# Restoring Coast Salish Foods and Landscapes:
# A More-than-Human Politics of Place, History and Becoming

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**Abstract**

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This dissertation seeks to develop an ethics of place through a study of people-plant relations in Puget Sound Coast Salish territory. The study follows the evolving relationship between Puget Sound Coast Salish people, swədáʔχ, or mountain huckleberry (*Vaccinium membranaceum*) and the places where it grows, from time immemorial to the present. In doing so, I show how placing a single plant at the center of inquiry illuminates a profoundly deep time co-evolutionary relationship with place of Coast Salish people, as well as ongoing struggles to maintain those relationships within the contemporary social and political-economic milieu.

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*For Grandpa Roy.*

## PROLOGUE

I am looking at a photograph of my mother picking huckleberries at Bone Lake in August of 2007. The sky is grey and the bright green leaves are just beginning to turn red. The bushes are heavy with fruit. Mom is holding a quart sized plastic container in her left hand, transferring a berry from bush to bucket with her right. She is standing, a bit hunched over, absorbed in her activity. The huckleberries invite her in. In her 70s now, mom is retired. Now that she has more time on her hands, she likes to spend that time with us, her family. Knowing we lead busy lives; she finds ways to connect through participating in the flow of them.

Bone Lake first captured me in another photo, one that Muckleshoot historian Warren King George had shared during a meeting with the Forest Service early that year. It is time-stamped July 24, 2003 and was taken at the top of the Divide Ridge, or čqalitc as the Muckleshoot people call it,[1] not far from where my mother had been standing. In the foreground there is a field of huckleberries, the middle ground slopes down to a deep green meadow in the vicinity of the "lake," named for the fact that it is bone dry in the summer. Forests of noble and silver fir, white pine and yellow cedar dominate the distance. In the upper right hand corner is the edge of a clear cut. There is an open stand of young conifers bisecting the upper huckleberry and lower grassy meadows. Younger saplings dot the huckleberry meadow in the foreground.

Warren had shared the photo at the meeting to propose Bone Lake as one possible site amongst others to work collaboratively with the Forest Service on a huckleberry "enhancement" project. He explained to us that Bone Lake was an important node in a network of gathering sites with a deep history. Muckleshoot ancestors had burned places like Bone Lake to encourage

[1] Thank you to Warren KingGeorge for sharing this place name with me.

berries and wildlife alike. John Newhauken had started a fire there sometime in the 1920s; the last time it had been intentionally burned. It was my interest in the history of Indigenous burning that brought my mother and me to Bone Lake four years after Warren had taken his photo. Coast Salish practices of cultivation, including intentional burning, were common and widespread in the past. But colonial processes have mostly obscured, if not obliterated those practices and the landscapes they nourished. In Warren's photo, Bone Lake appeared to me as an Indigenous landscape that had endured.

My committee chair, Steve Harrell, had helped me find my way to Bone Lake less than a month before the trip my mother and I had taken. He, his wife Barbara and I had started at Lost Springs, another node in the network where archaeology affirms an ongoing Indigenous history of use spanning at least twenty-five hundred years. Following the faint trail along čqalitc until we came to an open huckleberry meadow, we continued to walk until we found the exact spot where Warren had taken his photo.

When you are actually there, you see that the small clear cut in the photo only hints at the extent to which the forest that stretches before you into the distance is a "working landscape." Swaths of clear-cut forest on both sides of the Green River watershed reveal the Euclidean geometry of township-section-range and the economic logics it facilitates. It is a "checkerboard" landscape of private- and publicly owned property. The Forest Service owns the section that Bone Lake falls within. It is situated on the very edge of the Mt. Baker-Snoqualmie National Forest. This is not a landscape that lovers of "wilderness" would seek out, as the occasional "trip report" left by hikers travelling along čqalitc attest:

"The intermediate view point at the end of second spur road, in the clear-cut area, has been marred by another abandon [sic] truck."

"This alternate approach here has to cross ugly clear-cuts and does not have exciting vistas."

“This summit dose [sic] not appear to get many visitors anymore.”

Like urban wilds deemed “not pure enough to be true and not human enough to be political” (Hinchliffe, Kearnes, and Whatmore 2003:645), this place is unlikely to find a constituency in those who seek an outdoor aesthetic seemingly “untrammelled by man.”

For a time, my mother was an avid hiker. In her desire to spend more time in the woods, she acquainted herself with various hiking clubs. She would comment about the condition of the hikers (most her own age) and their tendency to move through the landscape as rapidly as possible. At Bone Lake, if such a hiker paused for a moment to look down rather than out, they would notice that the huckleberries were abundant. If they were to take a closer look, they might also notice that the ground is littered with bits of charcoal.

1868 was one of the driest years in recorded history on the central Northwest Coast, with extensive fires burning from Oregon to Bellingham and British Columbia. In his survey of merchantable timber of land that now comprises the Mt. Baker-Snoqualmie National Forest, United States Geological Survey geographer Fred Plummer noted in 1902 that a huge fire had burnt “about thirty-five years ago,” from the bottomlands of the Green River over the ridge and down to those of the White – from Hot Springs on the Green River to Greenwater on the White (Plummer 1902; Plummer, Plummer, and Rankine 1902). Although forest regeneration in higher elevations can be incredibly slow, much of the forest along čqalitc had recovered quickly from this fire. So quickly that in the words of Mt. Baker-Snoqualmie vegetation program manager Dave Kendrick, these forests were logged “early and often.”

Yet if one follows a line of inquiry from the source of that charcoal to what happened after it came to rest in the soil at Bone Lake, you will not find evidence of logging. What is left of the tops of the widely spaced, decaying stumps is jagged – signs that these trees died and then at some point broke off near the base. None of these old rotting stumps exhibit the flat plane of a saw cut log.

"What happened/is happening here?" These are questions that kept me coming back to Bone Lake for years. In 2009 I initiated an ecological-historical study intended to illuminate processes of anthropogenic burning, and to understand what the effects of disturbance suppression might be on the huckleberry's (and other plants') flourishing there. Becoming-ecologist, I got my "eco-legs" by setting up and monitoring thirty-two plots across the approximately eighty-acres that comprise the study area at Bone Lake. For four years in a row, I collected data. I counted the berries in my plots, characterizing each plot by canopy cover, slope, aspect, etc., I made lists of all the plants that grew in each plot, collecting voucher specimens of each species. Becoming-historian, I asked Muckleshoot tribal members and "locals" to share with me what they knew about this place. I pored through the archives for scraps of evidence – maps, field notes, ethnography and local history.

Colonialism proceeds through practices of making things legible over time and space in the language of the colonizer via a repertoire of shared "inscriptions" (statistics, diagrams, log books, Mercator projections, etc.). These inscriptions have three important characteristics – they are a form of distributed cognition, they are mobile, and they "allow translation without corruption" (Latour 1986:7). The latter two characteristics in combination make the artifacts of these practices what Latour refers to as "immutable mobiles." Immutable mobiles and their production both legitimize and facilitate the stabilization of colonial systems of domination. It is not only through making things visible; the legibility machine also and simultaneously facilitates colonialism by rendering other things invisible. Terra nullius is a concept that was constructed with the aid of immutable mobiles. However, there is nothing inherently oppressive about them. This is what "counter-mapping" is for. If we can change our understandings of the past by making the invisible visible, perhaps we can also change our present, and our future as well.

To Indigenous people huckleberries are a sacred food, a first food, a traditional food, and a key relation in the exercise of Indigenous food sovereignty. For years, Native communities in the west have expressed their concern about shrinking meadows due to lack of disturbance, loss of access due to privatization and the closure of roads, and the "desecration" of huckleberry meadows by commercial berry harvesters. What we might learn about how to care for these berries and the places where they grow was what initially drew me in to my research project at Bone Lake. Pragmatically, illuminating processes of anthropogenic burning as a form of "traditional ecological knowledge," or TEK that could perhaps be integrated in to public lands management practice was one goal. Another was to provide empirical "proof" that before Euro-American colonialism, Coast Salish ancestors had their own forms of what we might now call resource management, which included the cultivation of important plant resources like big huckleberry.

These are the kinds of things I explained to my mother the day I snapped her photo at Bone Lake. She listened to me intently as she picked the berries. At one point, without pausing from her task she asked, "If this place is so important to the Muckleshoot people, why are we the only ones here?"  What a succulent question! Predictably, "it's complicated, mom," was the only answer I could give her at the time.

Post-colonialism teaches us that the violence of the past continues to manifest itself in the present. Settler colonial studies examine the ways in which colonial violence itself is an ongoing practice in the present. Nevan McCullough served as the district ranger for the White River Ranger District from 1928 to 1959. In 1970, he completed his manuscript – *Interpretive Study of the White River Drainage*. McCullough's narrative contains one sort of answer to my mother's question:

> Huckleberry Mountain has always been a popular place for gathering berries. As the Indians adjusted to the white man's ways and acquired more of their food in the supermarkets, the big huckleberry picking junkets gradually decreased. The white man, though, more than filled the void in the huckleberry patch. Many local families planned annual vacations there for recreation as well as the berries (McCullough 1970:38).

When it comes to the "Indians," McCullough imagines them on an inexorable one-way trip to modernity. As if a trip to the huckleberry meadows could ever be replaced by a trip to the grocery store. As if a cultivated blueberry could ever nourish the body and spirit the way a recalcitrant huckleberry can. The "white man," however, reserves the power to perform both modernity and primitivism. The "white man" has the power to travel back and forth through time. And here were my mother and I, filling the "void" in the huckleberry patch.

# Chapter 1

## THE RELEVANCE OF THE HUCKLEBERRY

This dissertation seeks to develop an ethics of place grounded in people-plant-place relations. My key question is this: how do we flourish together and well, in this post-colonial[2] landscape that is our home? To address this question, my central focus is on the pragmatics and politics of Puget Sound Coast Salish food sovereignty and natural resource "management" of mountain huckleberry (*Vaccinium membranaceum*) and the places where it grows over time. Working with Puget Sound Coast Salish people on issues related to cross-cultural collaboration and access to traditional plant foods on public lands, I show how attention to the effects of multiple, shifting, and contested entanglements with other kinds of "living selves" (Kohn 2007:4) brings in to sharper focus the inter-related issues of colonial legacies, Indigenous-state relations, and the well-being of environments and people.

Over the past twenty years, adult onset ("type-2") diabetes has increased by forty-five percent in the US population overall (Busko 2013). Adult onset diabetes disproportionately affects people who identify as American Indian and Alaska Native (AIAN). Consider this: an (AIAN) adult living in the United States today is two and a half times as likely as a non-Hispanic white (NHW) adult to be diagnosed with diabetes.[3] AIAN youth between the ages of ten and nineteen are nine times more likely to be diagnosed with diabetes than NHW youth.[4] Insulin resistance leads to blood sugar fluctuation, which places a heavy burden on the cardiovascular

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[2] I recognize that some readers will disagree with my use of the term "post-colonial" to refer to a still colonized landscape. I find the term useful as conceptualized in post-colonial studies that highlight the ongoing effects of historical events as well as contemporary colonial practices – particularly settler colonialism.

[3] Diabetes and American Indians and Alaska Natives (http://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=33).

[4] IHS Fact Sheet (http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Resources/FactSheets/2012/Fact_sheet_AIAN_508c.pdf).

system, increasing the risk of stroke, heart attack, peripheral artery disease, and damage to smaller blood vessels in the eyes, nerves and kidneys.[5] AIAN's are more likely to experience complications arising from adult onset diabetes than NHW's; they are two to four times more likely to experience renal disease and kidney failure.[6] The risk of cardiovascular disease is as much as eight times higher for AIAN adults who have diabetes than those who do not.[7] AIAN women are twice as likely as NHW's to die from diabetes.[8] In Native American community settings where I have worked, type-2 diabetes is often described as the most recent in a long line of epidemics that have preferentially colonized Native bodies.

When describing the importance of a diet based on traditional foods to the physical wellbeing of contemporary Coast Salish people, it is common for community members to talk about the exceptionally vibrant health and longevity of their ancestors. It was not unusual for people to live to be one hundred years old, they will say. The elders say that huckleberry consumption is quite likely the reason (Krohn and Segrest 2010).

Although disease was not unheard of prior to Euro-American colonization, people were basically healthy and famine was rare (R. T. Boyd 1999; S. Snyder 1965). But these are not only "pre-treaty" ancestors people are talking about; they are also the parents, grandparents, and great-grandparents of Coast Salish people who are living today.

While they certainly varied over time and space, a general model of Coast Salish traditional diets is one that is diverse, changes with the seasons, is high in protein, healthy fats, berries, greens, and complex carbohydrates, and is low in sugar. Fresh and dried berries of all

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[5] Type 2 diabetes: overview (http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0072693/)
[6] IHS Fact Sheet
[7] ibid.
[8] Diabetes and American Indians and Alaska Natives

kinds provided important nutrients, particularly antioxidants and Vitamin C, as well as a little sweetness throughout the year. Traditional foods activists Elise Krohn and Valerie Segrest say that big huckleberry and other *Vacciniums* are one of the few fruits that do not raise blood sugar, and are rich in flavonoids, making them a perfect food for people with diabetes (Krohn and Segrest 2010). Even the leaves can be made into a tea that promotes healthy regulation of blood sugar (ibid.).

Type-2 diabetes is increasingly recognized as an inflammatory disease (Hildreth 2008; Paddock 2014; Spranger et al. 2003; Wellen and Hotamisligil 2005). Inflammation in the body inhibits the capacity of insulin to initiate the “downstream” signaling events that make red blood cells receptive to glucose (Wellen and Hotamisligil 2005). Cytokines - pro-inflammatory proteins - also help destroy insulin-producing beta cells in the pancreas (Paddock 2014). *Vaccinium* species are high in anthocyanins and flavones (Su 2012), phenolic compounds that are directly associated with a reduction in insulin resistance and inflammation in women (Jennings et al. 2014).

The harvest, preparation and consumption of traditional foods also feeds the spirit. As the late tribal elder Hank Gobin used to say, for Native people, it is important to feed your Indian: “If you get sick, eat your traditional foods. You have to feed your Indian. Native foods feed your body, but they also feed your spirit” (Krohn & Segrest 2010:9). Hank’s statement points to the understanding that physical and spiritual sicknesses are interconnected.

Sickness of a spiritual nature can manifest as many symptoms in AIAN communities. Here are a few. AIAN people over the age of eighteen are one and a half times more likely to report feeling serious psychological distress, a sense of worthlessness, nervousness or restlessness all or most of the time.[9] In the US, violent deaths from unintentional injuries, homicide and suicide account for 75% of all deaths amongst AIAN youth between the ages of ten and twenty, as compared to 57% for NHW's.[10] AIAN women between the ages of fifteen and twenty-four are four times as likely to commit suicide as NHW women of the same age.[11] AIAN women are also admitted to prison at four times the rate of NHW females.[12] AIAN's comprise about 1.5% of the population in Washington State,[13] yet in 2010 they comprised thirty-percent of the prison population.[14]

A common refrain within the Northwest Indian College Traditional Plants Program, through which I met and became friends with Elise and Valerie, is that the culture is the medicine. Everyone in the community has their gifts; it is the work of the community to identify, support and foster those gifts. Plants and animals also carry spiritual gifts, and when Native people, particularly youth, become caretakers of the knowledge related to those gifts, it gives them a role and a sense of purpose in their communities (Krohn & Segrest 2010:9).

When a Native person of this place goes out to pick big huckleberry, they are both connecting with a deep time ancestral practice and creating new memories of place and connection. These experiences in themselves can be powerful medicine. In the past and in the present, it is women who take primary responsibility for the gathering of plants like big

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[9] Mental Health and American Indians/Alaska Natives (http://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=39)
[10] *ibid.,* Youth Mortality in the United States, 1935-2007: Large and persistent disparities in injury and violent deaths. http://www.hrsa.gov/healthit/images/mchb_youthmortality_pub.pdf
[11] Ibid.
[12] Created Equal: Racial and ethnic disparities in the US Criminal Justice System (http://www.nccdglobal.org/sites/default/files/publication_pdf/created-equal.pdf)
[13] American Fact Finder: US Census data [citation]
[14] Washington Incarceration Rates by Race/Ethnicity, 2010 (http://www.prisonpolicy.org/graphs/2010rates/WA.html).

huckleberry. Once I went huckleberry picking with a Muckleshoot woman in her late twenties who intended to give the berries she picked that day to her auntie. She was hoping that some day her aunt would gift her a basketry hat. She explained to me that the basketry hat is a visible symbol of female maturity, of having taken on the responsibility to care for one's community.

The statistics that I just described, and the reality that they are a symptom of should not be acceptable to anyone. As the descendent of Euro-American settlers to the Pacific Northwest, and as someone who is deeply attached to this place, I personally believe that settlers here carry responsibility for the ongoing affects of colonialism on contemporary Native people and communities. My own sense of responsibility comes from the recognition that the arrival of my ancestors, my own presence, and the presence of my children owe a deep debt of gratitude to the first people of this place. It also comes from a profound appreciation for tribal culture and, even despite the statistics that I have just described, the incredible resilience of the Native people and communities with whom I have spent time. It makes me want to help ensure that they heal and flourish now and into the future. It makes me want to help change these statistics for the better.

Plants have always been a way in to the life beyond my self. It is primarily at the sites where my relationship with plants has resonated with Native people and their allies that I have devoted my research. Sharing some of my work with people-plant relations (especially big huckleberry) in this dissertation, I hope to show that Native American cultural identity and wellbeing is grounded in and dependent upon deep time and ever-evolving relations with plants and place.

## Toward a more-than-human ethnoecology

Ethnoecology, particularly ethnobotany, is the academic field through which I was first introduced to the study of people-plant-place relations. Ethnoecology is a diverse and interdisciplinary field that studies the ways in which different people at different places and times have understood, valued, transformed and been transformed by the biota and landscapes of which they are a part. A primary goal in ethnoecology is to document, understand, and advocate for the preservation and value of traditional ecological knowledge (TEK). Fikret Berkes has articulated one of the most widely cited descriptions of TEK: "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes 2008:7). In part due to a larger argument for the protection of the ways of life that such deep connections to place require to flourish, ethnoecologists in particular have been on the front lines, so to speak, of advocating for the validity and veracity of TEK as complementary to Western science in the context of contemporary environmental challenges (Hunn 1999). Due in large part to this kind of advocacy (along with the Brundtland Report[15]), awareness of TEK, and calls for its integration within natural resources management circles has dramatically increased globally over the past three decades.

At the same time, ethnoecology in many ways can trace its history back to colonial roots. This is particularly true for ethnobotany, which most commonly focuses on studying TEK in the context of Indigenous flora. Ethnobotany, especially economic botany, is deeply rooted in histories of imperialism and colonialism (Crosby 2003; Grove 1995; Hunn 2007; Schiebinger 2004) as well as salvage ethnography (Deur and Turner 2005; Martinez 2010). Ethnobotanical work conducted in the present can be especially controversial with respect to intellectual

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[15] (World Commission on Environment and Development 1987)

property rights and the appropriation of Indigenous knowledge (Brown 2003; Hunn 2007; Mauro and Hardison 2000; Posey 2001). A more academic critique of ethnobotany is that with the exception of work on taxonomy (Berlin 1992; Hunn 1976), it lacks theoretical moorings (Bennett 2005; Davis 1995; Martin 2004).

The particular critique of ethnoecology that I aim to address in this dissertation is this: by valorizing a particular tradition of Western science in its own methodology, ethnoecology does not take “other ways of knowing” the non-human biogeosphere seriously enough, and therefore is not advocating for TEK to the fullest extent possible. Ethnoecological commitments to being a scientific discipline are a reflection both of the intellectual genealogies of ethnoecologists themselves, and also I believe of the desire to bolster the legitimacy of their own research in the eyes of other scientists. Thus the argument for TEK integration also focuses on its legitimacy as being scientific too – the methods by which Indigenous people acquire TEK are different but the elements of science are still there (i.e., TEK is “time-tested,” a “science of the concrete,” etc.). As one kind of potential “counter-mapping,” I think this approach is important and I use it myself throughout the dissertation, especially in chapters 3 and 4. But this kind of approach focuses entirely on epistemology and thus leaves unsettled the supremacy of empiricist Western scientific knowledge, and the often-damaging binary representations of reality it upholds.

Amongst other binaries, the foregrounding of cognitive anthropology in ethnoecology reinforces a mind-body dualism, as much of the research focus in ethnoecology has been grounded in idealism and the culturally mediated ideas in people’s heads. I discuss this in greater depth in chapter two, but what is important to emphasize now is that the separation of thought from matter is untenable in most, if not all, Indigenous knowledge systems (Tallbear 2011). This includes matter that comprises a given body and that which lies beyond it. Animism teaches us the inseparability of mind from matter, which is an ontological, not an epistemological difference between Indigenous TEK and dominant forms of Western science.

What interests me most about the field of ethnoecology in this dissertation is what a decolonial ethnobotany might look like. I do not think that binaries are inherently unethical. They can be heuristically useful. As I discuss in chapter two, the recognition of difference is generative and a primary driver of life itself as a sign process. But recourse to binary thinking is not the last word on ontology; rather it is one amongst many options for understanding (and changing) the contours of reality in a “pluriverse” (Latour 2004). We are all bricoleurs now in this hyperlinked biogeosphere, and must choose the best tools at hand to build the world we envision. What might the world be like if in our research and perhaps even our daily lives, we behaved “as if” the biogeosphere were animate and aware? What if ethnoecology focused not just on what humans think about non-human selves, but instead proceeded from the standpoint that other selves think? (Kohn 2013:7). Would the lifeworlds inhabiting the planet flourish more?

As beings with the capacity to “teach us how to live,” plants are understood as active participants in the meshwork of social relations constituting historic Coast Salish food systems. Ensuring access to, and the continued well-being of plants often involves negotiation with land management agencies whose epistemological groundings fail to recognize plant subjectivities. While TEK is increasingly recognized and occasionally valorized within the realm of natural resources management discourse and thought, plant and animal subjectivity is typically relegated to the realm of cultural belief, as opposed to an empirically grounded understanding of the nature of more-than-human forms of life (Nadasdy 2003). This (mis)understanding can in part be traced back to (mis)representations of animism in the literature on TEK, with potentially negative consequences for Coast Salish people-plant relations and aspirations for food sovereignty.

What I strive for in this dissertation then is the articulation of a process-relational ethnobotany – a "more than human" ethnoecology of what Timothy Morton refers to as "the mesh" (Morton 2010:28). My approach to this project is inspired by a burgeoning of theoretical and methodological approaches that not only seek better ways to account for relations between the human and the living and non-living "other than human." Most importantly, I am interested in those approaches that explore ways of becoming in the world that do both "'them' and 'us' more justice" (Hinchliffe et al 2003:645).

The "more than human" turn in cultural anthropology and human geography in particular is a response to the recognition that neither a strictly humanist nor a strictly naturalist analytical frame is adequate to understand and address the complex socio-ecological problems we face in the present (Bennett 2010; Latour 2004; Grusin 2015; Whatmore 2006). Shared concerns over serious ecological problems such as climate change and the accelerated loss of species attributed to human activity ("the sixth great extinction"), are opening spaces for cross-cultural dialogue across disciplines, social groups, and species, as exemplified for example, in Deborah Bird Rose's call for writing that tends to the anthropocene and the "situated connectivities that bind us into multi-species communities" (Bird-Rose qtd. in Kirksey and Helmreich 2010:549). What I want to assert in taking this tack is, among other things, that the theoretical strands that constitute a process-relational, "more than human" paradigm can be put to work in the active and practical pursuit of decolonization of people and the land.

Process-relational theories are multiple and comprised of many western and non-western strands, resonances and ruptures.[16] What they share in common is the non-separation of matter

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[16] See (Castree 2003; Ivakhiv 2010; Latour 2005; Whatmore 1997).

from thought, taking as a starting point the understanding that bodies and minds are one and the same, or "material-semiotic." The "mind" is not the possession of specific objects or subjects, but rather is part of the relational and ever-changing becoming of the world. Our becomings are predicated not on the agency of autonomous selves, but on the agency afforded to a particular self through its relations with other entities, which, taken together constitute "assemblages" (Deleuze and Guattari 2009) or "actor-networks" (Latour 2005) of varying spatial and temporal scales. A process-relational stance enables a shift in perspective from the 'interactions' between nature and culture to an understanding of 'inhabitation,' or the recognition that humans live in, not on, an animate earth (Hinchliffe et al 2003).

Deleuze's (1988) notion of 'relational ontology' combines this recognition that human and non-human bodies and things exist only as assemblages with a discussion of the role of affect in initiating, sustaining and dissolving them: "If you define bodies and thoughts as capacities for affecting and being affected, many things change. You will define an animal, or a human being, not by its form, its organs, its functions and not as a subject either; you will define it by the affects of which it is capable" (Deleuze 1988:124). Bruno Latour would describe this as being articulate:

> An articulate subject is someone who learns to be affected by others – not by itself. There is nothing especially interesting, deep, profound, worthwhile in a subject 'by itself', this is the limit of the common definition – a subject only becomes interesting, deep, profound, worthwhile when it resonates with others, is effected, moved, put into motion by new entities whose differences are registered in new and unexpected ways. Articulation does not mean the ability to talk with authority … but being affected by differences (Latour 2002:3).

It is the relations between all of the actors in an actor-network, constituted by the recognition of difference that enables the performance of agency. Actors and stable categories do not precede the creation of an actor-network or assemblage.

My approach to understanding the role of affect in the formation of human-huckleberry assemblages quite literally follows Deleuze and Guattari's recommendation to follow the wisdom of the plants: "Even when they have roots, there is always an outside where they form a rhizome with something else – with the wind, an animal, human beings…" (Deleuze & Guattari 2009:11). This opening salvo in *A Thousand Plateaus* is both an ontological claim and description of a method – a pragmatics that follows the "rhizomatic affinities" of the people-plant nexus. Whereas arborescent filiations are evolutionary and hierarchical, rhizomatic affinities are involutionary. Involution refers to "the 'rolling, curling, turning inwards' that brings distinct being together to invent new ways of life" (Hustak and Myers 2012:96). Thus, in many ways this dissertation concerns the hopeful possibility of articulation and alliance across processes and living selves, including between groups of humans.

How do plants affect us, and how do they insert themselves into (and transform) our lives? Deleuze and Guattari's ideas about rhizomatic affinities have been important to many multispecies ethnographers focusing on plants. Isabelle Stengers identifies such intextricable becomings as forms of "reciprocal capture" (Hustak & Myers 2012:97). Through a re-reading of Darwin's study of pollination and the work of plant "neurobiologists," Hustak & Myers focus on how humans change their own ways of being as they become deeply involved with the plants they study. Kay Lewis-Jones (Lewis-Jones 2015) and Ruth Mendum (Mendum 2009) consider how scientists enact an ethics of care in the contexts of conservation in the case of the former, and plant breeding in the case of the latter. Reflecting on the complex chemical ecology of ayahuasca, Luci Attala (Attala 2014) considers plants and their affects in the context of the consumption of psychotropic plants. Nancy Berrigan (Berrigan 2012) considers the dandelion as "companion species" and her reciprocal relations with this plant in her articulation of a hepatitis-C, blood, dandelion assemblage, while Noel et al. (Noel et al. 2014) focus on the decolonizing politics and intertwined relations between Pomo people, oak, and acorn. Noel et al take us into microbiopolitical work in which the politics are more than human, while through his writing of the life history of Joshua Hunt, William Maxwell articulates a cosmopolitics in which “berries and politics, oaks and identity, plums and recognition” fluidly combine (Maxwell 2015:4). Poe et al. (2014) describe struggles and negotiation for the legitimacy of urban foraging as a deeply meaningful way of engaging with urban natures beyond valuing them for their ecosystem services in the city of Seattle’s forests.

Unsettling persistently violent binaries is in itself an ethical act. There is a long tradition of critique of the reification of nature-culture dualisms (Cronon 1995; White 1995; White 1995; MacCormack and Strathern 1980). Process-relational thought is an invitation to deconstruct this and other commonplace binaries and potentially to “open up a field of radical heterogeneities” (Gibson-Graham 2011). However, as Gibson-Graham (and others) have suggested, deconstruction alone is insufficient. The imaginative work of multispecies, post-human, nonhuman, more-than-human, actor-network, and other process-relational approaches is also productive, opening a space to think creatively about how we “might more responsibly inhabit our complex socioecological worlds” (Braun 2002). The nature-culture binary is already being blown apart by present day environmental concerns. The ontological principles of interdependence, where the recognition of self and other as fluid boundary has the potential to give rise to the perspective that harming another is ultimately harming the self.

If all assemblages are impermanent, existing in certain configurations for differing periods of time, there is the potential to reconfigure at least some of them. For others it is more a matter of learning how to organize ourselves in a manner within the limits of our power at any given point in time to change things. How do we, first people and settlers to this place alike, find a way to live together and well in this place? Specifically, how do we nourish ourselves and non-human others, or in utilitarian terms – manage, allocate and share resources like big huckleberry in a heterogeneous and rapidly changing world? And who decides?

Sites of shared concern over the fate of natural resources like big huckleberry are inevitably political. In addition to the pragmatic, hopeful outcome that deliberation over big huckleberries will result in them being with us now and into the future, these sites are also charged with potential for both tension and transformation when it comes to enacting an ethics of place. In Washington State, the majority of big huckleberry habitat occurs on United States Forest Service and National Park Service lands, and so it is the decisions of these agencies that most greatly affect the wellbeing of big huckleberry, human access to the places where they grow, and the socioecological dynamics of commercial harvesting.

In her decolonial reading of the social-natural co-production forests in the Meratus Mountains of Indonesia, Anna Tsing has persuasively argued, "whenever we want to trace the limits of hegemony, we need to look for gaps" (Tsing 2005:202). Her point is that the colonial project of rendering landscapes readable through the categorization and demarcation of space inevitably also leaves gaps – zones of illegibility. Tsing's engagement with the gap is both metaphorical and literal. In this dissertation, I literally follow the signs in a forest gap that is the place where huckleberries, humans and a host of other being thrive through the co-production of a heterogeneous and "patchy" landscape. Such an approach brings us into an understanding of forests like the Mt. Baker-Snoqualmie not from the perspective of the global and transcendent, as a thing that can only be known through expert knowledge and the categorization of space (Scott 1998; Tsing 2005). Rather, by focusing less on what a forest is, the goal here is to understand something of what forests do. To understand forests as immanent - comprised of biosocial, historical, and biographical processes (Fowler 2015; Tsing 2005). At the same time, in doing so I recognize that I am substituting one kind of general claim for another, and that is, as I discuss in chapter two, that life is a sign process.

Tribal members and, as I discuss in chapter two, many non-tribal, self-provisioning harvesters care deeply about big huckleberry. But it is the Tribes that have raised issues related to their care to the point where in some places at least, the Forest Service and the Park Service are beginning to recognize big huckleberries as a matter of concern. Federal-tribal interactions in particular are sites of tension because, as I discuss in greater detail below, the relation is borne out of a foundational colonial legacy – the "trust" relationship between the federal government and federally recognized Tribes. As it is somewhat of an emergent issue in Puget Sound Coast Salish territory, sites of deliberation over big huckleberry and the places where they grow are also inevitably sites of deliberation over how we might live together and well in this place. That deliberation also requires awareness of the ongoing affects of colonial legacies and settler colonial practices that reproduce uneven power relations, as well as sites of potential transformation where those types of relations are unsettled.

Thus, in this dissertation I also strive to develop a process-relational approach to political ecology that takes the agency of the non-human seriously. In *Politics of Nature*, Bruno Latour urges us to critically analyze the ways in which claims to a transcendent nature have the potential to derail deliberative processes. Rather, Latour and other key process-relational thinkers propose that we understand claims about what nature is as the outcome of negotiated, immanent processes involving both human and non-human animals, objects, and physical processes, in which "none of the partners pre-exist the relating, and the relating is never done once and for all" (Haraway 2012). This perspective I would argue is closely aligned with the philosophies of my Indigenous teachers, for whom a strict division between nature and culture is generally antithetical to their views of reality. The methodological principle of "generalized symmetry" in actor-network theory (ANT) precludes an a priori distinction between human social intention (culture) and brute material causation (nature). Rather, the question of agency is left open, as ANT presumes that the capacity for action is not the property of any one individual or thing in network, but emerges from a collective comprised of all the elements of the biogeosphere that comprise that network.

The qualities of big huckleberry and the nature(s) of fire are most certainly "actants" that both enliven and are enlivened by the (seemingly) strictly human deliberations over the historical role and potential reintroduction of Indigenous fire regimes to care for big huckleberries. Along with the recognition that the division between nature and culture is a fluid boundary mediated not only by humans but by non-human actors as well, Latour's proposal for a new political "division of labor" for the composition of a "good common world" is a useful method for analyzing the manner in which those boundaries are created, maintained and disrupted. Whereas the old division of labor separates those who articulate facts on behalf of nature from those who articulate values on behalf of society, Latour proposes a division of labor differentiating the power to take things into account, which asks: "How many are we?" (Who or what is a candidate for existence?), from the power to arrange in rank order, which asks "Can we live together?" (Who and/or what will comprise the collective?) (Latour 2004:109).

Latour's approach as method appeals because it seems a much more accurate reflection of the manner in which what we come to know as transcendent "nature" is actually the outcome of historically contingent, negotiated processes. However, to say nature is a social construction, is not the same as saying that something we have come to know as "nature" is not real, or a fiction (which would be completely antithetical to the argument that non-humans are also "actors" in assemblages). Rather, as Latour notes in Reassembling the Social, to acknowledge the fact that something is constructed and then to evaluate it from that point of view makes that thing more real, not less so:

> … to say that something is constructed has always been associated with an appreciation of its robustness, quality, style, durability, worth etc. So much so that no one would bother to say that a skyscraper, a nuclear plant, a sculpture or an automobile is 'constructed.' This is too obvious to be pointed out. The great questions are rather: How well designed is it? How solidly constructed is it? How durable or reliable is it? How costly is it? Everywhere, in technology, engineering, architecture and art, construction is so much a <u>synonym</u> for the real that the question shifts immediately to the next and really interesting one: Is it <u>well</u> or <u>badly</u> constructed? (Latour 2005:89, emphasis in original).

Other than opening up the possibility that humans never act alone, and that we are not the only "subjects" in the world, what is of particular interest to me are questions not only of how good or bad the science used in decision-making is, but whether, how, and under what conditions are the "facts" of nature (or the "facts" of society for that matter) deployed to short-circuit deliberations over what should be done? In terms of taking things into account, who speaks for huckleberries and for fire in these emergent collaborations?

## Coast Salish Worlds

While it is imperative to understand the histories of violence grounded in colonialism and racism that are part of this place (Bierwert 1999; Kew 1970; Miller 2003; Roy 2007; Raibmon 2005; Thrush 2007), it is equally important for an ethics of place to cultivate a better understanding and deeper appreciation of what life might have been like for the Indigenous people who lived here before Euro-American colonization. Bringing new understandings of the past into the present has potential immediate and practical value for the revitalization of traditional foods and the work of food sovereignty movements. Enriched understandings of the past have the potential to cultivate pride in one's culture, spark discourse leading to new understandings and strategies, reinvigorate historical practices, and guide eco-cultural restoration efforts.

The Puget Sound Coast Salish region comprises the traditional territories of Northern Straights Salish, nəxʷsƛ̕ayə̓múcən (Klallam), ‘lhéchelesem (Nooksack), Northern and Southern Lushootsed, and ‘twänə  (Skokomish) speaking people. The Puget Sound Coast Salish region in turn comprises a portion of the broader Coast Salish culture area, which at its northern end spans from present-day Homalco on the British Columbia Coast and also includes the southeast coast of Vancouver Island, to its southern end – the Cowlitz River drainage in Washington state, including portions of the Pacific coast (Sturtevant and Suttles 1990).

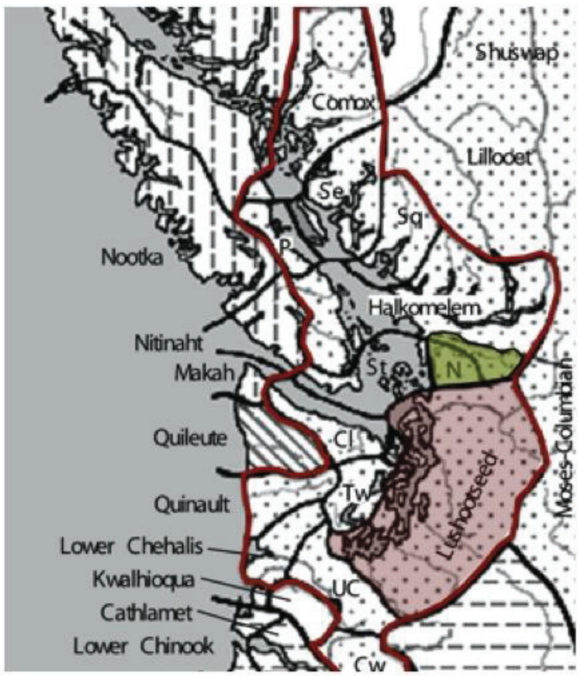


**Figure 1-1: The Coast Salish World, outlined in red. Map courtesy UW Special Collections**

Because of their connections to the mountains, this dissertation focuses primarily on ‘Lhéchelesem and Lushootseed speakers and their descendants. Prior to Euro-American colonization, the Lushootseed speaking Coast Salish inhabited the Puget Sound basin to the peaks of the Cascade Range, between the Skagit River drainage in the north, and the Nisqually River drainage in the south, while the Lhéchelesem speaking Coast Salish (aka “Nooksack”) inhabited the Nooksack and Fraser River drainages from mountains to saltwater (Richardson and

Galloway 2011).

The designation “Coast Salish” stems from the anthropological concept of the “culture area,” which recognizes sociocultural, linguistic and political-economic similarities between social groups. For the Coast Salish these include a shared language family, bilateral kinship reckoning,[17] extensive kin networks grounded in village exogamy,[18] and a hierarchical social organization, centered on networks of densely populated, semi-autonomous villages (Collins 1974; Elmendorf 1992; Haeberlin and Gunther 1930; Smith 1940). Ethnographic convention generally divides the Coast Salish homelands into northern, central (including Nooksack peoples), southern (which includes Lushootseed peoples), and southwestern Coast Salish territories. This reflects the substantive cultural and linguistic variation within the Coast Salish world, where approximately fourteen unique languages were historically spoken (Thompson and Kinkade 1990).

Prior to the devastating effects of the first smallpox epidemic in the area in the late 18th century, it is estimated that the combined population of the Lushootseed and Nooksack Coast Salish peoples of Washington State was about thirteen thousand (Boyd 1999; Richardson and Galloway 2011). The Puget Sound Coast Salish people lived in some one-hundred and forty winter villages along the saltwater, rivers, lakes, prairies and uplands, and along with the names of the specific rivers or shorelines they inhabited, were identified by others as such (Smith 1940:29). About 20,000 individuals claim Coast Salish tribal affiliation in the present (US Census 2010).

Although particular assemblages like the historic Puget Sound Salish food system have in

[17] Tracing one’s lineage through both parents.
[18] Marrying outside of one’s social group.

many ways and for many reasons experienced radical disruption, we should not mistake the historic form for its content. Elements of past assemblages adhere in the present, with differing velocities, trajectories, forces, and degrees of resilience. As I describe in chapter three, the notion of the gift, as well as the continual practices of gifting, generosity, and reciprocity remain foundational to what it means to be a Coast Salish person in the present. Puget Sound Salish origin stories describe how plants and animals sacrificed themselves to humans in the time when the world changed, offering themselves to human beings so we might live. The continuation of such relations is dependent on a foundational reciprocity, in which those beings that offered themselves continue to do so, so long as human beings offer care, prayer, and acknowledgement of that original relation. Due in part to its scale and spectacle, the "potlatch," or "give-away," is perhaps the most widely known expression of the gift economy practiced by Indigenous people living up and down the Pacific Northwest Coast of North America.

In addition to being culturally and spiritually linked to place, the members of all of Washington State's twenty-nine federally recognized tribes are also legally linked to place. Coast Salish and other federally recognized Tribes in Washington State are involved with virtually every agency at the local, state, and federal level when it comes to the management of natural resources. Tribal members of Washington State's twenty-four treaty tribes are people whose ancestors were party to the "Stevens Treaties," which in their texts include the following passage about reserved rights to resources:

> The right of taking fish at all usual and accustomed grounds and stations, is further secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting, [and] gathering roots and berries, and pasturing their horses on open and unclaimed lands (United States 1854; United States 1855).

Treaty Tribes have vigorously employed legal and rhetorical tactics, and have engaged in civil disobedience to defend their treaty-reserved rights to fish, hunt and gather (American Friends

Service Committee 1970; Cohen 1986; Wilkinson 2000). Indeed, it has been noted that the perennial battle to exercise their treaty rights has become a defining characteristic of Coast Salish identity (Harmon 1998).

The most notable outcome of these efforts was the 1974 Boldt Decision, which affirmed the Tribes' right to 50% of the salmon fishery, and made them co-managers with the state of Washington of the fishery. Today, the Tribes see themselves as co-managers not just of the fishery (which from a legal standpoint now also includes shellfish), but also of all natural resources related to treaty-reserved rights. Over the course of the past fifty years, tribal governments in general have developed formidable natural resources management apparatuses of their own, comprised of tribal members, (and typically non-tribal) scientists, policy analysts, and legal counsel. Their considerable political influence is attributed not only to the 1974 Boldt Decision, however; but also to the economic success of many tribal casinos and other economic endeavors. As Muckleshoot tribal historian Warren KingGeorge said to me once: "That's why this village has a voice. You know, it's always been there, it's just that with the help of our enterprises? Our financial success? Our voice is even louder now." For these reasons, the Tribes will be here, into the future, continuing to advocate for the well-being of resources and places that matter the most to them. In that way at least, those of us who care about the fate of this place and the non-humans who also dwell here are tied to the fate of the Tribes and the tribal members that comprise them.

Big huckleberry is a "cultural keystone species" (Turner and Garibaldi 2004), which throughout its range has been integral to the social lives and food systems of the Indigenous communities that harvest and tend to them. Fire, when used to tend to big huckleberry and for myriad other reasons, might also be considered a "cultural keystone process;" the presence or absence of which has cascading effects through social-ecological systems. These intertwined social relationships and disturbance regimes that develop over long periods of time are what Fowler (Fowler 2013:3) calls “Indigenous fire ecologies.”

Coast Salish people remind us that their ancestors have been here since time immemorial. The archaeological record confirms that people have inhabited the historical territories of the Coast Salish for nearly as long as the glaciers receded over 10,000 years ago (Kopperl, Miss, and Hodges 2010; Mierendorf, n.d.; Samuels 1993; Schalk and Taylor 1988). Terry Williams, tribal elder, and the natural resources director for the Tulalip Tribes, reminds us that the ancestors of contemporary Coast Salish people not only observed changes in the landscape over time. They also influenced, and were influenced by, the trajectory of its development. They were harvesting big huckleberry and likely tending to these habitats with fire for at least 4,000 years before Euro-American colonization (Burtchard 2009; Miss and Nelson 1995; Tweiten 2007).

As I describe in chapters 3 and 4, rather than being a wild and untamed wilderness from which the people randomly hunted and gathered, the land was intimately known and consciously tended to promote the abundance and predictability of culturally important plants and animals. This is an underexplored aspect of pre- and early settlement life in the Puget Sound basin, as the ethnographic literature is predisposed towards a focus on Coast Salish inhabitation of the saltwater shorelines and lowland rivers, with much less attention paid to the significance of inland and montane habitats (Oliver 2010).

## Research Sites and Research Methods

This dissertation presents the analysis of ethnographic fieldwork and archival research conducted between 2007 and 2014. The most significant and sustained relationships that I have developed by “following the huckleberries” are with members and staff of the Tulalip and

Muckleshoot tribes, Mt. Baker-Snoqualmie National Forest staff, and Northwest Indian College Traditional Foods and Medicines staff.

I first became involved with the Northwest Indian College through attending semi-monthly "Diabetes Prevention through Traditional Foods" programs early on in my graduate work. These classes were held on various reservations and tribal spaces from 2005 – 2014 to promote health and healing in Northwest Coast Indigenous communities through the revitalization of traditional food and medicine practices.

After a few years attending these classes, I was asked to be not just a student, but also a teacher of plant worlds, sharing some of my knowledge at various events and assisting with the development of curriculum, the program's cedar box teaching kits, and the "Gift of Food" game, which I describe in chapter three. It was through the program that I met Elise Krohn, an amazing plants woman and healer who had studied with Bruce; Valerie Segrest, Muckleshoot tribal nutritionist and catalyst for the Muckleshoot Food Sovereignty Project; Miguel Hernandez, Muckleshoot tribal gardener, and Elizabeth Campbell, a Spokane tribal member whose first NWIC plants class was also my first, and eventually came to work full time for the plants program. Although I have met many other people through the NWIC program it is these four people who really welcomed me in to "the work," and with whom I have grown closest to over the years.

Both the Muckleshoot and the Tulalip Indian Tribes are two of ten[19] federally recognized Coast Salish treaty tribes for whom the Mt. Baker-Snoqualmie National Forest comprises portions of their ceded hunting, fishing, and gathering territories. Tribal members of both tribes

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[19] Along with the Muckleshoot Indian Tribe and the Tulalip Tribes, the Lummi, Nooksack, Samish, Upper Skagit, Sauk-Suiattle, Stillaguamish, and Puyallup Tribes also claim portions of the Forest as part of their ceded territories, though not all of these tribes have treaty reserved rights.

are Coast Salish people whose ancestors were party to the Stevens Treaties. While both the Muckleshoot and the Tulalip Tribes share this legal status, there are also substantive differences between them.

The Muckleshoot Indian Reservation is located at the base of the Cascade foothills, approximately 35 miles southeast of Seattle. There are currently about 2000 enrolled tribal members living on and off the reservation (Census 2010). The reservation was established in 1857 as a direct result of the Puget Sound "Indian Wars" of 1855-56 (Horr 1974; Meeker 1980; Ballard 1951), and is comprised of six square-mile sections. While Tribal membership is currently comprised of Coast Salish peoples from throughout the Puget Sound basin who were removed to several reservations in the late 19th and early 20th centuries (Harmon 1998; Thrush 2007), the original inhabitants of the current reservation and surrounding villages included the Skoʔpabš and Smulkamish (White River) people, and were considered to be "inland" or "mountain" peoples who relied extensively on montane resources for their livelihoods (Smith 2006; Smith 1940; Suttles and Lane 1990). Like the Tulalip Tribes, the Muckleshoot Tribe currently operates a highly successful casino along with several other tribal enterprises. However, being more rural geographically, and perhaps having a tendency to be more inward looking, the Muckleshoot Tribe is somewhat less visible in the overall picture of the Puget Sound Basin.

I first became involved with the Muckleshoot Tribe through the "huckleberry enhancement" project at "Grouse Pass" that I describe in chapter seven, assisting in the development of a management and monitoring plan for the project (Potash-Martin et al. 2008). It was through this work that I met Warren KingGeorge, my first teacher of Coast Salish plant

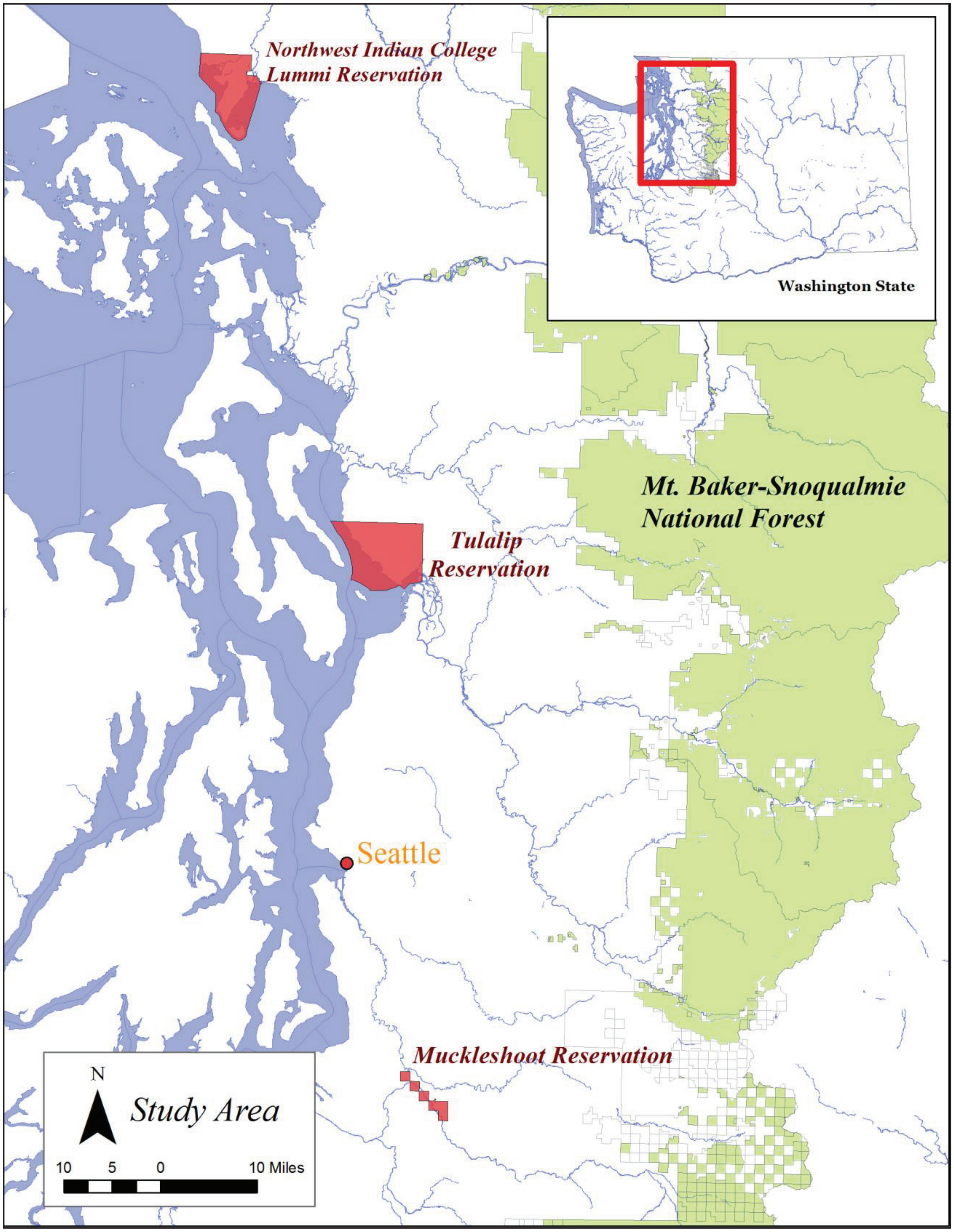



**Figure 1-2: Study area map**

worlds. I continued to work with Warren through the historical ecology work that I describe in chapters two and three. Later, through my acquaintance with Valerie Segrest, I became a member of the Muckleshoot Food Sovereignty Project's community leadership team. I also taught several courses at the Muckleshoot Tribal College over the course of three years, including introductory archaeology, ethnobotany, and together with Valerie, a culturally grounded nutrition course.

The Tulalip Indian Reservation is located about thirty miles north of Seattle, and is one of the largest Indian reservations in western Washington (~35 square miles). The reservation is situated on a portion of the traditional lands of the sduhúbš (Snohomish) people, who occupied three saltwater and one riverine village, each comprised of several longhouses (Tweddell 1974). While the reservation is situated on traditional Snohomish lands, residents of villages associated with at least thirteen other bands moved, or were forcibly removed to, the Tulalip Reservation with the signing of the treaties and subsequent Euro-American settlement. These included many people from inland villages, most notably Snoqualmie but also those living far up-river on the Skykomish. In current times, Tulalip is a highly visible presence with its four star casino and outlet mall that abuts Interstate 5. Over the past several years, the Tribes have also become increasingly involved in local civic and economic life, particularly with regards to cultivating a stronger relationship with the neighboring community of Marysville. In 2011, the Tribes also opened the Hibulb Cultural Center, as a place to both cultivate and share tribal history and culture.

In 2009 I was invited to participate as an outside observer on the "Cedar-Huckleberry Technical Committee," which was comprised of Tulalip tribal members and staff, and Mt. Baker-Snoqualmie National Forest staff. This work is described in chapter seven. I also contracted with Tulalip in 2012 to conduct a recreational harvester study in the Mt. Baker-Snoqualmie (see appendix A). It was through my work with the technical committee that I came to know Libby Halpin-Nelson, policy analyst for the Tribes, and Jason Gobin and Russell Moses. It was these three people that I worked most closely with. Both Jason and Russell are tribal members, and worked closely together in the Tribe's forestry department. My thinking about the importance of tribal food sovereignty and wellbeing was also strongly influenced by the late Tulalip tribal elder Hank Gobin, and his wife Inez Bill.

The 1.7 million acre Mt. Baker-Snoqualmie National Forest (MBSNF) stretches from the lowlands of the western flanks of the Cascade Range to its crest, extending approximately 150 miles from the US-Canadian border south to the boundary of Mount Rainier National Park. The land grows magnificent coniferous trees, and for much of its existence as a land management agency since the early 20$^{th}$ century, the primary focus of the MBSNF was timber extraction. Along with the extractive practice of industrial logging, however, through much of its history as a federal forest, the MBSNF has also been a place to consume the aesthetics of wild nature. Like the region of which it is a part, the forest is geologically and geographically complex, comprised of the Cascade volcanic chain, which on the northern part of the forest is overlain by the North Cascades subcontinent. This portion of the forest in particular is what gives the MBSNF the honor of having the most rugged, steep and inaccessible terrain in the National Forest system.

Drawn to its dramatic landscapes and lush forests, mostly white, middle and upper class urbanites from the greater Seattle Metropolitan area have long valued the MBSNF for its recreational opportunities and a place for respite from city life (Beckey 2003; Klingle 2007). As I discuss in more detail in chapter six, beginning in the late 1980s, continuing with the advent of the Northwest Forest Plan in 1994, and intensifying since then with the increasing probability of litigation in all but the narrowest parameters of acceptable timber harvest, industrial logging in the Forest has ceased almost entirely. With its proximity to the most populous area in Washington State, nowadays the MBSNF tends to be valued primarily as a place of recreation and biodiversity conservation. Each year it is estimated that more than two million people visit the MBSNF. By far, the majority resides not farther than 50 miles away from the forest, and visits for the purpose of recreation (USDA Forest Service 2005). Given that the Puget Sound Metro area is one of the fastest growing regions in the United States today (Soper 2014), this trend is only likely to intensify in the future.[20]

As previously mentioned, and as described especially in chapters five through seven, the majority of my work with Mt. Baker-Snoqualmie National Forest staff has been related to federal-tribal collaborations in the context of big huckleberry enhancement projects and my participation in the cedar-huckleberry technical committee. Through the “Grouse Pass” project described in Chapter seven, Laura Potash, retired MBSNF botanist was the first agency staff person that I worked with. Laura also participated on the cedar-huckleberry technical committee. Dave Kendrick, vegetation program manager, has also been closely involved with the Grouse Pass project, and also served on the cedar-huckleberry technical committee. Dave is someone who I have gone to repeatedly over the years for information about the MBSNF, clarification about broader Forest Service policy and practice, and general insight and advice. Phyllis Reed, MBSNF wildlife biologist, has also been a wealth of knowledge and insight regarding the functioning of Forest Service bureaucracy in the context of accomplishing any kind of project in the Forest. Dave, Laura and Phyllis are certainly not the only Forest Service staff that I have

[20] See Breslow, 2011 for an overview of the literature on relationships between urbanity and the politics of environmental preservation and conservation.

come to know who are strong allies of tribal food sovereignty, but they are the people that I have worked most closely with when it comes to issues of management and access to big huckleberry habitat within the MBSNF.

Ethnographic research is inevitably a messy endeavor. Our signature method, participant-observation, sounds straight forward on the surface but it is actually very challenging to simultaneously fully participate in and observe the flow of life happening around you. Over the course of my years of research I have participated in hundreds of events, including my involvement with the Northwest Indian College's traditional plants program, events related to the collaborative huckleberry enhancement projects that I have been involved with, the Cedar-Huckleberry technical committee, and the Muckleshoot Food Sovereignty Project. In these contexts, I was a full and integral participant, assisting with organizing activities and meetings, writing plans and proposals, and developing curriculum, amongst other things. I also attended numerous tribal events held on the Muckleshoot and Tulalip reservations and in other places where traditional foods revitalization related activities took place, as well as events pertaining to the Forest specifically and the USFS more generally, including forest planning meetings, and forest sponsored events that are relevant to tribes. I have also spent time as a participant-observer in the Gifford Pinchot National Forest, following conflicts over commercial harvesting of big huckleberry in the Trout Lake area.

For many, but certainly not all of these events I wrote detailed field notes describing what, from my perspective, had taken place. Altogether I wrote about eighty of them, ranging in length from a paragraph or two to several pages. In addition to participant-observation, I also conducted approximately fifty semi-structured interviews with tribal and non-tribal big huckleberry harvesters, tribal members and staff and forest service members and staff involved in collaborative projects to enhance big huckleberry, and tribal members, staff, and allies involved in tribal traditional foods revitalization and food sovereignty movements. These interviews were recorded and transcribed, and are the source of the lengthy quotes included in the text.

Over the years of my research, I developed an iterative, participatory approach to the analysis of my data. In particular, the significance of this work and my approach to it has been shaped and transformed by an increasing depth of understanding of the critical importance of plant foods and medicines to the well-being of Puget Sound Coast Salish and other Indigenous peoples from whom I have learned. My analysis has also been shaped in conversation especially with the people that I have worked most closely with over the years. Sharing my observations and asking for feedback and clarification has been a critical component of my work throughout the life of this project.

The history of relations between anthropologists and Indigenous people is a complicated one to say the least. As an anthropologist working within tribal communities as a consultant, professor, and ally in tribal food sovereignty work, there have certainly been questions amongst at least some tribal members about my intentions within the community. To address these concerns, I have always tried to make clear the difference between times when I am conducting ethnographic work, and when I am simply working for and with the community and community members – as teacher, friend, and confidant. As I am sure is true for most cultural anthropologists who work closely with particular communities, much of what we observe and are a part of is never explicitly discussed in our writing. Yet at the same time, these experiences shape our understandings of the situations we are trying to grasp in truly profound ways. For instance, I never wrote field notes detailing the stories that my students at the tribal college shared with me about the challenges they face in their personal lives or the lives of others. Yet their experiences with violence and racism and their struggles with the after-effects of colonialism and ongoing effects of settler colonialism are often in the back of my mind as I write.

Bone Lake is also often in the back of my mind as I write. As I described in the prologue, for four years, I spent several weeks each summer collecting ecological data at this traditional big huckleberry-gathering site of the Muckleshoot people. The results of that research will be published elsewhere. But Bone Lake has been my muse over the course of my research – a place to reflect on the significance of people-plant-place relations over time. Little ethnographies of Bone Lake show up throughout the dissertation.

Throughout the dissertation, I have attempted to continue the speculative experiment that I introduce in chapter two with varying degrees of success. Old habits of thought and writing can be difficult to change. In particular, while broad categories such as regions, species, and as I describe in chapter two, semeiotic codes, are always messy, they do at times provide convenient heuristics to think with. At the same time, rethinking the language that we use to understand reality is as productive as it is reflective of the worlds within which we live. As Hinchliffe et al (2003) remind us, this work is an ontological struggle, as opposed to yet another epistemological battle. How do we collectively define and create space for ourselves and other life forms? And when do our categories get in the way of that work?

Indigenous food activism is about reorganizing the assemblage so that we, both settler and Indigenous people alike and the other-than-human beings that we share this place with may be nourished. Indigenous food activism is not the individualist route of the health of an individual body only; it is about the health of the collective body. That collective body bumps up against histories of settler colonialism and contemporary politics. Where do we reorganize the assemblage, and at what scale, to facilitate the work? In the following chapters I begin to trace out the contours and ethical potential of process-relational ontology as ethnographic method and orientation to life. While not losing sight of the necessity of critique, I focus on spaces of hope, what we might learn from past social relations and apply in the present. On what we might gain from an ethics of the collective in the context of the politics, economics, and aesthetics of people-plant relations and our inhabitation of "the commons."

*What do we want?*

*A flourishing!*

*When do we want it?*

*Now! and Now! and Now!*

# Chapter 2

## PLANTS ARE GOOD TO LIVE WITH

stáb tiʔił swáw’tixʷtəd.
What are the swáw’tixʷtəd?

stáb kʷi gʷədsdáʔəd.
What can I call them?

xʷiʔ kʷi gʷədsəs(h)áydxʷ stab tiʔił swáw’tixʷtəd ʔal ti sləχil.
To this day I don’t know what the swáw’tixʷtəd are.

gʷəl b(ə)ascútəb čəł ʔə tiʔił lú□lu□
But the elders told us

“swáw’tixʷtəd gʷəl ʔáʔal ti sləχil”
(that) the swátixʷtəd are on this earth.

stab kʷi □əsuhuys əlgʷəʔ
What deeds do they perform?

□ələłə’čiləxʷ ti słáχil gʷəl łuʔíbʔibəš əxʷ əlgʷəʔ
When night comes, they travel all over.

□uʔíbəš ʔu; ʔusa□ʷ ʔu
Do they walk or do they fly?

xʷíʔ kʷi gʷát ʔəs(h)áydxʷ
No one knows.

ʔuʔəχíχəd əlgʷə?
What do they do (and how)?

ʔəslábədxʷ ti bə’ɛʷ stáb, kʷi łəsəsyáyus ʔətiʔił □áqaʔəc, gʷə’dbixʷəc, bə’ɛʷ stab
They see to everything, the salalberry bush, the blackberry vines, everything.

ʔulábabəd əlgʷəʔ
They look them over.

túχʷ łəsəxʷəs(h)áydxʷs əlgʷəʔ, “ʔi; háʔł kʷi səsyáyus ʔə kʷi □áqaʔəc tiʔił”
So they may know, “Yes, that salalberry bush is working well.”

“łu□áχʷədxʷ kʷi haʔł sʔə’łəd.”
“It will grow good food.” (Bates, Hess, and Hilbert 1994:245)

We stop at a patch of devil's club and Elise talks about her techniques for harvesting it. She explains that Subiyay taught her that like us, plants have a body, mind and spirit, that you should give something back to the plant for what you take, and that how you harvest affects the medicine the plant gives (*Field note, 8 August 2010*).

This short excerpt from a late summer field note is one of many from Northwest Indian College "Traditional Plants and Foods" classes that I have attended over the years - as both a student and teacher of plant worlds. The classes are held to promote health and healing in Northwest Coastal Indigenous communities through the revitalization of traditional food and medicine practices. The program is an enactment of Bruce Subiyay Miller's vision, and as the note above suggests, this work is enduringly guided by the spirit and intent of his teachings. Subiyay was a Skokomish elder, healer, artist, and plant person – a master weaver who was honored, along with the late Upper Skagit elder Vi takʷšeblu Hilbert, with a National Endowment for the Arts National Heritage Fellowship before his passing in 2005.

Subiyay's work with the plants lives on through a documentary film about his life and work, (*Teachings of the Tree People the Work of Bruce Miller* 2006), and through the ongoing work of his numerous apprentices, including Elise. Subiyay is never very far from the minds of the plant people who apprenticed with him. A commonly repeated quote of his is that the plants are our greatest teachers - that all the wisdom we need for living on earth is contained in the plants themselves. Elise is fond of saying that this is a difficult concept for the "Western" mind to grasp – how can beings that are so different from ourselves, that seem to have no language, that lack a nervous system and a brain, be teachers? Yet clearly the plants themselves are quite literally teachers for Elise and for others.

**Figure 2-1: Elise Krohn and Miguel Hernandez digging devil's club root**

I frequently refer to myself as a "plant person." My life is thoroughly entangled with the worlds of plants and I think of myself as someone who is sensitized to their presence. Yet having been trained in the science of botany through a Western scientific lens, like the typical "Westerner" that Elise describes, I too have struggled with how a plant might be teacher – not just metaphorically or filtered through a cultural "worldview," but literally. What I share in this chapter is the result of how I have come to rethink my understandings of plants and their capacities by finding the resonances between Indigenous ontologies of animism and the emergent fields of biosemiotics and plant signaling and behavior. Through a speculative, biosemiotic reading of the human-huckleberry nexus, I both introduce big huckleberry, some of its qualities, habits, and significance, and also offer the possibility that rather than simply being represented ideologically by humans, through their own ways of becoming in the world, plants might actually reveal something of themselves to humans.

Following Subiyay's example, this chapter also explores what plants might have to teach us about alliance across difference. I consider two kinds of alliance here; alliance between Indigenous and western ontologies when it comes to knowing plants as animate and aware; and alliances between native and non-native, both human and plant.

As I described in the introduction, alliance is central to process-relational thought, to our understandings of assemblages and actor-networks, and most importantly, to ethical questions of living together and well. In many ways, this entire dissertation is about tracing different kinds of alliance across space and time. But as it is an intervention that I am deeply invested in, I begin by constructing some conceptual scaffolding as a possible bridge between Indigenous and western ontologies when it comes to knowing plants as animate and aware. My hope is that in doing so, this work will contribute to a decolonization of thought (Viveiros de Castro 2014) amongst ethnoecologists and other allies involved with the discourse and practice of "traditional ecological knowledge."

Biosemiotics applies Charles Peirce's semeiotic and Jakob von Uexküll's theory of meaning to build the argument that all of life is a sign process. Peirce's semeiotic can be put to use to decenter the human (and animals in general) as the only organisms that are capable of thought and communication, resonating with Indigenous ontologies that recognize the intelligence of the other-than-human, including the plants, the land, and other beings that inhabit their worlds. Articulating a different strand of Western thought might also foster stronger alliances through decentering and complicating ideas of what "Western" knowledge is and might be.

