Our Landscape, Ourselves:
Integrating Process and Traditional food Principles for Wellbeing + Resilience in the Swinomish Tribal Community

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A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Landscape Architecture

University of Washington
2016

Committee:
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Program Authorized to Offer Degree:
Landscape Architecture

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Abstract

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Landscape Architecture

As the first Native American tribe to create a Climate Adaptation Plan in 2010, the Swinomish Tribal Community in Western Washington have identified their vulnerabilities both in the present day with respect to mental and physical health as well as future impacts to their well being from localized impacts due climate change.

This thesis attempts to convey the story of the Swinomish peoples and the processes and techniques that have historically and in the future will (re)connect them to their heritage and the land(scape) they co-exist and cultivate. This thesis proposes that the implicit ecological goals and practices of landscape architecture can play a role in helping to redefine and reinforce that relationship.Through informational interviews and site analysis, the design concept of a 'Traditional Edible Buffer' emerged. Each word in 'Traditional Edible Buffer' has its own practical application but also works collectively as a system. It is a systems-thinking proposal that reintroduces the importance of native plants and an ancient form of shellfish aquaculture.

The Traditional Edible Buffer is intended to reveal the dynamic processes, seasonality and growth of food knowledge within the Swinomish community over time. It is a practical application of culturally-significant knowledge of traditional foods integrated with the physical landscape providing greater resilience and wellbeing for the Swinomish Tribal Community.

Dedicated to my parents, Dave and Abby, and to my two sisters, Sarah and Julianne, for their unwaivering support and encouragement. And to my wonderful landscape cohort for helping me every single day.

ACKNOWLEDGEMENTS

I'd like to thank my committee, Daniel Winterbottom and Ken Yocom, for their guidance in this process.

I'd like to state my gratitude to Elizabeth Umbanhowar for reading quite the rough draft of my written document and provided me with very detailed feedback.

I'd like to thank community leader and Swinomish facilitator Shelly Vendiola for sharing her insight with me over a meal about her efforts in leading the Swinomish Climate Change Education & Awareness Group and other facilitation work. Her perspective and suggestions were incredibly valuable in the beginning of my research efforts.

I'd like to thank Joyce Lecompte-Mastenbrook PhD, for sitting down with me and sharing her expertise on collective action in the context of natural resource management relating to restoration ecology and non-timber forest products. She listened to my broad research interests at the beginning of the thesis process and helped guide me to some useful contacts and resources.

I'd like to thank Swinomish employee and researcher Jamie Donatuto, PhD, in making time to familiarize me with her ongoing research on community health in the context of Indigenous peoples and climate change.

I'd like to thank Jessica Gigot, PhD, a faculty member at the Swinomish campus of Northwest Indian College, who met with me on short notice to talk about her research on food sovereignty and '13 Moons' ethnobotanical community garden. She relayed other upcoming projects to test the growth of traditional foods on the Reservation as pilots. She listened to my own research interests and provided me with truly useful feedback and reaffirmed the importance of growing food at the community scale.

I'd like to thank Courtney Greiner for providing her expertise as a shellfish biologist in discussing her research and work with the Swinomish Tribe.

I'd like to thank Dakota Keene who described to me her passion in working with Native American communities as a landscape architect that has inspired and informed me of the great scope in the profession.

I'd like to thank Carolyn Edwards, Swinomish tribal member, who is the Editor of the Swinomish newsletter 'qyuuqs' for speaking with me about her efforts in communicating about climate change information to her community. She provided me with a personal perspective on experiencing a steady evolution of extreme local weather events and how that has informed her work in bringing awareness about these complex challenges.

I'd like to thank Steve Hinton, the Director of Restoration at the Skagit River System Cooperative, the ecological branch of the Swinomish Tribe, for speaking with me about the restoration efforts taking place on the Swinomish Reservation. He listened to my project ideas and provided suggestions for sites feasible on the Reservation to ground my proposal.

I'd also like to extend a big thank you to Wendy Scherrer, for speaking with me about her pertinent work and for listening to my research interests. She provided me a lot of invaluable literature that provided a main backbone for my project.

Lastly, I'd like to thank the Theresa Trebon, the archivist/historian for the Swinomish Tribal Community, who allowed me to describe my research interests and provided me generous time and resources that I otherwise would not have had the chance to obtain.

Thank you so much!

Our Landscape, Ourselves:

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INTRODUCTION

Across continents, Indigenous peoples have a relationship to the greater earth and a perspective of nature that is often in contrast with western views. Their identity is place-based--physically and spiritually grounded in the landscape and framed by natural boundaries. These boundaries were shared by a collective identity surrounding the relationship of where land meets water (Ames and Maschner 1999). The Coast Salish are among a global collective of Indigenous peoples in the Pacific Northwest who, for time immemorial, have depended on the land for their livelihood and wellbeing. In the mid-19th century, the Swinomish Tribe, a tribe in Washington State now located on Fidalgo Island was once a part of a larger band of tribes. After the signing of the Point Elliott Treaty in 1855, the Swinomish Tribe like many other Puget Sound tribes attempted to exercise their fishing and harvesting rights granted by the treaty but have historically been penalized for doing so. Further, irreversible changes and development in the Skagit Valley has forever altered the landscape itself and the cultural practices that were customary to the tribes.

Despite the seemingly insurmountable obstacles to rebuilding cultural expression and political autonomy, the Swinomish Tribal Community are among many Native Americans who are working to reconnect with traditional foods and practices, to ensure greater sovereignty within their communities. As the first Native American tribe to create a Climate Adaptation Plan in 2010, the Swinomish have identified their vulnerabilities both in the present day with respect to mental and physical health as well as future impacts to their well being from localized impacts due climate change. This research attempts to convey the story of the Swinomish peoples and the processes and techniques that have historically and in the future will (re)connect them to their heritage and the land(scape) they co-exist and cultivate.

This thesis proposes that the implicit ecological goals and practices of landscape architecture can play a role in helping to redefine and reinforce that relationship. Through informational interviews and site analysis, the design concept of a ‘Traditional Edible Buffer’ emerged. Each word in ‘Traditional Edible Buffer’ has its own practical application but also works collectively as a system. It is a systems-thinking proposal that reintroduces the importance of native plants and an ancient form of shellfish aquaculture. The Traditional Edible Buffer is intended to reveal the dynamic processes, seasonality and growth of food knowledge within the Swinomish community over time. It is a practical application of culturally-significant knowledge of traditional foods integrated with the physical landscape providing greater resilience and wellbeing for the Swinomish Tribal Community.

CANOES AT SWINOMISH CANOE JOURNEY

STANCE | METHODOLOGY

This intention of this research is to explore and examine the relationships that Indigenous peoples have with landscape and its intersection of Indigenous health and well-being in the context of local climate change. Throughout my time as a graduate student in landscape architecture, I have focused my studies on examining how communities and cities may be impacted by climate change and ways to plan and redesign the built environment to mitigate and perhaps, in some cases, adapt to these impacts.

As the first Native American tribe to create a Climate Adaptation Action Plan, the Swinomish Tribal Community located in Skagit County in Washington State has created a model for other Indigenous communities and municipalities to emulate. Beyond the technical aspects of creating this report, the Swinomish have also made more visible the larger-scale movement of Indigenous peoples' stewardship of the earth. This stewardship stems from a deeply rooted relationship with land and their belief of the spiritual nature of the various entities and species within it. Compared to western notions of nature which view nature as a commodity to be owned, traded, exploited, the Indigenous conception of nature has traditionally been focused on accessing the land to meet only their needs. While treatment of land by all human beings has evolved over time regardless of culture, customs and values of Indigenous peoples have remained more consistent.

These disparate views of nature between western and Indigenous societies have never quite merged. Connecting the linkages of land and wellbeing is also important for understanding how knowledge about the surrounding landscape is generated. Subjective knowledge of the Skagit River (among the territory for the Swinomish) was the primary, and arguably more intimate way, to read and understand the landscape for this Indigenous community. Conversely, with western notions of information gathering, an emphasis is put on objectivity and scientific process. Yet, truly reading and navigating through the landscape requires one to see the subtle tones and repeated interactions that occur in a day, within a season or the course of many years. Learning these patterns and rhythms of nature over the course of hundreds of generations has allowed Indigenous peoples to practice an embedded and intuitive traditional ecological knowledge within their environments.

Traditional ecological knowledge has enabled Indigenous peoples to promote the key lessons they've learned from nature, perform ceremonies, and redistribute this knowledge inter-generationally (Lynn et al. 2013). It is important as a larger society to understand and recognize the full value that rooted traditional knowledge holds, particularly in the context of considering western land management practices and climate change. Of equal importance is the ability of western leaders to respect and understand the sacred nature of traditional ecological knowledge to Indigenous communities (White 2015).

Reading the landscape and paying greater attention to specific dynamics may prove to be more imperative as local climate change impacts become more consistent and severe. The ability to read and interpret between different knowledge systems is an important tool not just for reading landscape changes but also for greater epistemology. Diversity in knowledge begets diversity in connection to place. Most appropriately, when these types of diversity of knowledge exist and a part of the mainstream, an expansion in the training of designers of the built environment can occur. This is especially invaluable to landscape architects who are trained in multi-scalar and systems-based thinking.

Further, landscape architects are very often the primary mediators between communities and the design world whose task is to communicate and integrate human experience with place (Swaffield 2002). As a student designer, the process of understanding how to communicate with and learn from the Swinomish Tribal Community has only just begun. Yet through this document, it is my hope that it serves to build a foundation to which landscape architects can learn how to approach challenges within Indigenous communities for greater cultural and design collaboration.

KUKUTALI PRESERVE AT MOUTH OF SIMILK BAY

LITERATURE REVIEW

This research investigation began with a broad exploration of how climate change is affecting cities and the people within those cities. Physical health was an inevitable factor in this topic. Specific regions that are or will be more vulnerable to climate change impacts like increased wildfires due to drought or loss of snowpack due to increased temperatures or high tide storm surges are an increasing reality for many regions around the world. The direct (and indirect) impacts on human health (emotional, ecological, physical and social) from climate change is an emerging area of research taking place in anthropology, geography, and public health, to name a few. As obvious as these connections seem, a common theme became clear: the Indigenous population of the world will be disproportionately affected by climate change due to a cultural, physical and spiritual relationship with the natural environment. Significant research has taken place with regards to developed nations and their First Nation peoples and the aspects of Indigenous practices and traditions of the land, their idea of landscape and unique linkage with health and well being in Canada and Australia. Examining these two countries served as case studies Within these disciplines, a discourse is taking shape on Indigenous Sources include anthropology, ethnobotany, ethnoecology, ecology, ethno-anthropology, environmental studies, food sovereignty, geography, history, philosophy, public health, literature on biophysical and social science indicators for community health, natural resource planning, urban planning.

Geography professor Kathleen Wilson focuses on the expanding body of research exploring the relationship between the concept of 'place' and therapeutic landscapes. Wilson relates human health (physical, emotional, mental and spiritual) to Indigenous holistic views of landscape and individual/collective identity. She studied the day-to-day practices of the 'Anishinbek' First Nation peoples in Ontario, Canada, to further illustrate the important link between health and place in everyday life among Indigenous culture. This author concludes that there is a lack of existing literature that highlights this connection.

Across the international fields of cultural anthropology, public policy, public health and land use planning, there is increasing consensus of the importance in acknowledging and integrating Indigenous peoples' rights and values into their respective processes (Lynn et al. 2013). The United Nations began a Permanent Forum on Indigenous Issues in 2008 signaling a global movement to merge Indigenous interests to the fore. In beginning to understand some of the central tenets of Indigenous peoples' relationship to the land in a place-based and intuitive way, it is also valuable to learn how landscape is broadly defined within this cultural paradigm (Wilson 2003). Professor of Environmental and Landscape Planning, Darryl Low Choy and colleagues begin to explore the question of how Indigenous landscape values can be identified and equitably represented in the planning process at the municipal level (Choy et al. 2011). Doing so in a manner that respects Indigenous culture and is fully representative of their interests in conventional regional planning processes is an effort that has only begun.

Carrying this question forward, Choy and colleagues facilitated two regional-scale workshops to address landscape values for the Aboriginal communities of the Murri Nation in South East Queensland in Australia. The overall objectives was to explore a range of representations within these communities and to engage in preliminary research to investigate the extent to which Indigenous perspectives are being incorporated into mainstream public policy and to better define the scale of the regional landscape. Over the course of the workshops, which had a representation of elders and other community members, four key landscape values were identified: Boundaries, Pathways, Biodiversity and Important Sites.

The values indicate Indigenous people's understanding and regard for the landscape in the past but may more elusive or in contrast with static documents in public policy in the contemporary. The European Landscape Convention mandates that its signatories "enact legally binding landscape protection, management and planning measures" that integrate the interests of Indigenous peoples (Choy et al. 2011, 2). Yet, there is a disconnect on the holistic and dynamic qualities of nature that Indigenous people are familiar with.

In Grounding Knowledge: Environmental Philosophy, Epistemology, and Place, Christopher Preston highlights how Indigenous peoples in North America view the world from a spatial point of view. Preston cites Native American historian and theologist Vine Deloria who asserts that the western Christian approach views the earth largely in the context of time-- "the sequence of events in the bible emphasize time instead of place" (Preston 2013, 85). This failure to see the earth from a spatial point of view is correlated to westerner's neglect of the natural environment (Preston 2013, 85). The earth and its rich resources are something to acquire, particularly as the world progresses through time. Indigenous people's emphasis on place is manifested in the way stories are told to convey previous histories, "in a sacred geography, history is told...in terms what happened here instead of what happened then" (Preston 2013, 86). In order to convey a sacred geography and a sense of place, stories are told that are specific to place, ones that embody--literally-- a deep history of the people residing in them. Another key aspect in understanding Indigenous views of nature is that it is regarded as a living organism, which requires environmentally-friendly practices and constant care: "Beginning to treat nature as an actor and an agent...is an important part of the revisioning of the culture / nature dualism that is so often blame for environmentally destructive behavior patterns" (Preston 2013, 133). The structure of Native Americans spiritual beliefs is based in the dynamic processes and relationships in non human organisms that are within a larger living landscape.

When culture and spiritual beliefs are intertwined with place, the processes within the living landscape also become a part of a larger ethics to the community living there. Preston affirms this message "when the place had been through its appearance in a story- the land became an agent with a specific role to play in the moral life of the people living there" (Preston 2013, 82). As such, "a sensing of place is not a vague feeling of attachment but an on-going dynamic interaction between a people and their world" (Preston 2013, 84). Martin Prominski discusses the concepts of 'Total landscape', which embraces the emerging notions in landscape architecture of uncertainty, processes and relationships. This is deviating away from the traditional landscape design school of thought that focused on the 'picturesque' or the sublime, an aesthetic that only encouraged a static and (visual) image (Prominski 2014). Further, the author links the connection of uncertainty and relationships to the evolution of ecology in the design world.

In addition to the importance of understanding how Indigenous peoples differentiate between accessing the land to meet their needs versus owning it, it is also necessary to see the differentiation in knowledge systems between Indigenous peoples and western culture. In "The Changing Experience of Historical Encounters with a Northwest River", environmental historian Linda Nash discusses how subjective and objective knowledge relate to each other and how they are different. The essay is intended to compare the great influence of the experiential and subjective understandings of the Skagit River against competing 'modern' and technical knowledge from survey explorers mapping out the region. As a phenomenological experience, Nash asserts that "with the emergence of new forms of

mediation -- the objects, technologies and cultural practices interposed between the individual and her surrounding environment-- earlier ways of experience a place are pushed aside" (Nash 2000, 1600). The fact that the Native Americans of the Skagit mapped the river according to natural boundaries and landmarks via canoe was seen as less legitimate than if done through the technologies of steam boat and concrete dams (Nash 2000, 1600). She also points out the bias towards 'objectivity' as a "cultural concept that certain professionals use to define what will count as legitimate and true knowledge about the river and the world" (Nash 2000, 1603). Rather, she contends that an individual takes in his/her environment through their direct senses and subjective experience but recognizes that this may co-exist alongside the tendency of abstraction. The value in understanding Native knowledge systems as an intuitive process, culminated over many generations of experience allows us to As both observers and practitioners in the natural environment, landscape architects should be aware of differing ways of intaking information about landscape.

Traditional practices of Indigenous peoples, commonly associated with traditional ecological knowledge, greatly lend to a larger scientific as well as holistic understanding of sustainability. Professor of ethnobotany and ethnoecology Nancy Turner at the University of Victoria, explores traditional practices of harvesting plant materials within the northwest Indigenous communities that are sustainable. She investigates how the techniques of the First Nation peoples in British Columbia in resource management maintain the capacity for growth and regeneration of species. This practice has also allowed Indigenous communities to control and monitor their own access and impact of their usage (Turner 2001). The author contends that the built-in traditional modes of learning and transmitting information inter-generationally within Indigenous communities can be useful and should be applied to the mainstream application of harvesting non-timber forest products (Turner 2001). Traditional ecological knowledge can play a critical role both in Indigenous communities as well as in municipalities in implementing sustainable land practices.

Philosophy professor Kyle Powys White explores a potential framework for ensuring environmental justice among North America's Indigenous communities in the midst of a changing climate and unforeseen impacts on their tribal networks. Noting that the institutions Indigenous peoples' rely on for climate change action are "often constrained by political obstructions", he suggests that a more comprehensive framework for justice be instituted (White 2013, 523). There is often an interplay of multiple political agencies who provide both opportunities as well as restrictions due to laws, agency rules, fiscal limitations, etc. through which tribes must often navigate. As such, White suggests that creating a 'political order' can help to facilitate tribes' request in addressing climate change, which would better help create successful solutions (White 2013). This framework should be one that accounts for the shifting dynamics and interwoven complexity of ecological, political and social systems and relationships. Only when a greater understanding of Indigenous peoples' priorities in environmental affairs is explicitly recognized in a political order can it then be better integrated into larger planning and design. The Swinomish Tribal Community Climate Change Initiative has, in many ways, forged a new path for itself in collaborating with other local organizations and municipalities for the cutting edge Initiative. Their efforts have enabled a greater dialogue and specific articulation of tribal needs in the midst of a shifting paradigm of challenges that require cross-cultural and cross-institutional collaboration. It is both the written reports and direct cooperation that helps to catalyze the creation of a 'political

rder' that would prioritize tribal needs in climate change planning.

Ensuring that there is an equitable representation of cultural diversity within the dialogue of climate change and sustainability planning sets the stage for greater collaboration for long term planning. It is also critical to consider how cross-collaborative planning can help guide a greater understanding of what ecological resilience is in various communities. Ecological resilience has different meanings in different communities as it is often place-specific. Distinguishing how ecological diversity varies based on the landscape and how this awareness informs diversity in knowledge is equally important. Preston underscores this notion: "Landscape diversity is a valuable source of the diversity sought by epistemologists. Ensuring the preservation of both cultural and natural diversity is therefore important for ensuring the production of critical knowledge" (Preston 2013, 133). For landscape architects and practitioners of the built environment, learning about various cultural value systems and how those may take shape onto a landscape is key to respecting and contributing to critical knowledge. Further reiterating the critical role of landscape diversity for diversity in knowledge Preston points out that "sameness of landscapes breeds sameness of mind" (Preston 2013, 133).

