Washington State Indigenous Nations and County Governments Climate Change Adaptation Planning: A Comparative Analysis of Intersectional Equity Considerations

WASHINGTON STATE INDIGENOUS NATIONS AND COUNTY GOVERNMENTS CLIMATE CHANGE ADAPTATION PLANNING: A COMPARATIVE ANALYSIS OF INTERSECTIONAL EQUITY CONSIDERATIONS

by

William Maurice Golding

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This Thesis for the Master of Environmental Studies Degree

by

William Maurice Golding

has been approved for

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by

Kathleen M. Saul, Ph. D.
Member of the Faculty

Date

AUTHOR'S NOTE

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I want to start by acknowledging the peoples of the Medicine Creek Treaty, and give thanks to the ancestors of the lands upon which I have conducted this thesis and writing, and to the generations living across the Southern Salish Sea today who I am continuously grateful to for the knowledge shared with myself. Throughout the essay, I utilize the term "Indigenous" generally referring to identities including American Indians, Tribal nations, Alaskan Natives, Native Hawaiians, and other people from around the world, "that there is a relationship through time between the people and a particular environment" (Tsosie, R. 2013 p 94). I recognize this term may not be inclusive to people who have experienced removal from ancestral lands to distant government established reservations. I have received many inherited privileges as non-indigenous, educated, cis-gendered, white male, of European-American ethnicity person and recognize that unconscious biases may be present in my writing regarding legal, moral, and ethical considerations of Indigenous rights in the face of climate change. All mistakes are my own. As a non-indigenous person, I believe it is important to center Indigenous voices in this paper by including direct quotations from Indigenous scholars who have guided my thinking regarding what is equitable climate change adaptation.

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ABSTRACT

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William Maurice Golding

The ‘climate justice’ movement seeks to address the disproportionate impacts of climate change on marginalized communities. Extensive global socio-political concern highlights the importance of analyzing existing climate change adaptation efforts for equity considerations. This thesis focuses on Washington State in the Pacific Northwest region of the United States of America to analyze leading local place-based adaptation efforts of Indigenous Nations and county governments. Indigenous Nations across this region are place-based climate change adaptation leaders, and should be looked to for geographically wise adaptation strategies by governments of various scales through ongoing local collaborations. This research is based upon an emergent grounded theory approach to applying parallel systems thinking and political ecology theoretical frameworks to critically analyze adaptation plans, distilling diverse intersectional equity considerations from existing efforts. This approach consists of a comprehensive compilation of existing plans, coding individual reports, and comparative analysis of equity considerations to deduce trends and highlight existing best practices. My study finds extensive local efforts ranging from Indigenous Nations, counties, cities, and many non-governmental organizations in Washington State. However, significant differences are apparent between Indigenous and State plans, the former taking account of more holistic considerations and the latter focusing more predominantly on economic implications of climate impacts. This is the most comprehensive documentation of current planning efforts within Washington State, and provides comparative analysis to more effectively inform geographically relevant collaborative adaptation efforts that intersect conventional politically determined boundaries. Place-based climate adaptation approaches by all governments can immensely benefit from respectful collaborations with Indigenous Nations and provide restorative justice to peoples impacted by extensive histories of colonization, while also supporting institutionalizing equity planning and analysis into current and future governmental actions. Institutionalizing equity as a fundamental goal of climate action can balance out disproportionate impacts.

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Chapter 1: Introduction

"The way that societies view the land tells much about them – revealing the character, values, history, and aspirations of a people" (Echo-Hawk, W.R. 2013, p 139).

The skies have turned grey. Not because it is a typical winter day in Washington State, but because wildfires rage across the Pacific coastal region of North America. The air is thick and hard to breath. As the sun begins to set, it does not cast its usual warm yellowish-orange glow across the land, but is instead red as it tries to cut through the thick haze of the smoke. It feels as if I am living in an alternate universe. Unfortunately, I am not. This is the reality of living in a climate change impacted future in Washington State. The stories of climate impacts vary around the world, but their occurrences continue to be more frequent and increasingly more impactful. These impacts are the result of over a century of exploitation of the earth, the air, the waters, for the use of fire to power modern societies. This history has brought us to where we are today, but it is not the path we have to continue on. We have the ability to adapt and take action on climate change.

Climate change has been a growing global concern over the last few decades of the 20th century and more so than ever in the 21st century. Major storms in 2017 and 2018 like Hurricane Harvey impacting Houston, Hurricane Irma impacting Puerto Rico and Florida, and the most recent category 5 Hurricane Michael that pummeled the Florida Panhandle. Regional changes are producing notable impacts across the Pacific Northwest

of the United States from increasing air and water temperatures, melting glaciers and mountain snowpack, increased extreme precipitation events and droughts, and increasing wildfire frequency and intensity (Whitely Binder, L.C. et al. 2010; Snover et al., 2013; Mauger, G.S. et al., 2015; Oregon Global Warming Commission, 2017; USGCRP, 2018). Many ecosystems and the species that thrive within them are increasingly less resilient and more vulnerable to extreme conditions. Climate change impacts already limit the ability of some species— salmon, western red cedar trees, shellfish like clams and oysters, and others —to thrive in current and historic ranges (Jamestown S'Klallam Tribe, 2013; Krueger, K. 2017; Mauger, G.S., Casola, J.H. et al., 2015; Puyallup Tribe of Indians, 2016; Snover, A. et al. 2013).

Predominant responses to climate change have included increasing scientific understanding of future climate impacts, identifying climate change drivers, and then developing mitigation strategies to reduce contributing forces to dampen future impacts. The United Nations Framework Convention on Climate Change (UNFCCC) established the formal use of the terms climate mitigation and adaptation in an effort to more effectively facilitate climate action (United Nations, 1992).

> Adaptation - "Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities,"

> Mitigation – "In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases." (UNFCCC, 2018).

Advocacy efforts to address climate change culminated in the signing of the 2015 Paris Climate Agreement during the 21st United Nations Conference of Parties (COP). However, in 2017 Donald Trump withdrew the United States' initial support for the agreement (Shear, M.D., 2017). In spite of national inaction, many levels of governments across the United States have initiated climate action efforts. At the regional level, Indigenous Nations and Washington State have been recognized as leaders in these efforts.

This thesis seeks to investigate local efforts in Washington State from Indigenous Nations and county governments, as both levels of governments have received less attention than state or city efforts in the consideration of local or regional climate action efforts. A number of Indigenous Nations' geographic context is predominantly rural, and this geographic context relates better to county governments for comparison of governmental planning efforts. Most city governments encompass a predominantly urban context. As a result, there is less commonality for comparison between city government and Indigenous Nations climate adaptation efforts. These differences do not mean city governments should not consult with local Indigenous Nations, because city governments could improve climate adaptation efforts by collaborating with Indigenous Nations to act more responsibly in the ancestral lands they occupy today.

Despite significant global support for climate mitigation, greenhouse gas (GHG) emissions reductions targets have failed to be achieved to reduce fossil fuel use as a result of limited implement. Examples of mitigation strategies supported include converting to electric vehicles, developing renewable energy sources, or utilizing more effective

heating/cooling systems in buildings all in an effort to reduce the use of energy from fossil fuel sources. Solely focusing on mitigating climate change through technological advances to reduce emissions has fundamental limitations because it fails to address underlying concerns of over-exploiting collective resources, but instead seeks to improve the efficiency of present actions without engaging in the transformational shift in society needed to exist on this planet in a different way from recent modern industrial history.

Adaptation efforts have received less focus than mitigation actions. Adaptation actions do have the ability so succeed where mitigation efforts have failed by establishing an alternative path for existence on this planet. Adaptation presents the opportunity to shift away from current fundamental exploitative relationships, and establish a future that works for the benefit of all people and our shared planet. I am not advocating for ignoring the need to reduce emissions, and accepting the impacts of climate change as an inevitability, but instead believe that adaptation should achieve mitigation by presenting alternatives that have significantly less emissions while also presenting ways to exist more sustainably in a climate impacted future. Adaptation presents an opportunity to establish major societal changes that shift away from our exploitative past if we apply that as the goal of these efforts as advocated for by climate justice movements (Dawson, A. 2010).

Climate adaptation planning efforts will guide governmental and subsequently societal efforts to address current and future climate impacts throughout the coming century. This thesis grows out of the understanding that significant and varied inequities have been institutionalized throughout the history of the development of the United States of America. If planning efforts do not make conscious and concerted efforts to cultivate

more equitable outcomes, institutionalized inequities will unconsciously be perpetuated through climate adaptation planning. This thesis communicates a framework for analyzing climate adaptation planning efforts to engage equity considerations systematically through considerations of ecological, social, economic, and political systems of consideration based on a theoretical framework of political ecology in conjunction with systems thinking.

Current and future climate change impacts threaten the fundamental nature of tribal sovereignty, the inherent power to govern oneself, compounding a history of impacts from colonization. Numerous interconnected concerns drive the need for Indigenous Nations to exercise sovereign power and lead adaptation actions in support of healthy regional environments. Rich place-based Indigenous Nations' cultures depend on diverse interdependent relationships of mutual respect between peoples and the environment over generations. These relationships are being impacted by climate change today, but action is occurring in response that follows a millennia's-long history of adaptation by Indigenous peoples to climate changes across Turtle Island (North American continent), and in particular in the areas composing present day Washington State. Indigenous Nations' authority should be viewed as, and consulted with as experts on the topics of how to sustainably adapt to changes within a place, while seeking to heal through restorative justice from significant historical traumas.

We live in an unequal world, not because that is the natural state of affairs, but because it is the world that has been created over a number of generations that established systems and institutions to uphold inequities so that some could receive concentrated benefits at the expense of many others. Every person and our planet deserve equal

respect, but in order to build towards this goal equity needs to be the approach utilized. A variety of climate adaptation actions need to provide equitable support where it is lacking due to power imbalances as marginalized people are disproportionately impacted by climate change.

Climate justice is extremely important for all people, and especially so for Indigenous peoples, as "Indigenous peoples are on the front line of climate change—the first to feel its effects, with subsistence economies and cultures that are the most vulnerable to climate catastrophes" (Grossman, Z. 2012, p 175). Climate change regionally violates reserved inherent sovereign rights reserved by the signing of treaty agreements between various Indigenous Nations and the United States across present day Washington State. Treaty agreements reserved rights to usual and accustomed fishing, hunting, and gathering areas and the associated ability to continue practicing traditional cultural acts; all of which are being impacted by climate change. Treaty agreements present a legal driver to require action to restore human-environment relationships in a culturally appropriate way, if the intentions of these agreements are upheld to the standards Indigenous Nations believed they would be at the time of approval.

To expand action addressing climate change, it is important to build off of existing climate adaptation efforts. In order to grow support for addressing climate change, there needs to be better recognition of ongoing efforts by a number of governments so that people and governments do not feel they are alone in efforts to take action. In the United States, a place that needs to be taking the greatest action to address drivers of climate change due to its disproportionate inputs to climate change drivers, federal inaction speaks loudly to many US citizens and limits perceptions of the need for

action. Local climate adaptation actions provide alternatives to the federal government's fairytale, and send the message to citizens of the need to take action addressing climate. These efforts are pivotal for local citizens, as well as have signifying implications for the people and planet for the rest of our world. The United States has a major climate debut to own up to regarding the many impacts it has contributed to around the world from climate change sources, ecological devastation, social disruption, economic destabilization, and political corruption from a history of war and resource exploitation.

In light of these varied considerations regarding actions being taken to implement climate change adaptation plans at the local level, I investigated the following questions for the focus of this thesis:

Thesis Research Question

Which Indigenous nations and county governments in Washington state are planning for climate adaptation? What climate adaptation best practices are utilized to ensure intersectional equitable outcomes in regards to ecological, social, economic, and political systems?

Thesis Purpose

This thesis provides documentation of existing climate adaptation efforts geographically across Washington State, presents a novel analytical method of inquiry regarding systematic equity considerations, and highlights planning best practices in the region while making suggestion for how climate adaptation efforts across the state can be improved.

Chapter 2: Institutionalized Inequities

Chapter Overview

We live in an unequal world that has been shaped by a history of impacts from institutionalized oppressions. The United States contains a number of concerns that were inherent to the formation of the nation established through a history of colonization by European settlers. Systems of oppression reinforce institutionalized inequities that continue to impact people and our planet in a variety of ways. This chapter identifies a number of fundamental institutionalized inequities in the United States to provide context for the equity analysis of climate adaptation efforts conducted in this thesis. These institutionalized inequities provided context to assessment of existing climate change adaptation plans to identify utilization of equity considerations in local governments climate action efforts.

Chapter Roadmap

This chapter lists a variety of concerns from institutionalized inequities that are pertinent to consider as influences on climate adaptation planning. The chapter starts by addressing institutionalized problems as a broad concept and connects this understanding to that of slow violence. Then this chapter goes into institutionalized inequities within ecological systems, followed by inequities across social, economic, and political systems.

The general application of these four systems of consideration should not be viewed as independent of each other, but intersecting in a variety of ways, and result in a multitude of traumas to marginalized peoples. These concerns are followed by an overview of how these impacts have been addressed by efforts like the environmental justice and more recently developed climate justice movement to round out this chapter.

Institutionalized inequities

Institutionalized inequities are discriminatory ideals structurally imbedded into the fabric of cultures and governments through laws and social norms. Institutionalized problems are analyzed through the lens of the United States for this thesis, as problems similar to these analyzed below may appear across the world but occur in different contexts and result in different outcomes that those of the United States. Institutionalized inequities perpetuate a traumatic legacy of impacts on marginalized populations based on a variety of political influences and social identity factors (Roscigno, V.J. 2016).

> An equity approach recognizes that distinct groups may need varied treatment in order to share the same advantages. Equity initiatives seek to create the conditions for a "level playing field" by addressing these exclusions (City for all Women Initiative, 2015 p 18).

Equity in the context of climate change adaptation planning implies that historic governmental processes overwhelmingly tend to be unevenly weighted due to power

differentials in ecological (Lynch, M.J. et al. 2013; Enríquez-de-Salmanca, Á. et al. 2017), social (Rodriguez-Bailon, R. et al. 2017; Kojola, E. 2018), economic (Redek, T. 2010; Center for Integrative Environmental Research, 2007), and political (Griffith, D.M. 2007; Phillips, C. 2011) systems. Systematic power differentials in the United States have historically favored wealthy white male, through systematic white supremacy (Bass, S. 2018), and associated corporate interests over those of the rest of society and the planet. The establishment of systematic privileges result in cognitive dissonance where those with power fail to see the impacts created by the privileges they have received because they are not forced to live with these realities on a daily basis like the rest of society who does not hold the same social standing (Kalof, L. et al. 2002; Satterfield, T.A. et al. 2004; Olofsson, A. & Rashid, S. 2011). For the past few centuries, in the age of Industrialization and fossil fuel development, institutionalized power differentials have justified the interests of,

> the polluter-industrial complex [...] sectors include chemical companies and agribusiness firms seeking to relax rules governing the use of pesticides; logging, oil, and mining companies wanting to open up protected wilderness areas to resource exploitation; and auto manufactures and big utilities seeking exemptions from clean air regulations (Faber, D. 2009 p 77).

Impacts of toxic masculinity are intertwined with these predominant mindsets and reinforce environmentally unfriendly behavior as “manly,” and present a significant institutionalized inequity that perpetuates climate change by sanctioning the

nonconsensual exploitation of our planet (Brough, A.E. et al. 2016). Climate change adaptation planning has the opportunity to act and restore justice in the face the impacts of patriarchy and the intersectional concerns of "structural racism" (Lopez Bunyasi, T. 2018) by providing equitable support to marginalized peoples while working towards a future where every person can receive equal rights in a healthier, nurturing, and sustainable society.

Slow violence

Acts of slow violence (Nixon, R. 2011) are not immediately recognizable impacts that result from institutionalized inequities over a long period of time. If impacts of slow violence are not both explicitly identified and then confronted with concerted efforts, they may be allowed to continue impacting people due to their unassuming nature. Climate change is a classic example of slow violence, as the cumulative effects are not readily apparent in everyday life, and are allowed to continue due to this subconscious invisibility. Climate adaptation efforts address this fundamental concern because they shine an institutionalized light on the existence of climate change, and more importantly the impacts it has on our world resulting in the need to adapt to a climatically altered future.

Ecological

Institutionalized inequities exist in the United States regarding ecological systems as both species and ecosystems are not afforded protections as living beings like those people are afforded, establishing a clear culturally determined hierarchy where people are seen as more than the rest of the world. Peoples' perceptions of the natural world are strongly influenced by the culture within which they exist (Ojalehto, B.L. et al. 2015). In the United States, Western cultural foundations are built on an assumed hierarchal understanding of the world both in relation to social standing, and the relationship of people to the natural world. This hierarchal perception unquestioningly accepts institutionalized inequities related to the natural environment that allow for their exploitation.

The institutionalized difference between humans and the environment is apparent even in concepts like stewardship that are thought to show the connection between people and the natural world,

> Stewardship implies that humans have empowered themselves with an authority to oversee, to protect, and have guardianship over the natural world. Yet, this conception is alien to the native cultures. In the American Indian worldview the concept of justice includes all life, and recognizes that humans are but a minor actor in the web of creation. Whether humans demonstrate wisdom and reverence to the natural world is a matter of choice, but ultimately all life, even human life, cannot escape accountability (Martinez, C. & Puopart, J. 2002 p 143).

Institutionalized cultural disregard for the environment is highlighted by the widely accepted cultural expectation of establishing lawns in communities across the entire continent (Ignatieva, M. et al. 2015), despite the physical contradictions lawns present to many local environments, as well as the extensive ecological harms related to their maintenance from use of chemical fertilizers and pesticides and fossil fuel emissions from machines like lawnmowers and other tools (Graber-Stiehl, I. 2018).

Ecological inequities were forced to be addressed by legislation like the 1973 Endangered Species Act (ESA), 1970 Clean Air Act, the 1972 Clean Water Act, 1970 National Environmental Policy Act (NEPA), and requirements for Environmental Impact Statements for proposed development projects; but often the regulatory power of these laws are undercut at the US federal government level by elected officials with political agenda driven motives over ecological concerns. Establishing the rights of nature as law (Biggs, S. et al. 2017, Hillebrecht, A.L. Berros, M.V. 2017; Boyd, D.R. 2018) provides the opportunity to address institutionalized equity for ecosystems related to all living species as well as physical entities like rivers or mountains that are culturally considered to not be alive through a Western cultural lens (Cano Pecharroman, L. 2018; O'Donnell, E.L. & Talbot-Jones, J. 2018). Recognition of the benefits ecosystems provide are growing, and the reestablishment of ecosystems especially in urban areas is becoming more widely applied. These efforts to reestablish urban ecosystems also present challenges regarding social and economic impacts of gentrification, as often formerly undesirable communities are transformed into highly sought after locations as a result of proximity to newly developed public amenities (McKendry, C. & Janos, N. 2015). Concerns of gentrification are important considerations to take into account regarding

climate adaptation planning as the establishment of ecosystems becomes a more widely practiced adaptation approach (Enríquez-de-Salmanca, Á. et al. 2017).

The field of conservation has historically focused on supporting ecosystems by ensuring landscapes have stayed intact. Conservation is now also being applied for climate adaptation purposes to preserve ecosystems and landscapes for both carbon sequestration and ecosystem services that counteract climate change impacts from more intense precipitation events, rising water and air temperatures, or providing protection for biological diversity like providing habitat connectivity (Chan K.M. et al. 2006; Hagermen, S. et al. 2010; Hansen, L. et al. 2010; Nuñez, T.A. et al. 2013; Stein, B.A. et al. 2014).

Growing concerns of climate impacts across the Pacific Northwest region drive the need for adaptation in conservation protected areas (Oliver, T.H. et al. 2012). However, adaptation needs in conservation protected areas face implementation challenges because adaptive active management approaches go against an institutionalized ideal of 'untouched' nature in some conservation areas with explicit legal designations limiting management practices that can address growing climate change threats, especially practices like historic indigenous controlled landscape burning (Anderson, M.K. 2009).

Conservation efforts also face concerns regarding equitable climate adaptation as the conservation movement derives from a history of racial discrimination, institutionalized segregation, and ties to the eugenics movements that sought to uphold the purity of a specific human race with a similar idea being applied by conservation efforts to uphold the purity of nature from the tarnish of human contact except for a select few people who were worthy based on their racial purity (Finney, C. 2014 pp 39-40).

Conservation is a beneficial ecological management tool if applied responsibly to work towards ensuring greater ecological equity in a world that is often too anthropocentrically focused. However, institutionalized inequities regarding both human-environment and human-human interactions cannot be ignored if conservation is utilized to promote equitable climate adaptation planning efforts. Ecological inequities can only be overcome by also overcoming social, economic, and political institutionalized inequities.

Cultural

Cultural discrimination lies at the heart of the establishment of the United States, founded on colonization and seeking to legitimize Western culture by making cultural differences seem threatening and leading to social marginalization. The homogenization of accepted cultures institutionalized a lack concern for impacts to those who exist outside the commonly accepted social norms and have been marginalized. This process is a major focus of colonization regarding indigenous cultures across the American continents, as indigenous cultural practices were outlawed (overturned by 1978 American Indian Religious Freedom Act). These practices were complimented with attempts to force assimilation into Western culture through the establishment of residential schools to "kill the Indian, but save the man" (Silburn, C. 2005). Education plays a major role in forming conceptualization of culture for children (Goddard, J.T. 2002).

Climate change perpetuates the legacy of colonial disruption to indigenous cultures by impacting the environments critical to these cultures (Fatorić, S. & Seekamp, E.

2017), especially for Indigenous Nations in the Pacific Northwest (USGS, 2018) with climate changes impacting critical cultural elements like forests that are intertwined with the regional identity of indigenous peoples (Voggesser, G. et al. 2013). Indigenous cultures are impacted by environmental changes as place-based languages are forced out of context as the natural environment changes and the languages and cultures are no longer aligned with the dynamics of the place (Barron, E.S. et al. 2015; Gonzalez, M.B. et al. 2017). Climate change also impacts associated cultural existence related to knowledge and seasonal movement throughout a region (Chisholm Hatfield, S. et al. 2018).

There is a growing recognition of the link between the natural world and cultures, as it is recognized that areas of biological diversity are often linked to areas of cultural diversity (Cocks, M. 2006). Cultural adaptation and the need to be open to differences and changes may be an effective approach to better support people of different cultures in a highly-globalized world (Domenech Rodríguez, M. et al. 2011) in the face of climate change impacting both people and environments. Some researchers even suggest that existing laws in the United States that have been seen as separate including the 1966 National Historic Preservation Act (NHPA) and the 1970 Endangered Species Act (ESA) can help to reinforce the connection between biocultural diversity (Watt, L.A. et al. 2004), and collectively better confront the impacts of climate change. Cultural inequities need to be acknowledged to support more equitable climate change adaptation.

Religion

Religious discrimination is utilized as a form of manipulated division amongst people to influences who participates in public dialogues, in an effort to homogenize different understanding of the world. In some cases, these social norms are upheld through traumatic fashion resulting in religious trauma syndrome (Tarico, V. 2018). Discrimination of Muslim religion and people of Middle Eastern ethnicity is a major form of current institutionalized inequity (Foroutan, Y. 2011). The history of religious discrimination on Turtle Island (North American continent) stretches back to the arrival of European settlers who came seeking religious freedom. Religious freedom is espoused as a supposed foundation of the United States, but often that consideration has not been equally upheld while allowing marginalization and criminalization of many people. Lack of supporting Native American religious freedom that focuses on the natural environment has warranted its desecration. Religion is also commonly used to justify allowing climate change as "the will of God" creating further need to address this social inequity to establish equitable climate adaptation.

Gender/Sexuality

Gender inequities are prevalent in the foundation of the United States as it took until 1920 with the passage of the 19th Amendment to the US Constitution before women were legally allowed to vote. Gender discrimination has institutionalized social inequities that are exacerbated by climate change. Climate change impacts present numerous complications based on gender impacts as evidenced by significant research across multiple academic fields of inquiry (Bunce, A. & Ford, J. 2015). Gender is a culturally

constructed idea (Wrights, M.C. 2003) that in Western culture reinforces a rigid dichotomy of men and women as the culturally accepted gender structure. In this patriarchal dichotomy, women face violent institutionalized inequities from socially normalized domestic abuse, that further marginalizes women's rights (Abraham, M. & Tastsoglou, E. 2016). In the epidemic of gender violence, Indigenous women face significantly higher rates of sexual violence than women of other ethnicities (Davila, V. 2018), and overall violence against these women sparking the grassroots movement Missing and Murdered Indigenous Women (MMIW) (Gray, L.A. 2018) seeking to bring awareness to this major atrocity. Links exist between nonconsensual resource extraction and violence against women (Simons, P. 2017), highlighting the source of a related nonconsensual nature of resource exploitation that drives climate change (Seck, S.L. 2017).

Gender inequities also play out as forms of slow violence that continuously reinforce societal power differentials. The gender pay gap puts women at an economic disadvantage to men (Chaudhry, S. 2018), while also limiting women's access to the same level of quality health care (Malmusi, D. et al. 2014). Women face a wider range of impacts from environmental toxins both personally as well as in regards to being a mother of children both in the womb and once born if they choose to breastfeed their children (Murphy, M.K. 2017). Slow violence of gender differentials also works by limiting engagement of gender concerns in research of policy and institutional analysis (Reed, M.G. & Mitchell, B. 2003). Ecofeminism engages a broad range of social considerations, and can help to address some of the institutionalized research inequities regarding climate impacts for topics like bullying in schools, hate crimes, marriage

equality, fair housing, and health care for a more gender equitable approach (Gaard, G. 2015). Gender inequities in research also appear in Paul Hawken's *Drawdown* (2017), considered a seminal work on climate action, as only 3 of the 100 proposed strategies focus on addressing gender inequities for women and girls when all other sectors of focus had at minimum 7 strategies.

Gender inequities will be further compounded by disproportionate impacts of climate change (Bendlin, L. 2014; Bunce, A. & Ford, J. 2015; Iniesta-Arandia, I. et al. 2016), and highlight the need for gendered climate change action responses in light of different impacts (Chaunhan, N.B. & Vinaya Kumar, H.M. 2016). A gendered approach to climate action in food systems is needed because of the large role women play in food cultivation, gathering, and preparation (Sarrouy, C. 2014). Recognizing women's intimate environmental knowledge in a world where their knowledge is currently devalued (Di Chiro, G. 1997) can provide more effective climate action as research shows America women have greater knowledge of climate change and concern regarding climate change impacts compared to men (McCright, A.M. 2010). These understandings show women can provide a more effective base for supporting community action on climate change.

When women are respected it has correlation to greater respect for the natural environment. Some researchers have highlighted the link between gender equity and climate justice correlates with lower levels of environmental degredation (McKinney, L.A. & Fulkerson, G.M. 2015). Women also have a deep history as leaders of grassroots justice movements (Rainey, S.A. & Johnson, G.S. 2009), and have the ability to apply these leadership capabilities to equitably gender local climate adaptation (Björnberg, K.E.

& Hansson, S.E. 2013) if they are not held back by institutionalized gendered inequities. Some critiques have arisen regarding climate equity and gender due to the limited application of gender equity in a rigidly conceived dichotomy of women compared to men, as well as the need for greater intersectional understandings to better inform the multitude of institutionalized inequities faced in relation to climate impacts (Djoudi, H. et al. 2016),

Sexual discrimination is a dominant inequity in the United States, providing an added barrier that compounds gender inequities to equitable participation in climate adaptation efforts. Patriarchy institutionalizes social norms of straight privilege (Dawson, G.A. 2005; Tatum, E. 2017), and this correlates with sexual orientation policy being largely invisible at the local level (Cramer, R. et al. 2016). Indigenous feminism presents an alternative perspective to the limited perceptions of colonized gender dichotomies that can address the broader intersectional impacts of patriarchy in conjunction with white supremacy (Begay, J. 2018). Indigenous feminism recognizes a more diverse consideration of sexualities and genders, compared to the colonized gender dichotomy and heterosexual norms, as evidenced by the common cultural custom of two-spirit people (Frei, D. 2006). Gender and sexual orientation equity efforts are being integrated into the efforts to protect Mother Earth (Amor, B. 2018) by combining decolonized perceptions of people and our relationship to the Earth. People are also standing up in the face of intersectional injustice regarding sexual orientation discrimination and racial/ethnicity inequities (Shamdeen, S. 2018). Equitable climate adaptation must work in support of these ongoing efforts.

Conceptualization of institutionalized inequity is incomplete if it only views gender inequities through a rigid culturally determined dichotomy of men and women. Transgendered people can be marginalized by narrow considerations as these limitations normalize impacts like the removal legal of recognition of trans-gendered people (Broverman, N. 2018; Haider, M. 2018), and intersex people (Levin, S. 2018) from social consideration. Marginalization of people outside of the Western culturally enforced gender dichotomy are prevalent in climate change research as no focuses on these aspects of gender inequities were found in climate change considerations (Rodriguez Acha, M.A. 2017). Significant work needs to be done to provide more equitable climate adaptation efforts in regards to intersectional gender and sexual orientation inequities.

Race/Ethnicity

Racial discrimination in the United States is founded on the system of institutionalized white supremacy to uphold social inequities that establish unequal power differentials between people of different races. Racial inequities were institutionalized in the United States by sanctioned slavery of African people that took until 1865 for the passage of the 13th Amendment to the US Constituting, and then the 14th Amendment of 1868 to recognize African-Americans' citizenship. These same rights were not extended to Native Americans until the passage of the 1924 Indian Citizenship Act. Climate change impacts will further marginalize those who already face impacts from institutionalized racial inequities.

Race is a socially constructed concept (Obach, B.K. 1999), used to uphold power differentials based upon the color of a person's skin. The institutionalization of racial discrimination runs deep in the psyche of American culture as implicit race bias (Smith-McLallen, A. et al. 2006). The social construction of race presents further complicated conflicts for those who are bi-racial from compounded internal conflicts (Shih, M. et al. 2007). Race is the most visible institutionalized inequity in society compared to other inequities that are not as visibly apparent, such as class (DiAngelo, R.J. 2006). Institutionalized racial inequities are exacerbated by impacts from racial profiling (Thomsen, F.K. 2011) and the complications this practice has created in an unequal justice system (Agarwal, R. & Marcus, J. 2015). Institutionalized racial inequities also lead to impacted health outcomes both in terms of health care provided by caregivers (Mengesha, B. 2017), and greater incidents of impacted health outcomes from long term stressors that can be better understood through Critical Race Theory (Ford, C.L. & Airhihenbuwa, C.O. 2010). Equitable climate adaptation cannot ignore these impacts if it wishes to support the needs of all people.

Language use reinforces the cultural construction of race, playing both a role in reinforcing cognitive perceptions of inequities and leads to limited ability to identify and address these social constructions (Desimone, L.M 1993). Race relations are so culturally volatile in the United States as topics of discussion, that it difficult to even begin talking about these topics (often by white people) (DiAngelo, R.J. 2018) without providing facilitated dialogue structures (Jefferies, Z. 2018).

An important place to confront cultural constructs of race are in regards to the false perception of the biological origin of race (Smedley, A. & Smedley, B.D. 2005;

McChesney, K.Y. 2015) which is a legacy effect of the eugenics movement, that clouds the reality of the origin of racial difference purely from a socially constructed inequity. Despite the lack of biological evidence for the existence of race, it is important to recognize that it is still a very real lived reality impacting many people's lives and cannot be ignored from dialogues that seek to establish a more equitable society.

Efforts to overcome institutionalized racial inequities include creating an environment of inclusiveness that recognizes the different needs of people from various backgrounds (Swanson, J.W. 2004). If a truly inclusive environment is created in organizations or communities, it can lead to more supportive internal working environments as well as improve external interactions that organizations engage in. Strategies to reduce implicit race bias have been researched and provide insights on confronting unconscious biases that can significantly improve interpersonal and institutional equitable climate action if applied throughout the field of practice (Devine, P.G. et al. 2012).

Despite many considering the goals of addressing racial inequities, especially regarding climate action, limitations of inclusiveness continue to exist within the broader environmental movement and in individual organizations (Taylor, D.E. 2014 b). Making racial justice a priority (Jefferies, Z. & Hachadourian, A. 2017) is another important step that needs to occur in equitable climate adaptation planning to overcome institutionalized racial inequities.

Institutionalized inequities regarding ethnicity are established through discrimination disproportionately impacting black and brown people of different ethnic origins, and provide privileges resulting from power differentials for European

Americans in the United States. Ethnicity inequities influence interactions for marginalized people related to the criminal justice system (Hagan, J. et al. 2005), leading to a significant amount of people of ethnic minorities being disproportionately targeted by law enforcement and sentenced to imprisonment more severely in the same systems preached to hold up justice. Ethnicity continues to be used as a form of institutionalizing perceived criteria for citizenship (Wallace, N. 2018), which will be an increasing concern in a world where many people globally are being displaced as a result of climate change impacts. Equitable climate adaptation must engage concerns of racial and ethnicity inequities in order to effectively meet the needs of all people in a climate impacted future.