Peirce's theory of the sign is a strand of process-relational thought. Signs are interactional by nature (they function on both connection and difference). By following those interactions and relations, we can trace the processes through which huckleberries and humans are bound together in nutritive networks, co-producing a thing that we call a forest. Applying this mode of thought to the human-huckleberry nexus, I consider the sociality of plants, how they affect human bodies and how this is connected to Puget Sound Coast Salish nourishment of mind, body and spirit. I also consider the role of affect in connections between plants, people and healing in the Northwest Indian College traditional plants program, and how different ways of being affected - different senses of place – offer both challenges and openings to broader social alliances. In addition to my fieldwork with tribal members and NWIC's plants program, the material for this chapter also draws on an ethnographic study of non-tribal self-provisioning harvesters that I conducted in the Mt. Baker-Snoqualmie National Forest in 2012 (see appendix A).

## PEIRCE'S SEMEIOTIC AND BIOSEMIOTICS

As I described in the introduction to this dissertation, the time is ripe for a deeper ethnographic engagement with plants. The world of plant biology is abuzz with insights and controversies surrounding the emergent field of "plant signaling and behavior," and its propositions about plants as aware & articulate subjects, with the capacity for information processing, learning, memory, decision-making and choice (Chamovitz 2012; Pollan 2013; Trewavas 2005).

There are also quiet murmurs of an emergent "plant turn," particularly within the fields of multispecies ethnography and more than human geographies. Recognizing the distributed agency of both humans and the more-than-human has also been a primary project in process-relational thought. Actor-network theorists, for example, have demonstrated how agency is a property of negotiated associations between heterogeneous assemblages of humans and other-than-humans. This body of work sheds light on the many ways in which the desires and goals of particular humans may be achieved, redirected, or thwarted in relation with the non-humans enrolled (or who enroll themselves) in an actor-network. For instance, in her discussion of people-plant relationships in suburban gardens, Emma Power uses actor-network methodology to show how gardening practices entail negotiated processes between humans and non-humans through which both people and plants are transformed. As Power suggests, plants recommend themselves to gardeners through their smells, appearance, and textures (Power 2005). Echoing Timothy Ingold's phenomenological discussion of "affordances" (Ingold 2000), it is the plants rather than solely a particular ideological worldview that are enrolling people in these relationships (Hitchings 2003; Power 2005). Plants "draw people down" into their worlds (Hitchings 2003:107).

Indigenous people might say that the plant biologists and actor-network theorists are just catching up with what they have known all along. As the opening dialogue in this chapter suggests, Puget Sound Coast Salish understandings about the distributed agency of plants is articulated in the close relationship between the Southern Lushootseed names for swətíxʷtəd, "all manner of plants;" swátíxʷtəd, land, or the earth itself; and swáw'tixʷtəd, or the "little earths" that "see to everything," and tend to the plants to ensure they are growing well (Bates et al 1994:245, Smith 1940).

They might also agree with Eduardo Kohn, who has persuasively argued that despite its commitment to "de-anthropocentrization" (Latour and Descola 2013) as an ethical project, there is a tendency in actor-network and other forms of process-relational thought to re-anthropomorphize by attributing decidedly human ways of being and thinking to non-human beings (Kohn 2013:40-42). From this standpoint, the non-human possesses no capacity for thought or communication itself, but must always speak through the human by way of various technoscientific "speech prostheses" (Latour 2004:67). This tendency towards the use of anthropology's "special brand of ventriloquism" (Appadurai, qtd. in (Kirksey, Schuetze, and Helmreich 2014:3) in actor-network theory raises serious ethical questions about speaking of/for the other that have long been raised in post-colonial, subaltern studies.

Kohn diagnoses this problem as a particular kind of anthropocentrism in which we restrict the capacity for "representation…telos, intentionality, 'aboutness,' and selfhood" (Kohn 2013:41) - and thus thought itself - to that of symbolic communication (often considered a uniquely human quality, or at least circumscribed to living beings with nervous systems and a brain). Rather, Kohn encourages us to rethink our understandings of representation – to "provincialize language" (Kohn 2013:41) through a more expansive understanding of the forms that representation takes within and beyond the worlds of humans. Kohn draws on Charles Peirce's semeiotic and Jakob von Uexküll's theory of meaning to develop this approach to "anthropology beyond the human" (Kohn 2013:7).

Biosemiotics is grounded in the premise that life is both material and semeiotic; that every life form, from the cell to the organism, is intelligent and dependent on the capacity for meaning-making (e.g. Kull 2005; Kull 2009; Trewavas 2005; Witzany 2006). As Kohn neatly summarizes: "Life forms – human and non-human alike – because they are intrinsically semiotic, exhibit what Peirce calls a 'scientific intelligence.' By 'scientific,' he does not mean an intelligence that is human, conscious, or even rational, but simply one that is 'capable of learning by experience'" (Kohn 2013:77). In other words, life itself is a sign process, and as such, is governed by semeiotic rules, rather than mechanistic laws (Witzany 2006:169). Conscious purpose is not a requirement of semeiosis. Indeed, we share a great deal with plants in that "like them, we [too] most often act without our heads" (Marder 2013:160).

The premise of Uexküll's theory of meaning is grounded in the concept of *Umwelt*. The *Umwelt* or "environment" is the subjective, meaningful universe of a particular, autonomous living being, as constituted by the relations between perceptual signs (*Merkzeichen*) and signs of action (*Wirkzeichen*) (Uexküll 2010). Since each self (and by extension, its *Umwelt*) is autonomous, there are as many worlds as there are selves. Semeiosis, the use and production of signs, is thus, to borrow a term from Heidegger, a process of "worlding." From a phenomenological standpoint worlding is the active and generative engagement that constitutes a life-form's being-in-the-world (Heidegger 1972). Phillipe Descola defines worlding as "the stabilization in frameworks of thought and action of our practical engagement with the world" (Descola 2013:78). The social world as "instituted expressions of relations between multiple entities whose ontological status and capacity of action vary according to the positions they occupy in relationship to others" (ibid.).

Biosemioticians argue that given that all of life is the result of the same evolutionary processes, there is a "meaningful structural correspondence between the *Umwelten* of different living beings within a species, and those of living beings of different species, according to a 'general plan of nature'" (Krampen 1981:189). This structural correspondence of all *Umwelten* collectively is what constitutes the "semiosphere" (Kull 2009a).

Peirce's semeiotic theories are broad enough to encompass the vastness of the semiosphere; the nature of the sign lies at the heart of this theory. For Peirce, a sign is "something, which stands to somebody for something in some respect or capacity" (Peirce, qtd. in Kohn 2013:29). The sign is a medium for the communication of a form – a "habit," or abstract quality of some type (Queiroz and Merrell 2006). All signs are triadic in nature (use of the lower case, as in "sign" indicates this triadic relation), consisting of a Sign, Object, and Interpretant (S-O-I). The Sign (aka "representamen," or sign vehicle) intrinsically links an interpreter (aka, a translator, or self) to its Object. Objects may be something that a particular being experiences that is external or internal to the self. The Interpretant is the effect of a sign on a self (Nöth 2007), and also a new sign that translates the way a prior sign relates to its Object (Kohn 2013:33). The Object determines the sign (it is the cause of an effect on a self), while selves produce Signs and Interpretants (Nöth 2007).

Peirce's system further categorizes signs as being of three types according to their semeiotic capacities. Iconic signs mean by virtue of resemblance (something that shares a common characteristic with something else – i.e., a photograph), indexical signs by virtue of association (i.e., the intensity of moving branches indexes the presence and rate of wind), and symbolic signs by virtue of pure convention. Symbolic signs are purely arbitrary - there is no necessary association between a symbolic sign and its meaning (Figure 2-2)

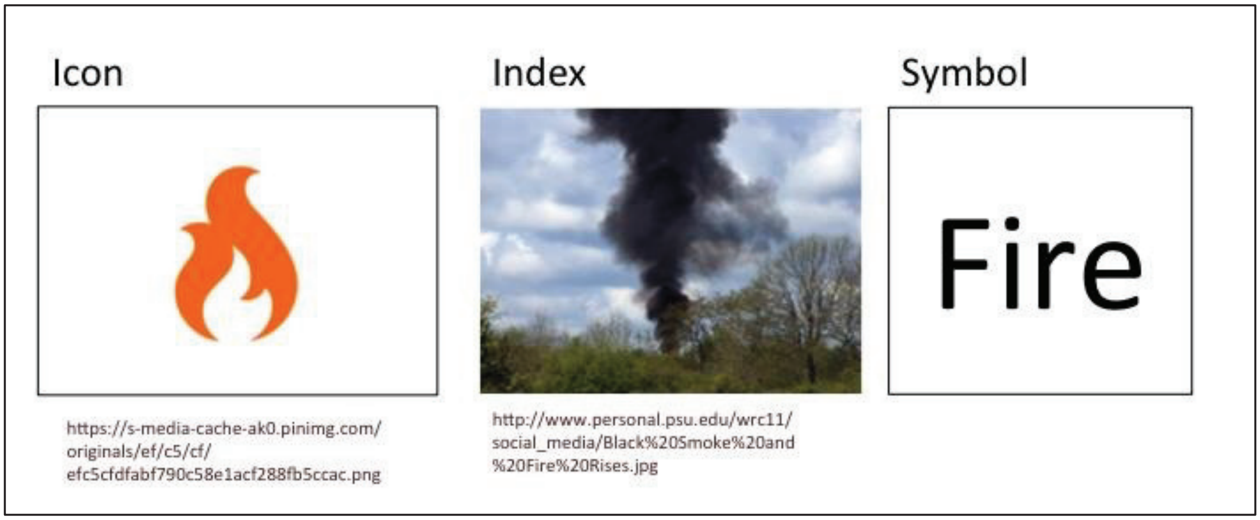
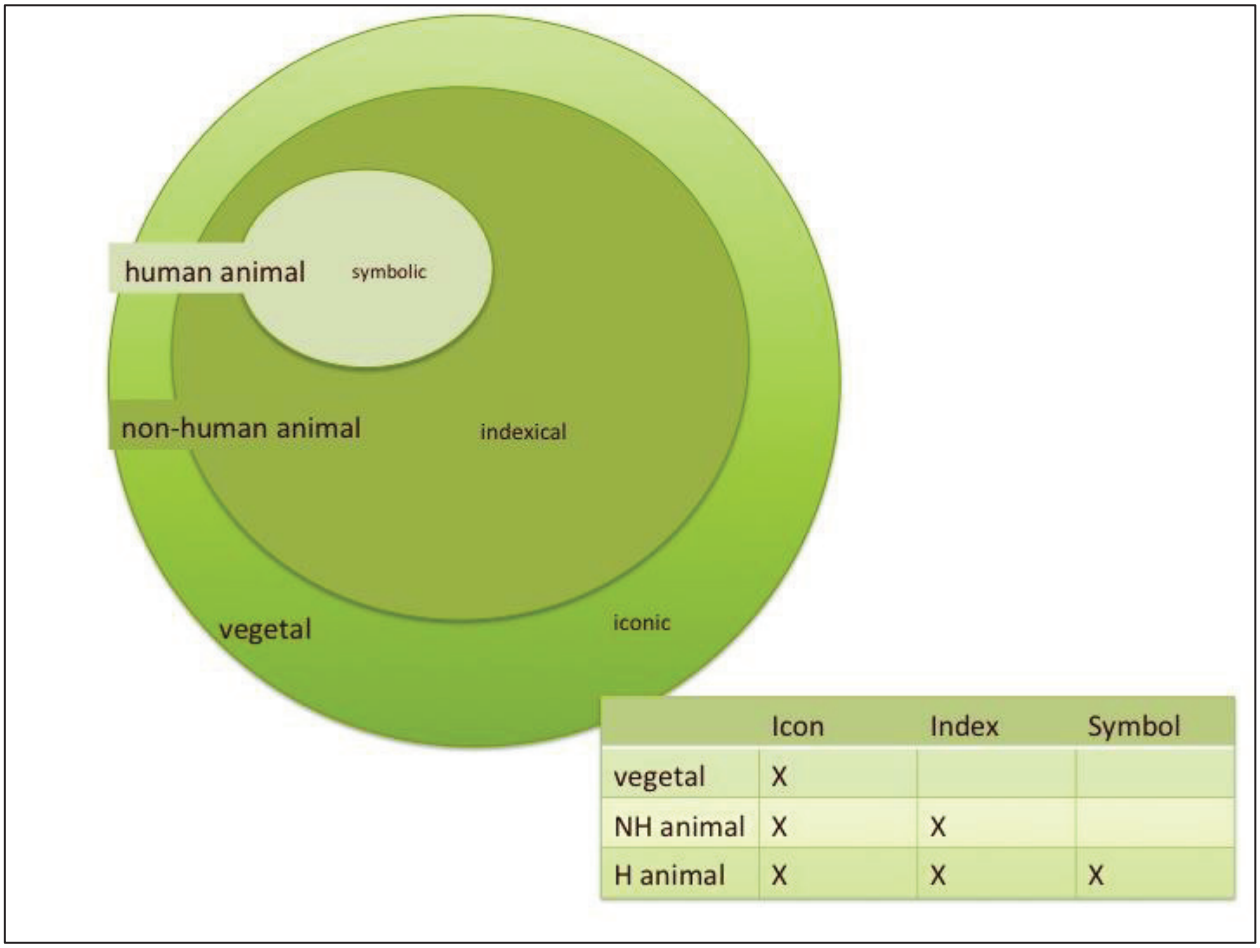



**Figure 2-2: Icon, Index Symbol**

Drawing on Terrence Deacon's theory of "semiotic thresholds" (Deacon 2010), Kalevi Kull (Kull 2009b) proposes that the capacities for thought of specific life-forms correspond to an evolutionary sequence, with iconicity being the oldest form of semiosis and corresponding to the *Umwelt* of plants, followed by indexicality and corresponding to the *Umwelt* of non-human animals, and finally symbolic systems and the *Umwelt* of humans and our particular cultural worlds. These semiotic forms are nested such that iconicity is shared across the spectrum of life (Figure 2-3). While Kull's evolutionary schema and tidy categories are overly deterministic (and anthropocentric), it does point to the possibility that if life is a sign process, then iconicity is a sufficient condition "for the biosphere … to be created" (Kull 2009b:21).

It is the capacity for thought of a particular self that determines the type of sign. We don't yet know for certain what kinds of communication non-human selves might be capable of (Hustak and Myers 2012), but we do know that as long as there are human selves on earth, all Objects may be interpreted iconically, indexically and symbolically. Therefore, any Object may exceed its own semiosic capacity – i.e., a human may perceive a plant as icon, index, or symbol, even if Kull is correct, and the plant itself perceives other Objects only iconically.




| | Icon | Index | Symbol |
|---|---|---|---|
| vegetal | X | | |
| NH animal | X | X | |
| H animal | X | X | X |

**Figure 2-3: A schema of semeiotic capacity**

How might a biosemiotic approach to ethnography invigorate our understandings and relationships, both with and about non-human others, and the people with whom we work that know something of non-human intelligence and thoughts? Drawing on a portion of the semiosphere comprising big huckleberry, or swəʔdáχ as it is known in the Coast Salish Lushootseed language, the following section gestures toward a multispecies ethnography comprised not just of the worldviews of humans, but also the lifeworlds of both human and non-human alike. To this end, I focus on semiosis having to do with nutrition, as all forms of life share this commonality in that “all beings are alive … to the extent that they are able to be nourished” (Marder 2013:45).

## SIGNS OF LIFE IN THE HUCKLEBERRY MEADOWS

swədáʔχ is found in mid-elevation meadows, primarily through the Pacific Northwest (Figure 2-4). For at least 6,000 years, in the late summertime when the days are simultaneously hot and carry the cool undertones of the coming autumn on the breeze, people have been traveling to the mountains to harvest the sweet, blue-black berries when they ripen. swədáʔχ meadows are an oasis in the dense middle-elevation forests where, in addition to the berries, many other plants and animals thrive. Along with their human harvesters, deer and elk, black and grizzly bear, mountain beaver, marmot, and other small mammals, as well as several species of resident and migratory birds also rely on the foliage and fruit of swədáʔχ and the other plants that grow along with them.

As with other forms of vegetal life, much of swədáʔχ communication can be difficult for humans to perceive. Biosemioticians explain that plant communication occurs primarily by way of “infochemicals,” (Barto et al. 2012), much of which takes place underground, in the “rhizosphere.” Following in the intellectual footsteps of Charles Darwin, scientists who study plant signaling and behaviors propose that the plant’s body plan is an inversion of that of animals (Baluška et al. 2006), such that plants literally have their heads in the ground and their reproductive organs in the air. But unlike animals, plants have as many “brains” as they have roots, each one behaving something like an animal forager that seeks information, processes it, and both changes its individual behavior and also influences collective “root-brain” behaviors accordingly (Baluška et al 2006:28). The root-brains are connected through their neuron-like vascular tissues. The animal’s nerve cells and the plant’s phloem cells serve the same purpose –

**Figure 2-4: Big huckleberry (*Vaccinium membranaceum*), or swədáʔχ**

conducting electrical signals (Hall 2011:142). In the "root-brain" hypothesis, the hormone auxin is the primary neurotransmitter – an Object to use Peirce's term, which transmits iconic codes throughout the plant's body, enabling the roots to behave as a swarm as they process these vast amounts of decentered information.

As with many higher elevation Ericaceous plants, swədáʔχ forms symbiotic relations with Ericoid mycorrhizae, which helps them cope with these difficult growing conditions. Mycorrhizal relationships further extend the plant's underground social networks, potentially creating alliances between both related and unrelated selves. In addition to increasing the amount of moisture and nutrients available to them, these mycelial networks are also informational networks that have the potential to transport infochemicals. This information in turn enables plants to not only ensure the movement of nutrients and water to portions of the root system where it is needed, but also to warn plants of herbivory, and to transfer fungal disease resistance signals (Babikova et al. 2013). Flavonoids are identified as among the key infochemicals used in these mycelial-plant communication networks (Hall 2011; Hassan and Mathesius 2012). The anthocyanins comprise a subset of flavonoid metabolites, which are responsible for the red and blue pigmentation of big huckleberry flowers and fruit (Graham, Graham, and Wilcox 2003).

The pinkish urn-shaped flowers of swədáʔχ serve as an indexical sign of their nectar to the long-nosed bees that pollinate them. Later in the season these same secondary compounds will give the fruits of swədáʔχ their deep purple color, indexically signaling from a distance to the bear, bird, human and other animal foragers that their delectable fruits are ripe. "Steve," an avid big huckleberry harvester observes that their deliciousness is a sign that the berries want us to eat them. Down in the lowlands, the flowering fireweed or the call of the red flicker might notify the attentive human forager that the time has come to travel to the mountains to harvest swədáʔχ (KingGeorge, qtd. in Krohn & Segrest 2010:68). When I ask him how he knows its time to go to the mountains to harvest big huckleberry, "Scott," who for forty years has been traveling to the same place to harvest them, tells me that Mother Nature just taps him on the shoulder. He describes the weather as an indexical sign; a feeling in the air that tells him when he should be up on the mountain.

Like many harvesters, Scott also values big huckleberry for their nutritive qualities; "they're off the charts in antioxidants," he tells me. This indexical association of anthocyanins with human health contributes to the importance of swədáʔχ as a traditional food in the Indigenous communities with whom I have spent time. As Muckleshoot tribal member Warren

KingGeorge has attested many times, “the medicinal properties … can address some extremely serious health issues among Native communities in the 21st century” (KingGeorge, qtd. in Krohn & Segrest 2010:68). This property has also helped to fuel a multi-million dollar global trade in big huckleberry as a “nutraceutical.” Here, the iconic, indexical, and symbolic communicative qualities of swədáʔχ blur into one another, creating a cacophony of meaning.

What kinds of iconic, biochemical communications occur between the cells of our bodies and the anthocyanins of the fruit when we consume them? In her discussion of food as actant in and alongside the bodies that consume them, Jane Bennett gestures towards the liveliness of plant chemicals as they are integrated into the human body. Omega-3 fatty acids have been found to improve the moods and capacity for concentration of school-children and inmates alike, but not as an invariant, “emergent causality” (Bennett 2010:41). Rather, these molecules act in different ways in different bodies, which are themselves nonlinear assemblages - “different collections of the same stuff – bacteria, heavy metals, atoms, energy” (Gibson-Graham 2011), where small differences can have large effects. Bennett also reminds us of Henry David Thoreau’s great love for wild blueberries and huckleberries, in part due to the vitality of these wild fruits as compared to those in the market. This chemical vitality is imparted to Thoreau through their consumption: “Some berries which I had eaten on the hillside had fed my genius,” remarks Thoreau (Thoreau qtd. in Bennett 2010:47). But while the wildness of the fruits feeds his genius, they do so in concert within Thoreau’s historical imagination and a larger critique of private property, amongst other things (Thoreau 2001:469).

Thus, while these chemical constituents are meanings that matter a great deal, they cannot be understood in isolation from the ways in which we are affected by them, how that communion indexes our histories, identities, responsibilities, and connections to place. Here, affect should not be confused with emotion. Rather, affect refers to habitual modes of attention. It is about how, through previous bodily training, living selves attune to the worlds we inhabit. It is also about how we articulate with other living selves when our worlds intersect (Ingold 2000).

In the plateau longhouses on the east side of the Cascades, the Sahaptin and Interior Salish peoples will hold their "first fruits" ceremonies before their journeys to the mountains to harvest the fruit. The ceremony indexes the time when Creator was making the world ready for the human people to come, and is an enactment of the mutual responsibility between human and other-than-human selves. Along with the water, the roots, the salmon and elk, and the chokecherry, big huckleberry offered itself to feed the human people to come. In turn, the human people are to care for the first foods, acknowledging and remembering this responsibility in their longhouse ceremonies (Hunn and Selam 1990).

As their therapeutic benefits to humans attest, plants, "immediately immersed in their dwelling worlds" as they are (Uexküll 2010:146) are certainly examples of a kind of admirable Zen-like presence and "comfortable calm" (Krampen 1981). As the philosopher Michael Marder notes, "Whereas humans remember whatever has phenomenally appeared in the light, plants keep the memory of light itself" (Marder 2013:156). Indeed, harvesters who spend time with them remark on the incredible sense of peace and calm that picking swədáʔχ affords them.

As it is both about the "here and now" and the "here and then," huckleberry time is also paradoxical. The "comfortable calm" of picking berries derives not just from the berries themselves, but also from the feeling that comes from spending time in their habitats and the rhythmic, meditative practice of plucking berries from bush to bucket. This practice is available to the harvester for a very short time. On the west side of the Cascades, this is usually for just a few weeks at the end of summer, when the cool undertones of fall are in the air. Speaking of the here and now, Wes, a non-tribal harvester who grew up in Idaho and relocated to Seattle to attend University, describes how he had to relearn the temporality of berries on the west side of the Cascades, and also why that temporality is important to his sense of self and place:

> I like times of year and seasonal rituals and this has just become one. […] It took me a while to actually realize that, the timing is different on this side of the mountains than it is [in Idaho]. The second week of September is kind of my target now, and that's a month later than it would be in north Idaho. You know, so I still had that, that sort of seasonal clock from growing up. [Here, huckleberry season] is sort of a bittersweet time, 'cause it's often sort of saying goodbye to the summer.

The meditative rhythm of harvesting the berries also seems to open a kind of time-space portal – a "here and then" of places and practices. This is certainly true for tribal harvesters, for whom picking the berries can open a space of direct connection to their ancestors. And there are settlers too who recognize and appreciate something of the deep time histories that adhere to the places where they harvest. Others describe the ways in which picking berries puts them in touch with our shared humanity – our hunter-gatherer roots, while still others imagine traveling back in time to a pioneer history and dependence on foods like huckleberry for sustenance. As "Dana," a non-tribal, self-provisioning harvester described one of the reasons that huckleberry harvesting is important to her:

> I don't know if [huckleberries are] unique to the Pacific Northwest but it makes me feel there's a little bit of frontier about being in the Pacific Northwest in relation to the rest of the United States. It's a little wilder, it's the edge of the continent, it's the, "Go west, young man, go west" … this is as far west as you get and when I'm out there picking berries or looking at the mushrooms or looking at anything we have out here just makes me feel… that I'm in a more special place than anywhere else. It just seems wild. Like I'm more one with nature. Not that I'm a tree-hugging freak or anything, but it's just kind of nice and romantic and poetic […] And I always think about the, the Indian people up there picking. They, I mean, their life depended on it. And I think about the, you know, the men were probably out hunting and the women were gathering and what was that like? And what if it was a bad year for them? Did they get in trouble when they went back to their village and they didn't have a lot of berries? And what happened? I just like to think about that.

Big huckleberry harvesters also speak of how, in the dark winter months when the berries are taken from the freezer, their smell and flavor transports the harvester back in time and place, to the late summer berry meadows, to childhood memories, to the sense of what it means to belong to a people and a place. As Scott noted, "it's almost a spiritual thing, and quite hard to explain."

Big huckleberry is also what we might call a "recalcitrant" species. It resists domestication, cannot be cultivated, will not produce fruit or even live for very long when transplanted into lowland gardens. While the wildness of eastern huckleberry fed Thoreau's genius, it is also in part the wildness of big huckleberry that is transmogrified into jams, syrups, soaps, lotions, and candles that serve as icons for something of what the Pacific Northwest means to the people who purchase these items. This sort of pure and wild property blends with the nutraceutical qualities of the berry as it makes its way in powdered form to far-flung places like Japan, where it is sold as a treatment for cataracts and glaucoma. Once a huckleberry buyer in Trout Lake shared a story with me of how a Japanese businessman had asked to film him riding through the huckleberry fields on horseback in his cowboy hat, for the purpose of using the video in an advertisement for the businessman's powdered huckleberry glaucoma treatment.

My Coast Salish teachers are fond of reminding me that Indigenous ways of teaching and learning take place in the field. "There are no books," smiles Warren in a film about Subiyay's life. I am also told that the moral and meaning of Coast Salish stories are left for the listener to ponder and learn on their own. The work of the Coast Salish plant teacher, I think, is the work of a storyteller, to gesture towards a way of noticing and listening, rather than telling the student what it is he or she is supposed to notice and hear. To be able to notice and hear swədáʔχ requires that they be there for us to spend time with.

Big huckleberry must have sufficient light to produce fruit, as flower production and fruit size depend on carbohydrates stored in the plant's roots and stems. Without sufficient carbohydrate stores, the plants reserve their energy for vegetative growth. Thus, big huckleberry plants growing under dense canopies have lower rates of photosynthesis, which in turn means less photosynthate storage for future fruit (Anzinger 2002). Yet the plants themselves can survive for decades under dense canopy. I have witnessed the emergence of dormant plants in the smallest gaps of dense forest. This suggests to me that their persistence may be related to underground mycorrhizal relations that allow the light deprived plants to survive on the generosity of their neighbors (Gorzelak, Hambleton, and Massicotte 2012). This quality also suggests that big huckleberry is a plant well adapted to infrequent, high severity fires (Agee 1993; Anzinger 2002; Mah 2000).

That it was one of the first plants to colonize the moonscape that was Mt. St. Helens after the 1980 eruption is a testament to the incredible resilience of big huckleberry (Yang 2006; Yang, Bishop, and Webster 2008). After a major disturbance event, it may however take a very long time, perhaps a decade or more, for the plants to once again produce fruit in abundance (Anzinger 2002; Minore 1984).

I read the story of shrinking huckleberry meadows indexically, their histories of care and liveliness as Indigenous places, their transformation into colonial spaces and attendant effects of changing property and land management regimes, the shading out of swədáʔχ by the wide branches of growing coniferous trees. The silences of a place may also communicate quite powerfully.

As I hope this section has illustrated, biosemiotics is an opening to understanding life as a sign process, and specifically in this case, to a reconsideration of the subjectivity of plants – their communicative capacities and their lifeworlds. Rather than simply being a backdrop for where the “real” action is taking place, plants are aware, they are taking in information from their *umwelten*, making meaning of that information and then making choices about what to do with the meanings they have made. Yet while this ontological frame begins to unsettle more anthropocentric notions of agency and subjectivity, a biosemiotic reading focused on the categorization of types of signs (icon, index, symbol) is just a scaffolding and bridge to aid our understanding of life as sign process. What is more important than the categories is the process itself – the S-O-I triad in Peirce's thinking, along with the ways in which affect and difference are what set that process in motion. The remainder of this chapter thus focuses on these things without the scaffolding, and from the standpoint of NWIC's plants program and the people and plants that comprise it.

## Senses of place at Bone Lake

In 2011 it seemed like the summer would never come. The long, cool, wet spring lingered into mid-summer, and when late August finally came around, it hardly seemed that a trip to the mountains to pick the huckleberries would be worthwhile. But I decided to go anyway, inviting Valerie Segrest and Miguel Hernandez to join me. They had heard me talk about Bone Lake before, but had never visited that place. Their intent for the day was to gather plants for the Northwest Indian College Traditional Plants Program, while mine was to collect plants for my herbarium collection.

As we drove up Highway 410, past the Salish tree farm, through the dark greens of Federation Forest, and into Greenwater, Miguel shared that he was thinking about the role of the "edge," those marginal spaces between forest and meadow, for instance, where things are really happening. I thought about a conversation that Val and Warren and I had had recently, where Warren had offered the word skʷəbáχ̌ad, "the edge of the earth," as a parallel idea in the Lushootseed language. The morning was so beautiful and clear, not a cloud in the sky, and as we climbed Huckleberry Mountain (sχəy'ús), we caught glimpses of Mount Rainier, bright and clear to the south. Miguel commented on how this view of the mountain offered such a different

**Figure 2-5: Mount Rainier from sχəyús**

perspective than the one he was familiar with – the mountain here is so close and clear. When we arrived at the open meadow, we were greeted by a raven circling high overhead and stopped to appreciate the bird before walking over to the top of the slope. We were all impressed by how the paintbrush was especially large, vibrantly red and abundant. The huckleberries were also abundant but still green. As I dug yarrow, valerian and arnica to press, Miguel and Val picked yarrow and arnica flowers for medicine. Miguel showed me how to collect the valerian root, explaining that he dries them and then combines them with other herbs to make a sleep mixture. As we wandered down through the upper meadow, marveling at the abundance of huckleberry plants, Val asked, "This is all mountain huckleberry!?"

I imagined that if there was enough time and heat before the weather turned cool again, that there would be lots of berries to pick that year. Down by the rocks at the mid-slope, the osha and angelica were flowering, along with cow parsnip and yet more bright yellow arnica (Figure 2-6). The air filled with the scent of licorice as Val and Miguel set to work collecting the osha root, accompanied by the ever-present smell of elk. I commented on the elk smell, mentioning that they were probably just right over there, in that cluster of trees as I pointed to the dense stand where last year Nina, an undergrad intern and I found a small grove of ancient Douglas firs. Val explained that the first time she came to the mountains with Warren, she could smell the elk but she could not see them. Warren told her to open her eyes and just look, and as she adjusted her eyes to the meadows edge, she could make out the bodies of the elk. She realized they were actually everywhere.

I told them about Tim Ingold's term – "an education of attention." How do our teachings about the complexity of the world orient our relationship to it, what we do, and do not notice? The hunters of game's senses are attuned to the world differently than the hunter of plant diversity. As Val's story about the elk attests, orientation by looking is a primary mode of educating the attention. The botanical category "*Apiaceae*" indexes a visible set of shared characteristics in the family to which osha belongs. But there are also our orientations towards noticing and knowing by smell, taste, and touch. I told Val the story of how Robin Lesher, a Forest Service ecologist who walked me through the sampling strategy for my ecological study here talked about getting one's "eco-legs" – a feel for moving on the landscape. Bone Lake has a very special feel. The ground is soft beneath your feet, as the rocks are very old and decomposed. You can sink your feet into the earth here, and as testimony, just notice the deep hoof marks that the elk have left behind, and the myriad networks of tunnels in which the mountain beavers make their homes.

**Figure 2-6: Val and Miguel in the osha meadows**

I shared the story of how once while working as a research assistant on a project studying urban foraging practices in the city of Seattle, I went out to harvest cottonwood buds in the dead of winter with a forager who had offered to take me. After harvesting the dormant buds from fallen branches, we went to her house to process them in oil. The smell of propolis and other resins filled the air of this woman's home. Now each year my own seasonal foraging round begins with the harvest of dormant cottonwood buds to process into a healing, analgesic salve. That process attuned me to the smell of cottonwoods leafing out in the spring. This was a scent that I had never noticed before processing the buds, despite the fact that cottonwoods are ubiquitous here in the Pacific Northwest. The terpenes are of course not for or because of me. Yet I have become an interested body through which the cottonwood's healing properties are articulated and circulated (Bennett 2010; Hustak and Myers 2012; Latour 2002).

Likewise the licorice smell of osha root, which on that day at Bone Lake with Val and Miguel, confirmed that this is the plant we were after. As they dug into the soft, wet earth to gather the large clumps of the root, Val explained that she would make the roots into medicine to share. She said that Inez Bill, Tulalip tribal elder and one of Val's most important plant teachers would be so pleased. I pointed out the differences between *Ligusticum canbyi* and *Ligusticum grayi*, explaining my theory that these two species are testimony to another kind of "edge." Canby's lovage is primarily an east side plant, while Gray's lovage is more commonly found on the west side of the mountains. Here on sχəy'ús, eastern bands and tribes met western ones. I muse that perhaps the two lovages are evidence of this ancient practice. Then again, perhaps it is just the plants reminding us that our simple categories of east versus west side montane forests don't really fit the variegated spaces that inhabit the boundary line.

## Plants, Affect and Healing in NWIC's Traditional Plants Program

I had first met Valerie at a Lushootseed language conference in the spring of the previous year, where she and Elise Krohn had conducted a workshop in making herbal salves. Both interspersed instructions for how to make the salve with their knowledge of the particular plants being used in it. As the two of them walked attendees through the process that day, they had invited peoples' participation and also encouraged them to share stories and ask questions about their experiences with the plants that they talked about. Val used a variety of stories from different traditions to teach about yarrow, retelling a Lakota story and then the Greek story of Achilles to explain this plant's power. Yarrow is a warrior plant that is used to stop bleeding, cool down inflammation and help treat infection. The most potent yarrow medicine is found in difficult growing conditions away from pollution, at places like Bone Lake, for instance. That day was the first of many times I would hear Val talk about her relationships with plants as friendships. It takes time and energy to get to know our friends, she said. Better to have a few good ones than many superficial ones.

Then Elise introduced cedar, plantain and comfrey. She described cedar as "long life giver," explaining that it has anti-microbial, anti-bacterial, and anti-fungal properties. Cedar "makes its own medicine," she said, because it has to protect itself from infection, given the wet conditions it lives in. Plantain (*Plantago major, P. lanceolata*), she explained, is "so powerful it bursts through cement." It contains vitamins C, A, and K, is soothing, and cleans out infection. Elise described how Johnson Charles, a lower Elwha tribal member who recently passed away, liked to tell the story of how his little brother got such a bad case of staph infection in his leg that the doctors wanted to amputate. Instead his family treated the boil that caused the staph with plantain. They would heat the leaves and apply them to the boil twice a day. In a few days the boil drained and within a couple of weeks the boy was completely healed. Someone in attendance asked whether or not plantain was a native species, to which Elise replied that no, it was not. She went on to describe how Subiyay had responded to similar questions about the use of non-native plants. Subiyay said that the elders would never have rejected a plant based on its status as native or non-native. What was more important was whether that plant could be a good neighbor and ally.

The question raised that day about the role of non-native plants in an Indigenous pharmacopeia had come up before, during other traditional plants classes that I participated in over the years. It had in fact come up at the very first one I attended. A local ethnobotanist with whom I had carpooled to Squaxin Island with had wondered out loud why non-native plant foods and medicines had been included, even emphasized in the class. Johnson Charles had been there that day, and had shared his story of the miraculous healing with plantain. There were questions too about the appropriateness of Elise, a non-native person, teaching tribal members about traditional uses of plants and medicines. Subiyay had taught both native and non-native students, including Elise. He was open to sharing his knowledge with anyone who sincerely wanted to learn, and whom he felt would use what was learned in a good way. As I describe in greater detail in the next chapter, there will of course also always be forms of knowledge that are closely held within particular families. But the broader role of the work of both natives and non-natives was not about specific identities, but about ways of connecting to the earth and to cultural identity that are healing.

In the autumn, after an elder offers a prayer, participants in an NWIC traditional plants class will sit down to a simple meal of huckleberry infused elk stew. They will sip qʷəlut tea and savor the smells and flavors of the food. For some in attendance, these flavors will infuse the body with memories from this life and the lives of the ancestors. We will learn about the role of healthy fats in a traditional diet. We will remember the feeling of satiety. In the afternoon the room will be filled with the smell of devil's club root processing. We will prepare a salve of devil's club oil, beeswax and lavender oil to treat the elders' achy joints and bones. There are smiles and laughter as the smell and the warm company intoxicates us.

The classes are about self-care, but not the disciplinary self-care of an atomistic self. The atomistic self thrives on the maintenance of firm and static categorical boundaries like the native/non-native distinction. Rather, the traditional plants classes were about care of the self through alliance and connection. Learning to be affected and articulate with the plants, with culture, with life and its flourishing is a strong antidote to the illusion of the atomistic self. In that vein, these classes and the alliances they facilitate are both healing and mildly subversive.

## Alliance and Difference

I end this chapter by sharing what the plants have taught me about alliance across difference. Just as Coast Salish storytellers remind us that stories work on different people in different ways, you may make sense of the stories that I have just told you in a way that is different from mine. But, as Donna Haraway (riffing off Marilyn Strathern) has said with regard to anthropology's study of relations with relations, "it matters what stories tell stories, what thoughts think thoughts, what words world worlds" (Haraway 2014).

Following swədáʔχ and its relations as sign process potentially opens a space for cross-cultural dialogue and understanding – for building alliances across different, but resonant ontologies and senses of place. As I have described above, many non-tribal harvesters also enact deep senses of place when they pick huckleberries. Just like tribal harvesters, many non-tribal harvesters, too, are elders (or at least elderly), and hold a great deal of local ecological knowledge (see appendix A). I would also argue that, like Elise, non-native humans are capable of tuning in to the wisdom of the plants and their healing capacities, just like non-native plants are capable of healing too.

Yet plant and human lifeworlds and the sign processes that comprise them really are quite different from one another. For instance, there is increasing evidence that immune signaling pathways in both plants and animals are the result of convergent evolutionary processes rather than one grand divergence (Ausubel 2005). Perhaps the plants communicate in ways that are entirely outside the categories of icon/index/symbol. To paraphrase the therolinguists and their struggle to understand the language of plants in Ursula LeGuin's "The Acacia Seeds": Can we in fact know it? Can we ever understand it? … We do not know… (LeGuin 2014).

And while the biosemiotic approach outlined here is an opening to the intelligence and communicative capacity of plants, we cannot presume an "unconditional right of admission" (Marder 2013:9), into their worlds, which are worlds of and for them. Similarly, while biosemiotics offers a potential opening to alliance, native traditional ecological knowledge is different from settler knowledge (including settler science), and is not really for or about "us." While settler stories are deeply meaningful and important to those of us who carry them, those stories are quite different from the Indigenous stories of this place, stretching back to time out of mind as they do. Those deep time stories are about coevolution with the land, and as I describe in the following chapter, the responsibilities that entails. They are also stories of displacement and dispossession (Breslow 2011; Capuder 2013; Thrush 2007).

In many ways the following chapters are about settler responsibilities to both kinds of Indigenous stories about place, and about finding alliances along the boundary lines of skəbáχad, the edges of our worlds. Perhaps most importantly, this includes advocating for Indigenous spaces and senses of place that most settlers will never be a part of - spaces for native communities to heal from the past, to be in dynamic relations with swátixʷtəd in the present, and to teach youth about ways of becoming with the land for the future.

# Chapter 3

# Ecologies of Reciprocity

### Balance, Reciprocity and ts'ytk$^w$o

One summer Miguel and I went to Bone Lake with two Muckleshoot tribal members who were enrolled in the Tribe's "Adult Worker Training Program." The AWTP prepares young adults for regular employment within the Tribe. AWTP members do a variety of jobs for different tribal departments over the course of their participation, which gives them an opportunity to think about what kind of work they might enjoy doing in the long-term. Miguel had a grant with the tribe to organize cultural activities for tribal members, and was doing a lot of medicine making with tribal elders at the senior center. In addition to hopefully gathering a few huckleberries for ourselves, we planned to gather plants for medicine making with the elders.

We took the lower trail and hiked down to the bottom meadow by Bone Lake. It was such a dry year that the "lake" was nothing but cracked, dry mud. We could still smell the elk though, and the spring where the osha grows so well was still flowing. The huckleberries were not abundant but they were unbelievably sweet. As we browsed through the meadow, we would drift apart for a while, then join together and chat, then drift apart again, each of us absorbed in our thoughts. Once when Pat and I were picking berries close by one another, he asked me if I had ever heard or smelled anything strange when I had been working up here. I told him how during my fieldwork, I had lost something of value every year for three years in a row. A water filter, a brand new hatchet – the third thing seemed important too, but I couldn't remember what it was.

I shared how I had always had the feeling that I was being watched, that there was not just one watcher, but a host of them. At Bone Lake, the elk are always closer than you think. And then there are mountain beavers, ravens, sooty grouse, and barred owls. Bear or cougar had probably also kept an eye on me at some point in time and another. Sometimes when the huckleberries shined a certain way, I felt that they recognized me. On my last day of fieldwork there, I had the overwhelming feeling that the place itself recognized my presence and welcomed me back. As if I had become a part of the place; as if I belonged there. That night at my campfire, two long-eared owls had circled above me as the sun set on Mount Rainier. But there were other feelings too – there was also the presence of things that I sensed but could not name.

Pat started telling me about ts'ytkʷo (bigfoot)[21], describing what they sound like, what they smell like, and some of the trouble they had caused his family on the reservation. I already knew that ts'ytkʷo were part of reservation life from my experiences teaching at the tribal college. The students would always draw the blinds in the classroom just before the sun went down. Once when I took one of my classes down to the White River behind the amphitheatre to spend time with the plants, several of the students heard a ts'ytkʷo not far from where we were. "I would just leave a little tobacco if you come up here again to work," Pat suggested. "Just leave 'em a couple cigarettes or something."

A little later we gathered by the osha meadow to eat lunch. Miguel, Pat and Melissa gathered the damp, aromatic roots as we ate. Before she started eating or gathering, Melissa broke off a piece of her sandwich, crumbled it into smaller pieces, and tossed it about on the ground. "Are you feeding the critters?" I asked her. "It's just something that I always do," she answered. The topic of ts'ytkʷo and also the elk came up again. I shared my story about losing things here. As we got up to pick berries for a while longer before it was time to leave, I realized

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[21] Jay Miller says that *ts'ytkʷo* and *stitał* (stick Indians) are one and the same sort of being (J. Miller 1999). I am not convinced that Coast Salish people agree with this.

that somewhere along the way I had lost my water bottle. “That is why I always scatter some food,” Melissa quickly said.

The message that I got that day is that when a person takes something from a place that belongs to someone else (in this case ts’ytk$^{w}$o), that person needs to give something in return. While the reciprocity in this instance was about an immediate exchange, I think it says something larger about Coast Salish gift economies and the varying temporalities of reciprocity that they entail. It is about maintaining a balance between give and take, which extends outward to maintain a cosmological balance in the world as a whole. Chaos theory and disequilibrium ecologies aside, homeostasis seems a more desirable condition from the perspective of the individual.

## Coast Salish Gift Economies

This chapter offers a “plant-centric” view of the historic Puget Sound Coast Salish food system. It is an attempt to integrate the cosmological aspects of historic Coast Salish food systems with a more etic understanding derived from the field of ecological anthropology, both of which I argue concern alliance. In doing so, I explore a different kind of gap – that of the space between “subsistence” and “market-oriented” ways of making a living.

What links ontology with ecology in this chapter is the notion of the “gift economy,” practices of ongoing exchange and reciprocity between individuals or groups where there is no explicit agreement made about immediate or future compensation. Focusing on the Puget Sound Salish gift economy through the lens of “tiχdx$^{w}$,” I describe how the highly networked historic food system was maintained through a kind of redistributive justice involving the cultivation of relationships with people, plants, animals and place. Food systems encompass the social, economic, and ecological aspects of food production and redistribution at multiple spatial and temporal scales. The chapter is a heuristic model of the food system and how practices of tiχdx$^{w}$ enhanced resilience in the face of resource variability in Puget Sound Coast Salish country. As I discuss in the conclusion, the nuances of the model could be further fleshed out through collaborative, interdisciplinary work. Following the thread of nourishment from chapter two, chapter three focuses primarily, though not exclusively on the nutritional qualities of Puget Sound Coast Salish traditional foods. While recognizing that human nourishment is complex and not easily reduced to specific dietary components, I give particular attention to Vitamin C, iron, and calcium. These three micronutrients are crucial to the diets of women and children, and as I discuss in greater detail below, typically obtained by consuming plants.

Puget Sound Salish gift economies constituted a set of strategies and practices that, amongst many other things, were adaptive to spatial variability of plants and animals across the landscape, and their temporal variability at different scales of time. The ethnographic analyses of Wayne Suttles, more than any other ethnographer of the Coast Salish endeavored not only to describe, but also to explain the links between variations in social organization and environmental variability on the Northwest Coast. Suttles employed an adaptationist framework to attempt to explain how the highly networked Coast Salish social system worked to ameliorate challenges of spatial and temporal variability, including both periodic shortage and surplus in Coast Salish food systems (Suttles 1987a; Suttles 1987d; Suttles 1987b).

The literature on risk, reciprocity and social networks also provides a theoretical framework within which to understand how the social system and cultural ideologies of Puget Salish people helped to address specific challenges to “food security” grounded in spatial and temporal variability. This body of work is an economic approach that attempts to explain how and why individuals make the choices that they do in terms of balancing the costs and benefits of social cooperation. In this model, cooperation itself is a risk, given that there is always the possibility of defection (i.e., that a partner will not hold up their end of the cooperative bargain). As I hope to demonstrate in this analysis of the Puget Sound Salish food system as a gift economy, the forms of gifting and other practices of reciprocity seem to have been as diverse as the peoples' likely motivations for doing so, pointing to a practical system that both includes and exceeds rational economic behavior.

## *The Gift, Revisited*

Gift economies have been an obsession of anthropologists at least since Marcel Mauss, who famously argued that there is no such thing as a free gift (Mauss 1950). Rather, Mauss argued that gifts such as those given in the Northwest Coast potlatch are an invitation to an ongoing relationship involving three obligations: giving, receiving and reciprocating (Mauss 1950:39). "The 'gift,'" Mauss famously said, "is a contract with a time limit" (1950:37).

In Mauss' view, the capacity to give was a reflection of the "chief's" good fortune, while the motivation for giving was to enhance one's own prestige by humiliating others. Mauss' analysis of the potlatch as characterized by rivalry and "agonism" was based on the observations of other ethnographers working in the more Northern Northwest Coast (from Northern Vancouver Island to Alaska), and was also ahistorical, as it did not take into account the ways in which colonialism may have affected the opulence of potlatch practices observed by early ethnographers (Codere 1950; Moss 2011). This understanding of social hierarchy and the desire for prestige as a driver of gift economies is also present in Malinowski's analysis of the nature and function of the gift economy in the Kula exchange specifically and Trobriand Islands society more generally, when he states that the fundamental motive of giving is to display one's possessions and power.[22] Malinowski claims that in many, but not all cases, the "handing over of wealth is the expression of the superiority of the giver over the recipient" (Malinowski 1964). Bryan Hayden (Hayden 2011) takes this idea to its extreme conclusion in his sociobiological "self-aggrandizer" theory of the emergence of elites in small-scale societies. Hayden argues that self-aggrandizing increases in prevalence during periods of relative abundance, when social proscriptions against self-interested behavior (such as hoarding) may be relaxed.

Yet the ethnographic record suggests that Puget Sound Coast Salish potlatch practices – known as x$^{w}$salik$^{w}$ in northern Lushootseed (Bates, Hess, and Hilbert 1994), and sg$^{w}$ig$^{w}$iʔ in the south (Smith 1940) - were not so much competitive as they were about maintaining the status quo of balanced and thoughtful giving. While acknowledging that individual or group prestige could be enhanced through practices of potlatching, Wayne Suttles (Suttles 1987a) argued that this was not what perpetuated the system. Rather, it was the redistribution of wealth - the maintenance of a kind of energetic equilibrium that ensured that the practice of potlatching itself – and thus the "contractual" relationships within "potlatching circles" - could continue:

> Since wealth is indirectly or directly obtainable through food, then inequalities in food production will be translated into inequalities in wealth. If one community over a period of several years were to produce more than its neighbors, it might have come to have a greater part of the society's wealth. Under such circumstances the less productive communities might become unable to give wealth back in exchange for further gifts of food from the more productive one. If amassing wealth were an end in itself the process of sharing surplus food might thus break down. But wealth, in the Native view, is only a means to high status achieved through the giving of it. And so the

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[22] Though elsewhere Malinowski describes giving, in functionalist terms, as a basic human need: "The view that the native can live in a state of individual search for food, or catering for his own household only, in isolation from any interchange of goods, implies a calculating, cold egotism, the possibility of enjoyment by man of utilities for their sake. This view, and all the previously criticized assumptions, ignore the fundamental human impulse to display, to share, to bestow. They ignore the deep tendency to create social ties through exchange of gifts. Apart from any consideration as to whether the gifts are necessary or even useful, giving for the sake of giving is one of the most important features of Trobriand sociology, and, from its very general and fundamental nature, I submit that it is a universal feature of all primitive [sic] societies" (Malinowski 175).

community that has converted its surplus food into wealth and now has a surplus of wealth gets rid of its wealth by giving it away at a potlatch. And this, though the participants need not be conscious of it, by 'restoring the purchasing power' of the other communities, enables the whole process to continue. The potlatchers have converted their surplus wealth into high status. High status in turn enables the potlatchers to establish wider ties, make better marriages with more distant villages, and thus extend the process farther (Suttles 1987a:24).

Mauss was thus partly correct in his assessment of the "contractual" relations inherent in some aspects of the gift economy, and the practical value of such a system, which is also consistent with an ecological point of view. However an emphasis on the role of prestige in the gift economy overlooks the fact that surplus food was the basis of all the wealth redistributed at these events. What enabled this elaborate institution to continue was the generation of surplus food through a myriad of everyday practices at smaller scales that also reflected the cultural ideologies that were encapsulated in the sg$^{w}$ig$^{w}$iʔ. As the quote by Suttles suggests, these everyday practices up to, and including the potlatch itself, constituted smaller-scale links in multi-scale social networks that were culturally meaningful, ameliorated inequalities in the social system, and also helped to address uncertainty and variability in the overall food system of Puget Sound Coast Salish people. Through an elaboration of the gift economy in the context of a "plant-centric" focus on Puget Sound Coast Salish food systems, the remainder of this chapter elaborates the deep connections between Puget Sound Coast Salish ontologies and the ecological complexity that comprises their traditional territories.

## *The Importance of Plants*

Plants were an integral part of the Coast Salish food system prior to Euro-American colonization, and continue to be integral to the traditional foods revitalization, food sovereignty and ecological restoration efforts of Coast Salish communities in the present (Krohn 2007, Krohn and Segrest 2010). Historically, plants constituted from 20 – 30% of the caloric intake consumed by Northwest Coastal peoples (Murdock 1967). Plant foods were an essential component of traditional Northwest Coast diets, providing dietary fiber and crucial micronutrients not available through the consumption of animal foods (Kuhnlein and Turner 1991), particularly for children and pregnant and nursing women (Norton 1985).

While animal foods are energy dense, high in protein, and in the case of fish oils, provide high levels of Vitamin D, these foods for the most part lack calcium (except for dried salmon, gumboots and herring roe) and iron (exceptions being eulachon, aka. Pacific smelt, basket cockles, and octopus) (Table 3-1). With the exception of the small amounts of Vitamin C in some terrestrial animal liver and in finfish roe, plants provide nearly all of this essential micronutrient in human diets. Plant played a central role in providing these three key nutrients, all of which are so essential to child development and the reproductive capacity of women of child-bearing age.

In addition to their dietary importance, plants played central roles in the entire food systems, and thus the social systems of Northwest Coast peoples, from the marking of seasonal time, to the organization of labor and the maintenance of relationships to ensure access to important food plants, to the fashioning of digging sticks, basketry, mats, and nets for harvesting and processing, to the use of fuel wood for cooking fires, and the creation of implements for cooking, serving, consumption and storage of both plant and animal foods (Ballard 1950; Gunther 1973; Norton 1985; Turner 2000). Given that the harvest and stewardship of plant resources fell primarily, though not exclusively to Northwest Coast women, the study of people-plant relationships is also inevitably a study of women's contributions to the well-being of a community (Norton 1985; Smith 1940; Snyder 1965).

**Table 3-1: Nutrient content comparison of selected Puget Sound Coast Salish animal foods**

| *Nutrient content of selected animal foods* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species- Latin** | **Common name** | **Part used** | **Food energy (kcal)** | **Protein g** | **Fat g** | **Carb g** | **Vit. C mg** | **Vit. A (RE)** | **Calcium mg** | **Iron mg** |
| *O. nerka* | sockeye | hard dried | 371 | 57.2 | 14.4 | 3.2 | 0 | 82 | 136 | 1.9 |
| *Thaleichthys pacificus* | Eulachon | smoked | 308 | 20.5 | 24.8 | 0.8 | 0 | 1183 | 30 | 12.2 |
| *O. kisutch/O. tshawytscha* | coho or chinook | kippered, canned | 266 | 30.7 | 15.9 | 0 | 0 | 15 | 38 | 1.7 |
| *O. nerka* | sockeye | kippered, canned | 190 | 29.5 | 7.7 | 0.7 | 0 | 0 | 68 | 1.3 |
| *O. kisutch/O. tshawytscha* | coho or chinook | smoked, canned | 150 | 23.2 | 5.9 | 1 | 0 | 84 | 60 | 1.8 |
| *Odocoileus hermionus* | venison | | 117 | 21.5 | 3.4 | 0.2 | 0 | 0 | 7 | 2.9 |
| | Mixed spp. clams | raw | 86 | 14.67 | 0.96 | 3.57 | 0 | 90 | 39 | 1.62 |
| *katharina tunicata* | gumboots | | 83 | 17.1 | 1.6 | 0 | 0 | 495 | 121 | 16 |
| *Clinocardium nuttalli* | basket cockle | steamed | 79 | 18.5 | 0.7 | 4.7 | 0 | 0 | 30 | 16.2 |
| *Stichopus californicus* | Sea cucumber | | 68 | 13 | 0.4 | 3.1 | 0 | 77 | 30 | 0.6 |
| *Clupea harengus pallasi* | Pacific herring | roe; from kelp | 59 | 11.3 | 0.8 | 2.6 | 0 | | 161 | 3.4 |
| *Octopus dofleini* | Octopus | | 57 | 11.9 | 0.6 | 0.9 | 0 | 0 | 24 | 5.3 |
| *Clupea harengus pallasi* | Pacific herring | roe; from hemlock branches | 56 | 9.6 | 1 | 4.4 | 0.6 | | 19 | 2.7 |

**Table 3-2: Nutrient content comparison of selected Puget Sound Coast Salish plant foods (per 100g fresh weight)**

| ***Nutrient content of selected plant foods*** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species- Latin** | **Common name** | **Part used** | **Food energy (kcal)** | **Protein g** | **Fat g** | **Carb g** | **Vit. C mg** | **Vit. A (RE)** | **Calcium mg** | **Iron mg** |
| *Allium nuttalli*[1, 3] | Nuttall's onion | bulbs (fresh) | x | 2.8 | 0.2 | x | 15 | x | 29 | 1.5 |
| *Balsamorrihza sagitatta*[2] | Arrow-leaved balsam-root | roots (fresh) | x | 4.1 | x | x | x | x | x | x |
| *Camassia leichtlinii*[3] | Great camas | corms (fresh) | x | 1 | 0.1 | 16.4 | x | x | 19 | 0.6 |
| *Camassia quamash*[3] | Common camas | corms (fresh) | 61 | 0.9 | 0.1 | 14.8 | 4 | x | 17 | 1.6 |
| *Erythronium grandiflorum* | Avalanche lily | bulbs (fresh) | x | 2.9 | 0.3 | 21.8 | x | x | x | x |
| *Fritillaria camschatensis*[2] | Riceroot lily | bulbs (fresh) | 98 | 2.9 | 0.3 | 21.8 | 29 | x | 10 | 2.2 |
| *Lomatium cous*[1,3] | Biscuitroot | roots (fresh) | 127 | 1 | 0.4 | 30 | 17 | x | 79 | 3.6 |
| *Perideridia gairdneri*[3] | Gairdner's yampah | roots (dry) | 350 | 6.2 | 1.7 | 79.3 | 3 | x | 74 | 7.5 |
| *Sagitarria latifolia*[3] | Wapato/arrowhead | tubers (fresh) | 103 | 4.7 | 0.2 | 20 | x | x | 12 | 6.6 |
| *Chenopodium album*[1] | Lambsquarters | seeds | 414 | 16.6 | 4.2 | 49.6 | x | x | 1017 | 62.9 |
| *Corylus sp.* | Hazelnut | nuts | 634 | 12.6 | 62.4 | 16.7 | 1 | 7 | 209 | 3.4 |
| *Quercus alba*[1] | White oak | nuts | 219 | 2.8 | 3.5 | 52.6 | x | x | 109 | x |
| *1. Closest species to native varieties that grow in Puget Sound Basin* | *2. Possible species only id'd to family in report* | *3. Tentative id* | | | | | | | | |

## TIXDX$^w$: CULTIVATION OF RELATIONSHIPS WITH PEOPLE, PLANTS, AND PLACE

The Lushootseed concept of "tiχdx$^w$" is foundational to Coast Salish understandings of care for humans and the more-than-human world (Miller and Hilbert 1993). The root word here is the verb "tiχ," which means to spread (Bates et al 1994). The suffix, -dx$^w$ refers to an uncertain level of "control" that the actor has over the action (ibid.). An English gloss would be that a person "managed" to accomplish the action. In Coast Salish languages, expressing the extent of "control" that a person has in taking some action is obligatory. Upper Skagit elder Vi tak$^w$šeblu Hilbert suggested that in the full sense, the English gloss "control" reflects a kind of mindfulness and means 'to take care of, hope for, indicate regard for, show concern' (Miller and Hilbert 1993: 238). The root –dx$^w$ thus suggests a great deal of forethought and intent, along with perhaps recognition of the possibility of failure, or the inability to accomplish a task on one's own. tak$^w$šeblu suggested that -dx$^w$ is closer to 'caring' and reflects a way of life in which each person has responsibility for others more than the self. People are respected as leaders because they take care of their own responsibilities and help out others, "like the care shown by birds for their young" tak$^w$šeblu said (Miller and Hilbert 1993:239).

Status as a high status person, or siʔáb,[23] (a derivative of ʔiʔáb, or "wealth") is predicated on one's capacity for generosity. The capacity to accumulate and share food and wealth revolves around the possession of g$^w$əd$^z$ádad ("advice") about one's own heritage and the responsibilities inherent in maintaining good relations with human and non-human others. Thus, someone who is siʔáb has the capacity to "manage to spread it out" (tiχdx$^w$) – to be generous, to share. Astrida Blukis-Onat, an ethnohistorian and archaeologist who has worked in Puget Sound Coast Salish

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[23] Suttles pointed out that rather than resembling a pyramid in structure, Coast Salish social class more resembled an inverted pear, with the majority of people at least considering themselves to be *siʔáb* (Suttles 1987:12).

country for more than forty years, proposes that "cultivation" in the broadest sense is possibly the most appropriate English gloss to fully express this perspective:

> It applies to the improvement and preparation of land by loosening or digging, to planting and tending a crop, and to nurturing and fostering the growth of plants. The term also applies to enhancing human relations through means of education and social refinement […] Cultivation applies to the totality of cultural interaction, both within a community and without (Blukis-Onat 2002:128).

Cultivation thus entails maintaining good relations by living up to one's responsibilities to care for other people, spirit powers (skəlálitut), plants and animals, and the land.

From this perspective, the relationship between the notion of (and focus on) "prestige" as a driver of the gift economy shifts from one in which the "high class" person is a self-interested, calculating individual focused on his or her own well-being, to one in which prestige and class are about striving to be an exemplary human being.[24] To be an exemplary human being in the Coast Salish world is to accept the responsibility to follow advice, to know your history, to take care of others more than the self, and ultimately to keep the energy and animacy that is the foundational gift of life flowing. Not unlike the merchants in Robin Kimmerer's dream market where everything was freely given, the ideal siʔab are "intermediaries passing on gifts from the earth" (Kimmerer 2013:29).

This is similar to Sami scholar Rauna Kuokkannen's argument in her critique of Mauss' explanation of the "pre-market" economy. What Mauss left out, according to Kuokkannen, was the idea that gifting also acknowledges and renews a cosmological philosophy characterized by the knowledge of the natural environment as living, and which "gives its gifts in abundance to people if it is treated with respect and gratitude" (Kuokkanen 2007). As Kuokkannen articulates

[24] Snyder describes some of the nuances in the term siʔáb. As a term of reference, and in the broadest sense, her description agrees with the one given above, and is reserved for people with true marks of respectability (Snyder 1964:117). As a term of address, calling someone "siʔáb" is somewhat similar to calling them "sir," or "ma'am," at times "with frank hypocrisy" (ibid.). And of course people often did not live up to the ideal – Snyder devotes a substantial amount of attention to the numerous examples in Upper Skagit folklore involving the lampooning of siʔab people and those who aspire to that status.

so well a repeated theme of Indigenous ontologies:

In gift reciprocity and mutuality, the ultimate goal is to secure the physical, social and spiritual well-being of the individual, community, and the entire social order. The goal of gift reciprocity is to recognize and sustain the relationships in and with the world (Kuokkannen 2007:265).

Food is one of the foundations of gift reciprocity in the Coast Salish world, ultimately provided through relationships with sqəlálitut, or "immortal beings":

The original inhabitants of the Lushootseed world became the present immortals who 'own' the land and steward all of its resources, occupying appropriate plank homes at various locations. As 'persons' they also travel widely and visit; humans might encounter them anywhere. While fasting and praying on vision quests, human children sought them out in hopes of visiting the immortals' homes, where the youngsters received a full dose of power allowing success (Miller 1999:57).[25]

Personal efficacy in any endeavor – including success at fishing, hunting, gathering and harvesting - requires the assistance of sqəlálitut. When it comes to berries, for instance, different spirit powers might be required for different aspects of a successful harvest. In her ethnography with the Upper Skagit, June Collins wrote about how sqəlálitut supplied the songs to make the berries grow, together with the knowledge of how to burn an area of forest in a carefully controlled way (Collins 1974).

The "immortal beings," or sqəlálitut's existence extend back to the Myth Age, or sx$^{w}$óχ$^{w}$iyám, a time of flux at the dawn of the world that continued for countless eons (Miller 1999). In the time of sx$^{w}$óχ$^{w}$iyám or the Myth Age, the land and people were strange and different from the way they are today. Old Pierre, an upper Sto:lo First Nations man from Katzie, on the Fraser River described the way the world was when it first came into being:

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[25] Although as Marian Smith pointed out, it wasn't absolutely necessary to go through the rigors of preparing for the guardian spirit quest; as spirit powers also desired to make contact with their human partners. sqəlálitut could come to a person through one's own effort, through inheritance, or they could come unsought: "One prepared for and did or did not seek it, one accidentally became receptive and it came unasked, or it came unsought to those who would not normally have been considered fit subjects. The stories which most delighted [the Puyallup-Nisqually] were those of people dirty, slovenly, untrained, without important family connections, who 'got good power' and became influential" (Smith 1940:58).

> There were no leafy trees to cast deep shadows. The dark green firs stood as they stand today, but they were grim and silent; no winds rocked their summits, no birds nested in their branches, no animals roamed by day or night past their motionless trunks. In the waters of the sea and the rivers there were clams and mussels, but no salmon, eulachon, or sturgeon, no seals and no sea lions (Jenness 1955:10).

The beings of the Myth Age were strange, ambiguous and powerful. They were in constant flux between human, animal, and monster, they "molded the strange and ever-changing places where they dwelled" (Oliver 2010:29). Animals and humans shared a common language, and they could have intercourse and make children together.

Myth Age stories, or syəhúb vary from place to place, but all share the presence of one or more dukʷibəł, or Transformers, who travelled across the landscape, preparing the world for the human beings of today (Ballard 1929; Collins 1974; Elmendorf 1992; Jenness 1955; Miller 1999; Suttles 1955). Old Pierre told Diamond Jenness that the "lord above" ćičəł səyem, created five couples (somewhat like Adam and Eve). They and their children went on to create the elements, significant places on the landscape, and habitat for important plants and animals (Jenness 1955). Upper Skagit elder John Fornsby's Transformer story equates transformer with God, who gave a great deal of thought to how the first people would make a living. It is for this reason that first food rituals were initiated, along with other protocols and proscriptions associated with hunting, fishing and gathering plant foods (Collins 1949). Joe Young, a Snoqualmie elder, described to Arthur Ballard how Moon, the progeny of a woman from earth and a red-eyed star, is responsible for the earth's transformation (Ballard 1929). Moon the Transformer married dog salmon and his first act of changing the world entailed affecting their migration patterns. This dukʷibəł created many kinds of plants and animals and also tamed fire.

The 'capsizing' marks the end of the world change by Transformer, but it was not Transformer's doing (Elmendorf 1992). At the capsizing, beings assumed their final forms, and became associated with particular locations on the landscape. Many continue to exist as geographic features, and unusual sounds and appearances (Miller 1999). It is these original beings who are the sqəlálitut, and with whom contemporary Coast Salish people continue to maintain relationships. The change in the Myth Age was a gift given to the first human people by Transformer. This is, I believe also the source of proscription in the ethnographic record against selling or bartering foods, particularly to one's family or community. As Suttles describes (and as I discuss in greater detail below), food is considered a spiritual gift and therefore should not be "sold" (Suttles 1987a:22).

