to anthropologists Michael Asch, James Tully, and Anishinaabe legal scholar John Borrows, resurgence<sup>5</sup> is conceptualized as “(...) a force for reclaiming and reconnecting with traditional territories by means of Indigenous ways of knowing and being” within communities (Asch, Borrows, and Tully 2018, 4). By using the term “resurgence”, I emphasize the local expressions and movements aimed at community involvement and knowledge transformation.

Anthropologist Anna Tsing has also written about resurgence, with a focus on more-than-human resurgence. She writes that, “[r]esurgence is the work of many organisms, negotiating across differences, to forge assemblages of multispecies livability in the midst of disturbance” (2017). As such, Tsing’s understanding of resurgence reminds us of humans’ place within an ecosystem, a core concept of the cumulative effects framework applied throughout this thesis. In this thesis, I would like to invoke both the socio-political discourse of resurgence outlined in Asch, Tully and Borrows, as well as Tsing’s more ecological approach, which is based on intra- and inter-entity responsiveness and reliance.

Because of the topics I focus on, this thesis has a potential to be centered on damage and loss. The demographics of research participants further highlighted loss or negative changes over gains and positive developments, because older generations remember more economically and ecologically stable times and compared these to their experiences today. While I do focus on these changes in order to grasp the expanse of impacts to Gitxaala, the information shared with me by interview participants has also enabled this thesis to concentrate on suggested steps to minimize these impacts, or to adapt to specific changes. As such, I follow Unangax scholar Eve Tuck in re-centering the Nation’s “desires,” as opposed to the perceived “damage” within the community

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<sup>5</sup> The concept of resurgence better connotes Indigenous understandings of transformation through time and relationships than other terms such as, for example, “revitalization” (Asch, Borrows, and Tully 2018, 7). To me, “revitalization” has an undercurrent of resurrection, of something that was once dead being reborn. I chose not to use the term because it seems clear to me that Indigeneity has never been dead.

(2009b). Desire-centered research is a way for me, as a non-Indigenous researcher, to promote resurgent concepts and ideas, because desire focusses on local realities, plans and actions.

This thesis argues that a community-based cumulative effects approach to impact assessments is integral to the furthering of communities' capacities to identify and respond to multiple effects. Cumulative effects offers a practical method to capture and depict these nuances. Because these nuances were identified by Gitxaala people, research participants have also created opportunities to implement accessible mitigation strategies that address the relationships between capitalist expansion, knowledge loss, and environmental change. Implementing such strategies within families and as a Nation is an example of acts of Indigenous resurgence.

### **3. Entangled Perceptions of Change**

The topic of “perception” is often associated with British anthropologist Tim Ingold, who argues that people perceive their surroundings differently, and the reason for these differences is primarily people’s variable skill sets (Ingold 2000). Certain skills are prized over others depending on a person’s age, gender, body, and the socio-political context of their upbringing, and these factors influence the way each person is primed to perceive the world around them. In Gitxaala, acquiring skills related to ecological monitoring can be highly beneficial, given the geographic exposure of the territory and the inhabitants’ dependence on harvestable resources. Beyond skills, (Indigenous) epistemologies, too, shape each individual’s perceptions, incorporating life experiences into broader frameworks of understanding (Kovach 2000). For these reasons, Gitxaala citizens who spoke with me were well attuned to minute disturbances or changes in their surroundings.

While living in the same general environment, however, interviewees described a wide variety of changes they had perceived to the territory - not everyone made the same points. Ronnie Shaw, for example, has spent many years of his life hunting and learning about medicinal plants. In his interview, he taught Ursula Nelson and me about the effects of social and environmental change on plants, such as berry bushes and seaweed. Others, who spent more harvesting time on the water than on land, detailed changes in fish and spawning grounds. Yet, when examined overall, many themes of impacts and their cumulative effects were raised unanimously. This shows how adept the Gitxaala citizens I interviewed are at perceiving changes in their surroundings and recognizing the consequences to local ecosystems.

Fikret Berkes shows that Indigenous knowledges of ecosystems develop and evolve over time, becoming increasingly incorporated in socio-cultural understandings of daily life (Berkes

2012). Recognizing the transformation of Indigenous knowledges is integral to the Nation's capacity, as well as to that of their government, to implement successful management and mitigation strategies today that uphold traditional laws and account for the intricacy of ecosystems.

While this thesis is based in a discussion and analysis of Gitxaala citizens' perceptions of change, it is relevant beyond the community because it gives an example of localized experiences of ecological change, and speaks to the discourse on Indigenous knowledge, cumulative effects, and natural resource management. A cumulative effects framework is ideal for showing how interrelated one entity or type of influence may be to others. However, this approach can quickly become overwhelming, as more and more intricacies are drawn into the picture. As I learned, one cannot simply remove the observations from their causalities, because each example is inextricably linked to its contexts. Depending on the background of the interviewee, such perceived causal relationships may be based more heavily on experience, oral tradition, or scientific research, for instance, and must therefore also be taken as a personal perception. There are many examples and components of cumulative effects impacting Gitxaala today, not all of which I will be able to detail here. In an effort to do justice to the level of entanglements, while also providing a legible discussion of effects, responses, and their consequences, I focus on two main case studies: impacts to seaweed (*la'ask*) and salmon (*hoon*). Overviews of the key effects influencing seaweed and salmon, respectively, are presented in pathways of effects in the *Appendices*.

### **Seaweed and the Barnacles**

Typically, seaweed season in Gitxaala is during the end of May and beginning of June, but a good season depends largely on the weather, on the rain, snowfall, the winds, and duration of sunshine. Yet weather can be fickle, especially when it is being increasingly influenced by the accelerated global process of climatic change. Furthermore, weather patterns impact both the quantity and quality of the seaweed, as well as the harvesters' capacity to pick it (Gendron 2016;

Turner and Clifton 2006). Here, I discuss some of the main impacts to *la'ask*, red laver seaweed, focussing on the environmental and socio-demographic factors influencing the entity over time. An overview of these cumulative effects is presented in the pathways of effects in Appendix A.

### **Working Out the Weather: Impacts to La'ask**

Weather and general climate have a high influence on seaweed, which is an ecologically sensitive entity. Below, Gitxaala citizen Robert Beynon highlights the algae's sensitivity to meteorological fluctuations:

Katrin: Do you know why this year is good for seaweed?

Robert Beynon: The weather.

Katrin: What about the weather?

Robert Beynon: You get too much rain; too much rain, hail, snow and it will just kill them off quick. We've been getting a very mild spring already. Very little rain. Fog is another factor with it too. You get too much of that and it doesn't take long for the seaweed to rot. It's fresh water and will wash the salt off.

A hailstorm at low tide could impact the *la'ask* both because it destroys the strands, and because it is a form of freshwater precipitation, which washes the salt off of the strands, causing it to lose the preserving salt coating. This leads to an earlier rot. As a result, the seaweed season is shorter in the years with wetter springs.