Age

Age inequities are an increasing concern in the face of climate change. Western cultures place a disproportionate value on working aged adults, while devaluing the young and the old. Age inequities show a disrespect for the past, and the knowledge our elders hold for sustainable well-being (Müller, J.G. et al. 2013), and the well-being of future generations (Summers, J.K. & Smith, L.M. 2014) by focusing too greatly on the concerns of the present generations of societal decision makers (Foot, D.K & Venne, R.A. 2005). Age inequities may be based on the Western cultural ideal of independence and self-sufficiency and lack of focus and support for others related to families and communities including those who need additional support including the elderly and the youth who both lack independence to varying degrees (Power, D. et al. 2010). Climate change creates a number of health concerns for the elderly and children who need greater

societal support in response to these concerns (Meade, T. 2010; Sheffield, P.E. & Landrigan, P.J. 2011), as well as recognition of the vulnerability for people of these age dependent populations with limited ability to act self-reliantly (Mitchell, P. & Borchard, C. 2014). Planning for equitable climate change adaptation needs to strive for creating age-friendly communities that provide physical considerations facilitating accessible mobility as well as enhanced social support systems to ensure people of all ages have support in times of need (Menec, V.H. et al. 2011). Equitable climate adaptation needs to apply these same principles to meet community needs for people of all ages, and it is beneficial that Indigenous Nations already embody this ideal and are leading work to weave these equity concerns into climate action.

Ability

Ability discrimination is not widely engaged with at the cultural level within the United States, but presents a number of concerns in light of climate change impacts that need to be considered for equitable adaptation. Climate change presents concerns to those with disabilities and may contribute to shortening their life spans (Zang, Y. et al. 2007). Physical ability limitations in inclement weather (Lindsay, S. & Yantzi, N. 2014) present growing concerns related to climate impacts and the need for evacuating from areas threatened by wildfire or increased flooding risks. Disability is also a concern in regards to the loss of Indigenous languages and how those trying to speak with an incomplete vocabulary and changing physical conditions with which the language has evolved to communicate may have a limited perspective within which to engage a climate altered

world (McCarty, T.L. 2013). Climate change research in regards to disabilities needs to be significantly expanded to support more equitable adaptation in a rapidly changing world.

Education

Education discrimination has been built on an institutionally inequitable system of public education funded by property taxes severely impacting poor communities from receiving a quality education (Boustan, L. et al. 2013). The poor quality of education, disparity of limited social mobility, and economically impoverished families requiring students to bringing in income lead to increased dropout rates for students of color and lower class (Kearney, M.S. & Levine, P.B. 2016) create cycles of oppression that keep people poor by limiting their educational attainment and ability to get higher paying employment as a result. Race and gender impact youth and limit their educational attainment level (Cage, J. et al. 2018) and widens the achievement gap (Allen, S. 2008). These matters are exacerbated by increasing need for higher levels of educational achievement for less prestigious jobs in conjunction with rising costs of higher education (National Center for Education Statistics, 2018) that further impact the ability of people with lower levels of educational achievement to get more supportive employment. Education is being more actively investigated as a consideration of influence in climate adaptation to expand considerations from the predominant demographic assessment in climate adaptation on age and sex (Lutz, W. & Strissnig, E. 2015). The widening gap in educational equity leads to cognitive exclusion from perceived “sophisticated” climate

change debates for people who may feel they do not have the educational background to participate in these public processes and in effect limits the effectiveness of climate action by reducing public engagement, input, and support of these efforts.

Class

Class discrimination is an institutionalized inequity in the United States that has upheld systematic privileges for those in higher classes through exploitation of lower classes as a result of disproportionate power dynamics. This is the oldest form of discrimination in the United States brought over by European settlers. The class inequity history has been overshadowed by the prevalent inequities of racial discrimination that were socially constructed to pit people of lower classes (Indigenous people, African slaves, European indentured servants) against one another in response to Bacon's Rebellion in 1676 as the lower class banded together against the ruling class and showed the power of unity by those of the lower class. Racialization was established by allowing white European indentured servants to become the first forms of police forces in the early 1700's as "Slave Patrol" (Platt, T. 1982) which has developed into our present-day police state that continues to uphold class inequities (Reichel, P.L. 1992). A multitude of class discriminations continue to reinforce power differentials keeping people of lower classes from raising their social status (Hardaway, C.R. & McLoyd, V.C. 2009). This dynamic has been influenced by capitalist systems that fundamentally disadvantage those of lower classes by undervaluing their labor (Ehrenreich, B. 2014) and limit their ability to gain meaningful work (Timmermann, C. 2018), while at the same time providing greater

opportunity and access to power for those of higher class referred to as a system trap called “success to the successful” (Meadows, pp 126-130). People of lower classes are also fundamentally impoverished by nonconsensual degrading resource extraction that provides exploitation of their labor while impacting their community’s local environmental health while higher classes, often today transnational corporations, benefit from the utilization of ‘cheap’ materials extracted without having to deal with the environmental impacts of extraction (Downey, L. & Hawkins, B. 2008; Kojola, E. 2018). Class inequities impact equitable climate action as those working manual labor are more exposed to environmental impacts resulting from climate change like smoke from wildfires and increasingly dangerous heat events (Vásquez-León, M. 2009). As a result of these inequities communities and their environments are less resilient to associated climate change impacts.

Trauma

Traumas result from systematic institutionalized inequities, and need to play a critical role in the consideration of equitable climate adaptation planning because the numerous effects of traumas can severely limit participation by marginalized people. Significant research has gone into assessing trauma for American Indians (Whitbeck, L.B. et al. 2004; Yellow Horse Brave Heart, M. et al. 2011) that has been perpetuated inter-generationally over the centuries of colonization of the American continents (Pember, M.A. 2016). A multitude of these considerations is covered more in-depth in the next chapter regarding the Indigenous Nations context in the United States.

State sanctioned killings of black and brown people, as well as excessive rates of incarceration perpetuate traumas onto many families and communities. These traumatic histories stoke distrust of the United States justice system (Westcott, K. 2015). Mass incarceration disproportionately perpetuates the disruption of family dynamics and leads to increased stress and resulting negative health outcomes for impacted family members (Machi, T. et al. 2015). Despite these varied impacts, efforts are underway to heal collective traumas (Erfan, A. 2017), and much can be learned from these efforts to apply to equitable climate adaptation. One severely needed approach in the United States, that has been utilized in other countries such as Canada, is a truth and reconciliation process to begin healing from traumatic histories (Davis, F. 2016). Climate change can compound the impacts of various traumas related to environmental degradation, social disruption, economic impoverishment, and political instability. For this reason, it is imperative for adaptation actions to work to equitably address these concerns through a historically informed perspective.

It is important to be aware of false solutions to climate change adaptation that can perpetuate a number of the above mentioned institutionalized inequities and associated traumas. Geoengineering has been proposed as a technological solution to address climate change concerns, but also presents a number of issues regarding power as well as unintended impacts (Klein, N. 2014 pp 256-290). Some technological adaptation proposals run the risk of perpetuating environmental inequities by limiting the need to stop exploiting environments if GHGs can be mechanically pulled out of the atmosphere, as well as reinforce class inequities as the ruling classes can have control over these technologies and monopolize the benefits of these efforts at the cost of the rest of society.

Equitable adaptation requires efforts that work for everyone, similar to the social movements of the Environmental Justice and now Climate Justice movements seeking to create change for the benefits of all people and our planet.

Environmental Justice Background

In the United States, the Environmental Justice Movement (Bullard, R.D. 1991; Bullard, R.D. et al., 1997; Bullard, R.D. et al., 2000; Pendersen, O.W. 2010) is commonly associated in conjunction with the Civil Rights Movement (Bryant, B. 1995; Dicochea, P.R. 2012) as a social movement to improve peoples' lives in light of institutionalized intersectional environmental and social inequities (Salazar, D.J. & Moulds, L.A. 1996; Bullard, R.D. 1999; Bullard, R.D. 2001; Agyeman, J. 2005; Rainey, S.A. & Johnson, G.S. 2009; Mann, S.A. 2011; Taylor, D. 2011; Lado, M.E. 2014; Ore, T.E. 2014; Taylor, D.E. 2014 a; Mascarenhas, M.J. 2016). These efforts have roots dating back to the 19th century in conjunction with the rise of the Industrial Revolution (Gugliotta, A. 2000).

Initial emphasis revolved around the disproportional siting of toxic and polluting facilities near low-income and minority communities that went hand in hand with discriminatory housing regulations from a history of "redlining" (Harner, J. et al., 2002; Bennett, M. 2004; Bullard, R.D. et al., 2009; Kremer, J. 2016; Rothstein, R. 2017). Distributional justice impacts communities due to their proximity to impacted locations whether from pollution or climate impacts (Bullard, R.D. 1984; Cole, O. & Woelfle-Erskine, C. 2006; Faber, D. 2009; Cohen, A. 2010; Lerner, S. 2010; Campbell, H.E. et

al., 2013; Turner, R. 2016; Mandarano, L. & Meenar, M. 2017). These efforts are now analyzed used GIS methodologies (Vaz, E. et al. 2017).

Increasingly efforts have expanded to the impacts of institutionalized inequities on procedural justice regarding restrictions to participation in planning processes (Petts, J. 2005; Arnold, T. 2007; Constantine, D. 2016; Deas, M. et al. 2017; Valenzuela, M. 2017). These restrictions limits community voices and concerns from being heard and incorporated into the public planning dialogue (O'Lear, S. 2010; Anguiano, C. et al., 2012; Corbin, T.B. 2015; Phadke, R. et al., 2015). Communities are taking action in a number of ways to make their voices heard despite these impacts (Towers, G. 2000; Di Chiro, G. 2008; Anson, A. et al., 2016; Harvey, D.C. 2016).

Justice as recognition is important (Cantzler, J.M & Huynh, M. 2016) for Indigenous Nation communities who are often forgotten about as vital local community members. Similar struggles are faced by many marginalized communities, but each is impacted in different ways, and not just as a result of a single injustice thus highlighting the need for intersectional concerns.

Environmental justice has grown into a movement that addresses institutionalized inequities, as well as establishes more effective environmental actions to create healthier futures (Liu, F. 2001; Agyeman, J. et al., 2002; Bullard, R.D. 2007; Downey, L. & Hawkins, B. 2008; Kates, R.W. 2009; Barnett, J.T. 2015; Opp, S.M. 2017; Welch, D. 2017). The extensive body of literature attests that these efforts are growing stronger as the understanding of many different ways varying communities are impacted by environmental hazards are increasingly made more prominent to the public consciousness (Stephens, S. 1996; Peeples, J.A. & DeLuca, K.M. 2006; Yuen, T.K. & Payne-Sturges,

D.C. 2013; Quam, V.G.M. et al., 2017). These efforts have influenced the development of the climate justice movement which provides critical context to this thesis around equitable climate change adaptation planning.

Climate Justice Background

> Climate justice must transcend narrow accounts of social justice (for example, as an 'equal righto develop') or of reparative justice for harms, such as relocation of entire villages or nations, that are caused by ineffective mitigation or adaptation strategies. Instead, national and international policies and programs should fairly consider and respect the different cultures, values and circumstances of affected populations (Tsosie, R. 2013 p 95).

The environmental justice movement shaped the recognition that many marginalized communities are frontline communities impacted first and worst by environmental degradation and these same sentiments apply to the climate justice movement as marginalized communities are most at risk of climate change impacts (Lerner, 2010; Burrows et al., 2016; Joe et al., 2016, Gilbertson, 2017). Many of these communities are impacted by having the least access to resources and limited capacity to adapt to additional challenges presented by climate change impacts (Viñuales, J.E. 2011).

Climate justice is of particular importance to Indigenous communities because subsistence lifestyles are already being impacted by climate change and leading to negative personal health impacts (Krakoff, S. 2011), as well as large cultural impacts with the loss of important foods and other resources (Lynn, K. et al. 2013). Climate

justice can apply a forward-looking approach to achieve justice for Indigenous Nations (Whyte, K.P. 2013);

Recognition of climate justice concerns are vital in regards to natural-resource dependent communities and the impacts of potentially inequitable policies that can negatively effect these communities (Thomas, D.S.G. & Twyman, C. 2005). Climate justice awareness has helped to refocus climate action away from risk-based assessments to value-based considerations in planning efforts to protect human health and well-being through an intersectional understanding of inequities (Roser, D. et al. 2015). The institutionalized inequities described above can be perpetuated through climate adaptation plans if we fail to incorporate concerns about them in early stages of planning for a climatically impacted future (Derman, B.D. 2014). Numerous resources are available to support these efforts to ensure equitable climate adaptation (Klinsky, S. et al. 2015; National Association for the Advancement of Colored People, 2016; Boeckmann, M. & Zeeb, H. 2016)

Chapter Conclusion

This chapter covered a range of institutionalized inequities from ecological, social, economic, and political systems. If these inequities are not recognized, they will be perpetuated by climate change adaptation efforts. Climate change will already create significant impacts, and it is important to not compound those impacts by perpetuating institutionalized impacts. Taking action on addressing climate change will require a major shift in how we exist on this planet, and in the process, provides the opportunity to

address a number of structural concerns inherent in the foundation of the United States. The following chapter will go into detail regarding the context of Indigenous Nations and their relationship to climate adaptation actions.

Chapter 3: Indigenous Nation Context

Chapter Overview

This chapter provides an analysis of the context of Indigenous Nations located within the United States in relation to climate change concern. Indigenous Nations face both significant concerns from the impacts of climate change, as well as from a number of historic impacts related to their relationship to the United States in a soci-political context. These concerns are particularly relevant to Washington State which has 29 federally recognized tribal governments who are impacted by these considerations.

Chapter Roadmap

This chapter starts by overviewing the impacts of colonization on Indigenous Nations, and then goes into how climate change perpetuates a history of colonization in a new context. An overview of how the sovereign nation status of Indigenous Nations has been legally recognized through treaty agreements, and how a lack of climate action at the US federal government level impacts this sovereign status. The concept of sovereignty is reviewed in recognition of climate change impacts, and then shown how climate adaptation efforts by Indigenous Nations act as exercises of sovereignty. This is followed by a review of the need for the US government to uphold its trust obligations to Indigenous Nations, and how reservations are currently limited in their current

construction to support effective climate action by tribal governments, and related indigenous food systems in light of climate change.

Impacts of Colonization

A critical foundation of the U.S. government is rooted in a history of colonialism and the dominant cultural paradigm of colonialized worldviews. Since 1492, and the arrival of Christopher Columbus and other European settlers, the sovereignty of Indigenous peoples and nations across Turtle Island have been under perpetual attack from the ills of colonization. Between 1492 and 1900, American Indian populations plummeted from over 5 million to less than 250,000, leaving behind only 5% of the historic population levels (Echo-Hawk, p 100). Drastic population declines and other associated impacts of assimilation policies have manifested themselves in "Postcolonial Stress Disorder (PCSD)" (Ibid, p 101), a form of historical trauma that permeates throughout Indigenous cultures resulting from the impacts of genocide.

Legacy impacts of colonization continue to take their toll on American Indians everywhere as a form of "slow violence" (Nixon, R. 2011); these concerns differ nation by nation throughout Washington state, and the American continents. "Differentials of power between and within nations are probably greater today than they ever have been" (Gosh, A. 2016, p. 146), and as a result of institutionalized systems of inequity, those oppressed face barriers to changing these fundamental inequities.

> As the natives were systematically stripped of their land, natural resources, traditional means of subsistence, and cultural wealth, they saw their habitats destroyed by development, and they swiftly became the poorest, most disadvantaged people in the world, according to every socio-economic indicator (Echo-Hawk, p 53).

Within the United States, the rulings of *Johnson v. M'Intosh* (1823) found that Native Americans could not sell title to lands they occupied because they did not possess legal title to those lands as it was officially held by colonial European governments, as they obtained these rights upon "discovery" and the land holding status was transferred to the United States upon it becoming its own governments separate from European rule. This ruling legally justified the wrongs of colonization, adapting the international legal precedent of the *Doctrine of Discovery*, "set forth by the Papal Bull 'Inter caetera' issued by Pope Alexander VI on May 4, 1493" (History Now, 2017) to form the legal basis of federal Indian law in the US to this day (Echo-Hawk, p. 63). As a result, racism underpins federal Indian law, as evidenced by Echo-Hawk citing racially discriminatory language utilized in the rulings of *Cherokee Nation v. Georgia* (1831), *Montoya v. United States* (1901), *United States v. Sandoval* (1913), *Lone Wolf v. Hitchcock* (1903), and *Tee-Hit-Ton Indians v. United States* (1955) (Ibid, pp.188-189). These cases embody,

> the outmoded values of the 19th century, which underpin the darkside of federal Indian law, when the Supreme Court drew heavily from principles of discovery, conquest, and the supposed racial inferiority of American Indians to fashion the legal framework for indigenous rights (Echo-Hawk, p.180).

The process of decolonization in climate change adaptation planning examined in this thesis engages with the ideas espoused in Reclaiming Indigenous Planning (Walker, R. et al., 2013).

> Planning is not just a word. It is also an imperial scholarly discipline and colonial practice located in the "West," around which much theoretical posturing and competing claims have accreted. As an activity, "planning" isn't owned by the West, its theorists, or practitioners. It just happens to be an English descriptor for a universal function with an abiding and justifiable concern for the future. […] Indigenous planning isn't just an armchair theoretical approach or set of methods and practices, but a political strategy aimed at improving the lives and environments of Indigenous peoples. To do Indigenous planning requires a commitment to political, social, economic, and environmental change. […] To do Indigenous planning requires that it be done in/at the place *with* the people of that place. […] While it has a future orientation that looks at where "we" are now and where "we" might want to be in the future, it must fully be informed by "our" past and critically how that past has constructed the present (Matunga, H. 2013 pp. 4-5).

This thesis seeks to address the "dual planning heritage" (Matunga, p. 13) that exists within the United States where Indigenous Nations' governments have engaged in planning efforts in parallel with state sanctioned governments, but these efforts have largely gone unacknowledged by various levels of state governments.

Climate Change as Colonization

> Colonization is typically considered as the appropriation of a people, nation or region by another for the purposes of economic exploitation. It imposes an external culture, social structure, laws and institutions, technology, systems of production, and even social relations on the colonized society (Byrne, J., Martinez, C. & Glover, L. 2002 p 11).

Anthropogenic climate change results from colonization (Agarwal, A. et al. 2002), and the non-consensual exploitation of natural resources for industrial development. The utilization of fossil energy sources fueled significant global increases in the emissions of greenhouse gases while at the same time undermining environmental quality as forms of colonization (Reo, N.J. Parker, A.K. 2013). Degraded ecosystems have limited capacity to adequately sequester organic resources to offset changes in atmospheric concentrations of various greenhouse gases. Climate change as colonization does not only refer to the non-consensual exploitation of geologic and water resources, but increasingly is acting as colonization of the atmosphere (Indigenous Environmental Network, 2018 a).

Fossil fuel combustion for energy production drive the engine of industrial development resulting in greenhouse gas (GHG) emissions that increasingly intensify pollution of the atmosphere resulting in increasing temperatures. The greenhouse effect occurs as greater amounts of GHGs are added back into the dynamic global

biogeochemical system, and more effectively trap heat as atmospheric concentrations increase. Understandings of the anthropogenic nature of increasing GHG emissions fueling rising threat of climate change are supported by almost 97% of scientists (Cook, J. Nuccitelli, D. et al., 2013).

The Industrial Revolution lies at the heart of colonial expansion for resource control fueling global imperialism. Outright colonization ended when the practice was officially condemned, "as a repugnant and oppressive institution" by UN Declaration on the Granting of Independence to Colonial Countries and Peoples in 1960" (Echo-Hawk, p 116). However, many remnant effects continue to this day based on institutionalized systems of inequity such as the "colonial feedback loop" (Chin, J. 2014), establishing significant power dynamics that support the interests of the wealthy who control resource use and normalize pollution at the expense of societies and environments (Byrne, J. Glover, L. & Martinez, C., 2002).

"Indigenous peoples are particularly vulnerable to climate change, both physically and legally" (Abate, S.R. & Kronk, E.A. p. 3). Climate change threats resulting from colonial globalized industrial development will disproportionally impact Indigenous people and locally adapted subsistence cultures (Galloway McLean, K. et al. 2009; Tsosie, R. 2010). Indigenous people will be disproportionately impacted because their cultures are tied into the natural environment which is changing and can cause a loss of intergenerational cultural knowledge and connection to ancestors; as well as impact subsistence economies dependent on local natural resources, Indigenous cultures have

shown extensive adaptive capacity in the Pacific Northwest (Colombi, B.J. Smith, C.L 2014) and can continueprovide leadership in climate action regionally.

Because of the unique political status of Indigenous peoples they often do not have the capability to require changes to stop these impacts as their jurisdictional control is limited to the scope of reservation lands and tribal members (Tsosie, 2013 pp 79-83). "Although there is agreement among a majority of scientists that climate change is triggered by anthropogenic emissions, uncertainties regarding the nature of scientific data and predictions have hindered legal actions" (Badrinarayana, D. 2013, p 21). Institutional barriers place the burden of proof on those who are impacted by environmental changes through legal systems at odds with many Indigenous cosmologies and cultures, without ever requiring responsibility from entities creating collective harms (Byrne, J. & Hoffman, S. 2002).

Despite the outright condemnation of traditional colonization, "neo-colonialism" (Jiménez Peña, G. 2015) continues to drive industrial development resulting in the exploitation of people globally mainly through economic and political endeavors. "Neo-liberalism is essentially an approach to development that considers the free market to be the best way to initiate and sustain economic development" (Elliott, J., 2013 p 34). The neo-liberal economic approach has been promoted through the establishment of international financial systems to guide economic and political system decision making. The result has been the systematic disenfranchisement of people and nations through the creation of debut from external support for 'development'.

Repayment of international debt often leads to the condoning of resource exploitation by transnational corporations to extract and sell raw materials to the global

market place at a discounted value, which further perpetuates socio-ecological and economic impoverishment known commonly as the 'resource curse' (Elliott, p 75). For Indigenous peoples in North America, this process proved to be very impactful as not only were individual resources exploited, but industrial development grew in scale of impact to "sacrifice entire landscapes and ecosystems" (Byrne, J. & Hoffman, S.M. p 98) in the pursuit of 'progress' through 'development'.

> The reason people go to bed hungry every night has nothing to do with food supply—rather they have been excluded from land to produce their own and cannot afford food offered on the market, or because of war and political disturbances that block access (Perfecto, I. VanDermeer, J. & Wright, A. 2009 pp 92-93).

Results of colonization and industrialization have fundamentally destabilized the sustainability of many ecosystems through over-consumption of resources, pollution, land-use conversion, and intensive development (Tauli-Corpuz, V. et al. 2009). These historical impacts have degraded ecosystems, making them more vulnerable to increasingly more significant climate change impacts expected over the next few decades according to a recent special report (IPCC, 2018) and the 5th Intergovernmental Panel on Climate Change (IPCC) report (2014). In order for climate change adaptation planning and implementation efforts to be successful, understandings of the historical impacts of colonization on the world as it is today need to play a central role in achieving equitable outcomes (Norton-Smith, K. et al. 2016).

> Historical colonization and oppression faced by many indigenous communities may have weakened these communities both spiritually and physically, which in turn also may make it more difficult for such communities to adapt to the environmental stresses related to climate change (Abate, R.S. & Kronk, E.A. p 13).

According to the 1998 Albuquerque Indigenous Declaration to the United Nations (UN) Framework Convention on Climate Change (UNFCCC) at Buenos Aires Conference of Parties (COP) 4, "there is a direct relationship between the denial of Indigenous peoples' land and water rights, along with the appropriation without consent of Indigenous Peoples' natural resources, and the causes of global climate change today" (Grossman, Z. 2012 p 115). The passage of the UN Declaration on the Rights of Indigenous People signified a major step internationally to address the institutionalized impact Indigenous peoples face around the world (United Nations, 2008) [ratified by the United States in 2010 after an initial vote against along with Australia, Canada, and New Zealand and a small number of abstentions]. The UN's Conference of Parties (COP) 21 Paris accord of 2015 shows extensive international agreement on the need to address the growing concerns of climate change. During this meeting, Indigenous rights activists from around the world exercised strong influence on decisions makers and the need to take action through a number of organized demonstrations.

> Tribal governments will be important entities in the upcoming discussions about adaptation planning and ecosystem management, given the documented environmental

> changes that are occurring and affecting all lands, whether under the control of state, federal, or tribal governments (Tsosie, p 94).

Climate change already violates Indigenous rights, and will violate more rights in the future, driving the need for the United States to effectively institutionalize the principles of the UN Declaration on the Rights of Indigenous Peoples. Institutionalizing these principles would place greater value in federal efforts to uphold both the intent and the letter of the law established in treaty agreements with Indigenous Nations. With these understandings firmly established, it becomes clear that the United States has a responsibility to take action on climate change, which it is already impacting treaty rights to traditional foods as well as loss of property on reservations being lost to rising sea-levels. Not only does the United States need to take action to better uphold these treaty rights, but this country has a historic responsibility to take significant action as it has been and continues to be one of the largest contributors to global GHG emissions and overconsumption of resources.

Recognizing Indigenous rights and taking climate action would support processes to restore justice for Indigenous peoples across the country and would help the country make strides towards being a global leader for democracy and human rights. The United States holds a unique place, with a history of being internationally looked to as a model democratic governmental structure. The country may have many concerns both domestically and internationally, but the foundational principles of a democracy for the people, and by the people can provides the opportunity to address a number of institutionalized biases through equitable climate action.

> It will not be possible in this integrated world for your heart to succeed if your lungs fail, or for your company to succeed if your workers fail, or for the rich in Los Angeles to succeed if the poor in Los Angeles fail, or for Europe to succeed if Africa fails, or for the global economy to succeed if the global environment fails (Meadows, D. 2008, p 184).

Indigenous Sovereignty—Recognized by Nation-to-Nation Relationship

Since time immemorial, Indigenous people have lived across Turtle Island (the North American continent). The northern Pacific coastal region of 'Salmon nation' consisted of especially rich cultures and resilient environments (Trosper, R.L. 2003). Indigenous peoples lived as sovereign peoples with immensely diverse cultures in equally as diverse ecosystems with culturally relevant political and legal structures (Trosper, R., 2002). Within the United States, the remnants of the plurality of peoples appear in the widely varying nations existing today, comprised of 573 federally recognized tribes (National Conference of State Legislatures, 2018). Twenty-nine federally recognized Indigenous Nations and eight non-recognized Indigenous Nations reside in Washington State (Washington State Department of Transportation, 2018). However, even these political organizations of Indigenous Nations consist of disrupted realities imposed by the colonial government state to homogenize groups into larger confederations like Yakima Nation or Squaxin Island Tribe.

Historically, powerful Indigenous Nations demanded the respect that accompanied the signing of treaties to establish peaceful nation-to-nation relationships

(Harjo, S.S. 2014, p 1). Even the youthful aspiring colonies and associated political European leaders pre-dating the establishment of the United States as a sovereign nation, "admired these Native political systems, which were the working models for the U.S. government" (Ibid, p 2).

> American Indian tribes were considered equals by the founders of the United States for several reasons. The most significant of these reasons was their right to declare war on anyone or group of people who threatened their way of life. They were deemed powerful forces […] [b]ecause American Indian tribes possessed such powerful forces [British and French allies], the United Stets treated Indian tribes like foreign nations and entered into treaties with them in the initial years of their relationship (Charles-Newton, E. & Kronk, E.A. 2013, p 67).

Institutionalized Climate Opposition Violates Indigenous Rights

In light of the United States' political opposition to acknowledging the need to take action on climate change, removal of support for climate action by the US federal government violates trust obligations to uphold Indigenous rights protected through treaty agreements. The United States has a responsibility to uphold trust obligations to Indigenous Nations that have entered into treaty agreements with the federal government to ensure those peoples' well-being is upheld.

A major component of how the federal government supports Indigenous peoples' well-being is through a number of support services administered by the Bureau of Indian

Affairs (BIA) within the US Department of Interior, with a significant portion of the funds for these efforts coming from the sale of natural resources located on reservations from timber, mining, and agricultural leases. The rulings of *Mitchell I & II* uphold the federal government's responsibility to meet obligations of responsible trust management with the findings that the federal government was irresponsibly selling timber contracts on the Quinault Reservation at an undervalued reduced price and as a result did not uphold the well-being of the Quinault Indian Nation (Krakoff, S. & Lavalle, J-D. 2013, p 210).

Executive Order (EO) 13783 (Trump, D.J. 2017) eliminated federal support for climate action and negated the 2009 Department of Interior's Secretarial Order 3289 to address impacts of climate change (William, T. & Hardison, P. 2012 p 63). Eliminating federal support of climate action violates federal trust responsibility to Indigenous Nations by limiting support for climate action capacity building, and also allows for further exacerbation of climate impacts through elimination of GHG emission mitigation requirements. These federal changes also correlate with changes in the BIA's mission statement from that present at the begging of the twenty first century to 2018.

> The Bureau of Indian Affairs' mission is to enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian Tribes and Alaskan Natives. We will accomplish this through the delivery of quality services, maintaining government-to-government relationships within the spirit of Indian self-determination (Hester, Jr., T.L. 2001, p 117).

At some point between 2001 and 2018, the BIA's mission statement was changed to now only include the first sentence (Bureau of Indian Affairs, 2018). Altering the text diminishes the federal government's recognition of the nation-to-nation relationships established through treaty agreements, and the importance of self-determination for Indigenous Nations. This follows in the footsteps of *Lone Wolf v. Hitchcock* (1903) and the plenary power doctrine that allows for exercising power over Indigenous Nations in disregard of reserved rights and trust responsibilities established in treaty making processes (Echo-Hawk, p 113).

Removal of federal support for climate action perpetuates an abusive colonial history that also eliminated the non-competitive BIA funding that supported climate action efforts by a number of Indigenous Nations (The Citizens Potawatomi Nation, 2015). The removal of the BIA's non-completive funding source impairs Indigenous Nations' self-determination and ability to take action addressing climate change causes and impacts. To continue expanding climate adaptation planning and action efforts, new funding strategies need to be utilized, but this will be challenging as many Indigenous Nations are already struggling with limited capacity concerns and now must use greater resource capacity to try and support climate action.

Indigenous Sovereignty in Climate Change Context

Sovereignty as constructed by European and American legal philosophy is fundamental to the basic rights of people to self-determination and self-governance

> and is the internationally recognized power of a nation to govern itself. It forms the legal and political basis for a people to establish custom, law, and traditions and is not conditional upon the consent of an external tribunal (Martinez, C. & Poupart, J. 2002 p 129).

Climate change impacts Indigenous sovereignty and well-being by stressing many ecologically and culturally important foods, water resources, and vital ecosystems. Loss of culturally important food sources make Indigenous Nations and their peoples reliant on outside food sources. Water supplies are being limited by drought leading to reduced well-being (Montag, J.M. et al. 2014). These impacts cause loss of connection to the land and non-human relatives, decreased physical activity that accompanies traditionally harvesting foods, and increases expenses for families as they are no longer able to harvest food from the local environment for minimal monetary costs. These impacts are allowed to occur due to discrepancies of lack of recognition of these impacts even in reporting on climate change (Belfer, E. et al. 2017), let alone about considerations of this by much of the wider public of American culture.

Loss of the important cultural food foundations within the natural environment represents a violation of treaty rights because it negates Indigenous Nations' inherent rights to govern access of places to hunt, fish, and gather important species. Similar concerns are apparent in a climate change impacted future regarding water quality and quantity on tribal lands that are compounded by water rights concerns (McNeeley, S. 2017), but significant case laws exist to attempt to combat these impacts through arguments supported by *Merrion v. Jicarilla Apache Tribe* (1982) supporting indigenous

sovereignty to tax non-indigenous peoples conducting business on Indigenous Nations' lands, *City of Albuquerque v. Browner* (1996) supporting indigenous sovereignty to set water quality standards that must be upheld off Indigenous Nations' lands, *Morris v. Hitchcock* (1904) supporting the ability of Indigenous Nations to establish regulations over their lands and that the United States must uphold if they have been approved by the federal government, *Southern Pacific Transportation Company v. Watt* (1983) supports the need for obtaining Indigenous Nations' consent to projects seeking right-of-way on Indigenous Nations' lands in question like a railroad in this case, and *United Nuclear Corporation v. Clark* (1984) supporting the need for Indigenous Nations' consent to projects like mining development (Charles-Newton, E. & Kronk, E.A., p 75).

Pacific Northwest Trust Obligations Impacts

Numerous treaty agreements were signed across Washington State between 1854-1855 (Richards, K. 2005). These are commonly referred to as Steven's Treaties from the first Governor of Washington and negotiator of the agreements. These agreements are unique because they provide explicit language of reserved rights to fish, hunt, and gather at usual and accustomed areas outside of reservation boundaries, and support both the need and ability to take action on climate change. The United States federal government has a trust responsibility to stop Indigenous Nations' reserved rights in the face of climate change.

Throughout the Pacific Northwest, Indigenous Nations face worsening climate change impacts to salmon populations ranging from habitat degradation, to decreasing

water quality and quantity, and ocean acidification which limits salmon ocean food supplies. Requirements to uphold treaty rights by sustaining traditional foods like salmon are founded on legal precedents such as the recent ruling on the culvert case *Washington v. United States* et al. (2017). This ruling requires Washington State to take action to uphold trust responsibilities that have been impacted by inadequate road culverts that limit access of salmon to upstream habitat in support of salmon population restoration by allowing greater access to high quality habitat to spawn for healthier future populations. Also, the *Boldt Decision* (1974), and *Washington v. Washington State Commercial Passenger Fishing Vessel Association* (1979) upholding the lower court's decision by Judge Boldt in support of reserved Indigenous fishing rights. Also, *Winters v. United States* (1908) recognizes reserved water rights for Indigenous Nations upon establishment of a reservation by the federal government. All of these rulings provide federal legal frameworks within which efforts to equitably address the impacts of climate change can be built from.