The understanding of food as a foundational gift continues to be central to Coast Salish ideology in the present. The gift of food was a repeated theme in the work of the Northwest Indian College's "Diabetes and Traditional Plants Program," and its later incarnation as the "Traditional Foods and Medicines Institute." Everyone involved with the program continually expressed and practiced it. For example, "The Gift of Food" board game, developed by staff and consultants (including myself) in 2014, was designed to teach players about Northwest Coast Indigenous values through role-playing the seasonal round as a Northwest Coast Native family. Players are encouraged to "collaborate and practice generosity, stewardship and gratitude" (Krohn and LaPenseé 2014).

Coast Salish understandings and practices related to the gift of food were and are foundational to practices of generosity and reciprocity. At its most fundamental level, these practices are an acknowledgement that the "individual" never acts alone. dukʷibəɬ made the earth a good place for humans to live. The "immortal beings" continue to be partners and allies to human beings, providing the necessary skills to acquire from the earth all that is needed. But the relationship with sqəlálitut is a reciprocal one, where the human partner is also expected to give in return. Likewise, accepting the gifts of plant foods and medicines also requires reciprocity and a spirit of generosity. As Tulalip tribal elder Inez Bill says:

All things in our environment are a gift – foods to nourish our bodies, medicine to heal us, and a spiritual connection that brings us into our values and teachings. Our teachings tell us not to take more than we need, not to waste anything, and to share our harvests with others in a generous and kind way. This will allow these gifts to nourish us and be our medicine.

Our teachings tell us that before we harvest a plant, we say a prayer to show our gratitude for what the plant provides us, and to let it know how we will use it. In that way, we are honoring its spirit (Bill 2015:1).

The relationship with sqəlálitut also entails responsibility to continue to care for the particular places, plants, animals and rituals associated with the Transformation of the land. This kind of care is often associated with particular families:

Every plant and animal is thought to carry its own spiritual gifts, and the methods to honor these with prayers, songs and ceremonies are passed down though the generations. When young people become the caretakers of this knowledge, it gives them an important role and purpose in society. Some families even specialized in knowing one food or medicine. … In the film *The Teachings of the Tree People*, Skokomish elder, Bruce Miller said, "You don't teach all of your children exactly the same thing. If you do, they will not need each other, and the world will split apart" (Krohn & Segrest 2010:9).

Bruce's remark is a reflection of an interconnectedness in Puget Sound Coast Salish villages and families that is grounded in the unique gifts of each. Each person, family and community has their gifts, and it is the variability between them that joins them together into a social network. It is from this perspective that I think we need to understand the highly networked nature of the Puget Sound Coast Salish food system. From this perspective it is also consistent and appropriate to consider how such a system may have functioned pragmatically to address challenges in the food system that Puget Sound Coast Salish people had to address. The following section, links the historic food system with the ecological factors that may have shaped it from a theoretical perspective grounded in ecological anthropology.

### *Variability, Unpredictability, and Biocultural Complexity*

The Puget Sound Coast Salish region is often characterized as a place of natural abundance, yet the nature of the environment and certain features that posed potential challenges to ensuring a consistently abundant and nutritionally diverse diet characterize key food resources here. These included temporal variability of key foods, along with ecological heterogeneity and thus, spatial variability of different kinds of plant and animal foods. As I describe in greater detail below, these types of variability were for the most part predictable. But there are also aspects of the environment that are quite unpredictable. Unpredictability stemmed both from slow-moving and fast-moving variables. Slow-moving variables can affect species abundance, productivity, and/or composition on the landscape over the long-term (i.e., long-term climate forcing and inter-decadal climate cycles). Fast moving variables have the potential to leave people and the plants and animals they depended upon subject to unpredictable fluctuations in normally reliable food supplies (i.e., short term weather related events), as well as potentially devastating disasters (i.e., volcanism, earthquakes). Despite these challenges, before the arrival of Euro-American settlers, Puget Sound Coast Salish social networks, and particularly exchange networks, appear to have been a resilient strategy that successfully functioned for thousands of years to mitigate for the uncertainties and variability that characterize the region. The sg$^{w}$ig$^{w}$iʔ was simply its ultimate expression.

*Resource Variability:* In the short-term, both spatial and temporal variability of key resources were typically predictable within a certain range of variation in Puget Sound Coast Salish country. The people living in a given village could therefore address these kinds of challenges through careful planning and cooperation within their own communities and with other groups. In the case of temporal variability, most of the food plants that a given village or family used were predictable but only seasonally available for harvest, or “contingent” (Colwell 1974). People might increase the availability of these kinds of plant foods by processing and storing them for later use, and through plant cultivation practices, or what Bruce Smith refers to as “low level food production” (Smith 2005). In the Puget Sound region, these practices of tiχdx$^{w}$

typically involved cultivating perennial plants, and included burning, weeding, tilling, transplanting, and pruning (Norton 1985; Norton 1979b; Turner and Peacock 2005).

Many species of culturally significant plants also occur only in quite specific habitats. In addition to reiterating the cultural salience of plants as demonstrated by the many plant-related place names, a map of the historic Duwamish-Green-White River watershed ("stúləkʷ," or river), also reiterates their spatial variability (Figure 3-1). Cooperation between villages and within kinship networks probably helped to ensure access to, and redistribution of these kinds of spatially variable resources. Goland (Goland 1991) helps to explain why the people may have stored foods that they could typically rely on from year to year, and also a practical benefit of participating in networks of reciprocal exchange. Food "storage is a principal means of averaging temporal availability of resources, while exchange and mobility are means of averaging spatial availability" (Goland 1991:107). Goland's work suggests that where the same types of seasonally available, or contingent resources occur over a large area, people produce and store surpluses of food. This is because if everyone in a particular area has access to, and is also subject to the same limitations in terms of seasonal harvest (high intergroup correlation), then mobility and/or exchange are not necessarily viable options, so people store food instead.

At the same time, Goland theorizes that when different villages or groups have access to different kinds of resources (low intergroup correlation), and some members within a given group consistently produce more food than others in the same group (high intra-group variance), "territorialism" may arise. This might include restricting access to highly valued – and presumably more rare – harvest sites such as root gardens, fish weirs, and berrying areas. People might also put more energy into 'social storage' through networks of reciprocity. As discussed in greater detail below, these two strategies are sometimes related.

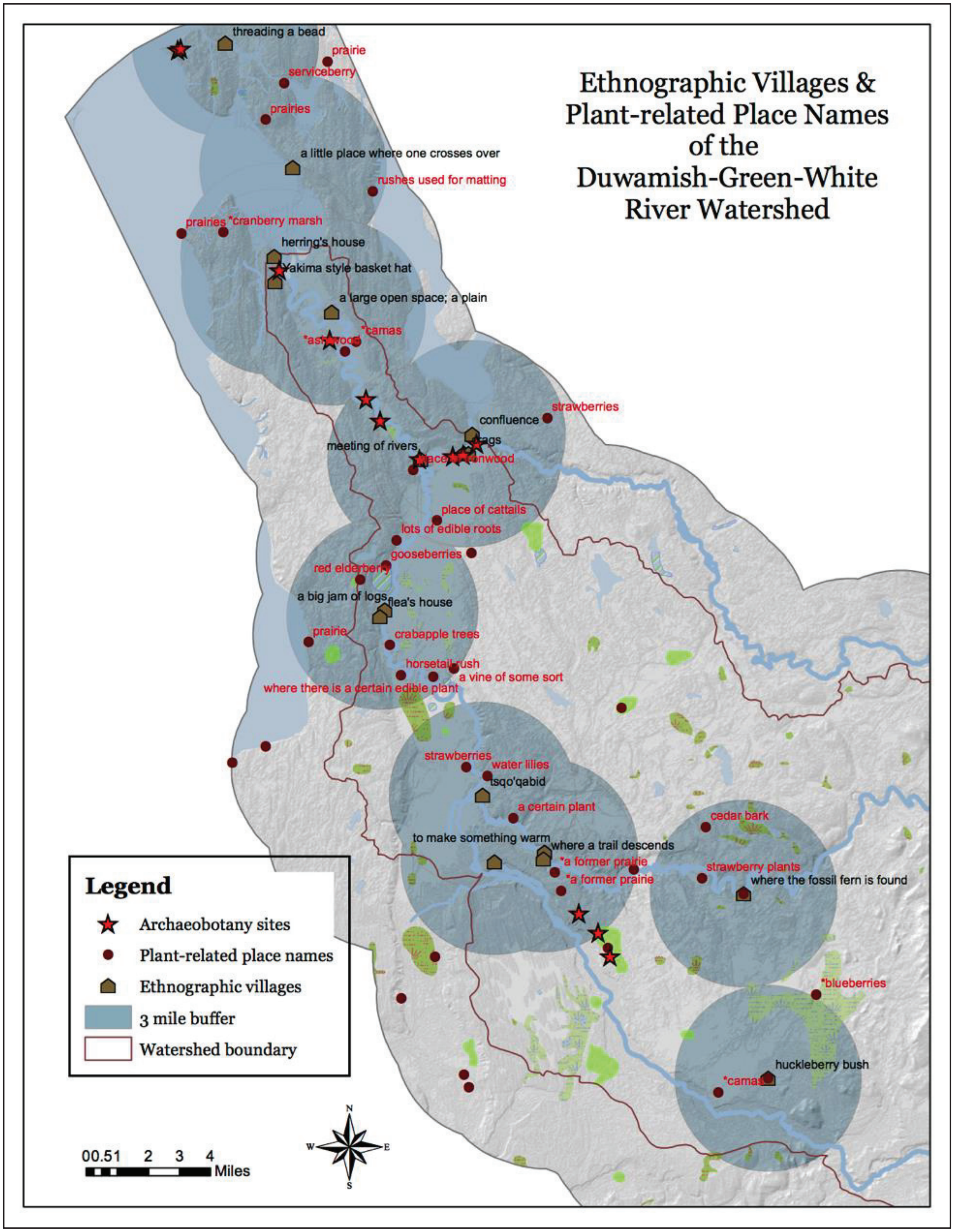


Figure 3-1: Ethnographic villages and plant-related place names of stúlək<sup>w</sup>

*Unpredictability:* The Puget Sound Basin is a "non-equilibrium" landscape. Slow moving, long-term environmental changes in climate have occurred throughout the Holocene, while catastrophic events, such as earthquakes and volcanic eruptions are both unpredictable and rare. Both have the potential to impact human communities over large areas. Their effects could best be addressed through regional scale information networks, which brought into play a broader social memory about major events and changes in the past that affected people at the regional scale, including stories about how they were addressed. Fitzhugh et al.'s social network analysis of the value of local and traditional knowledge (LTK) at the collective, 'supra-band' level describes how social relationships that were maintained at the regional level may have helped to ameliorate the effects of these kinds of uncertainties (Fitzhugh, Phillips, and Gjesfjeld 2011). Social network theory suggests that the greater number of social 'hubs,' (such as villages and other areas where different groups regularly interacted), along with repeated interaction between social hubs leads to higher reliability of the information that is shared (Fitzhugh et al 2011:90). TEK is passed along through narrative, including oral history, story, and songs. When that information is pooled at the collective, 'supra-band' level, the knowledge that is shared may provide a basis upon which to develop consensus (or at least a better understanding) of broader environmental trends, as well as catastrophic events. In other words, TEK pooled at the supra-band level has the potential to provide a larger pool of social memory, and thus potentially, a heterogeneity of responses to current or future events or trends.

In addition to unpredictable and rare kinds of uncertainty, the social system and ideologies that characterized the Puget Salish food system may also have helped to ameliorate unpredictable, local scale uncertainties (i.e., unexpected loss of the capacity to produce surplus food for winter storage, or outright loss of the food that people had stored to get through the winter). Cashdan (1985) provides a theoretical frame for understanding how participation in broader social networks at the scale of the watershed and within socially defined networks might help to mitigate a very localized catastrophic event. Participation in kin, trade, or potlatch networks would work something like an insurance policy. Everyone who participates in these networks has ‘pooled’ their risk through sharing, and having presumably derived benefits from the networks, would prefer for these arrangement to continue. Through their participation, people may get a little less immediate return, but are more likely to be cared for when something local and out of the ordinary happens. However, this form of “generalized reciprocity … can only protect against risk due to environmental variation when there is a situation of temporary local scarcity but regional abundance” (Cashdan 1985:457).

### *Cultural ecosystems*

The social complexity exhibited on the Northwest Coast is often attributed to the unusual natural abundance and species diversity of the region. However, while species abundance and diversity may be the case for marine resources, it is not necessarily so for terrestrial resources, which were also a crucial part of the historical food system of Northwest Coast people. The land and seascapes of Puget Sound Coast Salish homelands cover some 9,000 square kilometers. With a mean annual temperature of ~10ºC; and a mean annual rainfall of ~100cm, the region is characterized as a temperate rainforest. Thus, while the Northwest Coast may be unusually productive when it comes to overall biomass, much of this existed historically in the form of extensive mature forests. While producing the massive χpəyʔac, or western red cedar (*Thuja plicata*) – a tree that was used for everything from cedar plank houses to canoes, clothing and baby diapers, these forests produced very little in the way of edible plants. The historical record is filled with accounts of early settlers, explorers, and surveyors who attest to the extensive and generally ‘impenetrable’ forests of the region:

> The route lay, for several days, through forests of spruce, and some of the trees that had fallen measured two hundred and sixty-five feet in length. One of these, at the height of ten feet from the roots, measured thirty-five feet in circumference, and at the end which had been broken off in its fall, it was found to be eighteen inches in diameter, which would make the tree little short of three hundred feet when it was growing. The stems of all these trees were clear of branches to the height of one hundred and fifty feet from the ground, and perfectly straight. In many cases it was impossible to see over the fallen trees, even when on horseback, and on these, seedlings were growing luxuriantly, forcing their roots through the bark and over the body of the trunk till they reached the ground (Wilkes 1916:18).

Rather, the people accessed, modified, and cultivated the considerable ecological heterogeneity that occurred within and beyond the extensive forests that blanketed much of the land.

The Puget Sound basin is comprised of four biogeoclimatic zones, which are differentiated by climate, vegetation and topography. These include the lowland “coastal Douglas-fir” zone, which, due to rain shadow effects is relatively warm and dry; the “coastal western hemlock” zone, which is relatively warm and wet (described in the excerpt above); the mid-elevation “mountain hemlock” zone, which is cool and wet, and where rain falls as snow in winter; and the high-elevation “sub-alpine tundra” zone, where extended winters are too cold to support tree life (Franklin and Dyrness 1988; MoFor 2012). These vegetation types further multiply into additional variability when one takes into account the differences in species composition between coastal, riverine, and lacustrine habitats, not to mention the variability in the Cascade Mountains between the north and central geologic formations. Each of these zones and sub-zones has its own species compositions, and includes species that are unique to it. Here I provide three of many salient examples.

*Garry Oak Prairies*: Pacific Northwest oak savannahs occur in the drier lowland coastal Douglas-fir zone. The largest and best known of these include the expansive Garry oak (*Quercus garryana*) savannahs of the interior valleys of western Oregon, the southwest Washington prairies (Figure 3-2), Ebey’s Prairie on Whidbey Island, and the area in and around Victoria, British Columbia. In addition to these, there were many other small prairies dotting the Puget

Sound lowlands, the rain shadows of the Olympic Peninsula, and the San Juan and Gulf Islands. Native people maintained these prairies through controlled burning, as Garry oak is a seral species that cannot reproduce in its own shade. These prairies provided a cornucopia of plant foods to the communities who maintained them. The most important of these is the starchy corm of camas (*Camassia quamash*), but other important plant foods include Garry oak acorns (*Quercus garryana*), filberts (*Corylus cornuta*), Puget balsamroot (*Balsamorhiza deltoidea*), chocolate lily (*Fritillaria lanceolata*), bracken fern (*Pteridium aquilinum*), tiger lily (*Lilium columbianum*), nodding onions (*Allium sp.*), Gairdner's yampah (*Perideridia gairdneri*), Spring gold (*Lomatium utriculatum*), crabapple (*Malus fusca*), saskatoon berries (*Amelanchier alnifolia*), soapberry (*Shepherdia canadensis*), chokecherry (*Prunus virginiana*), and trailing blackberry (*Rubus ursinus*) (Duwamish et al v. United States of America 1933; Leopold and Boyd 1999; Norton 1979b; Norton 1979a).

*Wapato*: The iron-rich root of Wapato (*Sagittaria latifolia*) grows along the shorelines of lakes and the slow-moving sloughs of rivers. Wapato was intensively cultivated by Coast Salish people at Katzie along the banks of the Fraser River (Spurgeon 2003; Suttles 1955), and by Chinook people living near the mouth of the Columbia River (Darby 2005). Although its use and stewardship in Puget Salish and Nooksack territories is less well documented, we do know that there were extensive Wapato beds along the shores of Lake Washington at Union Bay, Sand Point, and Juanita Bay, and along the historic Black River (Waterman 2001). People came from as far north as the Upper Skagit villages to harvest at Juanita Bay (Collins 1974), despite the fact that Wapato was also cultivated at Big Lake, which is located just south and east of Mt. Vernon in Skagit County (ibid.).

**Figure 3-2: Valerie Segrest and Roger Fernandez gathering camas at Mima Mounds Prairies**

*Mid- and upper elevation Vaccinium habitats*: As described in chapter three, and discussed in greater detail in chapter four, many desirable plants and animals also occur in mid elevation meadows in the mountain hemlock zone and above tree line in the sub-alpine tundra, most notably swədáʔχ and Cascade blueberry (*Vaccinium deliciosum*). But there are also several species of medicinal plants unique to the mountains (Table 3-3), as well as elk, deer, bear, grouse, mountain beaver, marmot, and mountain goat, whose fine wool was used to make woven wool blankets that were considered a form of wealth throughout and beyond the Coast Salish world.

**Table 3-3: Puget Sound Coast Salish montane plants (Habitat from (Biek 2000) unless otherwise noted)**

| Species | Common name | Uses | Habitat |
|---|---|---|---|
| *Achillea millefolium* | Yarrow | Medicine, leaves & roots (internal & external) (Gunther 1973) | Common on dryish soil 5-7k |
| *Achlys triphylla* | Vanilla leaf | Medicine, leaves (internal & external) | Common in forests & along trails to 4.5k |
| *Allectoria sarmentosa* | Common witches hair | Fiber - facial hair for masks (Nuxalk/Bella Coola) (Pojar, Mackinnon, and Alaback 1994) | |
| *Amelanchier alnifolia* | Western serviceberry; Saskatoon | Food, berries; Fiber, wood (Gunther 1973) | Common along streams & at forest edges to 5.5k |
| *Aquilegia formosa* | Western columbine | Medicine, leaves & roots (external) (Gunther 1973). | Common above 2.5k, riparian & meadow edges |
| *Aruncus dioicus* | Goatsbeard | Medicine, leaves, twigs, roots (internal & external) (Gunther 1973) | Common to 4k, damp cliffs & moist woods |
| *Berberis nervosa* | Low Oregon grape | Food, berries; Fiber, roots; medicine, root (Gunther 1973). | Common below 3k in shaded to open forests but present at higher elvs. |
| *Chamaecyparis nootkatensis* | Alaska yellow cedar | | Common on rocky slopes 3-7k, best developed below 5k |
| *Claytonia lanceolata* | Western spring beauty | Food, bulbs (Lepofsky, *et al* 2005, Smith 2006) medicine, leaves & stems (internal & external) (Gunther 1973) | Common in subalpine meadows above 5k |
| *Epilobium angustifolium* | Fireweed | Fiber, inner fiber; Medicine, root (internal), whole plant (external) (Gunther 1973) | Common & abundant on disturbed sites below 5.5k |
| *Fragaria virginiana* | Virginia strawberry, blueleaf s. | Food, fruit (Gunther 1973) | Common in open woods, along roadsides & trails to 5k |
| *Geum macrophyllum* | Bigleaf avens | Medicine, leaves (Gunther 1973) | Common below 3.5k on disturbed ground and in meadows |
| *Heuchera micrantha* | Crevice alumroot | Medicine, external (Gunther 1973) | Rare, rocky banks cliffs below 5k |
| *Holodiscus discolor* | Oceanspray; ironwood | Fiber, stems & branches, Medicine, bark, flowers, leaves, seeds (internal & external) (Gunther 1973, Smith 1940) | Common in open woods on slopes & at roadsides |
| *Ligusticum canbyi* | Canby's lovage | | Rocky, seasonally moist ground, above 4k |
| *Ligusticum grayi* | Gray's lovage | Food, medicine (Smith 2006) | Subalpine meadows, riparian zones; 5-7k |
| *Lilium columbianum* | Tiger lily, Columbia lily | Food, bulb (Gunther 1973, Haeberlin & Gunther 1930, KingGeorge, pers. com., Lepofsky *et al* 2005; Smith 1940, Turner 1999); | Common in open woods on dryish ground to 5k |

| Species | Common name | Uses | Habitat |
|---|---|---|---|
| *Osmorhiza berteroi* | Common sweet cicely | | Common in open forests below 3k |
| *Pinus monticola* | Western white pine | Medicine, bark (Gunther 1973) | 1.7-5k, but most abundant between 3.5-4.5k. Best on poor, rocky soils |
| *Pseudotsuga menziesii* | Douglas fir | Fiber, wood, bark, pitchwood, boughs; medicine, pitch, needles, bark; ritual, cones (Gunther 1973) | Abundant below 3.5k, to 4.7k, open sites - shade intolerant |
| *Pteridium aquilinum* | Bracken fern | Food, rhizomes (dug in fall & roasted); fiber, leaves (Gunther 1973, Haeberlin & Gunther 1930, Smith 1940). | Moist to dry woods or open slopes, lowlands to montane (Hitchcock and Cronquist 1996) |
| *Ribes bracteosum* | Stink currant | Medicine, bark (Ballard 1929) | Common on moist ground along streams & in swamps to 5k |
| *Ribes lacustre* | Swamp gooseberry | Medicine, bark, twig, berries (internal & external) (Gunther 1973) | Frequent in moist woods, swamp edges & riparian zones, 3.7-5k |
| *Rubus parviflorus* | Thimbleberry | Food, berries & sprouts; fiber, bark; medicine, leaves (Gunther 1973, Smith 1940) | Very common in open places & moist woods, along trails & at roadsides to 4k |
| *Rubus spectabilis* | Salmonberry | Food, berries & sprouts; fiber, stems; medicine, leaves & bark (internal & external) (Gunther 1973, Smith 1940) | Common in wet places along streams and at the margins of meadows & swamps to 5k |
| *Salix sitchensis* | Sitka willow | Medicine, bark (Gunther 1973, Smith 1940). | Very common along streams and rivers, reaching to ~5k but most common below 3k |
| *Trillium ovatum* | Trillium | Medicine, leaf (external) (Gunther 1973) | Common to 5k in deep to open moist forests |
| *Tsuga hetrophylla* | Western hemlock | Fiber, inner bark, boughs, saplings. Medicine, pitch, bark, young shoots (Gunther 1973, Smith 1940). | Very common to 4.5k, shade tolerant |
| *Vaccinium deliciosum* | Cascade blueberry | | Common in subalpine meadows 5-8k |
| *Vaccinium membranaceum* | Big huckleberry, Mtn. h., Black h. | Food, berries; medicine, leaves & berries | Abundant in coniferous forests, occ. brushy places 3.5-5.5k |
| *Vaccinium ovalifolium* | Oval-leaf blueberry | Food, berries (Lepofsky *et al* 2005, Mack 2002, Smith 2006) | Common in fir forests 4-5.5k |
| *Veratrum viride* | Green false hellebore | Medicine, leaf (poultice) (Gunther 1973) | Common above 4k in subalpine meadows & on boggy ground |
| *Xerophyllum tenax* | Beargrass | Fiber-basketry, leaves (Gunther, 1973, Smith 2006) | Most common @ 4.5-5.5k, but as low as 2k; slopes & dry woods |

The spatially variable plants and animals that the people used for food, fiber, and medicines were also seasonally variable – typically available for limited seasons between early springtime and late autumn. Along with a deep knowledge of the material realities of this spatial and temporal variability, the cosmologies, social institutions and cultural ideologies of Puget Sound Coast Salish people guided the production, accumulation, storage, sharing, and exchange of these spatially heterogeneous and seasonally limited resources.

### *tiχdxʷ: Cultivation of relationships with plants and animals*

Puget Sound Coast Salish food system draws from the ethnographic literature of the region, the Burke Museum's "Puget Sound Traditional Foods and Diabetes" list of food remains in the archaeological record (Lape and Kopperl, n.d.; Kopperl 2010), my synthesis analysis of the archaeobotany of the historic Duwamish-Green-White River, or "stúləkʷ" watershed of the southern Puget Sound, and my own ethnographic work. The complete report of my synthesis of the archaeobotany of stúləkʷ is included in appendix B. Because both the ethnographic and archaeobotanical records are so fragmentary, I also reference the literature of their neighbors – the Straits Salish, Halkomelem, and Twana – for additional detail and clarification.

As can be seen on the example of a typical Southern Puget Salish seasonal round and associated Lushootseed calendric terms (Figure 3-3), there are roughly eight active months of plant and animal harvesting within a typical year. In addition to gathering food for immediate consumption, it was necessary historically for people also to gather sufficient foods to see them through the winter months – the end of which was χeχe - the most sacred and dangerous time of year. This was a time between the end of the potlatch season and the onset of the winter dances, when winter food stores might also run low. Although starvation seems to have been very rare, Puget Sound Coast Salish people thought quite a bit about food, and particularly in the inland villages, the late winter months could be precarious times (Snyder 1965:69). Both Sally Snyder and William Elmendorf suggested that, for the Upper Skagit and Twana people respectively, abstinence from overeating was considered virtuous, as it was associated with the purification that was necessary to associate with powerful sq́əlálitut (Elmendorf 1992:139, Snyder 1965:105):

> Until the dancing actually began village activity for a week or two ebbed to its lowest level of the year. Some persons were away from the village alone at ḱwi'at areas, grounds normally not used by man […] Fasting persons at home became withdrawn and often mute, lying on their beds with faces turned toward the wall (Snyder 1965:90).


**Figure 3-3: Southern Puget Sound Coast Salish Seasonal Round**

The Southern Lushootseed calendar also shows that plants played a central role in marking time. This suggests the importance of plant foods in the historic food system, as well as their temporally contingent nature. The availability of plant foods is generally predictable, but they are restricted in time and space. Individual plants don't move particularly quickly, so they don't really change their physical locations, but seasonal changes alter their physical properties through "stages of immaturity to uselessness" (Norton 1985:113). Of primary importance for food were three main categories of plant parts: roots, berries, and "greens," including leaves and plant shoots that were eaten fresh and were also used for teas.

*Root foods*: Root foods are rich in carbohydrates, and thus, like animal foods, are high in calories. They are also for the most part amenable to drying and winter storage, and (as would be predicted from Goland's model), the ethnographic record suggests that Coast Salish people harvested and dried these foods in large quantities for later use. As noted above, camas was key among these, but several other species of "lilies" as well as other roots were important in the villages and also as items of reciprocal exchange. The southern Lushootseed calendric term for spring, "plants in flower," or waχwəʔét, is probably an indication of the importance of this time for digging these roots, as they were most commonly dug while in flower.

Table 3-4 shows the calorie, carbohydrate, Vitamin C, calcium, and iron content of key Northwest Coast root foods for which there is nutritional data available (Drury 1985; Kuhnlein and Turner 1991). There are several interesting things to note about this data. Most importantly, while sources of vitamin C and calcium were more likely to be locally available close to village sites, iron is not. For example, while it is a good source of calories and carbohydrates, the celebrated camas is lacking in other key nutrients. Rather, bitterroot (*Lewisia rediviva*) is high in calcium and iron, and Nootka lupine (*Lupinus nootkatensis*), Gairdner's yampah (*Perideridia gairdneri*), Pacific silverweed (*Potentilla anserina* spp. "Pacifica"), and wapato (*Sagittaria latifolia*) are also iron-rich plants. Many of these grow in very specific habitat types and are documented as having been cultivated on the Northwest Coast more broadly, if not specifically for Puget Sound Coast Salish people. For instance, the cultivation of Pacific silverweed, along with springbank clover (*Trifolium wormsjkoldii*), is documented for northern Indigenous peoples, including the Kwakwa̱ka̱ʼwakw, Nuu-chah-nulth and Haida (Turner 2010).

**Table 3-4: Iron content of selected Coast Salish plant foods (mg/100g fresh weight)**

| Species | Common Name | Part used | Food energy (kcal) | Iron | Habitat | Comments |
|---|---|---|---|---|---|---|
| *Ledum groenlandicum* | Labrador tea | Leaves, dry | 0 | 184 | Swamps and bogs along the coast. | ~2g, dried = 1c. Tea (~37mg.) |
| *Lewisia rediviva* | Bitterroot | Roots, dry | 343 | 19.8 | E. of Cascade crest in Wa; southern BC south to Ca, E. to Mt, Wy, Ut, and Co. Open gravelly and rocky areas from sagebrush plains to moderate elevations in the mountains. | Traded |
| *Achillea millefolium* | Yarrow, squirrel tail | Leaves | 0 | 13.1 | Common in open, dry to somewhat moist areas from low to high elevations; tolerant of disturbance. | Tea |
| *Arctostaphylos uva-ursi* | Kinnikinnick | Greens | 0 | 12.7 | Coastal bluffs and prairies, rocky balds, dry subalpine meadows, and dry coniferous forest. | Tea |
| *Pseudotsuga menziesii* | Douglas fir | Needles | | 11.4 | Moist to dry areas from sea level to mid-elevations in the mountains, occasionally to timberline | Tea |
| *Lewisia rediviva* | Bitterroot | Roots, fresh | 94 | 10.9 | See above, dry | Traded |
| *Lupinus nootkatensis* | Nootka lupine | Roots | 71 | 10.4 | | |
| *Potentilla anserina* | Silverweed | Roots | | 9.1 | Wet, alkaline areas from coast to arid inlands. | Cultivated |
| *Perideridia gairdneri* | Gairdner's yampah, Indian carrot | Roots, dry | 350 | 7.5 | Mostly eastern Wa; SW Wa from Pierce Cty s. Woodlands and vernally wet meadows. | Cultivated |
| *Sagittaria latifolia* | Wapato/arrowhead | Tubers | 103 | 6.6 | Ditches, ponds, lakes, swampy areas. | Cultivated "likely" wapato |

Recommended daily intake: Age 31-50: males 8mg; females 18mg. Age 51, 8mg for both males and females

Iron-rich nutrient sources tend to be limited, not just in the Puget Sound Basin, but in many landscapes (Dr. Terry Maresca, pers. com.), and so it would not be surprising that people would make a considerable effort to obtain these foods through cultivation of relationships with people and place. Coast Salish people visited the extensive wapato beds at Katzie, along the banks of the middle Fraser River, from as far away as Vancouver Island. Here, individual families also “owned” the rights to access particular sections of the wapato beds (Suttles 1955). While cultivation and ownership of wapato is not documented in Puget Sound Coast Salish country, as previously mentioned, there were extensive beds of them in the shallow wetlands along the shores of Lake Washington (Waterman 2001). The case for "Indian carrot" is a bit more tenuous, due to a lack of clarity regarding which species the ethnographers who mentioned it were referring to.[26] Bitterroot is certainly a "superfood" in terms of its nutrient density. It does not grow on the west side of the Cascades. It is well-documented that at least in the early colonial period of the Puget Sound Basin of the mid-19th century, bitterroot was an important and highly desired item of trade between southern Puget Sound Coast Salish and plateau peoples from east of the Cascades, who exchanged them for dried cockles and clams (Elmendorf 1965, Norton 1985).

In addition to these sources of iron and calcium from roots, teas made from the fresh and dried leaves of Labrador tea (*Ledum groenlandicum*) and yarrow, or "squirrel's tail" (*Achillea millefolium*) are also substantive sources of iron (Table 3-4) and calcium (Table 3-5). Dried salal berries (*Gaultheria shallon*), and tea from dried needles and leaves of Douglas-fir (*Pseudotsuga menziesii*) and nettle (*Urtica dioica*) are excellent sources of "storeable" calcium, while fresh nettle, "goosefoot," (*Chenopodium spp.*) and fireweed leaves (*Epilobium angustifolium*) provide an immediate source of calcium. The use of teas as a nutrient source seems to have been common, but is commonly overlooked in the ethnobotanical literature of the Northwest Coast.

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[26] Probably *Perideridia gairdneri* but possibly also *Conioselinum pacificum.* See (Compton 1993)for a discussion of the 'ambiguity' around which species "Indian carrot" might have been.

**Table 3-5: Calcium content of selected Coast Salish plant foods (mg/100g fresh weight)**

| Species | Common Name | Part used | Food energy (kcal) | Calcium | Habitat | Comments |
|---|---|---|---|---|---|---|
| *Gaultheria shallon* | Salal | Berry, dry | 282 | 276 | W. of Cascdes. Woods, from sea level to moderate elevation in the mountains | |
| *Pseudotsuga menziesii* | Douglas fir | Needles | x | 272 | Abundant belows 3.5k, to 4.7k, open sites - shade intolerant | Tea |
| *Urtica dioica* | Stinging nettle | Greens/ leaves | x | 263 | Deep, rich soil or near moisture, sagebrush deserts, shady lowlands and mountain slopes, sea level to subalpine | |
| *Chenopodium spp* | Goosefoot | Greens | 43 | 258 | *berlanderi*: Yards, roadsides, sandy washes *rubrum*: Moist, saline soils | |
| *Achillea millefolium* | Yarrow, squirrel tail | Leaves | x | 225 | Common in open, dry to somewhat moist areas from low to high elevations; tolerant of disturbance. | Tea |
| *Arctostaphylos uva-ursi* | kinnikinnick | Greens | x | 221 | Coastal bluffs and prairies, rocky balds, dry subalpine meadows, and dry coniferous forest. | Tea |
| *Ledum groendlandicum* | Labrador tea | Leaves, dry | x | 215 | Swamps and bogs along the coast. | ~2g dried = 1c. tea |
| *Epilobium angustifolium* | Fireweed | Leaves | x | 175 | Open areas, sea level to subalpine, especially in burned areas. | |
| *Lewisia rediviva* | Bitterroot | Roots, dry | 343 | 168 | E. of Cascade crest in Wa; southern BC south to Ca, E. to Mt, Wy, Ut, and Co. Open gravelly and rocky areas from sagebrush plains to moderate elevations in the mountains. | |

Recommended daily allowance of calcium: Age 50- 1,000mg; Age 50+ 1,200mg

*Greens and berries*: Early spring greens and berries harvested in season near Coast Salish villages and within a watershed, and those dried and stored would have provided sufficient Vitamin C to people's diets for most of the year (Table 3-6). The harvest season of the southern Lushootseed calendar begins in early spring with sxdze'dzehi - plants in bud & sprout. This was the time of year when the fresh leaves and shoots of goosefoot (*Chenopodium sp.*), common horsetail (*Equisetum arvense*), strawberry (*Fragaria spp.*), wild violets (*Viola spp.*), nettle (*Urtica dioica*), and fireweed (*Epilobium angustifolium*) provided a welcome shift from dried and stored foods and an infusion of fresh Vitamin C.

These were followed by the fruits of several *Rubus* species in order of their ripening – salmonberry (*R. spectabilis*, which gets its own 'month' in early summer, and is also along with thimbleberry an important spring green), thimbleberry (*R. parviflorus*), blackcaps (*R. leucodermis*) and trailing blackberry (*R. ursinus*), along with the fresh fruits of several *Ribes* species, two kinds of wild strawberry, and saskatoons, among others.

Although there is substantial spatial heterogeneity when it comes to specific species, greens and berries in general are broadly distributed throughout Puget Sound Coast Salish country. For example, red elderberry (*Sambucus racemosa*), which is quite high in vitamin C, and ripens in mid-summer, is broadly distributed and also shows up quite frequently in the archaeobotanical record (see appendix B). The fruits of this plant ripen in mid-summer and must be processed to remove the seeds, which contain sufficient amounts of cyanide producing glycosides to make a person who consumes them quite ill. However, while apparently consumed in large quantities, red elderberry fruit probably would not have kept through the entire winter season. Rather, ericaceous fruits that typically ripen in late summer, including salal (*Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*), mountain huckleberry (*Vaccinium membranaceum*), and Cascade blueberry (*Vaccinium deliciosum*) are more suitable for storage. These were smoke-dried on large cattail or cedar mats over an open fire, then made into cakes or stored as "raisins" in baskets (see chapter four). Their ripening season typically coincides with the runs of early fall salmon, which, being lower in fat, were an essential storage item throughout the region.

**Table 3-6: Plants and their Vitamin C content by season of harvest (mg/100 g fresh weight)**

| Season | Species | Common name | Part used | Food energy (kcal) | Vit. C | Habitat |
|---|---|---|---|---|---|---|
| 2 | *Athyrium felix-femina* | Lady fern | | 34 | 8.9 | Common in moist woods and meadows, low to mid-elevations |
| 2 | *Chenopodium spp (berlanderi, rubrum)* | Goosefoot | Greens | 43 | 80 | *berlanderi*: Yards, roadsides, sandy washes *rubrum*: Moist, saline soils |
| 2 | *Equisetum arvense* | Common horsetail | Greens | 20 | 50 | Moist to moderately dry areas |
| 2 | *Fragraria spp* | Wild strawberry | Leaves | | 229 | open woods, meadows, streambanks, to mid-elv. |
| 2 | *Galium aparine* | Cleavers | | | 68.5 | Variety of habitats, sea level to mid-elevations in the mountains. |
| 2 | *Lomatium nudicaule* | Bare-stem desert-parsley | Greens/ shoots | | 40.7 - 66 | Widely distributed throughout Washington; dry, open areas; common in shrub-steppe, but found in mountain meadows. |
| 2 | *Urtica dioica* | Stinging nettle | Leaves, greens | 38 | 75 - 89.8 | Deep, rich soil or near moisture, sagebrush deserts, shady lowlands and mountain slopes, sea level to subalpine |
| 2 | *Viola spp* | Violets | Leaves | | 210 | moist woods, stream edges, lowlands to alpine |
| 3 | *Fritillaria camschatensis* | Riceroot lily | Bulbs | 98 | 29 | Chiefly northern PS lowlands in Wa; Kodiak Is and coastal AK S. to Wa. Moist areas from near tide flats to mountain meadows. |
| 3 | *Lewisia rediviva* | Bitterroot | Roots, fresh | 94 | 27 | E. of Cascade crest in Wa; southern BC south to Ca, E. to Mt, Wy, Ut, and Co. Open gravelly and rocky areas from sagebrush plains to moderate elevations in the mountains. |
| 3 | *Viola spp* | Violets | Flowers | | 150 | moist woods, stream edges, lowlands to alpine |
| 5 | *Epilobium angustifolium* | Fireweed | Leaves | | 88 | Open areas, sea level to subalpine, especially in burned areas. |
| 5 | *Rubus spectabilis* | Salmonberry | Fruit | 47 | 21.2 | Both sides of the Cascade crest. Lowland moist woods and swamps to mid-elevations in the mountains. |
| 6 | *Amelanchier alnifolia* | Western serviceberry; saskatoon | Fruit | 90 | 15.7 | Open woods, canyons and hillsides, sea level to subalpine |
| 6 | *Fragaria vesca* | Woodland strawberry | Fruit | 54 | 23.8 | Moist woods, stream banks and sandy meadows, low to mid-elevations in the mountains. Widely distributed throughout Wa. |
| 6 | *Maianthemum racemosum* | False Solomon's-seal | Fruit | 88 | 122 | Moist woods and open forests, sea level to mid-elevations in the mountains |
| 6 | *Ribes divaricatum* | Wild gooseberry | Fruit | 69 | 40.2 | West of Cascades & east into Klickitat Co; Moist hillsides, prairies and open woods at low elevations |
| 6 | *Rubus leucodermis* | Blackcap raspberry | Fruit | 79 | 18 | Fields and open to wooded hillsides, from low to moderate elevations. Both sides of Cascade crest. |
| 6 | *Rubus parviflorus* | Thimble-berry | Fruit | 105 | 78 | Throughout Wa; Open to wooded, moist to dry areas, from sea level to subalpine mountain slopes |

| Season | Species | Common name | Part used | Food energy (kcal) | Vit. C (mg/kg) | Habitat |
|---|---|---|---|---|---|---|
| 6 | *Rubus ursinus* | Trailing blackberry | Fruit | 57 | 6.2 | B. sides of Cascades. Open to fairly dense woodlands, sea level to mid-elevations in the mountains; common in logged areas |
| 6 | *Sambucus racemosa* | Red elderberry | Fruit | 103 | 81 | Widely dist throughout much of Wa; A wide variety of areas, typically in forests, fields, and wet areas. |
| 6 | *Vaccinium parvifolium* | Red huckleberry | Fruit | 50 | 15.7 | Chiefly West of the Cascades in Wa; Ak to Ca on both sides of the Cascades, but much more common on the west side. Moist woods, sea level to mid-elevations in the mountains. |
| 6 | *Vaccinium vitis-idaea* | Cranberry | Fruit | 62 | 21.2 | West of Cascades. Usually in sphagnum bogs. |
| 7 | *Gaultheria shallon* | Salal | Fruit | 63 | 68.5 | W. of Cascdes. Woods, from sea level to moderate elevation in the mountains |
| 7 | *Ribes lacustre* | Swamp gooseberry | Fruit | 59 | 58.2 | Moist woods and streambanks to drier forest slopes and subalpine ridges |
| 7 | *Rosa nutkana* | Nootka rose | Fruit | 74 | 413 | Widely distributed through Wa. Open or wooded areas, low to moderate elevations in the mountains. |
| 7 | *Rubus chamaemorus* | Cloudberry | Fruit | 50 | 130 | Closely related lasiococcus, Moist to dry woods, lowlands to subalpine |
| 7 | *Vaccinium membranaceum* | Big hberry, Mtn. h., Black h. | Fruit | 62 | 64.5 | Common in dry to moist coniferous forests and open areas, moderate to mid-elevations in the mountains |
| 8 | *Prunus virginiana* | Chokecherry | Fruit | | 30 | Foothills and lowlands, more common in drier areas (more common on E. side) |
| 8 | *Sambucus caerulea* | Blue elderberry | Fruit | 74 | 33.3 | Valley bottoms and open slopes where not too dry, from near sea level to moderate elevations in the mountains. Both sides of Cascades |
| 8 | *Vaccinium ovatum* | Evergreen huckleberry | Fruit | 48 | 43.7 | Coniferous forests at low elevations west side of Cascades. Locally abundant in PS basin and on the coast. |
| 8 | *Viburnum edule* | High-bush cranberry | Fruit | 50 | 15.7 | Moist woods and swamps. |
| 9 | *Sagittaria latifolia* | Wapato/ arrowhead | Tubers | 103 | 5 | Ditches, ponds, lakes, swampy areas. |
| S | *Gaultheria shallon* | Salal | Fruit, dry | 282 | 570 | see above, fresh |
| S | *Ledum groenlandicum* | Labrador tea | Leaves, dry | 0 | 98.2 | Swamps and bogs along the coast. |
| S | *Vaccinium ovatum* | Evergreen huckleberry | Fruit, dry | 266 | 289 | see above, fresh |

Recommended daily allowance of Vitamin C: Males, 90mg; Females 75mg

As discussed in greater detail in chapter four, cultivation practices of tending the land also helped to ensure the predictability and accessibility of culturally important plant foods, medicines and materials. The extensive camas prairies previously mentioned were collectively tended through burning, and are probably the best-known examples of Puget Sound Salish practices of plant cultivation. In addition to the specific cultivation of these plants for food, the first people of the Puget Sound basin also used fire to maintain and enhance plant species that were integral to the harvesting of other foods. In their testimony before the Indian Claims Commission in the late 1920s (Duwamish et al. 1933), tribal elders spoke of burning and weeding nettle patches on Whidbey Island for the purpose of producing quality material for crafting twine,[27] and burning the underbrush in densely forested areas throughout the territory to promote the growth of quality cedar for plank houses and canoes.[28]

People from inland villages also spoke of clearing and maintaining seasonal house sites and permanent village sites. The areas typically selected were ones that were deemed productive not only in terms of their proximity to aquatic resources, but also for the productivity – or potential productivity – of terrestrial resources. These sites tended to be areas with brushy vegetation and small trees, which would be cleared and burned.[29] Large, potentially hazardous trees were also removed by cutting and burning, leaving a cleared area around the houses of about three to four acres.[30]

Puget Sound Coast Salish people's social practices also extended the spatial range of autonomous villages within the context of tiχdxʷ. Cultivating relationships with people helped to

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[27] Testimony of George Alexander [sic], Duwamish *et al* p. 315
[28] Testimony of Joe Bill, Muckleshoot. *Duwamish et al* p. 160; Testimony of James Lochochanon, Nooksack. *Duwamish et al* p. 505
[29] Testimony of Margaret Jules, Upper Skagit. *Duwamish et al* p. 390
[30] Testimony of Jimmy Jones, Upper Skagit. *Duwamish et al* p. 379

ensure a continual supply of foods that were in many cases temporally contingent and spatially dispersed. These practices were effective so long as plant resources were predictable. However, they do not help to explain the ways in which Puget Salish people would have addressed stochastic events at both local and regional scales. Resorting to famine foods such as red alder cambium and horsetail shoots[31] is one possible strategy for short term fluctuations in the food supply – for example during anomalous weather patterns such as excessive snowpack or the late arrival of spring, when the people may have used up their winter food stores (Turner and Davis 1993). However, this strategy is a short-term, locally scaled solution that may not have been capable of addressing decadal and longer-term climate cycles or large-scale natural disasters. In the next section I discuss the ways in which Puget Salish peoples' everyday social practices during predictable years may also have helped them to weather these broader scaled events and processes.

## *tiχdxʷ: Cultivation of Relationships with People*

It was Marian Smith who first observed that the closest social relationships between villages occurred within each watershed. Villages were located from the saltwater at the mouths of major rivers, to the uplands at the foothills of the Cascade Range. According to Smith, Puget Sound Coast Salish people perceived and described "ethnical" differences between villages based upon their topographic position. Of relevance here are the sxwəljáb (saltwater people), stuləgʷábš (river people), and łalebiuqᵘ (inland people) (Smith 1940:29). The logic of this from a food systems perspective is that through inter-village trade and marriages, these associations facilitated greater, and fairly convenient, access to the suite of foods that occur in different

[31] See Turner and Davis 1993 for a discussion of Northwest Coast famine foods as well as the complexity of the category itself.

habitats within a given watershed. Thus, the maintenance of these social ties helped to address spatial variability with respect to predictable, seasonally available resources (Goland 1991, Colwell 1974). Yet much, but not all of what the inhabitants of each autonomous village required for their sustenance was probably available within close range of the village. See for example the three-mile buffers around each village in Figure 3-1, which is an estimate of what would have been available to a given village within an hour's walk.

At the village scale, specific access to resources was managed through specialized knowledge, proprietorship and the technological skills of processing and storage. This required within-village coordination of resource harvests that were valued and synchronous. This responsibility typically fell to siʔáb. The ethnographic record tends to characterize this decision-making process as the purview of a "headman," who each season had to consider how best to strategize the harvesting activities of various household members. But considering the cultural recognition and importance of particular people's gifts when it came to knowledge and social relations, it is more likely that this kind of planning and strategizing was a collective effort.

Planning would have included preparing for synchronous harvests of different foods within and beyond the immediate vicinity of the village, ensuring that the grounds within one's own area were used efficiently, and (in the case of the Upper Skagits, at least) that the village territory was protected from "uninvited campers" (Snyder 1965:74). In terms of planning for harvests beyond one's local country, it is not too difficult to imagine that by having a broad and varied network of social relations (discussed in greater detail below), the people in a given village would be knowledgeable about the annual variation in quality and quantity of the same type of food in different areas. To give a contemporary and relevant anecdotal example, there was a great deal of spatial variation in terms of big huckleberry production during the unusually hot, and in the case of 2015, dry years of 2014 & 2015. The huckleberry networks that I am part of were buzzing with discussions about where (and if) we were likely to find this fruit in abundance. In some areas the berries were abundant while in others they had simply dried up and withered on the branches.

It is also important to point out that the choices people made about where to harvest foods must certainly not have only been based purely on utilitarian logics. In her Upper Skagit ethnography, June Collins describes how women in particular would harvest plants together in groups not out of necessity but because having company was enjoyable. It is easy to imagine that people would feel similar things about particular places, such as the inland root gardens and huckleberry meadows that I describe in greater detail in chapter four. People must certainly have looked forward to the social aspects of traveling to gather particular foods in particular places, and at the same time probably avoided others out of aversion or animosity towards others. Those emotions must also have affected their harvesting choices.

As described in the discussion of the gift economy, above, harvested foods were freely shared and exchanged within villages and kinship networks. The process by which people shared food was sometimes formalized, with foods first redistributed to the group that had procured it, then the excess being distributed to the harvesters' family members that lived within his or her own village. These types of exchanges typically involved reciprocal behavior on the part of the recipient at some point, but as previously discussed, siʔab were inclined to be generous, and poor villagers were given food without any expectation of repayment - a practice known as abálts in Southern Lushootseed (Smith 1940:146). Public recognition of this kind of behavior was considered to be a kind of reward in and of itself (Snyder 1965).

Informal sharing occurred constantly throughout the food season, so that the same food sometimes exchanged hands several times. The result was that by the end of the season, each family in theory possessed a diversity of foods far beyond what they themselves had harvested (Snyder 1965, Elmendorf 1965). In addition to this informal sharing, a villager who found herself with an unexpected surplus of food might hold a household or village feast to share the surplus within the village and/or with neighboring villages. At these events, it was commonplace for the guests to receive a certain amount of surplus food to take home with them (məʔq̓aʔθ in Halkomelem) (M. W. Smith 1940; Suttles 1987c).

Most families within each village had special privileges of access to food areas beyond those of their own village, and these outside sources contributed substantially to the well-being of the village as a whole. (Snyder 1965). Access to harvest sites and additional resources were typically the products of marrying outside of one's own village that would extend social ties within or beyond the watershed (Suttles 1987a). In her ethnography with the Puyallup-Nisqually, Marian Smith described how reciprocal exchange between in-laws formed the basis of relationships that started with marriage and often outlasted the life of the partners. The practice of tsóiaxl – giving gifts of food and wealth combined with a social visit to one's in-laws – was an ongoing process (Smith 1940:148). Taking surplus food to affines (in-laws) in exchange for wealth, and the practice of ləʔels (a Halkomelem term), or "the putting away of food" - a practice by which people loaned excess food to in-laws and others with the understanding that it would be repaid at some point in the future – facilitated wealth accumulation for potlatching (Suttles 1987a). These practices also served as a kind of buffer against "free-riders" in one's own community, as well as putting the temptation to eat excess food out of the reach of the person who had actually procured it (Snyder 1965, Suttles 1987a). Here we have an example of how affinity, rather than filiation, forms the basis of rhizomatous networks of social relations between and beyond the human.

These networks of social relations and patterns of food distribution facilitated food security and nutritional diversity within Puget Sound Coast Salish villages. These practices also facilitated the accumulation of surplus foods that could be directly exchanged in trade for desired foods with people who were not kin and not members of one's own village (as in the case of clams for bitterroot, described above), or for wealth items that could be used for sgʷigʷiʔ. Food could only be "sold" to those who were not members of the seller's family or winter village community. Accumulations of surplus food thus also served to extend group access to seasonal or non-local resources: "inter-aereal and inter-village relationships were enhanced through exchanges of local specialties" (Norton 1985:126). Furthermore, some traded products or raw materials were valued over seemingly similar local ones (Norton 1985:115).

Table 3-7 is a visual representation of five types of environmental challenges to safeguarding the annual food supply in the Puget Sound Coast Salish homelands, arranged according to the predictability of those challenges and a theorized spatial scale at which these challenges could best be addressed. One of the most important things about this table to note is the importance of socially defined networks in addressing all of these challenges except for highly predictable, contingent resources. As discussed below, even in the case of these kinds of resources, redistributing the surplus within socially defined networks could result in long-term risk reduction by participating in networks of reciprocal gifting. On the other end of the spectrum, this model also proposes that all but the most unpredictable and broadest scale challenges could be addressed at the scale of the watershed.

**Table 3-7: Environmental challenges to safeguarding the annual food supply**

<table>
<tr><th rowspan="2">PREDICTABILITY</th><th colspan="5">SPATIAL SCALE (Scale at which food system challenges are addressed)</th></tr>
<tr><th>VILLAGE</th><th>WATERSHED</th><th>SOCIALLY DEFINED NETWORKS</th><th>REGION</th><th>INTER-REGION</th></tr>
<tr><td>HIGH</td><td colspan="2">Annual fluctuations in the availability of key resources (temporal variation)</td><td colspan="3"></td></tr>
<tr><td>HIGH</td><td rowspan="2"></td><td colspan="4">Spatial variability in the availability of key resources (spatial variation)</td></tr>
<tr><td>MED</td><td colspan="2">Fluctuations in quality or quantity of typically available local resources</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>LOW</td><td colspan="3">Localized, stochastic events</td></tr>
<tr><td>LOW</td><td colspan="2"></td><td colspan="3">Regional stochastic events</td></tr>
</table>

*Predictable, local resources*: When plant foods are contingent and locally available, i.e., when there are predictable, annual fluctuations in the availability of key resources, this kind of challenge could be addressed at the village and watershed scales. People could process and store foods to see them through the remainder of the year (particularly winter), and cultivate plants to increase their quality, quantity, and predictability. Plant cultivation is discussed in greater detail for inland root gardens and big huckleberry habitat in chapter four.

When there was an abundance of a particular resource, one could also give away surplus food within and beyond one's own village, through practices like abálts (giving freely to those in need), məqaʔθ (giving away leftover food after a feast), and tsóiaxl and ləʔels (bringing gifts of food on a visit to one's in-laws). Sharing the surplus beyond one's own village was part of a larger network of socially defined reciprocal relations that facilitated access to spatially variable and perhaps also "owned," but still predictable resources and gathering sites such as camas prairies, big huckleberry meadows and wapato beds. This type of spatial variability would have been addressed at scales from the watershed to the inter-region (i.e., exchange between west and east side groups, as in the case of bitter root). It is also possible to cultivate plants to extend their range. As I discuss in chapter four, there is some evidence for this on the Enumclaw Plateau in southern Puget Sound Coast Salish country. In some cases, and also discussed in more detail in chapter four, spatial variation in the availability of predictable plant and animal foods could also lead to substantive differences between the diets of different villages.

*Medium predictability*: Surprises in the food system, such as fluctuations in the quality and quantity of available resources are in some sense expectable – any person that relies directly on the earth for their livelihood will undoubtedly experience good harvest years and poor ones over the course of a lifetime. And, as previously discussed with the big huckleberry example, whether the year is a good one or a poor one for a particular resource can vary from place to place. To address these somewhat predictable surprises, people might choose a different location to harvest a particular resource within or beyond one's own area, or cultivate the same plants in different areas to take advantage of subtle differences between similar habitats that could make a difference from year to year. Both of these strategies are consistent with Inez Bill's discussion of how the ancestors would rotate the areas they visited for certain plants from year to year so as not to overtax any one particular place (Bill 2015:1).

*Low predictability*: Localized, stochastic events, such as loss of a village's winter food supply, or loss of a food provider could be ameliorated by the generosity and mutual aid of other villagers, villages, and socially defined networks. As Cashdan (1985) proposes, participation in networks where food sharing is central also acts as a kind of "insurance policy," buffering the effects of these kinds of challenges in the food system.

Stochastic, broad scale events such as long term climate forcing, and regional scale disasters such as volcanism and earthquakes are the most difficult suite of environmental challenges to address. Possible strategies could include changes in livelihood strategies, moving, and also relying on information networks for decision-making. In the case of the latter, participation in socially defined potlatch networks could provide one kind of information pooling where people could share collective knowledge about similar events and how people addressed them in the past.

## Conclusion

The social complexity of the Puget Sound Coast Salish world emerged in a landscape of substantial spatial and temporal variability and ecological heterogeneity. The relationship between social complexity and habitat diversity in their territories was not, as early anthropologists argued, simply “a spontaneous product of nature” (Haeberlin and Gunther 1930). Rather, the social complexity and high population density of the region was maintained through the intelligent, planned stewardship, or cultivation of resources and relationships.

Everyday acts of cultivation – or tiχdx$^{w}$ - of relationships with people, plants and place that constituted historic Puget Sound Coast Salish gift economies not only helped to address uncertainty and variability in the food system, they also, through the accumulation of surplus foods that were translated into surplus wealth, facilitated scaling up to regional scale potlatching. In addition to maintaining and extending social ties, as a form of social information network, participation in potlatch circles may have also helped to ameliorate the effects of unpredictable fast and slow moving variables, as the people who participated in them were able to ‘pool’ their local knowledge. Furthermore, participation in kin, watershed, and potlatch networks may also have acted as a sort of insurance policy against localized, unpredictable catastrophic events, so long as others within these networks were not also affected.

Yet this reading of the Puget Sound Coast Salish food system points both to the utility of Smith’s watershed model, and its limitations. If interpreted as a kind of limit to human possibility, Smith's watershed model can be read as "equivalent to living within a colonial landscape, a closed system … that constrains movement, economy, identity, and all aspects of cultural life to the smallest level possible within imposed and unyielding boundaries" (Schaepe 2007). But this privileging of "topography over topology" (Schaepe 2007:239) is also an oversimplification of Smith's model, who herself clearly recognized that the people were often as connected to those living beyond a given watershed as those within it. In any case, there are certainly topologies to further elaborate in terms of how the people made swátixʷtəd (the land) and swátixwtəd made the people. I explore this in greater depth for łalebiuqʷ - fire relations in chapter five. In future projects I will develop methods to better understand relationships between the spatial scale and qualities of socially defined networks and food system resilience over time. As I discuss in greater detail in the next chapter, the archaeological record suggests the remarkable fact that aside from resource intensification over time, the Puget Sound Coast Salish food system seems to have been fairly stable for at least four thousand years.

# Chapter 4

## ɬALEBIUQ$^{w}$ WORLDS

This chapter focuses on histories of inland, or ɬalebiuq$^{w}$ Puget Sound Coast Salish people's connections to, and stewardship of inland and montane landscapes on the west slope of the Cascades and Puget Sound Basin. As in chapter three, this chapter relies on the ethnographic literature, archival material, and archaeological reports of the region to construct an understanding of the historic food system. As I describe below, ɬalebiuq$^{w}$ people's cultivation of plant foods is more thoroughly documented for the uplands than for mountain habitats. From this information, however, we can certainly infer that Coast Salish people possessed substantial knowledge about the stewardship of plant resources, and that this knowledge must also have been applied to the cultivation of big huckleberry habitat. Furthermore, there is robust documentation of Indigenous stewardship of big huckleberry throughout the broader range of big huckleberry habitat. I take up the topic of Indigenous stewardship of big huckleberry habitats with fire in chapter five.

ɬalebiuq$^{w}$ villages were typically situated on the high terraces above riverbeds - often at the confluence of two rivers, in the Cascade foothills, and occasionally deep into the mountains. In close proximity to their village houses, inland people accessed, created, and maintained the prairies and meadows that provided a cornucopia of roots and fruits in an otherwise heavily wooded landscape. The ɬalebiuq$^{w}$ "traveled back and forth above the riverbeds in country paralleling the Cascade Range" (Smith 1940:30). Through marriage, friendship, and other forms of exchange, ɬalebiuq$^{w}$ people were often as connected to Indigenous communities living on the east side of the Cascades as they were to their down-river and saltwater neighbors. It was not uncommon for up-river people to speak a plateau language in addition to their mother tongue

(Bruseth 1977; Coleman 1932; Collins 1974).

Given that the people of the inland villages along the Nooksack, Upper Skagit, Sauk, Stillaguamish, Pilchuck, Skykomish, Snoqualmie, Cedar, Green, White, and Upper Puyallup Rivers are those that are most commonly noted in the literature for their connections to the Cascade Mountains of northwestern Washington, this chapter focuses primarily on them. Table 4-1 is a count of inland winter villages, and is given to provide a sense of the extensiveness of residence in these upland areas, but should not be considered conclusive or exhaustive.

Archaeological studies in the Upper Stillaguamish (Kidd 1964), Snoqualmie (Onat & Bennett 2001, Blukis-Onat 2001), Cedar (Lewarch 1978), and Green and White Rivers (described below) indicate that Puget Sound Coast Salish people have been living in the uplands since the early Holocene period, and in some cases have occupied the same places continually for many millennia (Blukis-Onat 2001). One of the oldest known sites in all of Western Washington is located on the shores of Chester Morse Lake in the Cascade foothills of the Cedar River watershed. This site is located some five hundred meters above sea level and was occupied sometime between nine and ten thousand years ago.

While there were certainly differences within and between inland villages and the people who inhabited them that were grounded in geography, history, social identity, and life experiences, inland people shared a set of practices that differentiated them from their relatives and neighbors of the saltwater, prairie, and river villages. These practices are summarized in and described in greater detail in the following discussion. It is interesting to note that Marian W. Smith, who conducted extensive ethnographic fieldwork in Puget Sound Coast Salish and territories in the 1930s and 1940s, proposed that the everyday practices of inland people were

**Table 4-1: łalebiuqʷ winter villages**

| Drainage | Inland winter villages |
|---|---|
| Nooksack[32] | 24 |
| Upper Skagit[33] | 5 |
| Sauk[34] | 1 |
| Stillaguamish[35] | 2 |
| Pilchuck[36] | 2 |
| Skykomish[37] | 5 |
| Snoqualmie[38] | 13 |
| Cedar[39] | 2 |
| Green[40] | 5 |
| White[41] | 3 |
| **Total** | **61** |

distinctive enough from that of saltwater and river people to warrant a "culture area" of their own (Smith 1956). Though the concept of the culture area has fallen out of favor in anthropology, Smith's proposition does underscore and reiterate the distinctiveness of łalebiuqʷ people. Puget Sound Coast Salish people themselves continue to recognize these differences in the present.

A story that Russell Moses and Jason Gobin once shared with me on a long ride up to Pyrola Meadows helped me to understand something of the ways in which differences between saltwater and inland villages and people remain salient today. The story may also shed a bit of

[32] Richardson & Galloway 2011
[33] Collins 1974
[34] Collins 1974, Bedal-Fish 1981:554
[35] Hollenbeck 1987:154
[36] Tweddell 1974
[37] ibid.
[38] Waterman 2001, [Watson] Martin 1933:176, Hollenbeck 1987:172
[39] Waterman 2001, Lewarch 1978
[40] Waterman 2001, Smith 1940
[41] Waterman 2001, Smith 1940

light on the differences between different approaches taken by different tribes to working with outsiders. Jason, a Tulalip tribal member and also head of the Tribes' forestry department, primarily identifies as a saltwater, Snohomish person, while Russell, who is also a Tulalip tribal member primarily identifies as a river and inland, Snoqualmie person.

Following the twists and turns of the Stillaguamish River as we traveled east towards the Cascades to Pyrola Meadows was also following the twists and turns of this complex social history. As we rode along the windy road, Russell described the cultural differences between inland and saltwater villages. The saltwater villages tended to be the largest and most powerful in Coast Salish territory. Hibulb, a large, fortified village in the vicinity of present day Marine Drive was like this. People would come from all over to gather at villages like Hibulb and to trade with one another. The inland people, who Russell seems to identify most with, would trade huckleberries, game, and mountain goat wool for fish, shellfish, and waterfowl. According to Russell, the inland people tended to live in smaller longhouses and were more independent than the saltwater people. This is something that he says carries over even today. The Snohomish did and do tend to do everything as group, and gave the example of cutting firewood for the winter. When a saltwater person needed to cut firewood, he would call on all of his extended relatives and cutting for everyone would be completed in a couple of days. For an inland person, the same amount of work would probably take two weeks, he said.

## ŁALEBIUQ$^{W}$ ROOT GARDENS

The inland villages of łalebiuq$^{w}$ people were nestled in the gaps and along the edges of densely forested western hemlock forests. As described in chapter three these gaps and edges were likely cleared and maintained. In close proximity to village houses, łalebiuq$^{w}$ people accessed, created and maintained the prairies and meadows that provided a cornucopia of roots and fruits in an otherwise heavily wooded landscape.

In the north, inland people living on the drainages of the Nooksack, Upper Skagit and Sauk rivers maintained family-owned root plots in several prairies near their villages. In these they grew and harvested the roots of bracken fern (*Pteridium aquilinum*), "wild carrot,"[42] tiger lily (*Lilium columbianum*), camas (*Camassia quamash*), wild onion (*Allium cernuum*) and other roots. These plots were around one to one and a half hectares and marked off with stones or sticks. The people maintained them by tilling, weeding, and replanting the seeds, bulbils, cormlets, and tillers of the plants that grew in them. The rights to harvest from the Upper Skagit plots passed through the matrilineal line. It was not necessary for a woman to live in the village to dig roots from these plots, and women traveled from distant villages to harvest in them (Amoss 1978; Duwamish et al v. United States of America 1933; Collins 1974).[43]

Some of the best known of these prairies were nuxwsáʔaq, or Nooksack ("always-bracken fern roots") near Goshen (Amoss 1978:7, Smith 1950, Richardson & Galloway 2011:111-112),[44] German (aka: Jarman) and Warner's Prairies northwest of Sedro Wooley (Collins 1974:57), and sákʷbixʷ (Sauk Prairie), northeast of Darrington, from which the Sauk take their name (Bruseth 1926; Bedal Fish and Bedal 2000). A story about sákʷbixʷ provides a sense of the kinds of labor that went in to creating and maintaining these prairies:

> At one time Sauk Prairie was a big marshland and belonged to the Beavers. Indian tribes used to send out scouts to locate hunting, fishing and camping grounds. One of these scouts found what is now Sauk Prairie. In and around the marsh were many plants with edible roots, many kinds of berries also much small game and birds. The scout had a vision of a great summer camp for his tribe. He wanted to secure the marsh for them and began dickering with the Beavers. They agreed to part with it for some pieces of hard wood with which to sharpen their teeth and with the understanding that thereafter the Indian should be friendly with the Beavers.