According to Gitxaala citizen Matthew Hill, the harvesting period for *la'ask* has changed, limiting the number of times people are able to go out to harvest. Previously, people went out in April to harvest seal seaweed, a short strand type of seaweed, and picked the "real seaweed" in the months of May and the first half of June (Ignas and Campbell 2009). Today, people are harvesting only twice or perhaps three times a season, and they are going further afield, or having to spend more time looking for a plentiful area. The change in harvesting season is a creeping shift, and while it is expressed by fluctuations in annual weather occurrences, the shifting season appears to

be a further sign of longer-term impacts from climate change.

When seasons become more unpredictable, harvesters have a harder time planning their trips. If people miss the opportune picking window, they can at times acquire seaweed through trade from others, if their economic and/or social situation allows them to. If not, they are faced with not having seaweed at all. As Gitxaala citizen Carol Vickers explains,

“[There are] less and less of a lot of things. Seaweed. Because of the times that they are available, people are not ready. They are having to go out quite a bit earlier to find the seaweed. So it’s just a matter of people adjusting to the time schedules now, because they’re coming a lot earlier than they used to. And I think they’re spoiling a lot faster than they used to. There’s only a certain amount of time that you can harvest the seaweed.”

The shifts in harvesting times affect who is able to participate in the act of picking. As such, environmental processes directly affect the social and economic realities of Gitxaala people. With a shorter harvesting window, people have to closely monitor the year’s weather patterns in order to accurately predict the best *la’ask* harvesting time. The majority of harvesters spoke about seasons coming earlier or later than they expected, which occasionally meant that they missed the ideal harvesting window. In an effort to monitor the harvesting window, some people have started keeping a logbook of when they went out for each resource the year before, however, this is not a widespread practice in Gitxaala. An alternative tactic was explained by Gitxaala harvester Greg McKay who revealed that social media has helped harvesters compare the timing of their harvests from one year to the next by using functions such as ‘On This Day...’ which pulls up posts from previous years published on the same date. This allows harvesters to compare the timing and abundance of their harvest over time.

The accumulation of shorter and milder winters, along with a higher fluctuation in precipitation levels, are said to heavily influence the seaweed due to the consequentially warmer water temperatures. *La’ask* rots sooner in warmer water, turning from an elastic dark green-black

to a slimy blonde-brown. The change in water temperatures is attributed to lack of snow, and more broadly, climate change. Less snow accumulation in the alpine regions surrounding Gitxaala reduces the volume of snowmelt entering the ocean come spring. Cold meltwater is welcomed in the ocean as a temperature regulator, and the thought of not being able to rely on this mechanism in the future is a serious concern for Gitxaala citizens.

But it is not only snow and a deep winter in the distant mountains that is important for seaweed. Warmer water and milder winters are further connected to the success of red laver, because the algae competes against the acorn barnacles within their intertidal ecosystem. As such, barnacles pose a threat to the seaweed growth. As Matthew Hill explained to me, while barnacles come and go, when they are there, the seaweed does not grow. Barnacle growth is encouraged by mild winters because they are able to expand their habitat as the water warms in the intertidal zone. Gitxaala harvester Elliot Moody remembers,

“Before, we never had that many barnacles on the top layer of the rocks, on top of the water. Before, you used to have to wait until the low tides to see the barnacles. And now you see them higher and higher.”

Mild winters could be detrimental to the volume of seaweed being harvested by Gitxaala in the future, due to the cumulative effects of warmer water, early rotting, shorter seasons, and the encroachment of barnacles. Today, harvesters go out before the typical date of harvest to scout the rocks for barnacle-free zones so that the picker can get to those rocks first, where there is seaweed.

Harvesters pointed out that the potential for seaweed to outgrow the barnacles may not only depend on the water temperature, but also seems to rely on the average ambient air temperature:

“Last year wasn’t good for seaweed. Last year wasn’t too much of a cold winter we had, so it doesn’t kill off most of the barnacles that were on the rock, because once there’s too much barnacles on the rock it kills the seaweed. And it doesn’t – , it just chokes them out and doesn’t give them time to grow in.” (Daniel Davis)

Ronnie Shaw gave a specific example of how the cold weather influences the barnacles when he described the effects of the wind:

Katrin: How has the seaweed changed?

Ronnie Shaw: “It’s the barnacles. The wind has to blow northwest. For about 2 to 3 months, northwest. That’s how long it used to blow, before, like when we were small kids. And then the barnacles would freeze off and then brand new ones would grow. When the brand new ones grow, the seaweed is really long and black! But it’s a change in weather, that’s why there’s not much seaweed now. You know, they call it *gyisiyaask*, when the wind blows offshore, *gyisiyaask*. And we always have to have respect for the winds, all the winds. Because if you don’t, one day you’re going to go out and you won’t make it back home. You know, you have to have respect. I always try to teach that when I take anybody out on the boat with me.”

In this quote, Ronnie also elaborates on the relationship between human behaviour and the weather and reminds us that we need to be respectful of the winds. This speaks not only to the relationships among material and immaterial beings, but also to the larger topic of harvesting practices.

### **Ripping, Not Stripping: Seaweed Harvest and Management**

During my time in Gitxaala Territory, people talked to me about the correct way to harvest seaweed and suggested that one of the reasons the seaweed is not doing as well as it has in the past is because people are not picking properly. The correct way of picking includes the timing of the harvest, the technique of ripping the strands off the rock, and what kind you pick (seal or “real”, rotten or “black gold”). Several reasons for less predictable harvesting patterns were discussed previously, including the erratic weather and shift of the season. However, Elders and younger harvesters alike also noticed a difference in the picking technique between younger people and themselves.

“One of the things the old people stress is that there’s a way you pick seaweed so you don’t yank the seeds out. You just rip them off, instead of stripping them off, you rip them off.



After you've picked, say, a foot long, and you have about an inch left on the rock. And it grows. Two weeks it'll be long enough to harvest again." (Matthew Hill)

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"Seaweed is the same. You can hear it when it's good seaweed, [by the sound of the tear when you break off the seaweed]. Now it's not so much like that anymore. They're weird. Because I've heard it from a couple people that it's more of a crunch sound when you pull it off. One thing that you really have to do is to pull the seaweed off as close to the rock as you can. So that it grows back, otherwise it doesn't grow back. (...) It seems to me the younger generation isn't picking it off quite as close as it should be." (Evan Aster)

When "stripped" instead of "ripped" off the rock, the seaweed has trouble growing back, because it is as though it is trying to grow from a blank slate instead of a nurtured garden. Fully removing the seaweed from the rock may also leave space for barnacles to move in, further restricting the space available to algae. The acceptable technique is a "partial harvest" of each strand, and is identified as an "ecological management strategy" (Mathews and Turner 2017, 175). Emphasizing the importance of this technique could aid in further nurturing Gitxaala's seaweed population (see point A. in seaweed PoE).