The culvert case ruling has major implications for requirements to act to uphold trust obligations by preventing future concerns presented by climate change on salmon habitat consideration needs. Restoration efforts to support salmon needs in a climate impacted future present an opportunity to build in increased road infrastructure resilience considerations. Many existing culverts are threatened by more severe flooding events, increasing the risk of road blow-outs and the potential for large debris to block undersized culverts further limiting salmon passage to spawning grounds (Krueger, K. 2017). Reconstructing inadequate culverts is an opportune endeavor to protect salmon by reestablishing habitat connectivity, as well as to plan for more extreme conditions to

provide greater water passage and in the process develop greater resilience for transportation access and aquatic habitats (Puyallup Tribe of Indians, p 30).

Climate change impacts affect cultural aspects associated with salmon. Important ceremonial traditions, like First Fish celebrations, have already been limited by lack of fish (Puyallup Tribe of Indians, p 24) resulting from climate impacts to watersheds from drought and over allocation of water resources (Dittmer, K. 2013) in conjunction with reduced glaciers that provide the main water source of most rivers in the Pacific Northwest (Grah, O. Beaulieu, J. 2013).

Access to healthy food, active lifestyles, and economic livelihoods are all disrupted in conjunction with cultural connections to the land (Grossman, Z. & Parker, A. p 14). *Kandra v. United States* (2001) established in the case of the Klamath River basin precedent for the responsibility of the federal government to act by supporting treaty trust obligations and Endangered Species Act obligations for traditional foods like salmon, even on off reservation lands to preserve water and habitat over competing claims to water rights from the river by farmers and hydropower utility operators (Echo-Hawk, pp 166-171).

Trust obligations are also violated if important traditional plant food species no longer exist in traditional ranges and result in loss of access to these cultural resources. This is of particular concern if migration due to a changing climate results in species moving outside of both reservation boundaries and the extent of accustomed hunting, fishing, and gathering areas within ceded treaty territories. If species relocate, their care and access may no longer fall within the directly controlled management jurisdictions of

reservation lands and or ceded territories access for Indigenous Nations guaranteed by treaty agreements.

In light of the ruling in *City of Albuquerque v. Browner* (1996) found the City of Albuquerque was required to meet more stringent water quality standards set by Isleta Pueblo, for a wastewater treatment facility discharging into the Rio Grande River, than New Mexico State levels because the city is up river of the Pueblo and impacts the Indigenous Nations' water quality. The court found that the Pueblo's water quality standards superseded the less stringent standards set by the State in order to ensure water quality needs were met for the Pueblo. The legal case can be made to support climate action that meets the reserved treaty rights to traditional food access and the ability to manage these resources off-reservation for their continued existence similar to setting a standard for upholding water quality.

Aforementioned legal precedents establish the legitimacy of claims seeking to drive climate action at all levels of US governments to address impacts to trust obligations for Indigenous Nations. It will be important to apply systems thinking approaches (Meadows, D. 2008) to uphold trust obligations in the face of climate impacts. Prioritizing actions grounded in the understanding of interdependence, a core tenant of indigenous cosmologies (Cajete, p 52), can establish more effective climate action that supports Indigenous rights, livelihoods, and peoples through culturally appropriate actions.

Climate Impacts Exacerbate Reservation Limitations

> When Native leaders reserved territory, they also did not give up off-reservation, gathering, and hunting sites, or sacred places; they did not intend to be bound by reservation borders, but they were forced into confining situations over time (Harjo, S.S. p. 3).

The establishment of reservations perpetuated colonization by using military force to limit historical and culturally relevant migration (approved by *Connors v. United States and Cheyenne Indians* (1898) (Echo-Hawk, p. 178)). These policies sought to eliminate traditional indigenous cultures in favor of the colonial settler preference for lifestyles geared towards turning Indians into stationary farmers (Shurts, S. 2000, p. 4).

Throughout Washington State, many Indigenous Nations were relegated to marginalized coastal lands that present constraints of location, topography, and extent of land base that manifest in climate change concerns today. Due to the limitations of reservation living and institutionalized inequities in the face of climate change, domestic sovereignty may be inadequate to deal with these growing concerns.

For Indigenous Nations in Washington State, climate change compounds historic impacts created by the establishment of reservations as some culturally important species of plants and animals are disappearing from reservations and even ceded treaty territories where fishing, hunting, and gathering are legally permitted at usual and accustomed areas. Also, some Indigenous Nations face climate change adaptation limitations as a result of institutionalized inequities inherent in the physical established of small coastal reservations as these peoples have limited property that is being lost to sea-level rise, threatened by increasing storm surges, and in some cases, have limited ability to relocate

vulnerable built environments to higher ground as a result of local geographic constraints and limited property ownership. This process has played out for the Quileute Tribe, as they have been forced to rely on actions from the US federal government to transfer property rights from nearby Olympic National Park lands to the Tribe so they can begin relocating vulnerable community components to higher ground (Grossman, Z. & Parker, A. 2012 p. 14). There is a need to look to international law frameworks like those reviewed above for more equitable outcomes (Tsosie, R. 2013 pp. 79-80).

Despite these injustices, many Indigenous cultures and people endure as resilient communities working to pass on many aspects of their ways of being that colonizers had sought to destroy in the name of justifying colonial aggressions and continued dominance under the disguise of civilizing the Indians (Harjo, p. 4).

> We have confronted hardships in the past, and it was our strong connection to the land and each other that got us through. Our best chances of success in preparing for what climate change will bring is through our collective commitment to remain steadfast (Puyallup Tribe of Indians, 2016 p. 3).

Climate Change Adaptation Planning as Exercise of Tribal Sovereignty

> Climate policy needs to establish a coherent framework of sustainability at the level of place. For indigenous peoples, an ethics of place is central to their long-standing identity as a distinctive people related through time and tradition to a particular set of lands and natural environment (Tsosie, R. p 93).

Ongoing climate change adaptation planning efforts across Pacific Northwest Indian Country provide shining examples of how Indigenous Nations adaptation can restore human-land relationships centered on the understanding of interdependent existence central to indigenous cosmologies (Cajete, 2000). Indigenous Nations are exercising tribal sovereignty by taking action on climate to regenerate their cultural ways of begin for generation to come (Davis, K. 2013). Recognition of Indigenous leadership can provide healing atonement if applied to mainstream cultural considerations to re-center the context of local through Indigenous frameworks for a more resilient future in the face of climate change.

Indigenous climate change adaptation draws on a long history of coexistence with and respect of local ecosystems while adapting to past climate change, based on important cultural values (Reid, M.G. et al. 2014). Numerous examples provide a decolonized worldview to climate adaptation like the Jamestown S'Klallam Tribe's place-based approach to vulnerability and adaptation planning (Petersen, A.S. et al. 2014), or other efforst from around the United States like that of the Navajo Nation (Nania, J. & Cozzetto, K. et al. 2014). Numerous resources exist to support the continuation of adaptation by Indigenous Nations from tribal white papers on adaptation/mitigation (Sharp, F. et al. 2009), literature reviews of tribal adaptation options (Rose, K.A. 2009), resource guides on tribal adaptation (Lamb, R. & Davis, M.D. 2011; Wotkyns, S. & González-Maddux, C. 2014; Tribal Climate Adaptation Guidebook Writing Team, 2018); and summits on climate change (Black, M. et al. 2015).

A variety of justice focused adaptation approaches (Whyte, K.P 2013) including reestablishing traditional practices like controlled burning (Storm, L. & Shebitz, D. 2006), traditional natural resource use for basketry (Shebitz, D. 2005), implementing Indigenous inspired sustainable building approaches (Baker, M. et al. 2015), or reestablishing indigenous food systems in the face of climate change (Lynn, K. et al. 2013) exercise sovereignty in the face of climate change. Sovereignty even looks like managing for a healthy environment by establishing regulation to provide sustainable natural resource management on tribal lands (Ford, J.K. & Giles, E. 2015). Recognition of efforts to address climate change impacts on tribal sovereignty provide critical insights for equitable climate change adaptation planning efforts.

Resilient Indigenous Food Systems

It is important not only to preserve the presence of and access to traditional indigenous foods to uphold treaty rights, but also to recognize in fact, that traditional food systems are more resilient to climate change than modern globalized industrial agriculture despite their limited utilization as a result of the impacts of colonization (Turner, N.J. et al. 2013). “Traditional systems share a surprising number of tendencies at a very general level. They tend to have a very highly planned and associated biodiversity, and to employ that biodiversity to utilize all available habitats in the agro-ecosystem” (Perfecto, I. et al., p 64). Additionally, traditional foods can be cultivated and gathered as part of functioning agro-ecosystems. As Winona LaDuke, a leading Indigenous food advocate, puts it:

> Indigenous agriculture is really the only future of agriculture; that is, agro-diversity, a multitude of crops adapted for the land, not adapting the land for industrial crops. That agriculture, as explained by Toby Hodges, must be connected to community land and seed ownership and biodiversity. It is, in other words, not just the seeds, but the ecosystem and the people. There are several reasons for this: First Indigenous peoples continue to live in a restorative and sustainable food system, when we control our lands, and our seeds. Second, Indigenous food producers and farmers are already adapting crops in the face of climate change through the intelligence of seed selection and cropping systems which have been passed down through the millennia. Third, Indigenous farmers are already producing up to 70% of the food eaten in communities, while industrialized agriculture, with its' upwards of $13 trillion in investments (according to Pat Mooney of the ETC), cannot actually feed the world; and Fourth, our food is cool (LaDuke, W. 2016, p 235).

Traditional foods are more resilient to climate change than mono-cropping operations because mon-cropping lacks basic ecosystem functions of various organisms supporting the growth of others in a closed loop system and are built on the commonly known concept of Traditional Ecological Knowledge (TEK) or Indigenous Ecological Knowledge (IEK) (Williams, T. & Hardison, P. 2013). First foods are an Indigenous cultural world view for the peoples of the Pacific Northwest region that makes explicit the connection between peoples and place in relationship with the main four categories of first foods including: roots, berries, animals (four-legged peoples), and fish.

Mono-cropping is the predominant approach of industrialized food production allowing for production at the landscape scale facilitated by industrial machinery and minimized human labor for mass production of a limited number of commodity crops. Industrialized food production is dependent on many external inputs from global capitalistic economies that consume massive quantities of water; transportation infrastructure, fuels, and vehicles; chemical fertilizers, herbicides, and pesticides; and expensive industrial scale farming equipment (Lee, K.N et al. 2013 p 343; Elliott, J., pp 208-209). The approach of command and control applied to industrial agriculture views the land as a food producing machine that solely needs added chemical inputs and excessive water use. This worldview is completely contradictory to Indigenous worldviews and practices that encompass,

> an 'attitude of humility,' with the belief that nature will generally do a better job than humans at adapting ecosystems to new, climate-induced baselines. Humility is a core principle of, at least, American Indian world views and is implicit in other indigenous approaches to the natural world (Burkett, M. 2013 p 111).

Indigenous traditional food systems do not engage with the land in relationship for only resource production like that of modern industrial agriculture, but have many deeper understandings of the reciprocal relationship that nurtures all participants. Indigenous food systems reinforce connection to the land and the plant species that grow from it in that place. The growing, harvesting, and eating of food through agro-ecological

process is viewed as both nourishment for the body, but also for the mind and spirit (Timmermann, C. & Félix, G.F. 2015).

Some indigenous food systems are completely dependent on ecosystems in a hunter/gatherer approach, while others resemble commonplace practices of agrarian lifestyles today. Despite some indigenous agrarian practices sharing rudimentary similarities with mono-cropping approaches of the industrialized approaches widely practiced today, Indigenous approaches are fundamentally different. Modern approaches separate food production from the rest of the environment, while indigenous systems view these as one and the same.

No indigenous food system relies on mono-cropping, even if they may seem like it at first glance; corn production is indigenous to the American continents and has been widely practiced for thousands of years. However, in indigenous agricultural systems corn is never grown in mono-crops, but with companion plants like the commonly known three sisters approach that integrates corn grown on mounds with beans trellised on the corn, and squash plants spreading around the surrounding area. These plants support each other with the appropriate soil nutrient needs as beans sequester nitrogen into the soil that the corn and squash growth would otherwise be limited without this added support, and the squash acts as an effective ground cover to limit the growth of other competing plants in the system. Corn production was often accompanied by sunflowers as crop barriers, as these were able to grow tall enough to limit wind dispersal of corn pollen to naturally control production of multiple varieties of corn species in close proximity without unintended cross pollination (EchoHawk, A. EchoHawk Kawe, E., 2018).

Sustainable locally controlled traditional indigenous food systems can provide a less environmentally degrading alternative to large corporate industrial agri-business and growing monopolies on food crops that's origins date back to the development of the Green Revolution (Elliott, p 213). Inequities in food systems both in the United States and internationally arise from agricultural policies that subsidize ineffective conventional industrialized farming methods, and this lack of focus on producing healthy nutritious foods leads to limited access as these options are often more expensive as a result limiting access to many low income people based on their individual economic capability as well as proximity as many smaller food sellers will not have these options available due to limited ability to sell creating food deserts (Walker, R.E. Keane, C.R. & Burke, J.G. 2010).

In the United States, subsidies support production of commodity crops, conservation programs, disaster programs, and crop insurance. The agricultural production subsidy system drives industrialized processed food production based around crops like corn, wheat, and soybeans. These production systems are often controlled by multi-national corporations that control agricultural production, processing, distribution, and marketing of these products. The monopolization of industrial food systems leads to the cheapest food being the least nutritionally beneficial options leading to result health benefits associated with malnutritious diets (Pollan, M. 2008; Franck, C. et al. 2013).

Large-scale landscape land-use conversion to conventional industrial agriculture destroys ecosystems, and soil health resulting in the need for extensive fertilizer application to support production on increasingly less productive soil. The excessive application of fertilizers has more than doubled the rate of nitrogen input into the

terrestrial nitrogen cycle (Moran, E.F. 2010, p 11). Industrial agricultural production methods in conjunction with industrial animal agriculture cause excessive nutrient-runoff issues leading to polluted and degraded aquatic ecosystems (Beman, J.M. Arrigo, K.R. & Matson, P.A. 2005), and significant pollution of methane into the atmosphere (Kamb, L. 2003).

Industrial corporations have even taken over food crop plant production through the implementation of Genetically Modified Organisms (GMO). The development of unique GMO crops allows for the establishment of patented varieties that provide ownership of seeds to the controlling patent holder (Kerle, C. 2007). The legal process of establishing a patent on the GMO fundamentally revokes control of the seeds for the crop from farmers, allowing biotechnical companies to guide farmers into a cycle of needing to buy seeds year after year and away from previous norms where farmers could save seeds from the previous year's harvest at minimal cost to provide the foundation for the next year's crop (Gonzalez, C.G. 2007). Legal concerns of GMO's and the copywriting and patenting of genetic information are hotly contested by those in favor (Salzberg, S. 2013) and those opposed (Lappé, F.M. 2011) and will continue to boil in the face of the destabilizing climate changes (Elliott, p 214).

> Genetically Engineered crops pose spiritual as well as health and ecological problems for our people. Dana Eldridge, Diné scholar, has been analyzing food systems for the Navajo Nation explains. GMOs, she says, threaten both the ownership of Native seeds and the spiritual aspects of food (LaDuke, 2016. p 234).

Chapter Conclusion

This concludes the chapter on the context of Indigenous Nations in light of climate change. This chapter has overviewed some of history of Indigenous Nations in the context of Washington State and how these peoples are disproportionately impacted by climate change. The chapter provides a number of examples of existing laws that drive the need for action on climate change with regard to Indigenous Nations concerns. A number of lessons learned from indigenous understanding provide examples of how to effectively take action on climate change moving forward. This leads to the following chapter which communicates that applied theoretical framework of analysis applied to analyzing existing climate change adaptation planning efforts in Washington State by Indigenous Nations and county governments.

Chapter 4: Theoretical Framework

Chapter Overview

The following chapter provides an overview of existing literature including peer-reviewed academic journal articles, books, NGO reports, government documents, and other sources to connect across interdisciplinary works related to climate change adaptation plans. It introduces the theoretical frameworks of this analysis—systems thinking analyzed through political ecology—including relevant research around climate change adaptation theory and utilization, in relation to climate justice equity considerations through an intersectional lens. Decolonize of my perspective of analysis was attempted by looking to an indigenous worldview when possible related to considerations of equitable climate change adaptation.

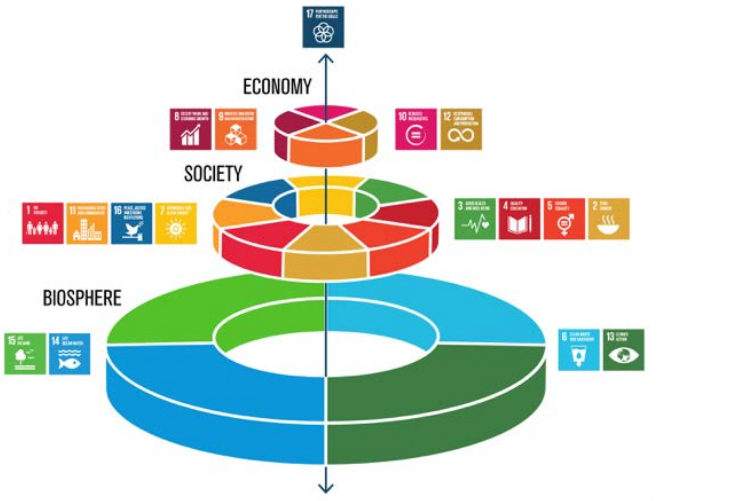
Theoretical Framework

The following section presents the theoretical framework used throughout this analysis centered on the concept of systems thinking applied in conjunction with political ecology understandings. Systems thinking requires understanding that the world consists of interconnected and nested systems that have interrelated feedback loops effecting the functioning of all things within that system (Meadows, D. 2008). Applying systems thinking to the climate adaptation planning analysis provides insights into the limitations of actions being taken by various governments. An analysis of government actions lies at

the heart of my thesis inquiry. Systems thinking also informs the focus on decolonization to move away from the current singular and limited dominant cultural focus present in the United States through Western culture.

Political ecology (Robbins, P. 2012; Taylor, M. 2015) meets the criteria of my theoretical framework of systems thinking, engaging interdisciplinary approaches and focusing on the integrated relationships of environmental, social, economic, and political systems all influenced by power dynamics (Campbell, D. & Olson, J. 1991). Political ecology recognizes we live in an unequal world that is influenced by interactions between the four aforementioned system of consideration. Understanding the intersectional (Crenshaw, K. 1991; Carbado, D.W. et al. 2013) influences of inequities in these four systems provides an informed perspective on the establishment of power differentials in regards to climate justice considerations being included into climate adaptation planning. Systems thinking combined with political ecology provides a foundational interdisciplinary consideration for climate adaptation planning to assess equity considerations in climate change adaptation plans.

Figure 1: Birthday Cake Model (Stockholm Resilience Centre, 2016)



The "birthday cake structure" pictured above (Stockholm Resilience Centre, 2016) provides a standard visualization of typical conceptions of the systems structurally interacting in the world through a Western cultural view. This conceptualization of systems presents fundamental limitations by lacking a political focus when viewed in regards to political ecology understandings. A conflict also exists from the hierarchal focus of this image communicating a message that some of the considerations are more important than the others.

Decolonization of thought is central to my thesis research and has been centralized in my focus by examining Indigenous government efforts to that of colonial state local level efforts at the county government scale. Applying decolonization to the lens of my analysis of systems thinking in conjunction with political ecology provides a critical perspective on the underlying meaning of common Western cultural perspectives, and their predominantly growing utilization in a future influenced by climate change (Kent, G. 2014). A decolonized perspective of the above pictured "birthday cake" of Sustainable Development Goals (SDGs) shows that the hierarchal consideration of various systems and the lack of political considerations presents an incomplete perspective on how to view relationships in the world around us.

Colonial worldviews are limited in perspective because of a need to hide fundamental inconsistencies with perception of existence in the world. To decolonize my understanding of systems thinking in conjunction with political ecology, I looked to the example of the Anishinaabeg Medicine Wheel for guidance as this symbology contains many levels of interdependent knowledge. The image of a circle represents all the world

as a single whole, while being composed of four different quarters that complete the whole. My theoretical framework for analysis consisted of viewing the four systems of political ecology (ecological, social, economic, and political) as four components in the Medicine Wheel.

Figure 2: Representation of Anishinaabeg Medicine Wheel

Political Ecology Systems Framework

The following sections overview relevant research broken apart by the four categories of political ecology to present climate change adaptation planning concerns related to these topics to show the diversity of thought related to climate change adaptation planning across a range of interdisciplinary fields. This review is extensive in breadth due to many considerations showing the strength of engagement across a variety of fields of interest. Despite these systems being designated as separate system, many of

the considerations cover below relate to intersectional concerns, but due to already extensive nature of this information it is more effective to present it in this distilled format. The thesis analysis of existing climate change adaptation plans in Washington State by Indigenous Nations and county governments generated qualitative codes based off considerations below, as an emergent grounded theory approach (Glaser, B. & Holton, J. 2004) to equity considerations regarding the practice of adaptation.

Ecological system focus

Ecological systems considerations in climate adaptation planning cover a wide range of topics. Some of the predominant focuses of ecological equity in climate change adaptation relate to ecosystems as dynamic systems, water and watershed considerations, changes in phenology of species in ecosystems, forestry concerns, wildfires, sea-level rise, and ecosystem services. Each of these topics will be overviewed in regards to existing literature.

Ecosystems as a whole are being planned for in climate adaptation. Ecosystem are being considered in regards to how adaptation development actions will result in impacts that need to be assessed (Enríquez-de-Salamanca, Á. et al. 2017), as well as how ecosystem management practices need to adjust in light of climate change concerns (Stein, B.A. et al. 2013). Ecological concerns for improving adaptation need to focus both on species (Rowland, E.L. et al. 2011), as well as ecosystem structures impacted by natural resource management practices (Cross, M.S. et al. 2013). Some researchers have addressed the need to engage ecosystem considerations at the scale of a contiguous

ecosystem context over a narrow politically defined boundary of consideration (Shi, L. 2017). Ecosystem-based adaptation is even a growing field of climate adaptation with a particular focus on urban ecosystems (Geneletti, D. Zardo, L. 2016), and the benefits they can provide as natural infrastructure adaptation solutions (van de Ven, F.H.M. et al. 2016).

Water is a critical concern of ecosystem equity in climate change adaptation planning. Water resource management practices are being adapted to climate change (Johnson, T.E. & Weaver, C.P. 2009; Stucker, D. & Lopez-Gunn, E. 2015) in light of concerns for ethical allocation of water to ecosystems (Jennings, B. et al. 2009). Water rights management is being adapted at the watershed scale (Bark, R.H. et al. 2012) which are especially important in Washington State for Indigenous Nations (Cozzetto, K. et al. 2013). Stakeholder engagement considerations are important at the watershed adaptation scale (Smolko, B.A. et al. 2002), in order to facilitate effective collaborative (Ryan, C.M. & Klug, J.S. 2005) planning across the extent of the watershed (Lemieux, C.J. et al. 2014). Watershed adaptation in Washington State presents challenges to meet competing demands created by extensive use of hydropower dams (Del Bene, D. et al. 2018), and could benefit from increased utilization of water equity frameworks (United States Water Alliance, 2017). Climate change presents the need to adapt to concerns of impacts to drinking water sources both from flooding contamination concerns and drought influences on overall availability (Boholm, Á. & Prutzer, M. 2017).

Sea-level rise presents a number of intersectional equity concerns for adaptation regarding ecological, socio-political, and economic concerns for many waterfront developments and results in considerable adaptation planning focuses. Adaptation in

response to sea-level rise includes shifts in urban planning practices (Hurlimann, A. et al. 2014) but often have to plan with limited capacity for uncertain outcomes (Barron, S. et al. 2012). Sea-level rise adaptation planning must balance concerns for coastal habitats impacted by these physical changes (Glick, P. et al. 2007) in conjunction with perceptions of social values of coastal areas (Graham, S. et al. 2013).

Forests are of vital concern for ecological equity in climate change adaptation planning. Forest management is viewed as an act of both climate adaptation and mitigation (D'Amato, A.W. et al. 2011; Halofsky, J.E. et al. 2018), and some researchers argue for the need for forest practitioners to act as agents of change through applying adaptation practices (Nelson, H.W. et al. 2016). These actions are needed because forest vegetation types are already changing (Halofsky, J.E. & Peterson, D.L. 2016), as well as the dynamics of forest succession (Laflower, D.M. et al. 2016). Adaptation in this context is pertinent to support continued effective co-management of forestry by state agencies and Indigenous Nations (Diver, S. 2016), especially with the need for considerations to adapt to a future impacted by increasing forest fires (Stephens, S.L. et al. 2013). Forestry certification standards can help to support more effective adaptation through informed actions (Collier, R. et al. 2002), and may be beneficial in meeting needs for adaptation of family owned forests (Grotta, A.T. et al. 2013). Agroforestry practices also present unique approaches to adaptation in a changing climate (Luedeling, E. et al. 2014).

Fire is a critical concern for ecological equity in climate change adaptation planning. Fire has played an important role in both human development (Pausas, J.G. & Keeley, J.E. 2009) as well as in shaping plant communities (Williams, G.W. 2002) as it has been an ecological management tool utilized by Indigenous peoples for thousands of

years, including in Washington State. Fire can be used to restore resilient ecosystem dynamics in fire-prone inland forests of the Pacific Northwest (Hessburg, P.F. et al. 2015). Establishing more responsible use of fire can support adaptation effort to developing fire-resilient communities (Smith, A.M.S. et al. 2016). The framing public policy for fire management as climate adaptation is vital as it can help to garner increased community support for efforts if it is framed as a resilience measure over the more politicized topic of climate change (Bosomworth, K. 2015). Adaption efforts need to take into consideration implications of soil erosion after severe fire impacts (Ravi, S. et al. 2010), and these concerns can be mitigated by reestablishing controlled burning practices to reintroduce lower severity fires that do not harm ecosystems in the ways major severity fires do. Some researchers express concerns of fire implications on carbon storage in Pacific Northwest forests (Law, B.E. & Waring, R.H. 2015 which again can be influenced through the adaptation practice of reestablishing controlled burning to limit major fires that release significantly more carbon back into the atmosphere and kill many trees that would otherwise continue sequestering carbon to address climate change drivers.

Phenology is the science climate influences on reoccurring annual phenomena of animal and plant life. Timing of seasonal events are increasingly out of balance and disrupting synergetic relationships between plants and animals as a result of climate changes including impacts to migratory marine species (Anderson, J.J. 2013), changes in bird migration timing (Both, C. & Visser, M.E. 2001), and changes in timing of plant flowering (Anderson, J.T. et al. 2012). These phenological changes have been associated

with declines in migrating bird species (Both, C. et al. 2006). Ecological equity in climate adaptation must take these changes into account.

Ecosystem services are benefits that natural systems actively provide, reducing the need for engineered solutions. Some of these considerations are now utilized in climate adaptation solutions focused on restoration and preservation of various ecosystems to provide greater ecological equity. Support for ecosystem services are being put into action (Lafortezza, R. & Chen, J. 2016), particularly through ecosystem manager as a form of climate change adaptation (Munang, R. et al. 2013). Ecosystems that relate to adaptation efforts include mountain ranges (Mojica, J. et al. 2018), forests (García-Nieto, A.P. et al. 2013), watersheds and rivers (Flores, L. et al. 2017), wetlands (Trepel, M. 2010), urban agriculture (Clinton, N. et al. 2017), near shore ecosystems (Flores, L. & Schundler, G. 2014); and esturaies as sources of " blue carbon" for storage of carbon in anaerobic state limiting decomposition (Vierros, M. 2017) in conjunction with restoring seagrass (Greiner, J.T. et al. 2013). Assessments of ecosystem services have included analysis of global scales (Costanza, R. et al. 1997); as well as local level assessments for places like Thurston County, Washington (Flores, L. et al. 2012). Ecosystem services also have cultural values that have been assessed at the community scale (Plieninger, T. et al. 2013). Ecosystem services as climate adaptation focuses have also been applied to practices like green roofs (Fjendbo Møller Francis, L. & Bergen Jensen, M. 2017). Expanding the considerations of ecosystem services in adaptation efforts can help to reinforce human connections to the natural world (Comberti, C. et al. 2015), and have implications for environmental justice (Aragão, A. et al. 2016). Ecosystem services have an economic underpinning in the field of ecological economics research that can provide

greater information to policy makers of the benefits of applying ecological equity considerations in climate adaptation efforts (Gómez-Baggethun, E. et al. 2010).

Social system focus

Social systems considerations in climate change adaptation planning cover a wide range of topics. Social equity considerations identified in existing literature rage from focuses on built environment, health considerations, climate change displacement, food security, communication, education, and rural considerations. Each of these topics will be overviewed in the context of the literature available related to climate change adaptation planning of social equity considerations.

A general social equity consideration in climate adaptation relates to the developing field of community-based adaptation (McNamara, K.A. & Buggy, L. 2017). This is a beneficial scale of consideration because it helps to underscore the fact that adaptation to climate change is a dynamic social process that takes collective action to be achieved (Adger, W.N. 2003). Some researchers have compiled equitable community adaptation guides to assist these efforts (Yuen, T. et al. 2017). When focusing on community aspects related to climate change adaptation, it is important to also consider social limitation that may hinder adaptation (Adger, W.N. et al. 2009), and how histories of institutionalized inequities influence climate change adaptation efforts (Adamson, G.C.D. et al. 2018).

Climate adaptation has been utilized in the built environment thorough a variety of approaches that revolve around ways to create more equitable social environments

within which communities exist. Sustainable design has been applied to provide social justice (Wendt, A. 2009) through considerations to meet affordable housing needs (Cohen, N.E. 2017) and has proposed solutions like accessory dwelling units to increase urban density and provide more affordable housing options (MRSC, 1995). Community engagement plays a major role in ensuring affordable housing needs are met (Ridings, A. & Nakintu, S. 2018) in order to avoid impacts from inequities such as gentrification (Formoso, D. et al. 2010). Equity framework of urban green spaces are vital to consider the potential impacts that needed ecological projects might have on gentrification (Nesbitt, L. et al. 2018), as well as inequitable siting and limited accessible to these vital community resources (Wolch, J.R. et al. 2014). Some researchers have analyzed impacts urban land use planning on the urban poor when enacting adaptation plans from both commission, impacts affecting or displacing poor, and omission, acts that prioritize special interests over the poor (Anguelovski, I. et al. 2016).

Research on the built environment also recognizes the influence the current built environment has on health outcomes (Srinivasan, S. et al. 2003; Taylor, W. et al. 2014), including disproportionate impacts from effects like the urban heat island effect (Jesdale, B.M. et al. 2013; Aleksandrowicz, O. et al. 2017). In response to these concerns efforts like the Living Building and Community Challenge have been enacted in adaptation efforts to create a built environment that better meets social and ecological health needs (International Living Future Institute, 2018 b). Implications of these efforts to shift practices in the built environment recognize benefits like green infrastructure and roofs utilizing indigenous vegetation to mitigate urban heat island effect (Breuste, J.H. 2004; Norton, B.A. 2015; Suter, I. et al. 2017). These practices are grounded in the concepts of

regenerative and biophilic design that seek to mimic ecological functions in the built environment for healthier communities (Plessis, C. 2012; Browning, W. et al. 2014; International Living Future Institute, 2018 a). These design practices act as social equity in the face of a future impacted by climate change (Melton, P. 2013) by incorporating local climate science understandings into the built environment (Beauvais, N. et al. 2015) so they are adapted to function effectively in climate altered future (Logan, K. 2017). The building industry will continue to play a role in adapting to climate change (Melton, P. 2016); and can increase social equity by integrating food production into urban built environments (Wilson, A. 2009), or implementing low impact development (LID) standards into urban areas (Wright, T.J. et al. 2016). Considerations such as these have been assessed through urban adaptation frameworks (Carter, J. et al., 2015) to provide greater social equity.

Health concerns are a critical component of social equity in climate change adaptation planning. Climate change has been documented to have significant impacts on ranging from respiratory concerns from decreasing air quality (Jackson, J.E. et al. 2010), heat related illnesses and deaths (Joe, L. et al. 2016), mental health (Page, L.A. & Howard, L.M. 2010), and a variety of other concerns (Environmental Health Perspectives & The National Institute of Environmental Health Sciences. 2010; Grasso, M. et al. 2012; Rao, S. et al. 2013; USGCRP, 2016). Health impacts are projected to be compounded for people in vulnerable situations like incarceration (Montanya, N.C. & Valera, P. 2016), highlighting the need for intersectional work on health and climate change equity action (Rudolph, L. et al. 2015). Systematic health disparities can be avoided through active

effort to equitably support marginalized populations (Braveman, P.A. et al. 2011) that are impacted by the political nature of health inequities (Ottersen, O.P. et al. 2014).

In light of the significant health impact from climate change, there is hope that these concerns can support improved public engagement in addressing climate change as research shows framing climate change through public health perspective has a positive correlation with more increased action (Myers, T.A. et al. 2012). Community-based adaptation frameworks provide models for improving these communications to address health impacts of climate change (Ebi, K.L. & Semenza, J.C. 2008), and can highlight the need to consider happiness and well-being in light of climate change impacts (Lissner, T.K. et al. 2014; Helliwell, J. F. et al. 2018). Other research even docuemnts the link between lower emission lifestyles and improved personal health (Quam, G.M.V. et al. 2017) providing further support to address social equity in climate adaptation planning.