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[42] See footnote 4.
[43] Also see Duwamish *et al* testimony of Ellen Selkanum 1933:513-515.
[44] This is the place name from which the Nooksack get their name. *Nuxwáʔaq* is a Halkomelem term. This place is also known as *Spálhχen* ("meadow" or "prairie") in Lhéchelsem (Richardson & Galloway 2011:115).

> The scout brought his people up one spring. They thought it a wonderful place, and at once pulled out the dams that the beavers had made, when most of the water rushed out. Then everybody went to work pulling out plants and bushes that did not have edible roots or berries, leaving all that had. Salmonberries, thimbleberries, huckleberries, spaykoolits [leek], etc. […]
>
> This they did year after year, sometimes bringing in and planting new varieties. So in time Sauk Prairie became known far and wide for its wealth of roots and berries (Bruseth 1926:7).

In addition to the Sauk people themselves, people from Upper Skagit and Upper Stillaguamish villages also came to $\text{sák}^{\text{w}}\text{bix}^{\text{w}}$ to harvest roots and berries there. According to Sauk tribal member Susan Bedal, the people burned dead ferns and grasses in the prairie in late winter or early spring to ensure that "no trees or brush ever got started on this prairie" (Bedal Fish and Bedal 2000).

While the literature for the inland people living on the Upper Stillaguamish, Pilchuck, Skykomish and Snoqualmie is less definitive with regard to the intentional cultivation of root gardens, the existing literature does give a sense of the prairies that existed in the territories of the people, and were likely maintained by them. Along the Upper Stillaguamish, tribal member Jimmy Dorsey testified to the Indian Claims Commission that the potatoes they cultivated near their village at Skabalko, near present-day Arlington, were not planted on the open lands of the river bottoms. Rather, as Dorsey described, the Stillaguamish would use "those already cleared lands to plant our potatoes,"[45] adding that those cleared lands had been used "since time immemorial."[46]

According to Samuel Hancock, who traveled through this region in the summer of 1849 but did not himself travel up the Skykomish, his Indian guides told him that "extensive and fertile prairies" bordered the Skykomish River (Hancock 1927:118). The prairies to which they

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[45] Jimmy Dorsey, Duwamish *et al* testimony 1933:267
[46] ibid.

were referring presumably included Allen Prairie near the Evergreen State fairgrounds in Monroe, where about 40 acres of hazelnuts grew and were harvested by the sq́exwəbc, or Skykomish people, as well as Woods and Cochran's prairie near present-day Sultan. Sq́exwəbc people densely populated the stretch of river from Fern Bluff to Goldbar, and these prairies were important berry gathering sites as well as seasonal campsites to which people repeatedly returned (Tweddell 1974). At Wood's Prairie, an "old Indian trail" led to the village at Fern Bluff (Tweddell 1974:652). Hancock's guides' statements to the contrary, the prairies along the Skykomish were not so common that the first settlers along the river were prevented from appropriating Woods and Cochran's prairies for their homesteads. Indeed, Woods Prairie is named after Salem Woods, the first white settler on the Skykomish River, who claimed this land in November 1859 (Figure 4-1).[47] Eldridge Morse, the editor of Snohomish County's Northern Star newspaper, described the area around Woods and Cochran's Prairies in this way:

> Mr. S. owns one of the most valuable farms in the county, situated on Wood's Prairie, through which runs Woods Creek. This place is some three-fourths of a mile from the river, a ridge separating the creek bottom from the river bottom. This ridge terminates a short distance above this prairie, from where it is level to the river. There are several very valuable places on the creek between Woods Prairie and Park Place, formed in part by natural prairies, the principal one being Cochran's, S. Peterson's and Richardson's. No more fertile soil or better situated places can be imagined than these. […]
>
> Mr. J. Cochran's place presents the most natural advantages to make money easily of any other place in the county. […] A good sized prairie, sloping toward the south and east about ten degrees, soil as fertile as can be, with a small perennial, crystal stream running through it (Morse 1878).

Open prairies like these were rare enough in the densely forested hemlock and cedar forests, that Morse was inclined to remark in another article describing a leisurely visit up the "Pill Chuck" River that

> For amusement, there is hunting and fishing; there being plenty of deer and bear in the woods and now and then a cougar, with fish in the stream. They can have illuminations whenever they wish, by setting a tree on fire. Indeed it is a beautiful sight at night, and rivals art illuminations to see the flames leaping from branch to branch, to the very

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[47] Morse 11 March 1876: pp. 4 & 5

top of the spruce and fir trees seething and crackling, with moss falling all ablaze like balls of fire. Fire is a great friend and helper of the settlers. In this country he could not do without it in clearing this land (Morse 1876).

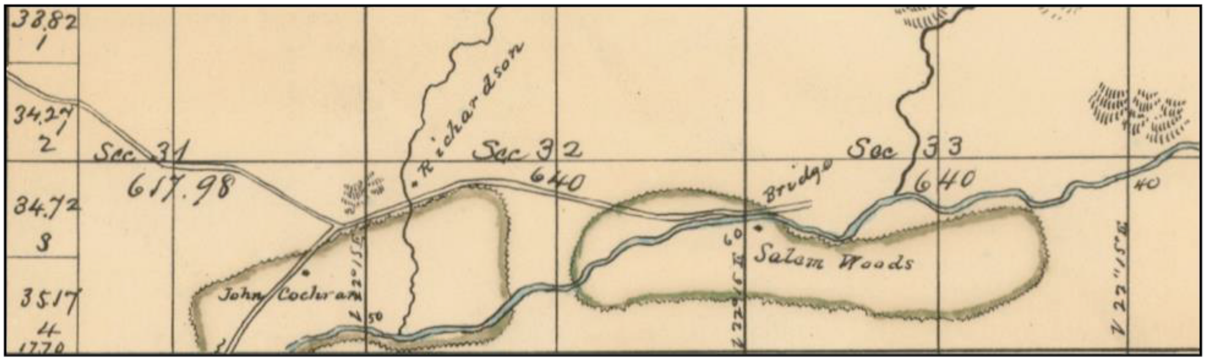


**Figure 4-1: 1873 cadastral map of T28N R7E showing Coachran's and Wood's Prairies on the Stillaguamish River (Hall 1873)**

Samuel Hancock's journey did take him up the Snoqualmie River, where he observed several prairies on his route. While several of his Native guides navigated their canoe through the rapids below Snoqualmie Falls, Hancock walked a trail paralleling the river with one of the guides who had remained with him. Their route took them a short distance through "land splendidly timbered, principally with cedar" (Hancock 1927:119), which opened on to a "large level and rich prairie" (ibid.) Here they encountered a group of Snoqualmie people who were raising potatoes. Hancock remarked that he had never seen finer ones, and attributed this to the character of the soil, from which he estimated that, "three or four hundred bushels [of potatoes] might be obtained from the acre" (ibid.). The Snoqualmie people he encountered on this prairie also had several horses. Hancock's guide informed him that: "his friends had many such" (ibid.), which they had obtained through their connections with tribes living on the east side of the mountains. After leaving the prairie, the travelers again found themselves in heavy timber, where they "meandered over logs for some time on the well-beaten Indian trail" (ibid.)

After his guides had portaged their canoe for some three miles to the top of Snoqualmie Falls, Hancock and his companions traveled for about two miles on the river, and arrived at Snoqualmie Prairie (Figure 4-2). Using the Chinook jargon to communicate with him, Hancock's guides informed him that they were at “Highas close Illihes” (Hancock 1927:120), a place where the land is good. Exploring the extensive prairie with his guides the following day, Hancock described it as follows:

> This land cannot be surpassed, in any country, for grazing and agricultural purposes; this prairie proper I should think five miles long, with perhaps an average breadth of a mile and a half, and the Prairie, I visited on the opposite side of the river, is equally extensive, and the two might be considered the same, with this beautiful little branch of the river flowing through it, pure and sparkling right from mountains close by (Hancock 1927:122).

The Snoqualmie Prairie was the site of a village with eight houses, known as ba’xab (Waterman 2001:178), a generic Lushootseed term meaning ‘prairie.’ ba’xab and the surrounding vicinity is the setting for a well-known Snoqualmie origin story, “Moon, the Transformer” (Ballard 1929, pp. 69-80). This epic begins with two sisters who camp out on the prairie after spending the day digging tadi, or bracken fern root (*Pteridium aquilinum*). Gazing up at the stars, the younger sister wishes that two of them were husbands for herself and her sister. When the sisters awake, they find themselves in the sky country, accompanied by their two star husbands. The sisters find that their daily lives in the sky country are basically the same as they were on earth – each day they go out and dig tadi while their husbands go and hunt game. They spend some of their time away from the sky village ostensibly to dig tadi but instead build a ladder from the sky back to earth, so they can rejoin their people. Once back to earth, the sisters fashion a swing from the remnants of the sky ladder. The people would ride this giant swing from da’xcdibc, or ‘footprint’ (Rattlesnake Mountain), to kəlbts, or ‘camping place’ (Mt. Si).

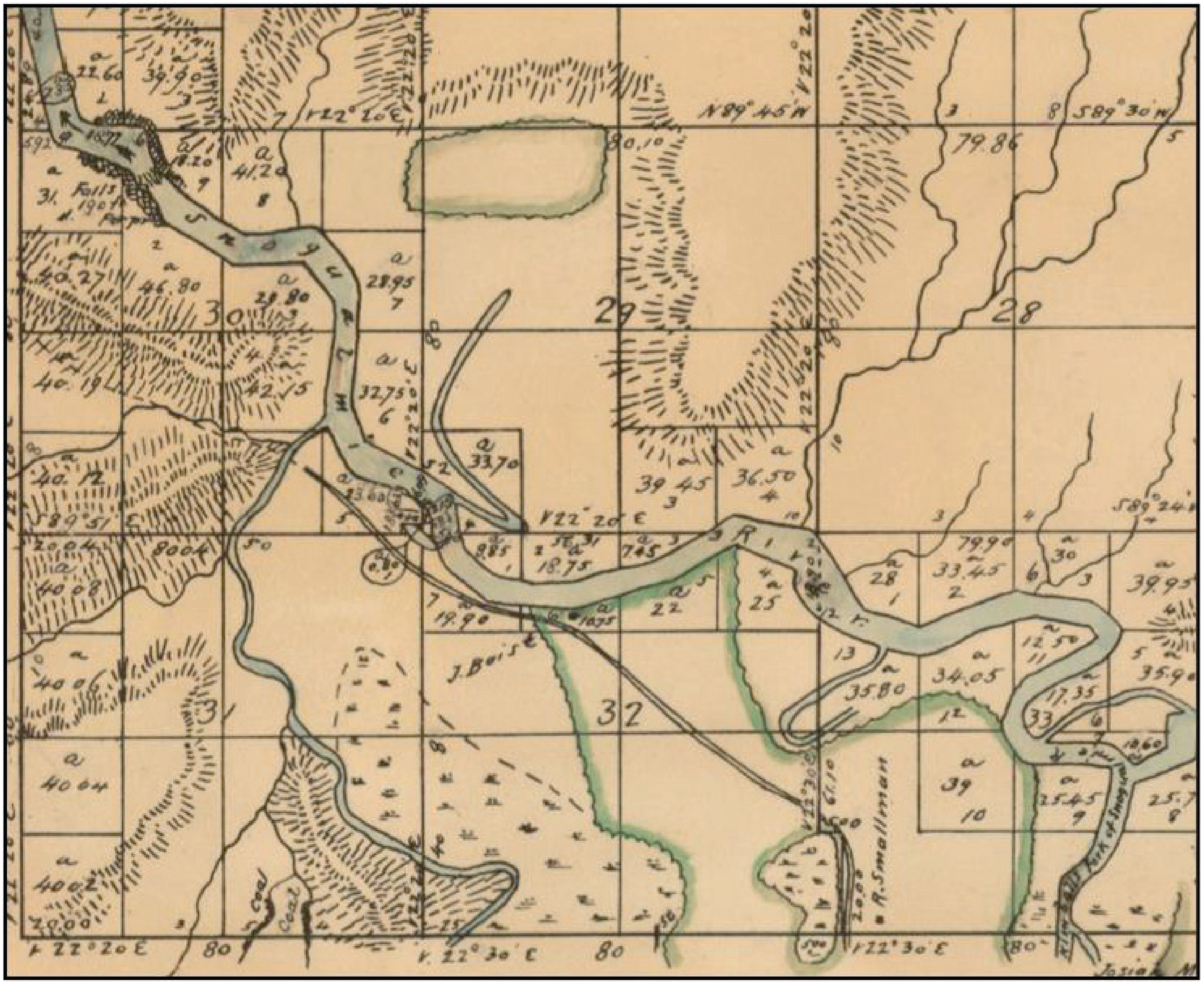


**Figure 4-2: T24N R8E 1865 cadastral map showing Snoqualmie Falls (upper left) and portion of Snoqualmie Prairie (lower right) (Richardson 1865)**

This story certainly indicates that bax'ab was an important place for digging bracken fern. The extensive prairie was very likely cultivated and burned by Snoqualmie people for bracken and probably other important root foods that grew there, as well as the game that would have been attracted to the prairie.[48] Although specific information regarding the historical ecology of Snoqualmie Prairie is meager, Edmund Coleman, an Englishman who in ~1870

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[48] There are several recent sources that definitively claim that this was a camas prairie that was regularly burned (Battey; Raibmon 2005). However, these sources either provide no citations to indicate where this knowledge came from, or they cite sources that do not specifically mention Snoqualmie Prairie.

followed the route of the Northern Pacific Railroad survey through the prairie, noted the wild fruits that grew at bax'ab as well, remarking that "there were blackberries, strawberries and many plants of the same species as those found on open lands in England" (Coleman 1932:250). By the late 19th century, Snoqualmie Prairie had been transformed into the "Snoqualmie Hop Farm," one of the largest hop farms in Western Washington at that time.

Rattlesnake Prairie was situated at the base of "footprint," or Rattlesnake Mountain in the Cedar River watershed. Both the mountain and the prairie got their names from the sound that the ripe camas seedpods that grew in the prairie made when the wind blew through them (Ralph Naess, personal communication 2013). This was most certainly an anthropogenic prairie, and was situated on a Native trail that led east to Yakima Pass, and west to the Enumclaw plateau, terminating in present-day Auburn at the site of an "Indian Village" identified on 19th century cadastral maps (Figure 4-3). The trail from Rattlesnake Prairie to this village led through forested lands intermittently interrupted by forest gaps that were important gathering sites of the Skoʔpabš, or Green River people. These included Meridian Prairie, or t'aqaʔadi, "salalberry place" (Waterman 2001:159), and Jenkins Prairie. Early settlers remembered this latter area (now a county park) for the Native people who, as late as the 1930s, pitched their "teepees" and harvested camas at the site (Storm 2002:504). Remnant oak groves, camas, and other culturally important food plants that have been identified at Jenkins Prairie, as well as the presence of fire scarred Douglas-fir trees, strongly suggest that this was a place that was culturally maintained by Skoʔpabš people (ibid.).

As described in chapter three, the Enumclaw plateau constituted portions of the homelands of both the Skoʔpabš and Smulkamish (White River) people, whose descendants are now collectively known as Muckleshoot. People have been occupying the plateau since before the Osceola mudflow, which about 5,600 years ago, inundated the plateau and portions of the Green River valley with more than two cubic kilometers of mud that travelled from the flanks of Mt. Rainier at a rate of perhaps 50 miles per hour (Hedlund, Ross, and Sutton 1978). Archaeological investigations conducted by Gerald Hedlund and his Green River Community College students in the 1970s yielded nineteen sites on the plateau. The largest and longest occupied of these tended to be located in or near open prairies (Hedlund 1983). Hedlund concluded that these prairies “were human-caused or kept open by deliberate burning on a regular basis, perhaps as often as twice a year” (Hedlund 1983:114). This claim stems from the considerable time depth of occupation at these sites. Hedlund infers that if they had not been deliberately maintained, these prairies would have inevitably reverted to closed canopy western hemlock and cedar forests, which would have rendered them unsuitable for occupation.

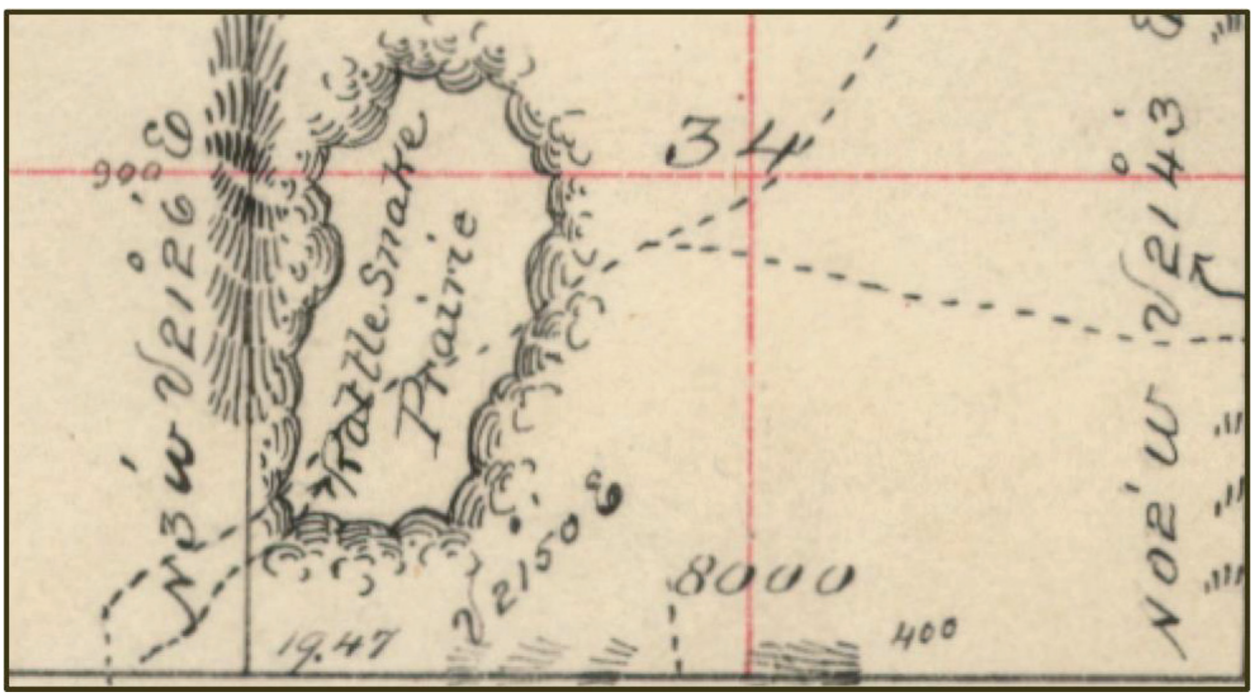


**Figure 4-3: Rattlesnake Prairie. Note trail network (dotted line), which connected the Enumclaw Plateau to Yakima Pass (Schwartz 1891)**

Hedlund's theory is supported by archaeological studies conducted at the George Nelson Allotment site described in chapter three, which is situated right on the edge of the historic boundary of the Muckleshoot prairie. Comparison of soil samples from different parts of the site indicated that the prairie-forest ecotone had persisted for at least 400 years and perhaps longer (Lewarch et al. 2000). Without human intervention, trees would have inevitably invaded the prairie. It is also supported by the prevalence of Garry oaks on the Enumclaw Plateau, which as discussed in chapter three, is an indicator of potential anthropogenic landscapes. Garry oak also appears to be somewhat out of its expected range on the plateau (David Giblin, pers. comm. 2012), suggesting either the maintenance of these habitats after the climate of the region began to cool around 4,500 years ago (Ames 2005; Brubaker 1988; Cwynar 1987), or the movement of Garry oak acorns to the Enumclaw Plateau at some time in the past.

Archaeobotanical studies of the four sites on the Enumclaw Plateau where such studies have been conducted are replete with many culturally significant root foods, all of which require light to survive. The Duwamish-Green-White River synthesis study (see appendix B) indicates a pattern of much higher prevalence of root foods in the inland sites, compared to those in the vicinity of saltwater and river villages (Figure 4-4). Nineteenth century cadastral maps clearly indicate a network of small prairies connected by trails on the Enumclaw Plateau (Figure 4-5). These prairies were potentially ideal root gathering habitat. Muckleshoot tribal members still gather camas from some of them today. Berries would also likely have thrived in them, particularly on forest edges.

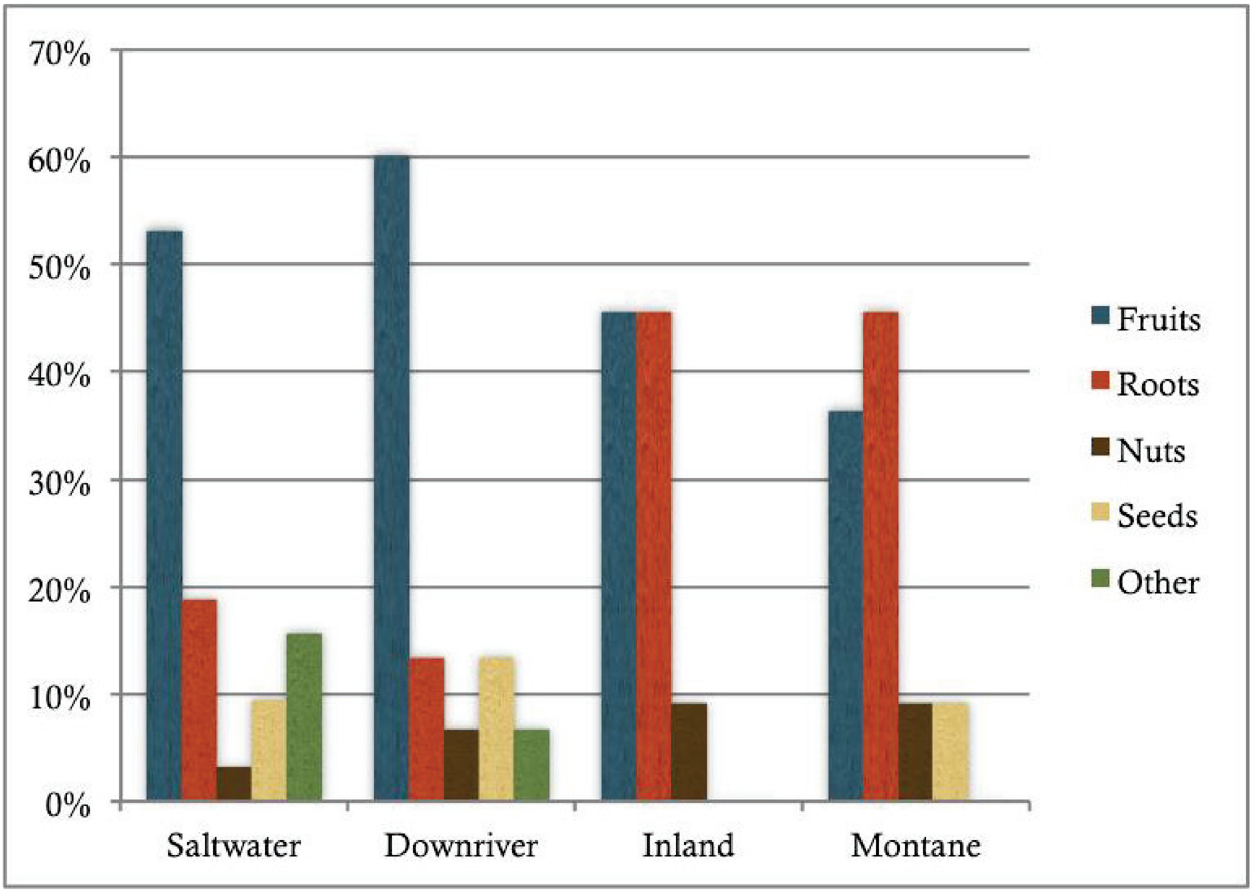


**Figure 4-4: Comparison of archaeobotanical remains by Smith's (1940) "ethnical" groups**

Joe Nimrod, a Muckleshoot tribal member who provided testimony to the Indian Court of Claims in 1927, implied that the Enumclaw plateau was good for cultivation (and possibly a cultivated place) when he stated that "All of the land between the two rivers was good for farming – that is the reason the white people drove the Indians out."[49]

The presence and persistence of culturally important species like Garry oak and camas in these prairies also suggests that the Enumclaw plateau is somewhat drier than the upland prairies further north, where bracken fern is more commonly mentioned as the dominant cultivated root food. It is also further testament to the Enumclaw plateau as a cultivated landscape (Hedlund

[49] Testimony of Joe Nimrod, Duwamish et al. 1933:174

1983; Warren KingGeorge, pers. comm. 2007). Furthermore, while not specifically referencing prairie cultivation, the Indian Claims Commission testimony of Joe Bill, also Muckleshoot, suggests that prescribed burning was a social institution. Bill indicated that the people "had a ruling,"[50] regarding the burning of underbrush, and that it was customary to do so "about every 3 years, in the fall of the year to keep 'big timber' from burning."[51]

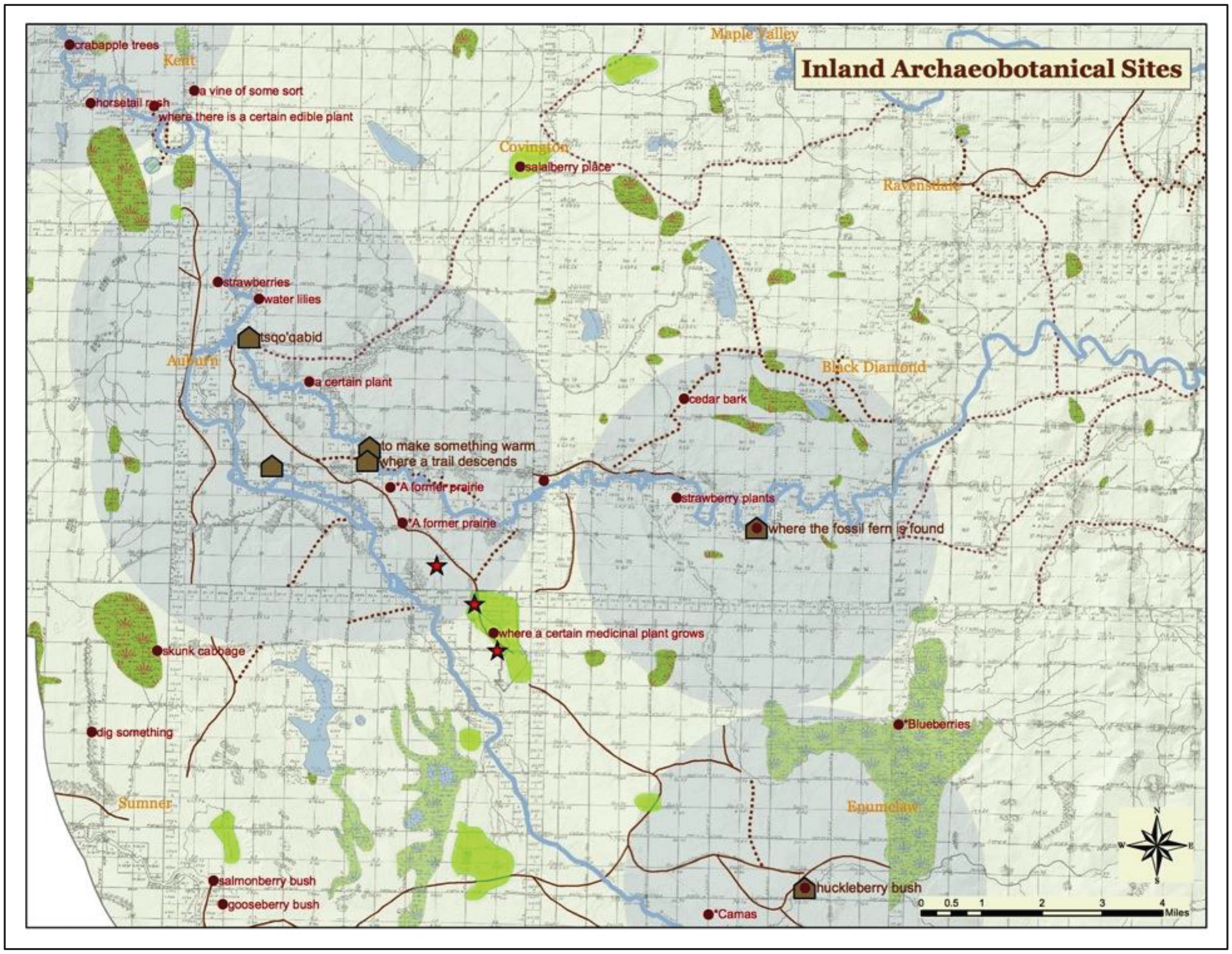


**Figure 4-5: łalebiuqʷ archaeobotanical sites on the Enumclaw Plateau**

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50 Testimony of Joe Bill, Duwamish et al. 1933:161
51 ibid.

The prevalence of cultivated prairies on the Enumclaw Plateau, as well as the higher abundance of carbohydrate dense foods – particularly roots - in inland archaeological sites, and as I describe below, in montane sites, may be related phenomena. Carbohydrate dense foods help to meet caloric needs in diets with lower fat content (Speth and Spielman, cited in Spurgeon 2003). The practice of substituting carbohydrates for fat may have been true for łalebiuq$^{w}$ people, for whom land mammals were a much more important part of the diet than they were for saltwater people. Furthermore, the all-important anadromous fish would have lost substantial body fat by the time they had swum all the way to these inland villages. As previously discussed, the ethnographic record also substantiates the greater importance of root foods in the diets of inland people, where “root gardens” are more commonly mentioned in relation to inland dwellers.

One final point regarding inland peoples’ cultivation of root gardens has to do with the early and extensive adoption of potato cultivation among łalebiuq$^{w}$ people, as well as the forms of employment they took in the early settlement period. As Nels Bruseth noted for Stillaguamish and Sauk people: “The Indians were good at transplanting or weeding root crops. In season they worked in the hop fields, being very adept at picking hops. They also got jobs slashing brush and clearing land” (Bruseth 1977:5).

As already mentioned for the village of Skabalko on the Stillaguamish, and the Snoqualmie people that Samuel Hancock encountered below Snoqualmie Falls, inland people practiced potato cultivation. The Nooksack were the first Indigenous people in Washington State to do so (Smith 1950). Indian Claims Commission testimonials from Upper Skagit, Sauk and Snoqualmie people indicate that potato cultivation was commonplace in their villages. These gardens were typically about three to four acres in size, and were grown both for personal consumption and sold at fur-trading posts and to early white settlers. Wayne Suttles suggested that "the easy acceptance of potato culture was made possible by … the knowledge and technology for using native plants… a semi-sedentary life … and property rights" (Suttles 2005:191; Suttles 1951). In short, the patterns of resource cultivation associated with łalebiuq$^{w}$ potato cultivation and the kinds of work Native people took in the early settlement period were a blend of their already existing social institutions, livelihood strategies, and horticultural knowledge & practice with the opportunities and challenges of Euro-American colonization (ibid.).

## The Role of the Cascade Mountains in the Lives of łalebiuq$^{w}$ People

The oldest known archaeological site in Puget Sound Coast Salish country is located at Cascade Pass (elev. 1,643m) in North Cascades National Park - about a three-hour walk from Marblemount, one of the furthest inland villages of the Upper Skagit people. Here, archaeologists have found evidence of recurrent use dating back to 9,000 years BP. The source material of some of the oldest chipped stone tools – particularly Hozomeen chert - links the site to people living along the Skagit and Fraser Rivers (Mierendorf, n.d.). Tools made of this material and locally obtained quartz crystal are most common from about 9,000 to 7,500 years BP. After about 3,800 years BP, stone sources primarily from eastern Washington are far more common than those from the west side of the Cascades. Park archaeologist Bob Mierendorf attributes this change to a region-wide shift in resource intensification after about 4,000 BP, characterized by population increase and the advent of "larger and more permanent settlements" (Mierendorf, n.d:323).

While Cascade Pass is the best-known archaeologically of those across the Cascades, inland people were familiar with, and regularly used several passes across the mountains, as many of the inland villages were connected to Interior Salish and Sahaptian people through friendship, marriage, and other forms of exchange, and it was not unusual for them to speak a plateau language in addition to their mother tongue. In addition to Cascade Pass, inland people most frequently traversed the Cascades across Hannegan, Kaiwhat, Indian, Cady, Stevens, Snoqualmie, Yakima, and Naches Passes (Beckey 2003), and were also familiar with Suiattle Pass, Windy Gap, and Bluebell Pass (Hollenbeck 1985). It was through these passes that inland people were essential as guides for early surveyors and travelers.[52] In addition to Cascade Pass, chipped stone tools have been found at Bluebell (Hollenbeck 1985), Stampede (ibid.) and Naches Passes (Hedlund 1978, Hollenbeck 1985), but have not been dated.

I now turn to practices associated with inland peoples' activity in the Cascade Mountains. These include connections with plateau people who dwelled on the east side of the Cascades, the hunting and exchange of mountain goat wool, harvesting of big huckleberry and Cascade blueberries, and burning of meadows where these berries grow. Taken together, these practices indicate that rather than just being a barrier between the west and east sides of Washington State, for łalebiuq$^{w}$ people, the Cascade Mountains were a region in their own right (Marsh 2004), comprised of spatio-temporal networks of culturally significant places, practices and resources. As indicated by the archaeological record in the Cascades, Coast Salish people have a deep history of mountain inhabitation. The vital role that they played as guides to early Euro-American explorers, surveyors, and various travelers (who would have been lost without them), is further testament to the intimate familiarity of inland people with these mountainous

[52] e.g. in addition to Coleman 1932 and Hancock 1927, see also (Linsley 1981; McClellan 1855; Wilkes 1916; Winthrop 2006). See (Nash 2000; Richardson and Galloway 2011), for a discussion of the crucial role that Nooksack people played in the delineation of the international boundary between the US and Canada.

landscapes.

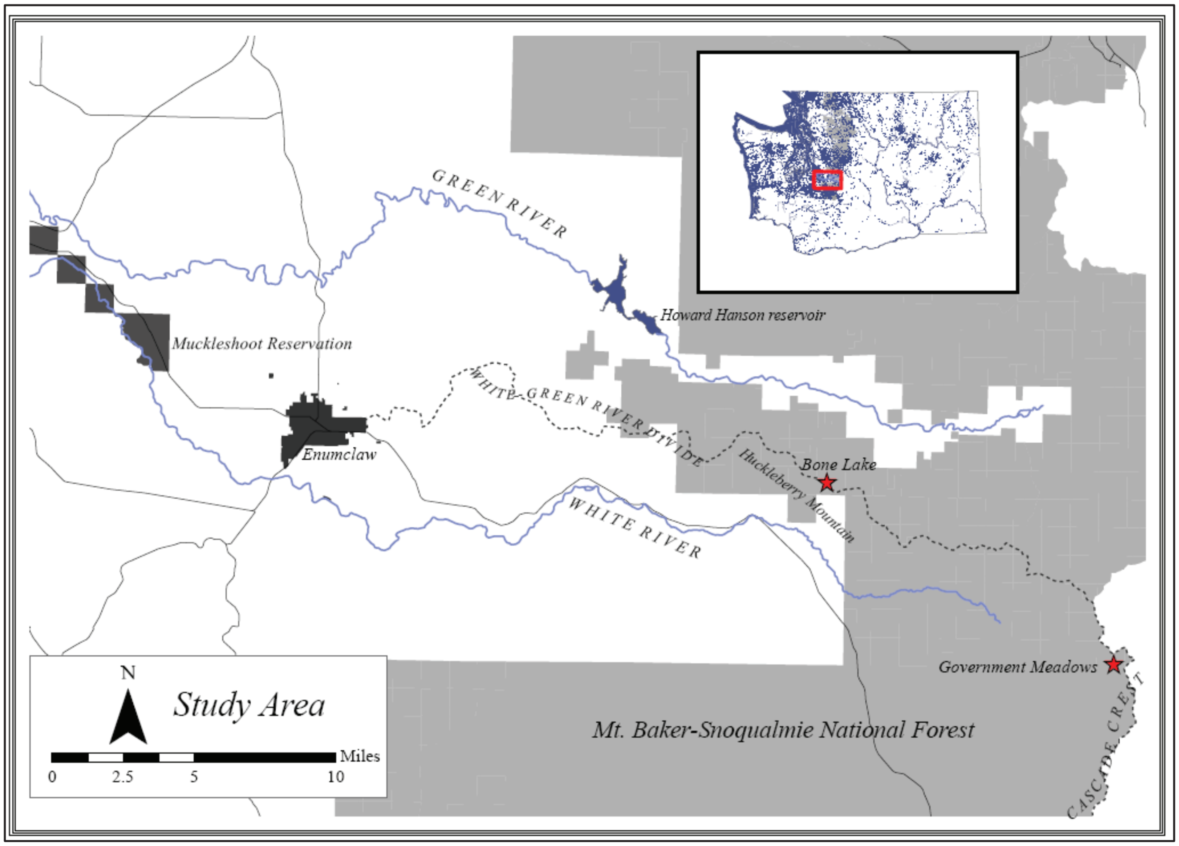


**Figure 4-6: Study area of the Divide Ridge Trail (čqalitc) and Huckleberry Mountain (sχay'ús)**

In the western Cascade Mountains of Washington State, culturally important plant and animal resources tend to be most abundant in the open meadows of the mid-elevation Pacific silver-fir and mountain hemlock zones, and in higher elevation sub-alpine tundra. Thus, it is not surprising that archaeological sites are also more densely concentrated in these mid – and upper elevation biogeoclimatic zones, as opposed to the densely forested lowlands (Burtchard 2003; Mierendorf 1999; Smith 2006; but for an exception, see US National Park Service 2015). Numerous archaeological sites composed mainly of lithic scatters have been identified across lands that now comprise the public lands in these zones (Burtchard 2003; Mierendorf 1999; Smith 2006). The most comprehensive and relevant archaeological research include studies conducted on the čqalitc trail between the Green and White Rivers, and comprehensive studies conducted by archaeologists in National Park system lands.

## *Harvest of big huckleberry and Cascade blueberry*

Big huckleberry meadows are most common and abundant at the southern end of Puget Sound Coast Salish territory, and at lower elevations (~1,100-1,600m), while Cascade blueberry occurs at higher elevations and is more common to the north. Furthermore, because big huckleberry was more common and Cascade blueberry more difficult to obtain, the blueberries were in some instances specifically favored and sought out for ceremonial purposes in the southern end of the territory (Russell Moses, pers. com. 2009).

There were many species of berry that łalebiuqʷ people might harvest from their homelands from mid- to late summer, but swədáʔχ and Cascade blueberry are the last to ripen, and thus were an abundant and important source of late season Vitamin C. In addition to eating them fresh, the people harvested and dried (and more recently canned) large quantities of them in the field for winter storage (Coleman 1932:256, Smith 1940:272). Aside from these purely practical reasons for harvesting them in quantity, anyone who has tasted swədáʔχ or Cascade blueberry[53] knows that these berries are delicious. As Edmund Coleman observed of the big huckleberry during his trip through Yakima Pass ca. 1870, “they are of a finer flavor and larger size than those [berries] growing on the lowlands” (Coleman 1932:252). Furthermore, trips to the mountains in late summer were not just subsistence events; they were social and spiritual events as well.

While Cascade Pass holds the distinction of being the oldest known archaeological site in

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[53] The Lushootseed name for Cascade blueberry is not entirely clear. In her work with Upper Skagit people, June Collins refers to what is probably Cascade blueberry as swədáʔχ also. sćəbayus is another possible term used for Cascade blueberry and possibly big huckleberry as well (Bates, Hess & Hilbert 1994, Collins 1974).

this part of the Cascade range, two major sites at the southern end of the study area provide strong evidence of long-term harvest and processing of big huckleberry. The first, in the traditional territory of Muckleshoot people, is located at Buck Lake (elev. ~1650m), on the northeast flank of Mt. Rainier National Park. Here, the earliest cultural deposits date to around eight thousand years ago. Similar to Cascade Pass, the Buck Lake site indicates intensification of use about four thousand years ago (Burtchard 2011). However, the site at Buck Lake differs from Cascade Pass in that intensive use was consistent from that time up to the present (Figure 4-7).

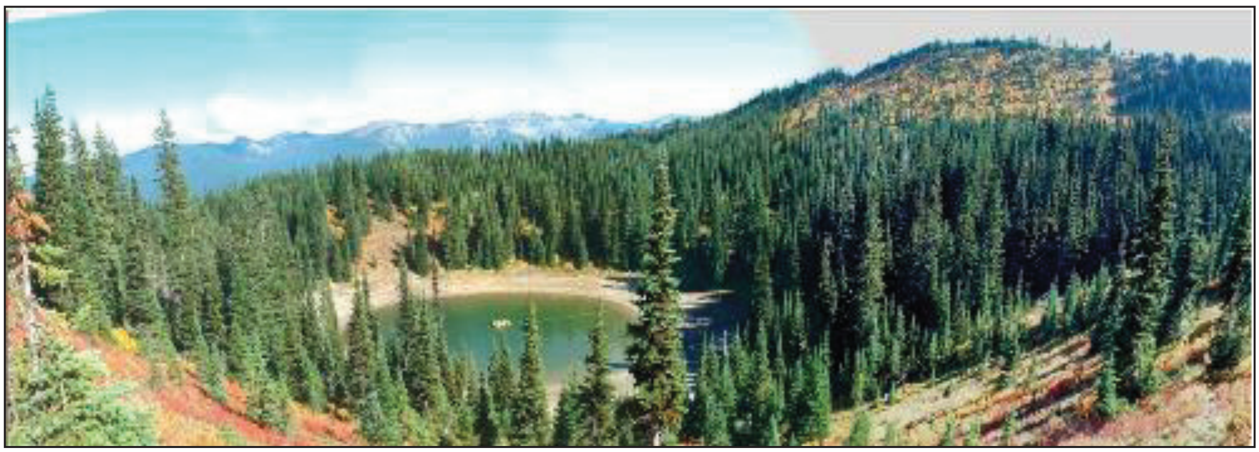

**Figure 4-7: Buck Lake (photo by Greg Burtchard)**

Small amounts of *Vaccinium* fruit and peduncles (stems) were identified in layers associated with an approximate date range between 3,600 and 2,800 years ago (Trieu-Gahr 2009). This layer is also associated with cultural deposits, including hearth and pit features, and small amounts of fire-cracked rock, indicating that some kind of *Vaccinium* - probably big huckleberry, which is abundant at the site – was likely dried here.[54] The charcoal record at Buck Lake also provides strong empirical support for anthropogenic burning of big huckleberry habitats in the pre-contact period. Fire frequency at Buck Lake increased beginning around 2,700

[54] Burtchard, pers. comm. 2013

years ago – a time when, based on what is known about climate history and fire in these upper elevation landscapes, fire frequency would be expected to decrease or remain constant: "The shift in fire regime does not correspond to changes in sedimentology, the pollen record or regional climate. Altered patterns of human resource use and fire management are the most likely explanation for the observed shift in fire regime" (Tweiten 2007:9). Tweiten proposes that the purpose of burning was to maintain productive beargrass harvesting sites. It is more likely that the purpose of burning was to maintain an open habitat that supported a suite of culturally important plants and animals, including beargrass.

Bone Lake is located northwest of Buck Lake, on the opposite side of the White River watershed. Not far from Bone Lake, Lost Springs (Miss and Nelson 1995) is located on the čqalitc trail between the Green and White Rivers – also Muckleshoot traditional territory - and is interpreted as a base camp from which people would depart to hunt and gather big huckleberry, and to which they would return to process their berries and game for transport to winter villages. According to Miss & Nelson (1995), the archaeological record at Lost Springs suggests upland resource intensification beginning about 4,000 years ago in response to changing climate and population increase, as is similarly proposed by Mierendorf for Cascade Pass (Mierendorf, n.d.), and Burtchard for Buck Lake. This pattern of resource intensification at around 4,000 years ago also shows up in the archaeobotanical record described in the Duwamish-Green-White River (stúləkʷ) synthesis study (Figure 4-8; also see appendix B).

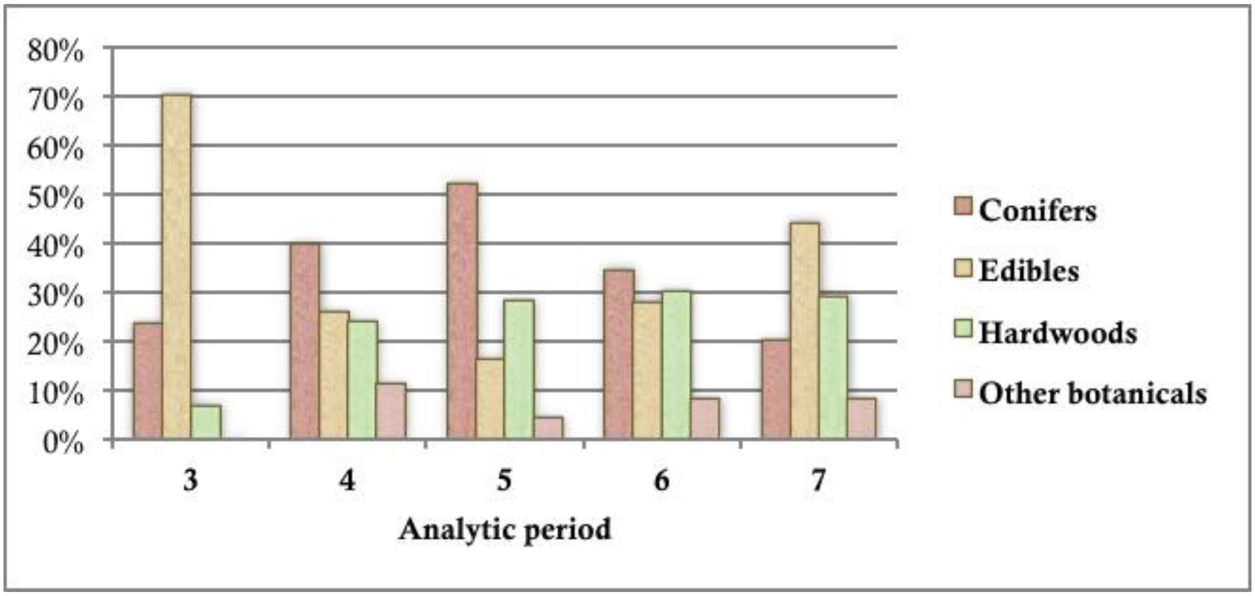


**Figure 4-8: Changes in proportion of botanical types in the historic Duwamish-Green-White River watershed (stúləkʷ)**

**Table 4-2: Analytic periods (rev from Kopperl 2011)**

| Analytic Period | Cal BP (thousands) |
|---|---|
| 1 | 14 - 12 |
| 2 | 12 - 8 |
| 3 | 8 - 5 |
| 4 | 5 – 2.5 |
| 5 | 2.5 - 1 |
| 6 | 1 - .5 |
| 7 | .5 - .2 |

The most ancient artifacts at Lost Springs are dated from 4,200 to 5,000 years ago, and include large side-notched projectile points and scrapers. These tools were made from locally sourced jasper as well as cryptocrystalline rock and petrified wood from the Vantage area. This distant source, along with obsidian flakes from central Oregon that were also identified in this assemblage, confirms the considerable time-depth of long distance travel and trade between the east and west sides of the Cascades. Five features interpreted as huckleberry "drying trenches" were also identified. This method entailed building up a mound of soil parallel to a downed log, which would be lit and allowed to smolder. The mound of soil would be covered with tule mats or animal hides, and then the huckleberries would be placed on top to be dried by the deflected heat of the smoking log (Filloon 1952; Mack and Mcclure 2001; Norton 1999). Radiocarbon dates indicate that one of the trenches at Lost Springs was in use around 2,500 years ago, while the dates from a second trench indicate that it was in use around 1,700 years ago. While no botanical remains of *Vaccinium* species were identified at Lost Springs, Miss & Nelson attribute this absence to their sampling techniques. They point out that where similar features have been undisputedly interpreted as huckleberry processing trenches further south on the Gifford Pinchot National Forest (Mack & McClure 2001), *Vaccinium* seed and tissue was extremely rare (Miss and Nelson 1995).

Miss and Nelson suggest that primarily big huckleberry and secondarily mountain goats were what attracted people to Lost Springs, based on the predictability and control of big huckleberry abundance through the use of fire. They also argue that its earliest occupation and use was by people from the east side of the mountains. This they conclude based primarily on geographic and ethnographic evidence, and the fact that lithic materials resemble those found on the east side near Vantage and Manastash Ridge. However, their assertion that access to Lost Springs was topographically easier from the east side than the west is surely incorrect. The closest Muckleshoot village was located near present-day Enumclaw, from which Lost Springs can easily be accessed via an old trail with moderate elevation gain from the Enumclaw Plateau to čqalitc, while the locations from which east-side bands are proposed to have accessed Lost Springs are a considerably greater distance. Furthermore, as they cite in their own report, the entirety of Huckleberry Mountain, or sχəy'ús (head) along with the site itself, constitute culturally significant places in the cultural landscape of Muckleshoot people. According to

Muckleshoot elder Gilbert KingGeorge, sχəy'ús came to be when two monsters "who were kind of like yin and yang" (KingGeorge 2007) got into a fight:

> One killed the other and he threw the head to the north to what's now Huckleberry Mountain, which is designated in the Indian language by the word meaning head [sχəy'ús]. Then he threw the entrails of the other monster to the mountain to the south of the Green River, which was called Guts Mountain (KingGeorge, qtd. in Hanson & Panagia 2002:186).

In the Indian Court of Claims cases of the 1950s, Arthur Ballard also testified that the Muckleshoot people "made seasonal trips to Huckleberry and Grass Mountains for berrying purposes, and to other areas in the eastern part of the claimed area for hunting mountain sheep [goats]" (Ballard 1951). Furthermore, Muckleshoot people continued to use Lost Springs regularly until the Weyerhauser Corporation restricted their access to it in 1943 (Miss & Nelson 1995:14). In his interpretive history of the White River Ranger District, District Ranger Nevan McCullough recounted a story about the significance of sχəy'ús that was told to him by Ed Wells, an 'old-timer' who worked intermittently for the Forest Service and had also been a trapper:

> In 1928 the Muckleshoot Indians still made annual pilgrimages to Huckleberry Mountain to pick and dry berries. It wasn't uncommon, around the middle of August, to see several buckboard wagons piled high with their camping gear, squaws [sic] and kids, with packhorses tied behind the wagons and young Indians riding the saddle horses, heading for Slippery Creek. Here the Indians left their wagons, loaded their gear on pack animals, and set up camp on Huckleberry Mountain around [Lost Springs] … For three weeks or a month, the Muckleshoots harvested and processed the huckleberries (McCullough 1970:37).

Lost Springs is one of eight archaeological sites that are known along the čqalitc trail to Naches Pass, all of which, from Lost Springs to the Pass, are located within mountain hemlock or Pacific silver-fir zones – swədáʔχ habitat. The majority of these sites are lithic scatters associated with temporary hunting camps. One of them, in the vicinity of Naches Pass, has been dated to around 2,200 years ago (Miss & Nelson 1995:11). Twin Camps, located about ten miles east of Lost Springs on the čqalitc trail, has a much more complex array of tool types, including side and end scrapers, knives, gravers and burins. No intact or well-worked projectile points were found at this site, however. This absence was attributed to the site having been largely disturbed by construction activities, as well as looted by "pot hunters." The complexity of tool types found at Twin Camps suggests that a diverse array of activities took place here, including hunting, butchering, working hides, wood and bone, and berry gathering (Hedlund 1978:19). Like Lost Springs, Twin Camps may have been an important base camp to which people repeatedly returned.

In addition to the eight archaeological sites, Bone Lake is located on sχəy'ús, about 1.5 miles east of Lost Springs on the čqalitc trail. Although no artifacts have been found there, Bone Lake is known ethnographically and historically as an important place for gathering big huckleberry, and also has a kind of local lore surrounding its reputation as a lively late summer social gathering site as well as for the presence of an "Indian race track" (Hedlund 1978:23). local resident who is very familiar with the site, stated that along with several huckleberry-drying features of the type found at Lost Springs, the racetrack was still visible in the late 1970s. She also told a story about how Jesse Rose, a Forest Service employee in the 1920s and 1930s who had staffed the Christoff Lookout during the summer, used to watch the Indians race their horses and play slahal at Bone Lake:

> They used to watch the pony races, and the bone games and everything else that went on up there, I mean, native tribes used to go up there. In fact, my, well, I call him my grandfather, but he's not, um, he's my husband's…cousins dad…but anyway, he used to go up there as a young man and camp out there for 2 weeks at a time, 3 weeks at a time and just… baskets and baskets of berries. There used to be [a racetrack]. You used to be able to see it back in '76. […] Back then, we saw the old berry drying pits up there, and a lot of the encampment sites, and a lot of areas that had cedar trees that were stripped 30 feet up that were used for basket making and stuff, so, yeah. And I don't know, a lot of that's probably been logged off now, or just so overgrown that I'd have a hard time finding that.

Taken together, all of the sites along the čqalitc trail suggest that is was a very active, well-populated place.

All of the łalebiuqʷ people had their favorite berry harvesting sites. While these must certainly have shifted over time, and the places named in the ethnographic and ethnohistoric literature are far from complete, Table 4-3 lists some of them (Bedal Fish and Bedal 2000; Hollenbeck 1985; Monohan-Carpenter 1981; Richardson and Galloway 2011; Tweddell 1974). Like excursions made by Muckleshoot ancestors to Lost Springs, trips to the berry fields might involve large groups of people for periods of three to four weeks, and perhaps longer. While in other instances small groups comprised predominately of women might go out for just a few days (Amoss 1978; Snyder 1965). In some cases harvesting sites seemed to be the exclusive domain of a village or of certain families, while at others, the berry-gathering season was an opportunity for people from far-flung villages to congregate in one place. Particularly when larger groups and longer periods of time were involved, the people also hunted mountain goat, elk, bear, and smaller mammals. And just as łalebiuqʷ people traveled to the saltwater to harvest clams and other shellfish (Haeberlin and Gunther 1930; Masten 1980; Richardson and Galloway 2011; Smith 1950; Tweddell 1974), sxwəljáb (saltwater people), and stuləgʷábš (river people) traveled to the mountains to harvest berries and hunt game[55].

Both the Nooksack and Upper Skagit harvested Cascade blueberries on the flanks of Mt. Baker. Nooksack people tended to harvest them on the west and north slopes, while Upper Skagit people harvested on the east and south slopes. Nooksack people often camped in the sheltered meadows at spelhpálhχen ("many meadows"), where they would harvest and process their berries, along with the game that was caught on the higher slopes of the mountain known as kwelshán ("shooting place"). Each family had their own campsite at spelhpálhχen (Richardson & Galloway 2011:148).

[55] Although mountain goat hunting seems to have been the unique province of inland people (Smith 1940, Tweddell 1974).
Klikitat

**Table 4-3: Traditional swədáʔχ and Cascade blueberry harvesting areas in the MBSNF**

| | Nooksack | Upper Skagit | Sauk-Suiattle | Stillaguamish | Pilchuck | Skykomish | Snoqualmie | Muckleshoot |
|---|---|---|---|---|---|---|---|---|
| Mt. Baker | x | x | | | | | | |
| Cascade Pass | | x | | | | | | |
| Lookout Mountain | | x | x | | | | | |
| Mt. Pugh | | x | x | | | | | |
| Sauk Mt. | | x | x | | | | | |
| Schreiber's Meadow | | x | | | | | | |
| Cow Heaven | | x | | | | | | |
| Barlow Pass | | | x | | | | | |
| Sloan Peak | | | x | | | | | |
| Mt. Higgins | | | x | x | | | | |
| Index | | | | | | x | | |
| Sultan Basin | | | | x | x | x | x | |
| Mt. Pilchuck | | | | x | x | x | | |
| Three Sisters Peak | | | | | | x | | |
| Stevens Pass | | | | | | x | | |
| Granite Mountain | | | | | | | x | |
| Snoqualmie Pass | | | | | | | x | |
| Yakima Pass | | | | | | | x | |
| Grass Mountain | | | | | | | | x |
| Huckleberry Mountain | | | | | | | | x |

Barlow Pass was an important elk hunting and berry gathering site for Sauk people, and one that they seemed to consider their exclusive domain:

… [T] he Sauks considered the Barlow Pass [elk] bands their own. […] When scouts brought down word that [the elk] had arrived there, hunting parties were organized. Canoes were loaded with hunting gear and supplies. As many as 40 or 50 men, women and children, also dogs took off up river. Elliot Creek up the South Fork Sauk was the end of the canoe navigation. There the main hunting camp was established. Sometimes a back-pack camp moved further up river. […] When out on such hunts the Indians might also gather other foods for winter use. Among these were huckleberries and edible roots. Occasionally they snared Mountain Goats. The wool and hair of these were highly valued as material from which could be made blankets, cloaks and socks to be used by the tribe or traded for other things to Puget Sound Indians (Bruseth, n.d.).

During the Indian Claims Commission hearings of the 1920s, Stillaguamish elder Jimmy Dorsey described a large campground on Mt. Higgins with a "large shed, drying racks and a fireplace" (Dorsey, qtd. in Hollenbeck 1985:157). Here, large numbers of Sauk, Snohomish, and Stillaguamish men and women would gather to pick berries and "for the hunting of bear, deer, elk, goat and other animals, the meat of which was dried on the racks" (ibid.).

Along the Skykomish River, Stevens Pass was an important gathering place for people from both sides of the Cascades. Further down the river, the Sultan Basin was also elk summer range. People would come from far afield to hunt the elk there and to gather big huckleberries. This was also true of Pilchuck Mountain and the Pilchuck basin (Tweddell 1974:686).

As with every personal skill in the Coast Salish world, berries were provided through the assistance of sqəlálitut. There were songs that helped the berries grow, and those that helped a person with their harvest (Collins 1974:57). There was a prevalent attitude to pick only the best berries, and certain competitiveness between harvesters to do so (Smith 1940:272). Older harvesters admonished the younger ones to move around and find the largest berries, and there were stories to keep the younger ones from eating more than what ended up in their baskets. Jessie Moses, an Upper Skagit woman, “told of a mother who warned her daughter, ‘You should pick your berries and not eat them or you will turn into a bear.’ The girl ate her berries and changed into a bear. ‘See that bear walking along. That is my daughter’” (Collins 1974:150).

Although the “first-salmon ceremony” is most well-documented in this area, John Fornsby, an Upper Skagit man who was born in 1855, described how people would also acknowledge the first berries:

> They prayed for the first salmonberries too. They prayed before they picked all the berries. They did this the first time they got berries. They put the berries on tables way up high and have to pray. Then the chief told them to go out and pick berries. I used to go along with them when I was a kid. They prayed for those berries and salmon because they knew God made them. God made them for us. They did that for meat, for bear meat and for deer when they first got it (Fornsby, qtd. in Collins1949:296).

The berries were harvested in small, coiled baskets that were suspended from the neck, leaving both hands free for harvesting. They were dried on cedar mats raised above a smoldering fire (Smith 2006), with the trench method described above, or spread out on a hide or flat rock to dry in the sun. Once they were dried they were packed into large, sturdy coiled baskets and transported back to villages (Smith 2006). Here, they might simply be stored whole, like little raisins, or pounded into powder, reconstituted with a little water, and shaped into berry “cakes.”

In either case, the berries stored well and were used for winter food, when they would be eaten on their own as a kind of dessert, or added to soups and stews.

### *Inland Connections with Plateau People*

In her ethnography of the Upper Skagit, June Collins observed that people from Upper Skagit villages traveled through one of two passes to eastern Washington (presumably Cascade or Indian Pass), where they "visited and intermarried with Sahaptins and Interior Salish" (Collins 1974:52). Nels Bruseth noted that among the Sauk people, "there was evidence of intermingling of west and east side tribes – especially Chelan and Wenatchi" (Bruseth 1977:6). Early Euro-American travelers through the Snoqualmie homelands observed that the people were as connected to the Klikatat people from the east side of the mountains as they were to Coast Salish people living further downriver (Blukis-Onat 2001), and that they were a 'two-language' people (Ballard 1929). As noted in the discussion of Samuel Hancock's journey to Snoqualmie Prairie, Hancock observed that the Snoqualmie people obtained their horses from the Klikatat people. He also noted that the trail through the Snoqualmie Prairie eventually led east to Yakima Pass (Coleman 1932, Hancock 1927). This trail must have at some point east of Rattlesnake Prairie joined with the one used by the skopʔabš people to access the prairie from the Enumclaw Plateau. Several Snoqualmie and Klikatat people accompanied Edmund Coleman when he retraced the route of the Northern Pacific Railroad Survey over Yakima Pass ca. 1870. In his description of his journey he notes the bilingual nature of Snoqualmie people: "The Indians on the eastern and western sides of the mountains have much intercourse with each other…[…] a portion of the Snoqualmie Indians [speak the Klikatat language]" (Coleman 1932:256). This was also true of the Skoʔpabš and Smulkamish people of the Green and White Rivers, who continue to maintain close ties with Yakama people living on the east side of the Cascade mountains

(Meeker 1980; Ballard 1929).

While łalebiuq$^{w}$ people and people living on the east side of the Cascades maintained strong connections with one another (perhaps for millennia; see discussion of Buck Lake in appendix B), the people living on opposite sides of the mountains from one another also recognized differences between them. This is evident in some of the stories that are told by inland people about their interactions with plateau people.

Lucy Williams, an Upper Skagit woman, recollected the story of her "Aunty-Grandmother," who had married into an Okanogan family. Lucy's Aunty-Grandmother was a young woman when she married her middle-aged husband. Her husband's family made her butcher fish all the time, then teased her for being dirty and smelling like fish. Meanwhile the husband was constantly urging his mother to go out and pick huckleberries to dry for the winter, but this woman never brought back any berries when she returned. The husband warns his young wife to never go picking berries with his mother. He tells her that her mother-in-law is actually a bear, and that she'll get jealous of the young wife picking "her" berries and will eat her up. But Lucy's Aunty-Grandmother doesn't believe her husband, and early one morning she tells her mother-in-law that she's going with her to pick berries. The mother-in-law laughs and starts walking so fast that Lucy's Aunty-Grandmother can hardly keep up. The mother-in-law just vanishes, and the young wife starts to think that her mother-in-law must have turned into a bear. Then she sees her mother-in-law from a distance, laughing a strange, throaty laugh. Returning to her village, the young wife learns that not only is her mother-in-law a bear, but her husband is too! The story goes on to say that "the Okanogan people change to animals like that. Aunty-Grandmother had some relatives living in the village and they told her to leave that man or he would chew her up; besides, he never helped her. All she ever got to do was smoke fish. So she left her husband and married a man from Skagit" (Collins 1974:149).

Another inland story, this one told by Sauk people, also speaks to a kind of tension between inland and plateau people. In this case, jealousy between two women explains how Mt. Higgins got the "long parallel gashes running slantwise from the top of the ridge down to the rock slides" (Bruseth 1977:22).

So-bahli-ahli (Whitehorse Mt.) was once a woman. She had come from the east side of the mountains. Near where she settled lived a man, Quae-hae-eths. She liked him very much, and he became her man, and they lived happily together, but this was not to last. Up from the Whulge (Sound) came another woman, Ska-dulgwas (Mt. Higgins) a young maiden of many charms.

She looked at Quae-hae-eths, envied So-bahli-ahli and decided to steal him. She dressed herself in beautiful colors, mostly red; smiled at and talked nice to the man. He made a move toward her, she suddenly grabbed him, and placed him behind her. Then a battle began. The noise was terrific; hair flew all over the sky; rocks whizzed through the air, hit their mark, rolled down and made big rock piles down below. The battle ended in victory for Ska-dulgwas, but she was disfigured for life by So-bahli-ahli who reached over and with her fingernails scratched those deep gashes across the face of her enemy. The man did not interfere the least in the battle. He just stood still and looked on. He stands there yet, the highest bald nob on the northeast of Mt. Higgins (Bruseth 1977:22).

Stories like these reaffirm an observation made by Marian Smith that while the Cascades did not form a barrier between inland people and Sahaptins and Interior Salish people, "there was still a sense that the latter belonged east of the mountains, just as persons born at certain villages 'belonged' to those villages, wherever they might later wander" (Smith 1940:21).

## *Hunting and Exchange of Mountain Goat Wool*

Mountain goat wool was (and is) a high prestige item in the Coast Salish world. It was one of the few available textiles that could be spun into yarn and woven into blankets, and it is difficult to come by. Mountain goats, or sχʷíƛ̕əyʔ in Lushootseed, are powerful fighters that inhabit some of the most difficult, rocky terrain in these high elevation landscapes. They are siʔab in Sauk and Upper Skagit teaching stories, and have the power to read other people's minds (Bruseth 1977, Snyder 1965).

Although the wool of sχʷíƛ̕əyʔ was collected from the branches of trees and shrubs that the goats would rub against, it was just as common for łalebiuqʷ people to hunt the goats for their flesh and hides, as well as their fur. The horns of sχʷíƛ̓əyʔ were also formed into spoons and high quality spear points (Turner 1976). While woven blankets were the most common article of clothing made from their wool, the Skykomish, who hunted mountain goat above Index (Tweddell 1974), made a practice of wearing "caps of a young mountain goat head with the horns and ears of the animal intact" (Haeberlin & Gunther 1930:38).

łalebiuqʷ people of the Puget Sound Coast Salish country including Nooksack, Upper Skagit, Sauk, Pilchuck, Skykomish, Snoqualmie, and Muckleshoot had highly skilled mountain goat hunters in their villages. Both Samuel Hancock and D.C. Linsley, a Northern Pacific Railway surveyor, witnessed this prowess first-hand. While camping out on Snoqualmie Prairie, Hancock and his companions met a party of five Snoqualmies returning from a hunting expedition who had twelve goats between them (Hancock 1927:124). Finding themselves somewhat stranded in snow at Indian Pass in July of 1870, and running out of food, two of the Upper Skagit guides that accompanied Linsley caught and dressed a mountain goat that they had spotted "high up on a neighboring mountain peak" (Linsley 1981:242). While having nothing to say about the methods by which his Upper Skagit guides caught the goat, Linsley was a meticulous data collector in other ways, and did note that the goat's horns were 9 inches long and that its length from the "tip of the nose to the root of the tail" was 4 feet 9 ½ inches (ibid.). Presumably by the time of these two encounters, łalebiuqʷ people were using rifles to hunt mountain goats. Before they had access to firearms, inland people hunted mountain goat using snares constructed of wild cherry bark (*Prunus emarginata*) (Bruseth 1977:11), and by driving them over cliffs.