Gitxaala citizen and Fisheries Technician Colin Nelson explained that the shorter harvesting season also restricts how much time pickers are willing to dedicate to cultivating the seaweed beds. Colin Nelson and Daniel Davis both told of a time when the seaweed harvesting team was larger; those who were not picking were responsible for scraping barnacles off of the rocks so that seaweed would grow in the following year. Overall, this practice is not as common today because not as many people have access to boats, limiting community members' involvement in harvesting. Instead, once the seaweed is long enough, people are focussed on harvesting.

The examples detailed in this section make clear that a good seaweed year is dependent on many relating factors. But what is good for the seaweed is not necessarily good for other entities, as former Fisheries Technician Greg McKay pointed out,

“Less rain’s good for seaweed. Obviously all the plants need more sun. The ocean bearing plants need more sun. And the land ones need more rain. So there’s a give or take, right, [as] I see it.”

In fact, people were worried about the low rainfall in the 2018-2019 season. As Mathews and Turner point out, marine ecosystems cannot be wholly separated from terrestrial systems due to the many linked resources and management practices (2017). However, one type of impact may affect systems differently. The absence of precipitation was of great concern to Gitxaala harvesters in connection to both the growth of local berries, for example, and the state of the salmon streams. They needed the rain.

### **Scouting for Salmon**

Katrin: Where are all the fish going?

Bill Stewart: That’s a good question – where? They’re not coming back. I believe it’s because of the weather. No rain. The creeks have to be running for them to go up, right. And a lot of the creeks are dried up because [there’s] no rain. I believe it’s going to be really, really bad this year because there’s been hardly any rain. Even for now sockeye should be running pretty soon but there’s been no rain. (...) And that’s scary because they don’t know if the fish will come around, or where they’ll be.

The 2019 salmon return was extremely low, according to the Department of Fisheries and Oceans (DFO) (Fisheries and Oceans Canada 2019). In fact, salmon numbers have been going down throughout the province of British Columbia over the past few decades. As one of their ecologically, economically, and culturally central entities, plummeting salmon runs are a key issue for First Nations, including Gitxaala (Mathews and Turner 2017).

Salmon is both eaten and spoken about regularly, so much so that every interviewee mentioned the fish. Not having salmon is a worrying prospect, and not knowing the best way to help the salmon is also troubling. There are many processes at play in this pathway of effects that

accumulate over time (see Appendix B). In this section, I focus on central environmental, socio-economic and political factors, as were mentioned in interviews with members of Gitxaala Nation.

### **One Fish, Two Fish, Warm Fish, No Fish**

Two of the main topics of discussion in relation to local salmon were the warming ocean and streams. According to MaPP, the “mean annual sea surface temperature has increased” as well as the temperatures in estuary and fjord-like systems, such as those found along the Northwest Coast, as a development of climate change (2016, 11). Warmer water temperatures severely affect the salmon, harvesters explained to me, stating that the sockeye mortality rate rises drastically as temperatures climb. According to Gitxaala Fisheries Technician Colin Nelson, the average temperature for the local creeks is usually around 8-9°C, but lately they have been measured at 12°C. While this rise in temperature is not yet deadly to salmon, the warming tendency is troubling (Quinn 2018). The oxygen content of these waters decreases as temperature increases, further affecting salmon populations, who require oxygen to survive. Salmon move deeper down in the water pillar when temperatures get too high for them to tolerate. This influences the catch, as is outlined by Carol Vickers:

“Temperature of the water has a big effect on the salmon. A few years back the water was too warm on top. When the water’s too warm on top the salmon go way down and you can’t get any, ‘cause they’re further down in the water than we can get.”

Clarke Murray et al. show that Gitxaala Territory is charted to be one of the most heavily impacted regions regarding the cumulative effects of natural resource projects and climate change along the Northwest Coast (2015, 113). With the effects of global warming already being felt, accurately assessing the contexts of cumulating processes, events, and projects on the region as a whole, as well as on specific entities and values, is paramount.

## **Frigid Laws and Technologies**

Rising water temperatures are only one perceived reason for Gitxaala's reduced access to salmon. Many interviewees explained that the regulation of the fishing industry through the DFO and the federal government has also had a big influence on their catch due to the management of fishing licenses and access to streams and waters. Legal scholar Douglas Harris outlines the history of this influence in his book, *Fish, Laws, and Colonialism*, in which he shows how the struggle between Indigenous and non-Indigenous fishers has always also been one fought through laws and regulations (2001). Fewer Indigenous people can commercially fish salmon today, due to the separation of First Nations food from commercial fishing, the high cost of licenses, and the systematic discrimination at the root of fisheries management (Menziez and Butler 2008). These large-scale regulations and the systemic violence affected Gitxaala's economy and daily life in many ways. While I do not go into detail on these aspects of influence, I have included them in the pathways of effects to salmon in Appendix B and will briefly discuss select examples here.

As hereditary leader Clarence Innis pointed out, far fewer Gitxaala citizens work in the canneries or as commercial fishers today. Anthropologist Robin Anderson describes how reduced employment in canneries is one consequence of a chain of linked developments (2017). In 1968, the DFO implemented the Davis Plan, leading to a reduction in the number of salmon licenses issued, causing the price of licenses to rise (Anderson 2017). As a result, small-scale fishers came under more economic pressure. Unable to afford the gear to fish on their own,

"(...) many fishermen bought everything with credit from the fish processors and canneries (...). [T]his was especially true for First Nations fishermen who could obtain no loans against reserve land. Those who missed payments due to a bad season often had to give up their boats, their licenses, and their livelihoods" (Anderson 2017, 74).

It is not only acts of legislation that influence Indigenous fishers' capacity to harvest, technological advances also affect people's prospects. Several interviewees brought contemporary

refrigeration and freezing methods to my attention, stating that improved functionality of these appliances increased people's food storage ability. Improved conservation methods led both households and industry to alter their harvesting practices. Industry shifted to fresh and frozen fish due to improved technology and faster transport routes. For both households and industry, better storage means that harvesting an excess is not necessarily as wasteful as it might have been prior to such food conservation technology, because the foods can be processed later without fear of spoiling. However, such conservation methods further decreased people's dependency on canneries, causing the canneries to downsize or close, resulting in massive unemployment among their primary employee demographic: Indigenous people (Anderson 2017). Laws and technology, therefore, can be directly correlated to harvesters' economic situation, which in turn influences their social relationships.

### **The Prospects of Canned Fish: Harvesting, Time and Money**

Today, the time people are able to spend on harvesting activities is dependant largely on their economic situation and available time:

Katrin: How can you tell if something is just having a bad point in its cycle, or if it's having a different change?