Displacement is a growing social equity concern that must be addressed by climate change adaptation planning. Displacement as a result of climate change is a traumatic experience and people need to be supported in their time of need by having societies act compassionately towards them (Lu, H. & Schuldt, J.P. 2016). Researchers have identified the need to provide equitable health care older adult refugees as they have a difficult time adjusting to life in a new place (Miner, S.M. et al. 2017). Some people are being displaced as a result of carbon trading effects as areas are established as carbon offset zones and people are then excluded from residing in these places leading to displacement (Reddy, T. 2008). The Puget Sound region will continue to be a destination for climate refugees as there are already significant international communities in the region and this should be planned for by climate adaptation efforts (Saperstein, A. 2015).

At the local level, people are also being displaced by impacts of sea-level rise in conjunction with managed retreat from coastal inundation (Dyckman, C.S. et al. 2014). These impacts are an important concern related to coastal tribal communities (Koppel Maldonado, J. et al. 2013). Social equity in climate adaptation needs to account for the movement of people and be accepting of people who have faced these impacts of dislocation.

Food security presents social equity concerns for climate change adaption planning adaptation planning to ensure food is available to all people despite potential climate impacts. Climate change presents concerns to food safety (Kirezieva, K. et al. 2015) and can impact food security by effecting production and transportation (Wheeler, T. & von Braun, J. 2013). The implementation of these understandings have been investigated in 18 state level adaptation efforts for considerations of food and agriculture policy (Robbins, Z. 2014). Climate adaptation will play a key role in ensure continued food security in a climate impacted future (Lobell, D.B. et al. 2008), by applying efforts to adapted agriculture production to changing climatic conditions (Lipper, L. et al. 2014) while also confronting multiple institutionalized problems like monopolization of land for industrial practices that effect local food sovereignty (Rosset, P. 2011). Local agriculture and food banks supporting community food needs will play a key role in ensuring food security (Vitiello, D. et al. 2015). Adaptation of agricultural production has the opportunity to support the preservation of biodiversity while achieving food security (Hannah, L. et al. 2013). A new research approach related to adaptation is growing in interest around the water-energy-food nexus approach (Holtermann, T. & Nandalal, K.D.W. 2015).

Communication is a key social equity factor for climate adaptation trying to understand what methods help to engage an audience and promote collective action on climate change. Communication of climate change adaptation needs to consider framing to make efforts accessible to a wider audience (Leombruni, L. 2015). Communication of government efforts on climate adaptation can be better supported through collaborations with boundary chain organizations to relay technical information to the wider general public or specific partners (Kirchhoff, C.J. et al. 2015). Communication can also be improved by applying insights from psychological sciences (van der Linden, S. et al. 2015) that can support the formation of personal ownership to engage in climate action locally (Moser, S.C. et al. 2011). Providing accessible comparisons between policies can provide standardized overviews of plans across the field of climate adaptation planning (Vogel, B. & Henstra, D. 2015). Neighborhood-based community outreach is a desirable approach to develop more personal support for climate adaptation action as evidenced in St. Paul, Minnesota area where significant community engagement allowed for community concerns around climate change to be communicated directly to city officials in a structured manner (Phadke, R. et al. 2015). Communication is a vital component of social equity in climate change adaptation planning.

Education is an important component of social equity in climate change adaptation planning. Research has shown that having greater awareness of climate change improves adaptive capacity for individuals (Striessnig, E. et al. 2013), and supports improved human adaptation at the societal scale (Smithers, J. et al. 2009). Education is recognized as a vital component of climate change adaptation planning and can help to better support social equity.

Rural communities are important actors in climate change adaptation, but have not been widely engaged in these efforts to date which limits the social equity of existing adaptation efforts (Lal, P. 2011). This may be the result of the social context of a tendency towards conservativism in rural areas in conjunction with the politicization of climate change into partisan concerns seen as more of a liberal focus. This divide also follows a similar pattern of polarization between urban and rural contexts. This is a major concern as rural areas face significant threats from climate change, and may have more limited capacity to address these concerns. Many Indigenous Nations exist in a rural context and have a need for specific climate adaptation related to unique geographical concerns (Jha, S.K. et al. 2017). Climate adaptation planning can provide greater social equity by placing a more direct focus on rural considerations.

Economic system focus

Economic systems considerations in climate change adaptation planning cover a wide range of topics. Economic equity considerations identified in the literature include a variety of impacts leading to greater costs associated with climate change, but also solutions to climate change that can create economic benefits, as well as some concerns with current proposals related to establishing new economic mechanism related to climate change. Economic equity considerations in relation to climate change adaptation planning are reviewed in the following sections.

The economic impacts of climate change of the United States have been review regionally, and highlight the rising costs of inaction on addressing climate change (Ruth,

M. et al. 2007). Economic impacts are occurring as home insurance costs are rising in response to risks from climate change impacts (Hoffman, A.J. 2018). Sea-level rise is leading to reductions in home values in a number of coastal areas (First Street Foundation, 2018). Climate change is impacting agricultural output and related agrarian economies (Deschênes, O. & Greenstone, M. 2007), as well as impacts labor workers' health and ability to work which has trickle down economic impacts (Kiefer, M. et al. 2016). Government actions in response to climate change have been limited and the costs of climate impacts will not only be felt at the governmental scale, but also by individuals who must face concerns of relocation or protect in place due to erosion by sea-level rise, or increasing costs of fire fighters and potential loss of personal property (Huntington, H.P et al. 2012). Belief in economic freedom fuels climate change skepticism and adds to these economic concerns (Rossen, I.L. 2015).

Economic analysis methodologies of climate change impacts provide information to decision makers to assess policy implications of climate adaptation approaches (Markandya, A. et al. 2014; Rouillard, J. et al., 2016). A shift is occurring with some researchers and governments recognizing the economic opportunities available from establishing climate adaptation actions (Bulla, L. et al. 2014). Considerations of smart growth to support economic gains are being considered as adaptation options in the face of climate change (Kooshian, C. & Winkelman, S. 2011). However, economic equity will not be achieved unless economic solutions are implemented in support of marginalized peoples in the face of climate impacts (LaDuke, W. 2008). An important economic equity consideration is the need to divestment from fossil fuels and remove support from the main drivers of climate change (Kim, M. 2018). Some researchers view industrial

adaptation as innovation that can address climate change concerns (Rodima-Taylor, D. et al. 2012). Some economic proposals in response to climate change concerns present negative implications as a result of the establishment the carbon market due to the resulting harms that are perpetuated on marginalized communities like lack of access to traditional territories and ecosystems to continue on cultural ways of being so that corporations can pay to continue polluting the atmosphere (Gilbertson, T. 2017);

Waste is an important economic equity consideration for climate change adaptation planning. Existing adaptation efforts failing to recognize the benefits of addressing food waste as action option (Moore, R. 2017). and the need to establish more efficient use of resources as climate adaptation efforts (Koop, S.H.A. & van Leeuwen, C.J. 2017). Product designs need to consider life cycle impact assessment as adaptation options to reduce wastefulness (Nakano, K. 2015). Waste needs to be recognized as an important economic equity consideration for improved climate change adaptation planning.

Political system focus

Political systems considerations in climate change adaptation planning engage with a wide range of topics as evidenced through literature reviewed. Political equity considerations included topics of scale of application, policy approaches, actions, and collaborations. Political equity considerations are reviewed in the section below.

The scale of adaptation application plays a role in the specificity of development approaches for adaptation planning (Urwin, K. et al. 2008; Jones, S. 2014; Leggett, J.A.

2015; Geneletti, D. et al. 2016; Vogel, B.A. 2016, Dhar, T. & Khirfan, L. 2017). Significant climate adaptation efforts have focused on international agreements and national action plans (United Nations Development Programme, 2009; Leggett, J.A. 2015; Wuebbles, D.J. et al., 2017). However, there is a growing need to focus on sub-national action planning, and in particular an emphasis on local efforts (Cruce, T.L. 2009; Poyar, K.A. & Beller-Simms, N. 2010; Moser, S.C. & Ekstrom, J.A. 2011; Broto, V.C. & Bulkely, H. 2013; Jones, S. 2014; Kettle, N.P. & Dow, K. 2014; Masson, V. et al. 2014; Robbins, Z. 2014; Carter, J.G. et al. 2015; Geneletti, D. et al. 2016; Havko, J. et al. 2017; Lawson, A. et al., 2017; McNamara, K.E. & Buggy, L. 2017).

Local adaptation (Nordgren, J. et al. 2016) and most governments up to global actions (Bierbaum, R. et al. 2013) lack effective implementation and subsequent evaluation of climate change adaptation efforts (Star, C. 2012). Reviews of equity considerations in planning efforts from federal, state, and city plans highlighted the need for greater governmental advocacy to improve climate change actions (Kye, P. 2017). At local level, climate adaptation plans are limited by difficulties addressing uncertainty in climate adaptation planning (Stults, M. & Larsen, L. 2018), and to incorporate changes to building codes (Stults, M. & Woodruff, S.C. 2017). Top-down adaptation approaches limit local adaptation planning efforts leading to advocacy for greater support of bottom up approaches, but bottom-up approaches require significant collaboration for success (Amaru, S. & Chhetri, N.B. 2013). This is supported by research findings that municipalities often act in partnership with a wide range of actors (Broto, V.C. et al. 2013). Political flexibility is required to support equitable climate change adaptation planning.

Adaptation approaches influence political equity considerations in climate adaptation planning. Political equity is negatively impacted by reactionary approaches to climate change related events (Bosello, F. et al. 2009; Burton, I. 2009; Moench, M. 2009; Schipper, E.L.F. 2009 a & b). Proactive approaches create political support for adaptation (Kelly, P.M. & Adger, W.N. 2000; Cruce, T.L. 2009; Poyar, K.A. & Beller-Simms, N. 2010; Masson, V. et al. 2014; van de Ven, F.H.M. et al. 2016) such as getting vulnerable structures out of floodplains, or creating spaces for community cooling centers in response to growing impacts of the urban heat island effect. Rebuild in place is an ineffective reactionary measure that has been institutionalized by some government requirements (Clancy, J.B. & Grannis, J. 2013).

Another planning approach improving political equity in climate change adaptation planning is the focus on outcomes based plans compared to component based planning approaches. Outcomes-based approaches are developed in a forward-thinking perspective leading to plan development occurring from back-casting practices, while component based approaches compile a list of actions and try to apply as many as possible. One creates a vision of what the world can look like moving forward, while the other creates checklists to keep things similar to how they are currently. Climate adaptation planning has a high frequency of technical approaches, a medium frequency of social and economic approaches, and a low frequency on ecological approaches (Geneletti, D. & Zardo, L. 2016; Enríquez-de-Salamanca, Á. et al. 2017), indicating a reliance on component-based approaches. Many adaptation approaches have been prescriptive in nature, relying on narrowly focused component-based approaches (Broto, V.C. & Bulkely, H. 2013; Masson, V. et al. 2014; Holtermann, T. & Nandalal, K.D.W.

2015; Doherty, M. et al., 2016). Political equity in climate change adaptation planning can be improved from increasing the application of outcome-based adaptation approaches.

Infrastructure considerations are of critical political equity concern for climate change adaptation planning efforts. Infrastructure investments are needed throughout the Pacific Northwest region, and present the opportunity to implement sustainable investments for the coming century in response to changing climate (Roth, R. & Partridge, C. 2014); Road infrastructures are threatened by climate change impacts (Schweikert, A. et al. 2014), and will need to be built to with stand increased flooding and heat concerns.

Green infrastructure projects for storm water and wastewater management systems concerns are important political equity considerations in climate adaptation actions because governments are responsible for upholding environmental quality standards (Matthews, T. et al. 2015; Roth, R. & Mazza, P. 2017). Constructed wetlands are utilized in stormwater and wastewater treatment systems as passive systems that naturally improve water quality while also restoring ecological habitats (Wurochekke, A.A. et al. 2014). Utilization of green infrastructure systems provides governments to provide targeted decentralized infrastructure systems that result in many resulting ecological, social, and economic benefits (Mangone, G. 2016). Recognition of ecosystems like coastal areas as a form of natural infrastructure are an emerging development in climate change adaptation (Langride, S.M. et al. 2014), present perspective on how to continue expanding the concept of green infrastructure.

Energy system improvements are important political equity considerations for climate change adaptation planning actions. Rising temperatures are projected to increase summer energy demands in the Pacific Northwest (Craig, M.T. et al. 2018); in a region, reliant on hydropower that is also vulnerable to reduced production as water in rivers decreases due to droughts and decreasing snowpack (Lee, S-Y. et al. 2015). Energy efficiencies can be supported through needed upgrades to energy infrastructure systems by fore fronting renewable energy (Roth, R. 2016), an idea that has been supported by multiple state government level proposals to get Washington State to 100 % renewable energy by 2050 (Jacobson, M.Z. et al. 2016). Procedural justice concerns are also an important political consideration in energy and climate change decision making related to siting of facilities (Ryder, S.S. 2018). Renewable energy projects can provide communities significant benefits as evidenced by projects developed on Indigenous Nation reservations across the United States (Brookshire, D. & Kaza, N. 2013).

Transportation systems are an important political equity consideration in climate change adaptation planning in an effort to reduce climate contributions from extensive fossil fuel use. Equitable transit oriented development (Zuk, M. & Carlton, I. 2015) is a popular concept that seeks to fundamentally reduce the need to individual vehicle use (Cox, L. et al. 2017). Transportation changes are a major component of existing climate actions (Schwanen, T. et al. 2011). Efforts are occurring to integrate adaptation and transportation planning (Walker, L. et al. 2010; Oswald, M.R. & McNeil, S. 2012).

The action of governing is an important political equity (Eriksen, S.H. et al. 2015) consideration in climate change adaptation planning. Governance needs to take on a flexible adaptive approach to policy (Burton, I. 2009 a & b; Karpouzoglou, T. et al.

2016). Governance of climate adaptation has a developed history (Schipper, E.L.F. 2009 a & b), early adaptation adaptor analysis has provided insights into improvements for climate governance (Poyar, K.A. & Beller-Simms, N. 2010). Continue practice oriented research, but also support this with continued advancing of theoretical conceptual analysis pushing the boundaries to continuously improve adaptation efforts (Swart, R. et al. 2014), and overcome barriers to adaptation and increase effectiveness of actions (Doherty, M. et al., 2016). Adaptation has received limited public participation (Sarzynski, A. 2015), but government actions can be improved by research showing people are concerned about impacts of climate change but are divided on the anthropogenic nature of the dialogue (Hartter, J. et al. 2018), so if it is framed properly it can lead to increased community support.

Power differentials influence the role of in governance on climate action at multiple levels (Marquardt, J. 2017). Modeling approach's being developed to consider interdisciplinary perspectives on the influence governance actions will have on overall climate change mitigation and adaptation efforts (Masson, V. et al. 2014); The establishment of adaptation public policy has been shown to influence other people and governments to also take climate action (Urwin, K. & Jordan, A. 2008), and a great example of this leadership is exhibited by King County (Saavedra, C. & Budd, W.W. 2009), According to one researcher, climate adaptation efforts can integrate considerations into efforts to build peace through socio-economic recovery, politics and governance, security and rule of law, and human rights (Matthew, R. 2014).

Local action is a critical component of political equity in climate change adaptation planning. Local action on climate change (Baker, I. et al. 2012) supports the

understanding of the importance of place in engaging equitably (Schrock, G. et al. 2015) with impacts of climate change (Hess, J.J. et al. 2008; Devine-Wright, P. 2013). Some researchers raise concerns if adaptation is solely a local responsibility (Nalau, J. et al. 2015), which is an important recognition of the need for collaborations to support local climate action. Power differentials influence procedural justice related who participates and who does not in adaptation (Orbach, A. 2011), and governments can provide greater political equity by making an effort to increase public participation by addressing institutionalized barriers. Adaptation planning occurs in conjunction with many other planning efforts at the local level (Picketts, I.M. et al. 2014), so it can improve governmental efficiency to weave climate adaptation planning into local comprehensive plans to directly influence how communities exist within a place (Hansen, L.J. et al. 2017).

Land use is an important political equity consideration in climate change adaptation planning. Example of implementing adaptation plans include establishing wildlife corridors for movement of species in climate impacted areas (Kostyack, J. et al. 2011). Land use policies have major implications for forested areas in Washington State with regards to increasing development in the urban/wildland interface leading to changes in forest habitats and dynamics (Gimona, A. et al. 2012). Land use policies also have implications on water resources in climate impacted future (Kaushal, S.S. et al. 2017). Land use policy is an important consideration in climate change adaptation and has the possibility to be significantly more widely applied.

Coastal areas are critical considerations of political equity in climate change adaptation planning. Coastal managers face limitations in institutionalizing climate

science understandings into actions in threatened coastal areas (Thorne, K.M. et al. 2017) in order to enact needed land use practices (Grannis, J. 2011; Kline, J. D. et al. 2014). Coastal adaptation needs to recognize the inherent racialized history of coastal development and plan with this in mind to promote more equitable outcomes (Hardy, R.D. et al. 2017), including considerations for equity in managed retreat (Clément, V. et al. 2015). Competing interests exists between those in favor of protect-in-place against managed-retreat advocates in threatened coastal areas and governments will need to address political equity in these situation strategically (Kundis C.R. & Ruhl, J.B. 2010; Rulleau, B. & Rey-Valette, H. 2017). Research shows that differences exist between state and NGO planning efforts favoring near term solutions more often than local planners in coastal areas (Kettle, N.P. et al. 2014).

Natural disasters are critical political equity concerns in climate change adaptation planning efforts. The occurrence of climate related natural disasters continues to grow and are major concerns for adaptation planning in regards to ecological dynamics as well as engineering planning concerns for worst-case scenarios. Landslides are concerns in metropolitan areas of the Pacific Northwest region (Biasutti, M. et al. 2016). Natural disaster impact important services like the power grid (Short, J.R. 2016), and hospitals hospitals (Ott, K.B. 2015) driving the need for governmental preparedness as an essential component of political equity in adaptation effort. Sea-level rise is impacting tribal cultures by washing away culturally important sites and driving the need for actions to protect identified sites of importance (White, D. 2018). Adaptation to natural hazards (Moench, M. 2009) needs to plan for the potential of natural disaster induced social conflict (Xu, J. et al. 2016) and understand how influences of race and class influence

reposes for natural disaster recovery (Downey, D.C. 2016; Luft, R.E. 2016). Disaster capitalism (Klein, N. 2007) is a growing practice of exploitation that governments need to plan for adaptation measures that avoid these concerns.

Power is a critical concern of political equity considerations for climate change adaptation planning (Nightingale, A.J. 2017). Power dynamics influence actions throughout the four systems of consideration in political ecology. Understanding institutionalized inequities helps to illuminate structures that actively take power away from various actors while at the same time working to uphold power that benefits various privileged subsets of a population. The chapter has centered political ecology systems to identify where power lies in each of these systems of interest, while also setting the stage to detail where contributions to the literature of climate adaptation can provide equitable for many marginalized communities by working to remove barriers established by power systems.

General Adaptation Planning Considerations

Geographic influences understandings that need to be addressed through place-based climate adaptation efforts. Every place is unique based on a variety of physical geography, ecological systems and cliamtes, social dynamics (Bailey, A.J. 2010; Curtis, S.E. & Oven, K.J. 2012), economic dynamics, and political systems (Head, L. & Gibson, C. 2012). As a result, each climate change adaptation plan needs to be tailored to specific geographic contexts and associated climate impact concerns that impact the lives of the local communities.

Vulnerability to climate change impacts play a critical role in that influences equitable adaptation measures. Assessing climate vulnerabilities is a major first step to creating an effective climate adaptation plan to act on addressing identified risks (Kelly, P.M. & Adger, W.N. 2000; Fussel, H. & Klein, R.J.T. 2006; Handmer, J.W. 2009 a; Ribot, J.C. et al. 2009; Bunce, A. & Ford, J. 2015; Havko, J. et al. 2017). Vulnerability increases governmental liability if they take action on climate change when they know the risks of not acting. Identifying vulnerabilities helps governments to determine what to adapt to and why (Pittock, 2009) in an effort to manage climate risks (United Nations Development Programme, 2009).

Adaptive capacity is a critical consideration of self-assessment for governments engaging in actions to adapt to climate change (Handmer, J.W. 2009 a & b). Assessing governmental adaptive capacity helps to gauge government's ability to take action on climate change an identify areas for improve existing limited capacities (Engle, N.L. 2011; Whitney, C.K. et al. 2017). Some factors that influence adaptive capacity include equality, transparency, accountability, and empowerment (Ensor, J.E. et al. 2015). Climate change variability (Smit, B. et al. 2009) will present major stresses to adaptive capacities, but with enough foresight governments can be prepared act effectively on climate change.

Resilience is a conceptual focus that is often considered synonymous with climate adaptation (Folke, C. 2006; Handmer, J.W. 2009 b; Grossman, Z. & Parker, A. 2012; Crawford, M. & Seidel, S. 2013; Bunce, A. & Ford, J. 2015; Meerow, S. et al. 2016; Olazabal M. & Pascal, U. 2016; Tyler, S. et al. 2016; van de Ven, F.H.M. et al. 2016; Dhar, T. & Khirfan, L. 2017; Havko, J. et al. 2017; Lawson, A. et al. 2017; Slivkova, S.

et al. 2017). Resilience conceptually works to ensure communities are able to withstand and bounce back from climate impacts (Doherty, M. et al., 2016). There is even an international effort to establish resilience plans in 100 cities (Friedman, Y. & Lee, T. 2017), as well as many great resource guides to support building climate resilience (Geos Institute, 2018). Resilience is an important consideration for equitable climate change adaptation planning.

Sustainable development is the fundamental basis for sustainability in the focus on humans developing the capacities to continue meeting their needs into the future (Bruntland, G.H. 1987), but this focus also comes with a number of concerns regarding the impacts of development to the environment and people of the world. Because of concerns like this, it is vital to assess how actions carried out in the name of sustainability and climate change adaptation engage with equity considerations.

Literature Review Chapter Conclusion

This concludes the review of the theoretical framework utilized in this thesis to assess equitable climate change adaptation planning. This chapter helped to illuminate what types of considerations were assessed qualitatively through systems thinking political ecology equity framework for climate adaptation plans based on an emergent grounded theory engagement with literature around climate adaptation planning theory and utilization, equity, and political ecology and the gaps existing in this literature that were highlighted through a systems thinking theoretical framework. This chapter introduced the complexity of climate change adaptation, emphasizing the critical need to

not shy away from this immense task, but to embrace complexity in developing effective adaptation plans in an effort to support a more equitable future. The next chapter provides an overview of the methods used to conduct this analysis, and then leads into a review of the analysis results and discussion of these findings.

Chapter 5: Methods

Methods Overview

My research falls generally within the discipline of geography in a broad sense, but engages a much more interdisciplinary approach to investigate more expansively the implications of local climate adaptation planning across Washington State. To support my interdisciplinary approach, I collected multiple forms of data to provide information regarding equity considerations as evidenced in climate adaptation planning. This mixed-method approach embodies the various theoretical perspectives discussed above. The results will be grounded in qualitative policy analysis and supported with complementary quantitative analysis of coded political ecology based systems equity considerations within each plan.

Methods Chapter Roadmap

The following sections review the mixed method approaches utilized in this research starting with policy analysis of individual adaptation plans, coding analysis of adaptation plans for equity considerations with specific focuses on institutionalized inequities, basic quantitative analysis, and comparative policy analysis resulting in highlighting regional best practices.

Scope of Research

The scope of my research methodology includes a mixed-method approach heavily relying on qualitative analysis and supplemented with simple statistics quantitative data of existing climate adaptation plans by Indigenous Nations and county governments within the geographical limits of Washington State. I chose this geographical scope to provide a regional overview of local level governments' efforts across the state's geographic contexts ranging from temperate, wet western ecosystems along the Pacific Ocean, and contrastingly dry Eastern ecosystems divided by the Cascade Mountain Range running north to south. I chose two separate government types to understand how each acts separately from the other, as well as to understand where opportunities for collaborations lie within regional climate adaptation planning efforts. This analysis seeks to document whether county governments consult with local Indigenous Nations on climate adaptation planning efforts. The results have implications from international to local scales that can be engaged with collectively through comprehensive collaborations by local governing actors to promote more equitable climate adaptation actions.

Policy Analysis

Policy analysis played an overarching role in the qualitative analysis of my research. I rigorously analyzed over 1,600 pages of content across all identified plans, looking for underlying influences within the planning process itself based on who was involved in the public input phase of planning development. My policy analysis approach

follows that of Kingdon's "Three Streams" consideration of the problem, policy, and politics generally guided my assessments on how the plans came to be in their current forms (Kingdon, J., 2011). In practice, assessments of governmental planning structures, funding sources, geographic context, and climate adaptation policy are assessed qualitatively.

Utilize grounded theory in climate adaptation plan analysis

In Grounded Theory, the researcher develops new theories from critical examination of existing literature, interview transcriptions, survey data, etc. (Glaser, B. 1967). Utilizing grounded theory in this analysis allowed me to build an interdisciplinary understanding of intersectional equity concerns and then utilize that in a political ecology based analysis of climate adaptation plans. Equity frameworks currently exist (Constantine, 2016), but many lack an interdisciplinary understanding or a local focus. For this reason, grounded theory provides a framework for filling in the gaps of this understanding and examining existing climate adaptation plans.

Equity Analysis

Increasing concerns around climate impacts are driving government interest in adapting to a changing future. As significant action is taken, it is important to understand the potential unintended effects of climate adaptation actions. To avoid perpetuating historical traumas and inequities, we must examine equity considerations in existing

climate adaptation efforts and plans using an intersectional lens (Crenshaw, K. 1991). This allows us to uncover institutionalized inequities and propose ways to respond to them. As indicated in the theoretical framework chapter, I relied on a combination of multiple methodological frameworks to assess equity implications of current climate adaptation plans utilizing a systems-thinking political ecology approach, with considerations centering around ecological, social, economic, and political systems. This approach provided a more comprehensive understanding of the equity considerations of climate adaptation planning efforts because it collectively brought together a variety of equity considerations from numerous different perspectives, considerations not often viewed as interconnected and nested systems of influence.

Institutionalized inequity analysis

Institutionalized inequities are built through societal structures of racism, sexism, patriarchy, capitalism, xenophobia, classism, colonialism, imperialism, ageism, ableism, and other forms of discrimination. Generally assessing climate adaptation plans for these considerations provided qualitative context to the focus of equity within these efforts.

Decolonized Climate Change Adaptation Planning Analysis

The reasoning behind first reading Indigenous Nations' climate change adaptation plans was to start with a grounded perspective in decolonized climate adaptation planning considerations from Indigenous Nations that informed my analyzation context of more

standardized approaches from county governments. Equity considerations related to county governments' consultation with local Indigenous Nations include distributional justice, procedural justice, and the presence of justice as recognition (Cantzler, J. et al. 2016).

Climate Adaptation Plan Equity Coding Analysis

To conduct this analysis, I individually read all existing climate adaptation plans within Washington State by Indigenous Nations and county governments, coded plans for political ecology based system equity considerations, and then generated basic counts from the aggregated codes of individual plans to find percentage focuses on ecological, social, economic, and political systems equity considerations (including intersectional combinations). For each category, I tallied equity consideration codes to comprehend how each plan addressed the various concerns of interest for this research across different systems of influence. Since I counted intersectional equity codes for each category addressed, considerations of issues from double counting were avoided by documenting occurrences of one to all four intersectional equity systems considerations ranging from a single sentence up to an entire paragraph. Each equity system was counted individually even when intersectional considerations were identified. If I only applied one equity system count to a sentence/paragraph consideration, I would in effect be undervaluing the comprehensiveness of equity concerns present in climate adaptation planning efforts. After reading all adaptation plans, codes for each governments' plan were charted in

tables to compile equity measures and overall focuses of governmental approaches through their own words.

Quantitative Analysis

I performed a quantitative analysis of publically available climate adaptation plans by Indigenous Nations and county governments in Washington State to add to the depth of the mixed-method approach. Quantitative analysis provided basic percentages of how many governments have established a climate adaptation plan out of the total number of governments present in each category of government type. I calculated simple percentages to analyze governments' adaptation plans and the various ecological, social, economic, and political equity measures. This revealed the focus area of each government's equity concerns. I then translated these equity counts into percentages visually representing the distribution of equity considerations by each government through pie graphs that apply understandings from the Anishinaabeg Medicine Wheel. In the pie charts, ecological systems are represented by yellow segments, social systems are represented by red segments, economic systems are represented by black segments, and political systems are represented by white segments. I also determined the average of the two types of government to see how Indigenous Nations and county governments addresses equity considerations compared against each other on the whole.

Best Practices

I documented best practices from analyzed climate adaptation planning efforts and highlight these in the results section of this thesis. The determination of "best practices" occurred in the frame of comparison against existing plans within this analysis to highlight regional leading examples in climate adaptation planning in an effort to enhance ongoing and future climate action collaborations. Best practices include not only actions detailed within plans to address climate concerns, but also democratic governmental approaches to planning that were equitable and inclusive, as well as adaptive management structures that strive to continually adapt to changing situations.

Methods Chapter Conclusion

This concludes the methods chapter. Mixed-methodology fundamental to this research effort included policy analysis, equity coding quantitative analysis, and best practices. This mixed-methods approach relies heavily on qualitative forms of inquiry and analysis and is supplemented by quantitative analysis to provide multiple approaches to communicating content of existing climate adaptation plans in Washington State. As this is a novel methodological approach, the actions were simple to provide support for expanding similar approaches to continue improving climate adaptation planning, analysis, and implementation actions. Mixed-methods communicating research findings can be found in the next chapter detailing results of thesis.

Chapter 6: Results

Results Chapter Overview

This chapter presents the results of this thesis research findings after analyzing Indigenous Nations and county government climate change adaptation plan within Washington State. The chapter begins with an overview of existing climate action efforts by Indigenous Nations, Washington state level efforts, county governments, city governments, intergovernmental efforts, and non-governmental organization efforts followed by reflections on the extent of efforts. This is followed by individual reviews of Indigenous Nations and then county governments planning efforts. Individual plan reviews include policy analysis, and quantitative equity coding analysis results. Individual analyses are followed by comparative analyses between governments of the same level and then aggregated analyses of comparisons between Indigenous Nations and county governments on the whole. The chapter ends with a review of best practices documented in the research analysis.

Existing Climate Action in Washington State Overview

In the process of searching for existing climate adaptation planning efforts, I came across numerous plans from various levels of governments and even non-governmental organizations across Washington State. A review of the results are listed below including: Indigenous Nations; Washington State Agencies; Counties; Cities; Intergovernmental; and Non-Governmental Organizations efforts. A cumulative

reflection of these efforts is provided before moving on to the individual analysis of climate adaptation plans by the Indigenous Nation and county governments analyzed in this research. The table below presents a compiled list of all levels of government identified taking climate action.