As a landscape architect and mediator between communities and the built environment, it is important to learn and stay engaged with matters concerning cultural diversity for greater integration of knowledge systems and ecological resilience. This is important in the exploration of the Swinomish Reservation landscape and how their culture values have contributed to many facets of the region in the context of ecological resilience.

A member of the Aboriginal community in New South Wales clarifies this relationship: "our identity remains tied to our land, to our cultural practices…destroy this relationship and you damage--sometimes irrevocably-- individual human beings and their health" (Rigby, 2011,). My end goal at the time, as it is now is to investigate the intersection of these three topics and see where opportunities may lie for the mainstream contemporary realm to better understand, learn and/or implement as states and municipalities contend with a changing climate. Perhaps looking back into the past will help provide insight into reconciling with the future.

SWINOMISH TRIBE CLAM HARVEST

LANDSCAPE AND THE INDIGENOUS PERSPECTIVE

The Coast Salish people, historically located from the coast of northern Oregon up to British Columbia, structured their lives around the seasons. The migrations and life cycle of the salmon necessitated a lifestyle that entailed movement through the watershed in which they were geographically and culturally associated. The sources of their diet, though quite diverse, often operated under a state of flux, which often encouraged a mode of relying on other kinship networks outside of their primary territory in order to provide fishing resources for themselves year-round (Breslow 2011, 73). Equally important to their diet were terrestrial flora and fauna, whose own quantity, and distribution were similarly affected by season and geography: game, birds, berries and a variety of plants of which all were utilized to supplement their nutrition. Paired with the skills and knowledge of maximizing the food resources that the landscape provided for millennia, traditional foods are also inextricably linked to medicine. The medicinal properties in traditional foods, both terrestrial and marine, were highly sought after and used to prevent or treat maladies.

Historically, Indigenous populations have depended on their immediate surroundings to provide for their necessities including food, shelter and livelihood. The Coast Salish peoples were the first "Northwesterners" to occupy the stretch of land from modern-day upper British Columbia to the southern reach of the Puget Sound. As with other Indigenous populations, the Coast Salish believed that the creatures and physical features of the environment possess powerful and spiritualistic entities to be honored and respected (Clarke 1953).

Articulating the intrinsic relationship that Indigenous peoples have with the landscape is best done through providing a basic framework of interrelated concepts, which have been communicated by members of Indigenous communities to municipal leaders and scholars. These conceptions and values of the landscape demonstrate how localized and traditional systems of knowledge inform Indigenous cultures. The sections are intended to provide insight that is distinguished from western notions of landscape; they are: Landscape as Life, as Temporality, as as Boundary, as Pathway, as Biodiversity and as Important Sites. They are tenets that are meant to provide perspective for subsequent discussion and do not represent a comprehensive account of Indigenous peoples' experience with the land(scape).

Landscape as Life

From an Indigenous peoples perspective, landscape is unequivocally linked to life. Traditional land is a complementary relationship of life and wellbeing; as "a place that gives and receives life" (Kingsley et al. 2009, 291). In this light, whatever is given in the landscape is treated in return. The Aboriginal People of Australia refer to traditional land as "a resource, which behaves as a living being, and a life support system for humans" that requires continuous care and respect (Ibid, 291). The language itself of "living" and "system" points to a keen understanding, where the earth and all its creatures are treated in a manner similar to that of human beings. The landscape, then, is implied as something that requires both give-and-take. Like all living beings that require care to maintain well being, the health of Indigenous people is directly tied to landscape. The Indigenous concept of health is holistic, involving the physical, social, emotional, cultural and environmental well being (UN Resource Kit on Indigenous Peoples' Issues 2008). Similarly, the Coast Salish people in the Pacific Northwest have long regarded the landscape as the fundamental life-giving organism. This understanding allows for its inhabitants to see its needs and adjust for any changes that may be necessary, which provides positive returns for those that realize its value.

Landscape as Temporality

Elaborating on this Indigenous conception of health, Aboriginal Elder and public health advocate Joan Vickery and colleagues use the analogy of the "wheel", in which nutrition, stress reduction, contact with the land, and cultural identity provide a balanced quality of life (Vickery et al. 2005). In this paradigm, temporality also plays a role. The past, present, and future are built into this conceptual framework to address Indigenous people's health "in the whole community rather than just individual" (Kingsley et al. 2009, 292). Embedded in the holistic and spiritual connection to their surroundings is the relationship Indigenous communities have to the spatial and temporal landscape, dwelling regionally in a localized place over thousands of years, from generation to generation. Life styles were also according to seasonality, which is another element that plays into landscape and a strong connection with nature.

Building on the holistic Indigenous perspective, Choy and colleagues (2005) document how language, identity/kinship and ceremonies all connect back to the physical landscape for the Indigenous people of South East Queensland, Australia. Indigenous study participants explained that the connection to land is "fundamentally derived from the spiritual realm through an understanding of the ancestral origin, genesis and creation of features in the regional landscape. It is not only relevant to the past but also governs appropriate ways of being and operating in the present" (Choy et al. 2005, 4). This concept of landscape is bridged by the past, present and future through a mental and physical mapping that are embodied in rooted cultural practices of storytelling, kinship and spirituality. Four key components of Indigenous' perspectives to landscape were identified: landscape as 'Boundary', as 'Pathway', as 'Biodiversity' and as 'Important Sites'.

Landscape as Boundary

Historically, Indigenous peoples divided up their respective territories according to physical boundaries. These boundaries are features of the landscape that demonstrate a natural division such as creeks, rivers, channels, mountains and mountain ranges (Choy et al., 2005). While these natural features in the landscape may imply a sense of flexibility due to their wide reach, they are also strictly protected (Ibid.). They are created and maintained through storytelling, law, custom and kinship, which help to also clearly demonstrate a sense of belonging and sense of place (Ibid.). While boundaries have changed over time due to expansion of clans or tribes (resulting sometimes in battles), they often may also serve as common ground between various groups. Boundaries were also maintained (and adjusted) according to their needs. This was particularly true for the Coast Salish tribes who hunted and harvested according to the season. A sense of place may be malleable for reasons of survival. The salmon cycle, for example, and the stage it was at along the watershed often required tribes to go beyond their own territory to harvest other types of fish. Aligning themselves to natural boundaries necessitated tribes' flexibility and resourcefulness for survival.

Landscape as Pathway

Valleys, wildlife corridors, beaches/shorelines, watersheds/waterways/currents/tides and ridgelines have historically been used to identify boundaries within the landscape by Indigenous peoples. Choy and colleagues (2005) refer to these geographic features as "pathways", which they describe as passages of land that were used to move through the landscape. The character and location of these pathways are largely contingent on the quantity of food, water and shelter along the way, or at the end or beginning. Equally important is the ability to have safe, navigable routes that connect the journey's origin and

destination, which was emphasized by the Elder participants from the workshop in South East Queensland (Choy et al. 2005). Furthermore, pathways are undoubtedly crucial for Indigenous peoples' ability to read the landscape and to generate and continually support traditional ecological knowledge. It is also likely that pathways have fostered important relationships among nearby tribes in connecting with a larger identity in the region. As such, it is important to protect and preserve these features as "pathways typically connect different groups of people and important sites (including boundary corners, sacred, ceremonial and meeting and habitation sites" (Choy et al., 2005). Today, these features still provide a guiding sense of how personal and community identity is tied to landscape. With modern day development continually encroaching on the natural environment, important sites to Indigenous communities are threatened. Continued stewardship of these features as pathways in the present-day Coast Salish landscape is critical as key habitat as well as for the role they play in their identity and community.

Landscape as Biodiversity

Biodiversity is a critical element of Indigenous peoples' relationship to the landscape. Celebrating biodiversity in the landscape is carried out in three ways. First, through the 'bush calendar', which encompasses animal behavior, flowering and growth seasons; secondly, through the monitoring of indicator species that prompt a warning of environmental change especially in fauna and lastly, through the presence or absence of regional species and their respective habitats (Choy et al. 2005). These indicators help demonstrate how animal and plant species are important as members of an Indigenous tribe often identified or associated with certain flora or fauna common in a region. As such, the spatial presence of species was essentially the primary mode of determining which totem or entity were assigned to which people (Ibid.). Consequently, any absence or presence of a particular species represents the territory of different groups of people. This linked identity with a particular species and its habitat niche enables the individual or group to have a vested interest in the health and welfare of the totemic species. This relationship lends itself to an embedded spiritual and intuitive relationship with their landscape. Any changes in biodiversity greatly influence the interactions that Indigenous communities have with their landscape (Ibid.).

Landscape as Important Sites

Understanding the landscape as having specific, important places used for ceremonial, habitation or other traditional purposes further indicates of the value that landscape plays in Indigenous cultures through its place-based connections. Though this concept is an assemblage of the components of landscape described above, important sites in and of themselves help to create and make visible meaning for Indigenous communities. The features within important sites contain narratives that are carried forth and retold generationally and serve as a "fundamental part of internal and external social relations" within these communities (Choy et al. 2005, 6). While these sites hold great value in maintaining bonds and relationships among tribes, they may also have limited access depending on the kinship structure of the area or relationship of the person wishing to visit (Ibid.). Participants in the workshop in South East Queensland also noted an example that traditional inhabitants were often on elevated land as a form of protection (Ibid.).

Community Well being in the Swinomish Tribal Community

Providing some foundation to frame an understanding of Indigenous peoples' relationship to landscape is important for also contextualizing how the Coast Salish people relate to landscape in the Pacific Northwest. Swinomish Tribal Member and Elder, Larry Campbell, who serves as the Tribal Historic Preservation Officer describes in a fairly intuitive fashion the way in which Indigenous people can regard their relationship to landscape, "Everything starts and ends with the land. We have to take care of every bit of it, whether it's the trees, the water or the air. It all has some useful, helpful purpose with it if we ask. But we have to learn how to use it. And we can only do that if we're there, listening" (Swinomish Reservation signage at Pavilion Hats, accessed February 28, 2016). As such, it follows that the Indigenous perspective of community health understands identity as inextricably linked to place, and is dependent on the on the health of the landscape for overall well being.

Many Indigenous peoples', including the Swinomish Tribal Community, health and wellbeing is defined "on a community level, consisting of inseparable strands of human health, ecological health, and cultural health woven together, all equally important" when planning for local climate change (Swinomish Climate Adaptation Action Plan 2010, 20). Equally significant for community wellbeing is "participation in spiritual ceremonies, intergenerational education opportunities, and traditional harvesting practices" (Ibid.), which reinforce the various tenets of health.

Relationship to Land + Health/ Well-being // definition

The World Health Organization defines health as a "state of of complete physical, mental and social well-being and not merely the absence of disease of infirmity" (WHO, 1946), which also affirms health as a "positive concept emphasizing social and personal resources as well as physical capabilities" (WHO, 1998).

This description reinforces Indigenous People's understanding of health as consisting of overlapping tenets of social, cultural, spiritual, environmental and psychological components.

DOUBLE HELIX DNA-LIKE STRUCTURE

FIGURE 1. CONCEPT DIAGRAM

The Swinomish Tribal community identified five primary health factors in their Climate Adaptation Action Plan (SCAAP) that prioritize community wellbeing to help guide planning efforts.

The first factor is 'Community Cohesion'. Within this factor, 'Participation and Cooperation', 'Roles' and 'Familiarity' are equally important. 'Participation and Cooperation' are seen as integral for a strong support network. 'Roles' refers to how each member of the community has a responsibility that is respected. 'Familiarity' points to how knowledge of specific foods or food roles are trusted and assumed "safe."

The second health factor is 'Food Security', which is defined by availability and abundance of natural resources; access to all resource use areas for harvest with an emphasis on local resources for subsistence consumers and sharing, which ensures that everyone in the community receives natural resources from the Salish Sea, especially Elders. The Salish Sea is the stretch of the Puget Sound in Western Washington that the Coast Salish people identify as a major waterway and boundary within their regional community.

'Ceremonial Use' is the third health factor, which is an important element in Indigenous communities. Within this area, there are three additional sub-components that play into this health factor. Gatherings and ceremonies are specific community assemblies that require natural resources from the Salish Sea; Giving thanks to Nature/the Spirit for providing the natural resources when harvesting and preparing them; done with prayers and thoughtful intention; and lastly, Feeding the Spirit, which is using natural resources from the Salish Sea to satisfy a spiritual "hunger".

The fourth health factor is 'Knowledge Transmission', which entails Teachings of knowledge, values, and beliefs about tribal health in connection with the Salish Sea; Elders who are the knowledge keepers; and, Youth who are universally seen as the future.

The last primary health factor is 'Self determination', which is comprised of "Healing", which offers the ability to choose life-style desired for what is consisted "good health"; "Development" of community enrichment opportunities directed by and for the community and "Restoration" of environmental or habitat restoration that is community driven.

21 SWINOMISH HOSTING OF CANOE JOURNEY IN 2011

HISTORY OF A LANDSCAPE + IT'S PEOPLE

PEOPLE OF THE SALMON

The Swinomish Reservation is home to a community of Coast Salish peoples who are descendents from of 4 major allied bands: Aboriginal Swinomish, Lower Skagit, Kikiallus and the Aboriginal Samish Tribes. These bands historically occupied Skagit and Samish River Valleys as well as the coastal areas surrounding Skagit, Padilla and Fidalgo Bays, and the Saratoga Passage.

The Coast Salish culture is centered around abudant salt water resources, including salmon, shellfish, marine mammals as well as upland resources such as cedar, camas, berries and wild game.

Today, the Swinomish Reservation is located west of La Conner, WA, on the southeastern end of Fidalgo Island. It is surrounded by 27 miles of shoreline; it is 15 square miles in size, which includes 7,450 acres of upland and approximately 2,900 acres of tidelands.

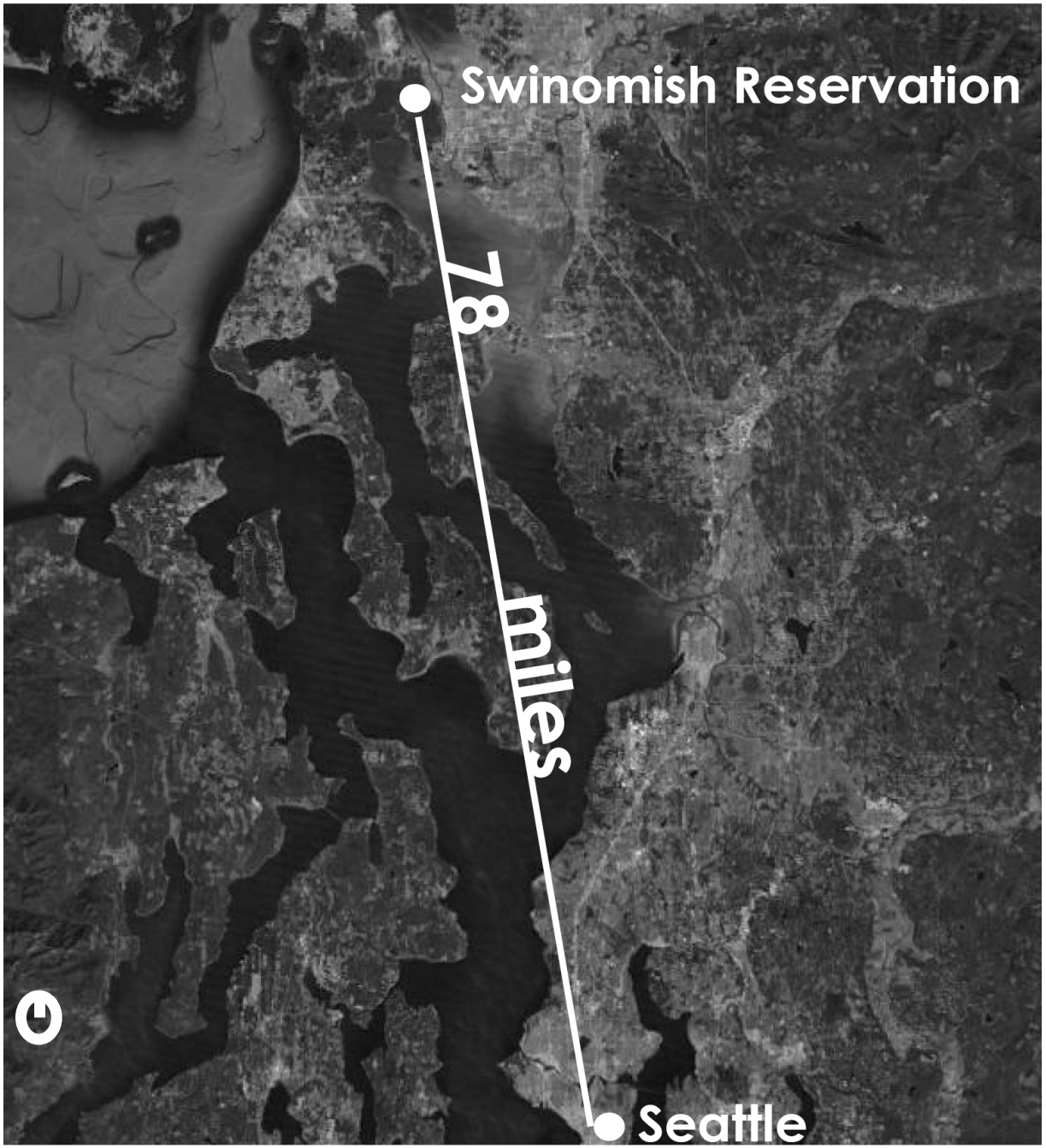


FIGURE 2. CONTEXT MAP

FIGURE 3. CONTEXT MAP OF SKAGIT COUNTY

Context

The Swinomish Tribal Community, known regionally today for their leading role as the first tribe in the U.S. to create a climate adaptation plan, is also a community with a rich history and strong identity-- an identity that is structured on the relationship of where land meets water around the Puget Sound. Their story begins with a traditional tale focusing on their origination. It begins with a chief's son who wandered from camp with his dog, and, through a series of trials, found a way to be spiritually transformed with great powers and metamorphose his dog to a woman. She became a "beautiful princess, wife and mother of the peoples whom were created through sowing rocks on the earth" (Ruby 1992, 230). This story alludes to the rooted connection-- literally to the terrain of the earth-- that the Swinomish Tribe has to their land.

The name Swinomish translates to "people by the water" (SCAAP 2010)'. They also identify as 'people of the salmon', referring to the strong connection they have with fresh and saltwater resources.