Greg McKay: For salmon the indicator is that they are not there when they should be there. It's the season. Each season has its different harvest. Right now we're getting into salmon. And the early fishermen are going out and prospecting, seeing what they can get. And all that is getting more expensive due to fuel cost, and of course it takes time.

With limited time or trips available, people's harvest methods may easily turn their focus to quantity of catch over other factors, such as the size of individual fish, or their accordance with respectful harvesting practices. This means that the economic cost of today's salmon fishery could have indirect impacts on the species and ecosystem health.

Elliot Moody: Supposed to be jarring and all that [now]. People are only coming out with 50 [salmon] or so.

Clyde Moody: Not even 50! 6!

Elliot Moody: Oh, is that right? I think that's their own fault though, because like my dad was telling Colin earlier, was that they really do have to stop the guys from blocking the creeks off. Last year we went out there, I can't remember what creek it was, but somebody had a damn net strung across the creek and it was all ugly and gross. It was there for at least a couple weeks. People are getting carried away, stringing up nets and leaving them in there.

The conversation between Clyde and Elliot Moody demonstrates the impact to salmon populations, harvesting seasons, and food security, as well as human influence on catch. One effect (fewer salmon caught) can have multiple causes and consequences, radiating beyond the initial entity or process into a wider system of significance.

### **Impacts to Salmon, Impacts to System**

Fewer salmon naturally affects more than just the humans in this system. Bears, wolves, and other predators feed on these fish, but their role in supporting the system does not end with the giving of their lives. Clarence Innis explained to me that salmon bodies act as fertilizer, providing nutrients for the stream and trees around it. Turner and Mathews write of common ecosystem management practices on the Northwest Coast, here with a specific example pertaining to the cyclical use of salmon:

“The remains of salmon and other fish from processing are either dug into the ground and help to fertilize berry bushes and increase berry production, or are replaced into the water, to feed crabs, young fish, and seabirds, in turn enhancing their growth and numbers” (2017, 183).

As such an integral animal, salmon has been very carefully managed by First Nations in the past, sustaining stocks and curating the habitats, facts presented in Charles Menzies' chapter on *hoon* in *People of the Saltwater* (2016). Since the disruption of many of these practices through settler-colonialism, and the exponential increase in commercial fishing activities, it is not surprising

that we currently find salmon numbers decreasing year by year. Mathews and Turner speak again to the wider impacts of an unstable salmon system:

“Without the pools and careful tending of the salmon, the salmon will not thrive. All of the other species that depend on salmon – wolves, bears, eagles – are also affected. In this sense, the absence of Indigenous management becomes a form of ecological perturbation” (Mathews and Turner 2017, 195).

With a being like salmon, it is especially apparent how interwoven the various impacts, responses, and cumulative effects are. Social and environmental, temporal and spatial, economic and political – no single consequence stands apart from others. Matthew Hill gives an example of this intricacy, and how it directly affects the salmon catch for Gitxaala today:

“Could get 10000 salmon in a day. And we used to fish 5 days a week. Can’t do that now. We’re lucky if they open the Skeena for 10-12 hours for one week. Only if there’s enough escapement. Because the sport fishermen have huge numbers. And the salmon is encountering –, the interception of salmon starts right at the mouth of the estuary, with the seals, and the sea lions. So when they and the fries and the fingerlings come out they’re being consumed. Then they go out into the ocean and find different predators there. Whales, different species of whales. And then the harvesting of the high seas fishery by the Russian, Spaniards, and other nations out there. They have factory ships out there. Whatever they catch they process on board. So they’re taking up far more than can be replenished. So every one of us is contributing to the demise of the salmon. And by the time they get back to the rivers, they’re competing against all the sport fishermen. All the way to the spawning ground. You know? It’s just the ocean temperature has changed. *Dramatically*. We are aware of global warming and that all contributes, too.”

Given the multitude of obstacles, it is remarkable that Gitxaala has managed and maintained a sustainable salmon fishery for over 5 millennia. Today, Gitxaala people are faced with new challenges to maintaining harvested populations, but their dedication to ecosystem monitoring, knowledge exchange, and respectful harvesting provides them with key tools with which to confront these developments.

#### **4. Resurgent Gitxaala: Collective Community Action**

“You never know. Anything is possible these days. They piss off the Indians, you know. You got to be careful. This is our nation. The government can’t move in on our nation. Because we still don’t want them here. As much as they are trying, they are still trying. We’ve been here for thousands of years. There are still thousands and thousands of years to come, we just have to keep them off.” – Gitxaala citizen Bill Stewart

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"In order to dance a new world into existence, we need the support of our communities in a collective action." (Simpson 2011, 69)

Gitxaala has experienced many changes over the past ten thousand years, but this process of transformation was expedited in the past two and a half centuries by the arrival of settler colonialists. While these changes severely affected Gitxaala, the Nation has also grown with these transformations, and remains a strong, engaged, community.

To me, taking a desire-centered approach rather than a damage-centered approach to this project means situating people’s perceptions of change within the discourse of transformation and Indigenous resurgence. During my short stay in the community there was not a day that passed without an event, community gathering, or training session. The central question for this project easily made space for a conversation surrounding loss through change. Those who participated in interviews made the impacts and their entangled consequences a high priority of discussion. Their knowledge and experiences sketched a web of cumulative effects more intricate than I had imagined. It was more difficult to approach change from the angle of potential, of transformation, of adaptation and mitigation. However, within every conversation about impacts to resources and harvesting, community members spoke of ways to positively influence the changes they had noticed. This section concentrates on re-centering Gitxaala people’s desires by describing the management methods interviewees put forward when talking about change.



The primary concern voiced in interviews and daily conversation was how to encourage young people to further their knowledge of harvesting, food processing, and Sm'algyax, the local Tsimshian language. These knowledges are inextricably linked and can only be fully understood through practical experience. Indigenous scholar John Borrows writes,

“It is not enough to be Indigenous and inherit an ethic of care. These teachings must be acted on by each generation. They must be continuously reproduced for Indigenous peoples to live harmoniously with the earth. Fortunately, Indigenous peoples possess norms and practices that flow from experience that can be activated to accomplish this goal.” (Borrows 2018, 50).

By promoting traditional knowledge-based activities, Gitxaala helps to promote citizens' awareness of the ecosystems they are in, and the tried-and-true practices of environmental maintenance. The challenges Gitxaala citizens face in realizing knowledge transfer to the extent desired, such as limited harvesting capacity, have been briefly discussed in the previous sections. Here, I present ideas and solutions brought forward by interviewees as mitigation strategies for bottlenecks to sharing knowledge and practical experiences.