Table 1: Extent of Climate Adaptation Planning Across Washington State

Government Type	Name
Indigenous Nations	Jamestown S'Klallam Tribe
	Lummi Nation
	Puyallup Tribe of Indians
	Quileute Tribe
	Quinault Indian Nation
	Samish Indian Nation
	Stillaguamish Tribe of Indians
	Swinomish Indian Tribal Community
	Yakama Nation
State Agencies	Department of Ecology
	Department of Commerce
	Department of Natural Resources
	Department of Transportation
	Department of Fish and Wildlife
County Governments	Jefferson County
	King County
	Skagit County
	Thurston County
City Governments	Anacortes
	Bainbridge Island
	Bellingham
	Edmonds
	Everett
	Kirkland
	Port Townsend
	Olympia
	Seattle

	Shoreline
	Spokane
	Tacoma
Inter-Governmental	Pacific Coast Collaboration
	Columbia River Basin Tribes
	Upper Snake River Tribes Foundation
	Northwest Indian Fisheries Commission
	North Olympia Peninsula
Non-Governmental Organizations	Island Climate Resilience
	Nisqually River Council
	Whatcom County Nooksack Salmon Enhancement Association
	The Nature Conservancy
	The National Wildlife Federation

Indigenous Nations' adaptation efforts—Extensive climate adaptation efforts by Indigenous Nations are occurring across Turtle Island (the North American continent), but in Washington state there are numerous efforts with 9 plans enacted by various Indigenous Nations. There are 29 federally recognized Indigenous Nations in Washington state, so the 9 governments taking action represent 31 % action by Indigenous Nations. More action is occurring as the Squaxin Island Tribe and the Makah Tribe are currently in the process of developing climate adaptation planning efforts within Washington State. The climate adaptation plans identified include:

Table 2: Washington State Indigenous Nation Climate Adaptation Plans

Washington Indigenous Nation Climate Adaptation Plans								
Jamestown S'Klallam Tribe (2013)	Lummi Nation (Lummi Natural Resources Department Water Resources	Puyallup Tribe of Indians (2016)	Quileute Tribe (Krueger, K. 2017)	Quinault Indian Nation (Quinault Indian Nation Community Developmen	Samish Indian Nation (2017, a & b)	Stillaguamish Tribe of Indians (Whitely Binder, L. Morgan, H. et al., 2017)	Swinomish Indian Tribal Community (2010)	Yakama Nation (2016)

	Division, 2016)			t and Planning Department, 2017)				

WA State Agencies' adaptation efforts— Executive Order 09-05 (Gregoire, C.O., 2009) established the need for Washington State governments to take action on climate leadership. Climate change adaptation efforts have been produced by Washington State agencies in response to this policy. Five State agencies have been identified as having implemented climate adaptation plans out of twenty-two total agencies resulting in a 23 % rate of State agencies taking action on climate change. Some planning efforts identified in my research include:

Table 3: Washington State Agency Climate Adaptation Plans

Washington State Agency Climate Adaptation Plans				
Department of Ecology (Adelsman, H. Ekrem, J. et al., 2012)	Department of Transportation (Washington State Department of Transportation, 2011)	Department of Natural Resources (Washington State Department of Natural Resources, 2017)	Department of Commerce (Wilkerson, J., 2008)	Department of Fish and Wildlife (Glick, P. et al. 2013; Wilere, G. et al. 2016)

WA counties' adaptation efforts—At the county level, four adaptation plans across Washington state were identified. There are thirty-nine counties in Washington State, so there is a rate of just over 10 % of counties taking action across the state. The plans identified include:

Table 4: Washington County Climate Adaptation Plans

Washington County Climate Adaptation Plans			
Jefferson County (Surber, J. & Lamp, Z.A., 2011)	King County (2018)	Skagit County (Walters, R. Martin, C. et al., 2010)	Thurston County (Thurston Regional Planning Council, 2018)

WA cities' adaptation efforts—At the city level, at least twelve adaptation plans have been identified by city governments. Out of a total of eighty-eight municipal governments across the state, the twelve taking climate action comprise 14 % of total municipal governments. The plans identified include:

Table 5: Washington City Climate Change Adaptation Plans

Washington City Climate Adaptation Plans					
Anacortes (Gibson, C. Shatzkin, A. & Ramel, A., 2007)	Bainbridge Island (Hansen, L. Nordgren, S. Mielbrecht, E.E., 2016)	Bellingham (City of Bellingham, 2007)	Edmonds (City of Edmonds, 2010)	Everett (City of Everett, 2015)	Kirkland (City of Kirkland, 2013; Burris, D. Leonhart, E. & Ingram-Lock, V., 2009)
Port Townsend (Surber, D. et al., 2011)	Olympia (City of Olympia Public Works Department, 2007)	Seattle (City of Seattle, 2017)	Shoreline (Cascadia Consulting Group, 2013)	Spokane (City of Spokane, 2009)	Tacoma (Cascadia Consulting Group, 2016; O'Hanlon, A. Kato, G., 2008)

Intergovernmental adaptation planning efforts—Intergovernmental actions also pay a role in climate action across Washington State. The Pacific Coast Collaboration (2013) consists of a joint agreement for climate action by California, Oregon, Washington and British Columbia spanning the entire length of the United Sates Pacific coastline line as well as the adjoining northern coastline of Canada. Inter-tribal collaborations addressing climate change exist from the Columbia River Basin Tribes (Sampson, D., 2015); the Upper Snake River Tribes Foundation (USRT) (Petersen, S. et al. 2017), as well as the Northwest Indian Fisheries Commission (2016). The North Olympic Peninsula effort brought a number of communities together to develop a climate adaptation for the region (Petersen, S. Bell, J. et al., 2015). Plans identified include:

Table 6: Washington Intergovernmental Climate Adaptation Plans

Washington Intergovernmental Climate Adaptation Plans				
Pacific Coast Collaboration (2013)	Columbia River Basin Tribes (Sampson, D. 2015)	Upper Snake River Tribes Foundation (Petersen, S. et al. 2017)	Northwest Indian Fisheries Commission (2016)	North Olympic Peninsula (Petersen, S. et al. 2015)

Non-governmental organizations adaptation planning efforts—Non-governmental organizations also play a key role in climate action in Washington State. Various organizations applied pressure to establish planning efforts in the local areas of Washington State as well as some national organizations who are also working in the State to expand climate actions. The plans documented include:

Table 7: Washington Non-Governmental Organizations Climate Adaptation Plans

Washington Non-Governmental Organization Climate Adaptation Plans				
Islands Climate Resilience (2014)	Nisqually River Council (Greene, M. et al. 2014)	Whatcom County Nooksack Salmon Enhancement Association (Taylor, L. Henson, K. et al., 2010)	The Nature Conservancy (TNC & CIG, 2016)	The National Wildlife Federation (Stein, B.A. et al. 2014)

Review of Planning Extent Across WA State

The plans documented above show that significant climate action is occurring throughout Washington State. These actions are occurring by all levels of government outside of the federal level. The documented efforts show that Indigenous Nations, on the whole are taking action at a higher rate than other levels of governments in Washington State as 31 % of these governments have established climate adaptation plans, with the next closest level of governmental action occurring at the Washington State agency level

where 23% of agencies are taking action, followed by city governments at 14 %, and then county governments at 10 %. Recognizing multi-levels of action is vital to building expanded climate action because new efforts by governments who have not taken action yet do not have to start from scratch, but can work based off these varied regional efforts.

Also, the planning efforts documented above are focused on climate adaptation planning, but there is even greater amounts of action occurring as many governments have engaged in climate vulnerability assessment processes. Indigenous Nations that have engaged in vulnerability assessments include the Treaty of Olympia Tribes including Quinault Indian Nation, Quileute Tribe, and the Hoh Tribe (Dalton, M. 2016); the Confederated Tribes of the Colville Reservation (Krosby, M. & Morgan, H., 2018); the Nooksack Indian Tribe (Morgan, H. & Krosby, M. 2017); the Port Gamble S'Klallam Tribe (Port Gamble S'Klallam Tribe Natural Resources Department, 2017); the Sauk Suiattle Indian Tribe (Natural Systems Design, 2014); and the Tulalip Tribe has a climate change website and is mentioned for their extensive climate action work in multiple reports, but I was unable to document any official climate action plan.

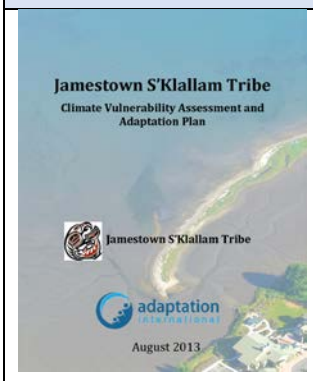
At the county level, climate change is engaged outside of the climate adaptation planning scope by efforts such as Clark County's effort to document climate impacts on human health (Clark County Public Health, 2011); a climate change report was required in Cowlitz County for assessment of a fossil fuel development project's Environmental Impact Statement (ICF, 2017); Pierce County is working to develop a Climate Resilience plan by 2020 (Pierce County, 2018); Snohomish County has worked towards a sustainable operations plan (Snohomish County Office of Energy and Sustainability, 2013); in Whatcom County an energy conservation plan to reduce greenhouse gas

emissions has been established (Reeves, C. 2007); and even Yakima County acknowledges the need to begin considering climate change in their comprehensive plan (Yakima County Public Services Planning Department, 2017). Puget Sound Partnership is a state agency that has an initial climate assessment with ongoing efforts between a number of regional partners (Siemann, D. & Whitely Binder, L. 2017). These are just some of the efforts that were documented in the research process and there are many more, but documenting all efforts falls outside the scope of this research effort and could encompass an entire research endeavor in and of itself.

Individual Planning Analysis

The following section provides an individual analysis of the nine Indigenous Nations and four county governments studied in this thesis. The individual analyses for each plan include: the tile of the plan; date published; funding source (where available); geographic context of the governmental jurisdiction; planning process aspects like participants, strategy development, outreach, evaluation criteria, list of key planning focuses; equity coding analysis results; equity results discussion; total page count and associated equity counts; general reflections on the planning document as a reader; and review of maps utilized. The individual analysis section is followed by a comparative analysis of the quantitative equity coding results between Indigenous Nations and between county governments, and is followed by a comparative analysis of all planning efforts analyzed.

Table 8: Jamestown S'Klallam Tribe Climate Adaptation Plan

Jamestown S'Klallam Tribe Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		22.35	29.42	23.45	24.78

The *Jamestown S'Klallam Tribe Climate Vulnerability Assessment and Adaptation Plan* was published in August 2013 (Jamestown S'Klallam Tribe, 2013, a), and then expanded on with an additional planning priorities with the *Jamestown S'Klallam Tribe Adaptation Plan Addendum: Two additional Key Areas of Concern* published in September of the same year (Jamestown S'Klallam Tribe, 2013, b). Funding for this project was supplied by the United States Environmental Protection Agency through a grant supporting the collaborative approach between the Jamestown S'Klallam Tribe, Adaptation International, and Washington Sea Grant. This plan provides an overview of the impacts of climate change locally on the northeast corner of the Olympic Peninsula that fall within the area of the 1855 Point No Point Treaty territory in present day Clallam County. The plan engaged with a vulnerability analysis to establish planning priorities for direction on future government action. Working group interviews were carried out with the 16-member tribal government working group by the outside consultants in conjunction with facilitating two consecutive days of morning workshops

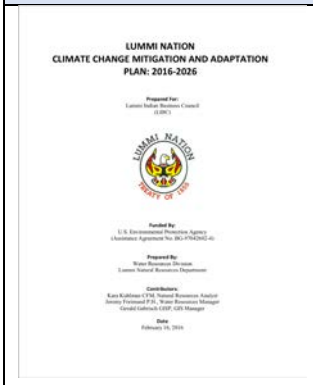
to address key areas of concern. The fundamental method utilized in the vulnerability assessment process included the formula:

Vulnerability = Exposure x Sensitivity x Adaptive Capacity.

The Key Areas of Concern for this plan include Group 1: Salmon, Clams & Oysters, Shellfish Biotoxins, Wildfires, and Cedar Harvests; Group 2: Casino & Longhouse Market, Transportation—Highway 101, and Tribal Campus Water Supply; Group 3: Water Supply Jamestown Beach, Natural Resources Lab & Planning Department Buildings for the initial plan and then the Addendum included two additional Key Areas of Concern including: Jamestown Beach (Very High Priority) and Shoreline from Rivers End to Jamestown Beach (High Priority). For each of these Key Areas of Concern, multiple strategies are provided and assessed for factors of Cost, Ease of Implementation, Political/Community Support, Timing of Action, and Partnerships Required. The two electronic documents totaled 99-pages with 452 identified equity occurrences for a rate of 4.57 occurrences per page. The equity coding analysis resulted in percentages of 30 %, 30 %, 17 %, and 23 % for ecological, social, economic, and political systems respectively. The equity coding results indicate a strong focus on ecological and social equity as many aspects of the adaptation plan addressed impacts on environmental factors and how these aspects were intricately tied into the social fabric of the tribal community's culture and way of being. The plan addresses a number of individual species of interest including: Chinook, coho, and chum salmon; oysters, little neck and manila clams, mussels, geoducks; phytoplankton; zooplankton; western hemlock; Douglas fir; western red cedar; lodgepole pine; mountain pine beetle; steelhead; bull trout; shrimp; crab; berries; deer; and bear. The plan was organized well making it easy to read as well as

concise to make the somewhat dense information accessible to a wide range of readers. Numerous maps were utilized to show where various areas of concern existed in regards to the reservation area. Maps utilized include: an overview of the Point No Point Treaty extent for consideration of Usual and Accustomed Areas; projected changes in summer streamflow across the PNW region; map detailing vertical land movement from geological interactions for the region of the North Olympic Peninsula; inundation flood risk projections for Blyn and Highway 101 in Sequim Bay, greater Jamestown, and Discovery Bay; vegetation type mapping of the Olympic Peninsula; projected air and river water temperatures on the Olympic Peninsula in relation to suitable salmon environments; relative sea-level rise measured by tide gauges across Pacific coast of North America; historic images showing dynamic local environment for change near Jamestown Beach; and shoreline change map over time at Rivers End.

Table 9: Lummi Nation Climate Adaptation Plan

Lummi Nation Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		27.65	22.46	19.87	30.02

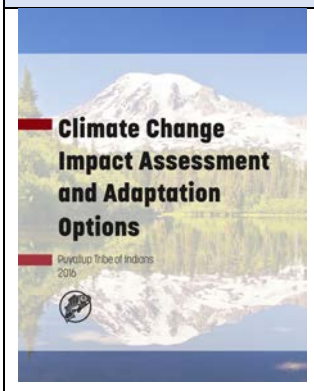
The Lummi Nation *Climate Change Mitigation and Adaptation Plan: 2016-2026* (Lummi Natural Resources Department Water Resources Division, 2016) was published in 2016. This project was completed internally by various staff of the tribal government.

Funding for this effort was provided by the United States Environmental Protection Agency and completed internally by the Water Resources Division of the Lummi Natural Resources Department in response to the Lummi Indian Business Council's 2014 Resolution #2014-084. This plan was created for the area of the Lummi Reservation just west of Bellingham, WA as well as the local areas of the Point Elliot Treaty of 1855 within the Nooksack River watershed and Whatcom County. A detailed history of the changes that have occurred to the lands locally was provided describing numerous impacts of colonization that have changed the landscape of existing ecosystem types as well as the flow of the Nooksack River into Bellingham Bay. Vulnerability assessments played a major role in this report, but unlike other climate adaptation plans prioritization rankings were not established in light of the need for context specific action that realize all have their unique needs. The main areas of emphasis in this plan include: Water Resources; Coastal Resources; Forest Resources; Fish, Wildlife, and Traditional Use Plants; Human Health; Emergency Services; Cultural Resources; Land Use; Transportation; and Utilities. The plan consisted of a 149-page electronic document with 463 equity occurrences for a rate of 3.11 occurrences per page. The equity coding analysis resulted in 28 %, 22 %, 20 %, and 30 % for ecological, social, economic, and political systems respectively. The quantitative results indicate a strong focus on ecological and political systems throughout Lummi Nation's plan. Despite these systems having the two largest quantitative representation, the social and economic equity considerations were strong as well. The plan repeatedly references the need for climate adaptation to support the Lummi *Schelangen* ("way of life") which is grounded in the interdependent connection between the Lummi people, their ancestral homelands, and the

other living non-human relatives they share the world with. The plan lists a number of species of interest including: Douglas fir; western hemlock; Sitka spruce; western red cedar; western big leaf maple; black cottonwood; red alder; western paper birch; vine maple; Oregon grape; willows; ocean spray; salmon berry; thimble berry; soapberry; Chinook, sockeye, coho, pink, and chum salmon; manila, and butter clams; geoducks; Pacific oysters; pteropods; copepods; elk; deer; ferns; camas; wapato; Dungeness crab; eelgrass; ducks; geese; swans; shorebirds; peregrine falcon; bald eagle; sea urchins; sea cucumbers; grand fir; subalpine fir; mountain hemlock; lodgepole pine; woodpecker; spotted owl; marbled murrelet; mountain pine beetle; spruce budworm; steelhead trout; cutthroat trout; bull trout; zooplankton; pacific herring; sandlance; surf smelt; longfin smelt (a.k.a "hooligans"); anchovy; spot shrimp; mountain goat; bear; bobcat; cougar; coyote; and mosquitoes. This plan is extensively detailed both in terms of scope of context as well as detail addressed to Mitigation and Adaptation Actions and strategies. Extensive detail was also supplied to documenting the extensive economic enterprises of the Lummi Nation and its tribal members compared to other planning efforts. Numerous maps provide context for both concerns related to the Lummi Nation Reservation and the greater Nooksack River Watershed including: a map of the Lummi Reservation in relation to the Nooksack River watershed; map of Lummi Reservation extent with roads and local waterways; land cover/land use map of area around Reservation; land use designation zones within Reservation extent; projected changes for summer runoff and streamflow across the PNW region; Washington state projections for changes in air and stream temperatures; groundwater characteristics across the Reservation; wetlands map across Reservation extent; acquisition and use plan for Reservation lands in floodplain; a

historical overview of the development of residential households across the Reservation over the last century; location of wells types and wellhead protection zones across Reservation; and wastewater collection and treatment locations across Reservation.

Table 10: Puyallup Tribe of Indians Climate Adaptation Plan

Puyallup Tribe of Indians Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		37.97	16.04	11.76	34.22

The Puyallup Tribe of Indians completed the *Climate Change Impact Assessment and Adaptation Options* (Puyallup Tribe of Indians, 2016) plan in 2016 in collaboration with Cascadia Consulting Group. The collaboration efforts involved a number of tribal government employees with the consulting firm preparing the first report. The plan covers considerations for the area of the Puyallup Reservation along the lower reaches of the Puyallup River as it flows into Commencement Bay in the City of Tacoma, Washington in the Southern Salish Sea Region and predominantly in Pierce County, with a small portion in King County. Considerations of the plan are not limited to the boundaries of the reservation, but focus on aspects throughout the 1854 Medicine Creek Treaty Area that the tribe has co-management responsibilities to and various trust lands throughout the region. There is no mention in the plan itself of where funding for this planning effort derived from. To develop a focus on key resources and sectors of interest,

Cascadia Consulting Group conducted interviews and three workshops with tribal government staff. The methodology of assessment engaged concerns of "Tribal people, resources, traditions, and infrastructure" (p 9) to assess vulnerability leading to the culmination of priority resources and sectors including: Fisheries and Hatcheries; Shellfish; Wildlife; Water Quality; Restoration Sites; Cultural Resources and Traditions; Transportation; and Public Health and Safety to develop associated adaptation options. The plan addresses vulnerabilities of sector specific impacts through mostly qualitative assessment and is followed by adaptation options that combined sector and important resources to provide various general strategies and screened in a workshop around the criteria of effectiveness; affordability; and feasibility (p 33). Each sector follows the structure of strategies addressing 5 main points of emphasis including: 1.) Implementation protection, restoration, and management practices; 2.) Provide education and guidance; 3.) Reevaluate policies, plans, and protocols; 4.) Gather Additional Information; 5.) Leverage partnerships. This plan was shorter in general, consisting of a 51-page electronic document with no appendices and 187 equity occurrences for a rate of 3.67 per page. The equity coding analysis for the Puyallup Tribe of Indians efforts included a focus on systems percentages of 38%, 16%, 12%, and 34% for ecological, social, economic, and political systems respectively. Ecological systems and political system were the dominant areas of focus for the plan as many equity consideration revolved around management practices or partnerships related to ecological restoration and areas of concern. Despite not having a large percentage of the equity focus social equity was prominent in the plan addressing a number of concerns, and even impacts to traditional ceremonies by the reduction in salmon populations, or limiting traditional swat

ceremonies from increased risk of fire (pp 29-30). Species identified of interest included steelhead; sockeye, coho, and Chinook salmon; oysters; clams; mussels; pteropods; crab; wolverine; northern spotted owls; and elk (pp 24-26). A variety of important creeks were addressed for water quality concerns. Important transportation routes were addressed around the reservation. Traditional use plants were addressed more generally, but some specific species were mentioned like western red cedar trees; wild berries (huckleberries), Douglas fir, Western hemlock, and Whitebark pine. This plan was shorter and accessible, but also information dense with many varied brief sentences on a variety of topics addressed. The plan provided a comprehensive understanding of climate concerns in the context of the local environment. This effort was supported by a number of maps showing Reservation relationships to Pierce county for flood mapping, stream temperature concerns, landslide risks; important tribally owned facilities in relation to high tide flooding risks exacerbated by sea level-rise, compromised water quality in creeks near the reservation and the Puyallup river and Commencement Bay; transportation vulnerability maps.

Table 11: Quileute Tribe Climate Adaptation Plan

Quileute Tribe Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		36.36	20.45	16.36	26.82

The Quileute Tribe completed the *Climate Change Plan for the Quileute Tribe of the Quileute Reservation* (Krueger, K. 2017) in September of 2016 and provided an update in April of 2017 to include a copy of Executive Order 13783 that effectively ended the previous United States federal level climate change actions (pp 64-71). This report was completed by a single author that is a tribal government employee in the Quileute Natural Resources Department through funding from the United States Environmental Protection Agency grant. The Quileute Tribe is located on a small reservation along the Pacific Ocean coastline in the northwest corner of the Olympic Peninsula in the town of La Push, Washington in Clallam County. The Quileute Tribe is a signatory members of the 1855 Quillayute River Treaty and later renegotiated and approved as the 1856 Treaty of Olympia (p 7), and were initially allotted on the Quinault Reservation, but later provided a reservation in 1889 by executive order from President Benjamin Harrison leading to the small size. The reservation is located at the mouth of the Quillayute River, fed by multiple rivers draining from lowland and mountain sources. Due to limited capabilities, this plan did not conduct its own vulnerability assessment, but instead relied heavily on the findings of the assessment completed by researchers with the Oregon Climate Change Research Institute (OCCRI) (Dalton (?), 2016) that utilized the common approach of:

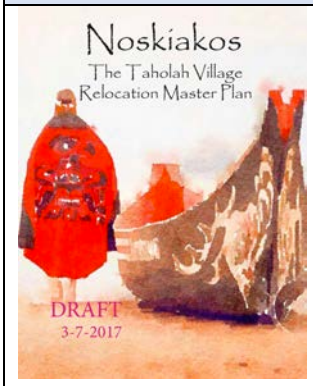
Vulnerability = Sensitivity + Exposure — Adaptive Capacity.

Important areas of consideration include: Sea Level Rise; Terrestrial (Land) Environment; Fresh Water (Lakes, Rivers, Wetlands); The Marine Environment; Impacts on Infrastructure/Facilities; and Cultural Impacts. The electronic document consisted of 71 pages with 220 equity occurrences accounting for 3.10 occurrences per page. The

equity coding analysis for systems resulted in percentages including 36 %, 20 %, 16 %, and 27 % for ecological, social, economic, and political systems respectively. The results show a strong focus on ecological systems followed by political systems. Focusses on social and economic systems were not strong in this report outside of addressing a few instances of utilizing Traditional Ecological Knowledge (TEK) and some culturally important natural resources. Species of interest addressed in the analysis include both food and culturally important species such as: salmonberry; blackberries; Labrador tea; camas; deer; elk; Chinook, coho, and sockeye salmon; steelhead; river and surf smelt; Dungeness crab; black cod (able fish); halibut; clams; eagles; ravens; whales; seals; sea lions; Sitka spruce; Western hemlock; Douglas fir; Yellow and Western Red Cedar; red alder; fiddle head ferns; horsetail shoots; cattails; stinging nettle; spruce tips; wild lettuces; sea weeds; skunk cabbage; mollusks; forage fish; bear; beaver; hare; Harlequin duck; brown pelican; Canada goose; hummingbird; salal; huckleberries; strawberries; cranberries; beargrass; Devil's club; Nootka rose; cascara; mushrooms; cougar; great blue heron; Pacific yew; zooplankton; otters; corals; shrimp; sea star; sea cucumber; sea urchins; kelp; rockfish; lingcod; Pacific herring; Pacific hake; gray whale; orca; Pacific harbor seal; Northern fur seal; Northern elephant seal; California sea lion; and Stellar sea lion. In general, this plan reflected the limited resources and capacity to carry out the effort as the author's background as a non-Indigenous person with an engineering/natural science background lead to a strong focus on natural resource management that mainly reviewed the OCCRI climate vulnerability assessment findings and a number of scientific journal articles. The plan was also difficult to follow the structure of the message being relayed at times in the dense analysis, but within this were many innovative and

important focuses. The overview of the Tribal government history and context were one of the most comprehensive analyzed in climate adaptation plans for this research effort. The author's coastal engineering background also added to the benefits of geographical analysis provided through numerous maps that addressed sea level rise locally in comparison to global changes; projected changes in stream temperatures; coastal ecological dynamics of the California current for marine resources; overviews of the Quileute Reservation and important built infrastructure locations. One map was missing from the updated version of the plan documenting the extent of the 1856 Olympia Treaty territory area that is present in the original publication of the plan.

Table 12: Quinault Indian Nation Climate Adaptation Plan

Quinault Indian Nation Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		19.10	42.21	19.60	19.10

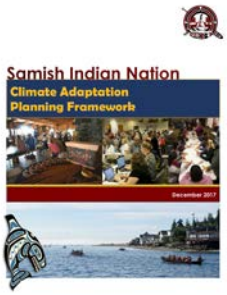
The Quinault Indian Nation produced *Noskiakos: The Taholah Village Relocation Master Plan* (Quinault Indian Nation Community Development and Planning Department, 2017) in March 2017. This was the only plan assessed that was not titled a climate adaptation plan, but I would contest this plan provides the most direct evidence of climate change adaptation planning put into action based on the need to relocate to higher ground as a result of rising sea levels and the increasing threat of tsunami impacts. The

plan was prepared by the Quinault Indian Nation Community Development and Planning Department with funding support from the Administration for Native Americans. Support was provided to the Planning Department staff from the Quinault Indian Nation Business Committee, a host of tribal government employees and departments, tribal members, various consultants, federal government entities, and numerous research organizations. The Quinault Indian Nation are signatory members of the 1856 Treaty of Olympia, however this information was not acknowledged in the planning report. Taholah village is located at the mouth of the Quinault River where it flows into the Pacific Ocean on the central coastline of Washington state in mostly Grays Harbor County with a small section of the reservation located in Jefferson County. The plan does acknowledge the colonial impact of the development of Taholah as it was platted by the Bureau of Indian Affairs (BIA) around 1915 over the filled estuary of the river, and established fundamental instability for the community from its initial development (p 3). A major driving force for this effort is the recognition through vulnerability assessments of the threats from tsunami as well as potential liquefaction of the village soils in the event of a strong earthquake as the result of the sites precarious development history. Over a two-year period, community outreach efforts including: door-to-door canvasing; community meetings; online surveys; event tabling; community dinners; Elders dinners; community picnic; Halloween party; educational outreach; and a website. Thus process led to calling this effort “Noskiakos, meaning ‘the water comes’ ” (p 4) in recognition of a former village located in this area of the mouth of the river. The key areas of interest in this plan include: Goals and Priorities; Community Facilities; Housing; Neighborhoods; Culture; Infrastructure; Sustainability; Economic Opportunities and Funding; Land Use Code Changes; and

Resilience. The electronic document is 134 pages with 398 documented equity occurrences for 2.97 occurrences per page. The equity coding analysis resulted in percentages of 19 %, 42 %, 20 %, and 19 % for ecological, social, economic, and political systems respectively. This outcome of a strong social focus is not surprising as the plan derives from extensive community engagement and seeks to develop a future community that meets the needs of the Quinault tribal community. Despite low quantitative representation, the other three system focuses are prominent throughout the plan. Acknowledgement of individual species of interest in this plan revolved around plant species related to landscaping concerns and provide an extensive list including: Labrador (Indian) tea; camas; red and blue elderberry; salal; blackcap raspberries; woodland strawberry; common bearberry; golden currant; Wapato; nodding onion; tall Oregon-grape; creeping Oregon-grape; Oregon iris; cascara; madrone; coltsfoot; mock orange; big leaf maple; Columbia lily; mountain and evergreen huckleberries; coastal strawberry; Indian plum; lady fern; spiny wood fern; bracken fern; miners lettuce; redwood Violeta; beaked hazelnut; pacific rhododendron; pacific dogwood; vine maple; cranberry; spring bank clover; pacific Silverweed; salmonberry; thimbleberry; cattail; service berry; soapberry; wild blackberry; choke cherry; crabapple; black gooseberry; Nootka rose; Douglas fir; Western hemlock; hooker's onion; biscuit root; licorice fern; Sitka spruce; bitter cheery; hazelnuts; acorns; walnuts; dense sedge; slough sedge; taper tip rush; jointed rush; common monkey flower; graceful cinquefoil; common rush; dagger-leaf rush; small-fruited bulrush; pacific ninebark; Douglas spirea; western fescue; tufted hair grass; red-osier dogwood; snowberry; and black twinberry. This is an excellent plan containing both detailed information while also still being accessible. I

really appreciate the added effort to practice in this document a goal of the broader effort to re-center Quinault culture and art in the effort by including significant imagery and art work reinforcing these common goals. The plan is supported by extensive use of maps ranging from location of existing important public facilities in the lower village; maps showing walking times to safety from tsunami threats; 3-D projections related to tsunami risk zones related to both the existing lower village and planned upper village; allotment plats related to the relocation area; architectural drawings of proposed community facilities; layout of the proposed relocation site developments for both community facilities and neighborhood layouts; walking trail networks; infrastructure layouts; phasing of stepped development stages; and land use zoning changes in comprehensive plan.

Table 13: Samish Indian Nation Climate Adaptation Plan

Samish Indian Nation Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		20.88	37.37	16.50	25.25

The Samish Indian Nation jointly released *Climate Adaptation Planning Framework* and *Climate Adaptation Planning Priorities* in December of 2017 (a & b). The projects were completed by the Climate Working Group of 6 government employees (some tribal members as well) with support from the Tribal Council. The projects were

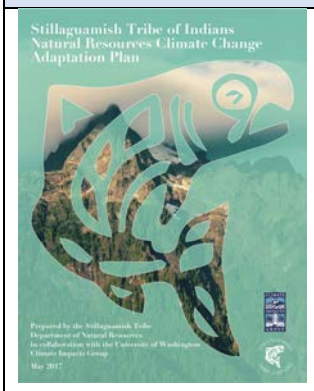
funded by the United States Bureau of Indian Affairs under an assistance agreement to the Samish Indian Nation for these efforts, and further efforts to develop a final climate Resiliency plan by Fall 2019 with funding from the Department of Energy Office of Indian Energy Policy and Programs grant. As coastal people, Samish Traditional Territory covers numerous islands in the Salish Sea near the Strait of Juan de Fuca and Haro Straight near the Southeastern extent of Vancouver Island in Skagit County, Washington. Samish Indian Nation is a signatory member of the 1855 Point Elliot Treaty, but lost federal recognition in 1969 and struggled to regain recognition in 1996, but lost lands and treaty rights (p 14). To develop these efforts, significant effort was applied to engage tribal members including providing a website of relevant information, tabling at cultural events, and a number of communication materials including an ESRI Story Map, with the two documents containing an associated communication plan and survey results provided in the Appendix of each report respectively. This effort was centered within a well-developed understanding of the regional context of ongoing climate adaptation efforts from national, state, local, governments; research organizations; non-governmental organizations, and fellow Tribal Nations (pp 18-20). Planning priorities identified by government staff and tribal members include: Built Environment; Natural and Cultural Resources; and Health and Wellbeing. The assessment of revolved around vulnerability in relation to the factors of exposure, sensitivity, and adaptive capacity theoretically, while in practice it appears the two main factors were sensitivity compared against adaptive capacity in a matrix formation. The two documents comprised of 170 pages electronically, with 297 equity occurrences for a rate of 1.75 occurrences per page. The equity coding analysis resulted in percentages of 21 %, 37 %, 17 %, and 25 % for

ecological, social, economic, and political systems respectively. The focus of this plan strongly revolves around social considerations, followed by political and then ecological considerations. These numbers show a major focus on the tribal community, but there are many well rounded considerations present. The plan included specific acknowledgment of important species such as salmon; orca (Q'ellhólmechen); clams (Stl'ló7om, Skw'lhá:y'7); horse clam (Swá:m), littleneck clam (X7óxwe7); geoducks; scallops; mussels; oyster (Tl'éxwtl'exw); snails; Labrador tea (Moq'wem); camas (Qwlhó7el); Chinook salmon (Yómech); Coho salmon (Q'échqs); sockeye salmon (Séqi7); pink salmon (Hénen); Chum Salmon (Kw'ól7exw); steelhead trout; halibut; herring; sucker; chub; sturgeon; cockles; crab (Á7chx); eelgrass; black-tailed deer (Sméyes); elk (Q'oyá:ch); seal (Ásxw); western red cedar (Xpéy7); Oregon spotted frog (Wéxes); Bald Eagle (Kwélengsen); Hawk (Ts'íxts'ix); Hummingbird (Xwét'ch'eli7); Owl (e.g., Screech, Barn, Snow); Marine and Water Birds; Raven (Skw't'ó7); Waterfowl/duck (Mó7oqw); Western Gull (Qwení7); Bull trout; Cod (Qwtóyesen); cutthroat trout; flounder; halibut (Sótx, Só7tx); pacific herring (Slhó:7nget); sculpin/bullhead; snapper/rockfish; sole; surf smelt (Kwa'tl's); abalone; bumble bee (Semóye7); chiton/Chinese slipper; dentalium; honey bee (Semsemóye7); mason bee; shrimp; urchin (Xixwe7); American beaver (Sqeláw7); American black bear (Schétxwen); American mink; coyote; gray wolf (Steqóye7); grizzly bear; mountain goat (Sxwítl'i7); river otter; sea otter (Sq'á7atl'); alder; barestem biscuitroot (Q!exmín); bear grass; black cap; blackberry (Sqw'elálngexw); cascara; cattail; chamomile; cherry; chocolate lily; currant; Devil's club; dogwood; eelgrass; hemlock; horsetail; huckleberry; kelp; madrone; maple; ocean spray (ironwood) (Q'ech'ílhch); rose; sage; salal (T'áqe7); salmonberry (Elíle7);

seaweed; serviceberry; skunk cabbage; soapberry (buffalo berry) (Sxwáseng); stinging nettle (Ts'exts'ex); thimbleberry (T'éqwem7); tule; wild onion; willow; yarrow; yellow cedar; yew; American crow; red-breasted merganser; black brant; peregrine falcon; pigeon; quail; red-winged black bird; robin; swainson thrush; swallow; turkey vulture; northern pacific spiny dogfish; pacific hake; pacific sand lance; pacific sardine; bay pipefish; sablefish; broadnose seven-gill shark; shiner perch; three-spine stickleback; fungi/lichen; crawfish; garter snake; mussel (Freshwater); newt; octopus (Sq'á:ymekw'); prawn; salamander; sea anemone; sea cucumber; squid; bat; chipmunk; long-tailed weasel; north American porcupine; snowshoe hare; squirrel; Alaska blueberry; American three-square; Baltic rush; bearberry; bent grass; black cottonwood; bunchberry; crab apple; Douglas fir; hazelnut; juniper; tree lupine; pickleweed; red elderberry; seabeach sandwort; seashore saltgrass; silverweed; spruce; and sweet grass. These numbers seem less than other reports, but this is mainly due to the extensive use of table documenting various information resources and species lists as well as providing pages documenting the online survey provided in this report lead to a lower per page equity occurrence rate. Generally, these reports were very accessible and complemented each other well. These reports are great resources for any interested climate adaptation practitioner as there are great acknowledgement of ongoing efforts as well as numerous resources cited with overviews of the benefits of each source. The inclusion of a significant number of important species and having many with their Samish name provided a unique perspective that is not always represented in these efforts. Maps were not a major point of emphasis in these two documents, but included: an overview of the Salish Sea and Samish Traditional Territory; projections for increases in extreme heat events; increased

west Nile cases regionally; coastal shell fishing closures due to impaired water quality; projected flood increases; projections of flooding impacting coastal resort areas; Samish Indian Nation property; transportation infrastructure vulnerability; ecosystem vulnerability; and cultural sites of importance that are projected to be impacted by climate change.