FIGURE 4. SWINOMISH AT BLESSING OF THE FLEET CELEBRATION

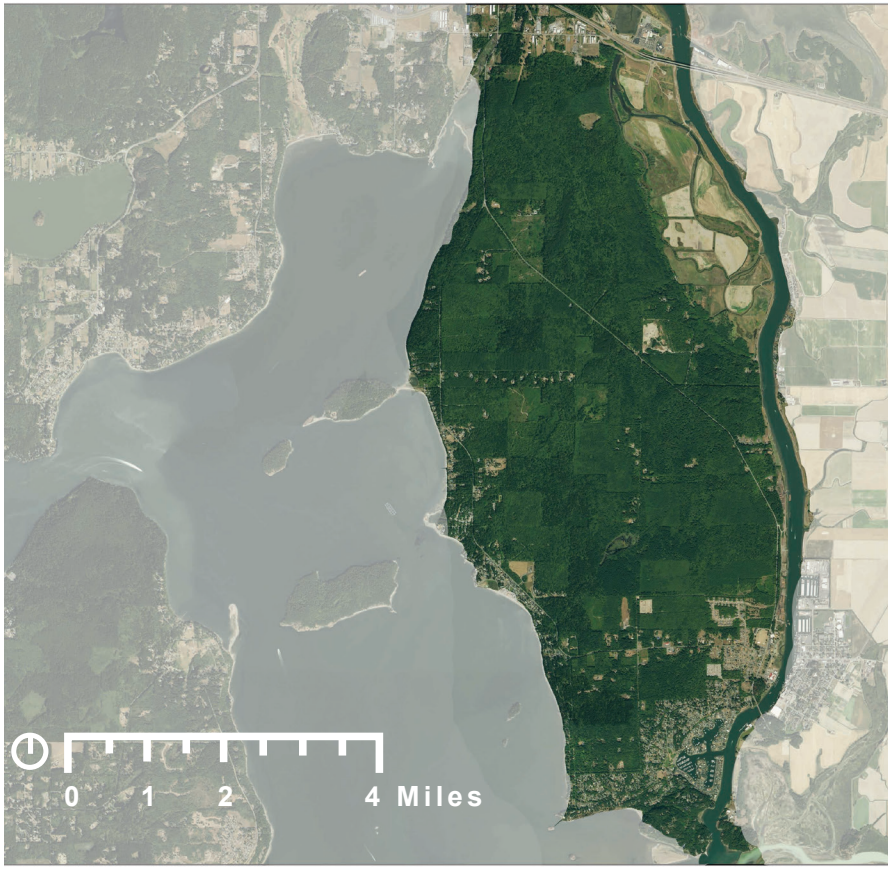


FIGURE 5. CONTEXT MAP OF SWINOMISH RESERVATION

Historically, the Swinomish' lands included stretches of northern Whidbey Island and islands in Similik Bay and Northern Skagit Bay including Hope, Skagit, Kiket, Goat and Ika, as well as Smith Island on the West coast of Whidbey and Hat island in Padilla Bay (Ruby 1992). The Swinomish were historically part of a larger aggregate of tribes: the Kikiallus, Suquamish, Samish, and Upper and Lower Skagit Peoples. Their language is the Lushootsled dialect of the Coast Salish. Their culture, like many Indigenous peoples, is marked by their seasonal migration around the landscape in accordance to weather and food availability. They maintained their permanent camps in the winter months and moved around to different fishing camps during the warmer, summer months, or more specifically, in congruence with the salmon cycle. From pre-European times to the 19th century, the ribbon of Swinomish villages maintained their independence and were composed of several families (Ruby 1992).

First Peoples of the Salish Sea

FIGURE 6. HISTORIC COAST SALISH TERRITORIES

European-American settlement of the Skagit

Euro-American immigrants did not settle the Skagit area until 1850, the same year the U.S. Congress passed the Oregon Donation Land Act giving each settler a 320-acre claim after having lived on the piece of land for some time (Roberts 1975). In 1855, when the Point Elliott Treaty was signed, the Swinomish Reservation was created. At 7,448.80 acres, it represented a drastic reduction of their original territory. Figure 24 references the vast reduction in land when the reservations were formed.

The people of the newly established Reservation were also faced pressure from Roman Catholic missionaries to shift to an agrarian lifestyle (Ruby 1992). This landscape paradigm, a European convention of farming and agriculture, is but one example that is contrary to Indigenous values. The platting of the land by the U.S. General Land Office was another significant shift in both lifestyle and how the landscape was understood (Nash 2000).

During the 1860s, some Swinomish moved around the Puget Sound looking for work due to a shift in perhaps creating the first diaspora within the Northwest landscape since the Treaty (Roberts 1975). By 1863, settlers had started to arrive in La Conner, a trading post, and the first town to be established in the county that is adjacent to the new Reservation (Ibid.).

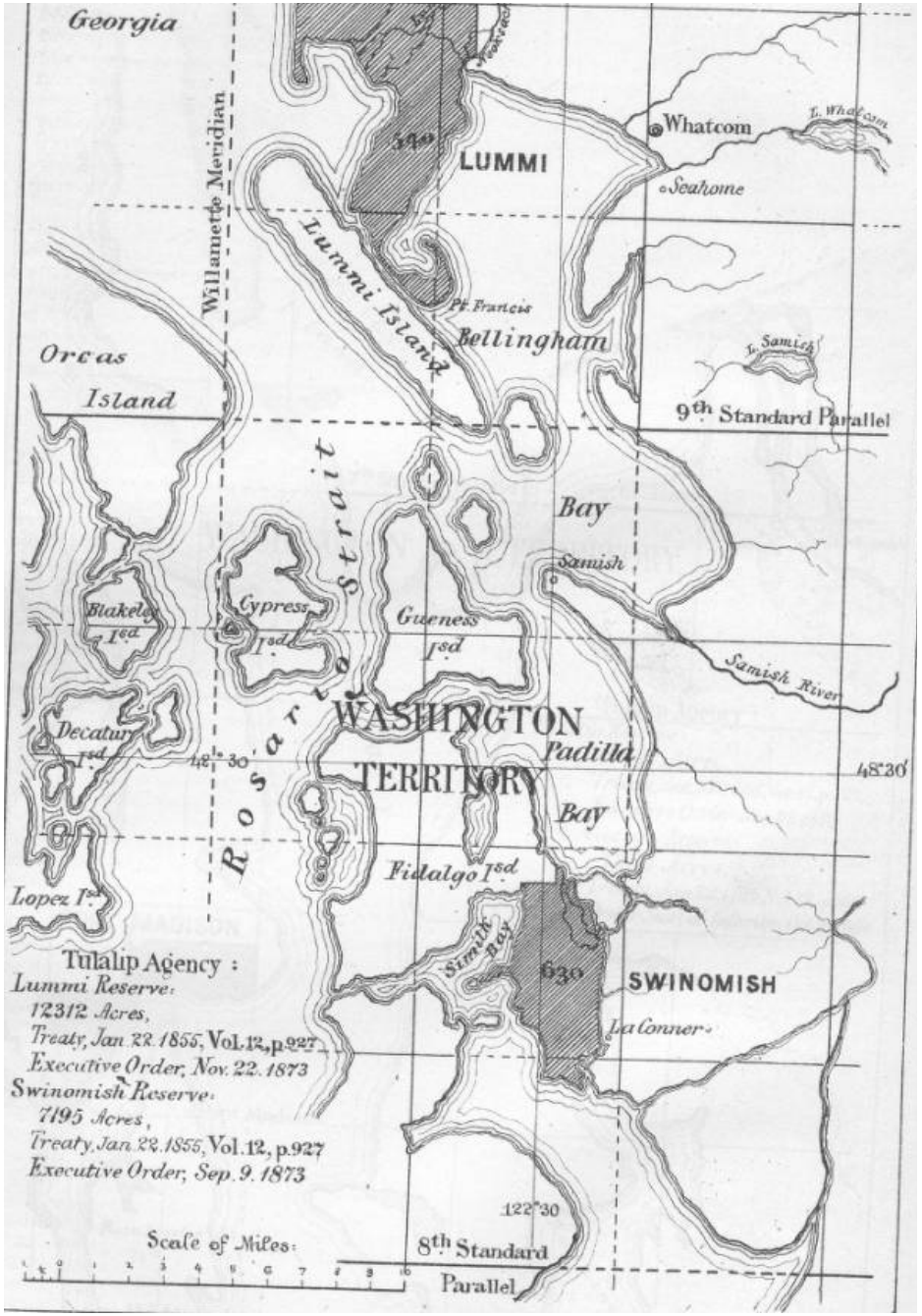
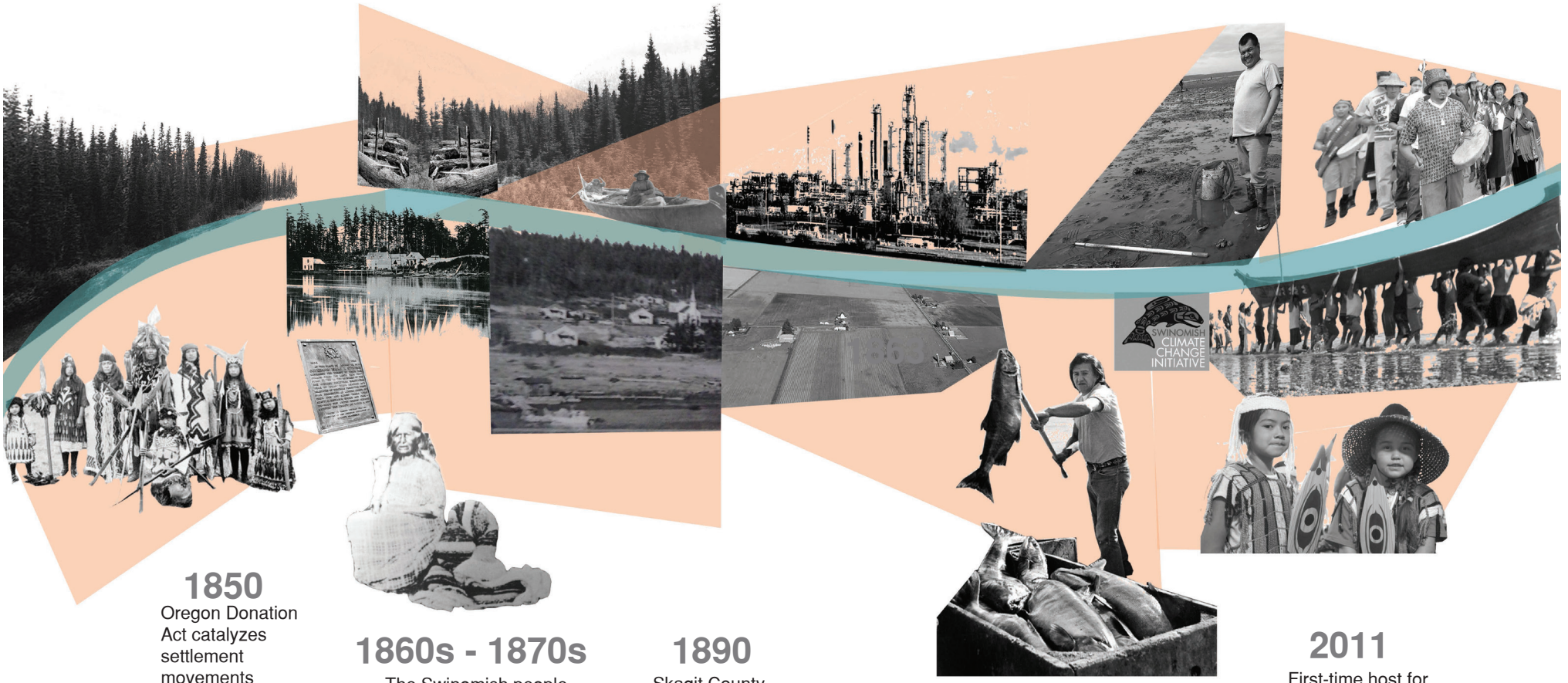


FIGURE 7. NEWLY FORMED LUMMI AND SWINOMISH RESERVATIONS, 1879



10,000+ years
Coastal Salish Tribes living in the Pacific Northwest for time immorial

1850
Oregon Donation Act catalyzes settlement movements

1855
Signing of the Point Elliott Treaty; Native American Tribal lands reduced and placed on Reservations

1860s - 1870s
The Swinomish people are moving around the Puget Sound looking for jobs

1863
The town of La Conner is esbtalished

1867
First logging camp in the Skagit region built on Samish Island

1890
Skagit County population is 7,000

1934
Federal Indian Reorganization Act gave full autonomy for tribes to manage their own affairs

1936
The 'Model Village' is created on the Swinomish Reservation

1960
Skagit County population reaches over 50,000

2011
First-time host for Tribal Canoe Journey for regional Tribes

2013
Swinomish Chairman Brian Cladoosby elected President of the National Congress of American Indians

FIGURE 8. SIGNIFICANT EVENTS IN SWINOMISH HISTORY

Landscape changes to the Skagit

The new Euro-American settlers wasted little time to make their mark on the landscape. This entailed recapturing land from wetlands, estuaries and floodplains. By 1864, the process of diking the Skagit Delta had begun. By 1873, all "government" land in the area had been acquired and claimed by new settlement (Roberts 1975). Before the early 1880s, two log jams blocked passage of steamer ships at Mount Vernon (Breslow 2011). The seasonal log jams served an ecological purpose- they created habitat for salmon and other fish in the river. But the jams impeded human activity and thus industrial development.

This was immediately apparent to the local residents how critical this junction really was-- until it was resolved, spring snow melt caused widespread flooding across the valley (Breslow 2011). It is no coincidence that landscape development went hand in hand with economic development in the 19th and 20th centuries- with economic efforts focused on the region's resources and resource extraction, including diking/drainage systems, logging, mining, the construction of dams, roads, levees and tide gates and agriculture.

The growth of the nearby Anacortes and other towns up the Skagit River were associated with nearby mining endeavors (Breslow 2011). The extent of the reach of industrial development is demonstrated when one looks not only across the Skagit valley but higher up in the watershed. The riparian forest had been logged as far upstream as the Sauk River and the remaining area of the floodplains had been converted to agricultural use (Lee et al. 2011). In 1884, the new Swinomish territory began to see many changes in its own physical form. It is estimated that as many as three-fourths of community members at the Swinomish Reservation were engaged with farming, logging and milling (Ruby 1992).

Forty years later, in the 1950s, the economy of Skagit County had shifted from primary employment in agriculture and forestry resources to the establishment of two petroleum refineries on Fidalgo Island near Anacortes (Hovee 2003). In addition, a pleasure boat building industry had also been established (Ibid). The shift of the Skagit valley's local economy is consistent with modernization elsewhere. Similarly, it fell victim to the eventual economic downturn in the 1970s and 1980s as lumber, wood and food production waned. This occurrence caused high unemployment and ultimately forced the local economy to diversify in its job sectors (Ibid).

FIGURE 9. SKAGIT RIVER WATERSHED

River Infrastructure in the Skagit Landscape

Though Skagit County farmers created a diking system for irrigation purposes to maintain and expand their livelihood within the Skagit river delta that also proved hazardous. Catastrophic flooding, perpetuated by logging, the channelization of streams and rivers was linked to the dike/drainage system by exacerbating the severity of downstream flooding. Furthermore, containing the river's natural force through channelization removed the absorptive capacity of trees and wetlands ultimately creating significant problems for the Skagit farming community (Breslow 2011). This type of artificial drainage infrastructure, on a mass scale, was also responsible for the decline in salmonid populations. Figure 11 references the evolution of the Skagit River from a meandering water body to a highly engineered and contained mechanism.

By removing large woody debris material, straightening channels, armoring shorelines, and later building the Ross, Gorge and Diablo dams, these products blocked the fish passage, destroyed nearshore habitat, increased flow volumes, scouring and erosion, prevented creation and flushing of gravel sediments for reproduction, and removed other nutrient-rich sediments historically transported to the delta wetlands and mudflats. (Lee et al., 2011). Diking isolated more than 90% of the delta from riverine and tidal influence (Ibid.), which resulted in a drastic loss of freshwater wetlands and estuarine habitats (Ibid.).

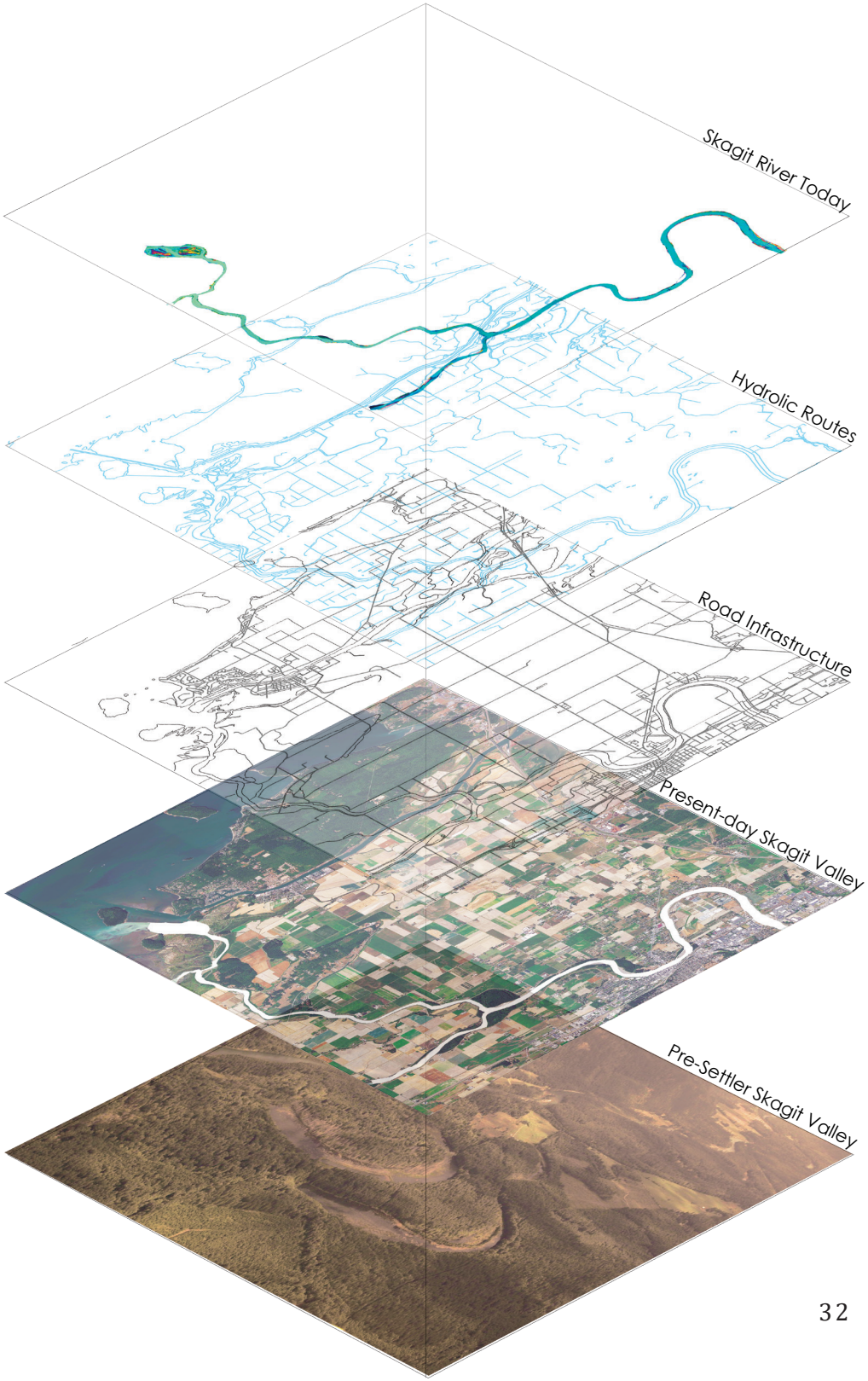


FIGURE 10. EVOLUTION OF SKAGIT RIVER

Diking isolated more than 90% of the delta from riverine and tidal influence (Ibid.), which resulted in a drastic loss of freshwater wetlands and estuarine habitats (Ibid.). Diking also drastically shifted the way remaining habitats are created and maintained (Ibid.). Blind tidal channels were reduced by 94.6% in the area between Padilla Bay and Camano Island. This reduction is significant as inflows from marine waters during high tide were cut off and freshwater flow during floods were also greatly compromised (Lee et al., 2011).