Nooksack tribal elders said that mountain goat wool was pulled off the hide and worked first by rolling it across ones thigh.[56] To finish the yarn, a spindle whorl carved with an image of the spinner's spirit power was used. The unspun wool was frequently traded for canoes, paddles, dried clams, and dried herring (Suttles 1955:25). Further downriver, mountain goat wool was often mixed with dog hair, duck feathers, and the fluff of fireweed seed. Skykomish people sent mountain goat wool downriver to the Snohomish, who mixed it with dog hair and traded it with First Nations people living on Vancouver Island (Tweddell 1974:522), suggesting that mountain goat wool trade networks extended over a wide geographic area. Because of its high value, anthropologist Pamela Amoss has suggested that Nooksack people had an advantage in systems of exchange and trade. This was probably true for other inland villages as well.

sχʷíƛ̓əyʔ also hold an important place within the cosmology of Coast Salish people. Myth Age teaching stories often reveal the nature of animals during the time of dukwibəɬ, or Changer. These animals were people before dukwibəɬ changed them into their current forms, and stories of their exploits offer insight into the nature of the human condition – particularly social relationships - as well as being guides to what constitutes admirable social behavior. In these stories, mountain goats are siʔab, or exemplary, high-class people whose behavior should be emulated. In one story told by the Upper Skagit and Sauk people, the youngest son of a family of mountain goats, portrayed as a somewhat undesirable catch, wins the hand of coyote's daughter with the help of his clever older brother. Later, the mountain goat family narrowly escapes disaster, after the thievish, bumbling coyote brings the goats' icy mountain home crashing down

[56] Testimony of Ellen Selkanem, Duwamish *et al* 1933:515

upon him.[57]

A Changer story recounted by the famous Snoqualmie Chief Patkanim's nephew, Jerry Kanim, describes how the mountain goats came to be. As dukwibəł traveled up the Tolt River, he encountered a group of people high up in the mountains, who were happy and content where they were, so he changed them into mountain goats:

> The people said: "Make us what you wish." Transformer [dukwibəł] said: I'm changing everything. I'll make you mountain goats. You will be here on the high rocky mountains. You'll be meat for the people who are coming soon. Your skin will be used for their clothes. Your fur will make good blankets for future people" (Snyder 1968:30).

Patkanim also told his nephew that when he obtained his spirit power from the mountain goat, sχʷíƛ̕əyʔ spoke to him and said, "Look at me, boy. I am watching the people. I am higher than all the others. You will be like me. You will be a high man" (Turner 1976:96). According to Jerry, "That is why Pat Kanim became chief" (ibid.).

Although it was not the only time of year they did so, Edmund Coleman observed that Snoqualmie people hunted "the mountain sheep [goat] in the fall, while their wives gather berries, which are dried, and kept for winter's use" (Coleman 1932:256). During the Indian Court of Claims cases of the 1920s, Muckleshoot Tribal member Joe Bill similarly testified that the Muckleshoots gathered blueberries and huckleberries in the prairies and the mountains, and harvested deer, sheep [goat] and elk in the high country. Joe Bill said that the Muckleshoot people had used the "sheeps" wool to make blankets.[58]

This review of the literature establishes łalebiuqʷ people's deep-time and multi-faceted relationships with the upland landscape and the Cascade Mountains, including lands that now comprise the Mt. Baker-Snoqualmie National Forest. łalebiuqʷ people have inhabited these

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[57] Bruseth notes sp. Coll. UW libraries
[58] Testimony of Joe Bill, Duwamish *et al* 1933:161

mountainous landscapes for at least 9,000 years. The archeological record suggests that about 4,000 years ago, their use of the mountains intensified, and it was perhaps around this time that the people started to burn big huckleberry meadows to ensure their future supply. Along with the big huckleberry, these habitats provide a suite of other plants and animals that were central to the food systems of łalebiuqʷ people and the Saltwater and River Coast Salish and the people of the east side of the Cascades that they were interconnected with through marriage, friendship and trade.

In the next chapter I take up the cultural significance and cultivation of big huckleberry throughout the plant's range. I use this data to develop some propositions about Puget Sound Coast Salish cultivation of these habitats with fire. Chapter five also compares Coast Salish fire histories in the Cascade Mountains with fire ecologists' understandings of fire behavior and fire histories in the same region. In doing so, I shed light on the tensions between these two ways of knowing the land and its history.

# Chapter 5

## INDIGENOUS AND OTHER FIRE ECOLOGIES

As discussed in the previous chapter, it was more often than not the łalebiuqʷ people of the inland Coast Salish villages who moved big huckleberries from the mountains to the lowlands after they had been harvested and dried. Along with mountain goat and other upper elevation species, the berries were integrated into the broader social circuits that tied together the saltwater, river, prairie and inland people, plants and animals. As previously mentioned, some of the people now collectively known as Muckleshoot and Tulalip are descendants of the inhabitants of these inland villages, whose ancestors followed and maintained well-worn trails from the lowlands to the mountain ridges, and over the passes leading to the east side of the Cascades. And as described in the last chapter, in some places it is still possible to trace the ancestors' journeys by following the fragments they left behind. Bits of stone and remnants of a meal prepared, stories and place names, and where that evidence hasn't been entirely materially and/or discursively obliterated, evidence of their tending of the land. Following these routes of evidence is also inevitably to follow the routes of human-fire relations, or Indigenous fire ecologies. I describe my own lines of flight and speculations about Indigenous fire ecologies along čqalitc and sχəy'ús, after a brief overview of the regional literature about Indigenous fire use and big huckleberry.

### REGIONAL SCALE INDIGENOUS CULTIVATION OF BIG HUCKLEBERRY HABITAT

On a regional scale, the ethnographic record contains many references to Indigenous fire use to maintain huckleberry meadows (Anzinger 2002; Deur 2002; French 1999; Hunn and Selam 1990; Keefer 2007; Lepofsky et al. 2005; Mack and Mcclure 2001; Mack et al. 2006; Mah

2000; Main-Johnson 1999; Main-Johnson and Trussler 2006; Richards and Alexander 2006; Ross 1999; Smith 2006; Turner 1999; Turner, Deur, and Mellott 2011; Turner and Peacock 2005; Turney-High 1941). Prior to the widespread suppression of these practices, Native people used fire in a variety of site-specific ways to prevent conifer encroachment into existing huckleberry meadows, and probably to create new ones (French 1999, Lepofsky et al 2005, Main-Johnson 1999).

As the case would be with lightning caused fires, Indigenous burning would have maintained and enhanced huckleberry abundance and food for deer and elk, as well as other culturally important species by ensuring that sufficient light reached the forest floor (Deur 2002, Lepofsky et al 2005, Smith 2006 and sources therein). In addition to ensuring sufficient light, the ash produced may have nourished the plants by releasing phosphorous and other nutrients and/or altering the composition of the soil. Burning may also have reinvigorated older, decadent shrubs by encouraging the development of new shoots, as well as discouraging the spread of harmful insects (Deur 2002, Lepofsky et al 2005, Turner 1999). Repeated burning of the same area would have altered the plant species composition of huckleberry habitats to those best adapted to the Indigenous fire regime (Mah 2000).

Beyond these very generalized descriptions of the characteristics of big huckleberry and its adaptation to fire, and the practical reasons for burning, Native people employed a range of strategies for maintaining big huckleberry meadows that were site-specific and culturally mediated. When and how to burn, and who these responsibilities fell to, varied in substantive ways across the region, shedding light on the complexity and sophistication of Indigenous burning practices. To ensure that their fires achieved the results they desired, people who were responsible for burning were often specialists with the gift of expertise in how to burn (French

1999, Lepofsky et al 2005, Main-Johnson 1999, Ross 1999). These people were attentive to weather patterns, the speed of the wind and its direction, the temperature, relative humidity of plant cover types, the time of day, the size of the area, the relationship between fire effects and slope and aspect, as well as the effects of these fires on the berry plants themselves, as well as people and animals (Lewis 1982).

Burning techniques related to the same resource and among the same people vary over time and space. For instance, big huckleberry may be managed differently in different areas based on microclimate and the length of time it takes a specific place to recover from a burn (Lewis 1982). This suggests a subtle, site-specific knowledge of factors that influence the recovery time of particular areas from fires, such as soil conditions and microclimate. In their study of big huckleberry meadows historically tended by Yakama Nation ancestors, Mack and McClure suggested that Native people probably focused their energies on maintaining the fields where conifer regeneration is slow (Mack & McClure 2001). In their study of burning huckleberry patches among Gitsxan and Wetsuweten, Main-Johnson and Trussler found that huckleberry patches occur on a wide range of habitats. They suggest that this may be associated with buffering against shortages, depending on the weather in a given year (Main-Johnson & Trussler 2006), which is reminiscent of similar strategies for Puget Sound Coast Salish People, as described in chapters 3 and 4. With big huckleberry specifically, lower elevation, more protected patches may produce berries during cooler, wetter years, while higher elevation sites on warmer aspects may be more productive in warmer, drier years. The location in relation to other important species (either within a patch or within the broader context of a seasonal round) and proximity to village sites would also contribute to its significance as a culturally important place. This may perhaps contribute to ongoing stewardship over time, which would in turn have helped to create and maintain a species diverse mosaic of habitat types across the broader landscape (Lewis and Ferguson 1999).

On the Northwest Coast and in transitional zones, the burning of big huckleberry meadows typically took place in early autumn, at the end of the harvest season when rains were (Deur 2002, French 1999, Lepofsky et al 2005, Smith 2006, Turner 1999), while spring burning was more commonplace in inland regions. The higher soil and duff moisture in spring would have reduced the likelihood of over-burning in these much drier habitats (Mah 2000). Native people's perspectives regarding fire intensity also vary. Main-Johnson's Gitx̱san and Wet'suwet'en teachers mentioned that light burns stimulate sprouting and enhance berry production, but elders working with Lepofsky et. al suggested that different species required different treatments, and that for the big huckleberry, "you had to have a very hot fire." The intervals between burning range widely – from every other year to once every twenty years (Anzinger 2001, Deur 2002, Lepofsky et al 2005, Main-Johnson 1999, Turner 1999, Turner, Deur & Mellott 2011). It is likely that this variability is a reflection of differences in habitat types and burning methodologies, as both site conditions and fire intensity affect the response of big huckleberry plants to being burned, as well as rates of conifer encroachment after a burn.

Unfortunately, specific details regarding the relationships between fuel sources, and extent and intensity of these anthropogenic fires have not been well documented. This is also true for Puget Sound Coast Salish country.

## TIXDXʷ AND THE CULTIVATION OF SWƏDÁʔX

Although it is commonly mentioned, much of what is discussed in the ethnographic literature regarding łalebiuqʷ people's burning of berry habitats speaks about this practice in a generalized way, both in the sense that there is very little discussion of specifically how people went about this, and also in the sense that these discussions seem to refer to any kind of berry habitat – in both upper and lower elevations. For instance, in her work with Nooksack people, Pamela Amoss simply notes that to encourage roots and berries and forage for game, the Nooksack "periodically burned forested areas to enlarge meadows" (Amoss 1978:6). Similarly June Collins mentions for the Upper Skagit that they "were well aware that berries grew much more abundantly in burnt-over sections" (Collins 1974:57), and that sqəlálitut provided "the knowledge of how to burn an area of forest in a carefully controlled way" (ibid.). It seems doubtful that any of the earliest ethnographers ever accompanied people to harvest berries in the mountains. And unfortunately it seems that none of the early surveyors and explorers who traveled through the mountains did so at a time of year when they would have encountered Indigenous berry pickers or observed them burning the meadows.

This is important, because big huckleberry plants themselves are not particularly flammable, so maintaining these meadows with fire required a fuel source other than the plants themselves. David French mentions that the Columbia River people may have left the smoldering log used to trench dry berries behind to burn after people left their berrying sites at the end of the season (French 1999). Perhaps the site for drying berries was chosen in relation to a site that was due for a burn. It is also likely that people were extending the productive life of these meadows by "broadcast" burning the snags and other wood that remained after the initial fire event that had created the meadow. Furthermore, the initial event that created a meadow may not have been a stand replacing one. Through processes of decadence, trees that were left standing would presumably continue to provide fuel for the continued maintenance of these meadows. The flammability of other site-specific associated species – both woody and herbaceous – must also be taken into account when considering possible fuel sources.

Used in hearths for warmth and cooking, clearing of vegetation around settlement areas and along trails, and the creation and maintenance of hunting and gathering areas (Collins 1974, Norton 1979, Smith 1940), fire was no less a "companion process" (sensu Haraway 2012) to the ancestors of contemporary Puget Sound Coast Salish people than it has been anywhere else. Fire flows "along human routes and humans adjust their movements to fire's designs" (Fowler 2013:3). There is ample evidence of root garden cultivation in the lowlands described in chapter four, and passing comments about prescribed burning in the ethnographic and historical records in both the lower elevations and in the mountains. Given the complex and deep-time relationships that they have with these landscapes, Puget Sound Coast Salish people obviously had a clear understanding of the relationship between fire and resource abundance, as well as knowledge of how to manipulate that relationship to their benefit. The deep-time relationship between fire and big huckleberry abundance is recounted in a passage from Jerry Kanim's Snoqualmie "Changer" story, which describes the feats of dukwibəɬ as he travels through the headwaters of the Tolt River:

> Transformer went on. He came upon five men singing. Transformer asked: "What are you doing?" They said: "We are children of fire. If we were to sing a song, it would burn the land." Transformer said: "Go ahead, sing your song." One man said: "I wouldn't sing it. If I should sing it, I would be dangerous. You could be burned." Transformer said: "It's alright for you to sing it. I want to learn it." The men said: "Alright."
>
> Then they sang: "We are sons of the fire. We are sons of the fire." They would point anywhere and, when they pointed, fire would come from their hands. Transformer jumped into the water. He was told by the water: "I'll be the first to burn." Transformer jumped again, this time toward the woods. The tree told him: "I'll be the first to burn." Someone yelled at Transformer: "It burns only when things are together. Come to me." Transformer went to the road. He watched the burning of the land.
>
> Transformer said: "It is alright for the fire to burn the land. The berries will grow. This will be a berry-gathering place for the people of the future. For this reason, the brush will be burned off this place again in the future. Only the big trees will be growing. This is the reason you will see the bark of the fir tree burned to charcoal. The people who are coming will discover that this land burned" (Snyder 1968:31).

These ɬalebiuq$^{w}$ cultural references to fire suggest a process-relational philosophy. They affirm that ɬalebiuq$^{w}$ people understood that fire was integral to processes of change and transformation in their worlds. Following the example of Coast Salish ancestors, a process-relational approach to fire histories and ecologies should include humans in our understandings of the ecological histories of these upper elevation landscapes. In doing so, it is possible to develop a richer and more nuanced understanding of the role of Indigenous burning on these lands. In the next section, I offer a speculative model of historic łalebiuqʷ practices of cultivating swədáʔχ with fire along the ridge that divides the Green and White Rivers in Muckleshoot country.

*Creation of new meadows*: Although there are numerous ways that one might start a forest fire, one of the most compelling lines of evidence for doing so (and thus for the creation of new huckleberry meadows) comes from the journals of Lt. Robert Johnson, who traveled from Fort Nisqually over Naches Pass with two "Muckleshoot" guides (Beckey 2003, Wilkes 1916) in May of 1841 as part of the Wilkes Expedition. Here, it seems that his guides may have been intentionally starting a crown fire. Stopping to camp near the crest of the Cascades in deep snow, Johnson noted that after setting up camp at the margin of the snow, his two guides 'accidentally' "set fire to the moss-covered trees, and in a few moments all around them was a blazing mass of flame" (Wilkes 1916:23). Presumably Johnson was speaking of tree lichen, as opposed to moss, under relatively dry conditions. It is hard to imagine that Johnson's guides were unaware of this quality of lichens. What is interesting about this statement is that many years later, Nevan McCullough made a similar observation about sheepherders in the same area:

The old-timers soon found out that the alpine grass meadows could be enlarged by setting fire to moss on the alpine fir on a hot day. The needles and limbs were consumed along with the moss – and grass thrived where trees formerly grew. […] The 'worthless' trees were easy to dispose of during periods of strong east winds in the fall when the sheep were on their way out (McCullough 1970:35).

**Figure 5-1: Old burn near "Grouse Pass;" swədáʔχ is the red-leaved shrub.**

One wonders if the "sheepmen" had learned this strategy from Native people. Furthermore, it is possible that inland people may have been starting "crown fires," or fires that spread from treetop to treetop to create huckleberry habitat in the winter, rather than exclusively at the end of the harvest season. The ethnographic record is clear that łalebiuq$^{w}$ people did travel to the mountains using snowshoes in the winter (Haeberlin & Gunther 1930). Lighting crown fires at this time would have minimized the risk of injury or catastrophe when lighting these high severity fires Figure 5-1).

*Prevention of conifer encroachment into existing meadows*: There are at least three types of fuel source that inland people could have used to prevent conifers from encroaching into big huckleberry meadows standing and downed dead wood, 'islands' of smaller trees that grew up in the meadows, and dry herbaceous plant material.

In his *Interpretive Study of the White River Drainage*, Nevan McCullough discusses how "the top of Huckleberry Mountain is a typical example of repeated burns" (McCullough 1970:38). These burns have "destroyed most tree reproduction, allowing the establishment of a thick stand of grass alternating with a heavy growth of huckleberry brush, both covering the ground so completely as to prevent tree seed from getting a start" (ibid.). McCullough clearly attributes these "repeated burns" to the Muckleshoot people. As he notes in a continuation of the story by Ed Wells:

> Ed told me of one conversation he had with an old Indian, who reported that when he was a very small boy the Muckleshoot had burned off [Huckleberry Mountain]. He recalled "working so hard, very hard, for a day or two to get fires in all rotten logs and dead trees to clean up [the] place for grass for horses and berries for [the] Indian" (McCullough 1970:37).

Notes from McCullough's daily logs suggest that Muckleshoot people may have set this type of fire at Bone Lake as late as 1929:

> Sept. 6 1929: […] Mr Froyer called at 8:30 and reported a fire on Huckleberry Mtn. Al Rose, Jess Rose and Myself left at 8:50, arrived at Bone Lake and found out from berry pickers that it was small fire in a rotten log.  Camped until morning.

Sept. 7 1929: Left Bone Lake at 5AM and arrived at fire a few minutes later put it out and in about one half hour no evedience [sic] was present although it was man caused fire returned to hdq at 12 noon and sleep rest of day.

Sept. 10, 1929: Orders came through this morning to close the entire forest to Entry. Rigged up signs for all the trails. Took Jess Rose to Slippery Creek Trail and sent him to Huckleberry Mtn. to get berry pickers out. […](McCullough 1929).

Another method for keeping these clearings open would have been the burning and "weeding" of tree islands. In her testimony to the Indian Claims Commission in 1927, Upper Skagit elder Margaret Jules stated that:

[W]here these berries are grown, that there is some young growth of timber that would grow, small bushes I mean to say, and they will take that and pull them out, or in patches where they will get kind of weak sometimes they would set it afire, and after the fire was gone out they would work it up to sterilize the vegetation of the berry patches.[59]

While the example is not specifically about čqalitc, this kind of practice was most likely used more broadly.

The dead and decadent vegetation of several species of herbaceous plants that may grow in association with big huckleberry are good sources of fuel for low intensity burning (Figure 5-2). These include bracken fern (*Pteridium aquilinum*), beargrass (*Xerophyllum tenax*) and grasses.[60] As noted above in McCullough's discussion of repeated burning, under some conditions these types of plants, in association with big huckleberry, can form dense groundcover that prevents tree seedlings from establishing (Elman and Peterson 2005). In such conditions, the regular burning of dried herbaceous materials in fall might also have helped to rejuvenate decadent huckleberry bushes by encouraging re-sprouting from their crowns.

It is not surprising that the fire incident at Bone Lake mentioned by McCullough in his daily log occurred in early September. High fire season coincides with big huckleberry harvesting season, and as mentioned above, the ethnographic record is clear that intentional

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[59] Testimony of Margaret Jules, Duwamish *et al* 1933:389
[60] "Pteridium aquilinum" and "Xerophyllym tenax," Fire Effects Information System (http://www.fs.fed.us/database/feis/)

burning of huckleberries typically occurred at the end of the berry-harvesting season in wetter areas. It is not just the typically dry conditions and the presence of people that facilitates this type of burning. Standing on the ridge at Bone Lake in late summer, once can feel the warm, dry, eastern Chinook winds that would have also been an actant that helped these fires quickly burn the rotten logs and dry herbaceous vegetation that the people ignited in these human-huckleberry-fire assemblages.

**Figure 5-2: Decadent beargrass growing amongst big huckleberry at Bone Lake**

## STATE MAKING AND THE SUPPRESSION OF FIRE ON SXƏY’ÚS

McCullough’s diaries provide a helpful sense of the major transformations in Forest management that were taking place at the time, his primary activities and concerns as district ranger, and how these related to the suppression of Indigenous fire ecologies along čqalitc. In reading them, one gets a sense of the daily, mundane activities that constitute processes of state making. It is as if the rough outline of the Snoqualmie National Forest created by the first surveyors was now being colored in through processes of trail, road and structure building. During the late 1920s and early 1930s, McCullough is working with a small crew and limited technology. Beginning in about 1933, he begins to mention the Civilian Conservation Corps (CCC). Having the CCC enables much more effective fire fighting. From small crews of twenty to thirty men, McCullough is now managing crews of one hundred or so. These men are under the auspices of the military. When not fighting fires, their primary activity seems to be constructing the Silver Springs compound and fire lookouts. As the fire lookouts, trails and roads proliferate, the CCC is facilitating state making. Particularly when it comes to fire lookouts and the suppression of Indigenous burning practices, they are also constructing a “forest panopticon” (McLain 2000).

Yet for the most part, sχəy’ús and specifically Bone Lake seem very much to be on the margins of McCullough’s activities and consciousness. Sχəy’ús is mentioned very rarely compared to other parts of the forest (Silver Springs, Naches Pass, Government Meadow, Bearhead, Bear Gap, Tipsoo Lake, Noble Knob, Correl Pass, Colquhoun Peak, Pyramid Peak, Suntop, etc.). McCullough goes on regular ‘field trips’ to all of these places, but only rarely to Bone Lake. He regularly takes visitors on ‘show me’ trips to the Forest – typically up to Naches Pass and never to sχəy’ús. The most frequent mention of this area is in relation to the "sheepmen," as it was one of three grazing allotments on the White River Ranger District. It seems that during this early period sχəy'ús remained Native space, despite the transformations that were happening all around it. Huckleberry Mountain, Bone Lake, Lost Springs, and the Lester Trail are all mentioned but only in relation to sheep grazing allotments. Perhaps this is an example of how diversity thrives at the edges.

## SCIENTIFIC CULTURAL MODELS OF WEST SIDE FIRE DYNAMICS

The nature of fire on the west side of the mountains is not nearly the matter of concern that it is on the east side of the Cascades, and has received neither the attention nor funding that the state's east side forests have. This is primarily due to forest ecologists' understandings of fire's role and the adaptations of trees to it in different forest types, as well as the manner in which fire suppression and other land management and use histories have affected fire severity in different types of forests. The possibility of wildfire is more immanent on the east side of the Cascades as compared to the west side. For example, based upon a hypothesized mean fire return interval of fifteen years, east side ponderosa pine forests have missed perhaps eight or more fire events as a result of fire suppression (Agee 1993).

Although prior logging and grazing practices, insect and disease outbreaks, climate change, and site specific qualities also contribute to fuel accumulation and the development of ladder fuels that encourage crown fires, fire suppression is a primary contributor to the increase in severity and extent of east side wildfires (Agee 1993; Hessburg, Agee, and Franklin 2005). As a result, substantial resources are expended to understand and restore historic fire regimes to east side forests (Ingalsbee 2010; USDA Forest Service 2014). In contrast, Washington's west side forests are generally understood to burn so infrequently that they are sometimes called "asbestos" forests, with fires tending to occur only during times of uncharacteristic drought. These forests can produce considerable amounts of biomass between fires. Because of the high levels of fuel that accumulate between them, there is the potential for them to be large crown fires that are typically deadly to trees.

Because these large fires are infrequent, high severity, and typically suppressed under the current land management regime, forest ecologists come to understand fire regimes in west side forests indirectly. Stand age reconstruction typically involves some combination of counting the rings of living and dead trees, and inferring the area covered of a particular even-aged stand of trees from aerial photos (Agee 1993, Hemstrom & Franklin 1982, Morrison & Swanson 1990) (Agee 1993; Hemstrom and Franklin 1982; Morrison and Swanson 1990). Data collected across different stands of similar forest type are then averaged to come up with mean fire return intervals and estimates of the proportion of a particular forest type within a given area in different stages of forest development at any given time. For example, for many years, USFS forest ecologists Jan and Robin Lesher directed a project to collect ecological data from $1/10^{th}$ acre within every square-mile section within the MBSNF. Based in large part on the ages of trees in their plots, they mapped a fire history on the MBSNF dating back to 950 AD. Their study shows that nearly every part of the forest has burned over that period of time, with the highest proportion of large fires occurring during the Little Ice Age.

Just south of the MBSNF in Mount Rainier National Park, Hemstrom and Franklin (1982) found that on average, fires occurred every 465 years in lower elevation Douglas-fir forests, with stand replacing fires ranging from 600 to 25,000 hectares in size. In the mid-montane mountain hemlock, Pacific silver-fir and subalpine fir forests where big huckleberry grows, fire return intervals range from 150 to 500 years. These fires too tend to be high severity, stand replacing events. But unlike lower elevation Douglas-fir forests, it may take over a century

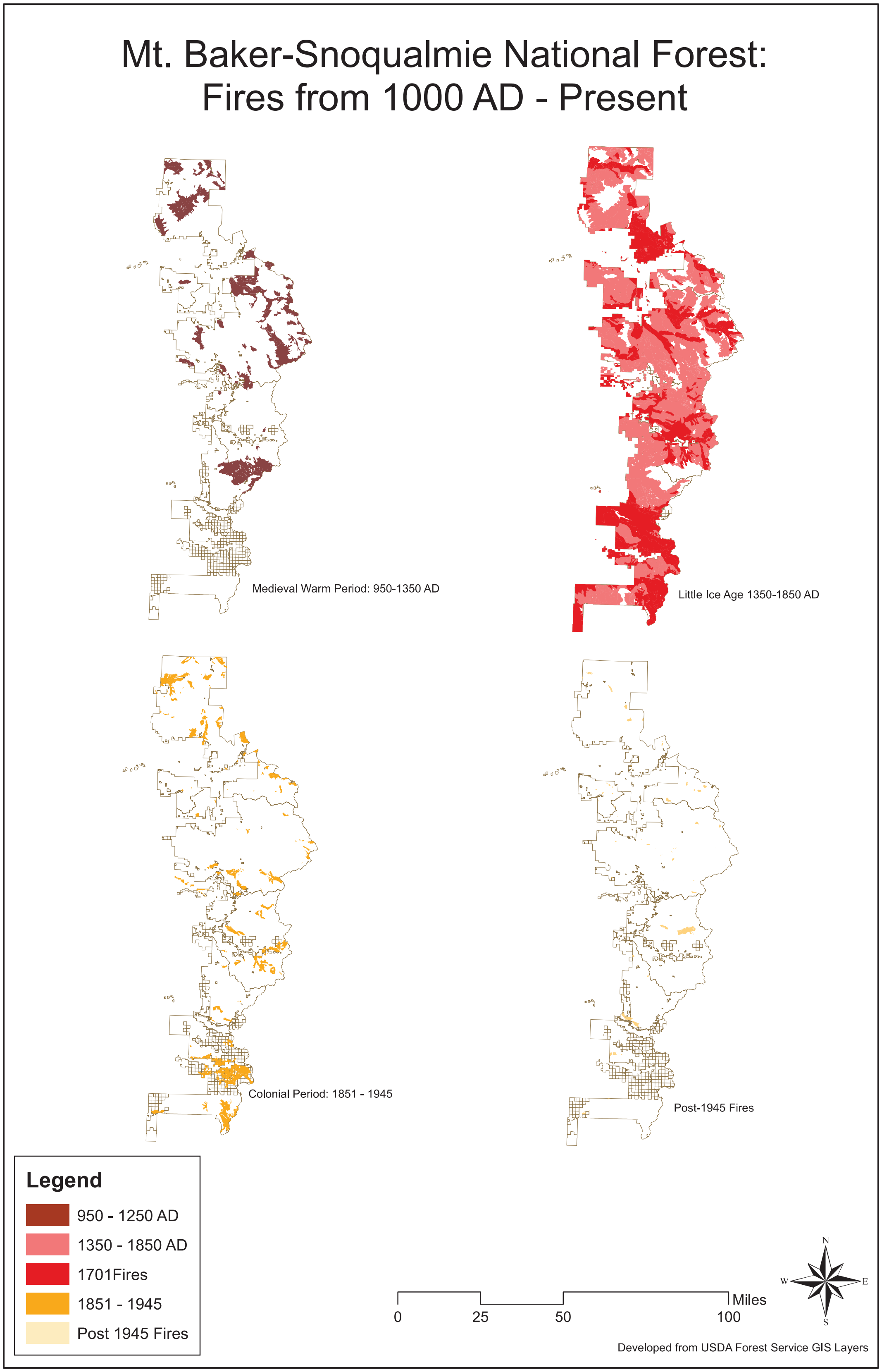


Figure 5-3: Henderson & Lesher's study of fire history in the MBSNF

for mid-elevation forests to re-establish themselves after such a high severity fire. Consequently, depending on the specific site conditions and climate at the time of disturbance, shrub and herb communities may be the dominant vegetation type for very long periods of time (Agee and Smith 1984; Agee 1993). This of course includes big huckleberry, which during the heyday of industrial logging was perceived as a problematic species that impeded development of forest stands for the harvesting of timber (Elman & Peterson 2005).

While the tools of fire reconstruction and estimates of average fire return intervals provide a model of the relationships between fire and forest, like any model, fire reconstructions tend to simplify in order to render complexity more comprehensible. As Gregory Bateson reminds us: “The map is not the territory, and the name is not the thing named” (Bateson 1979: 30). The “asbestos forest” mental model, for instance, does not take into account the number of fires that have the potential to become large fires but under the current fire regime are suppressed. As Hemstrom and Franklin (1982) themselves acknowledge, mean fire return intervals also do not take into account spatial variability and thus the heterogeneity of fire behavior across the area studied. As already described, there is substantial heterogeneity within the broad categories of biogeoclimatic zones. For instance, there is a patterned variability across the MBSNF from south to north, with the southern part of the forest generally being drier and the north wetter. But there is also a great deal of variability within that pattern. Weather is extremely localized across the landscape. In addition to prevailing weather patterns, topography, elevation and aspect all affect fire frequency, size, and severity.[61]

[61] See (Cansler and McKenzie 2014) for a discussion of variation in fire severity based on these variables in the North Cascades.

Stand replacing fires also tend to destroy any evidence of the fires that preceded them. This means that with the tools they currently utilize, forest ecologists find it very difficult to reconstruct the complex histories of forest development and disturbance that take place between major fire events (Tepley, Swanson, and Spies 2013). Forest memory, legacy, and the smaller scale disturbances that follow catastrophic fires are an integral part of every forest's history, but are difficult to infer with the methods of fire history reconstruction. Hemstrom and Franklin acknowledge this important point in their discussion of the fire history of Mount Rainier National Park:

> Small-scale disturbances that affect patches or destroy only part of a stand are probably frequent but do not usually produce a recognizable cohort of early seral trees. Mortality of individual trees or groups of trees at Mount Rainier may result from biotic influences (disease, root rot, insect attack, girdling by bears), windthrow, small soil mass movements (slumps, slides), snow avalanches, lightning strikes, small fires and so forth (Hemstrom and Franklin 1982:33).

Although Hemstrom and Franklin do not mention it in this passage, Indigenous burning was also a potentially important "small-scale" disturbance agent that contributed to the patchiness and ecological heterogeneity of "old-growth" west side forests. But with the exception of lower elevation prairies, historical practices and possible effects of Indigenous burning have proved elusive to recognize in the ecological record on the west side of the Cascades (Lepofsky et al. 2003; Lepofsky et al. 2005; Whitlock and Knox 2002; Tweiten 2007).

Fire suppression is also knowledge suppression, and the effects of colonialism and rational forest management have done much to obliterate the complex and nuanced knowledge that the ancestors of contemporary Coast Salish people most certainly carried in order to properly tend huckleberry meadows with fire. In my conversations with Russell, Jason and Warren, they all seem to agree with this. Russell in particular has actively sought out this knowledge among the living with little success:

Russell: And a lot of our family –people were mixed between Colvilles and Coastal Salish people. And they had – the manager people were from the Colville side. And their burning was not where the berries are, but either below it, or along side it. So that if you kind of skip areas, and then you could go back later on after these filled in. But it's really hard to burn huckleberry. And I don't know how they burned it. […] I sent inquiries to some of the people we do know [at Colville], that we were looking for some history about how to manage – I got no response. So I don't know how they burned.

Joyce: Why do you think you got no response?

Russell: I don't know. I don't know.

Adding to the difficulty with understanding histories of Indigenous burning on the west side of the Cascades is the fact that the topic was really not of much interest to ethnographers working in the "memory culture" tradition of early - mid-20$^{th}$ century anthropology, when there were likely still living elders who remembered these practices. This, combined with the fact that in many ways fire suppression was in its heyday at this time, constituted both by a fully actualized technological apparatus, but also a racially loaded rhetorical apparatus that associated fire prevention with good citizenship and national belonging (Kosek 2006). This latter situation alone may have contributed to Native American people's willingness to share their knowledge of burning in the forest. Add to this the widely held assumption amongst archaeologists until at least the 1970s that Coast Salish people did not even venture into the mountains (Greg Burtchard, pers. com.), and the reasons for the general absence of evidence becomes even clearer.

Yet nearly everywhere there are people, there is anthropogenic fire (Fowler 2013; Pyne 2001). As described in chapter three, prior to the devastating effects of the first smallpox epidemic in the area in the late 18$^{th}$ century, it is estimated that 13,000 people lived in some 140 permanent villages along the saltwater, rivers, lakes, prairies and uplands of the Puget Sound basin (R. T. Boyd 1999; M. W. Smith 1940).

In sum, the conceptual model of fire ecology in forests on the west side of the Cascades is largely shaped by research methodologies that focus on large scale, catastrophic fires. This is an issue that is increasingly recognized by forest ecologists themselves (Tepley, Swanson & Spies 2013). Those methodologies come perhaps with their own assumptions about the "pristine" nature of the landscape prior to Euro-American contact in the past, along with the goals, focus and funding sources of forest management in the present (i.e., timber production). The model is exacerbated by the "siloed" nature of academic research. Forest and fire ecologists are typically not trained in ethnographic or ethnohistoric methods, and so typically rely on the labor of the work of others who, either in the past or present, were trained in these methods. But anthropologists of the region, including archaeologists, have only recently begun to appreciate the role of Native people in shaping the landscape to suit their needs in the past. While Native communities are certainly capable of making claims about their own histories and practices, in the world of science-based natural resources management, those claims can often be bolstered (legitimated) by the work of anthropologists and ethnohistorians (Gragson and Blount 1999).

What actually matters, though, about the nature and extent of forest disturbance caused by historical Indigenous burning, and to whom? One reason that questions about Indigenous burning have come to matter is exemplified in books like Thomas Vale's edited volume, *Fire, Native Peoples and The Natural Landscape*. Focusing on case studies across the United States, the contributors are looking to settle a long-standing (and ongoing) debate about whether the country as observed by the first Euro-Americans to arrive was a "pristine" or "humanized" landscape.[62] In his introduction to the volume, Vale characterizes the argument as often devolving to a polarized binary between natural scientists arguing for the "pristine" model, and social scientists (particularly anthropologists) arguing for the "humanized" model (Vale 2002),

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[62] See Denevan (2011) for an overview of the history and contours of the debate.

with much of the dialogue dominated by "arm-waving, careless generalizations" (Vale 2002:6). On one level, the debate as characterized by Vale revolves around the extent to which pre-colonial Native American fire regimes affected the structure and composition of North American forests at a landscape scale. From Vale's perspective, what is most at stake in these debates are questions about "the legitimacy of hands-off protection [of non-human nature] as a policy" (Vale 2002:8), versus "the need for manipulating nature as a universal policy for the management of nature preserves" (ibid.). Paleoecologists Cathy Whitlock and Margaret Knox extend this argument in their chapter on fire regimes in the Pacific Northwest, characterizing the stakes as follows:

> It's not surprising that assigning a large role to prehistoric peoples is a popular concept among those who advocate management of wilderness and commodity lands today. The argument is that some forests are so altered by fire exclusion that fire alone may not restore them. Zyback (1995), for example, suggests that human-set fires, in prehistoric times, altered every acre of the Pacific Northwest, leaving no vegetation unaffected. The Northwest Forestry Association, which represents commercial timber interests in the region, states that current forests are unnaturally dense and vulnerable to disease in the absence of fires. Restoring forest health, in their opinion as well as that of others, requires immediate thinning and salvage to emulate the effects of native peoples (Bonnicksen 1989; Wagner and Kay 1993). […] Given the economic consequences, it is clear that more is at stake in this debate than an academic interest in prehistoric fire regimes (Whitlock and Knox 2002:222).

Over the course of my fieldwork, I too have observed and been troubled by what can only be described as the outright appropriation of Indigenous histories of resource "management" to serve the kind of political-economic agenda described by Whitlock and Knox. However, what both the authors of Vale's edited volume and those who would appropriate Indigenous fire histories to suit their own political-economic interests fail to acknowledge is the well-being of the actual living descendants of the people around whom their arguments revolve.

In the first place, following John Locke's notion of property as articulated in his *Two Treatises of Government* (Arneil 1996), in demonstrating that they managed resources by burning, Indigenous people can argue that they too "improved the land," potentially bolstering claims to rights to land and resources - albeit by appealing to a "Western" political-economic framework. Similarly, the inability to continue traditional land management practices in the present, or even to utilize traditional resources that rely on disturbance to be viable can be seen as a threat to tribal sovereignty. As Kari Norgaard describes for the Karuk Tribe of northern California:

> Denied access to cultural practices of burning is an issue of political sovereignty. […] Karuk traditional management including the activities of burning, tending, hunting and gathering … threaten political sovereignty for Karuk people because they interfere with the Tribe's ability to continue the cultural practices necessary to maintain this legal standing. Continued fire suppression damages the ecological functions and diminishes the availability of and access to cultural use species. Similarly, because fire suppression as well as firefighting activities interfere with the ability of members of the Karuk Tribe to perform their cultural practices, these activities hold the potential to erode the Karuk Tribe's sovereignty over tribal lands and cultural resources (Norgaard 2014:86).

Indigenous fire, then, is not simply a chemical reaction or a component of biological processes that can be separated from human meanings (Fowler 2013). Indigenous burning is also a "cultural keystone process" (Norgaard 2014; Turner and Garibaldi 2004), the absence of which will inevitably have cascading social effects. Not simply another agent of disturbance – within that agency is attached a suite of social relations:

> Jason: And so - there was a lot of that knowledge that was lost. Especially way back when with the disease, and then you had the schools and everything. So there's a lot of the knowledge that basically was just gone. You know, the people who were specialized in doing that thing were just gone, and weren't able to keep going and teaching everybody. So I think its important for us to do the work, to try and just get up there, and reconnect with that work, and reconnect with the land up there.
>
> Joyce: Yea. And as that happens you know, that remembering happens, you observe the way fire behaves, and the way it feels at the time of - you know, when a fire is good. Like this feels like a good burn.
>
> Jason: Yea.
>
> Joyce: And then it starts to become a part of you.
>
> Jason: Yea. And it's just - you just have to observe it. But the problem with fire is, that we have only limited opportunity to do it.

## Taking Indigenous Fire Ecologies Into Account

The historical role of small-scale fires, along with their potential effects in both past and present, and ultimately what huckleberries might need or want, are all open questions. With seemingly little to go on with regard to understanding the ecological effects of Indigenous burning practices on huckleberries specifically and ecosystem composition and structure more generally, forest ecologists may underestimate the impacts of anthropogenic burning on forest composition and development. The integration of "best available science" into National Environmental Policy Act (NEPA) analysis is a basic requirement of that process. If little is known about Indigenous burning in the past, then it is difficult to incorporate it as best available science in the present. And if some version of Indigenous land management is not incorporated into the planning process, that absence becomes a self-perpetuating cycle. There is little information about the effects of small-scale, and repeated burns on huckleberries and their habitats. These types of burns are not only potentially important for huckleberry production but also important ecologically in terms of species composition more generally. The significance of small-scale fires and their ecological effects should not simply be dismissed out of hand because of knowledge gaps in the present.

Just as important as the ecological implications are for recognizing our not knowing, are the social implications. Recognizing and acknowledging that Indigenous people were here, and that through their practices of burning and tending, they developed their own kinds of attachments and relations to the land that shaped their senses of themselves, is important in itself as a form of restoration. It might even be considered a kind of "restorative justice." A lack of recognition of Indigenous fire ecologies on the part of ecologists and land managers on the other hand can be experienced as yet another instance of neo-colonial "epistemic imperialism" (Perley and Heatherington 2011). Following on Latour's discussion of social constructivism in the introduction to this dissertation, perhaps it is time to begin the work of collectively constructing a more inclusive understanding of human-fire relations both past and present, in west side forests. Part of that is recognizing that west side forests and their fire ecologies are ecologies that have had people in them from the time they developed their current patterns of process, structure and composition some seven thousand years ago. Given that we find ourselves in a time when all fires in the Pacific Northwest have at least some anthropogenic influences, it is an especially salient time to do so.

# Chapter 6

## The (non)Reintroduction of Coast Salish Fire Ecologies

In June of 2007, sixty tribal members, federal land managers, natural and social scientists, policy-makers, and commercial harvest representatives traveled from throughout the US and Canadian Pacific Northwest to attend the first ever “Big Huckleberry Summit.” The one-day conference was held to share multiple perspectives about this berry, its cultural significance and concerns about its wellbeing. For some time, berry harvesters - particularly Native Americans for whom big huckleberry is a traditional food – have expressed concern about the effects of land management practices and competition from non-tribal harvesters on their ability to gather enough huckleberries to meet their needs. Throughout the day, Summit participants listened as Muckleshoot, Nisqually, Umatilla, and Warm Springs tribal members shared stories about their profound connections to big huckleberry and the importance of maintaining those connections to the cultural and physical well being of their people. As discussed in the previous chapter, before they were alienated from their traditional homelands and federal fire suppression policies were vigorously pursued, Native experts used to burn huckleberry habitat to reinvigorate the land and to discourage trees from invading the meadows. In addition to ensuring a future supply of the berries, the elders who spoke that day emphasized that burning was also a responsibility - part of a reciprocal obligation to take care of something that also takes care of them.

I co-organized the Huckleberry Summit with Warren KingGeorge and Laura Potash, a botanist for the Mt. Baker-Snoqualmie National Forest (MBSNF). We had recently begun a collaboration to implement a “huckleberry enhancement” project on a portion of the Muckleshoot Tribe’s ceded territories that now comprises a portion of the Forest. Our shared vision for the Summit was to provide a venue for cross-cultural sharing of knowledge, communication of the importance of the berry within tribal communities to land managers and natural scientists, and development of a network of support for those working on projects similar to our own. The human-huckleberry nexus has always been a node in a complex mesh of socioecological relations. But the nature of that network has dramatically changed from the kinds that were maintained by Indigenous peoples for thousands of years prior to Euro-American colonization and the eventual development of a state apparatus that has had the effect of managing and controlling those relations. Dynamic processes of becoming are integral to the relational ecologies that compose West-side forests like the Mt. Baker-Snoqualmie, where our huckleberry enhancement project was unfolding. Here, the interaction of very long lived tree species, long and short-term changes in climate, and infrequent yet major disturbance events make it difficult to claim any sort of ecological equilibrium. A central theme of the Huckleberry Summit was that both natural and anthropogenic fire are agents of disturbance in these forests that have been integral to the development and maintenance of huckleberry habitats. At the end of the day, as people summed up what they had learned, “Mike,” the then Snoqualmie district ranger, stood and remarked: “One thing I have come to believe after today is that we must find ways to reintroduce fire on the landscape.”

Over the eight years that have passed since the Summit, I have attended numerous conferences devoted specifically to discussions of big huckleberry, and to the management of traditional Indigenous plant foods. I have also been closely involved as a participant-observer in two collaborative “huckleberry enhancement” projects on the Mt. Baker-Snoqualmie National Forest. I have interviewed dozens of tribal members, land managers and natural scientists about their views on the loss of huckleberry habitat in the Pacific Northwest. Jim’s utterance at the end of the Summit seems a broadly shared, though by no means unanimous or unequivocal perspective. All of the tribal members, and the majority of US Forest Service staff that I have spoken with recognize not only the potential direct benefits of intentional burning to the flourishing of huckleberry, but also the broader ecological and cultural significance of doing so.

Considering the ecological benefits, both tribal members and many Forest Service staff say that fire cleans and invigorates the land in a way that only fire can. Along with increasing the availability of light, fire releases nutrients bound in the fuels that burn, making them available to the huckleberry plants. Although a burn may kill their tops, such an event reinvigorates huckleberries by encouraging the sprouting of new shoots from the surviving roots. Burning may also reduce the likelihood of disease and insect infestation. Not just huckleberries, but also other kinds of vegetation grow back lushly after a fire, increasing the quality and quantity of forage for deer and elk. All of these, people tell me, are effects that are difficult to achieve without the help of fire. In fact, people say that mechanical disturbance in the absence of fire can have the opposite effect. Accumulated dead wood suppresses the growth of vegetation, and also makes it difficult for both human and non-human animals to move through the forest. Russell Moses views fire as essential for the regeneration of the forest as a whole: “I liken fire to what beavers do down here,” he says. “[Fires] just completely change the whole kind of microsite. Enough that it releases a lot of woody debris.” He describes how during the heyday of logging in the Forest, if slash accumulated in upper elevation landscapes and was not burned, after a few years the wood was formed such a dense, compacted mat that nothing would grow through it. He has observed that wood decomposes much more slowly in the mountains than in the lowlands, so these effects can last for a very long time.

To incorporate burning into the care of big huckleberry is to also leave open a space for the possibility of cultural revitalization, and for all that flows from it to flourish. Warren says that Coast Salish ancestors used fire to "clear the table" in preparation for the next generation to enjoy: "Our ancestors used the fire to cleanse … a hillside of the old gifts when the life has been used up. […] And so this plate is cleaned. Wash the plate, get it ready for the next meal." Phyllis Reed, a Forest Service wildlife biologist and NEPA coordinator who has worked closely with the Tulalip Tribes on a huckleberry enhancement project at Pyrola Meadows (described in chapter seven), described the connections between cultural benefits to tribal members and to the Forest as a whole:

> I think it was a tool that was used traditionally […] so I think one of the concerns is just the reconnection of this tool with tribal persons. […] I think that just to keep all the tools that you have available to you. If you don't use it, then you sort of lose the knowledge… And so the mechanical means of working with the huckleberry is probably one of the things that perhaps was not as readily available in previous times as it is now. So it's being able to adapt to what tools are available now. But not lose some. Where fire may have some benefits or have some consequences in how the burn turns out that we aren't aware of with doing things mechanically.

Yet while the plans for the huckleberry enhancement projects that I have been involved with mention the use of fire as a "management tool" in some form or another, in practice, none of them have used prescribed fire in their implementation. Rather, the projects have involved the mechanical removal of encroaching trees. Through the lens of these projects, then, this chapter explores collaborators' perceptions about the socioecological risks and benefits of mechanical disturbance versus the reintroduction of fire as an agent of disturbance to tend to mid-elevation big huckleberry habitat. What are the perceived environmental and social risks, and structural barriers that have thus far prevented the reintroduction of fire on the land? Conversely, what are the perceived risks to both humans and non-humans of not reintroducing fire to the land?

The problem of whether and how big huckleberry is to be cared for is a matter of environmental justice. As I have argued in previous chapters, in the human realm at least, Native Americans bear a greater burden when it comes to the loss of accessible and productive meadows.

In her analysis of the "blasted landscapes" within which human-matsutake relations may thrive, Anna Tsing asks: "Which disturbance regimes are we willing to live with?" (Tsing 2014:92). Like the matsutake mushrooms that ground Tsing's questions, huckleberry vitality is also disturbance dependent. In their resistance to human efforts to cultivate them, huckleberries also share with the matsutake a certain recalcitrance. Echoing Tsing's observations of human-matsutake relations, I too find that relations with huckleberries and how we might care for them "press us into multispecies ecologies in which control may be impossible" (Tsing 2014:90). Deliberations over the kinds of disturbance that might be desirable or even possible to care for big huckleberry are inevitably political processes involving negotiation, diplomacy and risk for both the humans and non-humans involved.

Thus, as important as this very specific problem is on its own, examining deliberations over the role of fire in these projects also opens a space for asking broader questions about how we might live together and well in not quite postcolonial spaces like the Pacific Northwest. A critical examination of the fire-related deliberations that take place within these projects is also a historically specific window into processes of becoming in which the Forest Service, local tribes, fire, huckleberries, and numerous other bioculturally diverse actors that constitute this thing we call a forest are implicated. The forms that these evolving collectives take are also dependent on the discursive and material relations that are brought forward from the past into the present, including Forest Service policies, political economies, colonial histories, and the materiality of the forest itself.

## Generalized Symmetry, Radical Asymmetry

It is also important to keep in mind the radical asymmetry of the biogeophysical world.

The physical processes that constitute the material world upon which we depend seem largely indifferent to us, and there is much about the materiality of life that exceeds our ability to control or predict. By directing our attention to those aspects of existence upon which we humans are entirely dependent but that are not dependent on us, the cultural geographer Nigel Clark argues against a strain of anthropocentric thought that is present in Latour's version of actor-network theory (Clark 2011). There are many earth and life processes that do go on without any intervention from humans at all, will continue to go on without us long after we have gone, and over which we have little control. As much as the human story is deeply entangled with the use of fire as technology and source of meaning, fire on earth does goes on with or without the aid of human labor (Pyne 2001; Vale 2002).

As discussed in chapter five, at a *landscape* scale, human ignition likely played a very minor role at most in shaping west side fire regimes characterized by infrequent, catastrophic fires (Hemstrom & Franklin 1982). Coast Salish ancestors most certainly directly experienced those (probably terrifying) fires as well as igniting smaller "controlled" burns to meet their needs. Thus it shouldn't be surprising that these ancestors seem to have had a deep appreciation for both the destructive and productive capacities of fire (Ballard 1929; W. A. Snyder 1968). However, the Indigenous fire ecologies of Coast Salish ancestors certainly played a substantial role in shaping the landscape at a *human* scale. And the cumulative effects of these Indigenous fire regimes in a population of ~ 13,000 prior to the smallpox epidemics may have been considerable.

In short, based on what is known about the fire history of west side forests, prescribed burning as a mode of disturbance to enhance the production of big huckleberry has the potential to be incredibly risky: to put it mildly, human-caused catastrophic fire is a disturbance that it is best to avoid. On the other hand, the processes of colonialism that resulted in the extinguishment of Indigenous fire ecologies have cascading effects that continue to impact the physical, emotional, and spiritual wellbeing of Native communities today (Norgaard 2014). How might the reintroduction of a form of Indigenous fire ecology ameliorate the cultural disturbances wrought by colonialism? Anna Tsing's follow-up question to her first seems particularly apt when it comes both to catastrophic fire and the cascading effects of colonialism: "Given the realities of disturbance we do not like, how shall we live?" (Tsing 2014:92).

## RESTORATION AND RISK

The collaborative projects that form the basis of my observations come at an interesting time and place in terms of the history of American federal-tribal politics related to natural resources management. The political and economic power of Washington State's treaty tribes is ascending while at the same time, the very opposite is true in many ways for the US Forest Service. This creates a situation where the power dynamics that exist between the Forest Service and tribes are less unequal than they have ever been over the 150 years since the federal government and the ancestors of contemporary Coast Salish tribal members entered into a "trust" relationship under the Stevens Treaties. It is within this context of changing power relations between the Forest Service and treaty tribes the potential for "indigenizing" Forest Service land management ideology and practice lies. The reintroduction of fire on the land to tend to big huckleberry in a manner reminiscent of Coast Salish ancestors would be one measure of such a shift. In this section I thus illuminate some of the broader context within which these collaborations take place, reflecting on what is at stake for both the tribes and the Forest Service when it comes to the care of huckleberries involving the reintroduction of fire. What do those involved in these projects believe is being restored, and what is at risk, and how does that shape what it is possible to accomplish?

While some might argue that tribal governments, and by extension their members, risk becoming "bureaucratized" through processes of natural resources co-management (Nadasdy 2003), it has been my experience that tribal members who engage with outside agencies and their staff are perfectly capable of speaking the bureaucratic and scientific language of natural resources management and policy without becoming culturally unmoored. In speaking with Warren about the problematic concept of "co-management" for example, he tells me that the tribes use the term because (as it is enshrined in the Boldt Decision) it is a term that non-tribal agencies are able to understand. "Co-beneficiary" is the term that Warren settles on as an alternative that is more consistent with a Coast Salish worldview, however:

> The term management, it's like we're dictating where the plants are going to grow, and how much of it is going to grow, and then we determine who is going to get half of what. I think that's a terrible attitude to have, especially when these things are considered gifts. We're beneficiaries of these gifts, and that's how it should be approached.

Warren's perspective is a reminder that, while tribal sovereignty is growing in the Pacific Northwest, it is not necessarily an end in itself. Rather, tribal sovereignty is a means to ensure the viability of resources into the future, which in turn supports the restoration of tribal members' physical and emotional health, and the flourishing of tribal members' relationships of responsibility to the ancestors and to the land. Like all of us, contemporary Coast Salish people are the products of histories of becoming - human and non-human transformations of the world to which we are the heirs. But it seems that the truth of this informs the present to a much greater extent in Coast Salish communities than in the settler communities that co-inhabit this place. Ancestral signatories to the Stevens Treaties, and the deep time ancestors who tended the land never seem to be far from the minds of their descendants.

For Coast Salish tribal members with whom I have spent time, with that recognition, along with the awareness that their ancestors fought to preserve their descendants' rights to these resources, comes a responsibility to care for them. What is at stake in the present then is the sense that continued cultural erosion could conceivably put an end to exercising not only their sovereign rights as enshrined in United States Federal law, but also the responsibilities inherent in these relationships. While the physical health benefits that adhere to the consumption of huckleberries are certainly important to tribal members as well, creating opportunities to harvest huckleberries are in this way perceived as ameliorating the risk of cultural loss through the restoration of reciprocal relationships.

The Mt. Baker-Snoqualmie National Forest (MBSNF) where the "huckleberry enhancement" collaborative projects are taking place falls within the purview of the ~24 million acres of public lands in Washington, Oregon, and Northern California that must be managed in accord with the "goals and rationale" of the Northwest Forest Plan (Northwest Forest Plan). The Northwest Forest Plan was signed into law in 1994 with the stated vision of restoring and protecting the health of late successional forest habitats relied upon by two federally listed threatened species (the northern spotted owl and the marbled murrelet), while at the same time ensuring the economic health of timber-dependent communities and a continuing stream of social benefits to the broader public (USDA & USDI 1994a). This vision, and the ecosystem management approach that informs the Northwest Forest Plan's "Standards and Guidelines" essentially relies on a triple-bottom line sustainability model that in theory is attendant to balancing social, environmental and economic considerations in forest management planning and implementation (USDA & USDI 1994b).

To this end, public forests within the Northwest Forest Plan area were divided into seven land allocation types comprising different goals to achieve "desired future conditions," along with guidelines outlining the means to achieve those goals (Table 6-1). For instance, thirty-percent of the forested lands managed by the US Forest Service and Bureau of Land Management were set aside as "late-successional reserves," (LSR) to be managed for old-growth structural conditions favored by northern spotted owl and marbled murrelet. The majority of timber was to be cut from the 16% designated as "matrix" lands, which were in essence those portions of forests that were left unallocated at the end of the allocation process. In addition to matrix lands, limited timber harvest within late-successional reserves would be allowed if the harvest accelerated old-growth conditions or contributed to the prevention of catastrophic fire.

**Table 6-1: Northwest Forest Plan Land Allocations**

| Land allocation | Description/strategy | Allowable harvest | Plan Area | MBSNF |
|---|---|---|---|---|
| Congressionally Reserved Areas | Wilderness, National Monuments, Parks and Wildlife areas, etc. | No timber harvest | 30% | 47% |
| Late-Successional Reserves | Maintain functional old-growth ecosystems | West side forests – restoration thinning in stands <80 yr | 30% | 36% |
| Adaptive Management Areas | Experimental forests designed to integrate and achieve ecological, economic, and other social and community objectives. Ten total in Plan area | Timber harvest/salvage varies depending on focus of AMA | 6% | 1% |
| Managed Late Successional Areas | Protection of rare or threatened species. Includes mapped owl pair areas or unmapped habitat buffers. | Some timber harvest | 1% | * |
| Administratively Withdrawn | Recreational areas, viewsheds, back country, etc. | No timber harvest | 6% | 5% |
| Riparian Reserves | Water quality and aquatic species protection. Includes all riparian areas whether fish-bearing or not. | None within riparian buffer | 11% | ** |
| Matrix | Lands not included in other categories. Expectation that majority of timber harvest will occur on matrix lands. | Yes, must leave 15% green trees/acre | 16% | 9% |
| Other (not classified) | | | | 1% |

* Included in Late-Successional Reserves. ** Included in Matrix

In the current political and economic atmosphere and with the Northwest Forest Plan in place, it is quite difficult to accomplish anything in the Forest. As with the US federal budget in general, the USFS has undergone serious budget cuts since policies promoting neoliberalization were emplaced and began to be implemented during the Reagan Administration. Forest Service budgets are allocated based on projected annual timber harvests, which have shrunk in part as a result of the Northwest Forest Plan, but also as a result of the difficulty of doing any cutting in the Forest at all. I have been told repeatedly that this is due to the ever-present likelihood of any timber sale being challenged by environmental non-governmental organizations. Dave Kendrick, the vegetation manager for the Forest explained the broader repercussions and thus risks of potential lawsuits from his perspective:

> It just …. takes a tremendous amount of time and energy away from anything else you do, and therefore money as well. But I think the biggest risk is that if you end up losing, then you're basically set back in everything you've done up to that point. That effort is basically for nothing. So if you are dealing with limited resources and people available, and money – you want to put them where you will have the highest probability of success. So for example, rather than regenerating matrix stands in old growth now, we thin LSR's, which was a minor component of the Northwest Forest Plan. It was recognized as a possibility, but on some forests that is the primary activity they do in timber right now. Because there's a much lower risk and a higher probability – it's not so much a risk of failure as the probability of success.

According to University of Washington forest ecologist Jerry Franklin, one of the main architects of the Northwest Forest Plan, the plan as adopted was not the plan that he and others originally designed. The plan as envisioned was intended to be flexible, adaptive, and to change with what was learned about the forest through the monitoring protocols that were an integral part of the plan's standards and guidelines. For instance, the distribution and extent of land allocations were designed to vary across the landscape over time, but "everyone else wanted to lock [them] in place – land managers, the timber industry, enviros." From Dr. Franklin's perspective, the main parties involved wanted certainty from a system that is inevitably dynamic and subject to change – something that the main stakeholders did not want to acknowledge. In addition, because the US Forest Service wanted to avoid the possibility of conflict - particularly litigation – and get on with management, they continued to concede more and more to what Dr. Franklin described as "the grassroots enviros." Dave described this in the context of how past litigation on one Forest influenced the decision-making processes on Forests throughout the range of the Northwest Forest Plan. "People become much more circumspect due to litigation in the past," he explained. "The litigation not only sets you back, but also guides your thinking for what is an acceptable project" in the future. Following the Northwest Forest Plan, conflicts over salvage logging, the logging of old-growth and eventually all mature trees in the matrix were also taken off the table, all of which, according to Dr. Franklin, happened without any public process at all.

Dr. Franklin believes that, at least when it comes to the US Forest Service, the fear of litigation can be traced to the structure of the agency's budget. Federal forests and the people who work for them are evaluated and rewarded based on their accomplishments, rather than the risks they might be willing to take. As Dave also explained, Forests get no credit for projects that aren't completed. A timber sale that is laid out and then delayed or dropped is not considered an "accomplishment." Thus, almost the entire plan within the Forest Service has been to reduce management with the exception of tree thinning (a practice that can't continue indefinitely). Thus, while the Northwest Forest Plan projected that average annual timber harvest would drop from an estimated 1.5 billion board feet per year to about half a billion under the new land allocation management strategies, in practice, timber harvests on many forests, including the MBSNF, are increasingly rare. For example, in the early 1980s around 385 million board feet of timber per year was being harvested from the MBSNF. In the present, the annual harvest budget is around seventeen million board feet. Most of this harvest is for the purpose of improving wildlife habitat through the creation of forest openings, or accelerating old-growth forest characteristics through thinning (though the effectiveness of this strategy is debated).

An abstract understanding of the effects of current policy and plans and annual allowable timber harvests on the MBSNF does little to shed light on how the current status of the agency actually affects Forest Service staff, who often seem stressed and embattled (McLain 2000). Dr. Franklin characterized Forest Service conservatism as being related to increases in external scrutiny, the structure of the agency's budget and a general inability of large agencies to respond adaptively to change. However, processes of neo-liberalization and attendant shrinking budgets are another systemic factor affecting Forest Service sensitivity to public scrutiny, and thus also how the agency functions. For instance, along with the enactment of the Northwest Forest Plan 1994, in 1993 the US Congress signed into law the "Government Performance Results Act." This Act, a terrific example of neoliberal "audit culture," was created ostensibly as a means to minimize "waste and inefficiency" in government, which is diagnosed in the Act as caused by the "insufficient articulation of program goals and inadequate information on program performance" (Congress 1993). As a result of the Act, every federal agency since that time has been required to articulate a performance plan, including a comprehensive mission statement and strategic plan outlining the goals and objectives that the agency will achieve, a plan for accomplishing them, and a means of evaluating what was accomplished and what should be changed. The rhetoric of "government waste" has of course only increased under the current political composition of the federal government, and agencies like the Forest Service and their staffs are extremely sensitive to it, as a brief anecdote from a spring orientation for new hires that I attended at one of the MBSNF ranger stations will attest. The district ranger spent a good thirty minutes describing a minor controversy in the Forest when one of his staff had been driving a Forest Service vehicle stopped at a shopping mall to use the restroom. This person had been driving for hours, and simply couldn't wait any longer to relieve themselves. Apparently the agency received several phone calls from observers at the mall who, assuming the employee was using the vehicle to go on a shopping spree, expressed their concerns over this egregious example of profligate government "waste." Those complaints went right up the Forest Service chain of command.

On the one hand, the stated purpose of GPRA is to ensure that federal tax revenues are spent as efficiently as possible. On the other hand, the articulation of goals, performance plans, etc. also has the potential to simultaneously increase the workloads of federal employees through expansion of goals, objectives, and plans and increasing the complexity of processes involved with tracking performance. While Dave pointed out that the language of goals, targets and accomplishments pre-dates the early 1990s, the areas of focus have broadened to include many other things - wildlife habitat improvement, stream habitat improvement, etc. For example, the agency-wide US Forest Service budget for 2015 identifies three broad, key areas of focus: “restoring resilient landscapes, building thriving communities, and managing wildland fires” (USDA Forest Service 2014).

Clearly, under this first area of focus, one of the highest priorities of the MBSNF and other forests within the Northwest Forest Plan area is to repair the damage done by excessive logging in the past – to restore old-growth conditions and suitable habitat for endangered species - with limited funds to do so. The success of these efforts is one measure against which the performance of MBSNF staff and their “accomplishments” are evaluated. They are also a way in which the Forest may regain legitimacy from the perspective of at least some members of the broader public. As other forest studies scholars have observed, ideas like community forestry and collaborative management are particularly appealing as means by which land management agencies may not only satisfy the expectations of the governing bodies that oversee them, but also extend their access to revenue and also perhaps restore a sense of trust in stewardship of public lands (McCarthy 2005; McCarthy 2006; Charnley and Poe 2007). Considered in this context, while the threat of litigation is on the one hand perceived as an impediment to certain kinds of disturbance as envisioned in the initial Northwest Forest Plan, it is also another factor motivating broader public involvement when it comes to Forest Service decision-making. As several Forest Service staff explained to me, public engagement in decision-making processes is a means by which some of the risk of litigation is minimized. As Dave described:

> Looking at how we do things now, the whole concept of collaboration with all the different groups in a lot of ways is designed and intended to reduce some of the risk, and to allow us to develop projects that are beneficial. So that we can all discuss the benefits and the risks of that project. And that maybe we can do things that we the Forest Service wouldn't have thought of doing ourselves. Because being fairly risk averse, we might have shied away from it. But you might get greater support on a project [identified by] the broader public, and once you have that, then you know. We would see that as reducing the risk.