Table 14: Stillaguamish Tribe of Indians Climate Adaptation Plan

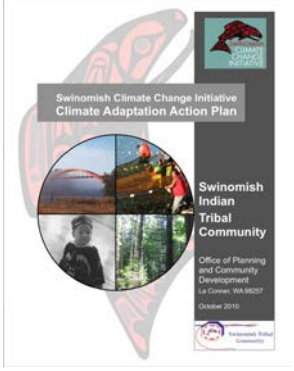
Stillaguamish Tribe of Indians Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		40.75	15.41	10.61	33.22

The Stillaguamish Tribe of Indians *Natural Resources Climate Change Adaptation Plan* (Whitely Binder, L. Morgan, H. et al., 2017) was published in May 2017. The plan was developed in a collaborative effort between the Stillaguamish Tribe Department of Natural Resources and the University of Washington Climate Impacts Group with funding from a Bureau of Indian Affairs, Rights Protection Implementation Climate Change Grant. The Stillaguamish Tribe of Indians are signatory members of the 1855 Treaty if Point Elliot in the central Salish Sea region with many tribal members living in the City of Arlington, Washington within the Stillaguamish Watershed in Snohomish County. The watershed ranges from the coastal reaches of Port Susan up to

the high reaches of the Cascade Range just to the east of the coastline. This plan was developed following the completion of a fellow collaboration of the two entities for a natural resources climate vulnerability assessment that relied on a vulnerability assessment methodology from the NatureServe Climate Change Vulnerability Index (CCVI) that factors projected temperature and moisture changes in relation to species range shifts, life history traits, climate exposure, and climate sensitivity that results in a quantitative value that is associated with vulnerability rankings (Krosby, M. et al., 2016, p 3). As the foundation of this planning effort is built out of this vulnerability assessment focused on various species, the priority focuses of this effort are grouped into categories including: Forests; Freshwater; Wetlands; Montane Wetlands and Meadow; Lowland Meadow; Marine; and Outreach and Education. Because of the extensive species focus, it was more effective to assess by habitat type, and had a number of actions derived from existing literature that were then compiled and prioritized over four workshops, and internal staff meetings. The adaptation plan consisted of a 107-page electronic document with 292 equity occurrences, for a rate of 2.73 occurrences per page. The equity coding analysis resulted in percentages of 41%, 15%, 11%, and 33 % for ecological, social, economy, and political systems respectively. The results indicate a strong focus around ecological systems, which is not surprising based on the focus of the watershed extent with its numerous ecosystem types supporting a variety of species in relation to climate change projections. Species addressed in this report include: Chinook salmon; American beaver; elk; mountain goats; bull trout; crabs; clams; shorebirds; waterfowl; Canada lynx; wolverine; marbled murrelet; spotted owl; western grebe; coho salmon; steelhead; Oregon spotted frog; western pond turtle; western hemlock; Douglas fir; mountain lion;

great blue heron; Wilson's warbler; red alder; black cottonwood; big leaf maple; northern flying squirrel; black-tailed deer; grizzly bear; bald eagle; Cassin's finch; pileated woodpecker; northern goshawk; olive sided flycatcher; red-breasted sap sucker; sooty grouse; Swainson's thrush; pink salmon; chum salmon; sockeye salmon; cutthroat; trumpeter swan; willow; red osier dogwood; elderberry; black hawthorn; American pipit; pacific jumping mouse; camas; chocolate lily; bracken fern; heath; Cascade blueberry; gray-crowned rosy finch; mollusks; western sandpiper; dunlin; ducks; black bellied plover; bufflehead; greater scaup; northern pintail; rhinoceros auklet; pigeon guillemont; and common goldeneye. In general, the plan was very straight forward, but limited by its extensive focus on ecological systems and a tendency towards technical aspects make this plan limited in its ability to connect with the Tribal community and other partners throughout the watershed to establish effective action in response to climate change concerns. Maps within this plan included: overview of 1855 Treaty of Point Elliot ceded treaty territory in relation to the Stillaguamish watershed; and projections for changes in stream temperatures throughout the watershed.

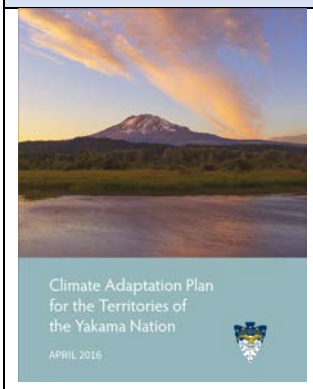
Table 15: Swinomish Indian Tribal Community Climate Adaptation Plan

Swinomish Indian Tribal Community Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		25.96	29.62	15.19	29.23

The Swinomish Indian Tribal Community published the *Swinomish Climate Change Initiative Climate Adaptation Action Plan* (Swinomish Indian Tribal Community, 2010) in October 2010. The plan was developed by the Office of Planning and Development with funding from a U.S. Department of Health and Human Series, Administration for Native Americans (ANA) grant. Support in producing tis work was provided by a team of researchers from the University of Washington, Center for Science in the Earth Systems, Climate Impacts Group; a Strategic Advisory Group consisting of members from Skagit county government, the ton of La Conner; and a local university representative; a number of Swinomish government employees; and a dedicated internal Climate Change Education & Awareness Group. The Swinomish Indian Tribal Community are signatory members of the 1855 Treaty of Point Elliot and have a coastal reservation in the central Salish Sea region between the cities of Anacortes and La Conner, Washington in Skagit County. This report was the culmination of a two-year process that initially produced an *Impact Assessment Technical Report* (Swinomish Indian Tribal Community Office of Planning and Community Development, 2009), and then in light of these understandings action plans were proposed to develop this planning report analyzed for this research project. UWCIG worked as a scientific advisor, while local jurisdictional governments provided strategic advisory support, and a community led effort worked to spread awareness of this effort (p 1). Climate action strategies consisted of options including: non-regulatory; regulatory; facilitating shoreward migration; engineered techniques; and risk prevention planning. These strategies were screened through evaluation criteria by the collaborating partners based on comprehensiveness, long-term sustainability, dynamic/adaptive approach, fiscal impact

and feasibility, non-regulatory approaches, and community goals. Prioritization of impacts were accomplished thorough a correlation of vulnerability and risk and were grouped into 4 categories including: Coastal Resources; Upland Resources; Physical Health; and Community Infrastructure and Services. The structure of the plan acknowledges impacts within each of these priority areas and then proposes an action in response. Factors of implementing actions include: flexibility in approach; public education/outreach; relevancy; political realities; incremental approach; and regional approach/partnerships. The electronic document consists of 144 pages with 520 equity occurrences identified for a rate of 3.61 per page. The equity coding analysis resulted in percentages of 26 %, 30 %, 15 %, and 29 % for ecological, social, economic, and political systems respectively. Social and political systems were the most heavily focused on with ecological systems not far behind. These percentages indicate a fairly balanced approach with even the economic equity considerations less occurrences but still a major focus throughout the report. Some species acknowledged in the plan include: salmon; western red cedar; shellfish; clams; Dungeness crabs; oysters; shrimp; mussels; berries; seaweed; duck; deer; Douglas fir; and eelgrass. Overall, this climate adaptation plan represents a significant endeavor containing a detailed analysis as the result of extensive government efforts related to climate adaptation efforts to help make this planning effort as effective as possible. Maps included in this planning effort include: a map of the Swinomish Indian Reservation in relation to the local areas within the coastal region of Skagit County; a detailed land ownership map of the Reservation; a projected inundation risk zone map; and an overview of residential structures within the urban/wildland interface at risk of wildfires.

Table 16: Yakama Nation Climate Adaptation Plan

Yakama Nation Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		43.21	19.16	20.21	17.42

The Yakama Nation published the *Climate Adaptation Plan for the Territories of the Yakama Nation* (Yakama Nation, 2016) in April of 2016. This climate adaptation plan was developed through the collaborative efforts of Yakama Nation's Department of Natural Resources and project management through contracted services by Cascadia Consulting Group, SAH Ecologia LLC, and the University of Washington Climate Impacts Group. The funding source for this effort is not disclosed in the planning document, but upon further review of UWCIG's overview webpage the project was funded internally by Yakama Nation. Yakama Nation is a confederation of 14 bands and tribes of signatory members of the 1855 Treaty with the Yakama (treaty not acknowledged in plan) located on the Yakama Reservation on the eastern side of the cascade mountain range and just west of the Columbia River (Nch'i-Wana) where it converges with the Snake River in central Washington State near the town of Yakima, in Yakima County. The reservation ranges from alpine/montane environments in the peak of Mount Adams down slope through dry forests and shrub steppe landscapes down to a heavily developed agricultural landscape across the Yakama River basin. Throughout

2015 a series of 7 workshops were conducted with consultants and tribal staff to identify priorities and recommended actions and this process was supplemented by solicited interviews and departments providing feedback on this draft. This report was just the initial effort of three phases to complete a planning and move to implementation. The priority areas of focus for adaptation revealed around Community and Environmental Resources including: Health and Public Safety; Tribal Infrastructure; Lands and Agriculture; Forestry; Water and Wetlands; Fisheries; Shrub Steppe and Rangelands; Wildlife and Vegetation; and Toxics. The plan consisted of a 52-page electronic document with 287 documented equity occurrences for a rate of 5.52 occurrences per page. The equity codding analysis resulted in percentages of 43 %, 19 %, 20 %, and 17 % for ecological, social, economic, and political systems respectively. The plan has a very strong ecological equity focus in comparison to the other systems of interest. This may be the result of a heavily natural resource dependent reservation ranging from forestry, fisheries, and agricultural interests leading to a strong ecological focus. Some of the specific species identified include: roots; berries; sockeye salmon; deer; elk; huckleberries; Ponderosa pine; Douglas fir; grand fir; western larch; true fir; mountain hemlock; lodgepole pine; Engelmann spruce; western red cedar; steelhead; lamprey; freshwater mussels; trout; Wyoming big sagebrush; bitterbrush; currant; service berry; blue bunch wheatgrass; Idaho fescue; Sandberg bluegrass; sage grouse; antelope; rabbits; chokecherries; quail; pheasant; eagles; hawks; sage sparrow; sage thrasher; cottonwood; white headed woodpecker; bear; wolves; bats; coyote; mink; otter; bullfrog; tail frog; beavers; raccoons; pronghorn; camas; oaks; western gray squirrels; spotted owls; fishers; white bark pine; pika; Clark's nutcracker; mountain goats; wolverine; ptarmigans; lynx;

American marten; and bighorn sheep. Overall, the adaptation plan was straight forward in its approach leading to a generally accessible document in a shorter format compared to other plans. Despite being a shorter document, this plan contained a significant amount of information around a wide range of climate impact concerns and did a fair job of placing these within the cultural context of the Yakama Nation. Maps utilized in this plan include: a map of the treaty ceded area in relation to the current reservation context; habitat types/land ownership and use for Yakama Nation Administration Forest; and a map of projected climate impacts on summer low flows in watersheds across Washington State.

Table 17: Jefferson County Climate Adaptation Plan

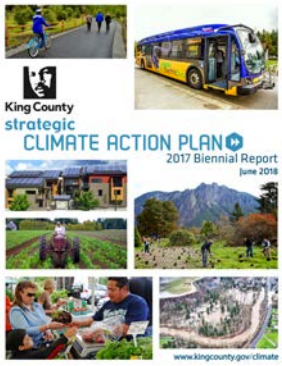
Jefferson County Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		14.58	21.25	29.17	35.00

Jefferson county adopted the *Climate Action Plan: Port Townsend/Jefferson County, Washington* (Surber, J. & Lamp, Z.A., 2011) on November 14, 2011. This plan was developed by the Climate Action Staff that consisted of a member from the city of Port Townsend and a member from Jefferson County. The plan appears to be funded internally, but no specific mentions are addressed. The staff of this effort were supported by a Climate Action Committee of 13 members ranging from the community, schools,

business, and governmental representatives. Jefferson County spans the east-west longitudinal extent of the Olympic Peninsula containing the city of Port Townsend as the largest urban center in the northeastern corner of the coastal areas of the county. The county spans completely across the area of two treaty agreements from 1855 Point No Point Treaty across the eastern extent of the county, and the 1855 Treaty of Quinault River and the final renegotiated 1856 Treaty of Olympia cover the western half of the county as well as none of the Indigenous nations who are party to these treaties are mentioned in the plan. The development of this plan was the result of significant community pressure to ignite government action. The development of this plan follows a 5-Milestone process set forth by ICLEI Local Governments for Sustainability including: 1.) Inventory Emissions; 2.) Establish Targets; 3.) Develop Climate Action Plan; 4.) Implement Climate Action Plan; and 5.) Monitor/Evaluate Progress. These steps consisted of brainstorming potential emissions reduction targets, conducting open houses for community brainstorming, outreaching to Washington State Agencies and ICELI support staff, reflecting list of reduction measures, and then another round of open houses to outreach about planning efforts findings. The key priorities focused on in this planning effort include: Education and Outreach; Buildings and Energy; Urban Form and Transportation; Consumption and Solid Waste; Community-wide Reductions; Food and Agriculture; and Rural Resource Management. The electronic document consisted of 156 pages with 240 documented equity occurrences for a rate of 1.54 occurrences per page. The equity coding analysis resulted in percentages of 15 %, 21 %, 29 %, and 35 % for ecological, social, economic, and political systems respectively. These results indicate a strong focus on political systems followed closely by economic systems interests. The

low value for ecological systems seems accurate as this was not a major point of emphasis in the planning effort. This number seems lower than most as a significant portion of this document was dedicated to graphs and charts with the text representing only around a third of the total content of the document. Improving social equity is listed as a benefit of an aggressive response to climate change impacts, but for the most part it is assumed that social equity will be the direct result of climate action. The only mention of targeted efforts to ensure this outcome of social equity is a focus on providing low income households low interest loans to finance homeowner energy efficiency upgrades. Overall, the plan was straightforward in its communication and presented concise emissions reduction targets. The plan was the only studied that applied a joint city/county planning approach and as such referenced and relied on the efforts of the most successful approach of this variety from The City of Portland and Multnomah County (2015) in Oregon state. The plan focuses mostly on emissions reductions efforts and has a strong mitigation focus without much adaptation focus. The plan does provide an appendix of all proposed emissions reductions measured as well as those that were prioritized based on the criteria of benefit and feasibility. I feel a number of the most creative ideas did not make it out of the initial brainstorming phase. No maps were included in this planning effort.

Table 18: King County Climate Adaptation Plan

King County Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		15.12	29.27	23.41	32.20

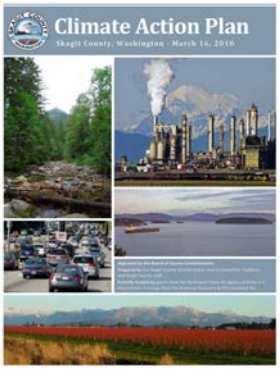
King County published the *Strategic Climate Action Plan: 2017 Biennial Report* in June 2018. This was the document studied in this analysis for the most up to date understanding and provided monitoring/assessment for King County's *Strategic Action Plan: November 2015*. The document analyzed is the result of efforts from King County Executive's Office and King County Council (KCC) with support from many staff members. This current plan is the result of over a decade of climate action by King County originating from 2006 King County Executive Orders for Global Warming Preparedness (PUT 7-5, 7-7. And 7-8) (King County, 2007. p 6), and KCC Motion 12362 requiring an initial plan by 2007 and then annual reports each subsequent year. The initial report was titled *King County 2007 Climate Plan* followed by Climate Reports in 2008 and 2009, and then the 2010 report shifted to the tile of *Towards a Sustainable, Prosperous King County: 2010 Annual Report of King County's Climate Change, Energy, Green Building, and Environmental Purchasing Program*, and was followed up with an annual report in 2011, but again the title was changed in 2012 to the current format of *Strategic Climate Action Plan*, and in 2013 and 2014 *Annual Report of King*

County's Climate Change, Energy, Green Building, and Environmental Purchasing Program documents were produced, 2015 was the last full update of the planning structure to the *Strategic Climate Action Plan,* and was evaluated in 2016 Annual Report before shifting to a biennial evaluation structure and leading to the 2018 report analyzed for this research project. The funding for these efforts are not clearly distinguished, but it appears to be internally sourced. King County has worked closely with the city of Seattle as the county's largest city and fellow climate action leader, the University of Washington Climate Impacts Group (also based in Seattle), and recently formed Puget Sound Climate Preparedness Collaborative of regional Tribes, cities, counties, and regional governments. King County is located in the central Salish Sea region ranging from Vashon Island and the coastlands on the county's western extent up to the Cascade Mountain Range's crest in the eastern county extent. The county spans across a number of watersheds (WRIA 7, 8, 9) and varied ecosystems. King County mostly falls within the bounds of the 1855 Point Elliot Treaty and a small portion of the 1854 Medicine Creek Treaty in the county's southern extent. Three reservations lie within the county's boundaries including the Snoqualmie Indian Tribe, Muckleshoot Indian Tribe, and the Puyallup Tribe of Indians; as well as the federally unrecognized Duwamish Tribe who have a Longhouse near the shores of the Duwamish Waterway and the Port of Seattle. Neither the treaty agreements or individual Indigenous Nation governments are acknowledged explicitly in King County's plan other than a general reference to working with tribes (p 1), and a general statement regarding the needs to protect treaty trust resources (p 14). As King County has a significant history of climate action, most of the prioritizing of areas of interest have been reworked over the past decade and not much

acknowledgment of these fundamental components is addressed in this version of the plan. The evaluation of Climate Action efforts is broken down into three sections including: 1.) Reducing Greenhouse Gas Emissions; 2.) Preparing for Climate Impacts; 3.) Climate Equity & Community Engagement. The first section (Reducing Greenhouse Gas Emissions) has 5 Goal Areas including: Transportation and Land Use; Building and Facilities Energy; Green Building; Consumption and Materials Management; and Forests and Agriculture. The second section (Preparing for Climate Impacts) focuses include: Extreme Precipitation; Sea-level Rise; Public Health; Hazard Mitigation; Regional Partnerships; Summer Water Supply and Streamflow; Climate Impacts on Population Growth; and Salmon Recovery. The third section (Climate Equity & Community Engagement) focuses include: Community Engagement & Capacity Building; and Climate-Related Services & Operations. The plan analyzed consisted of a 60 page electronic document with 205 equity occurrences documented for a rate of 3.42 occurrences per page. The equity coding analysis resulted in percentages of 15 %, 29 %, 23 %, and 32 % for ecological, social, economic, and political systems respectively. The quantitative results indicate a strong focus on political systems followed by social considerations. Ecological systems were not a major focus of this planning effort despite an entire Goal Area being related to ecological concerns with Forests and Agriculture. There were no explicit species identified, but only general mentions of salmon restoration and a goal of planting both native and non-native trees. Overall this plan was accessible by using extensive graphic imagery to make its presentation more appealing while still containing significant amounts of information. This plan is unique in that it dedicates an entire section to Climate Equity, but was very brief and was only about 5 % of this entire

document. The evaluation of previously identified targets was the first encountered in this research analysis. No maps were identified for any of the recent planning publications, and I could only find two ever used including a PNW regional climate impact map in the 20007 Plan, and a map of county wide Green Building Program efforts in the 2011 Annual Report.

Table 19: Skagit County Climate Adaptation Plan

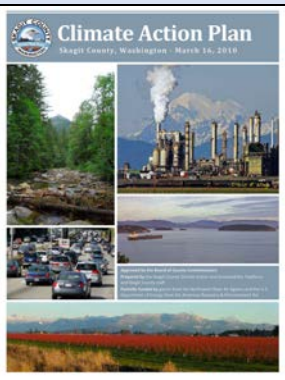
Skagit County Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		24.17	19.43	27.96	28.44

Skagit County published the *Climate Action Plan: Skagit County, Washington* (Walters, R. et al., 2010) on March 16, 2010. The plan was prepared by the Skagit Climate Action and Sustainability Taskforce and Skagit County staff with partial funding from grants from the Northwest Clean Air Agency and the U.S. Department of Energy from the American Recovery & Reinvestment Act. The Climate Action and Sustainability Taskforce consisted of 15 citizen members who provided support to the 4-person team of Climate Action & Sustainability Initiative Staff who developed this plan response to the passage of the 2008 Skagit County Climate Action Resolution. Skagit County also joined ICLEI-Local Governments for Sustainability Climate Protection

Campaign. The citizen taskforce began n 2009 and formed 5 working groups around Energy (Conservation and Renewables); County Purchasing; Land Use and Transportation; Outreach and Education; and Solid Waste and Recycling which worked with county staff members. Skagit County is located in the central Salish sea region of Washington State. The county extends from the coastal low lands on the western extent containing a number of watersheds and a variety of ecosystems. Skagit County is boarded by Whatcom County to the north, Snohomish County to the south, and Okanogan and Chelan Counties to the east. The entirety of Skagit County lies within the 1855 Point Elliot Treaty Territory. Within the county boundaries the Swinomish Indian Tribal Community, Samish Indian Nation, Upper Skagit Indian Tribe, and Sauk Suiattle Indian Tribe have reservations and co-management rights to ceded treaty territory. Skagit County does not acknowledge the treaty agreement with these Indigenous Nations in this plan, and only identifies the Swinomish Indian Tribal Community in a single paragraph because the county was engaged as a Strategic Advisor for this Climate Change Initiative. The Taskforce Workgroups developed Recommendations for policies to improve county operations, efficiencies and focused on General Policies, Energy Conservation & Renewables, Purchasing, and Solid Waste with a number of policies that were evaluated with criteria including: Timeframe; Lead Agency; Cost; Resource Reduction; and Co-Benefits. A final section of recommended Land-Use Planning Policies are proposed and included information for implementation. The plan analyzed consisted of a 90 page document with 422 equity occurrences for a rate of 4.69 occurrences per page. The equity coding analysis resulted in percentages of 24 %, 19 %, 28 %, and 28 % for ecological, social, economic, and political systems respectively. The strongest focuses of this plan

according to the quantitative results are for economic and political systems, as these played a major role in the focus of the planning efforts to improve government operations and save costs in the process. The ecological system quantitative results are somewhat surprising as this did not seem as much of an emphasis in the plan as no individual species were listed and many ecological focuses were around the topics of landscaping, agriculture, and carbon sequestration in forests. Overall, the plan was very comprehensive and provided detailed policy recommendations. The plan was almost exclusively focused on mitigation actions, and this was made even more apparent by the brief addressing of climate impacts at the beginning of the report and then never addressing these concerns implications in relation to recommended policies. This plan did not utilize maps very extensively and only included two instances of cited works from the Swinomish Climate Change Initiative's mapping of inundation risk zones from sea-level rise to State Road (SR) -20, and a PNW regional map of changes in precipitation over the last century by the University of Washington Climate Impacts Group.

Table 20: Thurston County Climate Adaptation Plan

Thurston County Climate Adaptation Plan Individual Analysis					
Plan	Equity	Ecological	Social	Economic	Political
		24.39	26.09	24.20	25.33

The *Thurston Climate Adaptation Plan: Climate Resilience Actions for Thurston County and South Puget Sound* (Thurston Regional Planning Council, 2018) was published in 2018 by the Thurston Regional Planning Council (TRPC) with a National Estuary Program (NEP) grant from the US Environmental Protection Agency and administered by Washington State Department of Commerce to conduct a watershed analysis of the county areas draining into the Salish Sea. TRPC is a 22-mwember intergovernmental board ranging from city, county, public services, business community, and two Indigenous Nations from the Confederated Tribes of the Chehalis Reservation and the Nisqually Indian Tribe. The planning effort was headed by a 6-person project team of TRPC staff and a Thurston County Planner with the subcontracted support of Earth Economics. Thurston County is located at the Southern extent of the Salish Sea in Washington and stretches upland from the coastal areas through three watersheds including the Nisqually River (WRIA 11), Deschutes River (WRIA 13), and Kennedy-Goldsborough (WRIA 14), while the southwestern corner of the county flows into the Chehalis River Basin and drains west directly into the Pacific Ocean through Grays Harbor. Thurston County is bordered by Pierce County to the north and east between coastal lands up into the Cascade Mountain range, Lewis County borders the southern portion of Thurston County in the prairies and river basins, Grays Harbor County lies to the west ern extent of the county's boundaries, and Mason County to the northwest extent of the county along coastal southern Salish Sea lands. A significant portion of the county lies within the area of the 1854 Medicine Creek Treaty Territory, mostly along the northeastern half of the county that falls within this watershed study extent, while the southwestern corner of the county is un-ceded territory. As a result of this the

Confederated Tribes of the Chehalis Reservation was established by Executive Order on July 8, 1864 by President Abraham Lincoln (Ruby, R. et al, 2010, p 56), and as such the tribe is not afforded the same rights by the federal government as treaty tribes have reserved. The plan acknowledged the existence of local Indigenous Nations, but fails to recognize the history or lack thereof regarding treaty agreements and in the process, limits the effort to a complete comprehensive analysis. The planning process spanned over a two-year process starting in 2016 with efforts from a Scientific Review Committee to then inform a vulnerability and risk assessment process to begin public engagement in an effort to solicit proposed actions and increase community support followed by the development of an initial plan that was sent out for public review and feedback before the final plan was officially presented and adapted into action in the early months of 2018. This effort grew out of a previous planning effort and these provided the adaptation plan's overarching regional goals (TRPC, 2013), and newly developed Guiding Principles (2018, p 23). The process of evaluating proposed actions utilized criteria including: Magnitude; Effectiveness; Side-effects; and Equity. 90 final actions were grouped into themed categories including: General Actions; Drought & Water Quality Actions; Flood & Erosion Actions; Plants & Animals Actions; Transportation & Energy Actions; and Wildfire & Extreme Heat. An action cost-benefit analysis was conducted by Earth Economics for two actions regarding the value of ecosystem services to both restore riparian habitat and also the benefits of guiding growth in urban areas. The plan analyzed consisted of a 337-page electronic document from the plan and 6 appendices with 529 documented equity occurrences for a rate of 1.57 occurrences per page. The equity coding analysis resulted in percentages of 24 %, 26 %, 24 %, and 25% for

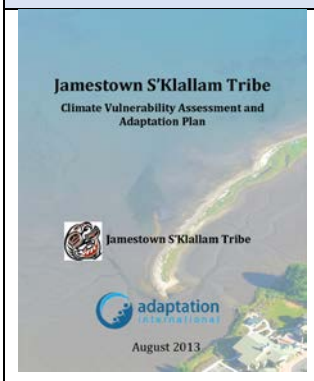
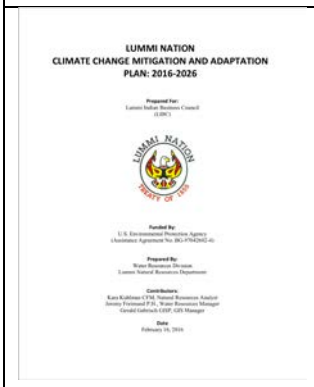
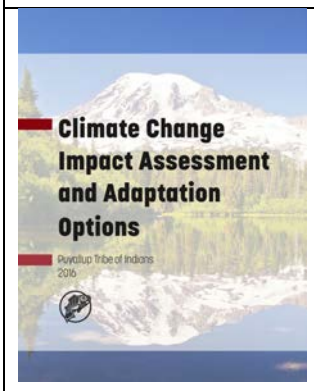
ecological, social, economic, and political systems respectively. The quantitative results indicate that the systems of equity considerations were fairly balanced for Thurston County's planning effort. A number of species were listed in the plan including: fish such as Chinook, coho, and chum salmon ;Oregon spotted frogs; birds; clams; oysters; beans; grasses; cows; horses; berries; fruit trees; tubers; Garry oaks; Douglas fir; eelgrass; plankton; western hemlock; whitebark pine; western red cedar; Oregon ash; big leaf maple; Pacific madrone; coral; benthic macroinvertebrates; waterfowl; otters; crabs; bald eagles; western grebe; orca; seals; Olympia oysters; mussels; blueberries; wine grapes; Golden paintbrush; white-topped aster; rose checker-mallow; Mazama pocket gophers, Taylor's checkerspot butterfly; streaked horned lark; red alder; and mountain pine beetle. Overall, Thurston County created an accessible plan that utilized engaging images and extensive community engagement, while still being supported by extensive documentation available in the appendix. The plan is unique in applying a watershed perspective, and as a result has a significant focus on ecological contexts. Maps were utilized extensively throughout the plan including: an overview of the county extent in relation to the three watersheds of interest and the location of the Indigenous Nation reservations and cities located in the county; extreme high daytime temperature projections in the watershed; maximum 24-hour precipitation projections; April 1st Snow Depth projections; winter run-off (Dec-Feb) projections; projected stream temperature increase; an image map of Olympia and the lower Deschutes River valley; map of study area for Earth Economics analysis along the Deschutes River; TRPC's interactive Thurston Region Hazards Assessment Map; map of Puget Sound Region; projected temperatures throughout the year; projected summer precipitation; projected length of

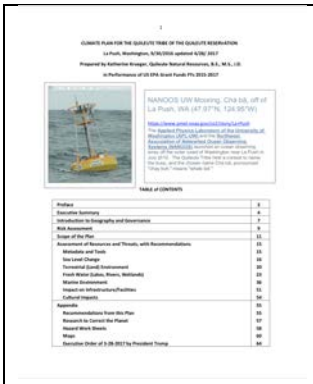
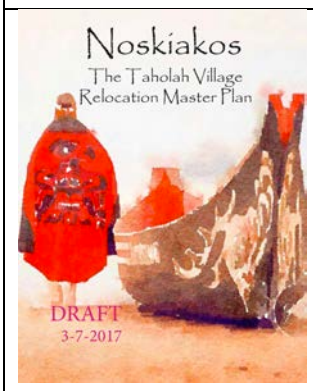
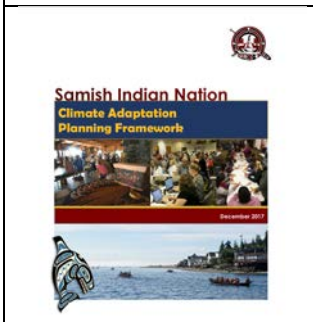
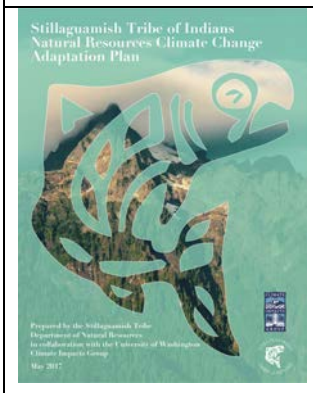
snow season; projected summer runoff; NOAA land cover wetlands maps; coastal flooding risk map of downtown Olympia; transportation risks; coastal flooding throughout county; shellfish vulnerability map; projected growing degree days; NOAA land cover type all; historic wildfire map; wildland urban interface map and risk zones; flooding vulnerability map; landslide vulnerability; census tract linked with natural hazard vulnerability; detailed geographic extent of county map; Deschutes River watershed riparian shade assessment map; and preferred land use scenario map.

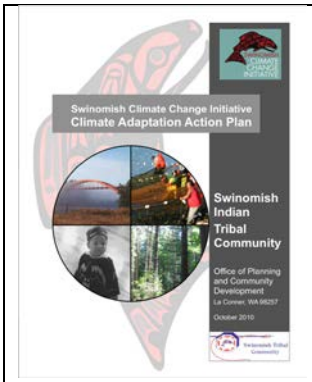
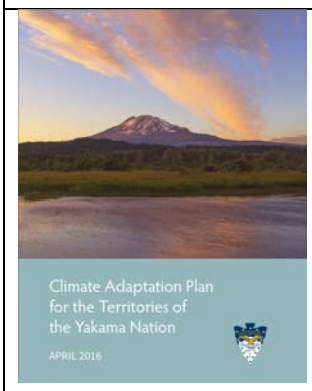
Comparative Analysis

This section will provide a comparison of the equity coding analysis quantitative results between all of the climate adaptation plans analyzed. This section is split into three portions including: Indigenous Nation-to-Indigenous Nation comparison; County-to-County Comparison; and Indigenous Nations Average-to-County Governments Average Comparison. The planning efforts are compared between the individual percentages of the four equity systems of interest and as whole plans comprised of the four-system split.