While dikes were created historically to have expanded, productive agricultural land, tide gates and flood gates were subsequently installed to prevent too much water from inundating these landscapes. Land surface in the delta protected by dikes is currently below mean higher high tide, thereby exposing the tide and flood gates offer protection of low-lying areas against flooding as well as to provide adequate drainage for farming (Lee et al., 2011). However, agriculture has changed the shape of the land, making it more vulnerable to flooding by creating arable lands behind dikes that are below the mean higher high tide, thereby exposing the area to increased river flooding now and sea level rise in the future (Ibid.). By 1879, over 10,000 acres of the Skagit Delta, a prime habitat for salmon, is diked.

FIGURE 11. DIKE CONSTRUCTION ON THE SKAGIT DELTA

The creation of hydroelectric dams upstream in the watershed further complicated and impacted the natural flows of the river. By the beginning of the 20th century, the great population growth in Seattle demonstrated the need for more power (Breslow 2011). Power from the first of the three dams, the Gorge dam, reached Seattle in 1924. Plans for this dam were negotiated a decade earlier but considerably difficulty ensued due to the robust terrain on the upper stretches of the Skagit River watershed (Breslow 2011). The second, much larger dam, which had become the world's tallest, was established in 1931 (Breslow 2011). The final dam, the Ross dam, was planned in 1937 and built in successive stages with its completion date in 1953. These dams built on the Skagit River have had adverse impacts to stream habitat, a total of 759 acres (Breslow 2011). Local residents and fishery managers may not have made a full technical assessment of whether or not salmon were able to migrate through the narrow walls of the dam, only observations may have been made. As a result, this led to a dispute if it was an issue at all (Breslow 2011). Consequently, the state fish and game departments requested that a hatchery be built in order to reduce the impacts of the declining salmon runs at the dams (Breslow 2011).

Exploring these developments to the Skagit River valley landscape help to convey the overhaul of massive changes that took place in a relatively short period of time. In less than a century, these developments transformed the landscape from its natural state to a highly engineered one. The Skagit River valley metamorphosed from a rich lowland evergreen forest, natural prairie, and freshwater marshes on the once existing Skagit delta to an agrarian pastoral and diked landscape. The natural boundaries of the landscape that served an invaluable role to the Indigenous people in reading the Skagit valley were rapidly erased. In less than 100 years, these rapid landscape changes created perhaps irreversible damage to what had naturally evolved over thousands of years by the landscape's original co-inhabitants. The previous sense of belonging and place that was innate to the Coast Salish tribes in the region for thousands of years began to vanish as massive development began.

The natural landscape of the Skagit served as common ground that the Coast Salish people could identify with. The natural boundaries identified within the region like the freshwater marshes or the adjacent islands, for instance, reinforced tribal identity. There was also a trans-boundary identity that Coast Salish could refer to, specifically with regards to meeting their food needs according to the salmon cycle. Members of tribes would travel along the watershed to other tribes they had relationships with to access other fishing resources for survival. Maintaining these relationships calls out the importance of how important kinship networks are in Indigenous communities.

To recall from the previous chapter, natural features in the landscape are used as ways of reinforcing boundary through the employment of tribal law, customs, storytelling and relationships. When the natural features of the landscape change drastically, understanding what the boundaries are become skewed. Identity is closely linked with boundaries because Indigenous peoples often associate themselves with natural boundaries that their community is near to. Understanding how boundaries impact landscape and the Indigenous inhabitants within them further reveals how landscape and identity are intertwined. Further, changing the ecology of the landscape on which Indigenous peoples greatly depend, alludes to a form of control by Euro-American settlers who very much valued this type of hegemony. Figure 26 references a form of early mapping of the Skagit Valley that uses subjective language to describe the lands ccape.

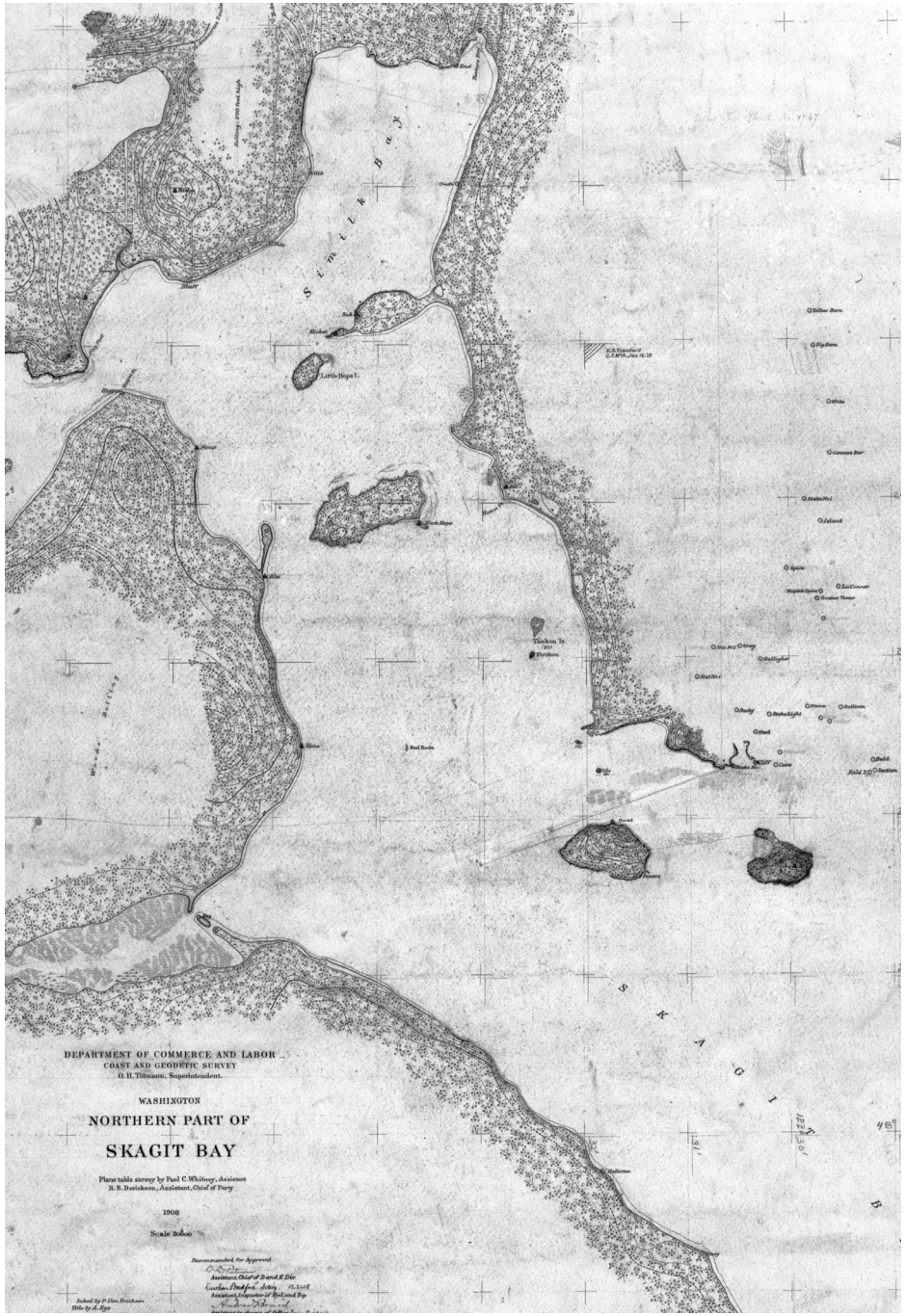


FIGURE 12. SKAGIT BAY MAP BY CARTOGRAPHER AND SURVEYOR PAUL C. WHITNEY, 1908

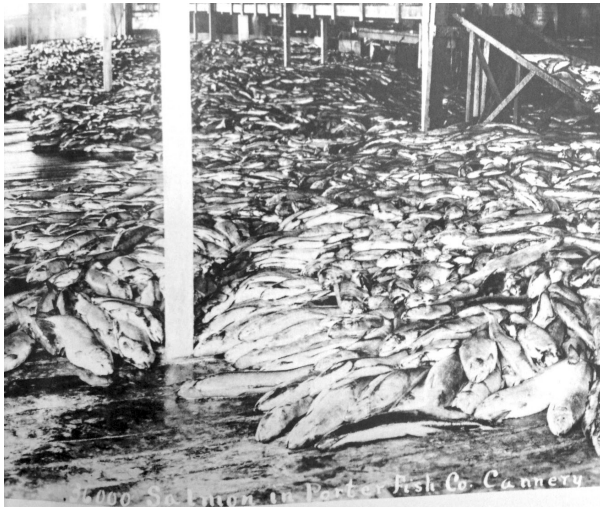
Environmental History of the Skagit

Bathymetry map with proposed diking locations, 1891.

PRE-SETTLEMENT	1790S	1824	1850	1853	1863
Indigenous population hunts and gathers and regularly manipulates the landscape for maxium production through setting fire to the prairie area, which serves as habitat for camas and grazing area for other large game.	British and Spanish explorers bring diseases that Indigenous population has no immunity to thereby devastating Native American groups	Hudson Bay Company enters Western Washington and begins establishing trading posts; Swinomish ancestors begin participating U.S. Coast Survey commences along inland Washington waters	Donation Land Claim Act becomes law and provides free land to non-native settlers in present-day Washington without regard for treaty with tribes	Washington territory created from Oregon territory	Non-native settlment begins on Fidalgo Island on March Point Diking begins on Skagit Delta creating the 'Swinomish Flats'

FIGURE 13. DEVELOPMENT OF THE SKAGIT TIMELINE

Swinomish Slough, 1890.



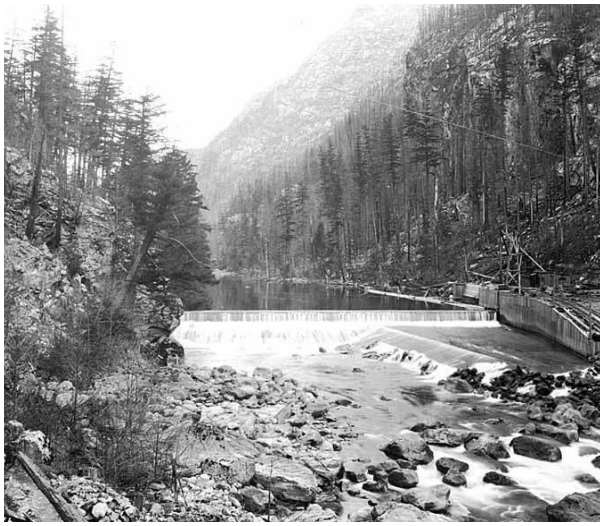
36,00 salmon in Porter Fish Cannery in Anacortes, early 1900s.

Dreding of the Swinomish Channel, early 1900s.

1873	1876	1877	1890S	1893	1895
Mineral exploration of upper Skagit Valley begins	Log jam finally cleared on ancient Skagit River	Concerns raised about Washington fisheries due to failure of salmon run in Columbia River	Mining accelerates in North Cascades	Regular dredging begins on Swinomish Slough Dredge byproduct deposited on shoreline of Swinomish Reservation, buyring its traditional shoreline	Industrial operations begin salmon canning, creating a mile-long fish trap on Swimomish Reservation tidelands; none are operated by Swinomish fishermen

Log boom on the upper Skagit River, 1900.

View of the jetty near future Swinomish Channel, 1908.



View of Gorge dam infrastructure on the Skagit River, 1926.

1902

Skagit fishermen begin to campaign to reduce commercial fish trapson county tidelands due to declining salmon runs

1906

Hydroelectric power operations profilerate through upper Skagit watershed; Corporations file claims for water rights for "mining, manufacturing, and electrical power purposes" on any prospective area in the Cascades

1907

National Forest Service begins auctioning off timber parcels for use; heavy run off of debris from logging operations impacts mountain watersheds and salmon habitat as loggers use Skagit River (among others) to transport timber down for processing

1908

Army Corps of Engineers begins jetty construction on Swimoish Slough, thus further impacting salmon

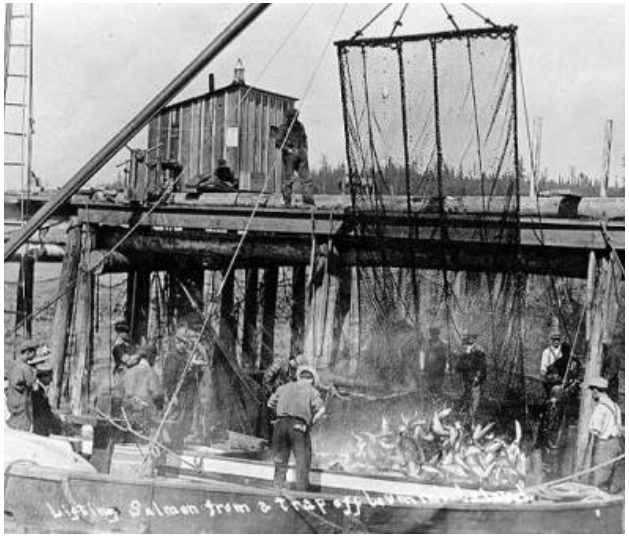
1913

Six salmon canneries in Anacortes produce record numbers of canned salmon: "Anacortes canneries produced 700,000 cases or about 33.6 millions cans of salmon, weighing about 43 million pounds

1924

Gorge Dam, the first of three Seattle City Light dams, is completed on Upper Skagit River

Non-Native resort period begins: Tribal allottments sold for vacation homes on west side



Fish trap near Lummi Island, 1911.

Flooding in the city of Conway in Skagit Valley, 1951.

Fish distribution day at Swinomish Tribal Dock, 1953.

1934

Swinomish Tribal opens their first fish trap on West Beach to provide "direly needed financial support and food for its members" yielding approximately 2000 fish per season

1939 - 46

Non-Native fishing resorts open on Swinomish Reservation on west side, gaining reputation as "Sportsman's Paradise"

1953

Construction of oil refineries begins on March Point by Shell Oil and Texaco

1963

Swinomish Tribal Community reports that "fishing is down lower than at any time" according to the Puget Sound Mail

1974

Boldt Decision upholds Treaty Fishing Rights for Swinomish and other Washington state tribes

1976

Skagit System Cooperative becomes ecological branch between Swinomish, Upper Skagit and Sauk Suiattle; intended to regulate and enhance fishing on Skagit River watershed

South fork restoration of the Skagit River by Skagit River System Cooperative (SRSC), 2000. SRSC

Construction along Swinomish Channel to create canoe landing area, 2011. Fisheries Commission

Swinomish Tribal Community survey juvenile manila clams, 2013.

1986	1993	1994	2007	2010	2011
Swinomish Indian Tribal Community adopts Coastal Zone Management Plan	Skagit System Cooperative begins decade-long effort to restore historic habitat of Skagit River's wild salmon	Rafeedi Decision established from Federal Court ruling reinforcing shellfish harvesting rights	Swinomish Senate passes a proclamation in support of the Swinomish Climate Change Initiative	Swinomish Climate Adaptation Action Plan is completed	Swinomish Tribal Community is awarded a grant to create a landing area for canoes

41 SWINOMISH CHANNEL LOOKING TOWARD THE TOWN OF LA CONNER

IMPACTS OF CLIMATE CHANGE + RESPONSE

The impacts of local climate change are currently being revealed in the Pacific Northwest. Regionally, in some areas of the Alaskan interior, melting permafrost has contributed to increased slumping of hillsides due to subsidence and siltation of streams that provide water supplies as well as habitat. Along the Alaskan coast, protective barrier islands are disappearing from sea level rise causing inundation and contamination of drinking water supplies (SCAAP 2010). The climatic changes are also compromising Indigenous Alaska communities' traditional way of hunting seals, walrus, and whales (Ibid, 14). Within the State of Washington, the Department of Ecology released a report in 2006 that identified two areas of the state that were most vulnerable, one of them being the lower Skagit Valley area near the Swinomish Reservation (Ibid.).

Recent weather events that have impacted the Reservation have signaled the growing impacts of climate change at a local level. These events created a great awareness within the community that helped to catalyze the creation of the Climate Adaptation Action Plan. These events left an impression on the community and are documented in the Plan to illustrate how climate change events resonate within a tight-knit community. Beginning in November 2006, a storm that pushed tidal levels several feet above normal along the shoreline areas of the Reservation and La Conner. In February 2006, a strong winter storm downed trees and power lines across the Reservation, isolating the Reservation for three days, and eventually prompting plans for evacuation of residents to the local tribal gymnasium. In 2009, extreme summer heat occurred in July with temperatures soaring above 100 degrees. In January 2010, an extreme high tide rose almost two feet above the projected high tide.