Here I am not trying to imply that Forest Service collaboration with broader publics is simply a means by which the agency may gain broader public approval for its own, internally pre-defined goals. Several Forest Service staffs also described broader engagement with the broader public and with the tribes as having been deeply meaningful to them personally, and also to have improved the way the Forest Service functions. As Dave described, learning other points of view about what they think the Forest Service should be doing, and how they view what the Forest Service is currently doing is important. Speaking specifically of the Cedar-Huckleberry Technical Committee (described in greater detail below), Dave described his understanding of some of the benefits to the Forest Service of that collaboration:

> Hearing those other views – like maybe some of our regulations are there to be just regulations and they don't provide any real benefit to anyone. […] It's just part of the whole broadening our perspectives, and kind of stepping back from our jobs – being within our jobs and also stepping back far enough that we can really take a more objective view, whereas we tend to get focused on our day to day – 'this is how we've always done it,' so we just keep doing it that way. A real benefit to me was just that perspective of stepping back and looking at – well why do we do it this way? I think its good that people question why we do this, because if I can't give an answer, then maybe we shouldn't be doing it that way. […] It's not just this one committee. The whole concept [of collaboration] applies at a broader scale.

In addition to a general trend towards greater public involvement in decision-making on Forest Service lands, as a federal entity the Forest Service also has a "trust" responsibility to federally recognized Tribes. As federally recognized tribes are legally wards of the state, The US government plays the paternalistic role of trustee of the Tribes' treaty reserved rights to resources. But within this specific context I would argue that the trust relationship is less a factor than the capacity of tribes to effectively litigate on the one hand, and to bring much needed resources to the agency on the other. As one of the Forest Service staff who has been closely involved with these projects described:

> I think that the Forest Service is really stressed. Perhaps even more so when resources are tight, the role of partnerships becomes very attractive. … [T]he tribes [are also] taking a stronger leadership role in how they will approach the forest with their interests. And they have the resources now to have additional staff to support [these] interactions with the Forest Service.

The trust relationship does, however, provide the legal and ethical foundation for the argument that tribes often make to federal land management agencies – that they are not just another "constituency" equal to other publics, or "stakeholder groups." I return to this point in the discussion section, below, but it is worth mentioning here, given that the "publics" that the Forest Service is beginning to embrace engaging with more broadly are heterogeneous in terms of political influence and the extent to which their interests are in alignment with those of the Tribes.

It is within this broader context that, at least from the perspectives of human actors involved in controversies over huckleberries and fires' role in their well-being, treaty tribes now more than at any time in the history of Euro-American colonialism are increasingly empowered to take the things of the world into account, and to have a say in arranging them in rank order (Latour 2004). It is the treaty tribes of the Pacific Northwest who have raised the status of big huckleberry as a matter of concern, and in doing so have encouraged other humans (i.e., US Forest Service staff) to begin to act on behalf of these plants' interests.

Of course, a prescribed fire that burned out of control – a "failure" on the part of Forest Service staff, would also potentially affect the public's perception of Forest Service legitimacy and efficacy, and therefore is a risk. The primary role of the ~100 person full-time MBSNF fire staff (which typically swells to over 150 during the fire season) is to suppress fires in the Forest, not to start them - ostensibly reducing the risk to resources, life and property. In a typical year, about 50 wildfires ignite on the MBSNF, approximately half of which are anthropogenic and half of which are lightning strikes. The response of the fire staff to those fires is predicated on their predictions of the fire behavior, its potential negative ecological and economic impacts and the risks that fighting a fire poses to fire crews. The potential benefits of fire are not taken into account in this calculus. Tony, the fire and aviation staff officer for the MBSNF, says that the potential benefits of fire are “just not in the collective mindset of the forest, really.”

However, it is in part the prioritization of certain species and habitat types over others (“hierarchization” to use Latour’s term) in the Northwest Forest Plan – particularly “old-growth” forests as opposed to early seral ones - that has had the most negative impact on huckleberry habitat in the recent past. Ironically, as fire suppression was increasingly integrated into forest management practice, clear-cut logging to some extent took the place of fire as an agent of disturbance that benefited big huckleberry habitat on national forests (Anzinger 2002). Under the Northwest Forest Plan, both forms of disturbance are suppressed, and it is their combined effects that have really raised loss of huckleberry habitat as a matter of concern. For instance, as shown on Table 6-1, the proportion of land allocations on the MBSNF comprising areas in the Forest where disturbance is allowed under the Northwest Forest Plan is quite small. Nearly half of MBSNF lands are designated wilderness, over a third are allocated to late-successional reserve or managed late successional areas, and about 10% are either matrix or adaptive management areas where timber harvesting and other anthropogenic forest disturbance is theoretically less constrained. This minimal disturbance negatively affects not just big huckleberry, but many kinds of culturally important plants, which often thrive on disturbance (Mah 2000). Most importantly however for big huckleberry, while it is estimated that there is a moderate to high probability of big huckleberry occurring on about one-third of MBSNF managed lands, in reality less than 4% of this potential habitat is included in matrix lands where anthropogenic disturbance would be ostensibly less controversial (Lesher, Henderson, and Ringo 2015).

Thus, the ability to actually act on tribal matters of concern (on the part of tribes and on the part of Forest Service staff collaborators) is substantially constrained by forest policy as it is currently practiced. These concerns are made explicit in a 2011 report documenting the effects of the Northwest Forest Plan on federally recognized tribes fifteen years after the plan had been implemented (Lynn and MacKendrick 2011). Nearly half of the twenty-two federally recognized tribes in Oregon and Washington that were interviewed for the study felt that the Northwest Forest Plan had negatively impacted treaty reserved gathering rights, either through effects on the resources themselves, or due to loss of access through the closure of roads. The tribes that participated in the study specifically mentioned cedar bark and big huckleberry as resources of concern.

While the Northwest Forest Plan recognizes potential conflicts between implementation and its effects on gathering rights, and claims to provide a higher level of protection for “trust” resources than the previous forest plans that it amends, the language of the Northwest Forest Plan sets up a false dichotomy between the goals of the plan and Indigenous peoples’ relations with the forest. The plan explicitly states that treaty reserved rights will not be restricted unless it is determined that the restriction is necessary for the preservation of a particular species at issue, and that the preservation of the species cannot be accomplished without the restriction and does not discriminate against Native American activities. Such an understanding does little to acknowledge the impacts of the absence of Native American active presence on the health of the forest. This contradiction is also highlighted in a report examining the effects of the Northwest Forest Plan on treaty tribes ten years after its implementation. The study highlights many of the challenges and contradictions inherent in the conceptualization and implementation of the Northwest Forest Plan, where “trade-offs” between protection of, and access to, some resources and practices over others is not desirable, but seems inevitable:

> Most tribes interviewed indicate reduced [timber] harvest under the Plan contributes to healthier landscapes, but express that fewer harvests also mean less available forage for elk and deer. Tribes find there is greater competition between tribal and non-tribal groups for forest resources under the Plan, particularly special forest products. Tribes view federal road decommissioning as contributing to fishery improvements, but also state decommissioning limits access necessary for timber harvest on tribal lands, as well as hunting, gathering, and tribal cultural activities on both federal and tribal lands. […] Tribes also state limiting access protects some areas, but also displaces use to other lands that experienced less use before the Plan was in place (Stuart and Martine 2005:13).

While there was a general impression in this report that forest health and the condition of aquatic and riparian habitat had improved under the Northwest Forest Plan, about half of the interviewed tribes stated that changes related to the Northwest Forest Plan had made access and exercise of rights worse. Another common theme was the generally negative effect of the Northwest Forest Plan on project implementation related to tribal trust resources.

It seems that huckleberry enhancement projects are most likely to gain the financial and staff support that is needed to implement them when they are small, and when they mesh well with other goals and objectives of the Northwest Forest Plan. So-called "synergies" are much easier to justify, both ecologically and economically. For example, there is a sense that thinning projects emphasizing benefits to wildlife (as opposed to emphasizing benefits to humans) are less likely to meet with resistance from environmental NGO's, and more likely to receive federal dollars to fund them, particularly if the projects are small. "We are in a sense, the wildlife," Russell told me, speaking of Pyrola Meadows, one of the huckleberry enhancement projects that the Tribe has implemented with the Forest Service (described in chapter seven). This project is only about eighty acres in size. Each year for three years, Jason and Russell brought tribal youth to the site to help thin a few acres of forest canopy and move the brush to where it could be chipped or ideally burned. "If I went up to treat eighty acres at once," says Jason, "Oh no, that would never happen. But if we do three acres, wait another year, do 3 acres, 10 acres, 4 acres. You know we can just sit there below the radar of everybody else and get the work done."

Another unintended consequence of changes in disturbance regimes is a certain amount of "deskilling" of fire staff on the MBSNF when it comes to prescribed burning with the shift of Forest Service fire staff from an orientation towards prescribed burning as well as fire suppression, to one almost entirely devoted to fire suppression. Prescribed burning of logging debris was an integral part of clear-cut logging and it was the forest's fire crews who were typically responsible for this. Brush and debris, or "BD" crews were an integral part of the process and fire crews developed substantial knowledge about working with fire in the particular environments that they were burning. John, the assistant fire staff officer for the MBSNF, made this point when discussing perceptions about potential "economies of scale" that might come with burning huckleberry meadows, as opposed to treating them strictly with mechanical methods:

> It's also an economy of familiarity. If we're doing the same things over and … again? We're gonna get much better at it. And the box we're gonna walk out and start to assess is gonna be much smaller, 'cause we're gonna know where we're gonna go with it, what we're gonna try, and when we're gonna try it. [When it's] a new thing, it takes a lot more time than if it's the twentieth one we've done in a five-year period.

Not surprisingly, under these conditions it is actually quite difficult to accomplish any projects that would benefit the production of big huckleberry, whether fire is involved or not. Thus far huckleberry enhancement in the Forest has not been considered a high enough priority to explicitly include in any forest-wide planning documents or the annual budget on the MBSNF, and so tribal or Forest Service staff look for grants or other funding sources to do them, typically creating yet more delays. Every action taken in the Forest requires that an environmental assessment (NEPA) be done to evaluate potential impacts to natural and cultural resources. Even for very small projects, it costs many thousands of dollars for Forest Service botanists, ecologists, wildlife biologists, hydrologists, silviculturists, fire experts, etc. to conduct their analyses, make recommendations, and propose adjustments to the project's initial plan.

Sometimes tribal members join the Forest Service for the interdisciplinary field trips that are an integral part of the NEPA process, and are included in the discussions about what the plan should involve, but that is not a given. Jason says he feels that the NEPA process is one of those areas where Forest Service bureaucracy interferes with the urgent task of just getting out on the land and getting the work done. He has been instrumental in writing the "prescription" for treatment at Pyrola Meadows as they are called in Forest Service parlance, but has little patience for the minutiae and bickering that can take place in the process. Speaking of a different project that the Tribe and Forest Service are involved in, Jason described his frustration with the NEPA process, particularly the haggling of interdisciplinary teams of scientists, both Forest Service and Tribal: "Rather than doing, people just spend a lot of time thinking about doing it. And everybody's coming to the same conclusion, but they're coming from a different direction. You know, and it's just like – you guys are wasting time here. Debating this. Let's just do it! What's the harm in doing it?"

There is also always the possibility that the fire expert involved in the interdisciplinary process can preclude the possibility of using fire in the project at that time. Burn plans are complex documents that require even more time to develop, and thus cost more money, than a project not involving prescribed fire. Even a burn plan for a very small project, like the one that was developed for Pyrola Meadows, can take several days to develop not including time spent in the field. Tony, the Forest's fire staff officer explained to me that burn plans are highly prescriptive and designed to minimize risk and plan for every unanticipated event. "There have been fires cause by prescribed fires," he says. "Burn plans are intended to lower the risk of that." John, the assistant fire staff officer, adds that the planning and the burning alone are expensive, but then there is also the question of where the funds will come from to implement a contingency plan should the fire escape: “That’s the risk of heading into a [prescribed burn]. Okay, we have the money to pay for this project, but then what about the ‘what if’? Then who’s gonna pay for that bill? Who’s gonna be responsible for that bill?” Therefore, it is not necessarily surprising that unless there are good relations and a strong desire on the part of the Forest Service to support a burn, it is easy to make excuses for not including prescribed fire in a project plan.

This is particularly true when there is no unequivocal consensus about the benefits of prescribed fire to huckleberry productivity. Although as previously mentioned tribal members and many Forest Service staff who have worked with the tribes perceive ecological, social and cultural benefits to burning, there are also Forest Service staff who are skeptical about the reintroduction of fire, particularly given the associated risks. For instance, one of the fire management officers who works on the south end of the MBSNF agrees that there is cause for concern that huckleberry meadows are filling in now that there is no cutting in these upper elevation landscapes, and that something needs to be done about it. But he does not necessarily feel that prescribed fire is the solution because there are “too many variables” that affect the way fire behaves. He expressed doubt that burning would actually yield the results that people are hoping for. His sense is that fires in these upper elevation landscapes tend to be very severe and that they kill all the vegetation (including huckleberries). From his observations, it can take up to twenty years for a huckleberry meadow to recover from one of these burns, if it recovers at all. This person believes that Native people who burned the forest did so because that was the only tool that was available to them at the time. He feels that mechanical thinning is a better approach that minimizes risk. Thinning areas that are from 5 to fifteen acres in size would be manageable from the standpoint of available labor and would also be effective in terms of opening up spaces for huckleberry production and elk habitat. From his perspective, projects of this scale would also be less likely to meet with resistance or concern from environmental groups.

This was also the perspective of Jan Henderson and Robin Lesher, recently retired forest ecologists who devoted their careers to understanding the structure, composition and processes that comprise forested communities on the MBSNF. Between the two of them, they told me, they have over sixty years of experience studying forest ecology in the MBSNF. Jan and Robin believe that what big huckleberry needs is light, and that the plants are not particular about how that actually happens. They do wonder, however, if fire might be beneficial over some longer interval, such as the “natural” fire return interval described for upper elevation huckleberry habitats in the last chapter. They say that this infrequent fire may be necessary for nutrient cycling and moderating insects and disease.

## THE POWER TO ARRANGE IN RANK ORDER?

In this chapter I have illuminated the broader political-economic and social contexts within which deliberations over the reintroduction of fire to care for swədáʔχ occur. On the one hand, Coast Salish treaty tribes are in a position to have the things of the world that matter to them taken into account. Yet at the same time there are broader changes in social values that are not especially conducive to forest disturbance, whether fire is involved or not. These include the almost complete shift from valuing the MBSNF for timber production to values focused on biodiversity conservation and recreation, and increased scrutiny of the Forest Service on the part of broader publics (particularly environmental groups). While the Northwest Forest Plan as written was not intended to foreclose the possibility of most kinds of disturbance within the plan area, it has had that effect. Forest Service functioning is also impacted by the inter-related issues of processes of neo-liberalization and hostility on the part of some broader publics and politicians to “big government.”

There are also technical challenges to the reintroduction of fire in habitats that are characterized by high severity fire regimes, along with challenges related to varying perspectives regarding the relative merits of reintroducing some kind of Indigenous burning practices in the Forest to manage for big huckleberry. And as I described in the previous chapter, differences between Coast Salish and forest ecologists' understandings of place and history also play a role. In the next chapter, I examine an additional suite of factors influencing the reintroduction of fire in big huckleberry habitat on the MBSNF through the micro-politics of two specific projects in the Forest.

# Chapter 7

## THE MICROPOLITICS OF FEDERAL-TRIBAL COLLABORATION

Sunday August 31, 2014 was the day before Labor Day, and our first day of harvesting huckleberries up at Pyrola Meadows. By Sunday afternoon the rain had passed through as the weather forecasts had promised, but the bushes were still wet and so we wore our heavy rain pants to wade through them. We stayed in the first area where the Tulalip Tribes had been thinning the trees to let light into the understory. The edges delineating the five-acre patch, as well as the “untreated” areas within it were a thicket of “dog hair” mountain hemlock and silver fir saplings. A few of these young trees were left standing in the places where Tulalip youth had cut the small trees and lopped off the lower branches of the larger ones to let light in to the forest floor four years ago. These trees were left to lie on the ground, with the intention to return the following year and burn the dried brush. But either the Forest Service fire crews had been called away to fight fires rather than start them, or Washington State’s Department of Natural Resources had refused to issue a permit due to air quality standards, so that had not happened. As I walked through the brush and noticed the vigorous new yellow-green stems and leaves emerging from between the twigs and dead tree branches covering the bare earth, it seemed that the big huckleberry was benefiting most from the thinning project (Figure 7-1). This gathering area is upslope from the only road to the ridge, and all of the thinning had been done within a few hundred feet of it. The plan is to create a place that is easily accessible to tribal elders. Compared to the Grouse Pass project, which the Muckleshoot Tribe and MBNSF had been working on for more than a decade, and as of September 2015, had quite literally not yet come to fruition, the huckleberry enhancement project at Pyrola Meadows had proceeded rapidly, taking just two field seasons to get from concept to the first year of thinning. And though broadcast burning did not take place at Pyrola Meadows, unlike Grouse Pass, the intent to do so had been written in to the project's Decision Memo and the management plan. A burn plan was also in place to do the work if the opportunity arose.

**Figure 7-1: Big huckleberry sprouting after overstory thinning at Pyrola Meadows**

Why was there such a difference between the outcomes at Pyrola Meadows and Grouse Pass, given that the two projects were in so many ways quite similar to one another? Both involved collaborations between a western Washington treaty tribe and MBSNF staff, and both were on fairly recently logged off lands. Given that Pyrola Meadows fell within an area now designated as Late-Successional Reserve under the Northwest Forest Plan, and the Grouse Pass project was within an area that was designated to be managed for permanent openings for elk forage, one would expect that completing the project at Pyrola Meadows would have been more difficult to accomplish, rather than less so.

## Grouse Pass

On a sunny day in mid-July of the summer of 2007, I had stood in a circle in the parking lot of the Enumclaw Ranger station with MBSNF staff comprising the interdisciplinary "NEPA" analysis team for a proposed huckleberry enhancement project at Grouse Pass. Laura Potash, the MBNSF botanist for this part of the Forest and team leader on the project, began to articulate to the interdisciplinary team the primary objective of the day – to agree on a proposed action to complete the NEPA analysis in order to move ahead with the Grouse Pass project. She was wearing what I had come to recognize as her signature summer field clothing – a paint-splattered long-sleeved white shirt, white pants, and a baseball cap. Laura and I had driven from Seattle with the forest silviculturist, and were joined in Enumclaw by one of the forest's wildlife biologists, a NEPA specialist, two forest ecologists (Jan Henderson and Robin Lesher), a cultural resources technician, a fire and fuels specialist, and a hydrologist. All together there were nine Forest Service staff on the interdisciplinary team for this forty-seven acre project.

We were standing in the parking lot waiting for Warren KingGeorge, who was to join us in the field that day. Warren was running quite late. Laura felt she needed to proceed with the pre-field trip discussions without him in order to accomplish the fieldwork that the interdisciplinary team needed to do. The ritual at these meetings begins with a round of introductions, followed by a review of the general context of the purpose for gathering, a discussion of the objectives for the day, the "game plan," and finally a safety review. Laura started off the discussion by reviewing her understanding of the "Huckleberry Land Exchange" – how the particular units that we were going to look at today were selected out of those that the wildlife biologist had delineated to be maintained as permanent elk forage openings. Then seemingly out of the blue, the cultural resources technician asked in the kind of insinuating tone a person might use when they are trying to catch someone in a lie: "If production is down in these sites, what are Warren and the others basing their 'argument' on? Because it is well known that the site was old-growth prior to its being logged in the 1970s and '80's." Jan added that other fires that had occurred in the vicinity in the early 1900s would have created openings in the forest, but that it was unclear to him whether these fires would have created suitable huckleberry habitat that Native Americans would have used. Laura quietly listened to their questions and remarks before suggesting that their queries be held for Warren, and moved on to discuss that the other point of this effort is to maintain the area with open patches of early seral species for the purposes of enhancing elk forage. Outside of the elk forage openings the remainder of the Huckleberry Land Exchange parcels at Grouse Pass would be managed as late successional reserve (LSR). Jan then asked a question that seemed to recur in various iterations throughout the day: "If it comes to a conflict between huckleberries and elk, then what do we do?" The NEPA coordinator quickly responded that if there were a conflict, the elk would "Predominate." The wildlife biologist, who for obvious reasons was very invested in the success of this project in terms of benefiting the elk, cited a study indicating that big huckleberry leaves have the same if not more nutritional quality than grasses and forbs. Then Jan asked, "But what do elk actually eat? Are we limiting elk forage by favoring *membranaceum*?"

This would not be the last time that I would witness the at times frustrating focus on the part of Forest Service staff – particularly scientists – on minute details that could be perceived more as barriers to accomplishing the tasks at hand than contributing to project implementation. And the attitude displayed by the cultural resources technician was not the only instance of hostility displayed by MSBNF staff towards the Muckleshoot Tribe on that day, nor the first time I'd witnessed such examples in encounters between some MBSNF staff and Muckleshoot tribal members. At a meeting that I had attended on the reservation the previous spring, Muckleshoot tribal members had expressed their dissatisfaction at the pace with which the elk forage enhancement projects were being completed. "Mark," the district ranger at the time, had responded that if the Muckleshoots didn't like the pace of the projects, they should consider contributing casino generated revenues to help expedite them. This was the same person who had stated that we must find ways to reintroduce fire to the land at the Huckleberry Summit described in the opening of chapter six.

That morning at the Enumclaw Ranger station during the conversation about elk forage, the NEPA coordinator had made a derisive remark about the effects on the elk population of the "Muckleshoot cougar eradication program." This remark had generated a few quiet sniggers amongst some of the rest of the group. Laura seemed generally masterful at steering these kinds of asides towards more productive discourse and keeping the conversation light by interjecting a corny joke here and there. But the attitudes were certainly still there, simmering just below the surface of at least some members of the interdisciplinary team on that day.

The Grouse Pass project was the one that had inspired the Huckleberry Summit that opened the previous chapter. Laura had inherited the project from Tracy Fuentes, another Forest Service botanist who had been laid off during a recent round of downsizing. According to Warren, Laura was actually the third Forest Service employee he had worked with on this particular problem since 2001. It was during the fall of that year that Melissa Calvert, the director of the Muckleshoot Tribe's Cultural Resources Program, had first contacted the MBSNF to communicate the Tribe's concerns over illegal beargrass harvest as well as big huckleberry production and competition from commercial berry harvesters in their usual and accustomed gathering areas in the Forest. "Honestly I didn't expect this project to be a career," Warren had told me once, "But it feels like it's turning in to a career."

Bill Ramos had been the first Forest Service employee that Warren had worked with on issues of huckleberry management in the Forest. According to Warren, Ramos had a genuine concern for the Tribe's interests. He was willing to hear the Tribe's concerns regarding forest management policy and practice that impacted treaty-reserved rights, and was willing to spend one-on-one time in the field with tribal members (including Warren). Shortly after the relationship with Ramos and the Tribe started to develop into something deeper, Ramos suddenly received a new title with new responsibilities. Warren wondered whether Ramos' growing relationship with the Tribe had played a role in the change.

After Ramos left, Tracy Fuentes was assigned to work with the Tribe on huckleberry management. For two consecutive years, Tracy had successfully applied for Resource Advisory Council, or "RAC"[63] funding to support a collaborative huckleberry enhancement project with the Muckleshoot Tribe. The first RAC grant supported initial research to develop a management plan; the second was intended to support doing the actual work. This second proposal described a plan to thin ten, and burn twenty to forty acres of berry fields at Lost Springs, which, as discussed in chapter four is a site that is documented in both the archaeological and historical record as a huckleberry processing camp, and continues to be deeply important to contemporary

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[63] "Resource Advisory Council" (RAC) funding flows from provisions in the "Secure Rural Schools and Self-Determination Act" of 2000 (SRS). This Act superseded previous laws requiring the federal government to pay a proportion of timber revenues to the counties that federal lands are located within, as a means of compensation for the fact that the federal government does not pay taxes to counties. The SRS was enacted to reflect the trend towards decreased revenue from timber sales and to continue to compensate counties in a predictable way. A portion of the funds allocated to the counties is reserved for competitive RAC funded projects. The SRS expired on September 30, 2014 and has not been renewed as of this writing. See http://www.fs.usda.gov/pts/ (accessed 19 March 2015).

tribal members (McCullough 1970, Miss & Nelson 1995).

For several reasons, some of which I describe in greater detail below, huckleberry enhancement at Lost Springs turned out to not be a viable option, and ultimately Grouse Pass was selected as the site to do the work instead. So rather than using the second year RAC funding to complete the project that Tracy had proposed, the eleven-thousand dollars was instead to be used to gather information for the Grouse Pass project's NEPA analysis and to develop a management and monitoring plan.

I had been traveling with Laura over the course of the summer to help her complete this part of the process. We had traveled down to Mt. Adams, to the Gifford Pinchot National Forest in southwest Washington to visit some potential restoration sites with staff conducting interdisciplinary analysis for projects there, and three times before up to Grouse Pass. The first of our trips to Grouse Pass was to identify potential "treatment" units for huckleberry enhancement. The second trip was to survey for rare plants and potential archaeological and historical sites that could be affected by the project. It was the same cultural resources technician who had asked the insinuating question in the parking lot before the interdisciplinary field trip who had joined us on that day. The third trip was to delineate the monitoring plots that would be used to assess the efficacy of treatments within each of the four units that were ultimately selected for the huckleberry enhancement project.

The circumstance that led to my work with Laura and Warren, like much of my dissertation fieldwork and training, was fairly fortuitous. I had enrolled in James Agee's Fire Ecology course the first quarter of graduate school, which happened to be the last time Dr. Agee intended to teach the class before retiring. It was there that I met a recently retired staff of the MBSNF, who told me about the ongoing work with huckleberry restoration, the Forest, and the

Muckleshoot Tribe. Even then, the former MBSNF staff member had shared with me that the "collaborative" project had been proceeding at a snail's pace. It was through him that I was introduced to Laura, and not long after that, to Warren.

The first time Warren, Laura and I met to discuss the possibilities of working together was at the then MBNSF supervisor's office in Mountlake Terrace. Waiting for Warren to arrive from the fifty mile drive from the reservation to the supervisor's office so that we could begin to discuss potential locations for huckleberry enhancement, Laura mentioned how many projects she had "on her plate" now that she was the only botanist in the south end of the Forest. When I asked her why so many projects and so little funding, she described the current political dynamics of working for the Forest Service, which turned out to be my first encounter with the extent to which the Northwest Forest Plan had influenced the thought and behavior of Forest Service staff. She explained to me at that time that she saw her work as being an "advocate for the resource," meaning the (primarily non-timber) plants in the Forest. She explained that much of her time was spent surveying for rare plants and managing invasive ones. At the end of our discussion she quoted a statement that she attributed to Jack Ward Thomas, which she said guided her work: "Obey the law, and speak the truth." Thomas, along with Jerry Franklin, was of the "gang of four" who had been primarily responsible for the development of the Northwest Forest Plan.

Looking at the maps and air photos, our goal was to choose a place among several that the Tribe had previously discussed with Tracy as possibilities for huckleberry enhancement in the Forest. All of the potential sites being considered were located along čqalitc, which, as described in previous chapters, was a major route of travel for Muckleshoot ancestors for generations, and continues to be an integral part of the usual and accustomed gathering areas that tribal members utilize today. Two of the sites were on sχəy'ús. One was Bone Lake, which, as previously mentioned, John Newhauken had burned sometime in the 1920s. Tribal members still considered Bone Lake to be a productive gathering area, but with road closures in the recent past, it had become increasingly difficult for elder harvesters to access.

Lost Springs, the site mentioned in Tracy's RAC grant, was also on sχəy'ús. But although it was adjacent to Lost Springs, Weyerhaeuser, not the Forest Service, owned the land that Tracy had proposed for the project. Just as it had taken some time for Laura to learn that this land was not within the boundaries of the MBSNF prior to our meeting, it took some time after our meeting to learn that another site that Warren proposed that day – "Bear's Burn," was also privately owned. This tendency for the MBSNF to not be entirely aware of which lands fell within the boundaries of the Forest, and which were privately owned surprised me, and I was unclear as to the reasons why this was so. This issue also came up when I proposed to conduct a historical ecology study at Bone Lake. Again, the district ranger at the time (the same one who had suggested that the tribe contribute casino moneys towards the project) was unclear as to whether this land was even a part of the MBSNF.

The reasons for the apparent confusion around land ownership on the part of MBSNF staff became clearer once I developed a better understanding of the history of the Huckleberry Land Exchange. Lost Springs and the land in that vicinity had a complex and conflict-laden recent history involving the MBSNF, the Muckleshoot Tribe, and two other groups – The Pilchuck Audubon Society and the Huckleberry Mountain Protection Society (mainly composed of local residents in the Greenwater area). With the exception of 1,300 acres surrounding the archaeological site, much of the Forest Service land around Lost Springs had actually been traded away to Weyerhaeuser in 1994 as part of the land exchange. The MBSNF had exchanged approximately 4,700 acres of (primarily late-successional and old-growth) USFS land for 32,000 acres of second-growth forest owned by the Weyerhaeuser Corporation (Hanson and Panagia 2002).

The stated goals of the land exchange were to enhance the Forest Service's capacity to better manage MBSNF lands and to meet the objectives of the Northwest Forest Plan; to improve management efficiency and to better apply ecosystem management principles to forest management (USDA Forest Service 1996; USDA Forest Service 2001a). The logic of the exchange seemed to revolve primarily around increased efficiency by trading away non-contiguous 640-acre sections of the Forest on the margins of Forest Service lands, and acquiring those parcels that fell within land where the Forest Service was already the primary landowner.[64] Not surprisingly, given their deep and enduring connections to this area, the part of the land exchange involving the "huckleberry parcels," (parcels located on sχəy'ús), of which Lost Springs was a part, were particularly concerning to the Muckleshoot Tribe.

In 1999, the Tribe, along with the Pilchuck Audubon Society and the Huckleberry Mountain Protection Society, successfully litigated a suit brought against the USFS in the 9th circuit district court of appeals, arguing that the MBSNF had failed to adequately mitigate for impacts to sites of traditional cultural importance and the Tribe's treaty reserved hunting and gathering rights (Fletcher, Reinhardt, and Thomas 1999). The Court found, amongst other infractions, that the Forest Service had failed to do a thorough traditional cultural property analysis of Huckleberry Mountain when there was ample evidence of the mountain's

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[64] A legacy of the "checkerboard" pattern of land ownership that resulted from the federal government's donating square mile sections to railroad companies in the mid 19th century to raise funds for the development of a national railroad system (see Richard White's (2011) historical account, *Railroaded: The Transcontinentals and the Making of Modern America* for a more detailed discussion).

significance and long-term use. The settlement of the suit required the US Forest Service to purchase back from Weyerhaeuser intact portions of the čqalitc trail that the MBSNF had traded away in the land exchange (approximately six acres), an additional 80-acre portion of the section of land that included Lost Springs, and a full 640-acre section (primarily related to protection of northern spotted owl habitat) - all to the tune of approximately six million dollars (Hanson & Panagia 2002). With the exception of the latter, these portions of land, along with the initial 1,300 acres including Lost Springs that were not exchanged in the original agreement were given a "Special Management Area" designation in the revised Huckleberry Land Exchange. Under the revised exchange, the Forest Service agreed to manage this land for protection of cultural and historical features, as well as old-growth forest and riparian habitat (Ironically, managing for old-growth and maintaining the cultural significance of Lost Springs as a hunting and berry gathering area are basically incompatible goals).

To mitigate for effects of the Northwest Forest Plan on elk populations (particularly late-successional reserve designations), the settlement also required the Forest Service to set aside two portions of MBSNF lands as Special Management Areas designated for elk forage habitat. The elk forage management areas were located east of Huckleberry Mountain, in the "Greenwater parcels" portion of the land exchange, and included 640 acres of upper elevation "summer range" elk forage, of which 130 acres was to involve a "type conversion" to permanent grass-forb habitat. The lower elevation "winter range" portion of the management unit set aside 1,700 acres, of which ~500 acres were to be converted to permanent openings of grass-forb habitat (USDA Forest Service 2001a; USDA Forest Service 2001b).

The summer range Special Management Area was located at Grouse Pass. After ruling out the other sites as possibilities for huckleberry enhancement, it was decided shortly after the meeting with Laura, Warren and at the forest supervisor's office that this would be the most logical area to do the huckleberry enhancement work. As Warren recently recalled that decision when I asked him how it was that the huckleberry enhancement units turned out to be a subset of the elk forage units, he said that it was his idea. It made sense to do the project at Grouse Pass, he told me, to "work with Mother Nature, rather than against her."

The interdisciplinary team meeting was basically over by the time Warren arrived at the Enumclaw Ranger Station, and after a very brief introduction to Warren, we hopped in two Forest Service vehicles; Warren, the hydrologist and I opting to ride with Laura. As we rode up the mountain with Laura driving, Warren would occasionally point out a gathering spot that is important to the Muckleshoot people. The elders pick blackberries here, and there. He spoke again about how Grouse Pass was once a "huckleberry heaven." He said that one of the Tribe's technical staff had a photograph of uncertain vintage of a burn that covered the whole area. "It looked like it was all prairie – a huckleberry prairie," he said, looking out the window. Contrary to the cultural resource technician's perspective in the parking lot that morning, one of the elders who had been present at the meeting where the district ranger had been so rude had also mentioned that when he was a young man, he had heard from his elders that the people used to regularly burn the huckleberry meadows at Grouse Pass. At one point when we were almost to the pass, Laura slowed down and pointed out her favorite rock, a giant mini basalt boulder covered with sedums and moss.

Once we arrived at Grouse Pass, everyone immediately hopped out of the pair of white forest service vehicles and donned their work regalia. Grouse Pass is over 5,000 feet in elevation – high enough to feel the difference in air pressure from the lowlands. On our previous field trips here, Laura had shown me how one can read the ground vegetation for clues to the local climate.

Here it suggests that in many places the area is a sink for cold air. There are large patches of the tiny grouse whortleberry (*Vaccinium scoparium*), and dense patches of beargrass (*Xerophyllum tenax*), both of which thrive in cold pockets. The land at Grouse Pass shows evidence of hard human use, especially the prior logging activity of the former landowner. The trees are densely planted and there is more noble fir (*Abies procera*) than any other tree. The MBSNF is not entirely sure of the logging history here, because Weyerhaeuser was not required to share that information in the land exchange. But in many places the land is crisscrossed with former logging skids, which compacted the soil. In these places in particular the ground vegetation – including big huckleberry – struggles to grow.

**Figure 7-2: An interdisciplinary team meeting at Grouse Pass**

The interdisciplinary team walked in small groups to the first of the four units that we would examine that day, carrying on conversations ranging from how so and so was to retirement, to whether big huckleberry grows from rhizomes or roots, to their understandings of the history and ecology of this place. At the first unit, we once again gathered in a circle to reiterate the plan for the day (Figure 7-2). Members of the interdisciplinary team again brought up the question of this having been an old growth forest not so long ago – talked about what they knew. The question of whether fire should be included in the management plan arose again, and Jan reiterated what he had once shared with Tracy when she had been developing the management plan. Big huckleberry plants themselves are rather inflammable, so Native people must have been burning something else. Jan believes that the practice must have involved the burning of "jackpot" fuels at the ecotone between forest and big huckleberry meadows.

No one asked Warren what he knew about this place, about histories of fire and burning, or his perspective on what might be the best way to proceed with the project. Nor did he offer any insight. The lack of interaction between Warren and the rest of the interdisciplinary team was something that bothered me more than it apparently bothered Warren. Whereas I interpreted members of the interdisciplinary team's almost completely ignoring Warren's presence throughout the day as a series of micro-aggressions and lost opportunities, he seemed to think that it was just the interdisciplinary team doing their work – a typical part of a typical planning process. "I felt that the trip wasn't about me," he said:

> It wasn't about the Tribe. The trip was more about the Forest Service getting familiar; so that when they read about the project they would be able to add some context to the content of their reading material. So instead of now looking at all of their tables, and their data, and their pies, and their ratios, this allowed them – these players in the management game to add some context. And I was okay with it. I mean that's part of the game. That's part of the deal. If these guys are gonna be making decisions that are going to effect other co-managers, they have to know what they're talking about. This is all part of the red tape. You know the Forest Service has all these players? They have to know what they're talking about. They're not gonna understand the tribe's concerns, but they damn well better know the area we're talkin' about, the habitat we're talking about, the orientation we're talking about. They have to know. If they don't, well then something's wrong. You can't just make a decision based on data collected by a monitor, or a technician.

However, during another conversation with Warren, he shared his frustration over the tendency on the part of natural resource management agencies (not just the Forest Service) to not treat the tribes as equal partners. Warren said that in many cases, resource management agencies intentionally exclude the Tribes from decision-making processes. Warren also described to me that as a person who follows "traditional teachings," he has learned that his role in events like the Grouse Pass interdisciplinary team meeting is to step back and listen, and not to speak unless he is asked a direct question.

Towards the end of the conversation in the first unit, Laura reminded the interdisciplinary team that time was actually of the essence when it came to completing the NEPA analysis for the project. The second RAC grant was set to expire at the end of the fiscal year, just a few months away. The forest hydrologist responded that if that was the case, then the interdisciplinary team would "almost have to make sure that [they] know what [they were] doing" by the end of the day.

By the end of the day, the interdisciplinary team had decided what would eventually be written into the management and monitoring plan for the Grouse Pass Huckleberry Enhancement Project, at least when it came to conducting prescribed burns: "Broadcast burning is not being considered at [Grouse Pass] because the trees are too small to effectively carry a burn" (Potash-Martin et al. 2008). The final management and monitoring plan also cited concerns over the potential for a burn to damage the "shallow rhizomes" and roots of big huckleberry. However, while there was substantial variation in terms of tree density and size in the proposed treatment units, in each case it is questionable as to whether the entire area lacked sufficient fuels to carry a burn. Some of the units were dense with "dog hair" stands of trees. These stands were practically impossible to walk through as we were locating the monitoring plots in the treatment units that year (Figure 7-3). Thinning these stands would have generated plenty of fuel to carry a burn. In other units where the trees were larger, it would have been possible to limb up the abundant living and dead lower branches and then use these as slash in the Forest floor to carry the burn. During the interdisciplinary team's field trip, the fire and fuels specialist had said nothing about a lack of fuels. Rather, he expressed concern that a broadcast burn had the potential to kill existing trees. This was somehow translated in to the statement in the Decision Memo that the trees were too small to carry a burn. And both Jan and Robin had reiterated the fact that big huckleberry is not a rhizomatous plant; that its roots are actually rather deep and are therefore capable of surviving a fire and re-sprouting from their crowns.

**Figure 7-3: Laying out the "treatment units" at Grouse Pass**

What seemed more relevant on the interdisciplinary team field trip was that neither the fuels specialist, nor Jan and Robin seemed to believe that broadcast burning at Grouse Pass would be more efficacious than simply thinning the forest stands. Ultimately, "pile burning" of slash resulting from the mechanical thinning of trees was the only type of prescribed fire incorporated in to the final Decision Memo. The Forest hydrologist had also mentioned concern about a burn that was too hot "vitrifying" the soil during the field meeting, but this would be even more likely when burning piles, as opposed to conducting a broadcast burn.

In the case of Grouse Pass, then, the exclusion of fire as a process to aid huckleberry production had everything to do with the fuels specialist's and forest ecologist's perceptions of fire's history and efficacy at Grouse Pass, and nothing to do with Muckleshoot tribal members' understandings of the fire history of Grouse Pass, or the regenerative potential of fire at the site.

The plan that Tracy had articulated in her second RAC proposal had explicitly included a proposal to burn. And the revised Huckleberry Land Exchange Record of Decision indicated that creation and maintenance of the elk forage openings could potentially involve the use of fire (USDA Forest Service 2001b). Particularly in the case of the RAC grant, this was the result of conversations with Muckleshoot tribal members who had expressed an interest and desire to reintegrate an Indigenous form of tending to big huckleberry into contemporary land management practice. Yet, as the fire staff officers had indicated during our interview, the development of burn plans is a time consuming and expensive process. Incorporating the intent to burn into the NEPA analysis and the management and monitoring plan would have been more labor intensive than excluding fire from the start. This in turn may have made the planning process more costly, time consuming, and perhaps ultimately, more difficult to finish the NEPA and get it approved before the second RAC was due to expire.

This was also Laura's (and my) first experience working with the development of a plan to enhance the production of big huckleberry on the landscape. It was also Laura's first experience working with the Tribes and tribal members on issues of concern in the Forest. As the interdisciplinary team's leader, Laura had to rely on the expert opinions of the fuels specialist and forest ecologists when it came to the use of fire.

Given all these factors – the perceived need to move the project ahead within a tight time frame driven by limited financial resources, a lack of fire "allies" on the interdisciplinary team, and Laura's and my relative inexperience with this type of project, excluding fire from the NEPA and the management and monitoring plan seemed like the only option available to us at the time. I return to a discussion of Grouse Pass and the slow pace of the project in the absence of fire, below.

## PYROLA MEADOWS

I had first visited Pyrola Meadows to discuss the possibilities for a huckleberry enhancement project with Phyllis Reed, the Darrington Ranger District's wildlife biologist, and Tulalip tribal members and staff, including Jason, Russell, and Mike - one of the Tribe's wildlife biologists in June of 2009. I had already heard a bit about this project through my involvement with the MBSNF-Tulalip "Cedar-Huckleberry Technical Committee" (described below), which I had been invited to join earlier that year. Phyllis had approached me after I had given a presentation to the technical committee about my dissertation research, sharing with me her interest in histories of Indigenous burning in the Forest, and her hopes to integrate prescribed fire in to a project that she was currently developing with the Tribe. She and Jason and Russell had already been talking about the (what seemed to me) exciting prospect of lighting a portion of the forest canopy on fire in the winter, when there was snow on the ground. Such a fire, they felt, would be a potentially low risk, low cost method for huckleberry enhancement. Phyllis explained that the Forest Service and the Tribe had already applied for a “Challenge Cost Share” grant, which would provide funds for the Forest Service to do the NEPA analysis as well as for a portion of the labor to do the actual work. Tribal labor, as opposed to actual dollars, would apply to the “cost sharing” component of the agreement on the part of the Tribe.

The ride to Pyrola Meadows with Jason and Russell on that sunny day in mid-June of 2009 was the first of many long conversations I had with them about their own histories and their perceptions about the value of projects like the one at Pyrola Meadows to the Tribes as a whole and to individual tribal members. It was on that ride that I learned a bit more about their own histories and experience with forestry, both on and off the reservation. At that time, Jason was the head of the tribal forestry department. Russell was employed in the forestry department as well. Jason had explained to me then how prior to casino revenues, the most important form of revenue on the reservation had been timber. There had been “lots of logging on the ‘rez’” over the years, he explained. Russell had also worked for the MBSNF in the Darrington Ranger district for about 17 years, from the late 1970s to about 1990. “My job went away with the spotted owl,” he explained. Both agreed that the Forest Service had been cutting too much timber at that time, but believed that now, because of the Northwest Forest Plan, the Forest had gone too far to the other extreme. Their understanding is that currently there is typically less than one timber sale per year on the MBSNF.

Several years later, in the fall of 2013 when I met Phyllis at the Darrington Ranger Station to conduct an interview about this project, she immediately suggested that we hop in her Forest Service vehicle for a field trip to Pyrola Meadows. It would be much more interesting and valuable to talk about the work “on site,” she explained, as opposed to just sitting in the office.

Phyllis and her husband Paul, a consulting forester, are long-term Darrington residents. When I was conducting the recreational huckleberry harvester study in the Forest the previous year (appendix A), literally everyone that I spoke with in the Darrington area explained that I should really speak with Phyllis and Paul if I wanted to understand the social and political nuances of huckleberry management in this part of the Forest. As we rode up the mountain she described how the project had gotten started and how it had developed from there:

> This one is really a good example of the tribes bringing their concerns to the Forest Service. In which Tulalip staff persons – Jason, Russell and Libby all came to the office and said they were interested in what the Forest could contribute to managing the huckleberry resource, and did we have any areas where we could promote huckleberry enhancement. We started talking and I said, "Well, we could put in for what we call the regional challenge cost share project." And Jason and Libby and folks were all agreeable… and we put in a proposal, and it was funded. And we've had three years of funding on this project. It's an initial one that started with the idea of can we do some thinning or release of some of the huckleberry in places where there had been previous clear cut harvesting and the huckleberry had come in, and now the trees were competing with the huckleberry, and it seemed like the huckleberry was being overgrown. And so the first was to look at just having some mechanical reduction of the tree canopy in order to provide more light, and then to pile or to chip the material so there'd still be some access through the huckleberry for the persons who were gathering it. We looked at a second phase of trying to do some thinning and burning.

After my experience with the Grouse Pass project's interdisciplinary team, I was quite surprised at how simple and straightforward the planning process at Pyrola Meadows seemed to be. On our field trip-interview to the area, Phyllis had described how it was more her intention to support and follow Jason and Russell's lead in terms of how the project would be approached than to control the project's direction – her role, she felt, was to be a "champion" for the project's success. From her perspective, the Pyrola Meadows project relied almost entirely on the Tribe's timber staff (aka Jason and Russell), and the tribal youth program. Jason and Russell made recommendations for where and how the thinning would take place. Phyllis, with her expertise also as an environmental planner, led the interdisciplinary review after Jason and Russell had worked through their ideas with her.

Phyllis went on to explain that they all viewed the project at Pyrola Meadows as a "pilot project." It was a pilot project both in terms of gaining a better understanding of how the huckleberries would respond to the thinning (and ideally prescribed burning), but perhaps most importantly, a small test of the ability of the Tribe and MBSNF staff to actually work together on a project of mutual interest. As she described:

> Even though it's a small project of just say 5 acres, it's still something that you can get done, and you can see how its working. And that to me was important that we get something started. So that was another reason to start with something that was perhaps not threatening to some of the other resource areas, by having something that was a little bit smaller than what you might think of otherwise.

**Figure 7-4: Jason, Mike & Phyllis planning the huckleberry enhancement project at Pyrola Meadows**

Tribal youth would eventually help with the huckleberry enhancement work. The Tribe has a summer youth hiring program where high school youth can earn ten to twelve dollars per hour for doing this kind of labour. Russell and Jason believe that this fosters a more meaningful attachment to a place. They say that the youth will be more likely to maintain that connection (and obligations to it), eventually sharing that connection with their own children. After the work at Pyrola Meadows was completed, I had asked Jason and Russell about the benefits to the Tribe of the project, to which Jason replied:

> Well one of the main things I guess with [these projects], I'm not really that concerned if berry production … you know, if we don't get a big improvement? The biggest thing I think was getting all our kids up there, and our summer youth crew working on it. Because it got them into an area, where, you know, "Wow! Look at all these berries," you know? […] I think it really gives them a sense of investment into it, you know doing that work up there? They're always asking me, "Are there any berries up there where we were working?" […] And so I think that investment of creating these areas, working these areas, and getting that investment from the Tribe, from the youth… the more work they seem to put into it, the more connections they get to it.

## The Cedar-Huckleberry Technical Committee

"You're simply getting on board with a number of canoes that are heading in the same direction." Hank Gobin, Tulalip Tribal Elder.

As previously mentioned, the huckleberry enhancement project at Pyrola Meadows had emerged from early discussions between MBNSF staff, and Tulalip tribal members and staff involved with the "Cedar-Huckleberry Technical Committee." The technical committee had formed as a result of a "Memorandum of Agreement" (MOA) that the Tulalip Tribes and the MBSNF had entered into in 2007. The MOA was put into place to formalize the working relationship between the MBSNF and the Tribes, in order to "facilitate the exercise of treaty hunting and fishing rights, and ensure, through collaboratively developed management plans, the protection of tribal gathering rights and the conservation of those natural and cultural resources upon which they depend." Both the Tribes and the MBNSF agreed to work together in "good faith on mutual interests," and to "identify areas where the Forest Service may be able to utilize tribal personnel and resources in cooperative projects of mutual benefit of both the Forest Service and the Tulalip Tribes."

Tribal plant gathering and issues related to access were prioritized as the first area of focus under the newly signed MOA. With tribal members having identified cedar and huckleberry (particularly big huckleberry) as two species of immediate concern in the Forest, the

MBSNF and the Tribes convened the Cedar Huckleberry Technical Committee. The committee was charged with identifying opportunities for and barriers to working together, barriers to accessing cedar and huckleberry, and developing a list of recommendations for future collaboration and management of cedar and huckleberry in the Forest. The committee began meeting for a full day once per month beginning in October of 2008. The core group consisted of six Forest Service staff (including Laura Potash), and six tribal members and staff. In December of that same year, after giving an overview presentation of my dissertation research to the technical committee, I was also invited to join the core group as an "outside observer." In addition to the thirteen core members, additional Tribal and Forest Service staff participated in the meetings where the members of the committee identified the need for additional technical expertise to accomplish the committee's goals.

Though the initial plan had been to alternate the monthly meeting location between the Tulalip Reservation and the Forest Supervisor's Office in nearby Everett, once construction was completed on the Tribes' new administration building, the committee typically met there. The "admin" building sits high on a hill and is evocative of an enormous Northwest Coast cedar plank house. Typically we would meet in one of the largest conference rooms in the building, facing to the southwest and overlooking Tulalip Bay. Laura Potash, the botanist that had worked so hard on the Grouse Pass project, and Libby Halpin-Nelson, a policy analyst for the Tulalip Tribes, co-chaired the committee and would alternate organizing the meeting and sending out each month's agenda. Meeting topics ranged from very specific issues related to projects and plans at the local level, to policy decisions at the federal level that either had the potential to negatively impact tribal gathering, or that posed potential opportunities for the Tribes. As important (and at times difficult) as these conversations were, what was perhaps most significant to the meetings and the committee was simply having a dedicated time for both the Tribes and the Forest Service to better understand one another, to find common ground and to "come to clarity and understanding," as Hank Gobin would often say.

Hank was the cultural resources director for the tribe over the course of time that the committee met. He would frequently open the monthly meetings, often with his wife, Inez Bill at his side, and stay for just a little while before heading off to another of his many commitments. Hank would often come in to the meetings riding a motorized wheel chair, reminding the technical committee that neither his health nor his eyesight was very good. Occasionally Hank would chide the group, particularly Forest Service staff, telling them that neither he nor the rest of the Tribe was particularly interested in hearing what from his perspective seemed like excuses for not accomplishing the work that was necessary to ensure ongoing tribal access to plants and places in the Forest. When he spoke he would oftentimes cajole the committee into maintaining focus, imparting a sense of urgency about the tasks at hand. He would sometimes stay and quietly listen to the discussions, then ask a pointed question. "These are grandiose plans," he said once. "But who's going to actually uphold these agreements once the technical committee is finished with their work?"

For Hank, coming to clarity and understanding seemed to me to be about recognizing the importance of the work that the committee was doing in relation to tribal members' health and wellbeing. "Rediscovery" of cultural traditions, he felt, was central to this. The committee could support the process of rediscovery by ensuring access and abundance of traditionally gathered plants. Hank's vision was that the use of plants would once again become "second nature" in the daily lives of tribal members. Hank and his wife Inez Bill were deeply involved with the development of the Hibulb Cultural Center, a museum intended both to share Tulalip's culture and history with the public on the Tribe's terms, as well as to be a resource for the rediscovery of tribal traditions and vibrant health for tribal members themselves. The tribe's "Rediscovery Center," located at Hibulb, was one means to do this. In addition to the building itself, which included space and resources for working with traditional plants (medicine making, basketry, etc.), Hank and Inez were developing "trails of tradition" on the lands surrounding Hibulb. These would be used as teaching trails, where tribal members could learn how to identify and harvest specific plants in a relatively accessible way.

On one occasion, Hank had just returned from a tribal wellness symposium at the Lower Elwha Tribe, located on the Olympic Peninsula. He described how the workshop had highlighted the spiritual, medicinal, and material importance of plants and the places where they grow. He explained that plants could act as helpers when it comes to healing, and the importance of gathering and spending time in pristine areas. Part of the healing involved getting above pollution, he explained. The MBSNF was of course one place where this might continue to happen.

Jason and Russell, too, worked hard to educate Forest Service staff about the values of the Forest to the Tribes. Typically it was Russell who would speak about the spiritual importance of the Forest during the technical committee meetings. At these times, he would speak in a low voice and in a matter of fact tone, describing a particular spiritual practice; its importance, and the need for privacy or a particular type of place to maintain these practices. Jason more often spoke about the importance of the Forest for accessing cedar bark for weaving and cedar wood for carving. In addition to being a tribal forester Jason is also a graphic artist and wood carver and the skipper of the Tribes' canoe family. At one of the breaks during the first technical committee meeting I had attended, Jason had shown me photos of some of his designs, and of the workshop where tribal members do their carving. He showed a series of photographs detailing the process of three huge welcome poles being carved. These poles, carved by Jason and two other tribal members, now stand inside the entrance to Tulalip's "five star" resort and spa. Jason explained that the three poles were carved from one massive cedar log, a "blow down" that had been salvaged from MBSNF lands.

Tribal members and staff also spent considerable time educating Forest Service staff about the Tribes' treaty rights, especially when issues related to Forest Service policy decisions that might have an impact on those rights came to the fore. In one instance, for example, there was a major project being planned that the Tribe felt had the potential to negatively impact huckleberry gathering. The Tribe had not been notified of the project until very late in the process; in part because the Forest Service seemed to think that the area in question was not an area that the Tribe would consider to be a part of their "Usual and Accustomed" area. At one point in that conversation, Laura had asked the tribal members and staff in attendance the seemingly innocuous question about the Tribes' specific geographic area of interest in the Forest. The tribal attorney, who was also often in attendance when topics related to treaty rights were part of the discussion had responded that the Tribes' interest includes the entire Forest, as the entire Forest falls within the territory covered by the Point Elliott Treaty.

Mike, the tribal wildlife biologist who would join us on the first field trip to Pyrola Meadows the following summer had added that it is important also to consider all projects in the Forest because incremental changes have potentially major cumulative impacts on resources, and thus the well-being of tribal members. It was during these discussions that the importance of better educating the Forest Service about treaty rights would inevitably arise. A common refrain within (and beyond) the technical committee is that because staff turnover happens frequently, education is an ongoing, and at times exhausting process that tribes feel they need to do. During this exchange, one of the Forest Service representatives on the committee responded that Forest Service training already happens, but understanding what the Forest actually means to tribes is what ultimately will motivate the staff. She suggested that being pressured about treaty rights may potentially have the opposite effect: “You start talking about treaty rights and we feel like you’re telling us that we’re screwing up,” she said.

Although the work of the committee was not without tensions like these at times, at the end of the year there was a generally positive feeling on the part of both tribal members and staff, and Forest Service staff that the work of the technical committee had substantially improved relations between the MBSNF and the Tribe. The technical committee had developed a robust set of recommendations to support the tribal access to cedar and huckleberry. The Pyrola Meadows project was well underway. The Tribes had also worked with the Forest Service to prevent the scheduled closure of a road that terminated in an excellent huckleberry harvesting area that the tribe has since named “swedaxliʔ,” or “Huckleberry Place.”

When I asked Russell and Jason about the benefits of the committee, Russell responded that some Forest Service staff in particular had become the Tribes’ “eyes” in the Forest. Improved communication has led Forest Service staff to better watch out for tribal interests. For example, The Tribes are now being notified when cedar resources become available in the Forest. Jason pointed out too that the Tribes have been willing and able to bring resources of their own to projects. From his perspective, this shows a commitment from the Tribes, and that they have something to contribute to Forest Management, and are not just asking for things. As Jason described:

> If we asked the Forest Service to do this, it wouldn’t get done. We have to bring out crew and funding, basically labor in there to do this work. It’s the same as everything with the Forest Service. If we don’t push the issue and do

it ourselves and take the lead on it. They've just got so much NEPA and different things that they have to do, and they're just, they won't do it. They just can't do it. Or they don't have the staffing to do it.

Forest Service staff involved with the committee often remarked that the experience of working with tribal members and staff was one of the most rewarding and meaningful experiences of their entire careers. In my interview with Phyllis, she described how much she had come to value the "friendship, knowledge and perspectives" of Jason, Russell, and Libby. Dave Kendrick remarked that being on the committee was "probably one of the most satisfying things that's happened since I've been here." He described how the work of the committee gave him a much better understanding of tribal perspectives, uses, and relationships with the Forest. For him it was also exciting to recognize that the Forest Service and the Tulalip Tribes have a lot of shared ideals and goals, and that they can and do want to work on achieving their goals together. He feels that the vision articulated in the committee fits perfectly with where the Forest Service wants to go – to better manage resources, to help the Tribes maintain relationships to the land, and to get youth involved with the Forest. At the same time, as previously mentioned, he highlighted the importance of the Tribes' questioning of some of the Forest Service policies and practices that can create barriers to collaboration and tribal access to forest resources.

Dave believes that the work of the committee is a great model for how the Forest Service should be managing for multiple uses, as well as maintaining trust responsibilities with Tribes. Phyllis too had mentioned the trust responsibility as a relationship that is unique and important to uphold. At the same time, there was a sense that the process also facilitated a better understanding on the part of the Tribes of what the Forest Service needs to do as a bureaucracy, while the Forest Service staff involved with the technical committee gained a better understanding of the tribal perspective and how they view their relationship with the forest ecosystem. From Dave's perspective, the MOA laid the foundation for doing the work that led to these outcomes:

> My understanding was that in the past, there was not really the level of trust? That was needed for these things to happen. I think that the MOA gave us the framework and enough structure to where we could develop that trust. So I think in that regard it was very important. You know, we could've just gone out and started talking to one another, but I think by putting the structure out there, I think it made it much easier for us … to get people involved, and probably for the tribe as well, I would guess.

MBSNF and tribal leadership had both encouraged development of, and participation in the technical committee. Dave suggested that the MBSNF staff that participated were selected, or perhaps self-selected, based on a tendency to be collaborative:

> I think that's where it came from, just the leadership. They made it clear that they wanted this to work. They wanted us to participate. And I think frankly the people who were involved were probably the right people. It was a group that – from the Forest Service as well as the tribe – people who really wanted this to work. The people who were involved had expertise as well as having the right frame of mind. They were inclined to take a collaborative approach anyway.

Finally, Dave articulated that he had gained a deeper understanding of the relationship between the health of tribal members and the health of resources like big huckleberry in the Forest:

> One thing that I think I've learned through this whole process is there are people within the tribes who are very, very interested in maintaining their tribal culture. And I think that's an integral part of it, you know maintaining the cultural foods. I think not only the tradition, but also the physical health of the tribes. … I think it's – maintaining their culture, and also just physical health. I think it's a real benefit to do that. And also by having that interest, it helps to maintain those items on the landscape. Just like I said, the huckleberry projects … you know look for ways to improve those items.

## Who Decides What Kind of Disturbance we want?

In this section I return to the primary questions that motivate the narratives in chapters 4 through 6: What kind of disturbance do we want? Who (or what) decides?

To summarize the challenges to reintroducing Indigenous fire ecologies on the land to manage big huckleberry, in the first place, minimal disturbance has been institutionalized throughout the range of the Northwest Forest Plan. This minimal disturbance has had a negative effect on huckleberry production. The institutionalization of minimal disturbance is not just the result of the Northwest Forest Plan per se, but also of the politics involved in how the plan has been implemented. In the schema of Latour's Politics of Nature, matters of value are presented as matters of fact. The focus on conservation and development of "old-growth," and even how that should happen, are based on the societal values of some; not on any intrinsic foundational form of old-growth forests. The increasing focus on the preservation and creation of old-growth conditions in lieu of consideration of any other facets of Forest worlds amounts to hierarchization without due process.

Yet, Pacific Northwest Treaty Tribes have increasing capacity to have a say in how the plants, animals and places that matter to them are to be taken into account in decision-making processes. This, combined with the decreasing capacity of the Forest Service under the Northwest Forest Plan and processes of neoliberalization has opened up spaces for new collectives, and new forms of deliberation about the kind of "good common world" that we want, to occur. In particular, these emergent dynamics multiply the number of voices participating in the articulation of propositions considered for inclusion in the "good common world." One might say that in the cases that I have described here, with the assistance of tribal spokespersons, big huckleberry has most certainly been an "actant" that has played a central role in bringing these new collectives together.

At the same time, scientific understandings of fire and forest disturbance in west side forests and land managers' use of this knowledge are informed by a generalized model that oversimplifies the complexity of fire as a disturbance process, both in terms of scale and of history. In particular, small-scale anthropogenic and non-anthropogenic disturbances in the past and present are typically not taken into account in the model. In Latourian terms, the quality of "perplexity," which allows the number of propositions that may be taken into account to multiply, seems to continually be short-circuited.

Yet these factors are at play in both projects, and the projects have had very different outcomes. At Grouse Pass, not only is prescribed fire not being considered in the project (with the exception of pile burning), eight years on the work has still not been accomplished. At Pyrola Meadows, prescribed burning was incorporated into the management plan, although it has not been used. Still, the project proceeded rapidly from concept to implementation. It might be tempting to suggest that part of the difference lies with the Muckleshoot Tribe, who unlike Tulalip, does not have the same kind of staff and capacity in terms of actually physically doing the work. Yet the Grouse Pass huckleberry enhancement project is not the only huckleberry related project with which the Muckleshoot Tribe has been involved.

The upper Cedar River watershed is the primary source of drinking water for the city of Seattle. In 2006 the city had entered into a settlement agreement with the Muckleshoot Tribe over potential impacts to salmon habitat resulting from the city's habitat conservation plan (Cupp et al. 1995). Part of the agreement entailed ensuring the right of Muckleshoot tribal members to continue to access the watershed – which is closed to the general public - for cultural activities, including hunting and plant gathering. The settlement agreement also entails managing for culturally important resources within the watershed, including big huckleberry. To that end, the city and the Tribe had worked together to implement a thinning project intended to enhance elk forage and big huckleberry. The Tribe's wildlife department had been closely involved with the project, and tribal members enrolled in what is now the Adult Worker Training Program had also assisted with removal of some of the brush that the thinning project had produced. Because of its role as a source of clean, and only lightly treated drinking water for the city, the watershed currently has a policy of complete fire suppression. This very different outcome between Grouse Pass and the collaborative work done in the Cedar River Watershed points to the fact that it is not something inherent about tribal capacity or belligerence on the part of the Muckleshoot Tribe.

Certainly in the case of Grouse Pass, those involved entered into (and in some cases were part of) a history of animosity on the part of both the Muckleshoot Tribe and the Forest Service. I believe that this history made it difficult, but not impossible to work well together. But the continuing lack of respect on the part of some (but not all) Forest Service staff, and their failure to acknowledge Muckleshoot peoples' history and the tribal members' deep connections to places in the Forest in the Huckleberry Land Exchange is the attitude that resulted in a lawsuit. This same attitude continued right on through to the NEPA process in the Grouse Pass project during the interdisciplinary team meeting described above.

Unlike at Pyrola Meadows, where the Tulalip Tribes had entered into a cost share agreement to do the thinning work, there were disagreements and different expectations about who was responsible for the thinning work at Grouse Pass. The district ranger had approved the Grouse Pass huckleberry enhancement project, but no funds were allocated to complete it. Instead, Laura Potash successfully wrote a grant for funding from the Rocky Mountain Elk Foundation, and Dave Kendrick set aside funds from a thinning project in the elk winter range special management unit to complete the project at Grouse Pass. Yet who would (or could) actually do the thinning work remained an open question. While Warren had expressed interest in having the Adult Worker Training Program involved as they had been in the Cedar River during several meetings with Forest Service staff, the Tribe did not broadly support Warren in this idea. Many members of the Muckleshoot Tribe believed that the MBSNF was responsible for ensuring that the work at Grouse Pass was completed, as part of the 9th circuit court ruling and Huckleberry Land Exchange settlement. Thus, the Tribe did not dedicate liaisons that were familiar with, and could potentially guide the process in terms of the complexities of accomplishing the work at Grouse Pass.

Still, while fire was incorporated into the management plan at Pyrola Meadows, it ultimately has not been used. This was primarily related to the agency of fire. Burning was planned for high fire season, a time of year when fire staffs are being continually pulled away to fight other fires. Nevertheless, the thinning work was completed and there are already social, cultural and ecological benefits to that work including benefits to wildlife (especially bears), tribal members, and the residents of the nearby community of Darrington. And as Phyllis, Jason and Russell also described, the project has been important for relationship building between the Forest Service and the Tulalip Tribes.

Both the memorandum of understanding between the Tribes and the Forest Service and the work of the Cedar Huckleberry Technical Committee laid the foundation for working together and fostered commitment to a successful outcome on everyone's part. The technical committee's success was in turn related to broader commitments within the Forest Service and the Tribes, who both devoted considerable effort and resources to ensuring the committee's success.

As Dave had mentioned, in addition to being a group inclined toward collaboration, there were also particular people whose participation made a substantive difference in the successful outcomes of the committee. In particular, Libby Halpin-Nelson had the capacity to keep the committee on track, and played a key role as a "cultural broker," having worked for federal agencies in the past, and the Tulalip Tribes in the present. Libby was also a skilled grant writer and was able to work within and beyond the Forest Service to obtain funds to do all aspects of the work. Similarly, Jason and Russell also played the roles of cultural brokers in that in addition to being tribal members, they speak a common language of forestry, and thus were able to contribute in a meaningful way to the development and implementation of the management plan at Pyrola Meadows. As Phyllis said, having a “champion” within the Forest Service for the project was also important. Forest Service staff involved with the project wanted it to be a success. As Tony and John, the fire staff officers described to me, the entire project was a labor of love.

# Chapter 8

## CAN THE HUCKLEBERRY SPEAK?

**Older man**: Look, there, there's a train coming through!

**Younger man**: The signal must have failed!

**Older man**: It's speeding toward where the bridge got washed away in the flood!

**Woman**: It's certain death for those people on that train.

**Second older man**: It's going in the river unless someone…

**Ethics man**: Let me through! I'm a moral philosopher.

**Second older man**: Why, it's Ethics Man!

**Woman**: Ethics Man!

**Older man**: What's he going to do?

**Younger man**: Look, he switched the tracks!

**Woman**: Just in time.

**Older man**: Nice work, Ethics Man!

**Younger man**: He diverted the train on to the other track!

**Woman**: You saved their lives, Ethics Man!

**Ethics Man**: I did what had to be done.

**Boy**: Wait! There's some kid standing on the other track!

**Older man**: You're right! And he doesn't see the train coming!

[Screams]

**Boy**: The train ran right over him. Didn't you see him there, Ethics Man?

**Ethics Man**: I saw him son. Someday you'll understand.

[In the classroom]

**Professor**: Hands up who thinks Ethics Man did the right thing? [pause] Hands up who thinks Ethics Man did the wrong thing? [pause] Hands up who didn't put their hand up? Miss McCoy?