### **Real-Life Sciences: Youth Engagement**

According to traditional practice, teaching roles are taken on by grandparents, aunts and uncles, parents and other community members. While family-based learning remains crucial to the upbringing of Gitxaala youth Lach Klan School is now also positioned as one of the central educators in the village. Schools' prominent role in contemporary time is due to colonial interference, in which Indigenous ways of knowing and teaching are often delegitimized. During the residential school period, children were taken from their families and communities, severing their ties to traditional teachers and severely restricting their capacity to engage with the knowledge they would have otherwise learned while growing up. With the passage of time, former residential and Indian Day school attendees are growing into the traditional roles of community teachers and

leaders themselves, adding another layer of complexity to “cultural education” for the Nation. With the institution of school situated accordingly, conversations about teaching and learning today often circled around Lach Klan School’s community involvement. There is a strong desire for the school to adapt its curriculum to the needs and interests of the community. Colin Nelson, Daniel Davis, Greg McKay, and Clyde and Elliot Moody all spoke of expanding the current school curriculum to include sessions directly related to ecosystem health, species lifecycles, and respectful harvesting practices (point *B.* in both PoEs). Colin Nelson suggested having special presenters from the GEM and Fisheries office talk to classes on these subjects, giving a combination of traditional knowledge and “Western” scientific approaches.

Field excursions incorporated into the life sciences program, or the establishment and maintenance of a school salmon hatchery program, are ways to engage youth in learning through practical experience. A similar project was conducted for one year in the past, and is still of great interest to interviewees. Daniel Davis, a teaching assistant at Lach Klan School, suggested the school take on this project again, in which a boat is hired to take classes out for the day to harvest whatever is in season. The students are allowed to take anything they harvest back with them, where they learn how to dissect it, or process it for consumption later (points *B.*, *C.* and *D.* in PoEs).

In fact, reconnecting the younger generations with their traditional foods and harvesting practices is already being approached from many different angles. Daniel Davis gave the example of creek-walking:

Daniel Davis: Yes. There was big interest. Because, this year alone they did a creek-walk with Colin Nelson. And I had all of the grade eights go and some of the grade 10, 11, 12s go. And hearing from the stories when they got back they just loved it and they wanted to go again. So he arranged another couple of more trips to walk the creek. But they would only walk the creeks where there was no bears around. So, just due to their safety. But they loved it. They got to see where exactly each sockeye, pinks, whatever’s happening that season, would return, from when they were little fry. And they just loved it. So we were trying to plan more trips like that for them, but... we had a boat, but his motor started acting

up, so we couldn't –. And everything just died off there. Just got pushed aside and forgotten about.

Katrin: Yeah. That would be really disappointing. To have just started something like that, and then –

Daniel: Oh yeah! But I'm trying to talk to the principal to do something like that again for next year's school year. So, hopefully she'll go for it. It'd be nice because I've talked to students about being out on the boat. Or they'd come and ask me questions about when it's a good time to harvest certain things.

Teaching goes beyond what one learns in the classroom, and while incorporating such lessons into the children's school experiences can be a vital step to furthering their understanding of ecosystems and harvesting, some lessons are best learned outside of the school context. Every single interview participant emphasized the importance of allowing young folks to learn through their own first-hand experiences on the land or in the boat. One way this can be encouraged is by taking children out of school for one to two weeks of family or community-led excursions (point *B*. in PoEs). Like many others, Cecil Hill did just this while his children were growing up. The family went to different parts of Gitxaala territory where Cecil taught the children stories and practices. The children kept a journal of their experiences and teachings from these days, which they turned in to their schoolteachers upon their return. Carol Vickers was also involved in educational excursions beyond school; she helped organize and participated in a community led camp teaching youth how to harvest and process traditional foods. As Annabelle Wood points out, such teachings need not involve an entire week's absence from school, but can be easily incorporated into daily village life through, for example, "(...) a workshop in the village here and try and get the young people to learn how to handle our food and share how our forefathers did things: put away their food for the winter and for the summer."

Such initiatives do take place every now and then, but not regularly. Some of the hurdles people mentioned, when I asked why these camps or workshops were not happening now, were

both the lack of funding, for example to hire a boat, and the absence of volunteers. These are two critical points that determine the stalling or the success of such projects in a community. Still, the community generally has a high interest in harvesting and supporting youth education. The strategies outlined above offer entry points for managing what interviewees identified as challenges to knowledge transfer between generations. Implementing these management strategies will, in turn, spread Gitxaala citizens' understandings of ecosystems and respectful harvesting, two of the main concepts that were spoken about in connection to the community's capacity to adapt to the localized cumulative effects of climate change.

### **Reaching Respectful Harvesters**

In addition to those surrounding youth engagement, initiatives were proposed specifically targeting current harvesters. Many of these focussed on further emphasizing respectful harvesting practices, while others aim to engage harvesters' knowledge, experience, and frequency out in the territory to collect more information on species and habitats. Over their multi-millennia long interrelationship with the land and waters, Gitxaala citizens have developed customary laws and practices to guide sustainable harvesting and maintain the ecosystems of their territory (Menzies 2012). It is because of this knowledge and its implementation that Gitxaala can continue their interdependence on a managed territory today. The transmission and transformation of their Indigenous knowledge throughout time established a local framework for respectful harvesting (Berkes 2012). However, as articulated in the case studies of seaweed and salmon, citizens' capacity to engage in harvesting, knowledge acquisition, and teaching is currently hampered in a variety of ways. Interview respondents presented strategies for overcoming these obstacles by working specifically with harvesters.

While education of younger generations plays an important role in re-engaging community

members, Greg McKay and Margaret Hill were careful to point out that teaching about harvesting is also a socio-economic issue; a lot of people cannot make it out because they simply cannot afford to do so. In fact, many Gitxaala citizens rely on the trading or sharing economy to access harvested foods (Anderson 2017; Gendron 2016). The examples of seaweed and salmon discussed earlier outline why it is more challenging in the current context to give harvested food away in exchange for anything other than money. However, not everyone has the financial capacity to participate in a cash market, which results in a further restriction of people who can access traditional foods, limiting citizens' practical knowledge of respectful harvesting. As Elliot Moody pointed out, many harvesters do harvest for others in their community, but this could be further encouraged:

Elliot Moody: I think what they should do is they should have a program where they're teaching some of these guys how to actually harvest properly. How much to take. Not to overharvest. I don't know if it would work, but at least you'd be showing you'd be making an effort.

Clyde Moody: Too stubborn now.

Elliot Moody: Yeah. Some of them are set in their ways. (...) They're sitting there saying they're feeding the village, but you see a lot of people saying they never got any, so. They're helping people out, but there's a lot of people still wondering where theirs is. Just show them how to support everyone properly. And how to handle it properly.

Again, providing learning opportunities is given as a foundational process to mitigating disrespectful harvesting practices. One project that is currently being implemented by Gitxaala Fisheries with exactly this aim in mind was mentioned by Keith Lewis: a handbook outlining the Gitxaala resource management laws for each species. This project is one way to mitigate shifts in knowledge and changing opportunities to be on the water and land. Having this type of condensed information at hand could help minimize the species being picked too early or too late in their life cycles, or, being harvested in a way that hinders their regeneration (points *B.* and *E.* in PoEs).