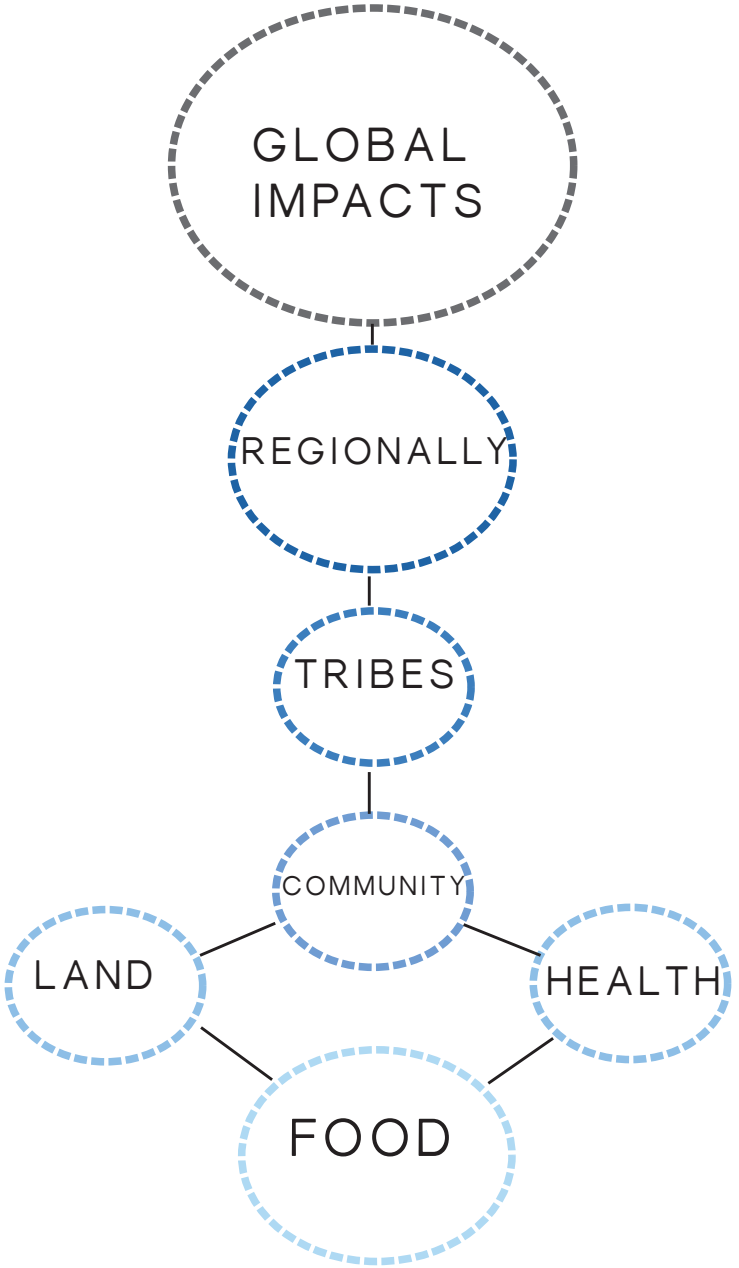


FIGURE 14. CONCEPTUAL DIAGRAM OF CLIMATE CHANGE IMPACTS TO TRIBE

In 2008, the Swinomish began work on a landmark report Climate Adaptation Action Plan, which gathered a consortium of scientists, consultants, employees of and members of the tribe to investigate and evaluate climate change impacts on Swinomish land. There is a range of sectors that are projected to be impacted.

Impacts from local climate change have been evident in the Salish Sea for several decades. These changes were officially documented in the Swinomish Climate Adaptation Action Plan in 2010. According to the Plan, Chinook salmon populations have experienced significant losses of approximately 95 percent of its stock since 1995 (SCAAP 2010). This phenomenon is not isolated in its impact; the salmon cycle effects both ecological as well as cultural health and vitality for Coast Salish culture.

Future projections of local climate change summarized in the Plan indicate the impacts on a wide range of physical, demographic, political and economic sectors within the Swinomish Reservation (26). These impacts include:

- Over 1,100 acres of Swinomish Reservation land, or approximately 15 percent of upland area, are at risk from sea level rise, including the only agricultural land that provide primary economic development and sensitive shoreline areas.
- Approximately 160 residential structures will be compromised by sea level rise and/or tidal surge.
- Approximately 18 non-residential or commercial structures from sea level rise and tidal surge.
- An estimated 2,218 acres of uplands and over 1,500 properties are in the high risk zone for wildfires based on projected increased temperatures; most other areas in the Reservation are least in moderate risk of wildfire.
- Vital transportation links and access routes to the Reservation are at risk of inundation from high tidal events.
- Traditional beach seining sites and significant shellfish beds along the west shore of the Reservation, which encompass traditional harvest areas that are at risk of permanent inundation (including estuaries and salmon-rearing areas).
- The Reservation population, particularly the ill or elderly demographic, are vulnerable to heat-related illnesses during isolated or extended high heat episodes as average temperatures increase.
- The Reservation population, particularly the ill or elderly demographic, are vulnerable to heat-related illnesses during isolated or extended high heat episodes as average temperatures increase.
- Sensitive cultural sites within low-lying areas may face permanent inundation and traditional native species may be compromised.

Risk Zones

The Intergovernmental Panel on Climate Change (IPCC), an international body that assesses the science of climate change predicts that sea level rise will have a range between conservative estimates of 1-2 feet to more liberal estimates of up to 2-4 feet by the end of the 21st century (SCAAP 2010). Regional estimates of sea level rise depend on local dynamics like wind patterns, atmospheric pressure, and vertical land movement due to tectonic activity. Sea level rise estimates for the Puget Sound range between 6 to 50 inches (Mote et al, 2008). For the purpose of risk analysis, an additional 5 feet of sea level rise with mean high highest water (MHHW) was factored in for greater planning strategies.

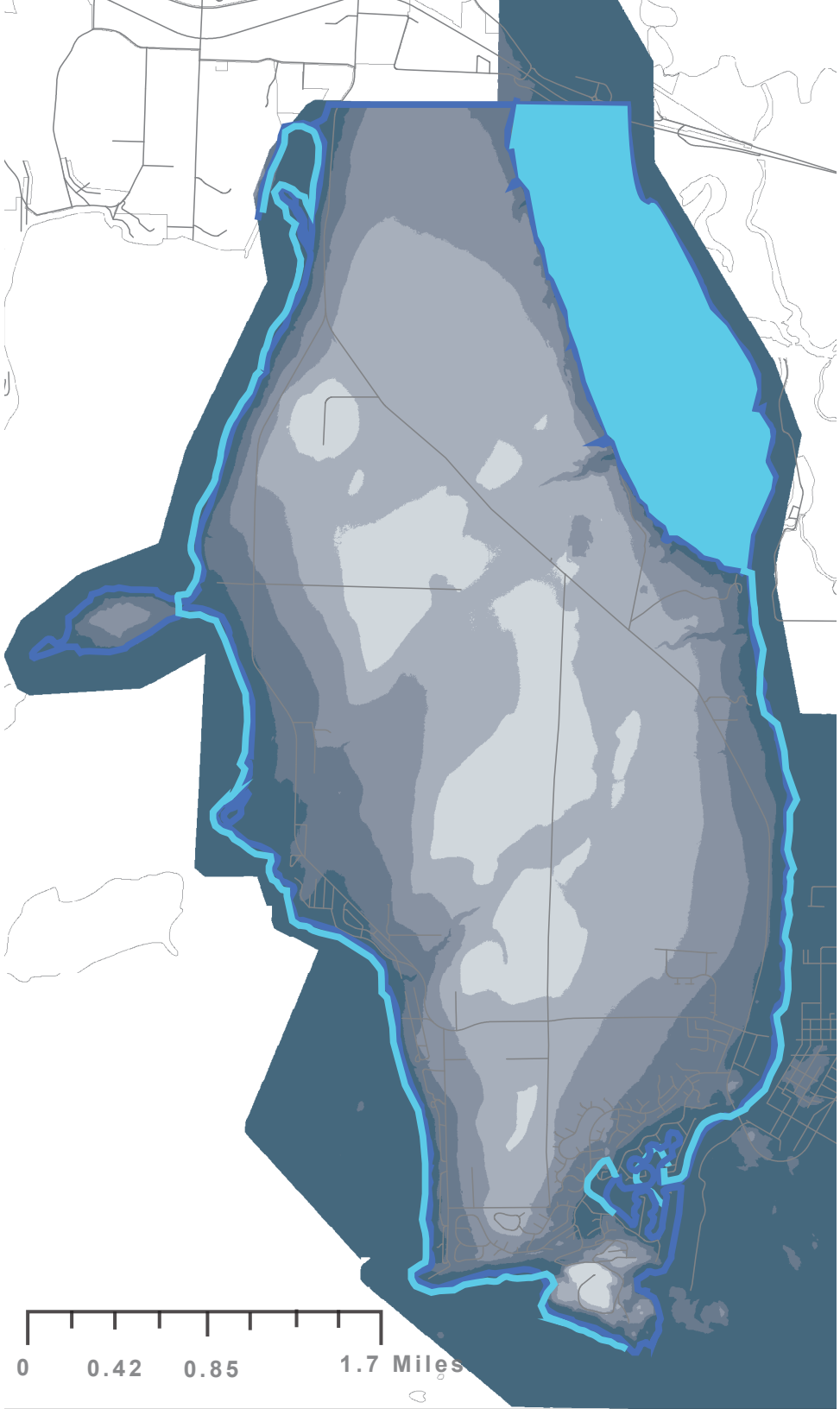


FIGURE 15. ELEVATION MAP OF SWINOMISH RESERVATION

Sea level rise will affect the following non-residential buildings that generate the top 3 highest sources of revenue and resources for the Tribe: the Fish Plant near the Swinomish Village, Hope Island Inn, and the Smoke Shop, while tidal surge will impact these properties that are among the highest property values including Swinomish Indian Tribal Community (SITC) Casino/Bingo, SITC gas station, and the SITC water treatment plant.

Annual temperature is projected to increase by 3 - 4 degrees Fahrenheit by 2040 and perhaps as much as 7 - 8 degrees Fahrenheit by the end of the century (SCAAP, 2010). As relative humidity decreases and temperature rises, wildfire risk will also increase. At Swinomish, the risk of wildfires associated with increased temperatures are intensified when urban/developed lands interface with forested areas (31). Other significant impacts are expected to occur to marine and cultural resources including increased ocean acidity and shifts in tidal zones, which will adversely affect shellfish and viable habitats. Increasing temperatures are projected to impact human health by potentially increasing pathogens and their associated vectors (SCAAP, 2010).

As a part of the planning process, evaluation objectives were created in order to establish a variety of strategies available options for the tribe. With project advisors, the following benchmark objectives were created: The first objective is Comprehensiveness which entails how proposed strategies should address impacts and risk assessment and whether or not it is fully applicable. The second evaluation objective is Long-term Sustainability. This is important in terms of thinking about climate shifts and subsequent impacts that unfold over the long term.

Another important objective is Dynamic/Adaptive approach. This is particularly important as thinking and preparing for local climate change that allows for flexibility is essential. The ability to adapt to changing facts and circumstances is critical for both local leaders and the community as a whole. The next evaluation objective is Fiscal Impact and feasibility. This primarily refers to the degree to which the fiscal impact influences proposed strategies based on financial requirements, commitments and terms.

Another evaluation objective is Non-Regulatory approaches, which describes to what extent the proposed strategy encourage cooperative, programmatic or incentive measures. Wherever possible, promoting efforts that foster a sense of collaboration and on-going growth is invaluable. Lastly, Community Goals is another important proposed evaluation objective in order accurately assess how proposed strategies align with the community needs and goals that are articulated within tribal leadership.

While these objectives are applicable and indicate a coherence on approaches to address the larger issues of climate change within the tribe, current socio-economic challenges within the tribe persist. The implication of these challenges is that poverty is often associated with poorer health, which could lead to greater vulnerability of physical with regards to climate change impacts. Physical stressors on health that are anticipated are summer heat spells, increased air pollution, toxic contamination of and reduced access to traditional foods such as shellfish (SCAAP 2010).

According to the Indian Health Service, it is estimated that the poverty in Native American communities is twice the poverty rate of the general U.S. population (SCAAP 2010). Inextricably linked to poverty is health and wellbeing (Kuhnlein 1996). Local climate change is expected to increase stress factors that effect Indigenous communities (SCAAP 2010). On average, Native American morbidity and mortality rates are notoriously higher than the U.S. average (SCAAP 2010). In addition, for the Swinomish, unemployment ranges from 20 to over 30 percent annually (Ibid.). Approximately one-quarter of the employed Swinomish workforce remain below the poverty line (Ibid.).

The Community Health Profile for American Indian and Alaska Natives (AI/AN) generated by the Northwest Tribal Epidemiology Center and Northwest Portland Area Indian Health Board describes the health status of those living in Washington State and identifies health disparities experienced by these communities (Community Health Profile 2014, vii).

Clearly poverty and disparities in health and access to health care are critical issues for the Swinomish and other tribes in the Pacific Northwest. An important aspect of communities that is often associated with health disparities is poverty. According to the 2015 Community Health Profile, the percent of AI/AN families in poverty in Washington is 18.5 percent while the percent of AI/AN individuals in poverty is 22.8 percent. An astounding 27.3 percent of AI/AN children are in poverty while 24.2 percent of the AI/AN population receives food stamp benefits. The leading causes of mortality for American Indian and Alaska Natives in Washington are heart disease, cancer, unintentional injury and diabetes. While the leading causes of death are not too dissimilar to those of Non-Hispanic Whites (NHW), the all-cause mortality rate for AI/AN in Washington from 2006-2010 was 1.7 times higher than the rate for NHW. Life expectancy at birth was 8.6 years lower than that of NHW. As the fourth leading cause of death for AI/AN in Washington, diabetes is an extraordinary public health epidemic in this community.

Type II diabetes has been on the rise in the United States for the last decade and mortality rates are also expected to increase as a result. According to the Community Health Profile, the current death rate from diabetes is three times higher for AI/AN compared to NHW. On average, the death rate from diabetes for AI/AN has increased by 2.3 percent per year since 1990. The self-reported diabetes by race and sex for AI/AN in Washington from 2006-2012 13% for both male and female. Comparatively, for NHW population the self-reported diabetes is 8% for males and 7% for females. Acknowledging the current public health conditions of tribes in Washington serves to contextualize how communities with existing disparities and adversity may fare against dynamic and unknown circumstances with regards to the climate.

Impacts Focus Area

There is a range of sectors that are projected to be impacted. In this research, the focus is on 'Cultural Resource' sector with the selected impacts of "loss/migration of traditional cultural use species" and secondly, "potential loss of harvest sites and opportunities due to impacts on shellfish populations and habitat".

SECTOR	POTENTIAL IMPACT	VULNERABILITY	ACTIONS	EVALUATION OBJECTIVES
Cultural Resources: Cultural use plants	Loss/migration of traditional cultural use species	HIGH	Not defined	Comprehensiveness
Cultural Resources: Shellfish harvesting	Potential loss of harvest sites and opportunities due to impacts on shellfish populations and habitat	HIGH	Aquaculture operations	Long-term sustainability Dynamic/adaptive approach Fiscal impact and feasibility Non-regulatory approachesh Community goals

These two priority issues and prescribed strategies highlight the importance of the continuous need as a 'People of the Salmon' who depend on a reliable source of seafood. This access to marine resources is tantamount to the air they breathe- an earthly element that cannot simply be ignored or overlooked. As such, ecological health begets cultural and community health/wellbeing. Aquaculture honors the past, addresses the needs of the present and looks to the (near) future as an opportunity. This practice also influences and promotes intergenerational educational opportunities, which is an important aspect in Indigenous communities.

The adaptation strategy identified is aquaculture operations. As specified in the Plan, "experimentally, shellfish could be seeded in upland operations to allow for proper growth and development under controlled conditions... once mature, they could be transplanted to established beds" (SCAAP 2010, 52). When shellfish habitat is impacted, harvesting opportunities are also significantly affected. Applicable goals identified to directly address this threat is to "restore, enhance and maintain the traditional livelihood based upon these resources; "seek off-Reservation sites for shellfish harvest/cultivation"; "preserve ability to fully exercise treaty rights and cultural practices for spiritual and physical health"; and, "reestablish natural diversity in harvestable clam populations" (SCAAP 2010, 52). Partners involved would be the Swinomish Tribe's Department of Fisheries and the Skagit River System Co-Op, which provides natural resource management for the Swinomish Tribal Community and Sauk-Suiattle Indian Tribe. the "promotion of shellfish aquaculture on Tribal tidelands should be encouraged emphasizing subsistence harvest practices." (SCAAP 2010, 61). The adaptation strategies described in the Plan describe the importance of strengthening traditional food knowledge to better identify when seafood is safe for consumption and to also implement aquaculture operations.

Shellfish beds, along with many other coastal resources, have been identified in the Plan as high risk due to rising temperatures and acidification both globally and locally. Among all of the impacts identified in the Climate Adaptation Action Plan, the focus of this research is on the relationship of where the land meets water. These issues also provide opportunities for adaptation that strive for community resiliency and cultural wellbeing.

Easily masked among the language of the impacts of local climate change that are described in both the Technical Report and Climate Adaptation Action Plan are the grassroot efforts occurring within the Swinomish community to bring awareness to these greater challenges. Communicating scientific information to a larger audience in a digestible manner is a crucial task that brings widespread benefits for all. Efforts began taking place within the Swinomish Tribe to begin to convey what the results of the Plan meant for the community at large. As a result of the Climate Adaptation Plan, the group Climate Change Education & Awareness Group was formed to better enable community-based response and ultimately "assist with communication of complex issues to the community and [generates the] gathering of input on tribal perspectives toward climate changes issues" (SCAAP 2010,15). Led by Shelly Vendiola, it opens a communication stream to help inform and guide policy. Most notably, the group embraces an 'honorable engagement process' (Ibid.).

The CCEAG is comprised of tribal members who represent each of the respective families within the tribal community. They are connected with all sectors within the Tribe including Youth Recreation, Prevention, Education, Social Groups, Law Enforcement, Fisheries and tribal leadership (SCAAP, 2010). This coalition fosters a pathway for interests of different sectors within the tribal community to be represented. Other targeted efforts that have taken place, which include a diverse range of outreach efforts. One obvious way to begin is to create a greater public awareness about climate change impacts to the Swinomish community in terms of its cultural and natural resources, marine life, forests, and surrounding communities. Engaging with community and youth voice in action planning for adapting to changes is another great way to hear their perspectives and to educate about the immediate impacts as well as opportunities to assist in the planning process. The Swinomish greatly value education and getting youth engaged in creating public education materials, sustainable community projects and use of technology to create reports, digital stories, films or other media has a been a very progressive strategy. Additionally, the ability to provide opportunities for students to receive education on environmental planning specific to climate change adaptation has allowed the Swinomish community a unique opportunity to directly influence younger generations. Collaboration and coordination with tribal community and departments to address climate impacts (flooding, fires, diseases, public safety, forests, plants, marine life, etc.) has also been another important way for cross-disciplinary solutions. A key opportunity in initiating the Adaptation Plan has also allowed for greater collaboration and strengthened relationships between Swinomish and neighboring communities in Skagit County. Overall, these efforts have afforded the opportunity to influence policy with regard to climate change impacts, adaptation, and mitigation.