**Miss McCoy**: Who was on the train?

**Professor**: We don't know who was on the train. Ethics Man did what had to be done. Who wants to tell me Ethics Man's moral philosophy? Yes, Miss McCoy.

**Miss McCoy**: Who was the boy who got hit by the train?

**Professor**: [exasperated] There's no boy, it's a thought experiment. We imagine a problem. By switching the points and sacrificing one person's life, we can save many lives. Is it a moral action? Ethics Man says "yes." Ethics Man is a utilitarian. He says an action is a moral action only if the consequences are good. He says the consequences are good if they increase the sum of human happiness. We define happiness as a state of well being, starting off with being alive instead of dead (*Darkside* 2013).

One day in late September 2015, I was sitting in a café with my headphones on, listening to Pink Floyd and finishing the first draft of this dissertation. Expecting only instrumental music when *Speak to me/Breathe (in the Air)* started to play, I was jarred when the song was interrupted by the preceding dialog. But as I listened to the words, they turned from noise to signal. This dialog opens Tom Stoppard's play *Darkside,* a musing on moral philosophy set to the music of *Dark Side of the Moon.* What Stoppard's dialog and my dissertation share is a connection to utilitarianism.

Utilitarianism is the foundational guiding philosophy of the United States Forest Service, exemplified in Gifford Pinchot's adoption of Jeremy Bentham's words in the agency's original motto: "Where conflicting interests must be reconciled, the question shall always be answered from the standpoint of the greatest good of the greatest number in the long run" (Pinchot 1905). Pinchot was of course thinking about the public good in the context of early 20$^{th}$ century progressivism and the problem of unfettered frontier capitalism (Langston 1995). But as Stoppard's dialog points out, a fundamental problem of utilitarianism is the question of what is the greatest good, and who decides?

The Forest Service has increasingly come to recognize that there is no one, general public. Rather, there are multiple general publics, with different ways of knowing and valuing Forest Service lands (Williams 2002). As I have described in this dissertation, the agency increasingly seeks out and relies upon alliances with so-called stakeholder groups when it comes to forest management. Yet, as tribal members and their allies are quick to point out, federally recognized tribes are not just another stakeholder group. This argument is generally made in the context of treaty rights. But as I hope to have shown in my case study of the history and politics of Puget Sound Coast Salish relationships with plants, fire, and place, Puget Sound Coast Salish people have unique, organic, deep-time relationships with the land. The physical, spiritual and emotional effects of being severed from those relationships should help us to understand and act upon (or at least support) the primacy of their claims to place, practices, and resources like big huckleberry regardless of the legal standing of tribes.

At the end of the twentieth century, environmental groups in the Pacific Northwest successfully litigated that US Forest Service interpretations of utilitarianism were not serving the greatest good, or the greatest number, and certainly not over the long run (Dietrich 1992). They were (justifiably) questioning the agency's utilitarian interpretation of forests as standing reserves (Heidegger 1977; Tsing 2015). But as has been argued elsewhere, on some level mainstream environmental values simply replace one kind of natural resource consumption for others (Cronon 1995; Langston 1995; White 1995). In the first instance, nature is objectified as extractable resource, in the second as something transcendent, pure and thus separate from culture. In both cases we find ourselves alienated from nature. But the immediate and relevant issue here is the negative effect of the latter on human-huckleberry relations. Shrinking huckleberry meadows and loss of access are two of the unintended consequences of the Northwest Forest Plan on tribal food sovereignty and non-tribal harvester practices as well. As I have shown in this dissertation, the human-huckleberry nexus is far more complex than simply an exercise in small-scale resource extraction.

Sometimes it is hard not to feel pessimistic about the future of tribal food sovereignty in our region. Not long before I stumbled upon *Darkside,* I flew out of Sea-Tac airport at six-o'clock in the morning, on my way to Fresno by way of Salt Lake City. The sun lit up the sky as we flew north before banking to fly southeast to Salt Lake. Looking out the window, I could see a layer of smoky haze on the horizon – wildfire smoke from the east side of the mountains and probably elsewhere. In the summer of 2015, the state experienced its most destructive wildfire season in written history. As I gazed out over the Olympic Mountains, they looked bare and grey with hardly any snow on them. The same was true of Mt. Adams. The east side of that mountain looked barren of snow in some places almost to its summit. As I watched the thick stream of vehicles barely moving along I-5, and the flows of silt forming slowly at the mouths of the rivers, I thought about the projected population increase in the Puget Sound basin of more than one million people over the next twenty-five years (PSRC 2015). How will we ever make space for other life forms and ways of life that depend on the glaciers and clean water for their flourishing? Do we have the foresight and the will?

One thing we can count on is that many more people will seek out public lands like the Mt. Baker-Snoqualmie National Forest as a place of refuge from urban life. It is probable that the majority of them will be seeking out a wilderness experience and not the obviously humanized landscape of a working forest. And many of those seekers of refuge will donate money to environmental organizations whose goal it is to protect and extend designated wilderness within National Forests. Rather than the utilitarian model, these organizations and the people who support them either implicitly or explicitly subscribe to preservationism, that other well-known philosophy of public lands stewardship in the United States.

There is something profound and important in the wilderness experience that cannot simply be chalked up to ideology. And these places are not just for or about us; they are also places where the non-humans that live best far from the human might thrive. Preservationism gets something about other species just wanting to live that utilitarianism does not. Yet as I have already mentioned, preservationism is anthropocentric too, leaving “us” on one side of a binary in which we make choices on behalf of “them” on the other (and doing nothing is a choice, too).

When it comes to the current and future settler inhabitants of the Puget Sound Basin, is there a non-alienating alternative to making human-nature relations all about us, all of the time? It is questions like these that we are grappling with in the "anthropocene." How do we live in a world where the nature-culture binary is unraveling, where ruin and precarious life seem to increasingly be the everyday state of things, rather than the exceptions? (Tsing 2015).

## Gaps and Edges

**Miss McCoy**: I'm sorry you're dead.

**The Boy**: It's okay – it didn't hurt.

**Miss McCoy**: It was a no-brainer for Ethics Man. You against a train load of people.

**The Boy**: Yeah. Wow.

**Miss McCoy**: What does he know about consequences? You could've been the one that stops the glaciers melting, or helped kids win an Olympic gold if we're talkin' about happiness.

**The Boy**: Yea. I could've. I could've stopped the glaciers melting, and whatever, probably.

**Miss McCoy**: And how about them on the train? Who's to say he didn't save a serial killer. Or a mad bomber on a date with destiny. Or just people who fuck you up normally? Geography teachers, ticket inspectors, boyfriends who shag your best friend. People who write the small print, see over the penalties. People who go, "I'm telling you for your own good." Or, "Can't you read? We're closed." All of them saved to fuck you up another day. Thanks very much, Ethics Man, I hope you're happy now (*Darkside* 2013).

Miss McCoy's reflection on The Boy's unrealized potential in the dialog above reminds me of a gap – those peripheral spaces that seem inconsequential if we only find value in the center, the majority, the greatest number and the greatest good. Rather than treating gaps and edges as peripheral to where the real action is happening, what happens when we put them at the center?

This dissertation shares with many multispecies ethnographies of late capitalism a rhizomatic method of research, analysis and writing. In it, I have followed the signs in a forest gap, starting with a particular place where huckleberries grow, and radiating outward to see where they took me. I followed the rhizomes backward in time to learn about Puget Sound Coast Salish people's inhabitation in place through the lens of tiχdx$^{w}$, or cultivation of relationships between and beyond the strictly human. My thinking has been shaped by my observation that the ethics underlying the historic food system are still central to what it means to be Puget Sound Coast Salish in the present. Following the rhizomes connected me to these other openings that reveal something about ways of relating to one another and to non-humans that offer a real alternative to place ethics grounded in either utilitarian or preservationist paradigms. We can learn something about ways of living together *in this place* from Puget Sound Coast Salish ethics, grounded in deep-time ontologies of connection and process. As I have also shown, supporting the flourishing of (and in) the gaps and along the edges of our shared worlds changes us too (Ayi, Harrell, and Ma 2011; Goulet and Miller 2007).

Two broad ontological commitments have informed this rhizomatic approach to my work. The first is that the human is always already more than human. From our internal ecologies to our external ones, we are constituted of and by other critters, things, and processes. The second is that life itself is a sign process. Both of these claims stem from my reading of process-relational theory. I find deep resonances between these ontological commitments and the lessons I have learned from my Coast Salish teachers. Sharing my philosophical ruminations with the Coast Salish people that I have worked with most closely has enriched our conversations and understandings of one another. When I explained to Jason Gobin my use of the term "more than human" in the dissertation's title, he understood me completely. As people of this place, Coast Salish people are constituted by their relationships with ti swátíxʷtəd – this land, this earth. Warren describes practices of tiχdxʷ as "cultural rhizome," which connects us to one another and to place through reciprocal responsibility. The sense of reciprocal responsibility is rooted in the knowledge that plants, animals, ts'ytkʷo, the little earths, and other beings that inhabit this land, as well as the land itself are animate and aware. I believe that living and practicing these kinds of ecological thoughts offer ways of being in the world that are potentially more ethical, and more "sustainable" for both the humans and other-than-humans inhabiting our shared world.

This is what my experiment with process relational theory has to offer the field of ethnoecology, and perhaps natural resources management as well. Through my effort at bridging different ways of knowing about being, I have tried to go beyond describing and theorizing about the cosmology of other people. Rather, with a bit of western philosophical scaffolding, I have tried to come closer to living within a more-than-human ontology, in which the world is eminently processual and social. I think that this is one of the main differences between conventional ethnoecological ways of conceptualizing and studying "TEK," and doing process-relational work. Rather than contrasting Indigenous Knowledge with Western Science as two different, yet complementary ways of knowing, I have looked for resonances between Indigenous ontologies and process-relational theories, and explored shared ways of being and becoming in the world.

I also believe that the work of decolonization requires that we take Indigenous ontologies seriously *on their own terms.* This requires that we loosen our hold on the privileged position of science as the final arbiter of truth claims about reality. This is Bruno Latour's main point in *The Politics of Nature.* As my example of different ways of knowing the role of fire in the western Cascade Mountains of Washington State shows, forest and fire ecologists conduct their work with their own assumptions, commitments and blind spots when it comes to understanding the role of anthropogenic fire in shaping the landscape historically. Scientific knowledge about west side fires that takes the historic role of Puget Sound Coast Salish people into account might help in making better decisions about how to care for big huckleberry in the present. At the same time, the barriers to integration of Puget Sound Coast Salish knowledge of fire extend far beyond the technical problem of engaging in a more inclusive form of scientific practice. The struggle to compose a "good common world," including the use of science to do so, is inherently a political one. This doesn't mean that we need to let go of the possibility of collectively testing truth claims about the world. My own approach has been to continually share my propositions about the phenomena I am trying to understand with the people with whom I have worked, and revise them as I go along.

## ALLIANCE ACROSS THE BOUNDARIES OF SKƏBÁXAD

Yet this cross-cultural work is not primarily about or for us, as settlers in Coast Salish territory. And as I hope I have made clear in this work, it most especially is not about reclaiming some lost sense of ourselves by imagining a more pure, authentic form of Indigenous identity that somehow exists outside experiences of colonization.

As The Boy's response to Miss McCoy's speculation about his lost potential also shows – his main concern is not how he might have been of benefit to others. The Boy would just rather be alive instead of having been run over by a train. Like the metaphorical Boy, Puget Sound Coast Salish peoples and the knowledge they carry is not here to potentially save us from ourselves. But taking seriously their leadership, legal standing and commitment to caring for the places and resources that constitute Puget Sound Coast Salish identities might just have that effect. Taking these struggles seriously requires alliance, and a commitment to understanding history and ontology from Puget Sound Coast Salish points of view – to listening to and telling different kinds of stories about what it means to live together in the here and now, in this place.


**Figure 8-1: Kady Charles and her huckleberry harvest, Bone Lake 2012**

In late September, my friend Tracy Rector screened a documentary short about Samish identity and experiences with colonization called *Maiden of Deception Pass*. Before the film started, she said that there would be a panel discussion afterward on the question, "What does it mean to indigenize reality?" In her introduction to the film, Tracy explained that the story had emerged through her and co-director Lou Karsen's deep conversations with members of the Samish Indian Nation. It was revised many times before arriving at the final version we were about to see. In the opening of the film, Samish tribal member Leslie [last name] explains that the story is not a creation story, but a defining story of Samish identity.

The intertwining stories of the Maiden of Deception Pass, or Ko-kwahl-alwoot, and the Samish Nation's struggle for federal recognition speaks not only to the inextricable links between place and Samish identity, but also to how the fundamental value of generosity and gift reciprocity endures regardless of external appearances. Ko-kwahl-alwoot gave up her life on land to marry a man who lived in the sea. The man of the sea threatened to take the peoples' food away if she did not. Ko-kwahl-alwoot's father agreed on the condition that she returned to the village to visit her people once a year. Each year the return visit became increasingly difficult for her. After four years Ko-kwakl-alwoot had changed so much she had to spend all her time in the sea, where to this day she protects the Samish people.

In the mid 1970s, then tribal chairman Ken Hansen commissioned a local, non-Native wood carver to carve a pole depicting Ko-kwahl-alwoot. Hansen hoped that the pole would bring back the Samish people who had left their homelands. In the late 1960s, the Samish Nation had lost their federal recognition due to a clerical error made by the Bureau of Indian Affairs. Leslie explained that between 1966 and 1969, the BIA's list of tribes with a land base started to be used as a list of federally recognized tribes. Being landless, the BIA dropped the Samish Nation from that list. Even before the federal government dissolved the tribe, Samish people had been moving away from their homelands in search of opportunity, enrolling at other reservations, and intermarrying with the non-Native population. A tribal elder explains in the film that when she was a girl, the elders discouraged the youth from identifying as Native or practicing their culture to protect them from racist bigotry.

After the film, Leslie, who was there for the screening, explained that the word Samish means "to give," or "the people who stand up and give." She went on to describe that many of the tribe's members had intermarried with Euro-American settlers and no longer really appeared to be Native American. She explained how Samish Nation members had had deep conversations about not looking down upon, or denying the European parts of themselves.

The *Maiden of Deception Pass* is a story about the deep connections between Puget Sound Coast Salish people and the materiality of place that doesn't rely on static tropes of ecologically noble Indians. The story of the pole's carving and the alliances that formed between a settler wood carver, the Mt. Baker-Snoqualmie Forest, a particular cedar log, a selfless gift, and members of the Samish Nation in their struggle for re-recognition is certainly a process-relational story of becoming. Process-relational stories can teach us about alliance across difference – about how we might live together and well in post-colonial spaces like Puget Sound Coast Salish territory.

After the screening, the panel discussion turned to questions of settler alliance when it comes to indigenizing reality. Matt Remle, a Hunkpapa Lakota educator who was instrumental in the City of Seattle's renaming of "Columbus Day" to "Indigenous People's Day," quoted Vine Deloria: "We talk, you listen," he said. Holding up a plastic bottle of water, he explained that the Lakota word for water, mni, is the same as the word for life. "Imagine if every time you took a sip of water, you remembered that this is life," he said.

A woman in the audience explained that she was a nurse, and had worked at the Colville Reservation the past summer providing medical care to people affected by the Okanogan Complex, the largest wildfire in state history. That fire burned over 81,000 of the reservation's 1.2 million hectare land base. The generosity of the Colville people, despite huge losses of their own, had made a deep impression on the woman. She wondered how she might stay connected and continue to be of support to the Tribes. Annette Anquoe, another of the panelists and a Colville tribal member herself, responded that through the work this woman had done on the reservation, in some sense she and the woman were already related. "Stay in touch," she encouraged her.

Kshama Sawant, Seattle City Council member and self-proclaimed Marxist urged us to consider that building alliances requires us to remember that our battle is not with each other, but with a political-economic system that in some sense oppresses us all. Perhaps, but it is important to remember that, as the statistics that I opened this dissertation with in my introduction show, the "system" has not oppressed everyone equally.

I like Tracy's question about indigenizing reality because it shifts the conversation towards thinking about and working towards a shared vision. Tracy's question implies that decolonization requires not just an undoing, but also a different way of doing and thinking. As the responses of the panelists show, there is no one, right answer to diagnosing the problem or what the solutions might be. The panelists' answers also gesture toward the challenges of alliance across difference.

As I described in chapter two, the difficulty of alliance across difference eventually led to the dissolution of the Northwest Indian College Plants Program as I had first come to know it. Many of the people that I had come to know through the plants program were either forced out or left. That group has now reassembled as the Northwest Native Plants and Foods Collective. And as the different outcomes of collaboration to care for swədáʔχ and the places where it grows on the Mt. Baker-Snoqualmie National Forest show, even in the best of circumstances, alliance across difference is a struggle. Jason once told me that between settler animosity and racism towards Native people, and a majority population that he believes does not care about natural resources at all, accessing and caring for culturally significant plants, animals and places is always going to be a struggle. He believes the most viable solution is for Tribes to buy their land back. To paraphrase Miss McCoy, perhaps insulating oneself from those who mess you up normally is the most viable solution. That is a solution that the Muckleshoot Tribe exercised in

2013, when they purchased the Tomanamus Forest from Hancock Forest Management.

The Tomanamus forest comprises ~39,000 hectares of Muckleshoot homelands along the White River between Enumclaw and Greenwater. Hancock continues to manage the forest for timber, and for tribal cultural values, on behalf of the Muckleshoot Tribe. The forest includes portions of čqəlitc, adjacent to Lost Springs, just west of Bone Lake. In the summer of 2014, Hancock and the Muckleshoot Tribe instituted the Muckleshoot Youth Stewardship Crew, for youth to learn about sustainable forestry and the cultural significance of the forest. That summer, about twenty of the youth, outfitted in bright orange cruiser vests, hardhats, and brand new boots, hiked to Bone Lake to see the land, hear its stories, and ideally to pick a few huckleberries. For some of the youth, it was the first time they had ever tasted swədáʔχ.

In a video about Tomanamus produced for the Muckleshoot community, Warren explains that his elders taught him that places like Bone Lake are special because they are teaching places – places to point out the non-monetary values of the land. Members of the Youth Stewardship Crew sit on a rock ledge in the video, overlooking the lower meadow as they eat their lunch. I have sat in that exact same spot for lunch many times, at first by myself but increasingly over time with others – Muckleshoot tribal members, traditional foods activists, archaeologists, cultural anthropologists, US Forest Service staff, botanists, family and close friends. It is easy to imagine that people have been sitting in that exact same spot for millennia, looking up from their berry picking, or stopping for a bite of lunch in the late summer sun.

There is a spot on the rather precarious road up to Bone Lake where you can see that rock ridge in the gap if you know what you're looking for. Every year I stop at that spot in the road and observe how the trees are slowly filling in. Perhaps in another hundred years or so the gap that is Bone Lake will have disappeared completely. Or perhaps another fire will burn through the area like the one in 1865, reopening this gap and perhaps creating new ones where the huckleberries will thrive. If global warming continues at its current projected pace, it is also possible that Bone Lake will be more amenable to growing wine grapes than swədáʔχ. If, in the end, everything is process, does the loss of a teaching place like Bone Lake really matter?

*Can the huckleberry speak?*

*Who is listening, and from where?*

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Appendix A

# MT. BAKER-SNOQUALMIE NATIONAL FOREST

# BIG HUCKLEBERRY RECREATIONAL HARVESTER STUDY 2012

FINAL REPORT

THE TULALIP TRIBES

# Distribution and Recreational Harvest of Mountain Huckleberry "swədaʔx̌" in the Mt. Baker-Snoqualmie National Forest

*A cooperative tribal-federal pilot effort toward the long-term sustainability of mountain huckleberries on national forest lands*

*Libby Halpin Nelson, Editor*

*August 2015*

The Tulalip Tribes

*Cover: (left) Berry Picker at Stevens Pass; Source: Seattle Times, 1946; (right) Daniel Gene Zackuse, Jr., Summer 2012, Skykomish River watershed; Source: Libby Halpin Nelson.*

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# Abstract

This report summarizes the results of an exploratory ethnographic study conducted in 2012 that examined the practices, values and knowledge of people who harvest big huckleberry (*Vaccinium membranaceum*) on the Mt. Baker-Snoqualmie National Forest (MBS). The results of the study were developed from a comprehensive analysis of 225 valid surveys, 24 semi-structured interviews, and during the big huckleberry-harvesting season, participant-observation activities at key berry harvesting sites across the Forest. The study found that big huckleberry harvesting is a highly valued practice amongst a diversity of harvesters and plays an important role in terms of their physical, emotional and social wellbeing. Those for whom the practice appears to play a more central role in their lives (i.e., people who typically harvest larger quantities of berries which they preserve for later use, and those who travel to the MBS Forest for the explicit purpose of harvesting big huckleberry) are more likely to be long-term harvesters with more than 15 years of experience harvesting on the Forest, and those who live in rural areas. These harvesters in turn are more likely to be over the age of 50. Big huckleberry harvesting is also more likely to play a central role in the lives of those harvesters who self-identify as belonging to a race/ethnicity other than white. Long-term harvesters in particular have substantial local knowledge about huckleberry ecology and changes in huckleberry production over time. A key observation amongst these harvesters is the effect of conifer encroachment on formerly productive meadows. Road closures and permit requirements to harvest for personal use were key concerns amongst harvesters about decision-making and policy on the Forest. It is recommended that further harvest studies be conducted in order to assess harvest by groups that may not have responded to or been targeted by this type of recreational survey, including tribal treaty harvesters on the MBS.

# Introduction

This report summarizes the results of an exploratory ethnographic study conducted in 2012 that examined the practices, values and knowledge of people who harvest big huckleberry (*Vaccinium membranaceum*) on the Mt. Baker-Snoqualmie National Forest (MBS).

Big huckleberry (*Vaccinium membranaceum*), also known as mountain, black, or thin-leaf huckleberry, is a middle elevation, montane understory shrub that grows throughout northwestern North America.[65] Under favorable growing conditions, the plants can produce up to 100 gallons per acre of highly palatable and nutritious berries in a growing season.[66] Throughout their range, the people who harvest these fruits enjoy them for their delicious flavor and nutritional values. Big huckleberries are also valued for subsistence, symbolic, ritual and economic reasons. Native Americans throughout the coastal and inland northwest have a long-term and enduring relationship with big huckleberries –or *swedʔáχ* as it is known in the Coast Salish Lushootseed language. More recent settlers to the region also attach both material and symbolic values to the berries themselves, as well as to the places where they grow and to the very act of harvesting them.[67]

There are a number of socioecological factors that affect huckleberry abundance and harvester access to the places that bear plentiful fruit. When abundance and access are negatively affected, huckleberry harvesters have the potential to be negatively affected too. Throughout the plants' range, three of the most commonly noted factors affecting abundance and access include conifer encroachment into formerly productive meadows, loss of access to productive meadows

[65] Franklin & Dyrness (1988), Hitchcock & Cronquist (1996)
[66] Minore, Smart, & Dubrasich (1979), Norton (1999)
[67] Carroll *et.al* (2003), Richards and Alexander (2006)

due to road closures, and competition between harvesting groups in the remaining productive, accessible harvesting sites. These problems are understood as the result of concurrent and inter-related changes in ecological disturbance patterns and changing societal values regarding public lands.

Big huckleberry tends to fruit most productively in relatively open conditions, such as mesic meadows and forest edges.[68] These conditions are most typically met through some form of disturbance – most notably natural and anthropogenic fire, and, more recently, clearcut logging. Management practices and forest policies that suppress forest disturbance thus have the potential to negatively affect huckleberry fruit production. In the US, the majority of huckleberry habitat open to harvesting occurs on public lands managed by the US Forest Service (USFS), where it is commonly acknowledged that management practices over the course of the past century – particularly fire suppression - have resulted in declining berry productivity.[69]

This study was conducted on the Mt. Baker-Snoqualmie National Forest (MBS), which falls within the purview of lands that must be managed in accord with the goals and rationale of the Northwest Forest Plan.[70] The MBS is also within close proximity to the most populous and rapidly growing area in Washington State – the Puget Sound metropolitan region. These two factors mean that Forest policy and practice tends to be oriented primarily towards recreational (as opposed to economic) human use, and to biodiversity conservation related goals. About 48% of the Forest is designated as wilderness area, where no motorized access is allowed, and a very "hands off" management is outlined, such that "natural processes' and the wilderness character

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[68] Anzinger (2002), Franklin & Dyrness (1988), Henderson & Lesher (1992)
[69] Mack & McClure (2001), Main-Johnson (1999) A. H. Smith (2006), Turner (1999)
[70] The Northwest Forest Plan was developed in 1994 to protect the old growth forest habitat of two federally listed endangered species (spotted owl and marbled murellet). In addition to other set-asides, the Plan allows for timber harvest on about 8% of the ~24 million acres of federal land that it covers (NWFP ROD 1994)

of the area is preserved. While logging has historically been a primary source of revenue, it is only permitted currently on about five-percent of the MBS (94,434 acres out of a total MBS acreage of 1,724,229), on lands designated as “matrix” lands (excluding riparian reserves, which must be maintained in a manner that supports the ecology and functions of the adjacent waterbody). This minimal disturbance designation on the vast majority of the forest allows for conifer encroachment and thus also negatively impacts huckleberry habitat, while road closures and expansion of wilderness areas have the potential to negatively impact access to huckleberry gathering areas.

The 2005 MBS National Visitor Use Monitoring Report (NVUM) suggests that 12.4% of the Forest’s users, or 170,128 ± 11%[71] spent an average of 1.2 hours gathering special forest products (SFP’s)[72] on the MBS. Of these NVUM survey respondents, 17,013 ± 11% indicated that harvesting forest products was their primary forest use activity. While it is not possible to discern from NVUM statistics the subset of big huckleberry harvesters included in these numbers, these figures do indicate that the harvest and collection of special forest products *is* an important activity for a substantial number of MBS users.

While there is a general understanding that people value big huckleberry and a general consensus around loss of big huckleberry habitat and access amongst land management agencies, tribes, and other forest users, very few studies have been conducted that provide insight into who harvests big huckleberry and why they value this practice.[73] No studies pertaining to big

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[71] Visitor Use Report (2005). Calculated from table 2. Annual visit estimates (p. 9), and table 13. Activity participation (p. 21). These figures are estimated at a 90% confidence interval.
[72] The USFS defines special forest products as “Products collected from National Forest System lands for commercial, personal, tribal, educational, or scientific purposes, including without limitation: bark, berries, boughs, bryophytes, bulbs, burls, Christmas trees, cones, ferns, firewood, forbs, fungi (including mushrooms), grasses, mosses, nuts, pine straw, roots, sedges, seeds, transplants, tree sap, wildlflowers, fence material, mine props, posts and poles, shingle and shake bolts, and rails” (USDA Forest Service 2008**).**
[73] Carroll *et al* (2002), Carroll *et al* (2003), Forney (2012), Hansis (1998), Keefer (2007)

huckleberry harvesting have ever been conducted on the MBS. Understanding the specific levels of harvesting on the Forest, as well as harvester demographics is an important first step towards implementing policies that are both ecologically sustainable and socially just. In addition to their role as potential "stakeholders," big huckleberry harvesters have the potential to offer considerable insight into huckleberry ecology and productivity on the MBS.[74]

This exploratory study of big huckleberry harvesting was conducted to begin to fill key knowledge gaps in our understanding of huckleberry harvesting levels, and harvester practices, knowledge and values related to big huckleberry and big huckleberry habitat on the MBS. To this end, the project sought to address the following key questions:

1. What is the scope and extent of huckleberry harvesting that currently occurs on the Mt. Baker-Snoqualmie National Forest?
2. What are the social, economic and cultural roles that huckleberry harvesting plays in the lives of people who harvest the berries? (i.e., how do people value big huckleberry?)
3. What do big huckleberry harvesters observe and know that may contribute to the sustainable management of huckleberries and their habitats?
4. What are the social, economic, and ecological impacts of harvesting on the Forest?
5. What do harvesters understand about policies regulating the harvest and management of huckleberries and how do they feel about them?

The main body of the remainder of this report focuses on the study's key findings. These findings are drawn from the study survey, qualitative interviews, and participant-observation in the field during huckleberry harvesting season. Readers are also encouraged to examine the

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[74] Charnley *et al* (2008), Emery (2001), Jones & Lynch (2002), Jones *et al* (2005), Lynch *et al* (2004)

"Survey results" section, below, which summarizes in greater detail the results of the survey. In particular, this section discusses some of the variation in harvester demographics and practices across the districts that comprise the MBS Forest.

# Methods

This study employed both quantitative and qualitative ethnographic methods to address the research questions described above. To this end, the study was comprised of three components – a survey that was available in both on-line and paper formats, in-depth interviews conducted with 24 harvesters, and participant-observation at key berry harvesting sites across the Forest during the big huckleberry harvesting season. Triangulating between these three forms of data during analysis helps to build on the strengths and address the weaknesses inherent in each of these three methods when used alone. Copies of the study flier, survey, and interview instrument are included at the end of this report.


**Figure A 1: Washington Trails Association website study announcement**

The study was promoted in the following ways:

- Laminated study fliers (see below) were posted at the trailheads to key berry picking sites across the Forest, and were also posted on community bulletin boards (grocery stores, gas stations, visitor centers, post offices, etc.) in the vicinity of harvesting sites.
- Study fliers and self-addressed, stamped paper copies of the survey were provided at ranger stations across the Forest. Several MBS staff alerted potential participants to the study in the field and at ranger stations.
- The study was actively promoted by the Washington Trails Association on their website and Facebook page. The Washington Native Plant Society also promoted the study through their listserv (Figure A-1).
- The study was informally promoted through conversations on the online forum "Northwest Hikers.net"

### *Harvester Survey*

The survey consisted of a series of questions related to harvester practices, other activities harvesters engage in on the Forest, and barriers to harvesting, and took about 10 minutes to complete (see p. A-74). The study was available online from mid-July through November 2012, and was administered using the University of Washington's WebQ program. Self-addressed, stamped paper copies of the survey were available at Ranger Stations across the district.

A total of 241 individuals completed the harvester survey. The majority of respondents (n = 228) completed the survey online, with the remainder sending in paper copies that were manually entered into an Excel database as they were received. These results were then exported to an SPSS statistical program for further analysis. Of the initial 241 respondents, 16 were excluded from this analysis because they answered either "no" or "not sure" to the first survey question, “have you ever picked or harvested big huckleberry on the Mt. Baker-Snoqualmie National Forest?” This left a total of 225 valid survey responses. Significance of correlations was assessed using chi-square at the 95-percent confidence level.

### *Semi-structured interviews*

Interviewees were selected from a pool of harvesters who indicated their interest in being interviewed (n=57), and to a small extent by “snowball sampling” harvesters recommended by other interviewees. Twenty interviewees were selected to represent a roughly even number of harvesters from each Ranger District. Within each District, an effort was made to ensure a roughly even distribution of harvesters who live in urban or peri-urban environments, and those who live in more rural areas. Although an effort was made to select harvesters with a range of ages, the study was somewhat biased towards selecting harvesters with more than 15 years experience harvesting on the Forest, so interviewees tended to be, but were not always, older than 50 years of age. Out of respect for their privacy, pseudonyms are used in place of the harvesters’ actual names. These are signaled with parentheses the first time a harvester’s pseudonym is used in the text.

The interview instrument consisted of a series of open-ended questions related to harvester practices and values, and observations and perceptions regarding huckleberry ecology, harvesting, stewardship, and policy (see p. A-80). Interviews were audio recorded, transcribed, and coded by subject using Tams Analyzer. Each subject code was then evaluated for common patterns across the interviews.

### *Participant observation*

Participant-observation was carried out at popular harvesting sites across the Forest throughout the season. This was an opportunity to observe harvester activity and speak with harvesters about their experiences out in the field. Berry harvesting is widely dispersed across the Forest, making it difficult at times to know when and where harvesters might be encountered. Nevertheless roughly 50 harvesters were observed in the field, and about half of them were engaged in informal conversations. These discussions and observations provided valuable insights for the study, and were recorded in field-notes, which were written up each evening after a participant-observation event.

## Study Limitations

This exploratory study of big huckleberry harvesting on the MBS Forest can be considered valid for that proportion of the harvesting population that outreach materials accessed, who were also amenable to participating in the study. Because the participants in this study were a “self-selected,” rather than random sample, the study results cannot be considered scientific in the strictest sense. However, due to the exploratory nature of this study combined with the highly disbursed and time-sensitive nature of big huckleberry harvesting, random sampling of huckleberry harvesters was not a realistic strategy.

In future studies of berry harvesting in particular, or special forests products harvesting in general, more effort should be made to reach out to, and better represent the perspectives of harvesters of non-majority racial and ethnic identities. In particular, given the significance of big huckleberry harvesting to those individuals who self-identify as Native American, an effort should be made to work closely with tribal elders and cultural departments to develop a study protocol specifically crafted with this highly important group of harvesters in mind. Similar efforts should be made with minority populations for whom it is known that big huckleberry gathering is an important practice in their communities, including those groups for whom English is not their first language.

It should also be noted that the study finding of low levels of commercial harvest on the MBS Forest might not accurately reflect the actual levels of commercial harvesting that takes place. While none of the study participants indicated that they have definitely observed large scale commercial harvesting on the Forest, it is possible that it does occur in areas not typically frequented by those who participated in this study. Furthermore, while three of the survey participants did volunteer that they do rarely sell their big huckleberries, it is possible that those who do this are less likely to participate in this type of study than those who do not.

# Study Results

## I: Overview of Harvester Demographics and Harvesting Levels

To provide a general sense of who is out on the MBS Forest picking big huckleberry and the quantity of berries they typically harvest, this section briefly reviews the results of questions included in the survey that are related to harvester demographics and the quantity of berries typically harvested in a given year. The survey included five basic demographic questions regarding place of residence, age, income, education, and race, and/or ethnicity. In addition, the gender ratio of a subset of harvesters was calculated from those survey respondents who left their names for a follow-up interview. There are correlations between harvester demographics, harvesting levels and what harvesters use their berries for that provide further insight into the economic importance of big huckleberry harvesting to survey participants. These are discussed in greater detail at the end of this section.

### *Harvester demographics*

The survey results indicate that huckleberry picking is an important activity for a diverse group of MBS Forest users. In terms of place of residence, about three-quarters of the harvesters who responded to the survey live in urban or peri-urban areas, while one-quarter live in rural areas. The age range of survey participants spanned from the most elderly survey respondent who was 80 years old, to the youngest, who was 20 years old. Just over half (53%) of the people who participated indicated that they were over 50 years of age. With regard to harvester income, three-quarters of the survey respondents indicated that they considered themselves to be middle income, with a roughly equal proportion of respondents indicating that they were either low or high income. About three-quarters of the survey participants indicated that their highest level of education attained was at least a bachelor's degree. Just over half of the respondents who left their names for a follow-up interview were male. 89% of the survey respondents indicated that their self-identified as white, while the remaining 11% of survey respondents indicated their race or ethnicity as African-American (1%), Asian (3%), Native American (1%), more than one race or ethnicity (2%), non-white Hispanic (2%), or "other" (3%). Demographic results are discussed in greater detail in Appendix A of this report.

It should be noted that while the proportion of harvesters who do not identify as white is small in relation to those who *do* identify as white, 11% is a substantially larger proportion of non-white Forest users than those who participated in the 2005 National Visitor Use Monitoring Survey mentioned above, where only 5% of Forest users self-identified as belonging to a race or ethnicity other than white. Although further research would be necessary to confirm it, this difference between our survey and the 2005 NVUM indicates that big huckleberry harvesting may be an activity that is proportionally more important to this group of Forest users than to the overall proportion of MBS Forest users who self-identify as being white. This finding reiterates the importance of a concerted outreach effort to the racially and ethnically diverse groups of Forest users who engage in big huckleberry harvesting should there be future studies of this activity on the MBS, and when it comes to decision-making processes concerning big huckleberry and other special forest products on the MBS Forest.

### *Harvesting levels*

Precisely two-thirds of harvesters who participated in the survey indicated that they typically pick less than one gallon of big huckleberry in a given year. Of the remaining 1/3 of harvesters, 32% of the total say they harvest from one to five gallons, and a very small proportion (3% of the total) indicated that they harvest from 6 to 10 gallons of big huckleberry in a given year. It is likely that in at least some cases, survey respondents under-reported the quantities of big huckleberry that they are harvesting. However, in-person interviews with harvesters, as well as survey comments indicate that this was probably rare, as it was not uncommon for participants to remark that, given the time-consuming nature of big huckleberry harvesting, and the very small amounts they typically do harvest, they were surprised that the lowest level choice provided on the survey was 1 gallon of berries or less.

The survey results indicate that people who are more likely to harvest more than one gallon of berries in a typical season are those over the age of 50, those who live in rural areas, those who indicated their race or ethnicity as other than white, and those whose level of education is less than a bachelor's degree. Harvesters who indicated on other questions in the survey that they had been harvesting berries on the MBS for more than 15 years, and those who got started picking berries as a family tradition are also more likely to harvest more than one gallon of big huckleberry in a typical year. Not surprisingly, these harvesters, along with those who say they started picking big huckleberry through an interest in wild foods harvesting, are most likely to at least some of the time make a trip to the MBS for which the primary purpose is harvesting big huckleberry.

### *Uses of big huckleberry*

In addition to the quantity of big huckleberries they harvest, participants were also asked how they typically use their berries. Not surprisingly, the survey participants clearly show that eating fresh huckleberries is very common and culturally important to harvesters. On the other end of the spectrum, bartering, trading, or selling huckleberries is not. However, there are a substantial number of harvesters who at least sometimes preserve their berries for later use, serve them on special occasions, and give them as gifts. Table A-1, below, summarizes the types of harvesters who are more likely to engage in these activities than the "average" harvester. These results indicate that the same groups of people who are more likely to pick more than one gallon of berries in a typical season or to visit the MBS primarily for a berry-picking excursion are also the ones who are more likely to engage in at least some of these practices.

**Table A 1: Harvester use of berries**

| **Pct. harvesters more likely to preserve, serve on special occasions, or gift big huckleberry, as compared to study mean** | | | |
|---|---|---|---|
| | Preserve | Special | Gift |
| **STUDY MEAN (sometimes-always)** | **71%** | **55%** | **37%** |
| Rural | 89% | n.a. | n.a. |
| Education < Bachelor's | 81% | n.a. | n.a. |
| Harvest experience > 15 yr | 82% | 77% | n.a. |
| Harvest > 1gal | 96% | 87% | 62% |
| Harvest primary (sometimes-always) | 92% | 87% | 57% |
| Beg. Family tradition | 91% | 83% | 48% |
| Beg. Wild foods harvesting | 77% | 86% | 56% |
| Race/ethnicity other than white** | 89% | 78% | 56% |

To summarize, the quantity of big huckleberries that a person typically harvests in a given year, whether they visit the MBS for the primary purpose of picking big huckleberry, and whether they are more likely to preserve, serve on special occasions, or gift their berries are all indicators of the social, cultural, and/or economic importance of big huckleberry in the lives of berry harvesters. Based upon these indicators, the survey results suggest that if a big huckleberry harvester is over the age of 50, has been harvesting berries for 15 years or more, lives in a rural area, has a level of education that is less than a bachelor's degree, identifies as being of a race/ethnicity other than white, or got started picking big huckleberries as a family tradition, then big huckleberry harvesting is more likely to be an activity that is very important to them. It should also be noted that these practices are as or more important to a harvester's social and cultural identity, gift economy, or general sense of well-being as they are to their household's overall food budget. Indeed, harvester income is not correlated with any of these indicators of importance, and it was not uncommon for harvesters who were interviewed to remark that while the berries are very important to them, financial need is not what motivates them to harvest big huckleberries.

## II: Understanding the Importance of Big Huckleberry to Harvesters

This section draws primarily on semi-structured interviews to gather a more nuanced understanding of what it is that people value about big huckleberry harvesting. While the people who gather big huckleberry on the MBS are demographically diverse, there is a shared sense among them that not only are the berries themselves highly valued, but that the actual practice of harvesting berries is profoundly meaningful. Big huckleberry is a flavorful, nutrient dense food that is high in antioxidants and essentially free for the taking, and these use values are of course important to harvesters. But a focus only on this captures just one facet of the affection and sense of attachment that people feel for this plant, and for the places where it grows. Rather, when a harvester travels to the MBS to pick big huckleberry, the excursion may also affirm their identity, their sense of place and of time, and strengthen their sense of connection to the Forest.

"Paula" is a long-time resident of the Darrington area with deep connections to the MBS Forest. In addition to working in the forest products industry for decades, she has extensive knowledge of the uses of wild plants in her area. This knowledge stems from her family history, as well as her close work with members of the Sauk-Suiattle Tribe. The nutrient density and healing properties of big huckleberry and other wild harvested foods was a point she emphasized several times during her interview, but as made clear in her statement below, these values are deeply intertwined with a strong sense of her personal and familial identity:

> You need all these vital nutrients that you get from the wild plants, that you're not getting from the food [grown] on depleted soils that you buy in the grocery store…You know I wasn't even walking when my parents had me up picking berries. And my Grandmother would take me out and we would gather miners' lettuce, and [go] mushroom picking, and we were always out getting fish. My family always hunted, we always had wild meat in the freezer. That way is just something that I've done all my life, that's just part of who I am, is to go out and gather the berries, to feed my family. Basically to put food on the table. And it's to give them good quality, nutritious food.

Similarly, "Scott" is a former University of Washington administrative employee who has been harvesting big huckleberry on Tonga Ridge since the early 1960s. Prior to what he described as increasing stress levels dealing with the traffic on highway two, and later, a move to Gig Harbor, for decades, Scott typically visited Tonga Ridge every week during big huckleberry season to harvest. Like Paula, Scott values the berries for their nutrient density, and flavor is of primary importance to him as well. But he also emphasizes the specialness of spending time in huckleberry habitat at this time of year:

> Number one is the flavor, okay? Number two is just being in the woods at that time of year. It's magical, completely magical. Nothing like the rest of the year. And uh… of course, the anthocyanins, I mean, you have the antioxidants. There's nothin' like huckleberries for that. Those are the main reasons. Just to be there, and the flavor, and to have that flavor year round. [Cultivated] blueberries don't compare.

Scott's comment that berry season is a magical time of year echoes the sense expressed repeatedly by harvesters that it is an important annual ritual that keeps them attuned to the seasonal cycles of nature. This was important to harvesters who dwell in both rural and urban areas. Rural dwellers most commonly described the connections between being in touch with the seasons and personal self-reliance and community identity. Harvesters living in urban areas often spoke about the importance of maintaining or cultivating their knowledge of plant gathering and the rhythms of the seasons as a kind of antidote to what they perceive as an increasingly homogeneous, industrialized food system.

"Susan" is also a long-time Darrington resident who has been instrumental in organizing volunteers to help maintain Forest Service roads. She describes the significance of berry harvesting in terms of self-reliance in her community in this way:

> And the people here. We're very, we're self-reliant and we're very tied, I think, to the land … We talk about the weather by what White Horse Mountain is doing. You know, first snow, last snow, "did you see White Horse last night with the sunset?" I mean, that's the topic of conversation. […] And the huckleberries [are part of the conversation, too], you know? Its like, it's the morel season, it's the chanterelle season, it's time to get the blackberries. It is definitely a cultural thing. I just went to a contra dance last night. The early spring contra dances you'll always see wild salads at the potluck… Our local population, you know, it's part of our culture. Some of us just don't want to eat domestic plants all the time.

Though he no longer lives there, "Eric" was raised in Skykomish and continues to maintain strong connections to the MBS Forest and to the people who live in the area. Throughout the interview, Eric described how picking big huckleberry and other seasonally available plants were part of a way of life for his family and community when he was growing up. Like other rural harvesters that were interviewed, Eric described how he has at times harvested big huckleberry not only for himself, but also for elderly neighbors who are no longer physically able to harvest these berries themselves:

> I used to just give mine away. Like I said, I've got those friends of mine that are elderly, and they can't get out anymore. So I give 'em the berries or I'll give 'em mushrooms or whatever. I don't ever swap, I don't sell berries or nothing like that. I'll just say, "here are some berries, maybe do me a favor later or something," but I don't expect nothing in return.

"Steve" is a resident of Redmond who grew up in Alaska and moved to Washington State to attend the University of Washington. He works in the IT industry and is an avid hiker and wild foods harvester. During the interview, Steve made clear that harvesting wild foods is a practice that serves as an antidote to the contemporary food system, and connects him to his experiences in Alaska, as well as to what he and other harvesters described as a deep time, almost instinctual human connection to gathering food:

> …It's about 1,000 times more satisfying than going down to the store and buying them [berries]. You kind of connect with the earth and you're assuming they didn't go through a bunch of middle-men and what not to get to you. […] I would say that… here and there you go down and buy stuff that comes in a plastic wrapper or it came from… maybe not Mexico or New Zealand, but at least, somebody who you don't know picked it, and they put it on a truck… maybe it was as close as where I would go and pick the berries, but still, this thing was growing, and I picked it… like someone would have 40,000 years ago.

As alluded to in Steve's comment, for berry harvesters who come from other places where berry picking in particular, or wild foods foraging more generally, is a part of their culture, harvesting berries is a way for them to continue that practice and in some ways connect to the places and people they've come from. These people as well as harvesters who have lifelong or intergenerational ties to the MBS Forest frequently indicated that it was important to them to pass on this tradition by taking the younger generation out berry picking. "Tim," who works as a wildlife biologist for one of the local tribes, described the intergenerational importance of big huckleberry gathering to his family:

> [I started picking huckleberries with] my Mother. We have a cabin just down the road from Corral Pass. Family camp. My great-grandfather built it in the '40's. We've been there … since the early 1900s. I used to go up there [Corral Pass] as a kid and used to pick huckleberries, so… It just kinda goes down the line. My kids are growing up with us going and picking huckleberries [there too] and, you know, I would like them to have their kids go up and pick huckleberries. … I think it's valuable for, not only Native American culture, but just people in general. You know, me teaching my kids how to go up and pick huckleberries and do that sort of stuff, too. I think that's important for my kids as well.

Like Paula and Susan, Eric - the harvester from the Skykomish area mentioned above - described the importance of maintaining connections to seasonal harvesting cycles. Like Tim, Eric also learned these things from a parent and also emphasized the importance of continuing these intergenerational practices:

> My Dad used to take me out and we'd get berries, so that kinda just carried on through me. You know, we'd always do some canning, make jam or whatever, or make pies and stuff, and as long as I can remember, he used to haul me out, and we'd pick 'em since I was - since I can remember. It's kinda a seasonal thing you do. You do the mushrooms in the spring, you do the blackberries in mid May, June; the huckleberries in the fall, and mushrooms too for that, so it's kind of just a big cycle. So, we'd do that pretty much continuously here. And I think it's important, really. It's good to see people out there takin' their kid. If I see a family out there, and they're pickin' berries with their kids, then I can relate to 'em. It's good to see that, cause I used to do that. It's good to get them involved. Something that maybe in the future, they'll be able to do that. Or something they might wanna do… they think, "well, yeah. I used to do that when I was a kid." That's how I got to do all the stuff I got to do. Hiking and all that, is because I did it when I was a kid, and I enjoyed it, and it instills it in you.

"Minna" is a Swedish immigrant who typically gathers both big huckleberry and Cascade blueberry on Mt. Baker. She described how the practice of gathering blueberries provides a sense of connection to her childhood, and is integral to her sense of identity as a Swedish person. Minna also spoke of how this practice may be going by the wayside in Sweden:

> I think it's a little bit of a connection with my childhood and my mother. I mean, I would love for her to come over [from Sweden] and do it. I mean, maybe she's too old, but I think still she would enjoy it, so a lot of that [her reasons for berry harvesting] is keeping those [traditions] alive. And unfortunately, my sisters and their kids are not doing it. I do not have children, so it feels sort of like a dying tradition. So a lot of it is just…I don't know. It connects us to nature and to history, and something that has good flavor.

The cultural significance that Minna feels for these berries was reiterated when she was asked whether she ever exchanges or sells them:

> Oh, god no. Not happening. I've been thinking when I picked blueberries last time, I was gonna have it as a dessert, for like a dinner party, and the people that were there, I just couldn't, because I know they wouldn't appreciate it. There are peoples I might have it as a dessert for dinner party, but it would be dependent on the people. Cause if I don't feel like they appreciate it, they're not gonna get my hard labored blueberries. […] I'm more likely to share the berries with a Swede than an American. […] I mean, I can't imagine a Swede who didn't grow up and pick blueberries nearby growing up, and at least understand, but a lot of Americans, I feel…why pick it when they can buy it in the store? And they think, "those are much bigger, so they're better," and it's like, "no!"

Many harvesters, both long-term and those who are newer to big huckleberry harvesting, also spoke of the practice as a deeply meaningful way to connect to what it means to live in this place – expressing in different ways a similar sentiment that when they harvest and consume these berries, the places where they grow literally become a part of them. Harvesters frequently spoke of how picking huckleberries causes them to slow down and look around when they are out in nature, and that when they use the berries later, their smell and taste brings them back to that place for a moment. One harvester wrote in the survey that "it's almost a spiritual thing, and quite hard to explain." Another harvester who participated in an interview similarly described how she enjoys hiking and seeing views, but that there is something about slowing down and looking closely at the berries that allows her to really see the place where she is harvesting. Interview participants frequently described how the places where they harvest are beautiful to them – even old clearcuts – both because of the views they often afford and the beauty of the landscapes themselves. Harvesters also spoke about how the berries are iconic of the Pacific Northwest in general. "Mary," a long-time big huckleberry harvester and resident of the Greenwater area who is married to a Puyallup tribal member, described berry gathering areas are important both to wildlife, and because of their deep-time significance to Native communities:

> I think a lot of [these gathering areas] used to be, well they're traditional berry harvesting areas. Many of 'em. And there's just a special feel about 'em. … There's just something about walking in an area like that that, you know, you just can't get somewhere else. I like goin' out there and seeing that it's a traditional area that's been used for generations. You know, that's very unique and very special. So, I hate to see that kind of go by the wayside. A lot of 'em…also have good wildlife-they're wildlife corridors. Huckleberry Mountain's a classic wildlife corridor. I see cougar all the time when I'm up there, I see martin, I see bobcat, I've had 'em follow me.

## III: Harvester knowledge about big huckleberries and their habitats

The harvesters who were interviewed that have been picking big huckleberry on the MBS for long periods of time (15 years or more), not surprisingly also tend to be the people who carry considerable local knowledge about changes over time to big huckleberry production, and the local ecology and history of berry habitats. As mentioned in the demographic section above, long-term harvesters more often than not tend to be over the age of 50 and to live in rural areas.

Some of these harvesters keep diligent records of each year's harvest, noting where and when they harvested, when the berries ripened, and their relative abundance. The time it takes to pick a certain amount of berries is also a common metric for assessing berry productivity in a given year. Many of the long-term harvesters interviewed, as well as those that left comments on the survey, have observed that, in general, the past several years have been rather poor in terms of berry production. Some harvesters characterized this as a long-term trend, while others characterized a few years of poor berry production as a cyclical event. Still others theorized that recent declines in berry productivity could be attributed to a combination of both long-term trends and cyclical weather patterns. Common themes and observations regarding long-term declines in big huckleberry production centered on the effects of conifer encroachment, plant-pollinator interactions, and climate change.

Experienced harvesters are well aware that big huckleberry does not produce well in shade, and many harvesters with a strong understanding of the histories of their gathering areas similar to Mary's are aware that Native Americans used to burn big huckleberry meadows to keep them productive. Without fail, those who considered declining big huckleberry production to be a long-term trend primarily attribute this change to conifers encroaching into formerly productive meadows. Harvesters frequently attributed this to a lack of forest disturbance, either in terms of fire or clear-cut logging, or in some cases, to post-harvest re-vegetation practices that have occurred in the past. For instance, Mary described how, while working on tree planting crews on the Enumclaw Ranger District in the 1970s, trees would be planted every 10 or so feet apart after a harvest. The trees, while growing slowly at these higher elevations, are now filling in so densely that nothing will grow in the understory.

Some harvesters also noted that over the past decade or so, they have observed that the rate of conifer encroachment is increasing in these upper elevation habitats. They attributed this to a warmer, wetter weather pattern more conducive to tree seedling germination because the snows melt out earlier. Paula, one of the Darrington area harvesters interviewed for the study, also suggested that this earlier snowmelt leaves exposed big huckleberry bushes more vulnerable to late spring cold snaps, which in turn can effect fruit production and potentially the overall health of the plants. It was not uncommon for harvesters concerned with conifer encroachment to also indicate that the lack of forest disturbance was contributing to declines in the abundance of other species, including in particular bears, ungulates, and certain types of birds.

Although it is not a unanimous sentiment amongst every harvester who participated in this study, it was quite common for those concerned with the relationship between conifer encroachment and declines in big huckleberry production to advocate for some form of disturbance in areas that are important to berry harvesters and to wildlife. For instance, Scott, the long-term harvester who is so familiar with Tonga Ridge, put it this way:

> You know, I was cursing everyday when Reagan was selling all the trees to the Japanese because in the '60's you'd go up on top of the mountain and you'd see a few patches of logging. By the late '80's you'd go up in the mountains and you'd see a few patches of trees. But, I mean, today, I would say, you know, if you can promote huckleberry habitat by selectively logging, do it.

On the other hand, Tim, the tribal wildlife biologist, suggested that prescribed burning might be a more ecologically beneficial form of disturbance than selective logging:

> I would think that burning these habitats every so often would increase a lot of things. Understory species, biodiversity, better berries, it produces bigger, fatter, elk and deer, which in turn feed the bears and cougars, which in turn feed the scavengers, which in turn, you know, so it just kind of goes down the… the chain. So… in my personal opinion I would say that burning would be better than scarifying the earth, [which] promotes weed species to come in and what not. If you burn and drop everything that's there, those nutrients and then the seeds that are there are gonna be the ones that grow, not the stuff that comes in on the [machinery].

A few harvesters also wondered whether removing senescent, or aging branches would result in increased berry production by stimulating new growth. This observation is similar to one made about ecological relations between elk behavior and big huckleberry productivity in conversations with Muckleshoot tribal member Warren King-George. Warren has observed that in big huckleberry habitat where elk are prevalent, the elk tend to break the branches while also leaving their scat, both of which may have a positive effect on big huckleberry production.

On both the surveys and in interviews, a substantial number of harvesters concerned with declining huckleberry production also theorized about the possibility that plant-pollinator relationships may be changing. Although few of the study participants were completely confident in their knowledge of which insects actually pollinate big huckleberry, harvesters most commonly expressed concern over whether there might be an overall decline in big huckleberry pollinators. Part of this concern is likely linked to the attention that honeybee colony collapse disorder has received in the media over the past several years. Others wondered about plant-pollinator interactions and climate change. In her discussion regarding the increased vulnerability of huckleberry bushes with earlier snowmelts to late season cold snaps, Paula also suggested that this phenomenon could also have an effect on plant-pollinator interactions. This observation was echoed by a number of harvesters during interviews, who theorized that pollinators might not be active if the plants are blooming when it is colder than usual.

Mary, who wonders whether pollinators are declining, theorized that if this is in fact the case, it might be related to pesticide use, or perhaps increased competition from European honeybees that are brought to the mountains for summer nectar foraging:

> You used to hear a really loud hum in years past. And I noticed a decline when they … first did the gypsy moth. They flew over this whole area up here [highway 410]. And they sprayed. And they said it was only supposed to hurt the gypsy moth. And, the next year, we had absolutely, I mean, I have a house with flowers everywhere, and a big meadow next door, and it has wildflowers growing in it. The next year, we absolutely had no butterflies. I didn't see one butterfly. It killed…I don't know how many larvae. […] I didn't have any of the hummingbird moths, and the nighttime pollinators, the moth pollinators, I didn't have any of those. And I went out looking for them all summer long, and I didn't…the number of bees was down easily by over half. I could sit on my back deck, and listen to this, just this loud hum of insects and pollinators. It was barely audible. So, it was just this huge, huge decrease then. And, since then, … if I go out and really look in all of my flowerbeds, I might see 4 bees. […] I also wonder about the interaction between a lot of the - like [a local honey company] comes up and puts hives everywhere. I don't know if there's a competition there? Because they put a lot of hives out, and they put 'em all over the place in areas that have been timber harvested, like for fireweed honey. And that's typically your blueberry bushes as well, your huckleberry bushes, so I don't know what kinda impact that's had on the bees and the native stuff. I would think there's a competition there, but I'm not sure.

Although he says he has not observed changes in huckleberry productivity that can specifically be attributed to climate change, Scott suggested that with current climate forecast models, big huckleberry plants may be lost altogether, or where it is possible, that they might "migrate" to higher elevations. Scott also theorized that subspecies of big huckleberry that are better adapted to a warmer, wetter climate might become more prevalent:

> The climate models forecast that in this part of the world there's gonna be more rain and less snow. … If there's very little snow pack at 4000 ft. we might lose those huckleberries. [Or] they could evolve. I know there are what seem to be subspecies … in places like the White River. They don't look anything like the ones on Tonga Ridge … but the berries are in flavor…very similar. But that's a drier climate, not a wetter climate. So, this is a question for posterity…are there any other subspecies habituated to a wetter climate? … Maybe what we'll see is, the places that are now covered with those ankle-high, bright red leaved, glorious, but not as tasty huckleberries [Cascade blueberry - Vaccinium deliciosum]… maybe they will be the future home of this huckleberry. But this huckleberry is so much superior to the others that it's really worth keeping. I mean, speaking absolutely selfishly as a human, right? Mom [Mother Nature] has her own plans […] But where else can you find such a succulent monster that is so heavenly?

Although they did not necessarily use these terms when describing their observations, harvesters who understood low berry productivity as a cyclical phenomenon commonly associated differences in berry production from year to year with *el Niño/la Niña* southern oscillation events, and longer periods of "poor" berry years with the inter-decadal Pacific oscillation – the pattern of our local climate to shift between relatively cooler and relatively warmer periods approximately every 20 years. These theories were coupled with harvester observations about what big huckleberry "needs" in order to produce well:

- A reasonable snow pack that melts out early enough for the berries to mature, and at the same time provides sufficient moisture in the summer is critical to big huckleberry fruit production.
- Big huckleberry is susceptible to extreme cold, particularly when the plants are flowering and setting fruit. Therefore, plants growing in more exposed environments may be more susceptible to late season frosts.
- The berries simply dry up on more exposed sites in situations of excessive heat, particularly when combined with an extended period of drought.

These kinds of observations led harvesters to conclude that while "ideal" big huckleberry habitat will vary depending on the weather in a given year, in general the most *reliably* *productive* berry patches receive adequate sunlight and moisture during the growing season, while at the same time being protected from extreme weather events.

In sum, big huckleberry harvesters, particularly those with experience observing the places where they gather over long periods of time, have accumulated considerable knowledge of the ecological and climactic relationships that contribute to, or detract from, the productivity of this highly valued berry. Harvester observations and attitudes regarding the effects of conifer encroachment on big huckleberry harvesting areas suggest that they share tribal concerns about this phenomena, and are for the most part likely to be supportive of any efforts on the part of the MBS and of tribes to restore or enhance gathering areas. Harvesters' observations and theories regarding the dynamics of plant-pollinator interactions suggest the need for further analysis regarding the impacts of climate and possibly pesticide use on pollinator abundance, as well as possible competition from non-native pollinators. Their observations regarding microclimate and variability of big huckleberry production over time and space, the effects of long-term climate change, as well as shorter-term climate cycles, suggests that it will be important to consider these types of factors when identifying and prioritizing sites on the MBS Forest for future big huckleberry enhancement and restoration.

## IV: Social, ecological, and economic effects of big huckleberry harvesting

This section of the report reviews the results of survey and interview questions related to harvester observations and practices related to the social, ecological and economic effects of big huckleberry harvesting on the MBS Forest. In general, harvesters tended to view big huckleberry harvesting as ecologically benign, since taking the fruit of a plant is "what that plant 'wants' you to do." Harvesters also tended to view their interactions with other harvesters and MBS Forest users in positive terms. None of the harvesters who were interviewed for this study shared that they had experienced any conflicts over big huckleberry harvesting on the MBS, or that they had definitely observed large-scale illicit commercial harvesting of big huckleberry. However, some of the interviewees and survey participants did describe experiencing conflicts over big huckleberry harvesting in other areas, such as the Gifford-Pinchot National Forest, where commercial harvesting is allowed.

In general, while big huckleberry harvesters did not feel that there was much that they could personally do to improve berry habitat and fruit production, many mentioned that they do participate in other kinds of stewardship activities on the Forest, including ecological monitoring, road and trail maintenance, invasive species removal, fire lookout maintenance, and environmental education. Harvesters also described certain practices that they felt would reduce any impacts their harvesting might have on the plants and other species. These included taking care not to trample the bushes or break their branches, and also moving around so as not to take all the fruit from a single bush or particular area in order to leave fruit for other species that also depend on the berries. A few harvesters also mentioned the use of huckleberry rakes with some level of ambivalence. Some of the harvesters who have observed a decline in big huckleberry production in the areas that they gather mentioned that they have also observed harvesters raking the bushes in these areas. They wondered if these phenomena were related, suggesting that perhaps the raking activity damages the buds that will become next year’s berries. Other harvesters who have tried using huckleberry rakes were ambivalent about them not because of their ecological effects, but because they had found that removing the copious amounts of twigs and leaves that come along with the berries when one uses a rake is just as time-consuming as harvesting by hand.

While a small proportion of harvesters did indicate in the survey that “other pickers” and feeling unsafe were barriers to harvesting, these impressions seem to be very rare on the MBS. Harvesters tended to describe their interactions with other harvesters in positive terms. In areas that harvesters drive to, people will stop on the road and ask how the berries are. Eric, the harvester from Skykomish, suggested that there is a general sense of camaraderie amongst big huckleberry harvesters:

> People have always been nice when you're out there picking … there's a camaraderie there. I've never really had, "Oh, you're pickin' on my bush! Don't come over here!" Or nothing like that.

Rather than experiencing conflict, several harvesters remarked that they were surprised at how few people they encounter are even aware of the big huckleberry that is all around them when they are out on a hike. One harvester described it this way:

> And with a lot of hikers who come by, they have no idea what I'm doing. They don't see them. It's really interesting. I'm picking them and they're a little bit under the leaf, kind of. And they don't realize what it is and they've never had them. It's kind of amazing to me how many people around here don't know what huckleberries are. They're taking a hike and they don't think about it. I mean maybe some are new to the area? But I think some of them are not.

Minna, the harvester who is originally from Sweden, describes a similar experience, elaborating with some surprise that some people actually are fearful of eating berries in the wild:

> I remember I had a friend who had hiked up to Spray Park, sort of ...September, and I had asked her [how] were the blueberries out here and she said she didn't know, cause she didn't look at the ground when she was hiking. Which, to me is like oh, my god, you can't be so focused on the destination; you need to see what's on the ground! […] If anything people are questioning what I'm doing, and if I'm not scared that I'm gonna die… Once when I was hiking Snow Lake up in Snoqualmie, and I was picking blueberries, it was one of those hike, pick blueberries, where you have enough for a couple of oatmeal breakfasts. A lot of people asked me what I was doing. Asking how I knew it was blueberries, if it was safe. They wouldn't try it. I gave it to them and they wouldn't try it!

In general, harvesters do seem to feel that berry harvesting is a safe and healthy activity that carries no greater risk than a typical hike, so long as one remembers that, "bears have right of way in the berry patch." As one harvester put it, "I've never had an argument over picking… I'd be more worried with a bear… having an argument with a bear [more] than another person." However, while only 5% of survey participants overall mentioned "feeling unsafe" as sometimes being a barrier to harvesting, 10% of survey participants who identified with a racial/ethnic category other than white mentioned that feeling unsafe was sometimes a barrier to harvesting. Furthermore, some harvesters did express in interviews concern that there is the *potential* for an increase in frequency of harvester conflict in the future. With conifer encroachment and increasingly limited access to the remaining productive berry harvesting sites, these harvesters expressed concern about the social and ecological effects of concentrating berry harvesters into increasingly limited areas on the Forest. It should also be noted that, while not explicitly associated with the research for this study, the author has upon numerous occasions over the past eight years heard anecdotal stories of conflicts over big huckleberry harvesting in the Stampede Pass area.

The practice of harvesting big huckleberries to sell them to others does appear to occur on a very small and limited scale on the MBS Forest. Three harvesters who responded to the survey indicated that they have "rarely" sold their berries (these three harvesters all self-identified as white, male, and low-income). A few interviewees who live in rural areas indicated that they knew of elderly neighbors who, for a little extra money, might pick and sell their harvested berries to neighbors. No study participants indicated that they had definitely observed any kind of larger scale commercial huckleberry harvesting on the MBS, noting that, having observed other kinds of commercial harvesting on the Forest (floral greens, fiddlehead ferns) they are familiar enough with these types of activities to recognize them when they are taking place. Tim, the tribal wildlife biologist, does helicopter monitoring of elk in the Green River watershed during huckleberry season, and has observed what may be commercial huckleberry gathering camps in this area:

> I've seen vans out there before. I've never seen a group of people with rakes. I haven't seen that yet [but] I know it happens. I know it goes on. I haven't seen that myself, but, you know, I've been flying in the helicopter, capturing stuff, and you see a van down there and, you know, some people kinda movin' through and it's like, what are they… what are they doin'? … I'd probably say the Government Meadows area. Yeah. Up towards… Pyramid Creek, Windy Gap…

Study participants tended to be ambivalent about large scale commercial harvesting as a matter of principle. The most common theme regarding commercial harvest stems from study participants' experiences in places where commercial big huckleberry harvesting does take place (e.g., Montana, Idaho, and on the Gifford Pinchot National Forest). In this regard, harvesters expressed concern about potential conflicts between user groups and the ecological effects of commercial harvest. While a few study participants feel that commercial harvesting is fine so long as commercial harvesters "respect" the berries, their habitats, and other MBS Forest users, the majority seem to feel strongly that what makes big huckleberry harvesting special is that it is an activity that takes place, at least for them, outside of the money economy. These participants tend to feel that under no circumstances should commercial harvesting of the berries be allowed on the MBS Forest.