Maintaining species populations also requires the upkeep of their habitats. The case studies

of impacts to seaweed and salmon show how entangled the wellbeing of these ecosystems is, and the increased pressure put on these systems by rapid change. As Fisheries Technicians, Colin Nelson and Greg McKay were trained in scuba diving for habitat monitoring. While I was working at GEM, Colin made several trips, as part of his position as Fisheries Technician, to scout the salmon streams and do a general survey of the territory, reporting his observations to Gitxaala Fisheries upon his return. Other harvesters also monitor and report back to community, but Greg McKay suggested expanding the official training in Gitxaala to include more people, with a focus on specific habitats and species. In fact, the Gitxaala Fisheries office is currently attempting to widen the monitor-network. Increasing the number of people involved in monitoring widens the network of individuals invested in this form of ecological management, making it a social management system, too (points *F.* and *G.* in PoEs).

Supporting harvesters in their knowledge development and engagement is beneficial to the broader Gitxaala community. It is these community members to whom the youth look when seeking practical harvesting experience; and it is these community members from whom people get their traditional foods. Harvesters are keenly aware of the ecosystem fluctuations of the region and are thus experts in habitat monitoring and species evaluation. By implementing the mitigation strategies put forward in this section, the community is proactive in understanding local forms of transformation and their consequences.

### **Learning the Languages of Managing Gitxaala**

“While Indigenous knowledges obviously have useful information about the nature of ecological changes, it is perhaps more interesting to explore how renewing Indigenous knowledges serves the motivation of people and communities to address climate change.” (Whyte 2017, 158)

A crucial aspect of preparing for imminent or future changes is understanding the

fundamental processes and causes of impacts to people, community, and systems. As Whyte points out, re-centering Indigenous knowledges can simultaneously bring ecosystem knowledge to the forefront of discussions, inspiring their application in developing and implementing community-led projects designed to minimize future impacts (2017, 158).

In Gitxaala, one such project is already underway, with a concentration on improving people's opportunities to engage with Sm'algyax. Clarence Innis and Ronnie Shaw say teaching the language gives people deeper understanding and respect, and helps people reconnect with traditional foods and values, because the language carries the traditional teachings of the *ayaawx* and *adaawx*. Many Gitxaala people refer to particular foods only by their Sm'algyax name, simultaneously resonating the laws connected to this entity. During my stay in Prince Rupert and Gitxaala, the weekly language workshop coordinated by Vonnie Hutchinson had very active participants of various age groups and was spoken of enthusiastically by attendees. In this setting, speakers and learners exchange and collaborate on knowledge not only pertaining to pronunciation and grammar, but also to the meanings and contexts of words or sayings. As such, these workshops play an integral role in encouraging people to immerse themselves in traditional teachings. Language is also promoted among young children and their parents, for example at the new Head Start day care centre in the village, where children are exposed to Sm'algyax through play.

Learning and teaching Sm'algyax is a fundamental strategy to increase citizens' exposure to traditional laws, and ways of knowing and being (point *B.* in PoEs). But the language itself is only one way community members are learning how best to manage themselves in relation to the territory and all that comes with it. Research participants also called for practices that were common in the past to be implemented again. An idea put forward by many interviewees is maintaining the salmon streams and stocks (points *C.*, *H.* and *I.* in salmon PoE).

Katrin: So how could the community try to prepare not by stockpiling, but in a different way?

Greg McKay: I think that if they were really serious about it and they want to help make a difference they can create a program like a community harvest group where they can focus on one system and try to ensure that fish make it up there. That they create some alternate passage for them. Or they go through them, into the spawning beds by hand. Or assisting the salmon. Because I remember, my dad told me about one of my great-great-grandfathers, they used to brood stock fish. They'd grab them and then milk them and then they'd get them all stirred up and then they'd help the fish grow. And then they'd implant them into a creek.

Katrin: Really?! Do you know how they did that?

Greg: In buckets.

Gitxaala citizens may know about previous maintenance practices, but because they were not all taught to do them themselves, they feel less inclined to rebuild the practice now:

Matthew Hill: There's an organization that's trying to help revive the fishing industry. But it's a bit concerning. We are blessed with a lot of salmon streams. They haven't done enough homework to record the number of salmon streams that we have. A lot of them are impacted already. They're not producing like they used to. And I was hoping that this organization that has now acquired a few million dollars from the government to revive the salmon industry would help restart our salmon streams again and help build them up again.

Katrin: How would they do that?

Matthew: Go back to the system, the introducing eggs. And in Alaska the fishermen do salmon ranching there. They'll incubate the eggs and get the little fries and they'll bring it to a lake that doesn't have a stream and set them free. And then they'll come back to harvest. They have to do the manual of the eggs in order to be able to do that. Now you can go to a salmon stream that's been dead for a while and clean it, replenish it, and then the salmon will start going up there again. And that was a common practice for people years ago. An elder told me, you go out to Banks Island where you're from. Go to the Skeena River and pick pebbles. And reintroduce it to your salmon stream because when the salmon go and spawn, they're churning up to bury the eggs, and it gets washed away. And year after year, they'll be gone, so you've got to bring them back. And it's not happening. We've got Fisheries people that work, but they're not replenishing, they're just recording.

Katrin: Are people not interested in doing that?

Matthew: They don't understand that *we* have to contribute to it, they think it's Fisheries.

Katrin: So that could be something –

Matthew: That is a big challenge that I would like to see [taken on]. Cause our life ends when the salmon's gone. That's what people don't understand. You can't live off processed meat. You can't live off of the store-boxed. We are a part of the ecosystem. I've always



maintained in my speeches. I went to the wild salmon conference and I listened to everybody's complaints. So, when I spoke I said I just have one thing to add to the discussion here. We are spiritual people. And we are a part of the ecosystem. We're not superior to any of the rocks, the trees, or the salmon. We are a part of them. We've ignored and damaged the salmon spirit and we have to get with it again and redevelop that. And I had some Elders that were excited when they heard that remark and said, finally somebody mentioned the right thing. And greed is the one that has taken over. Commercialization and greed has taken over. And they're going to be extinct, if they're not careful. So we have to reassess the whole thing and decide, how are we going to approach it whereby the salmon will come back in the form that it used to be and the future generations will benefit?

Formerly, another important regulation method for the Indigenous salmon fishery was that of house territories. House territories determine who has access to which areas, at what times, and for which reasons (Menzies 2016). As Mathews and Turner point out, managing the harvest in this way played a significant role in maintaining, or increasing, the salmon population over thousands of years (2017). Currently, the active legal political weight of house territories has been diminished, in part due to the reserve system. Several interviewees expressed a desire to have more control returned to the house leaders regarding individuals' harvesting access.