Another area of engagement within the community takes places at the research level with regards to determining what community health really is for Indigenous communities. The Indigenous Health Indicators formulated by Swinomish employee researchers and tribal members, they seek to be able to apply these in at the planning level.

Indigenous Health Indicators

Community Connection: Members actively participate in community functions and help each other, particularly in connection with the harvest, preparation, and storage of natural resources.

Natural Resources Security: Local natural resources (air, water, land, plants and animals) are abundant, accessible and support a healthy ecosystem(s) and healthy human community. The community equitably shares these natural sources.

Cultural Use: The community is able to perform their cultural traditions in a respectful and fulfilling way using the local natural resources.

Education: Knowledge, values and beliefs are actively passed from elders to youths.

Self-Determination: Communities develop and enact their own healing, development and restoration programs.

Well-being: Community members maintain connections to meaningful locations, confident that their health and the health of the next seven generations are not at risk due to contained natural resources.

(Donatuto et al. 2014)

Blessing of the Fleet procession, 2013

Children looking at Swinomish Channel at Blessing of the Fleet, 2013

Blessing of the Fleet ceremony, 2013

NATIVE PLANTINGS AREA NEAR SWINOMISH VILLAGE

DESIGN | APPROACH + CONCEPT

Bridging the connection between the current public health conditions and the impacts of local climate change on the community at large reinforces the importance of local/traditional foods and their relationship to landscape. Momentum within Native American communities both nationally and regionally is gathering to reconnect the value of traditional diets and health through the cultivation of local food. Local and regional precedents of ethnobotanical and community native plant gardens are evolving. Community garden projects are a start; education and outreach is an equally important component within the community as much as the gardens themselves. Landscape architects can play a role in assisting Native American tribes as part communicator, plant knowledge keeper, problem solver, and designer. Helping to establish an essential foundation and space for growing and food for long-term resilience is fundamental to what landscape architects do.

Precedents

The Traditional Foods of Puget Sound Project began as a research study that resulted in Feeding the People, Feeding the Spirit (2010), co-authored by native foods specialist Elise Krohn and Valerie Segrest, a Native nutrition educator and member of the Muckleshoot Tribe. This project has provided a significant research that documents primary accounts and experiences of Native American tribal members in Western Washington with regards to their exposure and understanding of traditional foods. It also documents the rich array of foods that were used by reviewing key archeological data. Through the process of interviewing tribal elders and other members, Krohn and Segrest's book has created an invaluable resource that shares tribal members' intimate stories and experiences of their relationship to place through the foods that come from the land.

Local precedents of education concerning the practice of growing traditional native plants have taken place and continue to expand each year as partnerships with communities, organizations and educational institutions are strengthened. For example, the Muckleshoot Food Sovereignty Project focuses on a few challenges including evaluating the status quo of community food resources and tactics to create a food system centered around healthy community. Monthly classes are offered as workshops that "focus on old traditions around utilizing traditional foods and plants in a new world" and result in periodic community feasts that feature various seasonal foods (Krohn and Segrest 2010, 1). Further north, the Lummi Traditional Foods Project focuses on distributing locally grown food to a select number of families that include instructions and recipes on how to prepare the seasonal foods. Co-organized through the Northwest Indian College (NWIC), workshops are also offered and feedback from the community helps to communicate information specific to traditional customs (The Lummi Traditional Foods Project).

At Northwest Indian College on the Swinomish Reservation, the '13 Moons Garden' focuses on growing traditional native plants based on their seasonality. The community-scale garden serves as part education part function and is stewarded by NWIC employees, students, community volunteers and tribal employees. With growing interest, the Swinomish campus has also integrated a new food sovereignty class, which has ultimately led to creating a new curriculum (The Living Breath Symposium 2016). The 13 Moons Garden also centers their goals around 6 key food sovereignty principles, including "Focus on food for people", "Values food providers", "Localizes food systems", "Makes decisions locally", "Builds knowledge and skills", and "Works with nature" (Ibid.).

In northern Oregon, the Quamash Prairie First Foods program is on a 170-acre natural area with a distinct wet prairie habitat. Located in the city of Scholls, camas prairies and other native plants are thriving there. The First Foods Program is a community-led process where events like camas gathering and pit roasting take place with local Native American groups.

In the city of Tukwila near South Seattle, the 10.5 acre Duwamish Hill Preserve is a landscape that is historically, culturally and ecologically significant for the local Indigenous people (Duwamish Alive Coalition 2016). It is an active restoration area with native plantings and is an educational platform for learning about the site and how the landscape served nearby inhabitants. These programs, which are partnerships among private and public entities, emphasize the importance of community outreach and opportunities in teaching and learning about growing traditional foods.

The community-scale precedents for growing and harvesting food sets the starting point for addressing current day health challenges as well as targeting for future goals of well being. Setting goals to address the challenges of today help to meet the challenges of tomorrow. If these short term and long terms goals are addressed, then a certain standard of community resilience can be achieved.

In the process of research and reflection surrounding the growth of food as the mainstay of resilience, defining the term resilience in the context of the Swinomish Climate Change Initiative is essential. Resilience is interpreted as the “capability of a strained body to recover its size and shape after deformation caused especially by compressive stress; an ability to recover from or adjust easily to misfortune or change” (Merriam-Webster, 2016). A resilient design response is one that enables the Swinomish to recover and reconnect with traditional foods, which enriches community well being and leads to long-term resilience. Addressing the two areas within the defined Cultural Resources of “Cultural plant use” and “shellfish harvesting” mpacts of the Plan, they encompass the relationship of traditional foods and cultural, ecological, social, and physical health. The next step of reflection entails how resilience can manifest physically on the landscape of the Swinomish Reservation.

Recalling the integral connection of traditional foods to Swinomish community well being, a schematic proposal emerged. The role of terrestrial and marine resources were used as food, medicine and tools. In speaking with with Jessica Gigot, PhD, a faculty member at the Swinomish campus of Northwest Indian College who has pilot community garden projects, the concept of edible 'buffer' emerged. In our conversation regarding the principle well being as tied to landscape, growing food was the consistent thread in one of the ways to achieve resilience in the Swinomish community. It is an inevitable product that feeds not just the physical body but the spiritual one as well.

In consultation with the Director of Restoration at the Skagit River System Cooperative (SRSC), I selected a stretch of Similk Bay on the Reservation as a site model that could be adapted and replicated throughout Swinomish lands. Located just north of the Kukutali Preserve, this site is located in an existing shellfish harvesting area. This site was also selected based on its location away from the projected low-lying inundation zone that is identified in the Swinomish Climate Adaptation Action Plan to be impacted by the year 2100(SCAAP 2010, 28). See Figure 10.

"How do you uphold traditional values and concepts without being able to feed the people?

-Shelly Vendiola, Swinomish community member (Interview, January 2016)

Concept

TRADITIONAL | EDIBLE | BUFFER

The Traditional Edible Buffer (referred also as 'Buffer') is a proposal for the growth and harvesting of Native plants and commonly eaten clams within Coast Salish culture. Native plants associated with the lowland forest, prairie and wetland, and shoreline ecosystems in the Pacific Northwest represent the terrestrial component of the Buffer. Butter clams and littleneck clams are the focus for the as they are a product of the Swinomish coastal resources and serve to bridge the embedded relationship of landscape to wellbeing in Indigenous communities. These traditional foods also known as First Foods, are highly valued for their ability to provide food, medicine and materials for tools (Krohn and Segrest 2010).

This design research explores the reintroduction of ancient practices of root gardens and clam gardens, a form of shellfish aquaculture, in adaptive and hybrid uses for the future. The proposed site along a quarter-mile stretch of Similk Bay will begin as a demonstration of growing food on the Reservation on a community garden scale and progress to an extensive operation that be maintained by Swinomish tribal employees and volunteers.

The Buffer will engage the eight traditional food principles that are well rooted in traditional Coast Salish culture (Krohn and Segrest 2010).

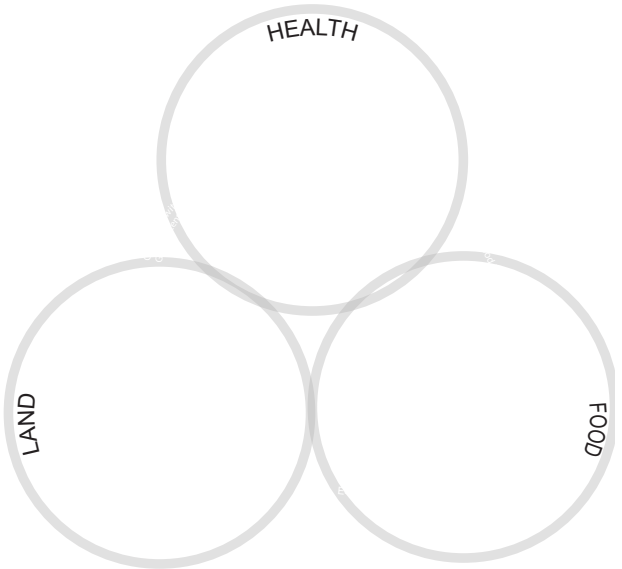
Traditional Food Principles:

'Food is at the center of culture'
'Honor the food web/chain'
'Eat with the seasons'
'Eat a variety of foods'
'Traditional foods are whole foods'
'Eat local foods'
'Wild and organic foods are better for health'
'Cook and eat with good intention'

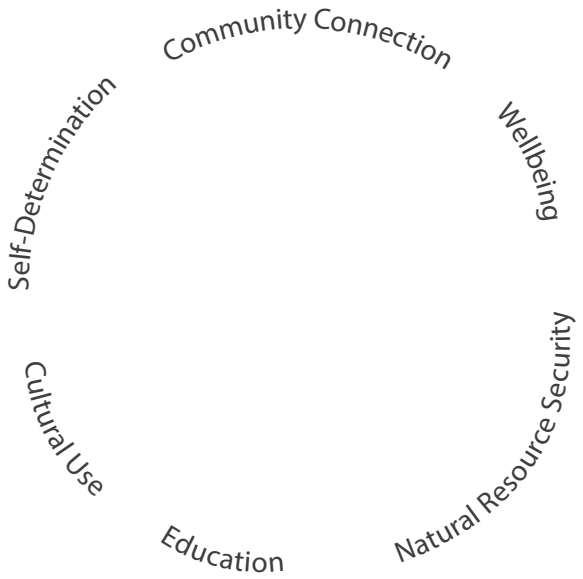
FIGURE 16.CONCEPTUAL ILLUSTRATION OF TRADITIONAL EDIBLE BUFFER

Process | Project Focus of Traditional Edible Buffer

Wide Lens



Indigenous Health Indicators



Traditional Food Principles

Collective Thinking

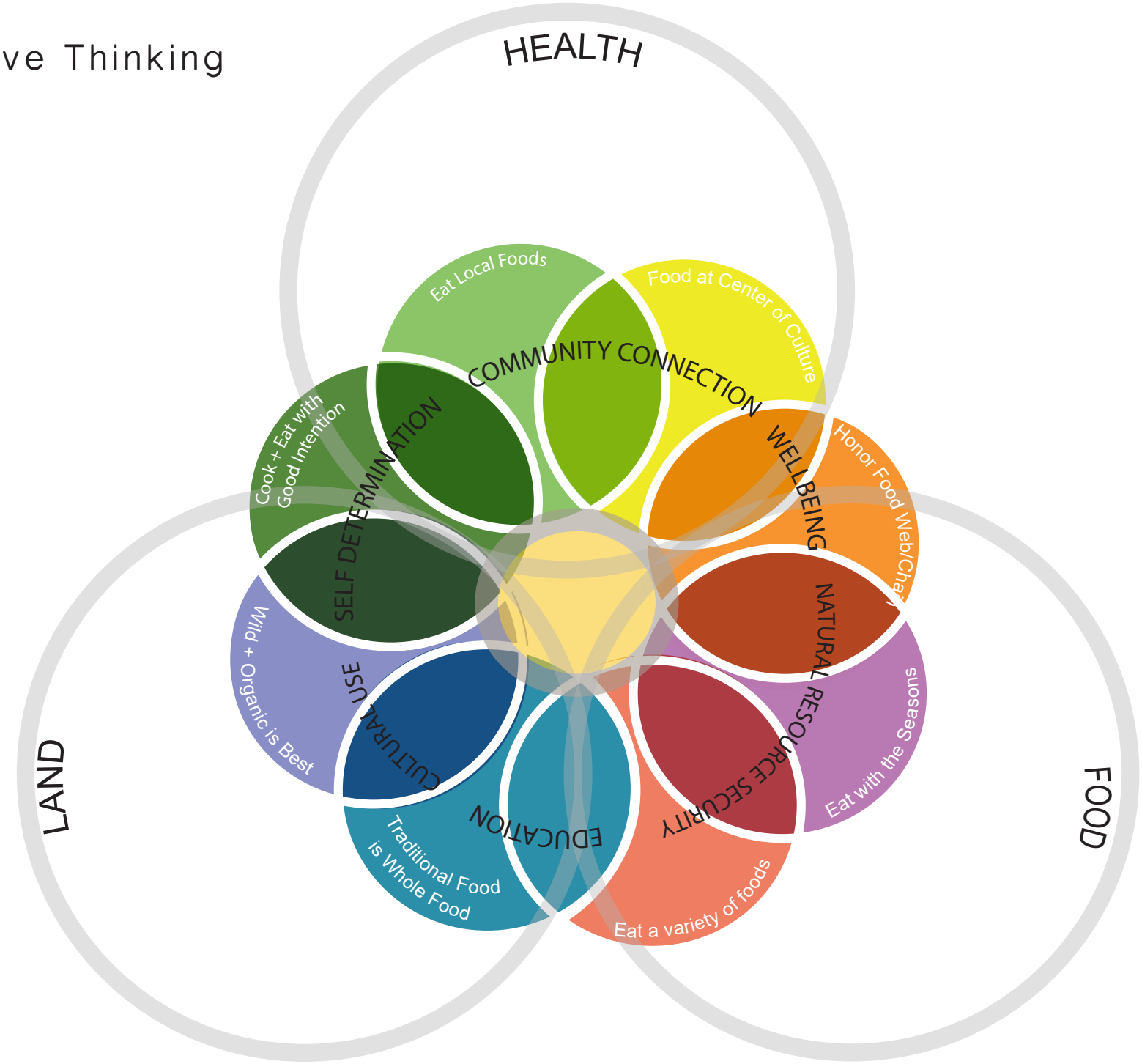


FIGURE 17. CONCEPTUAL PROCESS | PROGRESSION

Process | Schematic

Learning about Coast Salish traditional foods and materials enabled process-thinking. The Traditional Edible Buffer engages the 3 ecosystems that are characteristic of the Coast Salish landscape and the Skagit Valley as whole. The ecosystems engage in creating ecotones, which are transition areas of the different ecosystems and serve as visible passageways in the landscape. The lowland forest grows on the western slopes of the Cascades and stretch to the saltwater shoreline (Bohan 2009). The woody debris from the evergreen trees provide organic material to encourage new growth. Within the tree canopy of this rich ecosystem is a rich plethora of plants that receive filtered sunlight.

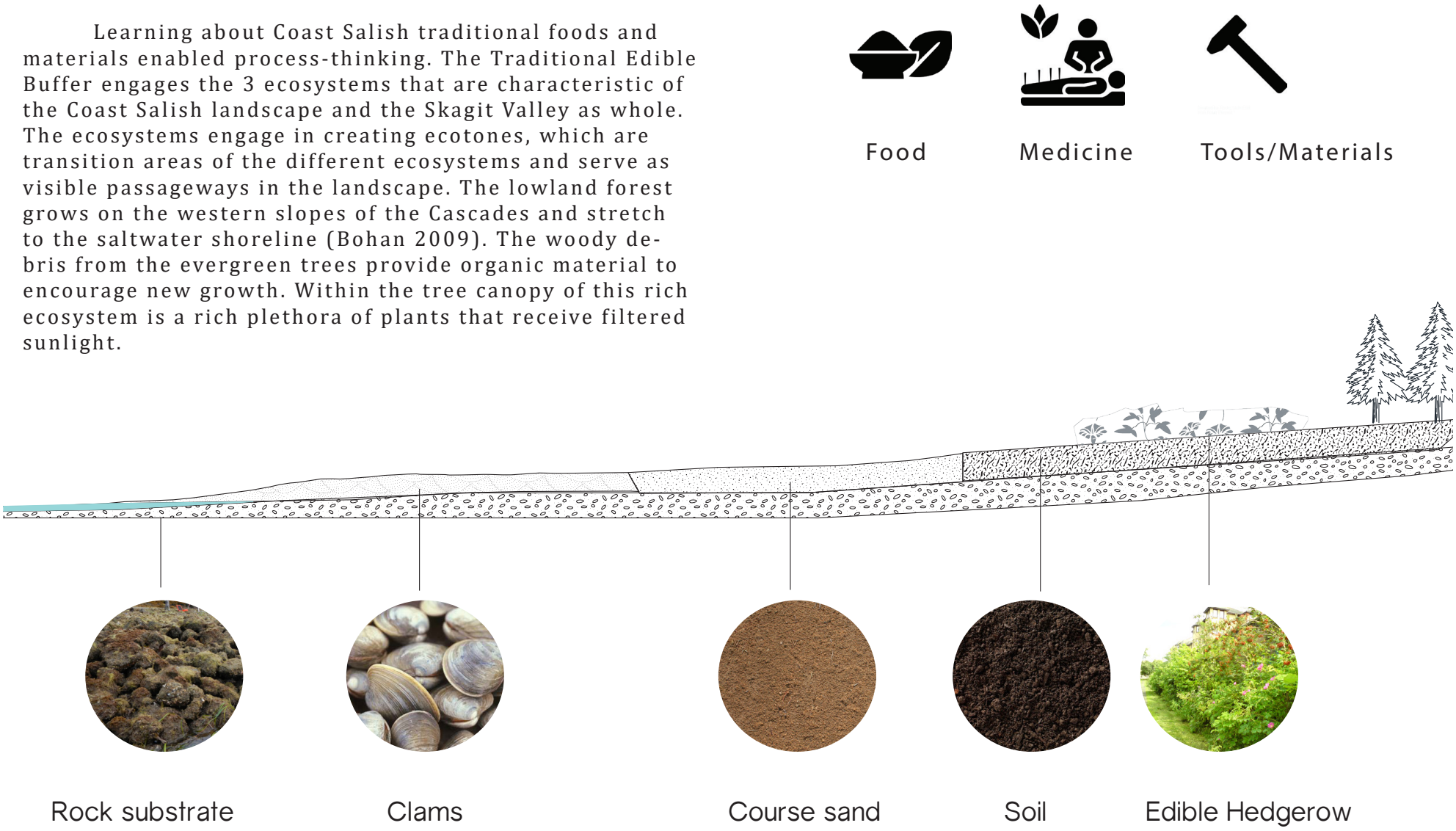


FIGURE 18. SCHEMATIC DESIGN OF BUFFER

The Traditional Edible Buffer engages the 3 ecosystems that are characteristic of the Coast Salish landscape and the Skagit Valley as whole. The ecosystems engage in creating ecotones, which are transition areas of the different ecosystems and serve as visible passageways in the landscape. The lowland forest grows on the western slopes of the Cascades and stretch to the saltwater shoreline (Bohan 2009). The woody debris from the evergreen trees provide organic material to encourage new growth. Within the tree canopy of this rich ecosystem is a rich plethora of plants that receive filtered sunlight.