Table 21: Indigenous Nations Comparative Analysis

Indigenous Nation-to-Indigenous Nation Comparison					
Plan	Name/Equity	Ecological	Social	Economic	Political
	Jamestown S'Klallam Tribe 	22.35	29.42	23.45	24.78
	Lummi Nation 	27.65	22.46	19.87	30.02
	Puyallup Tribe of Indians 	37.97	16.04	11.76	34.22

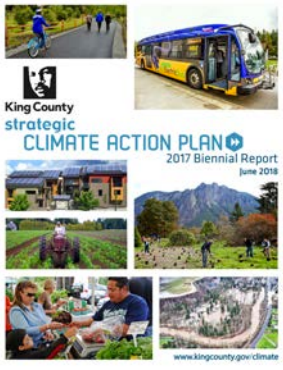
	Quileute Tribe 	36.36	20.45	16.36	26.82
	Quinault Indian Nation 	19.10	42.21	19.60	19.10
	Samish Indian Nation 	20.88	37.37	16.50	25.25
	Stillaguamish Tribe of Indians 	40.75	15.41	10.61	33.22

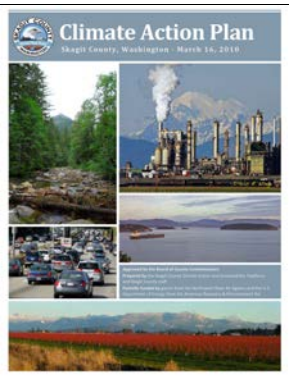
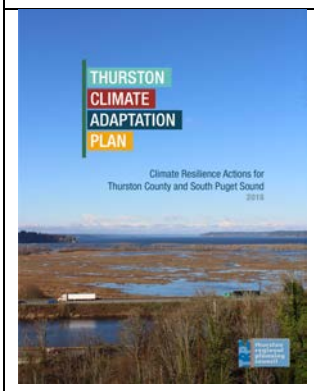
	Swinomish Indian Tribal Community 	25.96	29.62	15.19	29.23
	Yakama Nation 	43.21	19.16	20.21	17.42
Indigenous Nations Average		30.47	25.79	17.06	26.67

The Indigenous Nations comparative analysis average of equity system percent focuses included the strongest emphasis on ecological system, followed by similar levels of social and political system focuses, and the lowest focus on economic systems. Multiple of the plans analyzed between Indigenous Nations had very strong focuses on one and sometimes two systems of equity considerations. The largest percentage focus by an Indigenous Nation government was by Yakama Nation with a 43.21 % focus on ecological systems of equity considerations, followed closely by Quinault Indian Nation with a 42.21 % focus on social systems equity. The Jamestown S'Klallam Tribe had the highest Indigenous Nation economic system equity focus at 23.45 %. The Puyallup Tribe

of Indians had the highest Indigenous Nation political system equity focus at 34.22 %. The lowest percent focus for any Indigenous Nation system equity consideration was by the Stillaguamish Tribe of Indians with an economic systems equity focus of only 10.61 %, with the next lowest by the Puyallup Tribe of Indians also for economic systems equity with a percent focus of 11.76 %. The Quinault Indian Nation had the lowest Indigenous Nation ecological system equity focus at 19.1 %. The Stillaguamish Tribe of Indians had the lowest Indigenous Nation social systems equity focus at 15.41 %. Yakama Nation had the lowest Indigenous Nation political system equity focus at 17.42 %.

Table 22: County Governments Comparative Analysis

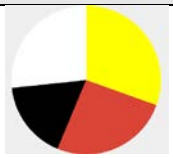
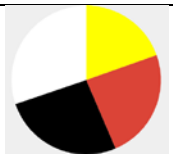
County-to-County Comparison					
Plan	Name/Equity	Ecological	Social	Economic	Political
	Jefferson County 	14.58	21.25	29.17	35.00
	King County 	15.12	29.27	23.41	32.20

	Skagit County 	24.17	19.43	27.96	28.44
	Thurston County 	24.39	26.09	24.20	25.33
County Governments Average		19.57	24.01	26.19	30.24

The county governments overall focused on political systems the most, followed by economic and social systems, with ecological systems having the lowest focus. Political systems equity percentages were the highest focus for three out of the four counties analyzed. Thurston County was the only county analyzed to have a different system focus as the highest system equity percentage with a rate of 26.09 % for social systems equity focus. The largest percent focus for any County system equity consideration was for political system by Jefferson County with a focus of 35 %, followed closely by King County with a 32.2 % political system equity focus. Thurston County had the highest County ecological system equity focus at 24.39 %. King County

had the highest percent County social systems equity focus at 29.27 %. Jefferson County had the highest County economic system equity focus at 29.17 %. The lowest County system equity percent focus for any County was by Jefferson County with a 14.58 % ecological system equity focus, followed closely by King County with a 15.12 % ecological system equity focus as well. Skagit County had the lowest County social systems equity focus at 19.43 %. King County had the County lowest economic system equity focus at 23.41 %. Thurston County had the lowest County political system equity focus at 25.33 %.

Table 23: Indigenous Nation to County Government Comparative Analysis

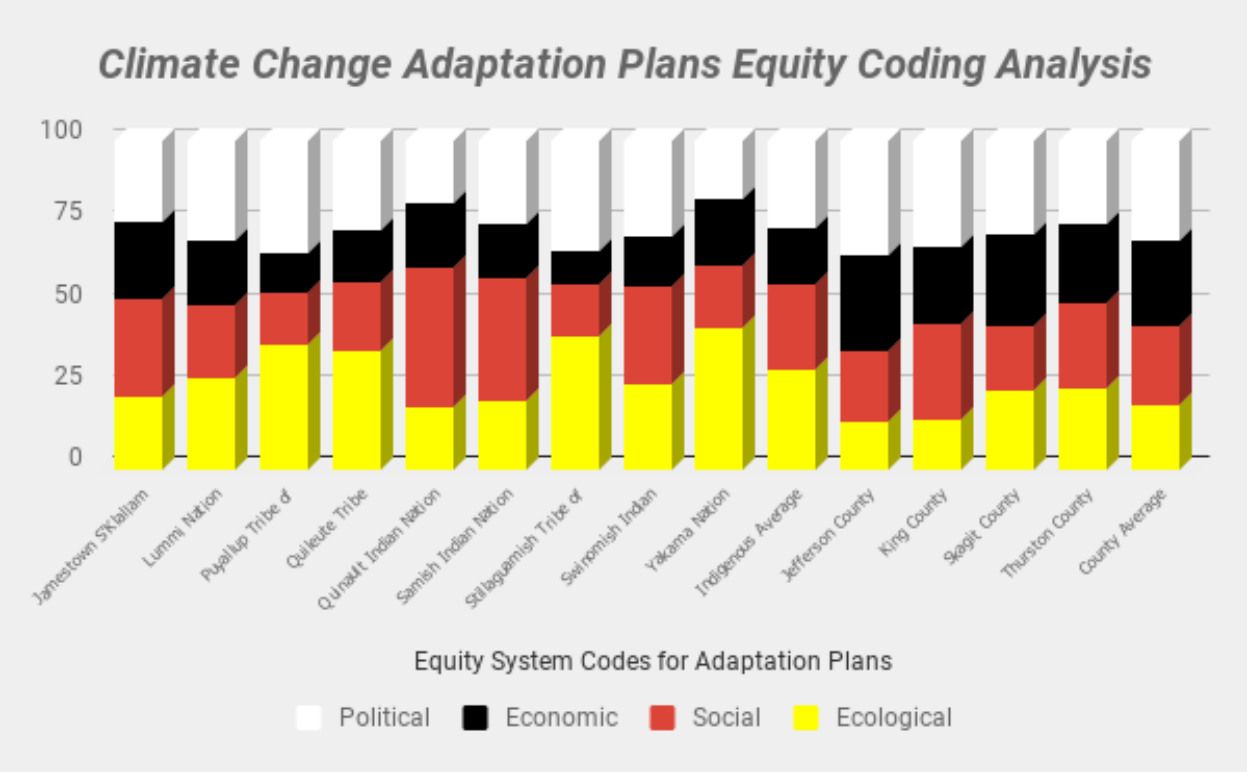
Indigenous Nations Average-to-County Governments Average Comparison					
Plans	Equity	Ecological	Social	Economic	Political
Indigenous Nations Average		30.47	25.79	17.06	26.67
County Governments Average		19.57	24.01	26.19	30.24
Total Average		25.02	24.90	21.63	28.46

Overall, the regional planning efforts had the highest focus on political systems, followed by ecological and social systems, with economic focuses receiving the lowest percentage of focus. When looking at the average for Indigenous Nations efforts compared to the average for County governments was the difference in ecological and

economic systems equity focus. Indigenous Nations on average had a much higher focus on ecological systems equity at 30.47 % compared to just 19.57 %. This is a major difference in the percent focus and this result seems consistent with the content of the planning efforts I reviewed by all governments. The highest county ecological system equity focus, Thurston County at 24.39 %, was still much lower than that of the average for Indigenous Nations and much lower than the highest value by Yakama Nation at 43.21 %. County governments on average had a much higher focus on economic systems, 26.19 % respectively, than Indigenous Nations on average, 17.06 % respectively. The highest Indigenous Nation economic system equity focus, Jamestown S'Klallam Tribe at 23.45 %, was still below the County governments average, and just slightly above the lowest County value, King County 23.41 %. The social system equity focus of the average between Indigenous Nations and County governments fairly even with a 25.79 % and 24.01 % focus respectively. Political system equity focus on average was somewhat similar between Indigenous Nations and County governments at 26.67 % and 30.24 % respectively. The highest values for each system equity focus across all efforts include: ecological system equity of 43.21% by Yakama Nation; social system equity of 42.21 % by Quinault Indian Nation; economic system equity of 29.17 % by Jefferson County; and political system equity of 35% by Jefferson County. The lowest values for each system equity focus across all efforts include: ecological system equity of 14.58 % by Jefferson County; social system equity of 15.41 % by the Stillaguamish Tribe of Indians; economic system equity of 10.61 % by the Stillaguamish Tribe of Indians; and political system equity of 17.42 % by Yakama Nation. The figure below depicts a bar graph with all

analyzed system equity considerations together to show how all of these efforts compare across the region.

Figure 3: Equity Coding Analysis Table



Best Practices

In the process of extensively reviewing each of these plans, a number of best practices are apparent when looking across the state of the region. These thirteen governments are providing their own unique leading efforts to implement climate action across Washington State. Below is a list of various best practices identified, and is followed with a short description of each effort.

- Community Health Metrics— Swinomish Indian Tribal Community
- Ecological Planning— Jamestown S'Klallam Tribe
- Traditional Agro-ecology— Quileute Tribe
- Sustainable Community Design— Quinault Indian Nation
- Renewable Energy— Lummi Nation
- Wetland Mitigation/Sequestration— Lummi Nation
- Transportation Plan— King County
- Ecological Economics— Thurston County
- Watershed Planning Approach— Thurston County
- Recognizing Indigenous Nations— Thurston County
- Planning Resources and Recognizing Local Efforts— Samish Indian Nation
- Communication Plan— Samish Indian Nation
- Watershed Ecosystem Planning— Stillaguamish Tribe of Indians
- Focus on Mountain Goats— Stillaguamish Tribe of Indians
- Restoration Collaboration— Puyallup Tribe of Indians
- Green Purchasing Program— Skagit County
- Funding Energy Efficiency— Skagit County
- Citizen Involvement— Jefferson County
- Community Benefits Framing of Climate Action— Jefferson County

Community Health Metrics— The Swinomish Indian Tribal Community developed a unique approach of creating an assessment method for the planning approach that sought to move the focus of planning efforts up from the individual level to the community scale

as a culturally appropriate representation of traditional Indigenous cultures. This work is a specialty for Dr. Jamie Donatuto, who has been engaging with other Indigenous Nation governments to help spread the use of this approach while shaping the individual framework for each government who applies these understandings like the Squaxin Island Tribe who has used this approach to develop Indigenous Health and Wellbeing Indicators including: Physical Health; Community Connection; Natural Resources Security; Cultural Use and Practice; Education; Self-Determination; and Resilience/Balance (Donatuto, J et al. 2016; Poe, M. et al. 2017). The chart below is the community health framework applied by the Swinomish Indian Tribal Community.

Five Health Factors	**Fifteen Health Indicators with Definitions for each**
Community Cohesion	*Participation & cooperation* – the community depends on each other; strong support network (e.g., everyone supports the maintenance, harvest and distribution of resources)
	Roles (e.g., harvest, prepare, preserve natural resources) – each member of the community has a role that is respected
	Familiarity – food roles are known and trusted; therefore, it is assumed food is "safe"
Food Security	*Availability* – natural resources are abundant and healthy
	Access – all resource use areas (i.e., Usual and Accustomed areas) are allowed to be harvested with an emphasis on local resources for subsistence consumers.
	Sharing – ensuring that everyone in the community receives natural resources from the Salish Sea, esp. Elders
Ceremonial Use	*Gatherings & ceremonies* – particular community assemblies that require natural resources from the Salish

	Sea
	Giving thanks – thanking Nature/ the Spirit for providing the natural resources when harvesting and preparing them; done with prayers and thoughtful intentions
	Feeding the Spirit – using natural resources from the Salish Sea to satisfy a spiritual "hunger" (e.g., consuming traditional foods)
Knowledge Transmission	*The Teachings* – knowledge, values and beliefs about tribal health in connection with the Salish Sea
	Elders – the knowledge keepers; they have and are able to pass on the knowledge
	Youth – the future; they receive and respect the knowledge
Self Determination	*Healing*— ability to choose life-style desired for what is considered "good health" (e.g., traditional medicines, language programs)
	Development—community enrichment opportunities directed by and for the community
	Restoration— environmental or habitat restoration projects that are community driven

Figure 4: Swinomish Indian Tribal Community Indigenous Health Metrics (p 20)

Ecological Planning— The Jamestown S'Klallam Tribe provides a leading example of a best practice that puts culturally important species as the top priority of climate adaptation planning. A number of governments analyzed have planning efforts that revolve heavily around ecological considerations, but most of these place the priority focus on the ecosystem level. This is an important focus, but this sometimes takes away from the importance of specific species. The Jamestown S'Klallam Tribe provides a leading example of identifying culturally important species as priority focuses such as

salmon, clams & oysters, and western red cedar trees. This approach helps to target climate adaptation efforts to the most important ecological resources without having to account for prioritizing whole ecosystem types and then having to individually identify efforts focusing on all of these areas. Below is an image of the charts provided in the plan for key areas of concern to show an example of the focus in this planning effort.

	Cost	Ease of Implementation	Political/ Community Support	Timing of Action	Partnerships Required
Clams & Oysters (focus on limiting other stressors)[4]					
Monitor and continue to improve local water-quality since a significant amount of bivalve species decline is associated with water-quality degradation[74]. Consider expanding monitoring to include continuous water temperature and pH.	Medium	Hard	High	Medium-Term	Yes (surrounding communities, State, private land owners)
Ensure sustainable harvesting of clams and oysters[75].	Low	Moderate	High	Immediate	Yes (with State, industry, other Tribes)
Rebuild stocks (i.e., restoration)[76].	Medium	Moderate	Medium	Medium-Term	Yes (with State DNR)
Hatchery propagation and restocking of populations in areas where natural reproduction of native bivalves is limited. If this is pursued, ensure replaced stocks are indigenous to the area[77].	Medium	Easy	Medium	Immediate	Yes (with State DNR)
Transplanting adult clams and oysters (assisted migration) from remnant populations into areas that are more suitable for reproductive success[78].	Medium	Moderate	Medium	Immediate	Yes (with State DNR)
Develop cultural center and traditional Longhouse around Harvest Beach in Blyn to enhance understanding of shellfish heritage and engage more Trial Citizens in the harvest of clams and oysters[79].	Medium	Easy	Medium	Immediate	No

Figure 5: Jamestown S'Klallam Tribe Shellfish Vulnerability Assessment (p. 35)

Traditional Agro-ecology— The Quileute Tribe provides a best practice for supporting traditional agro-ecology through establishing community gardens and restoration projects to cultivate important traditional use plants, as well as is seeking to establish an elk reserve. All of these efforts are seeking to improve food security for the geographically

isolated coastal reservation in the event that the Tribal community's connection to outside communities becomes disrupted. The geographical context of the Reservation drives this unique concern for the Quileute Tribe, while at the same time making them a leader for climate adaptation food security through reconnection to traditional food sources. The author of this planning effort does state that the efforts for reestablishing traditional use plants come from efforts occurring at Northwest Indian College on the Lummi Reservation as well as the idea of an elk reservation comes from efforts by the Coeur d'Alene Tribe.

Sustainable Community Design—The Quinault Indian Nation provides a leading example for considerations to include in sustainable community development planning designs. This effort grows out of the need to relocate the village of Taholah from the threat of sea-level rise in conjunction with tsunami risks, but is being utilized to established the most sustainable community possible in this opportunity for change. The village relocation is being geared towards providing a compact, pedestrian friendly orientation that limits the need to transportation, establishes green building efforts for all residential, commercial, and public buildings to improve community energy efficiency, utilizes renewable energy development, institutionalizes culturally relevant architecture and public artwork throughout the community to reinforce the sense of a Quinault place, and provides accessible public facilities that meet a variety of community needs after engaging in a rigorous two year community outreach process. A detailed assessment of the design features is provided throughout the report, a variety of community owned housing options including affordable housing provided for those experiencing

houselessness, as well as a number of renderings and planning layouts for ongoing development efforts. The image below is the planned layout of the redeveloped village.

Figure 6: Quinault Indian Nation Village Relocation Map (p 50)

Renewable Energy—The Lummi Nation has established an explicit strategic renewable energy planning effort (Water Resources Division Lummi Natural Resources Department. 2016). A number of demonstration projects have already been established both on buildings at Northwest Indian College on the Reservation as well as multiple street lights around the reservation. The plan proposes putting solar panel photovoltaic (PV) arrays on a number of government buildings to reduce the amount of energy needed from the existing utility grid.

Wetland Mitigation/Sequestration— The Lummi Nation also provides a leading example of efforts to identify areas where residences are at risk of inundation from rising sea-levels and increased storm surges. A variety of actions are being utilized to raise awareness for properties at risk and then providing opportunities to buy out at risk owner. Upon buying these properties, Lummi Nation establishes conservation easements so than no future development can occur in these areas, and in many cases these properties are restored and placed into the wetland mitigation banking system. Lummi Nation is exploring the possibility of establishing these sites as carbon sequestration projects so they can receive funds for keeping these spaces in their natural state as the value of 'blue carbon' continues to rise.

Transportation Plan— King County provides the most extensive transportation planning effort studied out of the regional efforts. The county seeks to provide equitable access and affordable rates for use of low emission public transportation options. King County was not only focused on converting their fleet of vehicles to electric options, but also

providing better support for bike riders, providing more connected access to transit locations and even providing increased ride share services to connect to and from transit location to begging and end destinations. These efforts are being applied across the region to expand ridership of public transportation options.

Ecological Economics— Thurston County applied ecological economics understandings to include an ecosystem service valuation assessment in their planning efforts regarding proposed actions. This was the only planning effort that sought to identify the value of ecological systems and apply existing methodologies to value these components in relation to climate adaptation planning efforts. Earth Economics was contracted to conduct this analysis as they have worked extensively throughout Washington State to value ecosystem services in a number of locations. There is great potential for this practice to expand across the field of climate adaptation planning efforts, and Thurston County provides a starting point to begin engaging in these efforts.

Watershed Planning Approach— Thurston County's climate adaptation plan was focused on an analysis of the watersheds in the county flowing into the Southern Salish Sea. The watershed perspective was not common in plans analyzed, but provides a leading approach to understand the impacts of climate change at the scale of anticipated concerns. The watershed planning approach helped to provide an effective overview of ecological concerns in relation to associated political, social, and economic considerations. Seeing climate change through the context of a watershed perspective allows for actions to be

taken at the appropriate location where they can be the most effective from the start. The image below shows the extent of the watershed study area within Thurston County.

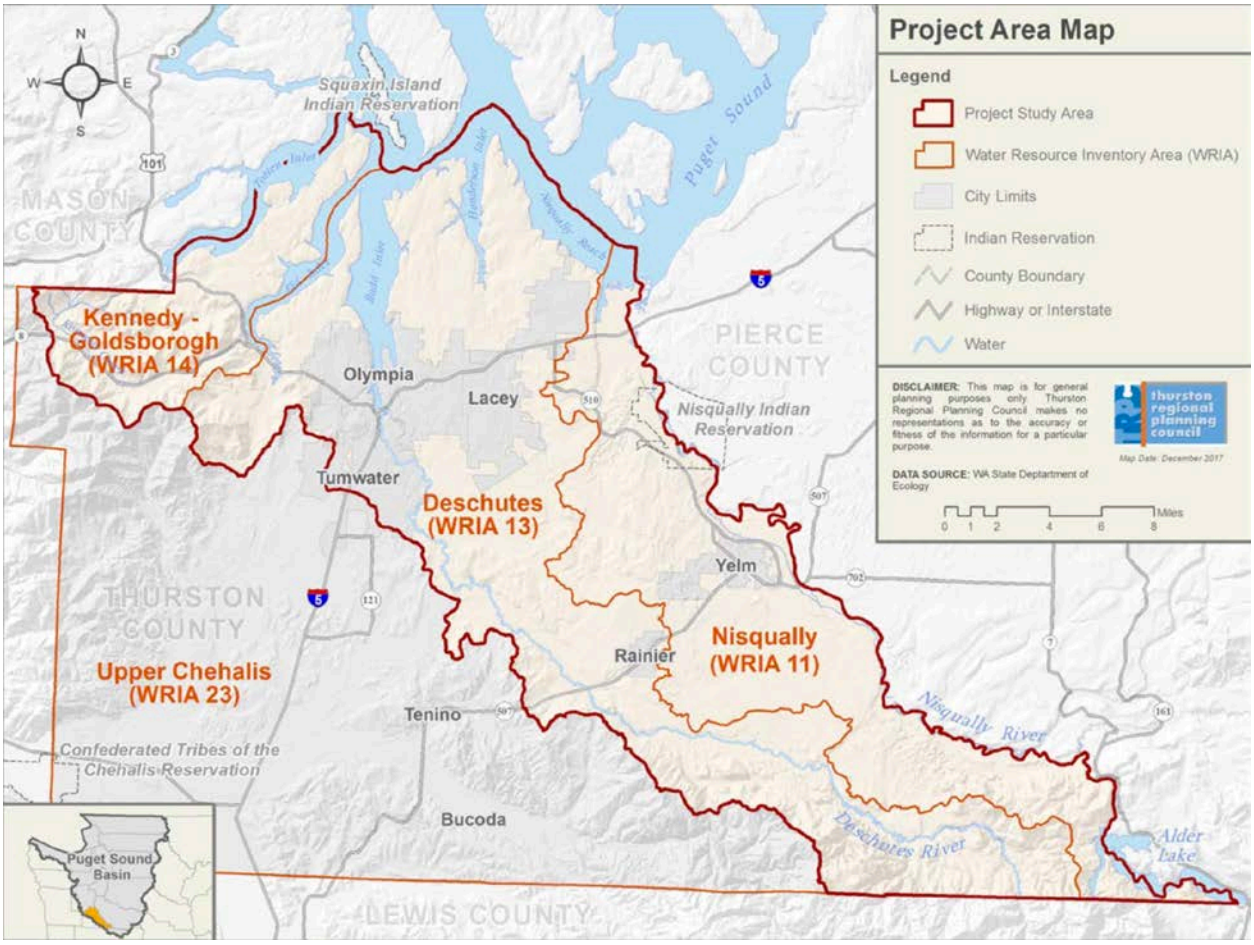


Figure7: Thurston County Watershed Adaptation Map (p 14)

Recognizing Indigenous Nations— Thurston County was the only County analyzed to individually recognize Indigenous Nations inside of the County boundaries. To act effectively, governments need to be grounded in an understanding of the context of the place. Often times local governments do not effectively engage with Indigenous Nations, but in Washington State Thurston County is leading in these regards for climate adaptation planning. Despite being a leader in this regard, Thurston County is still lacking both based on their lack of recognizing treaty agreements with local Indigenous

Nations, as well as recognizing the sovereign nation status of these governments. In Thurston County's planning efforts, the Indigenous Nation governments are relegated to stakeholders with similar standing of cities, public utilities, and public academic institutions. This is not an effective nation-to-nation relationship, and could be improved by recognizing the existing history of treaty agreements and the sovereign status of these Nations.

Planning Resources— Samish Indian Nation provides a best practice of identifying existing climate adaptation planning tools as well as identifying the extent of regional planning efforts. A significant portion of the planning documents were dedicated to provide an overview of existing planning tools to best support ongoing climate action. Other planning documents mentioned a few resources, but none of the other planning efforts compared to the work of the Samish Indian Nation. This documentation of resources helps to address a major concern pointed out by one planning practitioner regarding the greatest difficulty of the field of climate adaptation planning being the challenge of staying on top of all of the existing and continuously expanding resources available to engage in this work.

Communication Plan— Samish Indian Nation provides a leading communication plan as an appendix to the *Climate Adaptation Planning Framework.* A number of governments talk about their efforts to engage in community outreach throughout the planning and implementation process, but this effort was the first documentation of the extent of these efforts through strategic planning. The plan provides an established purposes and

overview of the various components of the strategic communication methods to provide a culturally appropriate effort. Example materials are also provided to show the visual ways in which the efforts are being communicated to the community. The image below is the title page for the communication plan from Appendix A of the Samish Indian Nation's *Climate Adaptation Planning Framework.*

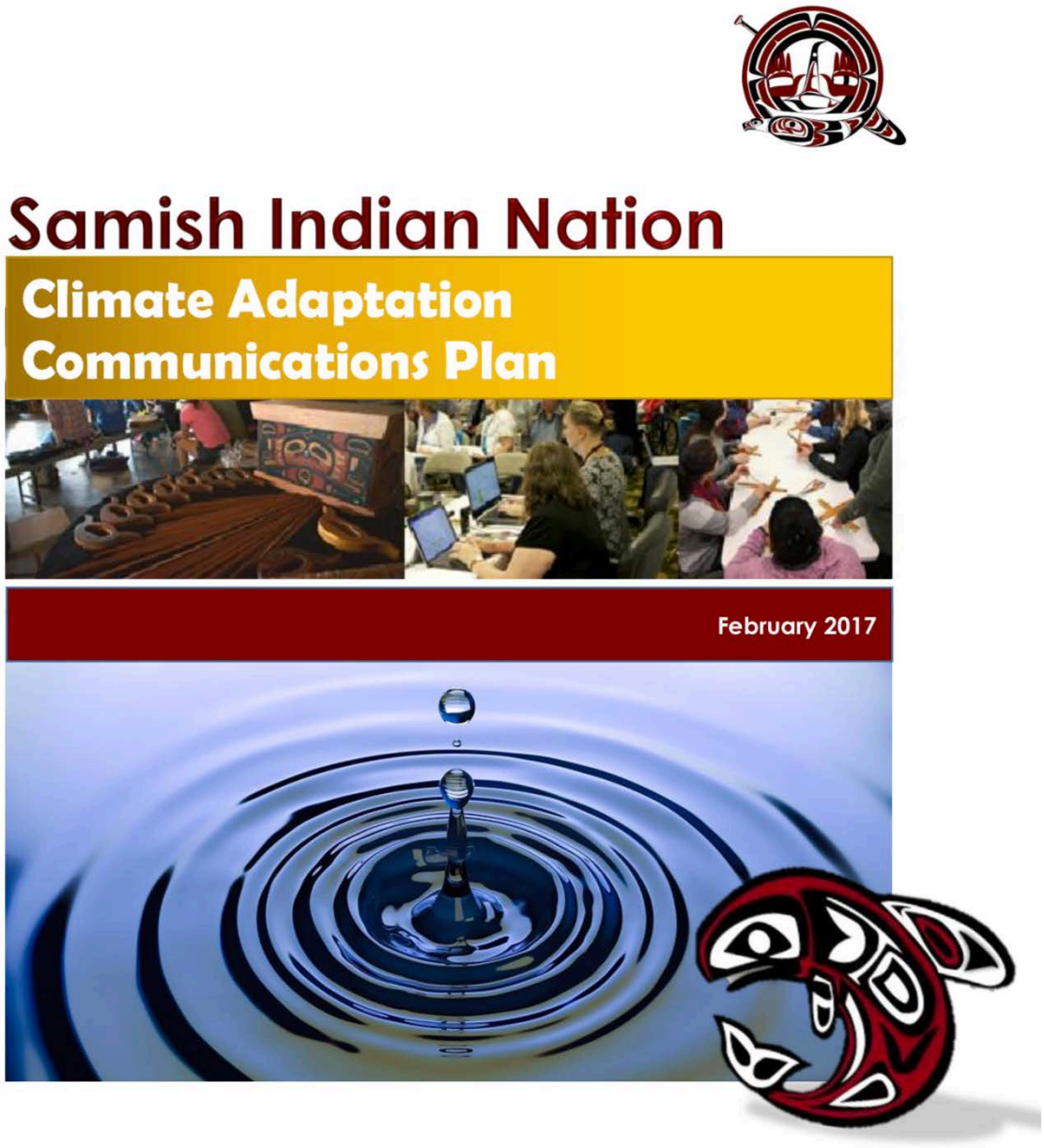


Figure 8: Samish Indian Nation Communication Plan (p App. A-1)

Watershed Ecosystem Planning— The Stillaguamish Tribe of Indian's climate adaptation plan provides a best practice for consideration of ecological concerns by identifying all of the associated ecosystem types throughout the Stillaguamish River watershed to provide the context for action. This effort completed by the University of Washington Climate Impacts Group was initially focused on identifying a number of important species, but as so many species were identified, it made more sense to approach the planning effort through the context of the ecosystems within with these species exist. This plan shows the inherent knowledge of being grounded in a place by recognizing that despite the Tribe being located in the center of the watershed, it is important to recognize the connections that exist from the coastal waters and lowlands all the way up to the peaks of the mountain range as the source of the Stillaguamish Rivers headwaters. The image below comes from Stillaguamish Tribe of Indian's climate adaptation plan showing the priority focuses of the effort mainly revolving around ecosystems of interest throughout the watershed and supported with outreach and education efforts.