Today, managing the territory includes taking pre-emptive measures against threats to habitats or entities. Gitxaala is aware of the risks that come with increased marine traffic through their territory and have taken steps to prepare accordingly. One way the community in Lach Klan is helping to mitigate damage from potential oil spills is by holding a preparedness training. Bill Stewart has completed this training, and spoke to the ways Gitxaala harvesters have contributed to and benefited from it:

Bill Stewart: Make sure you have your boats and that. Make sure you have boats running, capable of going wherever it is, make sure your equipment is all ready. Make sure you have the right equipment. Make sure you have the people that do the coordinating properly. Make sure they are capable of running the crews. Be easy with them, not hard on them. It makes them run away if you're hard on them because our people aren't used to that. A lot of them have never really worked in the white man's world. They don't know what it's like. Some of them have actually never left. [There are a] few of them around here that haven't. This was their life..... That's what I think about for whatever happens afterwards. There is a lot

of readiness, ready to go forward. There is a lot. We do have a good system ready for a lot of it if it does happen because there has been a lot of training going on for everything. ... I believe that we're ready to do the best that we can for whatever happens. Especially to save our food. If it comes to that. A lot of the guys that did this oil spill stuff there are harvesters. Most of them are our harvesters. They care for our land, [our] water here because they joined up with it. They are the ones that are going to be the first ones there when it does happen because they know where to go. They know the areas.

Each of the examples presented in this section explains a method for approaching an obstacle identified by community members. Different strategies were proposed to integrate the broader Gitxaala community into mitigation processes, and each one of them relied on the Nation taking actions to manage impacts as a collective.

### **The Cumulative Effects of Collective Action**

“Collectivity does not start with the individual as the ‘real’ first unit and build up to the group. Rather, collectivity begins with the group, and stretches to include, celebrate and support the diversity of its members.” (Tuck 2009a, 62)

What does acting as a collective mean in the context of Gitxaala? During our interview, Cecil Hill noted that if the Nation expects the younger folks to change their ways, the older generations have to lead by example when it comes to respectful harvesting, especially given their traditional role as teachers. He further emphasized the importance of functioning through a combined community effort, instead of simply presenting as such:

“Yeah, that’s a really good question – how do we teach them. You know, it’s a mindset. We talk about *syt güüllum goot* – you’ve heard that? – but the way we look at it, we take it so literal, it’s like, oh yeah well, we do all these things together. But in actual fact, what it is, *syt güüllum goot*, is like having the same vision. That’s what we don’t have. Is the same vision. That is of one heart, or of one mind.”

John Borrows writes that due to their marginalized position in society, it is especially important that Indigenous people, “(...) depend more upon one another and pay more attention to the environmental circumstances that surround them” (2018, 57). Nurturing collective community

action with the same vision means fostering these dependencies. The initiatives explained by interviewees illustrate the deep relations among Gitxaala citizens and their understandings of responsibility towards their social, political, and “environmental circumstances”. Strengthening the collective sensibilities and relational network encourages positive interventions against the processes that are currently negatively impacting Gitxaala. Seen cumulatively, these community-driven initiatives can act to positively affect various (eco-) systems within Gitxaala, strengthening the Nation’s overall capacities. The community’s capacity to react to changes is further supported through cumulative effects assessments. Gitxaala Nation is being proactive in adapting their management strategies to meet the demands of their citizens to best equip themselves for changes that cannot be avoided, while promoting efforts to mitigate the impacts of effects that can be diminished.

The case studies described in this thesis show how many different processes play into the observations people make about environmental change today. One cannot effectively manage effects without taking their main drivers into account. This requires a contextualization of environmental, social, economic, political, and cultural processes and components. While not all of the impacts and obstacles referred to by community members seem to speak directly to climate change, food security, or access to resources, they do speak towards ways Gitxaala Nation can understand and manage the effects that are or may be impacting them now or in the future.

## 5. Conclusion

The key drivers of cumulative effects to Gitxaala today do not have quick fixes. The legacy and contemporary expressions of settler colonialism in British Columbia remain the most detrimental forces confronting the Nation. The extent of this detriment was clearly articulated when interviewees spoke of territory loss, the influence of residential and Indian Day School, and the complications of wage labor in today's capitalist market. When asked about effects on ecosystems and territory, interviewed harvesters connected specific impacts to overarching socio-political and economic factors and responses, thus establishing the undeniable links between them.

Responses from the interviews indicate the seaweed is likely being affected by processes such as warming waters and a shorter winter season, which are caused by global climate change. Gitxaala harvesters state that their capacity to pick seaweed is hemmed in by their economically reduced participation in harvesting practices, and by the limited time they are able to dedicate to managing and harvesting the entity as a result.

According to Gitxaala interviewees, salmon is being impacted by low precipitation, rising ocean and stream temperatures, and ensuing hypoxia, all responses to anthropogenic climate change. Overfishing and habitat destruction create further challenges for local salmon populations. The exclusionist construction of the commercial fishing industry, and the diminishment of intergenerational knowledge transfer are two fundamental obstacles to salmon harvesting Gitxaala is facing today.

The case studies of salmon and seaweed show how large-scale systems analysis can be used to address localized experiences of change. The pathways of effects, as seen in the Appendices, are a form of mapping out effects that emphasizes the relationship between human actions and socio-ecological change. PoEs are helpful in their simplified overview of multiple connected processes,

institutions, and beings. It is important to note that due to their simplification, I had to choose which processes and influenced bodies I wanted to emphasize in my analysis over others. For this reason, PoEs maintain a highly subjective interpretation of effects and their consequences; their subjectivity and simplification need to be taken into account when examining systems for causal links. However, the clarity offered through narrowing the web down to key processes and consequences also functions to encourage a discussion of possible management strategies and leaves room for more in-depth analysis of specific nodes.

Cumulative effects frameworks offer a holistic method of systems analysis that supports a responsible description of pathways of effects and the roles of human actions therein. Within this framework, I find it necessary to apply an Indigenous climate change studies approach to the line of inquiry to acknowledge the complications and power imbalances. Including power dynamics in an analysis should in no way be restricted to studies connected to Indigenous people. However, centering Indigenous voices in climate change discourse functions to encourage critical inquiry, calling attention to imbalances in a topic that has become the new norm. Carrying cumulative effects and Indigenous climate change studies out of the academic institutions and into practical daily life means taking those moments to consider the broader implications of actions, and it means supporting everyday acts of Indigenous resurgence by supporting community-inspired management strategies.

At this time, few anthropologists have been working with CE, but this thesis shows that the discipline is well positioned to conduct just such analyses. Anthropologists have long been involved in research projects that illuminate local expressions of large-scale processes or issues. Methodologically, the discipline is well-equipped to approach topics holistically and over long periods of time, taking care to disentangle interacting dynamics of power and the intricacies of

daily life. This optimally situates anthropological practitioners to delve into a systems analysis such as cumulative effects. In doing so, anthropology through ethnography can offer insight into effects on individuals' lives and identify community-inspired management approaches. These perspectives are invaluable to furthering our understanding of climate change and the resurgent actions that direct local management strategies. As such, I urge anthropologists to become more involved at the intersections of cumulative effects, climate change, and Indigenous resurgence.