Situated between the lowland forest and the saltwater shoreline is the prairie and wetland ecosystem. Prairies and wetlands are scattered across the Coast Salish territory. They provide a spectrum of plants that can thrive in a range of wet to very dry habitats.

The saltwater shoreline of the Pacific Northwest is a natural boundary that has served a key component of Coast Salish culture. This ecosystem, intermingled by the Puget Sound and Pacific Ocean, is one of the most productive in the world (Bohan 2009). It is a passageway for Pacific Northwest species of salmon and humans. The coastal areas encompass rocky tidal zones that contain shellfish such as clams, mussels and oysters and a vast array of algaes and seaweeds (Ibid.). The water helps to moderate the climate that is characteristic in Western Washington.

At the beginning of implementation, the Buffer will contain low-lying shrubs as it will take several years for deciduous and evergreen trees to establish. The Buffer will establish the growth of plants that are harvestable in various seasons so that food resources will be available year round. Understanding how resources can be extracted from shrubs and trees for food, medicine and tools is a component of the Buffer that touches on education, which is an Indigenous Health Indicator identified by the Swinomish Tribal Community (Donatuto et al. 2014).

After the Buffer has reached a moderate amount of growth, it the goal that the Buffer will serve as a preliminary source for local and organic fruits and vegetables and clams that are customary for the community. It will serve as a community space that is accessible on the Reservation and make visible the coalition efforts the Swinomish have taken to prepare local climate change. After ten years, it is the goal that the Buffer would mature enough to provide clams for the annual celebration “Blessing of the Fleet” that honors the local salmon. Understanding how the Buffer progresses over time provides lessons on how human and non-human organisms in the landscape can co-evolve when stewardship is prioritized

Lowland Forest Plants

1 Bigleaf Maple

2 Bitter Cherry

3 Chanterelle Mush-rooms

4 Douglas Fir

5 Huckleberries

6 Lady Fern

7 Licorice Root

8 Nootka Rose

9 Oregon Grape

10 Pacific Solomon

11 Red Alder

12 Salal

13 Stinging Nettle

14 Swamp Lantern

15 Sword Fern

16 Trillium

17 Vanilla Leaf

18 Western Red Cedar

19 Wild Ginger

FIGURE 19. SELECTION OF LOWLAND FOREST PLANTS

1 Bigleaf Maple Wood for canoe paddles, containers, tools; Bark for cordage and Firestarter; Leaves for cooking and containers.

2 Bitter Cherry Bark for strapping, basketry, medicine.

3 Chanterelle Mushrooms Occasional food.

4 Douglas Fir Bark for firewood; Wood for tools, spears, houses; Pitch for fire, snack, medicine, glue.

5 Huckleberries Berries for food; leaves for tea.

6 Lady Fern Leaves for bedding, preparing food; Roots and new shoots for food.

7 Licorice Root Roots for medicine, flavoring.

8 Nootka Rose Fruit for hygiene, tea; Wood for baskets, ornament.

9 Oregon Grape Leaves for medicine; Bark and roots for dye; Berries for food and dye.

10 Pacific Solomon Seal Roots for medicine.

11 Red Alder Wood for food containers, smoking food, ceremonial objects; Bark for medicine and dye; Catkins for food, medicine.

12 Salal Leaves for medicine and dye; Berries for food and dye.

13 Stinging Nettle New shoots for food; Leaves for medicine; Bark for cordage.

14 Swamp Lantern Leaves for cooking; New shoots and roots for famine food.

15 Sword Fern Leaves for preparing food, bedding, basket lining and covers; Spore for medicine; Roots for survival food.

16 Trillium 'Love potion'; if picked will bring rain.

18 Vanilla Leaf Leaves used to scent houses, deter insects.

19 Western Red Cedar Wood for houses, canoes, tools, ceremonial objects; Bark for clothing, towels and diapers, baskets, cordage, tools; Roots for baskets, cordage; Boughs for cordage, cleansing, medicine, ceremony.

20 Wild Ginger Roots for medicine; Leaves for tea.

Wetland + Prairie

1 Balsamroot

2 Black Cottonwood

3 Black Hawthorn

4 Bullrush

5 Cattails

6 Cow Parsnip

7 Garry Oak

8 Horsetail

9 Kinnikinnick

10 Oceanspray

11 Pacific Madrone

12 Red Osier Dog-wood

13 Slough Sedge

14 Thistle

15 Tule

16 Wapato

17 Wild Onions

18 Wild Rose

19 Willows

20 Yarrow

21 Yellow Pond Lily

FIGURE 20. SELECTION OF WETLAND PLANTS

1 Balsamroot Roots for food and medicine; Seeds for food.

2 Black Cottonwood Wood for canoes, building, fire, starting; Resinous buds for medicine and glue; Bark for building; medicine; Inner bark for soup.

3 Black Hawthorn Thorns for piercing, tattooing and medicine; Berries for food and medicine.

4 Bullrush Leaves for basketry; Bulbs for food.

5 Cattails Leaves for basketry, mats; cordage, clothing; New shoots for food; roots for food; Seeds for clothing and fire tinder.

6 Cow Parsnip New shoots for food.

7 Garry Oak Nuts for food and dye; Wood for utensils; Galls for dye, medicine.

8 Horsetail Leaf stalks for sandpaper; and medicine; New shoots for food.

9 Kinnikinnick Leaves for medicine/ceremony; Berries for food.

10 Oceanspray Wood for tools, spears and arrows; Seed for medicine.

11 Pacific Madrone Wood for tools; Berries for food; Bark for dye.

12 Red Osier Dogwood Wood for baskets and tools; Bark for medicine.

13 Slough Sedge Leaves for basketry.

14 Thistle Roots for food.

15 Tule Leaves for mats, basketry; clothing.

16 Wapato Bulbs for food.

17 Wild Onions Bulbs for food; Leaves for food.

18 Wild Rose Leaves for medicine and tea; Branches for basketry and ceremony; Berries (hips) for hygiene, snack, medicine.

19 Willows Bark for cordage and medicine; Wood for building.

20 Yarrow Flowers and leaves for medicine.

Saltwater Shoreline

1 Arrowgrass

2 Basket Sweetgrass

3 Bullwhip Kelp

4 Dulses

5 Eelgrass

6 Fucus

7 Laver

8 Pacific Silverweed

9 Pickleweed Stems

10 Perrenial Kelp

11 Sea Lettuce

12 Sea Palm

13 Seashore Lupine

14 Sea Spatula

15 Springbank Clover

16 Winged Kelp

FIGURE 21. SELECTION OF SALTWATER SHORELINE PLANTS

1 Arrowgrass New shoots for food.

2 Basket Sweetgrass Leaves used for basketry.

3 Bullwhip Kelp Fronds for food, and for collecting herring eggs; Stalked used for food, rope, nets; Fruiting bulb used for storing liquids.

4 Dulses Fronds used for food.

5 Eelgrass Leaves for food and to collect herring eggs; Roots for food.

6 Fucus Fronds used for food; Fruiting bulbs used for medicine, cleansing.

7 Laver Fronds for food and medicine.

8 Pacific Silverweed Roots for food.

9 Pickleweed Stems, fronds for food.

10 Perrenial Kelp Fronds for food.

11 Sea Lettuce Fronds for food.

12 Sea Palm Fronds for food and medicine.

13 Seashore Lupine Roots for food.

14 Sea Spatula Fronds for food.

15 Springbank Clover Roots for food.

16 Winged Kelp Fronds for food.

Site Selection

In consultation with the Director of Restoration at the Skagit River System Cooperative (SRSC), I selected a stretch of Similk Bay on the Reservation as a site model that could be adapted and replicated throughout Swinomish lands. Located just north of the Kukutali Preserve, this site is located in an existing shellfish harvesting area. This site was also selected based on its location away from the projected low-lying inundation zone that is identified in the Swinomish Climate Adaptation Action Plan to be impacted by the year 2100(SCAAP 2010, 28). See Figure 10.

In the research of ways to re-engage and strengthen shellfish harvesting that is both impacted in the present due to toxic contamination and vulnerable to increased impacts by climate change, I began looking into ancient shellfish aquaculture practices and how could re-adapted in the contemporary. In an interview with Skagit River System Cooperative employee and shellfish biologist Courtney Greiner, we spoke about the work that she is engaged with for the Swinomish Tribe. Her research interests pertain to the composition of substrate and vegetation and mitigation strategies for shellfish in the midst of climate change impacts. She recommended the work of Amy Groesbeck, a marine ecologist who studies clam gardens in the region. In conveying my research and project interests on the Swinomish Reservation, she referenced Lone Tree Point, an area of shoreline along Similk Bay that is a special area for shellfish harvesting and provides the best clam habitat and substrate for a proposed clam garden. A clam garden is an intertidal rock-walled terrace constructed by humans during the late Holoscene (Groesbeck 2014). These constructions are known to improve growing conditions for clams by altering slopes through of soft sediment beaches and the creation of rocky terraces thereby expanding optimal intertidal clam habitat (Ibid.).

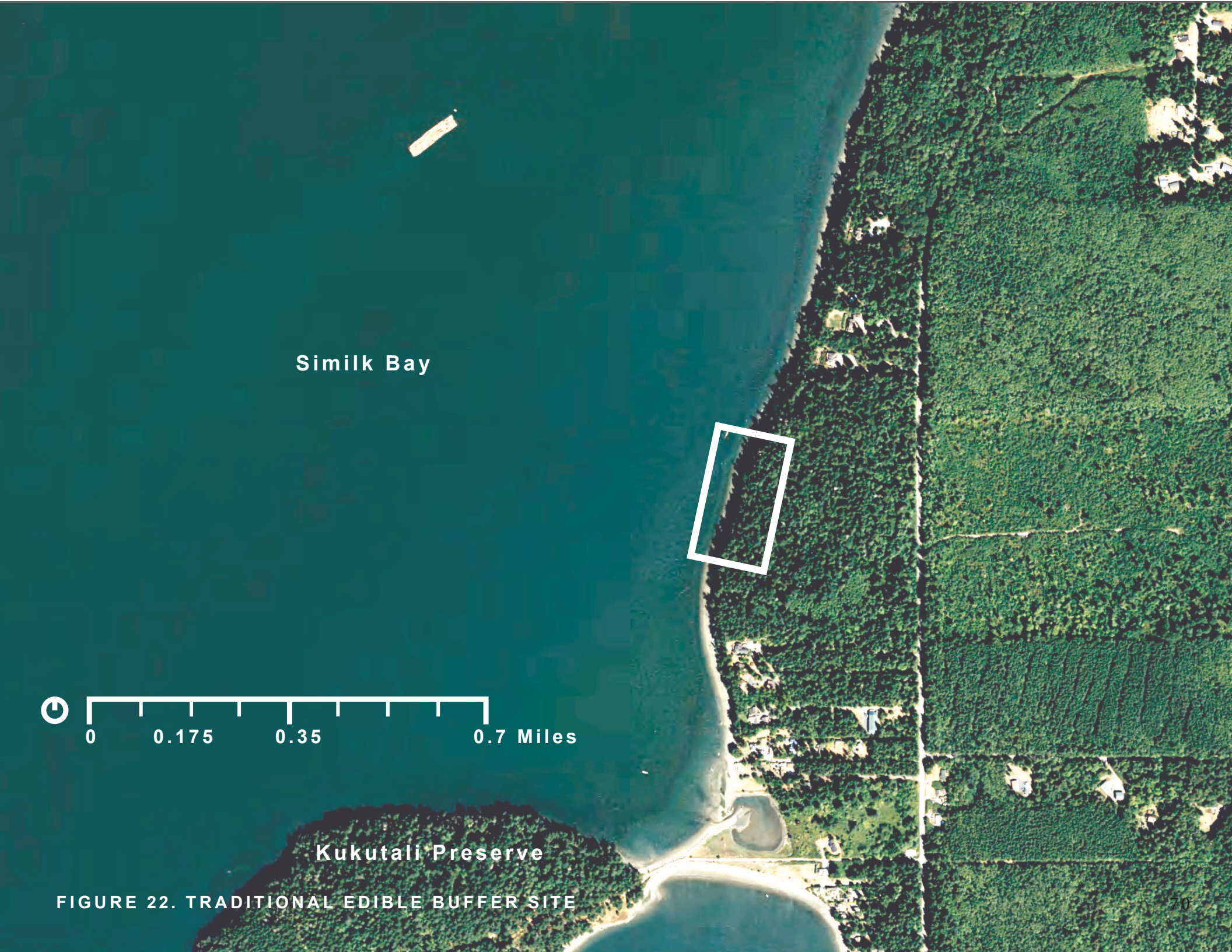


FIGURE 22. TRADITIONAL EDIBLE BUFFER SITE

Site Selection

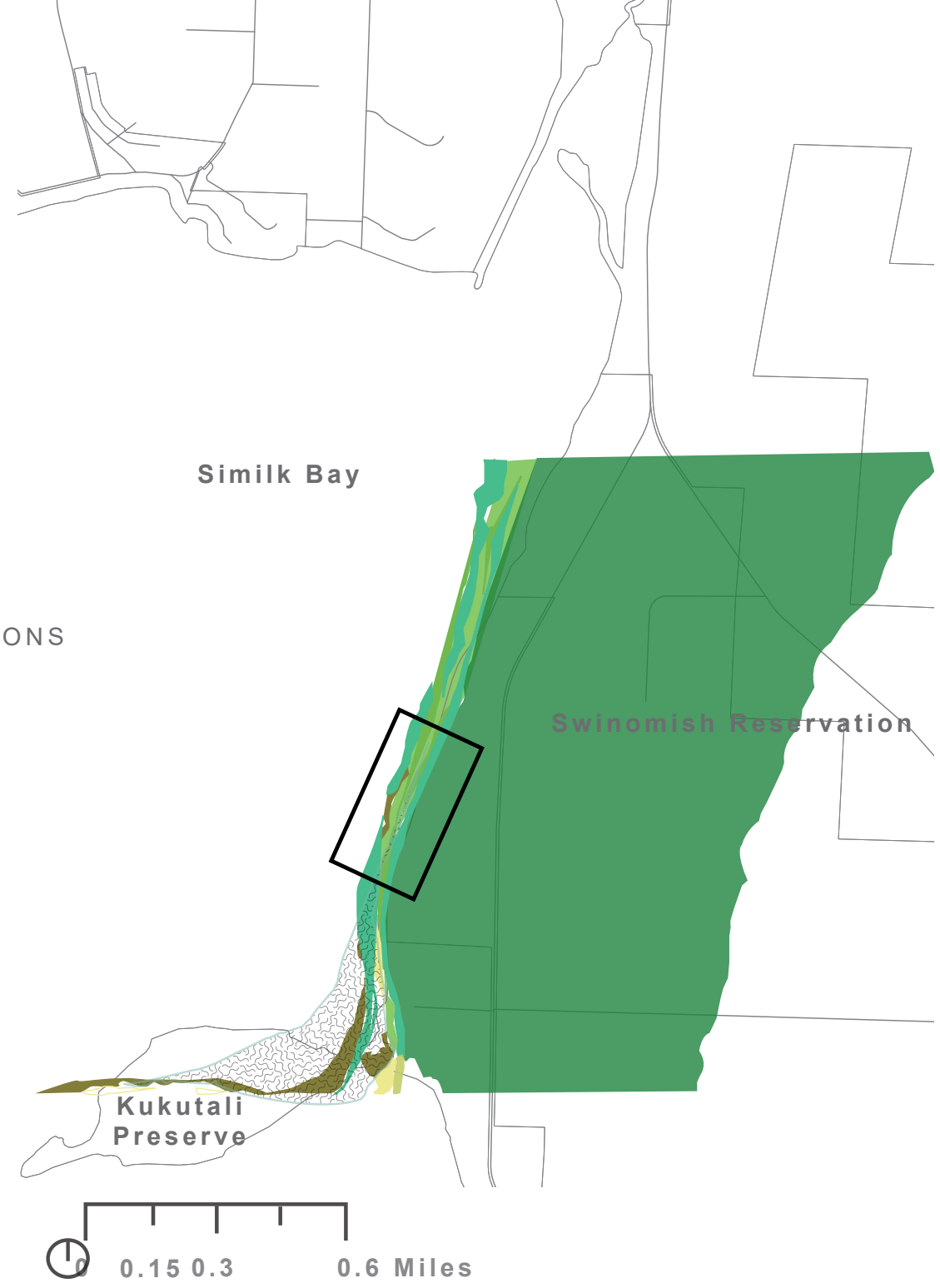


FIGURE 23. SUBSTRATE AND SOIL CONDITIONS

LEGEND

- Organic material
- Mixed course
- Mixed fine
- Gravel
- Sand
- Mud
- Mixed Algae
- Marine tidelands