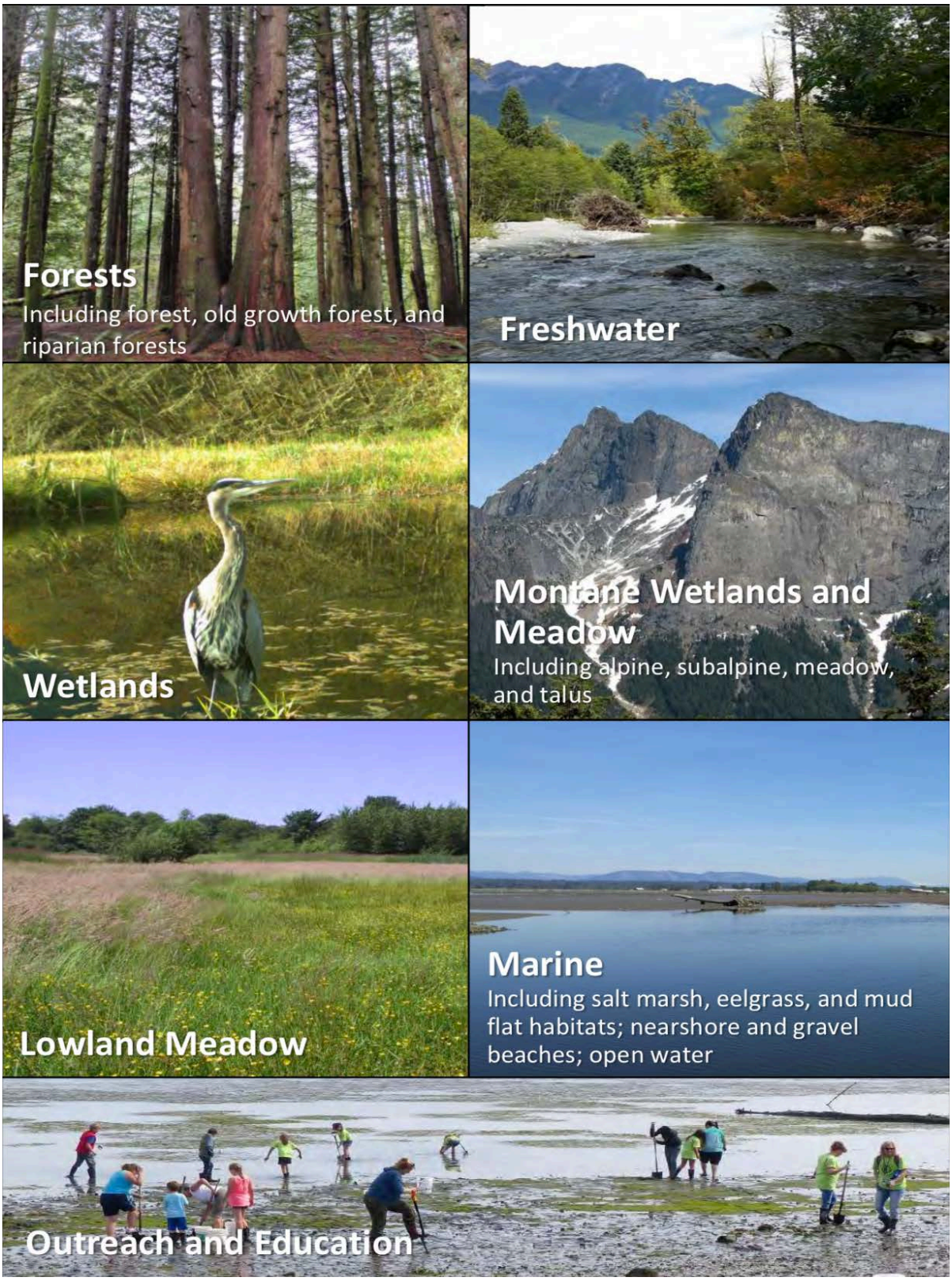
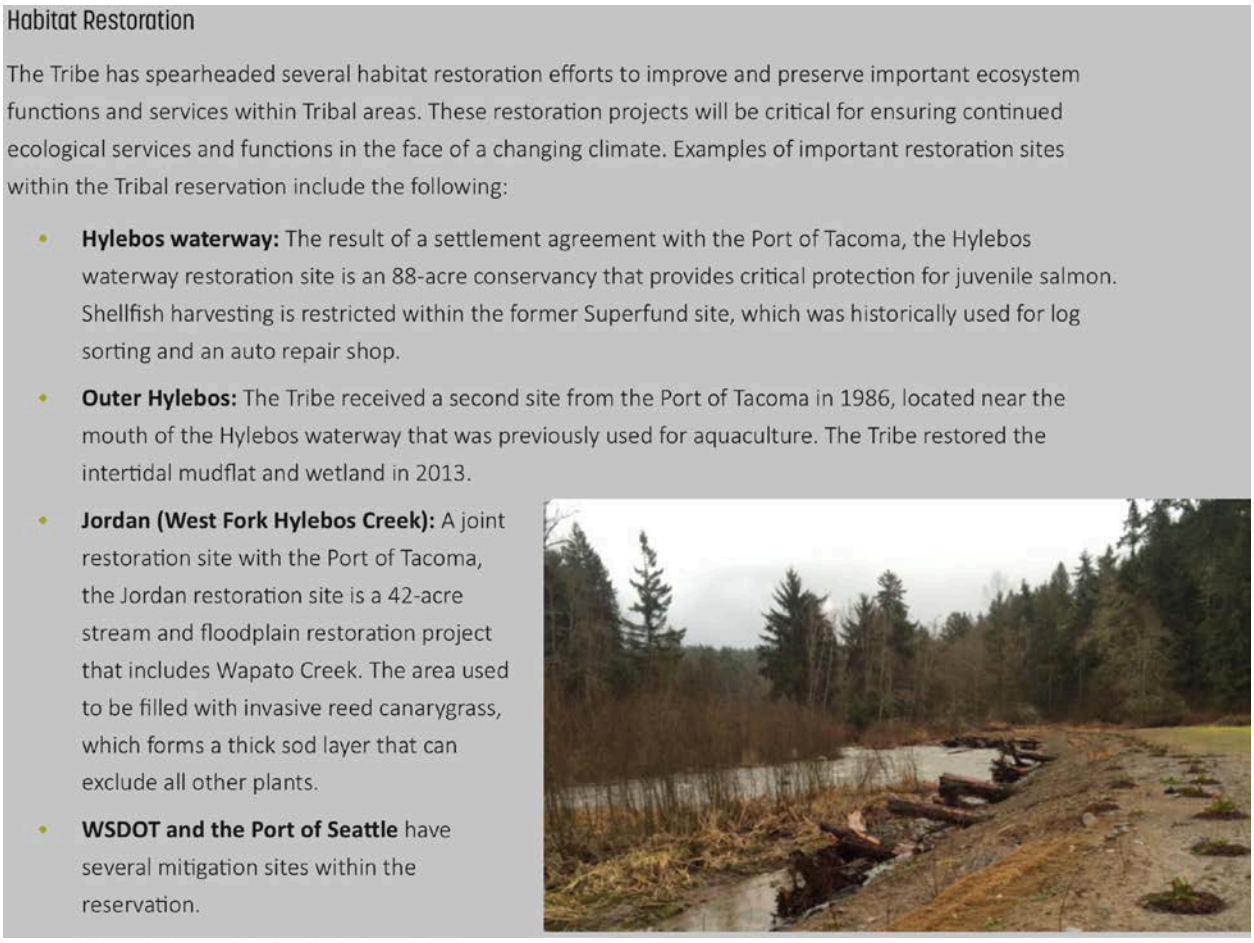


Figure 9: Stillaguamish Tribe of Indians Ecosystem Considerations (p 3)

Focus on Mountain Goats— The Stillaguamish Tribe of Indians provided a leading example of efforts to engage climate adaptation planning in regards to mountain goats. Mountain goats face a variety of concerns from the vulnerability of the ecosystems upon which they exist within being disproportionately impacted by climate change. This planning effort focuses on increasing research and monitoring of mountain goat populations, providing active management to support future population sustainability, and also the recognition that mountain goats may face greater interactions with humans as climate change leads to better hiking conditions bringing more recreationalists into contact with these animals.

Restoration Collaboration— The Puyallup Tribe of Indians provide a leading example of partnering to engage in restoration projects. A number of sites have been restored through collaborative efforts around the industrially developed areas of the Puyallup River estuary and the areas of the Port of Tacoma, as well as upstream restoration projects. Similar restoration efforts have also been engaged in farther up the Puyallup River watershed to support healthy elk herd populations. The image below is a box of various restoration projects Puyallup Tribe of Indians has engaged in that have climate adaptation benefits.



Habitat Restoration

The Tribe has spearheaded several habitat restoration efforts to improve and preserve important ecosystem functions and services within Tribal areas. These restoration projects will be critical for ensuring continued ecological services and functions in the face of a changing climate. Examples of important restoration sites within the Tribal reservation include the following:

- **Hylebos waterway:** The result of a settlement agreement with the Port of Tacoma, the Hylebos waterway restoration site is an 88-acre conservancy that provides critical protection for juvenile salmon. Shellfish harvesting is restricted within the former Superfund site, which was historically used for log sorting and an auto repair shop.
- **Outer Hylebos:** The Tribe received a second site from the Port of Tacoma in 1986, located near the mouth of the Hylebos waterway that was previously used for aquaculture. The Tribe restored the intertidal mudflat and wetland in 2013.
- **Jordan (West Fork Hylebos Creek):** A joint restoration site with the Port of Tacoma, the Jordan restoration site is a 42-acre stream and floodplain restoration project that includes Wapato Creek. The area used to be filled with invasive reed canarygrass, which forms a thick sod layer that can exclude all other plants.
- **WSDOT and the Port of Seattle** have several mitigation sites within the reservation.

Figure 10: Puyallup Tribe of Indians Restoration Collaboration Chart (p 27)

Green Purchasing Program— Skagit County provides a leading example of sustainable resource use by county government operations through a Green Purchasing Program. The detail provided by Skagit County regarding the considerations of their Green Purchasing Program from leading resource organizations to make informed purchasing decisions, as well as centralizing purchasing so materials can be purchased in bulk to provide cost savings. The governmental structure for this program shows details have been extensively consider to make this process as effective as possible. The image below is the policy tile from the Skagit County climate action plan with regards to considerations for establishing the Green Purchasing Policy.

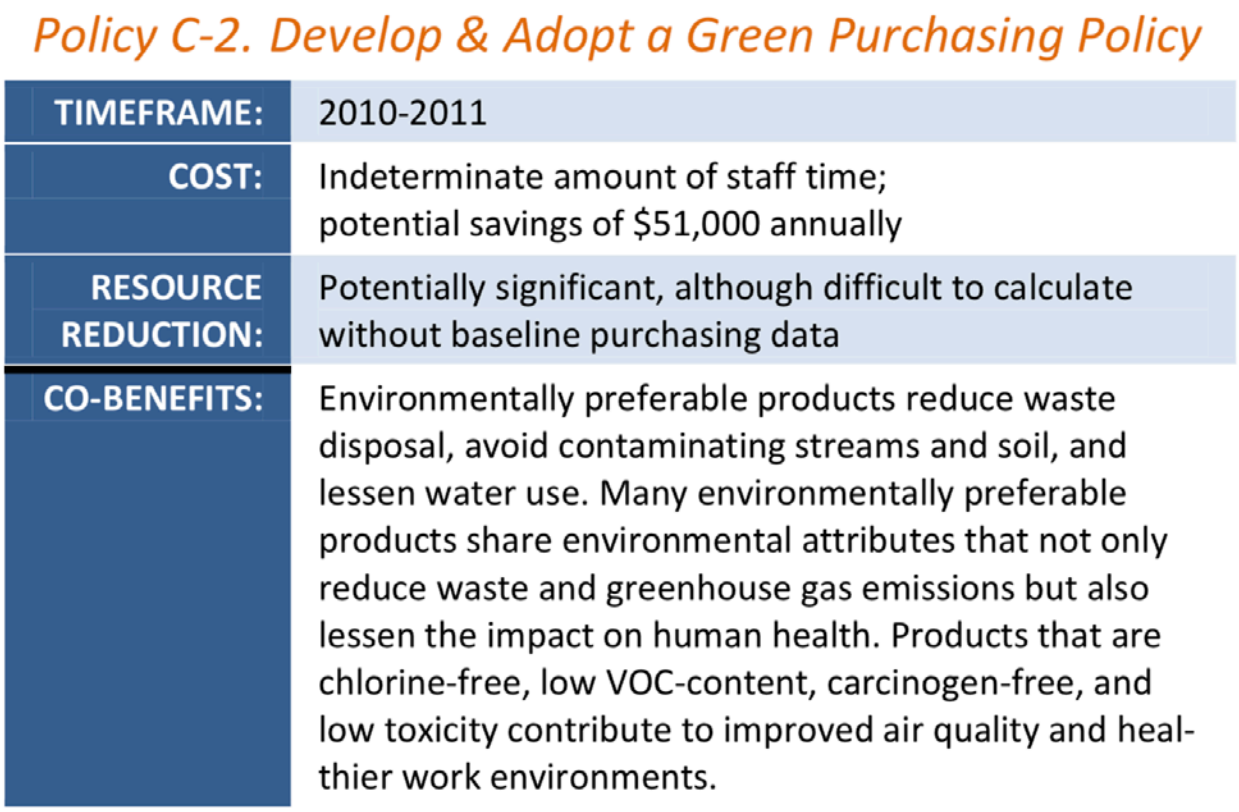


Figure11: Skagit County Green Purchasing Policy Criteria (p 36)

Funding Energy Efficiency— Skagit County provide a leading example of a unique funding mechanism to promote energy efficiency through the development of an Energy Savings Account (Walters, R. et al., 2010. p 32). The functioning of this account acts by having all cost savings in energy through efficiency measures be applied to the Energy Savings Account to provide funds for projects to reinvest this cost savings into new renewable energy development projects to continue lowering the cost of energy and provide a growing amount of funds for this account. Other governments talked about the need to expand the use of renewable energy sources, but many were focused on purchasing energy through utilities from renewable sources as opposed to establishing a funding mechanism to expand internal development of renewable energy sources. The

image below is the policy tile from Skagit County's plan detailing the basic concerns related to establishing the Energy Savings Account.

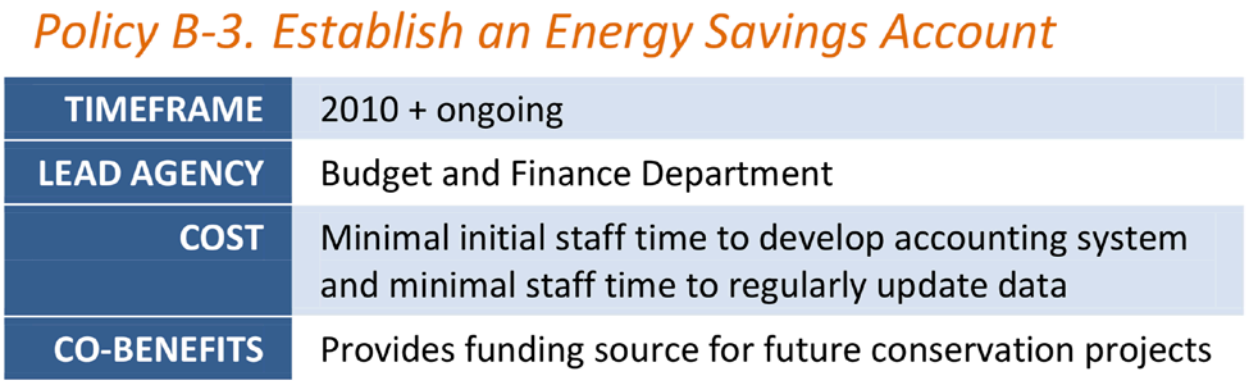


Figure 12: Skagit County Energy Saving Account (p 32)

Citizen Involvement— Jefferson County provides a leading example of engaging citizens in their Climate Action planning process. This best practice was developed out of the unique context through which Jefferson County's climate action plan was developed as a result of significant effort by citizen organizations that engaged in extensive effort to document local emissions and background research for the need to take action on climate change. The County supported the development of the Climate Action Committee that includes a number of positions for citizens to play a critical role in the development of the climate action plan.

Community Benefits Framing of Climate Action— Jefferson County provides a leading example of framing the processes of taking climate action through the lens of achieving community benefits. Climate action is phrased as a process to invest in the local community so that it meets the needs of everyone more effectively. This process of framing climate action as a community benefit is not unique to Jefferson County, as a

number of governments reiterated similar sentiments, but it is the only government to forefront this consideration as the focus of benefits to be achieved through taking climate action. A multitude of benefits are considered to be possible from taking climate action, and this focus can help the community to get behind efforts to expand climate action.

Results Chapter Conclusion

This concludes the results chapter. In this chapter, existing climate adaptation efforts throughout Washington State have been documented, individual analysis of nine Indigenous Nations and four County governments' have been provided with both qualitative and quantitative data, a comparative analysis of the quantitative results was provided, and best practices were identified from across the region to highlight leading efforts. The next chapter provides a discussion of general takeaways from studying these various efforts in relation to the extensive literature review conducted for this research effort. The discussion chapter is the final content before the conclusion of this research report.

Chapter 7: Discussion

Discussion Chapter Overview

This chapter of the thesis presents dialogue regarding the context of the results identified throughout the previous chapter. The discussion overviews the benefits of Indigenous Nations-State collaborations, Inter-tribal collaboration efforts, limitations of existing efforts, opportunities for change, and implications of this research. This chapter will conclude the content engaged with in this thesis research process.

Indigenous Nation-to-State Collaborations Support Adaptation

> First, recognition of indigenous rights will 'enhance harmonious and cooperative relationships between the state and indigenous peoples, based on principles of justice, democracy, and respect for human rights, non-discrimination, and good faith.' Second, respect for tribal knowledge, cultures and traditional practices will 'contribute to sustainable and equitable development and proper management of the environment.' […] Third, the application of international law and treaty obligations to indigenous peoples creates a 'strengthened partnership' between them and the state (Echo-Hawk, W.R. p 42).

Various jurisdictional governments throughout Washington state could improve their own efforts, and engage in healing processes of atonement for the history of

colonization by recognizing and supporting the leadership of Indigenous Nations in local place-based climate change adaptation planning across ancestral cultural landscapes. As identified in existing county planning efforts, this is not currently the standard of action in Washington State.

> These are crucial nation-building steps because they serve to heal an inherited legacy of injustice through acts of atonement and reconciliation that allow civil society to move forward with a more just culture (Echo-Hawk, W.R. p 43).

Acknowledging Indigenous nations' sovereignty grounded in historical authority of local areas and their extensive Indigenous Ecological Knowledge (IEK) developed over millennia in the face of historic climate changes can guide colonial settler state governments in devising more sustainable climate adaptation plans that move away from abusive relationships with the land. Indigenous peoples possess deep-rooted ancestral histories of coexisting with and learning from the lands and the many species who rely on each other for continued prosperity, and the wisdom inherent in these cultures as a result of this history provides a leading example that colonial state governments and societies can learn from as they are still relatively new to this region with only about two centuries of existence in these places.

Original instructions are concepts that are common for many Indigenous cultures and provide the foundational understanding of how people have a responsibility to coexist respectfully with the other living relatives of a place. These understandings are often found in oral histories, and especially creation stories to form a critical component

of local Indigenous peoples' worldviews. State governments have a responsibility to look to Indigenous Nations leadership to guide state adaptation efforts. Local colonial state governments have failed to recognize nation-to-nation relationships, and in the process, limit equitable engagement with Indigenous Nations because, "tribal-local cooperation only works if local governments respect the inherent sovereignty of Indigenous nations and understand how tribal sovereignty can actually benefit them – by pressuring state and federal governments into action" (Grossman, Z. p 181).

State governments can learn a lot from the Indigenous Nations, and much of the lessons they can learn apply to climate adaptation efforts. Indigenous cultures have a strong respect for the land and an understanding of the interdependent relationship of people to the rest of the world to support their continued well-being. This sentiment is often lacking in the colonial state governments, and is a major concern related to actions that continue to drive anthropogenic climate change. Some governments are presumably learning from Indigenous Nations regarding climate adaptation efforts even in some of the most unlikely locations such as rural and conservative areas. Yakima County briefly acknowledges the need to consider climate change in their comprehensive plan, most likely as a result of the efforts by Yakama Nation (Yakima County Planning Commission, 2017). However, despite recognizing the impacts of climate change, the County explicitly states a resistance to acknowledging the anthropogenic nature of present climate change concerns.

Indigenous Nation governments can benefit from indigenous-local collaborations and from inter-tribal efforts. Collaborations increase the likelihood of receiving funding

for climate action proposals. Collaborative efforts increase the extent of the benefits resulting from these relationships. The reality of reduced funding support after the removal of non-competitive funding sources from the BIA forces Indigenous Nations to rely on increasingly more competitive funding sources that are receiving greater amounts of applications, and result in the need for more outstanding proposals to receive funding support to for climate action efforts.

> The most important Indigenous responses to climate change will not be in tribal government offices or negotiations over political rights with other governments, but in the ability of tribal members to pass on cultures that respect the land (Grossman, Z. p 185).

Research institutions are playing an integral role in support of Indigenous Nation-State collaborations. In the Pacific Northwest, the University of Washington Climate Impacts Group (CIG), Oregon State University's Oregon Climate Change Research Institute (OCCRI), and the University of Oregon's Tribal Climate Change Project have all been identified as key contributors to Indigenous Nation's climate adaptation plans analyzed in this thesis. The Evergreen State College also has a number of academic programs that support Indigenous Nations. These collaborations provide research capabilities to governments that face constraints in addressing climate change in relation to their existing governmental actions.

When considering Indigenous Nation-State collaborations on climate action, it is hard to ignore the existing geographical correlation between Indigenous Nation and

county governments taking action on climate change. There is significant overlap between these two levels of governmental action on climate change in Washington State, mostly in the coastal regions of the state where both government types have the predominant location of existing efforts.

Inter-Tribal Collaboration Efforts

While Indigenous Nations already provide climate adaptation leadership, their efforts can have even greater effects through expanded collaborative efforts for the benefit of future generations. Numerous examples of such institutional structures exist at various scales and for different purposes, such as: the National Congress of American Indians, and the Affiliated Tribes of the Northwest Indians for political collaboration to engage in targeted advocacy to meet Indigenous Nations' needs in relationship to the United States federal government; the Inter-Tribal Buffalo Cooperative, Northwest Indian Fisheries Commission, and the Columbia River Intertribal Fish Commission provide examples of food and environmental management related collaborations; as well as many more compiled into an organized list in the powerful anthology *Asserting Native Resilience: Pacific Rim Indigenous Nations Face the Climate Crisis* (Grossman, Z. & Parker, A. pp 195-208). "Intertribal cooperation will become essential, since some tribes lack suitable conditions or enough land for sustainable agriculture, while other tribes have adequate land, food crops, and livestock herds" (Grossman, Z. p 179). These efforts will become more important as climate change increases food insecurity. Collaborations across geographic contexts with varied food systems can help provide greater resilience

through shared networks in the face of potential impacts to local food sources as a result of climate change impacts.

The Institute for Tribal Environmental Professionals (ITEP) through Northern Arizona University, provides support to improve resource management through increasing culturally relevant education, research, partnerships, and policy-based services (Arizona Board of Regents, 2018). ITEP provides a leading example supporting Indigenous adaptation planning efforts. Over 20 tribes across Washington State connect through ITEP facilitated efforts, creating a regional network of supportive expert practical climate adaptation knowledge. Inter-tribal collaborations like this can provide technical support, access to funding resources, and collaborative political will to smaller Indigenous Nations who may have limited funding, staff, or time resources to carry out climate adaptation efforts with results leading to increased awareness of and competiveness for funding opportunities.

Inter-tribal collaboration efforts have the unique ability to lead climate adaptation by applying pressure on all levels of government throughout the United States, and internationally to advocate for responsible action for a sustainable future in the face of climate change like efforts carried out by the Indigenous Environmental Network and Indigenous Climate Action to may inter-tribal connections across continents (Bunten, A. 2018). This power is rooted in Indigenous people's unique legal and moral standing as sovereign nation tribal members and as United States citizens. Multiple 'Indigenous Statements' to Conferences of the Parties (COP) of the United Nations Framework Convention on Climate Change meetings have applied continued pressure in support of climate action from inter-tribal collaborations across continents (Grossman & Parker p

115). These efforts played an important role in the 2015 COP 21 Paris accord, as the first international agreement to act on climate change signed by almost every nation except for three including Syria, Uzbekistan (signed in 2017), and Nicaragua who felt the agreement was not ambitious enough (Kaufman, A., 2017). Efforts to uphold Indigenous rights in the face of climate change apply pressure opposing continued fossil fuel development to reduce impacts of globalized neo-colonial development, while at the same time promoting the restoration of healthy ecosystems throughout the world to steward a more resilient future.

Indigenous Nations highlight a striking difference in climate action compared to the extensive obstruction of even acknowledging and engaging with climate change by the United States federal government and many of the country's citizens. Exercising tribal sovereignty leads on adapting to climate change in stark contrast to the lack of action at the US federal government level. Indigenous Nations' climate adaptation efforts are founded on Indigenous cosmologies grounded in a deep spiritual connection to the local regional environment.

Local action is paramount to addressing climate change effectively as everyplace will be impacted differently, especially across the varied geographic context of the United States. Indigenous Nations' efforts can work in conjunction with parallel actions by various levels of local state governments to enact strong regional climate actions because, "demands would be even stronger if they were made by Indigenous government officials, as part of a government-to-government relationship with a signatory state" (Grossman, Z. & Parker, A. p 113).

Limitations of Existing Efforts

A recent study by a graduate student at the University of Washington found that despite climate action mandates and various planning efforts at the Washington State governmental level, many state agency employees find it hard to incorporate climate action into their day-to-day work and do not see these efforts being carried out in practice institutionally in a number of agencies (Ziff, D. 2017). State level climate action is important, but the implementation of these efforts will not be successful if one-size fits-all attempts are imposed across the large and geographically diverse regions of Washington State. State level efforts must work to support local governmental efforts from Indigenous Nations and county and city governments for place-based actions adapting to climate change.

Limitations were identified in existing climate adaptation efforts as no government made explicit to need to stop the expansion of fossil fuel infrastructure development, despite having many statements about the need to cut back emissions from fossil fuel energy sources. If fossil fuel infrastructure systems are continuously allowed to expand, they will lock in the continued use of fossil fuels well past a time in the near future when their use needs to be all but eliminated to avoid climate catastrophe over the coming centuries (IPCC, 2018).

Limitations in existing climate adaption planning efforts were also identified in the fact that no mention of gender or racial inequities were present in the assessed adaptation planning efforts. Significant research highlighted in the institutionalized inequities and theoretical framework chapters of this thesis shows these topics are of

major interest in the literature, but these considerations failed to appear in on the ground governmental actions. Without addressing these equity considerations, climate adaptation planning efforts will continue to be limited and not receive the level of public support needed to address societal norms that must be overturned to limit continued exacerbation of climate change drivers.

I believe there is a connection between not addressing the need to stop extractive industry impacts and a lack of recognition of gender impacts from climate change. I feel the connection is related to a lack of addressing a societal problem of failing to respect the topic of consent. Climate change is an issue of non-consensual desecration of the planet. Natural resources are exploited in non-consensual manners including the earth, water, and the air we breathe. We allow this to occur because our society has a problem with acknowledging consent both for human-environment relationships, as well as inter-personal human relationships. Addressing climate change needs to be accomplished through expanding our respect for consent to say no to undesirable impacts that are all too often justified through power differential created by institutionalized inequities.

Existing climate change adaptation planning efforts also face limitations regarding the source of their funding. A majority of the planning efforts analyzed were funded through federal government sources, and as these are removed, future action will need to be supported through alternate sources. Issues related to funding climate adaptation efforts are also limited by a perspective that only seeks to receive and implement funding without developing sustained funding structures to support the continued development of adaptation efforts into the future. Addressing a multitude of equity considerations presented in this thesis theoretical framework can benefit effort for

climate adaptation by opening up a wider range of funding sources by meeting application criteria for a variety of outcomes that can be achieved through climate action.

When the United States entered into treaty agreements with Indigenous Nations, they recognized reserved rights that these nations and peoples already possessed and also took on the responsibility of upholding these rights through the formally agreed up peacemaking efforts central to treaty agreements. Court rulings have upheld topics of responsible trust management that the United States must ensure in recognition of the nation-to-nation relationships established by treaty agreements. However, I think there is still significant effort beyond this scope that the United States is responsible for to Indigenous Nations.

The United States has caused significant impacts to Indigenous Nations with regards to a history of genocide, violation of treaty agreements, establishments of institutionally inequitable policies aimed at discriminating against Indigenous Nations and peoples, and a multitude of other impacts. Despite these damages inflicted by the US or at the very least condoned by governmental inaction, there has never been any sort of effort towards reconciliation in support of restorative justice to begin healing process from historical trauma that continue to be perpetuated inter-generationally. To provide equity for Indigenous Nations and peoples, the United States must engage in acts of reconciliation to atone for significant impacts.

Reconciliation efforts by the US government should not only be applied to Indigenous Nations and peoples, but also to all the peoples who have been impacted by institutionalized inequities documented previously in this thesis. This includes reconciliation for African Americans who were dehumanized and traumatized through

the institutions of slavery and then racially discriminatory actions that have legacy effects to this day. The United States also needs to reconcile damages inflicted on Asian Americans through the history of interment and theft of property and other significant monetary and cultural valuables. The United States needs to reconcile impacts perpetuated on immigrants of Latin American and Middle Eastern ethnicities who are presently facing dehumanization as well as significant religious persecution. The United States must reconcile its historic and perpetuated impacts on women through gender discrimination and acts still discriminating on the basis of sexual orientation.

It is concerning that there is not much focus within analyzed adaptation plans to move these efforts forward other than a predominant focus on documenting emissions reductions targets. There is a lack of adaptive management present in these efforts which limits governments' abilities to adjust efforts to changing conditions. This is concerning because climate action will not be effective as stationary plans and processes, but must continue to evolve and grow over time. This does not seem to be the case with the efforts I have reviewed to date and presents concerns of where the field of climate action is moving.

County governments' efforts were found to mainly focused on addressing internal actions to reduce governmental emissions. There are some proposals to facilitate societal change at the county level, but these are few and far between related to individual government concerns. This is quite a different focus from Indigenous Nation governments who have much more of a focus on how their actions facilitate the change of the community and the environment within which they exist. At the county level, it seems many are caught up with concerns related to the jobs of the county government

and not so much on the communities that exist within the boundary of the counties. County governments need to better address broader community concerns related to climate change to get action institutionalized and enacted by community members and businesses. County governments are under exercising their ability for change and also their important part to play in nation-to nation relationships between the U.S government, and local Indigenous Nations, especially those that have management and access rights to significant areas that were ceded in the process of signing treaties. This seem to correlate with counties' predominant focus on urban concerns over rural concerns despite the fact that counties have significant rural areas in Washington State with many similarities to the governmental context of Indigenous Nations. There also seems to be a lack of specificity of who the communities within the counties are, and what lands and ecosystem/species they coexist with in this place.

Opportunities for Change

Legal options are being tested to bring the discussion of climate change impacts into the light of the impacts it creates in violating future rights of youth and those yet unborn to a healthy world. *Juliana v United States* (2016) (Blumm, M.C. & Wood, M.C.) is supported by the work of the non-profit Our Children's Trust in pursuit of centering youth voices in the legal climate change discussion regarding current actions and the legacy effects they will have on future generations. "Their complaint asserts that, through the government's affirmative actions that cause climate change, it has violated the youngest generation's constitutional rights to life, liberty, and property, as well as failed

to protect essential public trust resources" (Our Children's Trust, 2018). This legal effort is working to legally recognize the rights of future generations, i.e. Seven Generations perspective, which is a central cultural component of Indigenous cultures and highlights the benefits decolonized cultural considerations provide regarding largely unexplored legal avenues to take action on climate change.

Legal efforts like these are important for everyone's future well-being when thinking of the next seven generations as is appropriate in an Indigenous worldview. Efforts like this legal case can promote healing by honoring and respecting the wisdom of Indigenous peoples in the climate change legal arena. Outside of the box approaches like this need to become the norm and can be extremely beneficial if successful to further support the need for local place-based efforts as climate action is more routinely taken.

Potential results of decolonization efforts adapting indigenous cosmologies like recognition of 'all our relations' (LaDuke, W. 1999) can lead to applying 'human rights' to all of the environment know as "rights of nature" and allow for greater protection through improved legal standing and the resulting abilities to require actions stop abusing these rights. Examples exist internationally, such as granting legal personhood status to the Whanganui River in New Zealand (Hutchinson, A., 2014), with similar attempts being undertaken in the United States for the Colorado River watershed (Goodland, M., 2017).

Opportunities exist to establish place-based equity frameworks for climate adaptation that take into account unique ecological, social, economic, and political system considerations as discussed in this thesis. These efforts must be grounded in a

historical understanding of the place in order to work within its unique dynamics to gain as much public support for these efforts as possible.

Equity consideration development should be engaged as an initial step in planning processes to identify from the start where institutionalized inequities exist in an effort to confront potential unconscious biases. This can help to set the stage for what should be considered moving forward in a planning process as well as the implementation of action efforts, and what is indicators are assessed to determine if actions taken are meeting desired outcomes. Equity considerations need to acknowledge existing inequitable impacts that are faced as well as considerations for how to respond to these understandings by proposing targeted actions to address these inequitable impacts.

Contribution of Research

My research covers a mix of local governmental climate change adaptation planning efforts from sovereign Indigenous Nations, and sub-national county governments in the United States. Despite holding different political standing, these governments provide unique examples of local actions for climate adaptation. The role of power is critical in this analysis as each level of government contain different power bases for enacting effective climate adaptation plans. More studies on regional county governments collaboration with Indigenous Nation governments are needed to document the context of procedural justice and justice as recognition within the Pacific Northwest region. Impacts from historic institutionalized inequities influence climate adaptation planning efforts, and these concerns can be more effectively informed through an

intersectional focus. Understanding inequities faced by different communities better informs adaptation planning. A broadened understanding of the equity implication of climate adaptation will also aid more effective intersectional efforts to address the different ways people are impacted by climate change. This understanding facilitates greater internalization of the varied consequences of climate change on different peoples' lives, and more relatable considerations of climate impacts can promote more involvement in community adaptation efforts to support everyone's wellbeing.

Discussion Chapter Conclusion

This concludes the discussion chapter. Topics regarding improving governmental actions and capacities were discussed in light of research findings, as well as identifying limitations of existing climate adaptation efforts in order to create more effective plans moving forward. The conclusion of the thesis report follows this discussion chapter.

Chapter 8: Conclusion

"*We are the Earth becoming conscious of itself*" (Cajete, G., pp. 55).

Climate change is a strong indicator of humans' loss of balance of sustainability with the interdependent natural world we rely on for our continued existence. People are feeling the impacts of climate change, and are working to address the root causes of these disruptions. We can begin to address impacts originating from anthropogenic effects because these mistakes are who people have been and how they have treated others, but they do not have to continue to be us. Climate change adaptation efforts identify current societal ailments in order to take action healing perpetuated historic damages, while at the same time adjusting to a new future. Legal frameworks exist for action to be taken to address climate change drivers and the resulting impacts on Indigenous rights both internationally and within the United States. To achieve equitable recognition of Indigenous rights, significant effort must be made to decolonize predominant worldviews and address institutionalized inequities if there is any hope of a just transition to a brighter future for the entire planet. Climate change adaptation planning and action by Indigenous Nations exercises sovereignty, and should be collaboratively supported by parallel actions from colonial state governments to work towards creating a healthier world for future generations.

Holistic considerations of equitable climate adaptation planning are necessary for improving inclusive participation and more encompassing outcomes to meet a variety of ecological, social, economic, and political system needs. Understanding this in regards to

efforts across Washington State provides the ability to establish more comprehensive processes and regional collaborations to confront climate impacts. The magnitude and wide reaching impact of climate change is a major concern for everyone living on this planet throughout the rest of this century and beyond. It is important to enact equitable approaches in climate adaption planning efforts to steward a more sustainable future for at the next seven generations and beyond.

As stated at the outset of this thesis: "The way that societies view the land tells much about them—revealing the character, values, history, and aspirations of a people" (Echo-Hawk, W.R., p 139). How we all address climate change around the world will say a lot about who we are as a global people. This does not mean we need the same approaches replicated across the world. If we want a healthy planet, we as a people need to adequately express the diverse brilliance of local and regional ecosystems and associated cultures for a more balanced world while addressing historical institutionalized inequities. Climate adaptation has the ability to achieve intersectional equitable outcomes.

"If a factory is torn down but the rationality which produced it is left standing, then tat rationality will simply produce another factory. If a revolution destroys a government, but the systematic patterns of thought that produced that government are left intact, then those patterns will repeat themselves…. There's so much talk about the system. And so little understanding.—Robert Pirsig, *Zen and the Art of Motorcycle Maintenance*" (Meadows, D. 2008, p xv).

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