As the examples in this thesis have demonstrated, current and future effects are highly interconnected and cumulative, adding or multiplying effects from previous events and processes. While the contexts of Gitxaala's experiences and impacts are specific, they speak to a larger reality of (environmental) injustice, and the strength of Indigenous knowledge and management practices. The fact that the actions we take, and the processes we initiate today influence systems, territory, and people, also presents us with the opportunity to direct our actions and decisions towards management of negative impacts, and instigation of positive effect flows.

Small community action projects also have cumulative effects and can contribute to mitigating or managing larger pathways of effects. As Leanne Simpson and Jeff Corntassel show, the strength of a community percolates into the strength of the families and individuals, powered on by "everyday acts of resurgence" (Corntassel 2012). Gitxaala is a very active and tight-knit community. Their assessments of impacts and cumulative effects show a breadth and depth of knowledge and understanding that is instrumental to identifying and implementing management programs. Looking forward, the management strategies outlined by Gitxaala harvesters are only part of a multi-step, on-going process that involves continuous monitoring and assessment of their chosen indicators. Long-term management and monitoring of effects to Gitxaala systems develop an important basis for protecting and strengthening the 33 core values identified by Gitxaala.

Managing these effects not only means taking steps to restore ecosystems, but also Gitxaala Indigenous identity and relationships with those systems (Mathews and Turner 2017).

Recalling our morning of seaweed picking, those few hours of harvesting were a quick-fire lesson in the complexity of Gitxaala's systems. As the *hak'wn* and the sea star illustrate, one creature is not alone, it is caught in a web that is helping to keep it and others alive. As someone's namesake, *hak'wn* plays a role beyond the physical, imbuing a name with a meaning, and creating another layer of relationship between humans and itself. One entity is connected to others, and they are all draped with many layers of meaning. We dried the sea star in the sun, and I was encouraged to take it home with me. The *hak'wn*, barnacles, seaweed, harvesters, and sea star are a reminder of the multiple layers and scales of life, and a reminder that when one part of a system is influenced, altered in some way, it in turn influences others. To understand the intricacies you have to be thorough, you have to be *magonsk*.

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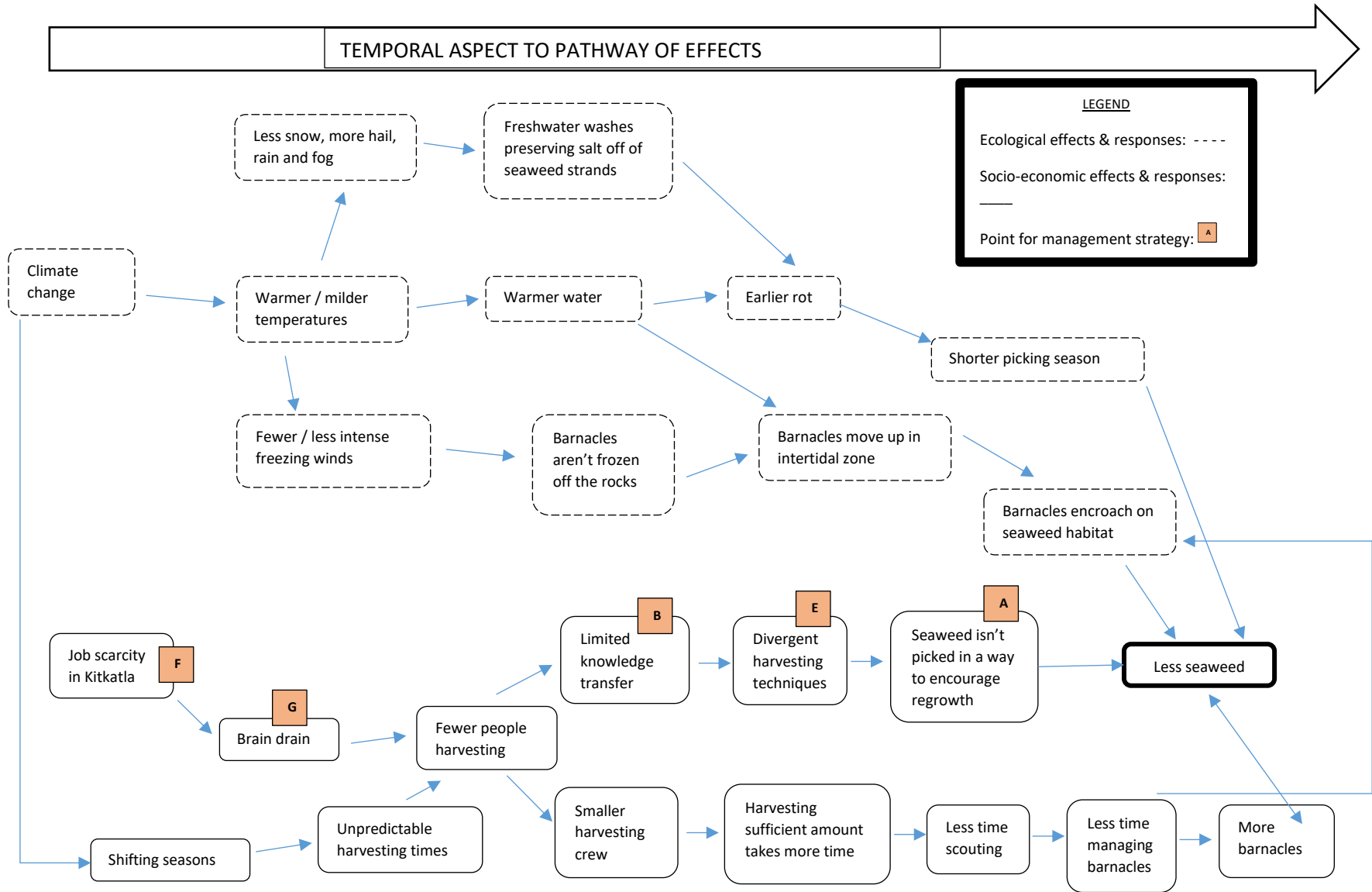
## Appendices

A note to the reader: The arrows in the following pathways of effects indicate causality, but they do not differentiate between scientific causation and other ways of knowing. These pathways display perceived causations as implied to me by interviewees. In the interest of legibility, only the main relational effect pathways are depicted.

An explanation of the points for management strategies can be found in the text on the following pages:

Point A .....	22
Point B .....	31, 32, 34, 36
Point C .....	31, 36
Point D .....	31
Point E .....	34
Point F .....	35
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# Appendix A. Pathways of Effects on Seaweed



## Appendix B. Pathways of Effects on Salmon