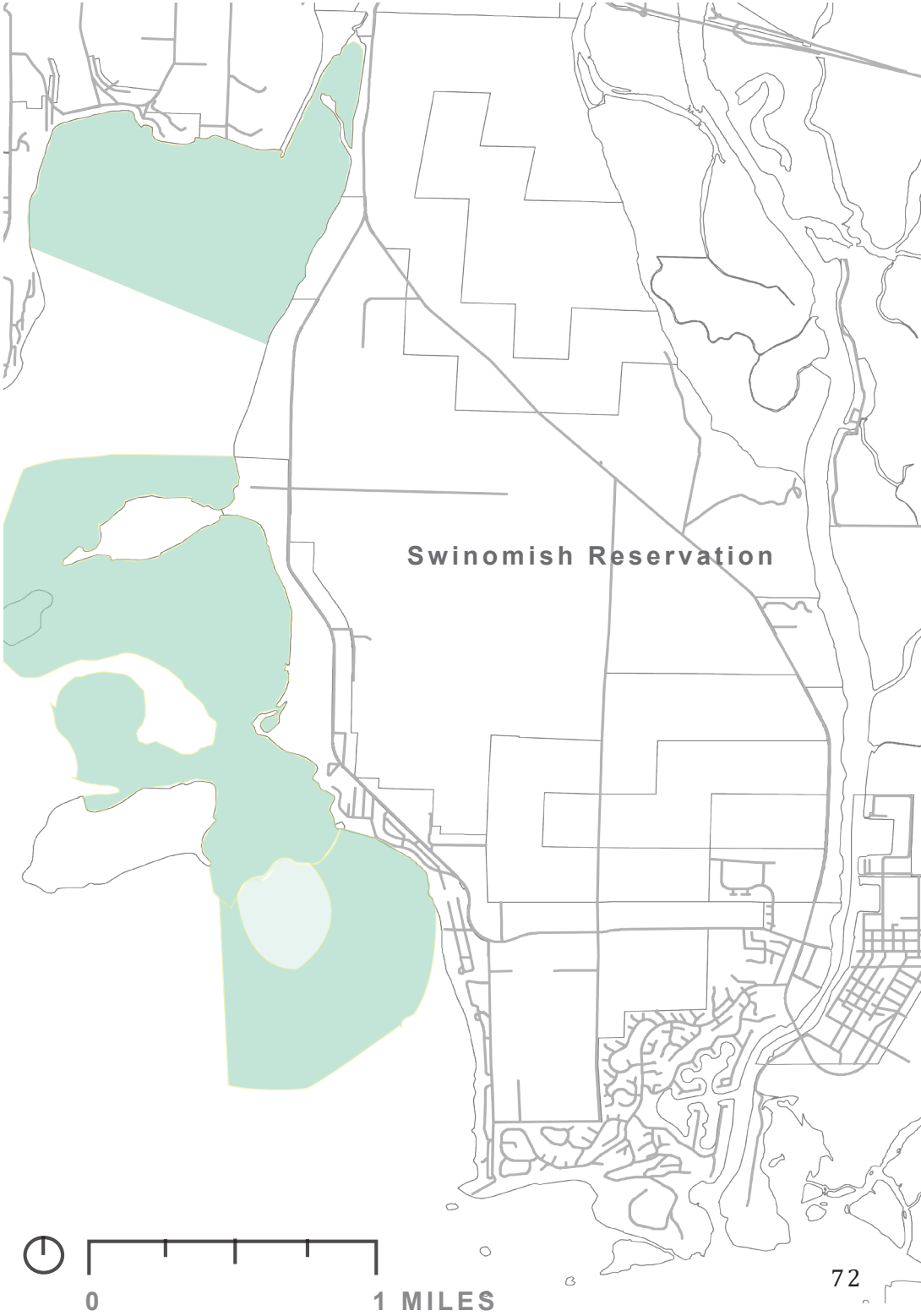


FIGURE 24. SHELLFISH HARVESTING AREAS OF RESERVATION

LEGEND

Shellfish harvesting zone

Clam Garden Proposal

According to recent studies, the terraced substrate for clam gardens can improve clam yields by four times over non-walled beaches (Groesbeck 2014). These human-engineered terraces have been recorded from Alaska to British Columbia to Washington State (Ibid.). They exist at mouths and along edges of embayments and vary in size (Ibid.).The two primary clam species that have served as the subsistence species in the terraces are L. staminea and Saxidomus giganteus and thrive in tidal heights of .9 -1.5 meters. (Ibid.).

In areas where the clam gardens have been studied, immense shell middens have been found, which suggests to researchers that has been a productive food source for at least 5,000 years. This provides great insight to how ancient shellfish aquaculture practices in the Coast Salish territory has supported food security from generation to generation. Further, understanding these strategies may help to provide adaptation efforts and management today.

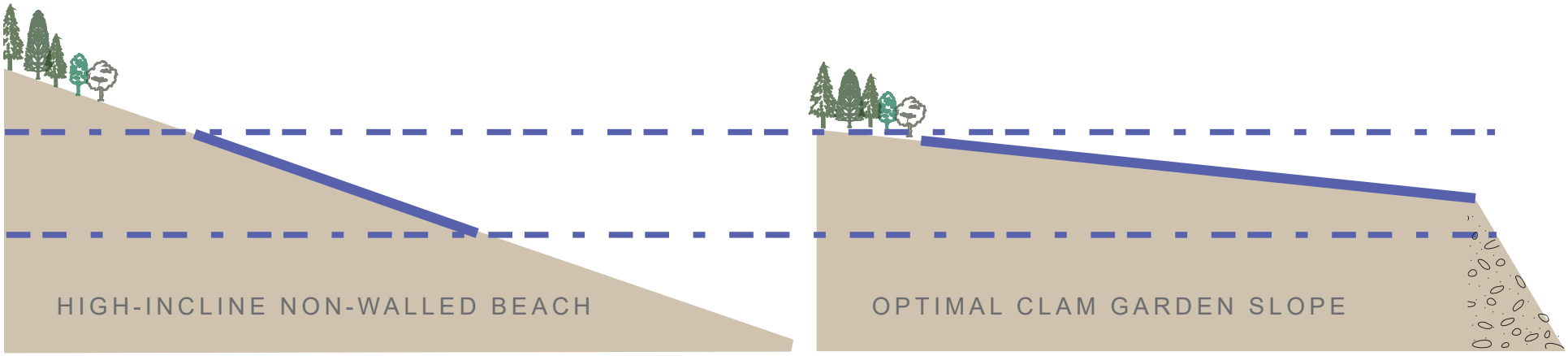


FIGURE 25. CLAM GARDEN DIAGRAM

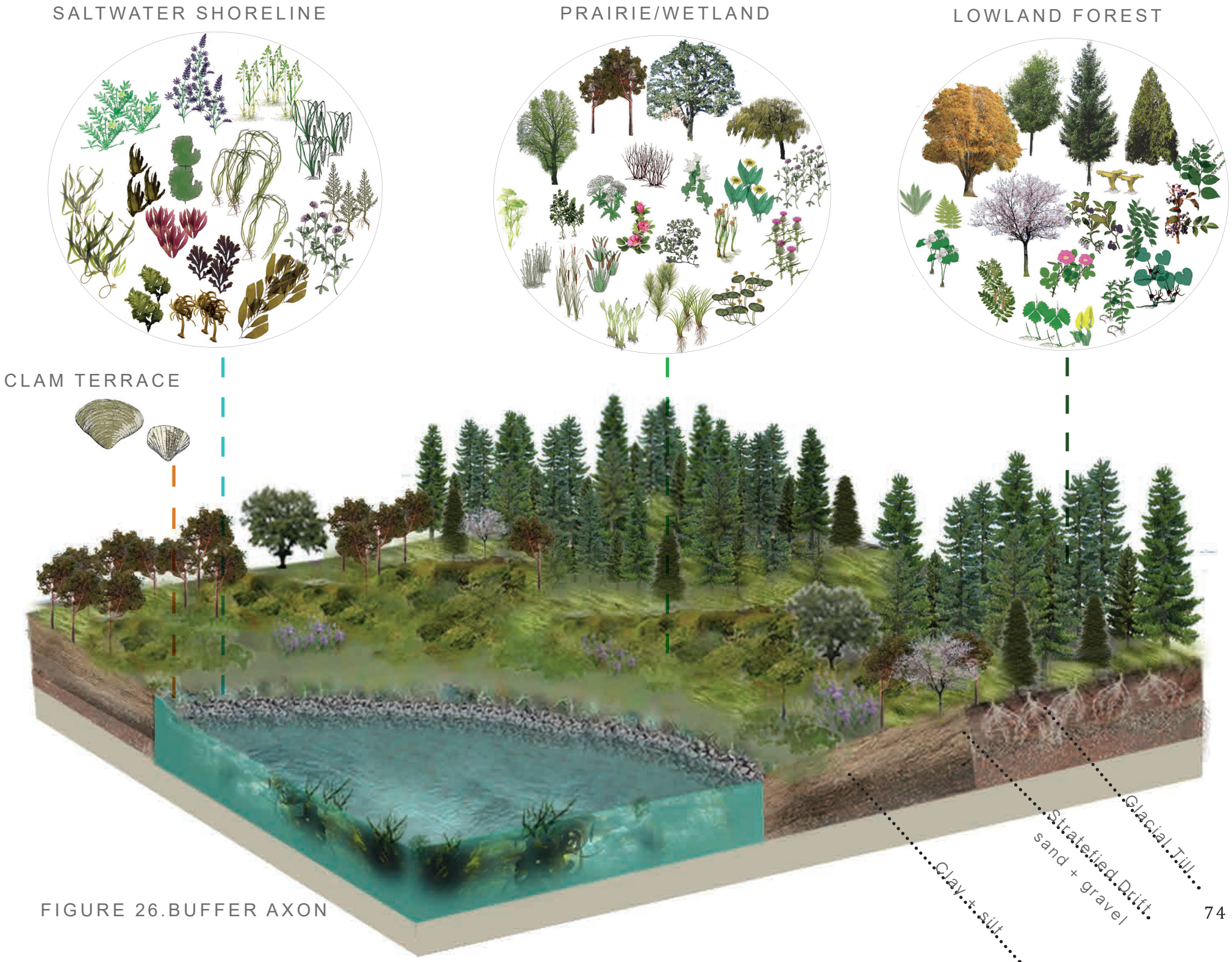


FIGURE 26.BUFFER AXON

YEAR 1

Autumn

MHHW Tide: 10.4ft

Saltwater Shoreline

Wetland/Prairie

Lowland Forest

FIGURE 27. CROSS SECTION OF BUFFER AUTUMN GROWTH

YEAR 5

Late Winter -
Early Spring

MHHW Tide: 9.8ft

FIGURE 28. CROSS SECTION OF BUFFER WINTER + SPRING GROWTH

YEAR 10

Late Spring - Summer

MHHW Tide: 7.66ft.

FIGURE 28. CROSS SECTION OF BUFFER SPRING + SUMMER GROWTH

FIGURE 30. VIGNETTE OF CLAM GARDEN COMMUNITY HARVESTING

The concept of Traditional Edible Buffer implies the notion of community and individual nourishment but it does not stop there. It is a physical manifestation of native food agriculture as a 'buffer' against dietary health issues in the present as well as a sociocultural construct that insulates a community from adversity. "Traditional" refers to the social and cultural aspect of the concept and alludes to what is the essence of traditional foods consumed by Indigenous peoples, which are also known as 'first foods'. "Edible" underscores the fundamental necessity of a community to be able to feed itself, which can be addressed through growing and harvesting their own food. "Buffer" is interpreted here as both a physical entity as well as a socio-cultural one as well. It is defined by Merriam Webster (2016) as "something that serves as a protective barrier; as buffer state; as a person who shields another; as mediator". Put succinctly, Traditional Edible Buffer directly links to the concept of community resilience. Each word carries forth its individual meaning and taken as a whole is a defense mechanism against present-day food related diseases like diabetes and a cultural strategy rooted in tradition and science to combat projected impacts on the landscape from local climate change.

In the process of analyzing what Traditional Edible Buffer means to generate resilience, The Swinomish Tribal Community is the living body that experiences circumstances that are constantly in flux. The circumstances can necessitate expansion or retreat. Expansion in the context of climate shifts suggests the ability to 'recover' or withstand impacts from a phenomenon that encompass cultural, physical and social consequences. Retreat implies the act of becoming smaller under pressure. The ability of a community to respond to environmental change in a manner that enables growth rather than regression is central in both conceptualizing and achieving resilience. Traditional foods like shellfish serve as a cultural and physical indicator species for food sovereignty and resilience within Coast Salish culture.

FIGURE 31. VIGNETTE OF COMMUNITY BUFFER HARVESTING

DISCUSSION

The Traditional Edible Buffer is a physical manifestation of growing traditional foods at a community-scale helps to address existing public health challenges concerning diabetes and high mortality rates. The Buffer addresses the lack in accessibility of local and organic fruits and vegetables by proposing to grow them on site at the Swinomish Reservation at Similk Bay. It also addresses the cultural and spiritual need of Indigenous peoples to be reconnected with traditional or 'first foods', which includes shellfish for the Swinomish Tribal Community.

The Buffer containing native plants and a clam garden is a response to the rapid changes that occurred to the Skagit landscape in less than a century. It enables the Reservation landscape to support the concept of Indigenous community health as containing physical, social, emotional, cultural and environmental well being. The landscape is a source of life and resource for human and non-human organisms. Through the Buffer's location on Similk Bay, it is celebrating the Swinomish's relationship to their sense of place over the course of thousands of years. Additionally, it is beginning to recall the "ancestral origin, genesis and creation of features in the regional landscape" that has existed through the course of time (Choy et al. 2005, 4).

The Buffer reintroduces the notion of natural boundaries that is associated with Indigenous peoples' connection to the landscape. These natural boundaries are bridged together by cultural practices, customs, relationships that share a common value to further reconnect with a sense of belonging and a sense of place. Similar to the notion of boundaries, understanding the Buffer landscape as a pathway enables the Swinomish to navigate through and utilize the site. It provides community members the opportunity to reconnect with harvesting traditional foods in a functional way. It provides a space that is culturally important and allows opportunities for other cultural practices. Equally important, the space alludes to a vital component of landscape as a place that contains biodiversity. The reintroduction and reconnection with native plant species and shellfish because of the rooted relationship they have had with the flora and fauna that is associated with the landscape they inhabit.

The Traditional Edible Buffer also serves to address local climate change in mitigating its impacts through ensuring food sovereignty and food security. Ensuring these two rights is embedded in the concept of the Buffer through the existing framework of Coast Salish traditional food principles. These eight principles focus on: food at the center of culture, honoring the food web, eating food that is according to the seasons, eating a variety of foods, acknowledging and celebrating traditional foods as whole foods, eating local foods, understanding that wild and organic foods are better for health, and cooking and eating with good intention. These principles are concerned with creating a benchmark for community health and wellbeing as they directly relate to access and sovereignty of cultural food resources.

Further, the aim of the Buffer is to be able to reflect what Indigenous health and wellbeing truly is. The Indigenous Health Indicators formed by researchers Jamie Donatuto and colleagues in the Swinomish Tribal Community serve to better convey how health is being impacted by local climate change (Donatuto et al. 2014). The Buffer is also a response in beginning to address these indicators of Community Connection, Natural Resource Security, Cultural Use, Education, Self Determination and Well being. All are invaluable gauges with which to measure community health. They demonstrate how health is holistic and all-encompassing. Growing traditional foods that sustain community members is a reflection of community health.

The concept of the Buffer evolved over a course of steady investigation of the Swinomish Tribal Community and their leading efforts in their steps in the Climate Change Initiative. Understanding their groundbreaking role as the first Native American tribe in the United States to create a comprehensive assessment of climate change impacts on their community pointed me to learning more about why land is such a sacred component of Indigenous identity. Looking at case studies in other countries of climate change impacts on Indigenous peoples revealed the relationship of landscape as being tied to health and well-being. Direct impacts from climate change on natural resources have a direct consequence to Indigenous peoples' wellbeing. This learning process provided me with the query of how landscape interventions may soften or "buffer" the impacts that may occur on the landscape itself as well as the people who are among the community being impacted. Over time, the intervention would mitigate some of the impacts thereby creating local resilience for the community.

Exploring how integral traditional foods are to the Coast Salish people In addition to the research of the theoretical apparati engaged to understand the value of local and traditional systems of knowledge, as well as of the environmental history of the Skagit Valley, projected impacts from climate change and the role of traditional foods in Coast Salish culture provided me

Another impetus for this research has been to expand the dialogue within the field of landscape architecture for other design students who are interested in design thinking and problem solving for climate change at the community scale. Further, the intention is to also provide some insight into my process as a design student in studying this community and lessons learned.

Natural boundaries that helped to define identities of the Coast Salish people in the Skagit valley have undergone massive changes since early Euro-American settlement resulting in subsequent impacts on culture. As local climate change has made into its way into the greater consciousness of the Swinomish Tribal Community through extreme weather events and an overall changing ecology, the defined boundaries following the Point Elliott Treaty are being tested. As a portion of the Swinomish Reservation is projected to be impacted by rising sea level and storm surges, the boundaries of this community will be further altered. There are sure to be long lasting impacts beyond those on the natural environment, including cultural and social impacts that affect community well-being. The Traditional Edible Buffer explores how it may help to bridge existing boundaries and thus Indigenous identity. The Buffer aims to reintroduce the meaning of natural boundaries in the landscape and the non-human organisms living within it. Like many other efforts taking place within tribes in the region in reconnecting with traditional foods, the Buffer seeks to reacquaint the Swinomish Tribal Community with these cultural resources on a community scale. Equally important in this exploration of the Traditional Edible Buffer is discovering how acquiring these traditional foods may reassert original boundaries through enabling the attainment of these plants and aquatic resources that were historically a part of the Swinomish landscape.

35 ARRIVAL AT SWINOMISH LANDING FOR CANOE JOURNEY

CONCLUSION

Throughout my time as a graduate student in landscape architecture, I have focused my studies on examining how communities and cities may be impacted by climate change and ways to plan and redesign the built environment to mitigate and perhaps, in some cases, adapt to these impacts. Studying the Swinomish Tribal Community and their response to the localized impacts of climate change has been profoundly inspiring. As a part of a larger identity of the Coast Salish people, the Swinomish Tribal Community have demonstrated their resourcefulness both on land and on water. Learning about their abilities to use the natural resources in multi-purposeful ways has illustrated a profound resilience. Though they have experienced cultural, social and physical adversity, they are a proactive community who seek solutions for defined and undefined challenges. While public health disparities continue to be a challenge for Native American communities, the ability to integrate practices that encourage Indigenous people's holistic view of health provides a deeper understanding in the context of adapting to local changes brought on by climate shifts.

Leading by example, the Swinomish provide a unique case study on how a Native American community is taking a proactive and unified stance in protecting their landscape. Their Climate Change Initiative has created a model not just for other Native American tribes but one that municipalities and regions can emulate. As more and more communities, both globally and locally, are forced to reckon with the realities of a shifting climate and the consequences on human health, leadership is as valuable as ever. As the story of the Swinomish carries forward, it will continue to inspire and bring courage to communities who will experience similar adversity with climate change. They are helping to greatly expand the dialogue on planning for resilience in uncertainty. Further, they are contributing to an emerging discourse on how Indigenous peoples' values can be incorporated into regional land planning efforts as well as how their interests can be best integrated in climate change planning.

Sharing the story of the Swinomish people to help create a more focused discussion within the field of landscape architecture in relearning the concept of landscape to Indigenous peoples is another main objective of this research. Learning and connecting with the notions of how Native Americans understand the land(scape) is invaluable to a profession that acts as the intermediary of communities, the human experience and the built environment. As practitioners who are trained in an array of disciplines and trained to think multi-scalar and multi-systems, it is incumbent on landscape architects to understand how Indigenous and traditional knowledge systems can be incorporated into practice. Understanding that diversity in landscape creates diversity in knowledge is critical. Creating this awareness and comprehension is a skill that all people can benefit from and a commonality between ecological designers and Indigenous peoples. Integrating this shared learning and understanding can also benefit educational institutions who are training in all disciplines thereby creating greater diversity in knowledge.

MOUTH OF THE SKAGIT RIVER

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