## V. Recreational harvester perceptions of MBS policy and planning

In general, the harvesters who participated in this study tend to feel that big huckleberry harvesting is not a high priority of the MBS. Indeed, it was not unusual for harvesters who were interviewed to share the sentiment of one participant, who stated that big huckleberry is "not even on the radar" of MBS Forest Service staff. This they often attributed to the many issues that the Forest has to deal with in a time of shrinking budgets and minimal staffing. However, in addition to addressing the issue of conifer encroachment into meadows and declining big huckleberry productivity, harvesters most commonly mentioned permitting and road access to gathering sites as two areas where Forest planning and policy has the potential to effect the quality of, and capacity for, big huckleberry gathering on the MBS. Of these, road access to big huckleberry gathering areas was by far the issue that harvesters most frequently mentioned.

Several interviewees also expressed a sense of frustration or bewilderment about Forest planning processes and policies related to access and gathering of big huckleberry. These individuals were either unsure about how the Forest notifies the public when it comes to decision-making on the Forest, or felt that even when they had been involved in the planning process, that their involvement had not really made a difference. Harvesters also mentioned the difficulty they have in finding information regarding anything related to berry harvesting on the MBS website, including information about harvest regulations, and planning decisions that might affect harvesting.

### *Road Access*

The harvester survey asked a series of questions about the kinds of barriers to big huckleberry harvesting that the study participants had experienced. After "poor berry year" (72%), and "lack of time," (68%), "road closures" (33%) was the third most commonly cited barrier to harvesting. At 47% for harvesters who live in rural areas, and 43% for those who have been harvesting big huckleberry on the MBS Forest for 15 years, these harvesters tend to experience this barrier much more often than the study mean. As previously mentioned, these groups are also amongst those harvesters for whom big huckleberry harvesting is more likely to be a highly important aspect of their lives, and who at least sometimes make a trip to the Forest for the express purpose of picking big huckleberry. These harvesters typically choose harvest sites that take an hour or less to reach from the place where they park their cars. They also tend to be over the age of 50. The importance of road access for these individuals is reflected in a statement made by Mary, who lives in the Greenwater area, and is herself over the age of 50:

> I mean, the small blackberries, we still get those, but the huckleberries, it's just, you know… two things, I think a lot of the people got older… The roads got harder… You can't just find somewhere and pull up and pick along the road anymore. You've gotta really hoof it. So those of us who do go out, we try to get some for us and some for our older friends as well. Even I'm getting to the point where, I can't get the nice big berries. I can go up to Cumberland Pass, but it's not the big berries up there. You have to get a little higher up than that.

"Bruce" is the pastor of a church in Darrington, and along with his wife "Helen," makes annual excursions to Segelson Ridge for the express purpose of gathering big huckleberry. They too are over the age of 50 and in their interview described the importance of being able to drive to their favorite gathering site:

> Bruce: We like Segelson because you can drive, park your car, get out, and start pickin'. You don't have to hike in a half a mile to find them [big huckleberry].
>
> Helen: See, we appreciated that. That was… you know, besides the beauty of the spot up there. But it was… once you got up there you felt safe and it was nice. And… familiarity. Being familiar with that spot and we know what it's like. It's easy to go back to the same place because you've been there. We've never gone past where we sit and park. […] And it's funny because we, each time we go it's always available. That little area, it's like people have their favorite spots and … we've got ours. 'Cause you [just] get out of the car, and you walk across the road and you start pickin'. And that is the view spot. But I guess because that's where we found it and it's like going home each time, you know, and knowing that we just have to get out of the car and they're right there and even the same little logs that you can, you know you've walked on before…
>
> Bruce: And then you can sit down and start pickin'.
>
> Helen: And I just fill my bucket.

In addition to road access to gathering sites for older harvesters, several harvesters also discussed the importance of road access to these areas for families with younger children. Another harvester from the Darrington area whose career is in the timber industry described the effects of a recent decommissioning in that area:

> And this one in particular… one of the last times I went in there before I heard about the decommissioning, I was struck by the number of kids that were going in to fish. There's fish, they're stocked… I actually met one of the guys that stocks 'em. It's a big deal. So how do you get kids in the woods? And how do you give 'em the opportunities that I had as a Boy Scout, you know, to enjoy some of this area and then to grow up and actually care about it? And maybe even go in and make your career in it? You gotta have access. […] You know, when you've got the President talking about America's Great Outdoors and all this wonderful stuff - and I've got a whole folder full of wonderful quotes - but if you can't get there, if you can't provide it, it's all hot air.

### *Permitting for recreational use*

The harvest regulations on the MBS Forest officially requires recreational harvesters to obtain a permit to gather big huckleberry on the Forest if a harvester's intent is to gather more berries than what is considered to be "incidental use" The MBS does not permit or allow the commercial harvest of big huckleberry on the Forest. However, most of the harvesters who participated in the survey and in interviews claimed to be unaware of any regulations restricting the amount of berries that one is allowed to harvest from the Forest. They also seemed to be under the impression that the quantities of berries they are harvesting are less than the amount for which any sort of permit would be required. Harvesters expressed that if this is not the case, the Forest could do a better job informing harvesters about what the rules are. In addition to information on the website, harvesters suggested that it would be helpful to have these rules posted on trailhead signs. However, many harvesters felt highly ambivalent about the Forest requiring any kind of permit to harvest berries for personal use. A few harvesters objected to *any* permitting as a matter of principle – stating that this would be antithetical to the ideal of *public* lands. Others did not object to permitting *per se,* but felt that permits to harvest big huckleberry or other types of special forest products should only be required if issuing them serves a well thought out and clearly articulated objective. A few of the harvesters who participated in the study, both in comments left on the survey and in interviews, expressed concern that the results of this study would lead to increased regulation of big huckleberry harvesting on the part of the MBS Forest, and would perhaps lead to charging a fee for permits. For instance, Eric, the harvester from the Skykomish area, described how he and a friend had discussed this concern when talking about the study before he made the decision to participate:

> So, yeah, even when I filled out the survey, I always thought that the Forest Service was gonna end up tryin' to get you to buy a permit to pick berries, or to buy a permit to pick mushrooms, just to make money. […] That's everybody's fear, is it might develop to be. And you'd think well, they can never charge you to go hiking on the trails, cause it's a public thing. Well, you gotta buy a trail pass now. Ya know, that's kinda just part of society's thinking is sure maybe not now, but maybe in the future, they will. To generate funds, because we'll have to lay off this many people. Cutbacks … So they have to go and get funds some other way.

## Conclusions

Through a harvester survey, in-depth interviews with 24 big huckleberry harvesters, and participant-observation at harvesting locations across the Forest, this study shows that big huckleberry, as well as Cascade blueberry (*Vaccinium deliciosum*) harvesting is an activity that is highly important to a diversity of Forest users. Big huckleberry is a flavorful, nutrient dense food, and this is of course important to harvesters. However, what is equally significant about the practice is the way that harvesting big huckleberry may affirm a harvester's identity, their sense of place and of time, and also strengthen their sense of connection to the Forest.

Berry harvesting is a culturally, socially, and economically important activity to a diversity of MBS Forest users. For particular user groups, berry harvesting plays a more central role in their lives, including long-time harvesters, those who live in rural areas, harvesters who self-identify as belonging to a race/ethnicity other than white, and harvesters who got their start picking berries as a family tradition or due to an interest in wild foods harvesting. These harvesters are more likely than the "average" harvester to make trips to the Forest for the primary purpose of picking berries. They are also more likely to pick greater quantities of berries, and these berries are more likely to play a role in their household and gift economies.

The study also found that long-time harvesters (those who have been picking berries on the Forest for 15 years or more) carry important insights regarding huckleberry ecology, environmental change on the Forest, and the effects of climate and weather on huckleberry production. Long-term harvesters also tend to be over the age of fifty, to live in rural areas, and to be more likely than the average of survey respondent to indicate that road closures are at least sometimes a barrier to their ability to harvest berries.

Although the sample size is small, this study also suggests that big huckleberry harvesting is an important way that people who self-identify with a race/ethnicity other than white connect with the Forest. This group is twice as likely as harvesters who self identify as white to say that feeling unsafe is sometimes a barrier to their berry harvesting.

Over the past several years, the USFS and other land management agencies have increasingly come to recognize how important it is that the lands they are entrusted to steward remain relevant to American youth, and to a US population whose demographic is rapidly changing. This includes an aging population and proportionally larger numbers of the population who self-identify with a race or ethnicity other than white. The importance of big huckleberry gathering as an intergenerational practice, and the value placed on gathering big huckleberry harvesting by individuals across the demographic spectrum, suggests that it is just the type of activity that may help to ensure that the MBS remains relevant to Forest users over the long-term.

Furthermore, their substantive local knowledge of big huckleberry habitat, and a general tendency of long-term harvesters to engage in different types of stewardship activities on the Forest, suggests that these individuals may bring under-appreciated strengths to the challenge of ensuring the long-term sustainability of big huckleberry, and the places where it grows. Many of these harvesters would be likely to participate in, or at least support, projects that enhance big huckleberry production in important gathering areas. And should the Forest ever decide to initiate them, given their considerable local knowledge, long-term harvesters in particular would be a great asset to "citizen-science" big huckleberry monitoring projects that could in turn help us to better understand big huckleberry ecology and to better plan for their future in the context of a rapidly changing climate.

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# Survey results

A total of 241 individuals completed the harvester survey. The majority of respondents (n = 228) completed the survey online, with the remainder sending in paper copies that were manually entered into an Excel database as they were received. These results were then exported to an SPSS statistical program for further analysis. Of the initial 241 respondents, 16 were excluded from this analysis because they answered either "no" or "not sure" to the first survey question, "have you ever picked or harvested big huckleberry on the Mt. Baker-Snoqualmie National Forest?" This left a total of 225 valid survey responses. Significance was evaluated using a 95% confidence level.

## Harvester Demographics

The survey included five demographic questions regarding place of residence, age, income, education, and race and/or ethnicity. In addition, the gender ratio of a subset of harvesters was calculated from those survey respondents who left their names for a follow-up interview. This section provides a brief summary of Forest-wide demographic data for valid survey responses to the demographic questions. Relevant correlations between demographic results and other components of the survey are discussed in greater detail in the sections that follow this demographic overview. Note that because survey percentages were rounded, in some cases the reported total results may equal 101%.

### *Place of residence*

Of the 216 survey participants who responded to this question, 50% fell within the "urban" category, 27% fell into the "rural" category, and 22% were peri-urban. All respondents with the exception of the three Canadian participants were from Washington State. Of these, most reside in Western Washington.

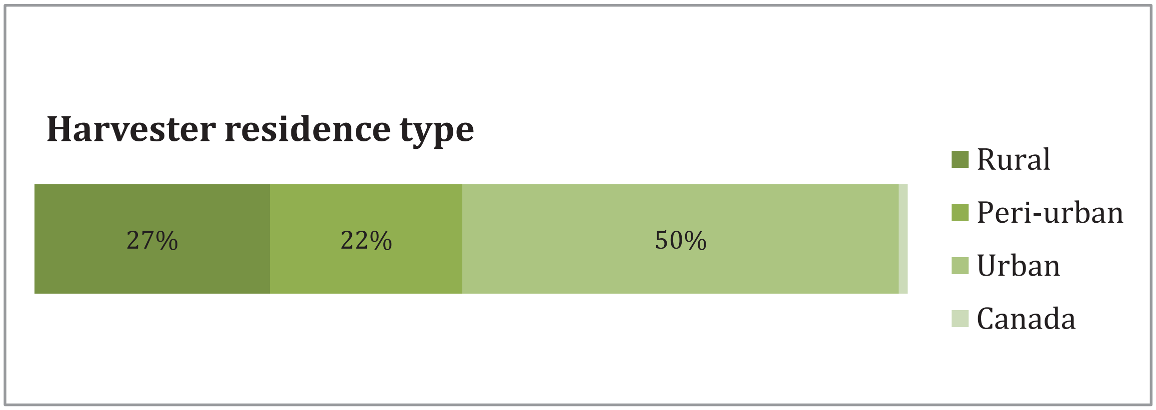


**Figure A 2: Harvester residence type**

Figures A-3 & A-4 are visual representations of the relationship between the zip code respondents provided as that of their primary residence, and the district that a harvester said they typically harvested within. Although there is variation, particularly when it comes to urban areas, the maps indicate a general pattern in that people typically harvest on the district that is closest to where they live. Correlations between harvest districts, harvester demographics and harvester practices are discussed in greater detail in the section on primary harvest district, below.

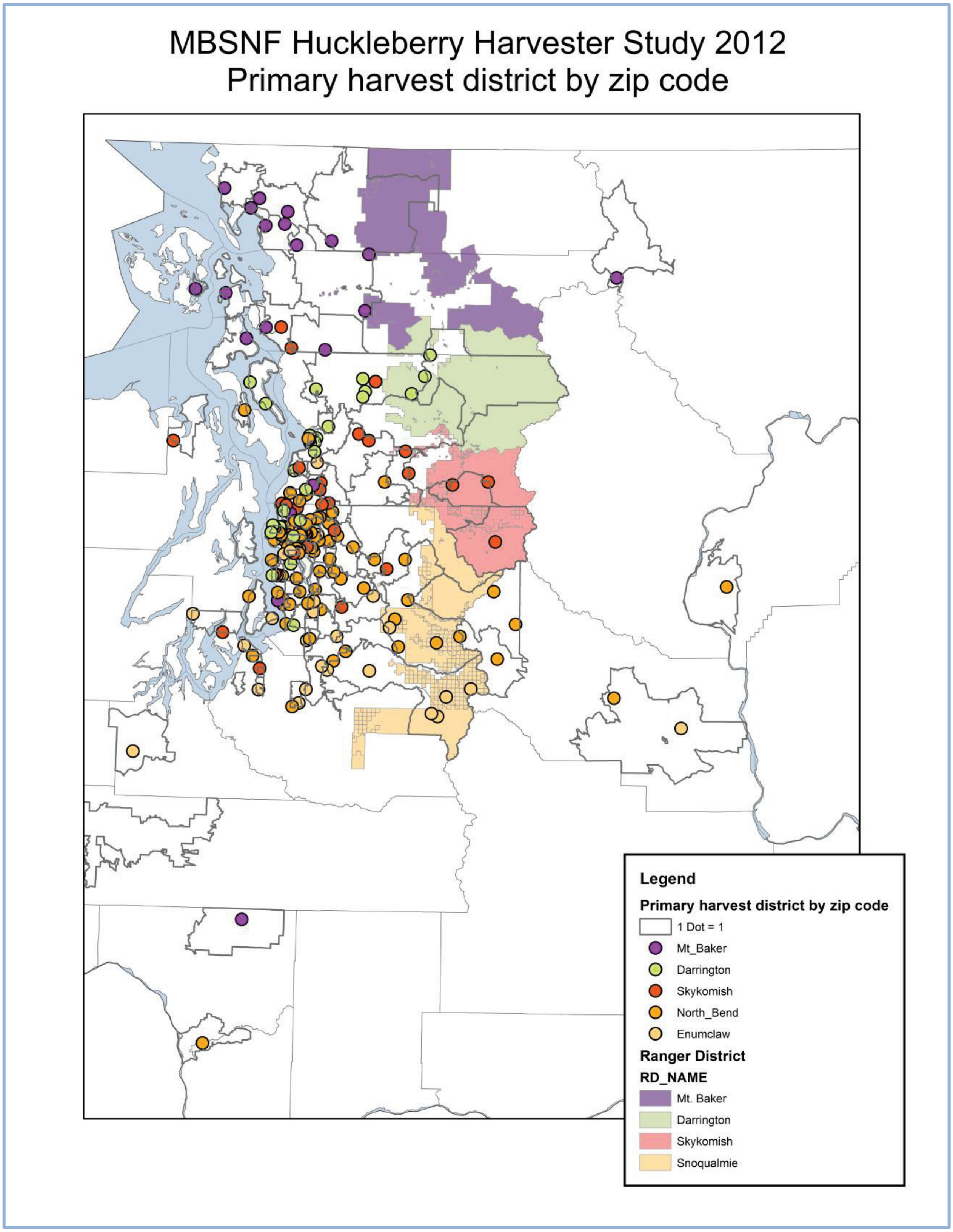


**Figure A 3: Primary harvest district by zip code**

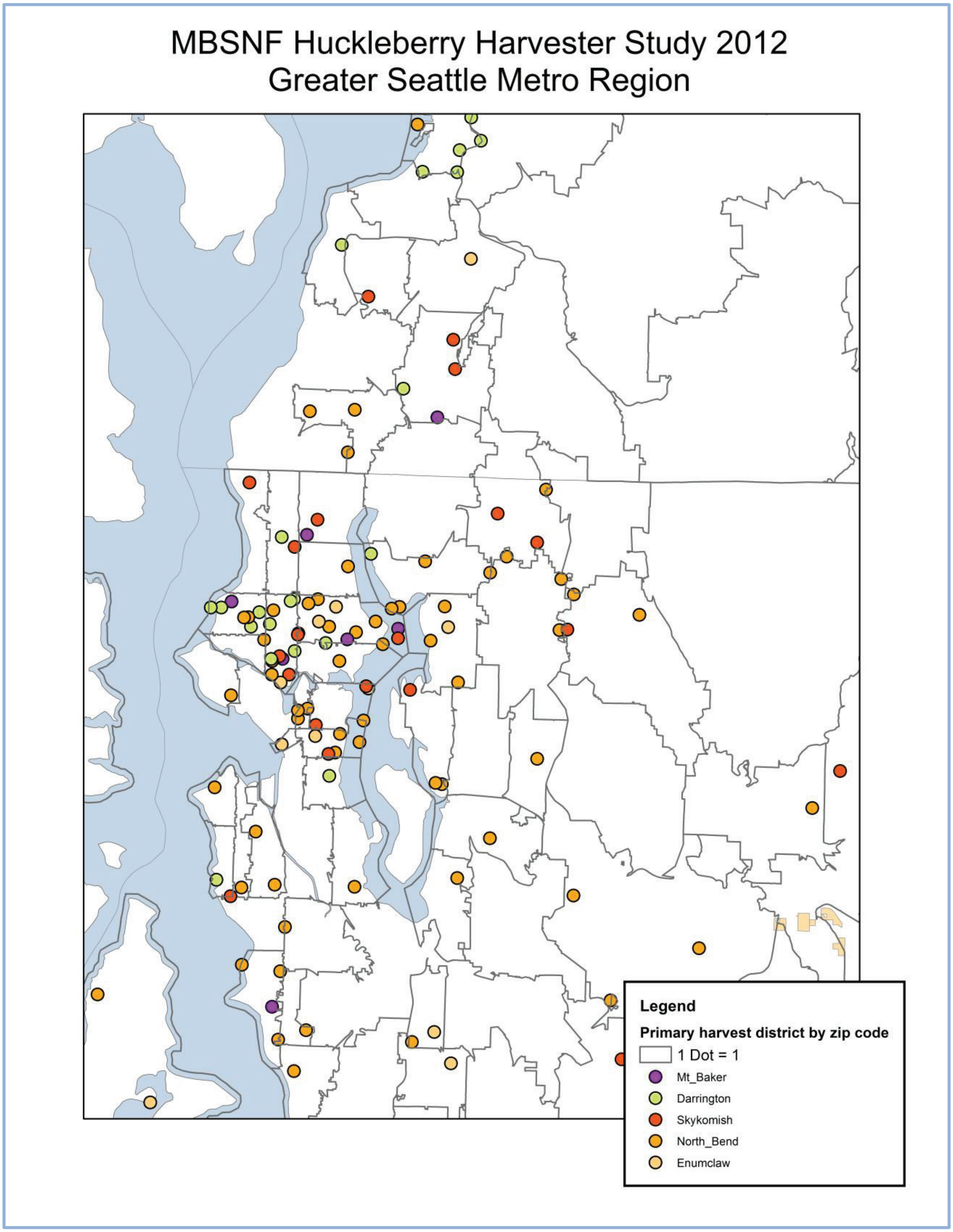


**Figure A 4: Primary harvest district by zip code, Seattle Metro Area**

### *Age*

Harvester reported age (n = 217) indicates a slight bi-modal distribution, with just over half of all survey respondents falling within the 30 – 39 year-old and 50-59 year-old age ranges. 53% of survey respondents indicated that they were 50 years of age or older. The most elderly survey respondent was 80 years old, while the youngest was 20 years old. Just 5% of survey respondents fell within the 20 – 29 year age range.

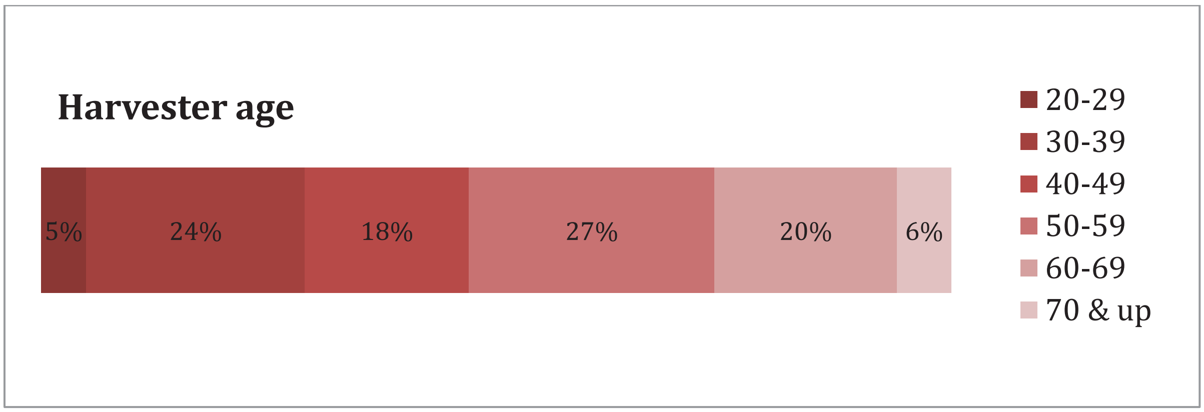


**Figure A 5: Harvester age**

### *Income*

The survey asked participants if they considered themselves to be low, middle or high income. 214 respondents answered this question, of which 75% indicated that they considered themselves to be middle income, while a roughly even percent of the remainder indicated that they considered themselves to be low (14%) or high (12%) income.

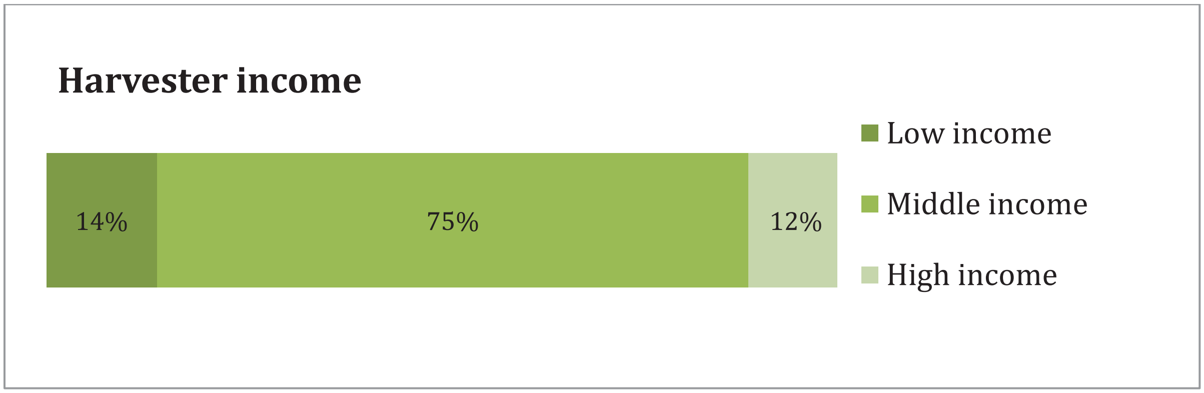


Figure A 6: Harvester income

### *Education*

28% of survey participants who answered this question (n = 217) indicated that their highest level of education was either high school or GED (16%), or that they had earned an Associate's degree (12%). 36% of the survey respondents indicated that a Bachelor's degree was their highest level of education, with an equal percentage reporting that their highest levels of education were either a master's or professional (24%) or doctoral degree (12%). It should be noted that in follow-up interviews, it was found that there was a tendency amongst some survey respondents to over-report their levels of education.

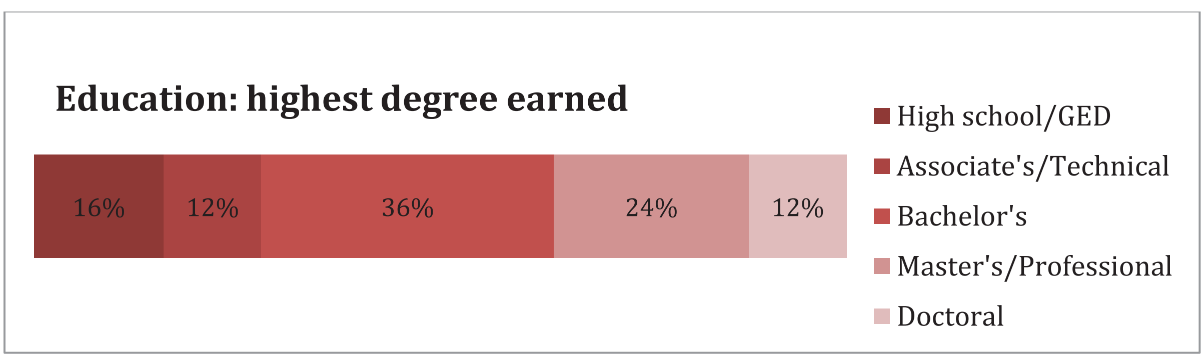


Figure A 7: Education - highest degree earned

### *Gender*

Gender results are based on the first names of the sub-set of respondents who left contact information for follow-up interviews, as the survey itself did not include a question about the respondents' gender. This resulted in a total of 57 valid responses. Of these, 54% were male and 46% were female.

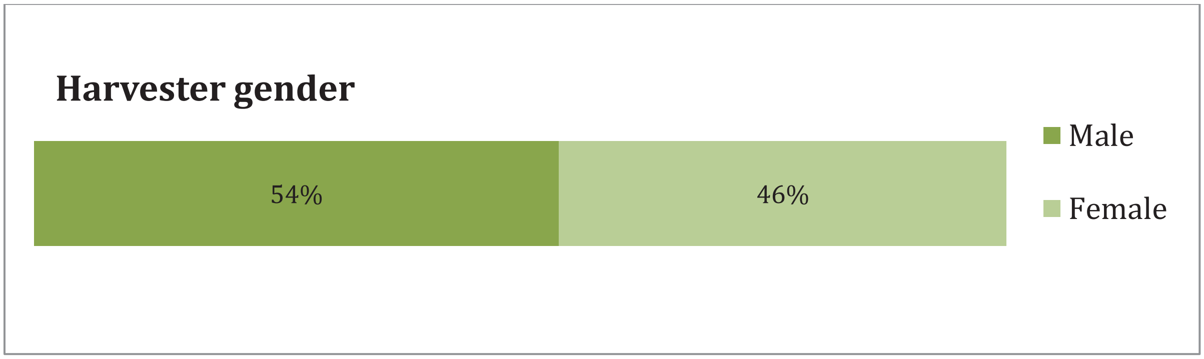


**Figure A 8: Harvester gender**

### *Harvester race and/or ethnicity*

89% of the survey respondents who answered this question (n=194) indicated that they self-identified as "white," while the remaining 11% of respondents (n=21) indicated their race or ethnicity as African-American (1%), Asian (3%), Native American (1%), more than one race or ethnicity (2%), non-white Hispanic (2%), or "other" (3%). For the purposes of further analysis, these results were collapsed into two categories - "white" and "non-white."

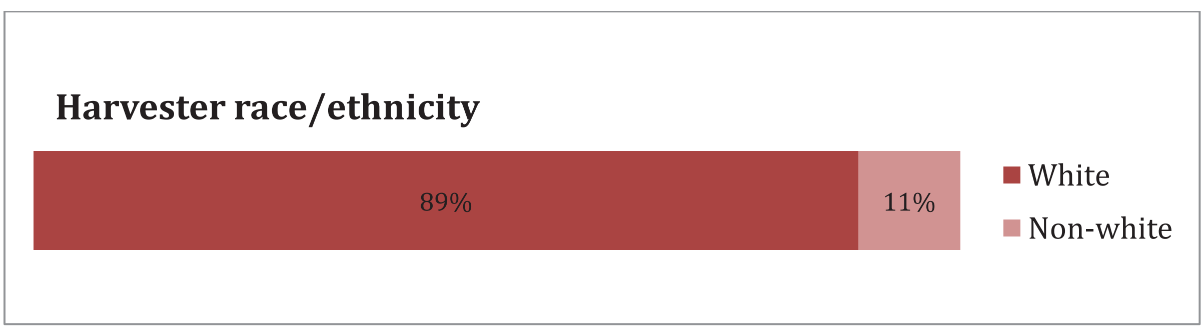


**Figure A 9: Harvester race/ethnicity**

## Harvester practices

The survey asked five general questions related to harvesting practices on the Forest. These questions and their results are described in this section.

**Question:** ***For how many years have you been picking or harvesting big huckleberry on the Mt. Baker-Snoqualmie National Forest?***

Of the 218 harvesters who responded to this question, 10% indicated that they had been harvesting on the Forest for less than 2 years, 30% for 2 to 5 years, 17% for 6 to 10 years, 7% for 11 to 15 years, and 37% for more than 15 years on the MBS.

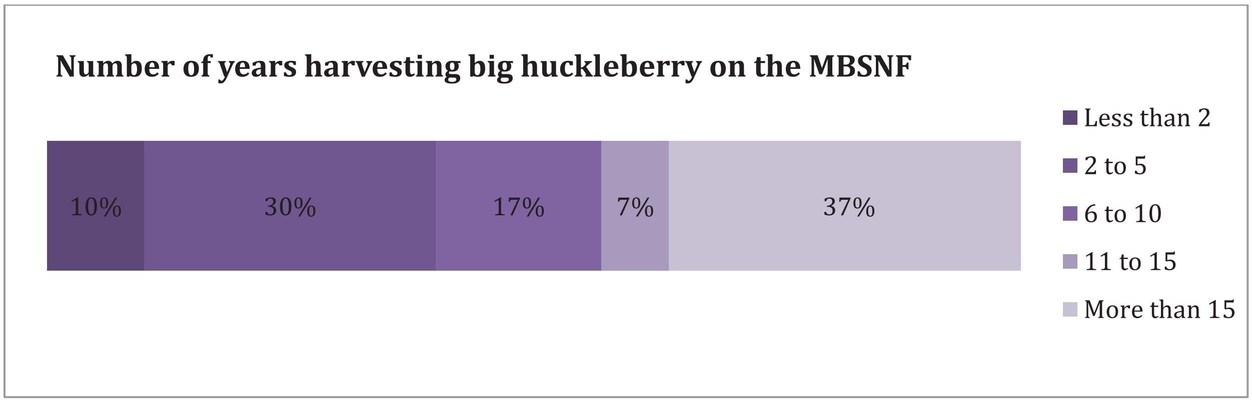


**Figure A 10: Number of years harvesting big huckleberry on the Mt. Baker-Snoqualmie National Forest**

*Relationships between harvester demographics and years of experience harvesting on the MBS:*

- Respondents who reported that they have been harvesting on the Forest for longer periods of time tend to be older, but those who have been harvesting on the Forest for shorter periods of time are not necessarily younger. 76% of respondents who stated that they have been harvesting on the Forest for more than 15 years are over the age of 50, while 58% of those reporting that they have been harvesting on the Forest 5 years or less are *also* over the age of 50. This distribution may reflect a trend observed by study interviewees, who indicated both the presence of an aging, more experienced population of harvesters (thus suggesting a potential decline in harvesting levels on the Forest), as well as an emergent group of people with an interest in harvesting wild foods (thus suggesting a potential rise in harvesting levels on the Forest).

- Harvesters who have been picking big huckleberries on the Forest for more than 15 years are more likely to reside in rural areas than those who have been harvesting on the Forest for less than 15 years.
- Harvesters who have been picking big huckleberries on the Forest for less than 15 years are more likely to live in urban areas than those who have been harvesting on the Forest for more than 15 years.

**Question:** ***How did you get started picking big huckleberries?***

224 harvesters responded to this question. 33% indicated that big huckleberry harvesting is a family tradition, 16% reported that it was because of an interest in wild foods harvesting, while the majority, 43%, responded that they got started through other outdoor experiences. Another 8% responded in the "other" category. Most of these respondents seem to have misunderstood the question, and responded with write-in answers indicating that they thought the question was asking them *why* they picked big huckleberry (i.e., because they taste good).

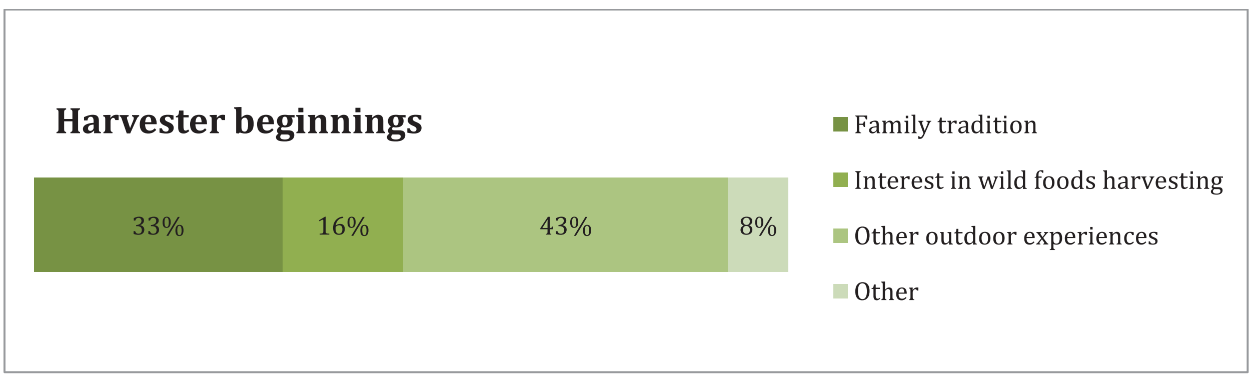


**Figure A 11: Harvester beginnings**

*Relationships between harvester demographics and harvester beginnings on the MBS*

- Harvesters who were most likely to respond that "family tradition" was how they got started harvesting big huckleberry included people over the age of 50, and those who reported being middle income.
- Harvesters most likely to respond that they started picking big huckleberry through an

interest in wild foods harvesting included harvesters under the age of 50, those who identified as low-income, those who reported their highest level of education as being less than a bachelor's degree, and males.

- *Both* low and high-income harvesters were more likely to report that they started picking big huckleberry through other outdoor experiences than middle-income harvesters.

**Question:** ***In gallons, about how many big huckleberries do you pick or harvest on the Mt. Baker-Snoqualmie National Forest in a <u>typical year?</u>***

The number of berries a harvest typically picks is one measure of the importance of big huckleberry to the people who harvest them. Of the 224 survey participants who responded to this question, 65% said they harvest less than 1 gallon per year, 32% harvest 1 to 5 gallons per year, 3% indicated that they harvest 6 to 10 gallons of berries per year, and 1% said they harvest more than 10 gallons per year.

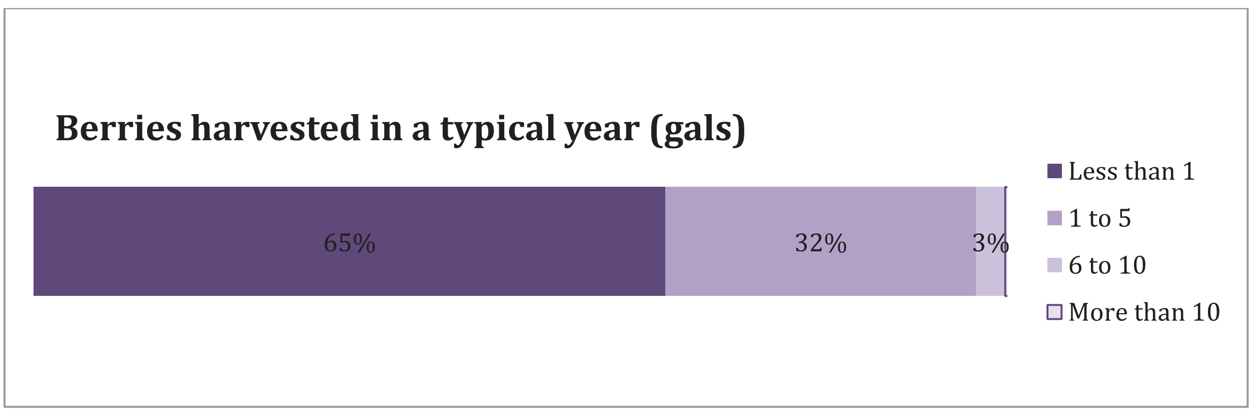


**Figure A 12: Berries harvested in a typical year (gallons)**

There are several statistically significant correlations between harvester demographics and other practices, and those who say they typically pick more than one gallon in a season, suggesting that for these groups of harvesters, berry picking may play a more central role in their lives than it does for other harvesters.

- Harvesters over the age of 50 are more likely to pick more than one gallon per season than those under the age of 50 (57% versus 43%).

- Number of years harvesting on the forest is positively correlated with the number of berries a harvester typically picks (Figure A-12).

- Harvesters who live in rural areas are more likely to pick more than one gallon of berries in a typical season than their peri-urban and urban counterparts (rural = 52%, peri-urban = 35%, urban = 27%).

- Harvesters who indicated that their race or ethnicity was other than white were more likely to harvest more than one gallon of berries in a typical season than those who identified as white (52% v. 36%).

- Berry harvesters whose level of education is less than a bachelor's degree were more likely to pick more than one gallon of berries than those harvesters with a bachelor's degree or higher (< bachelor's degree = 41%, bachelor's degree, 33%, > bachelor's degree 26%).

- Harvesters who indicated that they got their start picking berries as a family tradition are also more likely to say they typically harvest more than one gallon of berries in a year than those who got their start through an interest in wild foods harvesting or through other outdoor experiences (53% for family tradition, versus 16% for wild foods and 31% for other outdoor experiences).

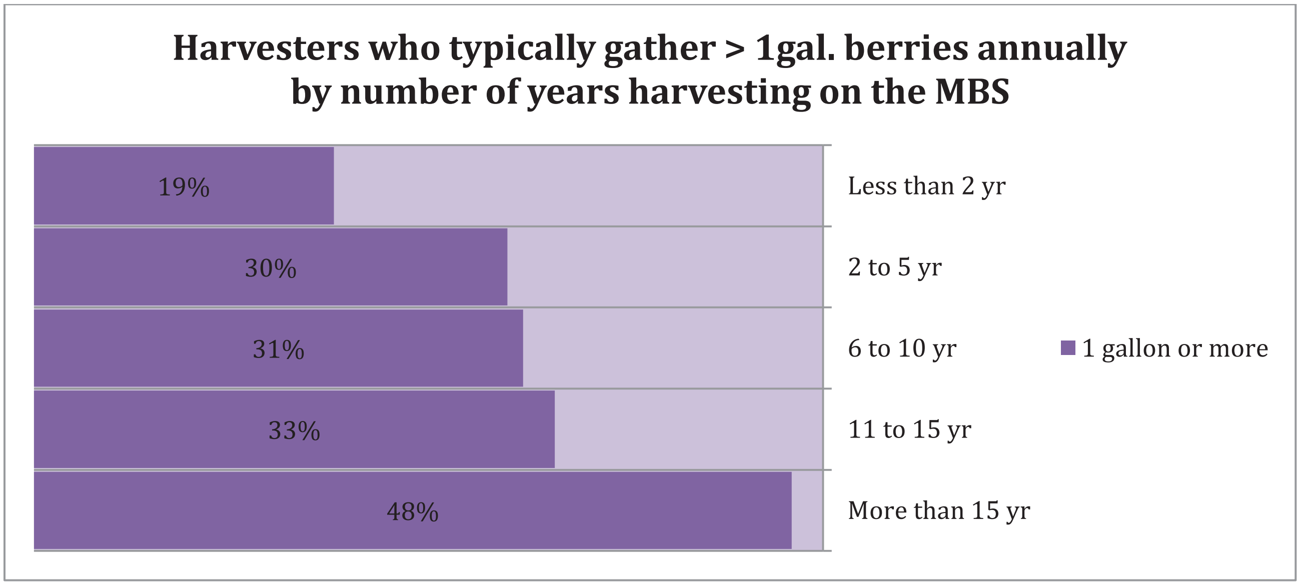


Figure A 13: Harvesters who typically gather > 1gal. berries annually by number of years harvesting on the MBS

***Question: Is big huckleberry picking your primary focus when you travel to the Mt. Baker-Snoqualmie National Forest and harvest?***

This question is considered a proxy for the importance of these berries to harvesters. On a 5-point scale ranging from "never" to "always," 27% of survey participants responded that berry picking never was their primary focus, 21% indicated that berry picking rarely was, 40% responded that berry picking sometimes was, 8% responded that berry picking usually was, and 4% answered that harvesting big huckleberry was always their primary focus when they visited the Forest to pick berries.

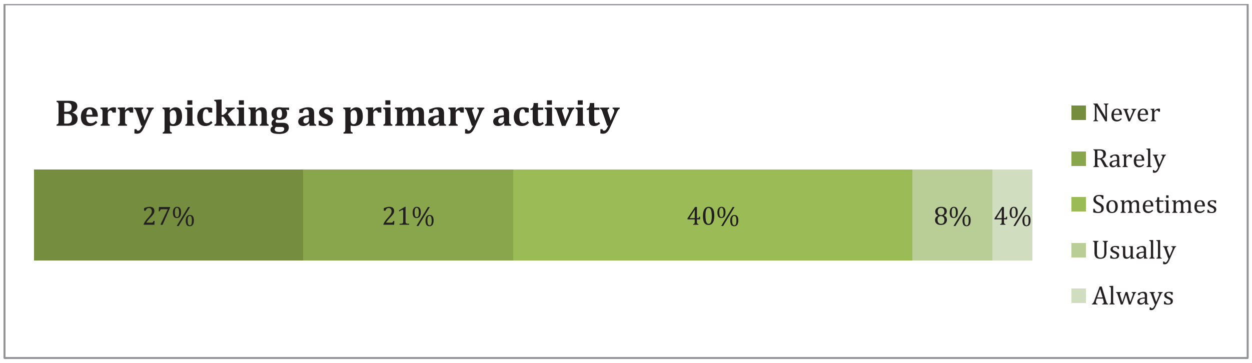


**Figure A 14: Berry picking as primary activity**

To assess correlations between this question and demographic variables as well as those related to general harvester practices, the Likert scale was collapsed into a binary category of "never" and "rarely" responses (48%), and "sometimes" to "always" responses (52%). Level of education, race/ethnicity, harvester residence, years harvesting on the Forest, gallons of berries typically harvested, and harvester beginnings all had statistically significant correlations with this question, while age, income, and gender did not.

- Harvesters who are more likely than the average of 52% to say that berry picking is "sometimes – always" their primary activity include:
    - Harvesters whose level of education is less than a bachelor's degree (59%)
    - Harvesters who live in rural areas (61%)
    - Harvesters who responded that their race/ethnicity is other than white (76%)
    - Harvesters who have been picking berries on the Forest for more than 15 years (60%)
    - Harvesters who got their start picking huckleberries because it is a family tradition (77%) *as well as* those with an interest in wild foods harvesting (66%).
- Not surprisingly, quantity of berries harvested and berry picking being the primary purpose of a visit to the MBS are correlated. 80% of harvesters who answered that they

sometimes – always go to the Forest with the primary intention of picking berries also indicated that they typically harvest more than 1 gallon of berries in a given harvest season.

### *Harvester practices by district*

**Question:** ***Which of the following towns is closest to where you harvested, or will harvest most of the big huckleberry that you have picked or will pick on the Mt. Baker-Snoqualmie National Forest in 2012?***

14% of survey respondents answered that they typically harvest on the Mt. Baker Ranger District, 17% of harvesters responded that they usually harvest on the Darrington District, 17% indicated that they typically harvest on the Skykomish District, 40% responded that they harvest on the North Bend side of the Snoqualmie District, while 12% of harvesters indicated that they harvest on the Enumclaw side of the Snoqualmie Ranger District.

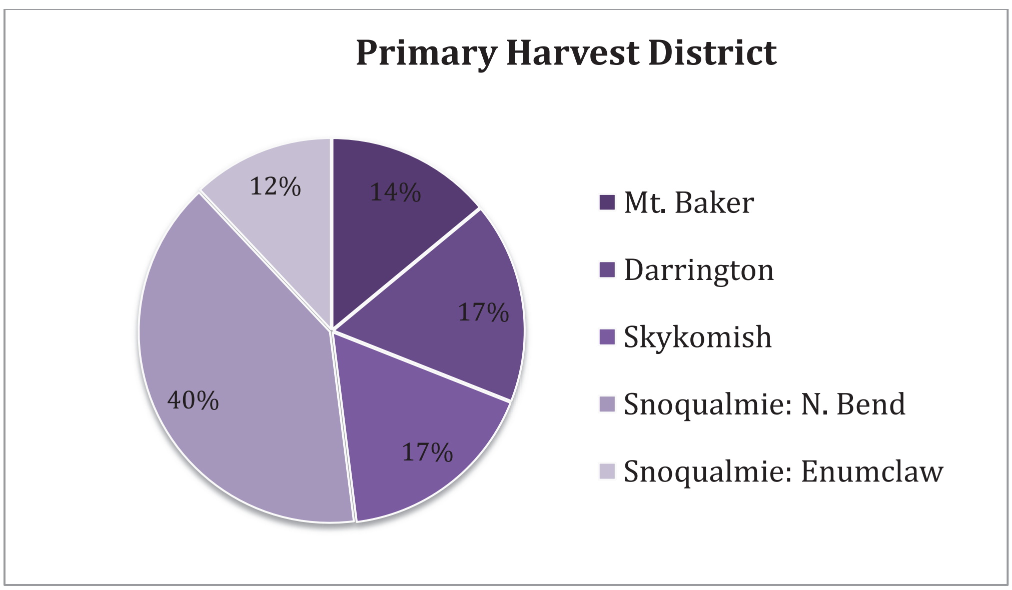


**Figure A 15: Primary harvest district**

There were significant differences between districts regarding how harvesters got started picking big huckleberry, and whether big huckleberry harvesting was ever their primary activity when they go to the Forest to harvest berries. There were also significant demographic differences with respect to income, age, and primary residence. While differences between districts in terms of gallons typically harvested in a given year, number of years experience harvesting berries, level of education, race/ethnicity, or gender were not statistically significant between districts overall, there are some important differences in these categories that will be noted below.

*Mt. Baker District*

- The Mt. Baker District has a greater proportion than the overall mean of harvesters who indicated that family tradition was how they got started picking big huckleberries (46% as compared to the 37% Forest average).

- This district also had the highest overall percentage of harvesters who indicated that they were low income (22% versus the mean of 14%), and fewer harvesters who indicated that they were middle or high income.

- The Mt. Baker District also had the highest proportion of rural harvesters (52% compared to the overall mean for the Forest of 30%), slightly more than the mean of peri-urban harvesters (26% versus 22%), and substantially fewer urban harvesters (22% versus 48%).

- Mt. Baker also had the highest proportion of harvesters who indicated that their race/ethnicity was other than white (20% compared to the Forest mean of 11%).

- This District also had a higher than average proportion of harvesters over the age of 50 (63% versus 53%).

*Darrington District*

- The Darrington District has a very high proportion of harvesters who indicated that they got started picking big huckleberry through other outdoor experiences (65% as compared to the mean of 47%).

- This District also had a high proportion of urban harvesters (56% v. 48%).

- People who harvest big huckleberry on the Darrington Ranger District were also most likely to indicate that picking big huckleberry was *not* their primary activity when they go to the Forest and harvest berries (58% versus the overall mean of 27%).

- No harvesters who said they typically pick berries on the Darrington Ranger District indicated that they were high income, while the largest proportion for the Forest overall indicated that they were middle income (84% versus a Forest average of 75%).

- Slightly more than the mean indicated that they were low income (16% versus 14%).

*Skykomish District*

- Harvesters on the Skykomish District were most likely to indicate that they typically harvest more than one gallon of big huckleberry in a given year (44% compared to 36% for the Forest overall).

- This District also had the highest proportion of harvesters who indicated that picking big huckleberry was "sometimes – always" their primary reason for going to the Forest when they pick big huckleberry (82% v. 73%).

- Like the Mt. Baker District, the Skykomish District has a high proportion of rural harvesters (41%), and harvesters that got started picking big huckleberry because it is a family tradition (53%).

- Skykomish has the highest proportion on the Forest of harvesters over the age of 50 (74% versus 53%).

- This district has a higher than average proportion of harvesters who have been picking big huckleberry for more than 15 years (41% versus 36%).

- Skykomish has both a higher than the mean proportion of low-income (16% versus 14%) and high-income (19% versus 11%) of harvesters.

*Snoqualmie - North Bend*

- North Bend has the highest percentage of urban harvesters (58% compared to the Forest mean of 48%).

- The harvesters on this portion of the Snoqualmie Ranger District have the highest proportion that indicated they had been harvesting on the Forest for less than 15 years (73% v. 64% for the Forest overall).

- This group of harvesters also has the highest proportion of harvesters on the Forest who are under the age of 50 (62% v. 47%).

- North Bend also has the highest proportion of harvesters who self-identified as white (94% versus 89% for the Forest overall).

- This part of the Forest also has the highest proportion of harvesters who indicated that they got started picking big huckleberry through an interest in wild foods harvesting (20% as compared to the Forest mean of 16%).

- A higher than average proportion also indicated that they started picking huckleberries through other outdoor experiences (53% v. 47%).

- North Bend harvesters are also more likely than the mean to say that picking big huckleberry is sometimes to always the exclusive reason for a visit to the Forest (80% versus 73%).

- They are also slightly more likely than the average to say they harvest more than one gallon of big huckleberry in a typical harvest season (39% v. 36%).

*Snoqualmie – Enumclaw*

- Enumclaw has the highest percentage of harvesters who have been picking big huckleberry on the Forest for more than 15 years (50% compared to the Forest mean of 36%).

- A high proportion of harvesters on this part of the Snoqualmie Ranger District are also over the age of 50 (63% v. 53%).

- The highest percentage of harvesters who say they got started picking big huckleberry because it is a family tradition typically harvest on this part of the Forest (59% compared to 37% for the Forest overall).

- A higher than average percentage of Enumclaw harvesters also indicated that picking big huckleberry is sometimes to always a primary reason for a visit to the Forest (79% v. 73%).

- This group of harvesters was also *least* likely to indicate that they typically harvest more than one gallon of big huckleberry in a typical season (25% v. 36%).

- Enumclaw has the highest percentage of peri-urban harvesters (33% v. 22%), the lowest percentage of harvesters who indicated that they were low income (4% v. 14%), and a higher proportion of high-income harvesters (17% v. 11%).

## Harvester use of big huckleberries

Survey participants responded to a series of questions regarding how they use the big huckleberry that they harvest on the Forest, using a 1 – 5 scale, where 1 is *never* and 5 is *always.* Harvester use is one measure of the social, cultural, and economic *importance* of big huckleberry harvesting in people's lives. Survey responses clearly show that eating fresh huckleberries is culturally important to a wide range of harvesters. On the other end of the spectrum, bartering, trading, or selling big huckleberries are not. Figure A-16 shows the results for each question.

On the 1 – 5 scale, the average responses for each question about harvester use of their berries were as follows:

| Use | Average response |
| --- | --- |
| Eat fresh | 4.50 (*usually-always*) |
| Preserve for later use | 3.36 (*sometimes*) |
| Serve on special occasions | 3.06 (*sometimes*) |
| Give as gifts | 2.13 (*rarely*) |
| Barter or trade | 1.15 (*never*) |
| Sell | 1.01 (*never*) |

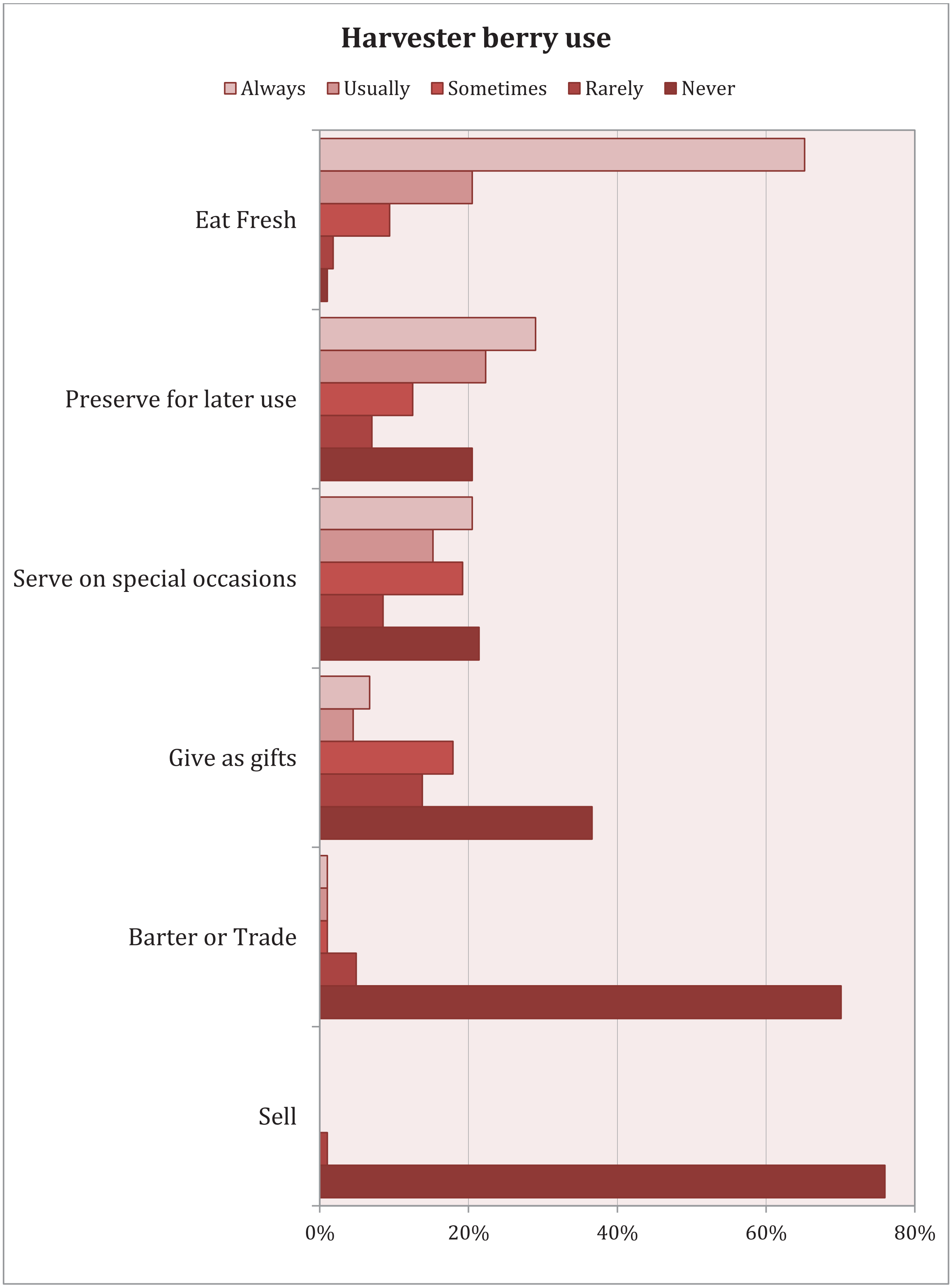


Figure A 16: Harvester berry use

There were statistically significant variations within three categories of berry use – “preserve for later use,” “serve on special occasions,” “and give as gifts.” These were evaluated for correlations between observed variations and harvester demographics and practices by collapsing the five-point scale to a binary scale (*never-rarely* and *sometimes-always*). Table A-2 summarizes harvesters who are *more likely than the average survey respondent* to preserve, serve on special occasions, or gift big huckleberry. Though *not statistically significant* due to small sample size, the demographic “race/ethnicity other than white” is included.

**Table A 2: Harvesters more likely to preserve, use on special occasions, gift, trade or sell their harvested berries**

| **Percent of harvesters based on demographics and harvester practices, who are more likely to preserve, serve on special occasions, or gift big huckleberry, as compared to study mean** | | | |
|---|---|---|---|
| | Preserve | Special | Gift |
| **STUDY MEAN (sometimes-always)** | **71%** | **55%** | **37%** |
| Rural | 89% | | |
| Education < Bachelor's | 81% | | |
| Harvest experience > 15 yr | 82% | 77% | |
| Harvest > 1gal | 96% | 87% | 62% |
| Harvest primary (sometimes-always) | 92% | 87% | 57% |
| Beg. Family tradition | 91% | 83% | 48% |
| Beg. Wild foods harvesting | 77% | 86% | 56% |
| Race/ethnicity other than white** | 89% | 78% | 56% |

These results provide a more nuanced insight into the cultural, social, and economic importance of berry harvesting in people's lives.

- Preserving huckleberries for later use is interpreted here as something that is important in the context of a harvester's household economy. Doing so is more important than it is for the "average" harvester for the following groups:
    - Rural berry harvesters
    - Those who have been harvesting berries on the MBS for more than fifteen years
    - Those whose level of education is less than a bachelor's degree
    - Harvesters who got started picking berries because it is a family tradition
    - Harvesters who got started picking berries though an interest in wild foods harvesting
    - Harvesters whose race/ethnicity is other than white.
    - Harvesters who typically pick more than one gallon of berries in a given year.
    - Harvesters for whom berry picking is at least some of the time a primary reason for an excursion to the MBS.

As discussed in the harvester demographics and practices sections above, these categories overlap. Rural berry harvesters, those with more than 15 years experience harvesting on the Forest, harvesters who started picking berries as part of a family tradition or due to an interest in wild foods harvesting, and those whose race/ethnicity is other than white, are *also* the harvesters who were most likely to at least sometimes go to the Forest with the primary intention of picking berries, *and* were most likely to pick more than one gallon of berries in a season (with the exception of the wild foods harvesters).

This overlap reinforces the idea that for people who tend to harvest more than one gallon of berries in a year, or who do go to the MBS with the primary intention of picking berries, huckleberry harvesting is an important activity in terms of their household economies.

These results hold true for the spectrum of harvesters from low to high income, suggesting that the importance of berries in harvesters' household economies is not necessarily dependent upon a harvester's income.

- Serving berries on special occasions is interpreted here as an expression of the symbolic value that a harvester assigns to the berries. The following groups are more likely than the average harvester to serve their berries on a special occasion:
    - Harvesters who have been picking berries on the MBS for more than 15 years
    - Harvesters who got started picking berries because it is a family tradition
    - Harvesters who got started picking berries due to an interest in wild foods harvesting
    - Harvesters whose race/ethnicity is other than white
    - Harvesters who typically pick more than one gallon of berries in a given year
    - Harvesters for whom berry picking is at least some of the time a primary reason for an excursion to the MBS.
- Giving berries as gifts can be interpreted as a measure of the importance of berries to harvesters in the context of a gift economy. Gift economies can be understood as a form of "exchange" in which the gift giver is communicating to the recipient that he or she values the relationship they have with that person and would like for it to continue. The following groups are more likely than the average to give their berries as gifts:
    - Harvesters who got started picking berries because it is a family tradition

- Harvesters who got started picking berries due to an interest in wild foods harvesting
- Harvesters whose race/ethnicity is other than white
- Harvesters who typically pick more than one gallon of berries in a given year
- Harvesters for whom berry picking is at least some of the time a primary reason for an excursion to the MBS.

## Other harvester activities

Survey participants were asked to respond to a series of questions regarding other activities that they engage in on the Forest during their berry picking excursions using a 1 – 5 scale, where 1 is *never* and 5 is *always*. Figure A-17 shows the results for each activity.

On the 1 – 5 scale, the average responses for each question about harvester use of their berries were as follows:

| Activity | Average response |
|---|---|
| Hunting & fishing | 1.66 (*rarely*) |
| Cultural or spiritual activities | 1.79 (*rarely*) |
| Artistic activities | 1.84 (*rarely*) |
| Gathering other plants & fungi | 1.93 (*rarely*) |
| Nature study | 2.73 (*sometimes*) |
| Camping | 2.99 (*sometimes*) |
| Spending time with friends or family | 3.94 (*usually*) |
| Hiking | 4.36 (*usually*) |

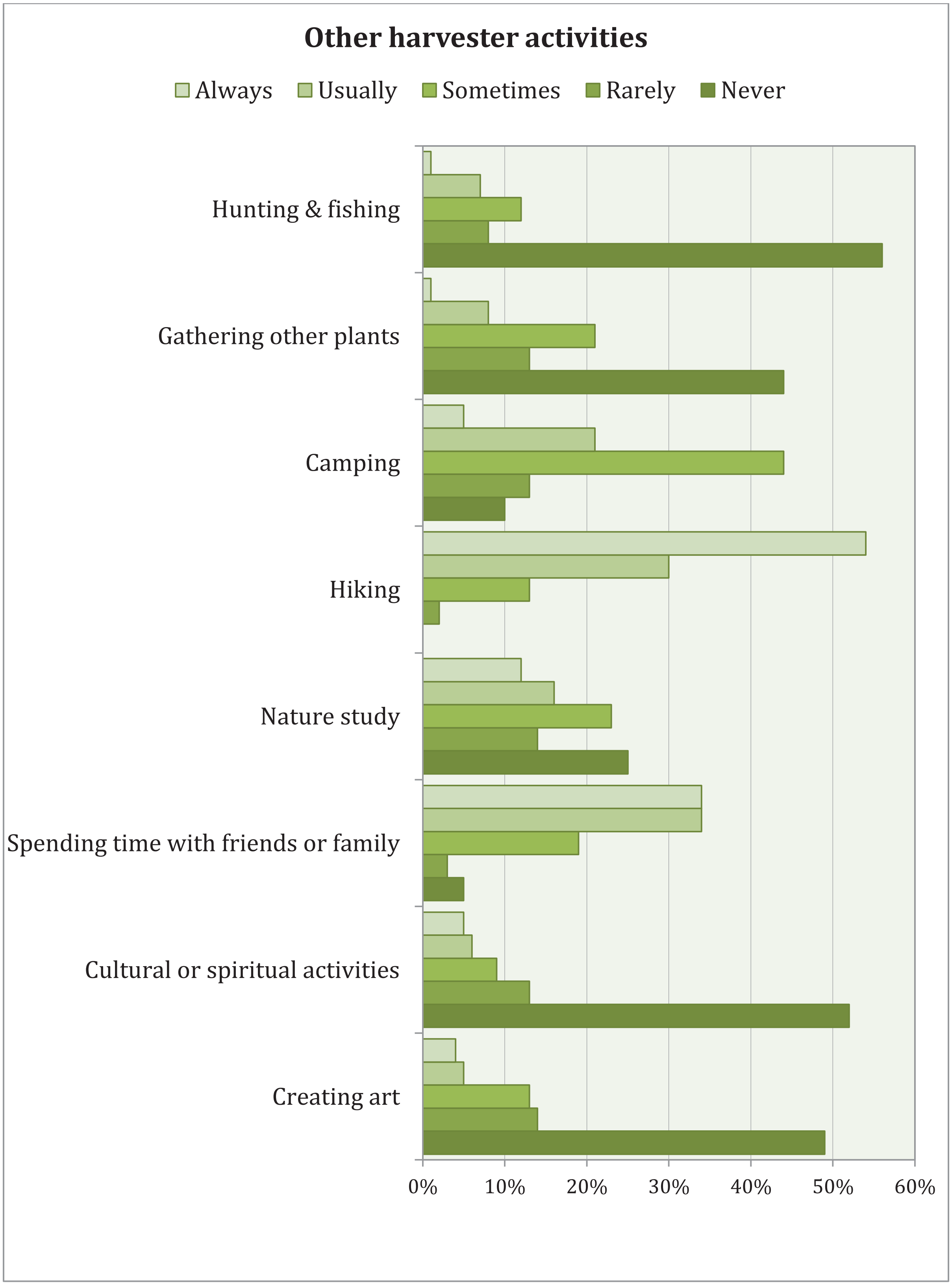


Figure A 17: Other harvester activities

Table A 3: Pct. harvesters more likely to participate in other activities on the MBS

**Percent of harvesters by demographic and harvester practices who are more likely to participate in other activities on the MBS, as compared to study mean**

| | Hunt/fish | Gather Plant/fungi | Nature study | Cult/spir | Art |
|---|---|---|---|---|---|
| **STUDY MEAN (*sometimes-always)*** | **23%** | **34%** | **57%** | **27%** | **27%** |
| Low income | | | | | 52% |
| Ed < bac | 38% | 48% | 63% | | |
| Race/ethnicity other than white | | 53% | 78% | | |
| Age > 50 yr | | | 67% | | |
| Exp > 15 yr | 30% | | | | |
| Res Rural | 35% | 50% | 70% | | |
| Wild foods | | 56% | 74% | 36% | |
| Other outdoor experiences | 17%* | 21%* | 48%* | | |
| Harvest primary | | 45% | 66% | 30% | |
| Harvest > 1 gal | 31% | 44% | 67% | 31% | |

* *Negative correlation*

Five types of "other activities" had statistically significant variations related to harvester demographics and practices. These included hunting & fishing, gathering other plants & fungi, studying nature, engaging in cultural or spiritual activities, and creating art. These were evaluated for correlations between observed variations and harvester demographics and practices by collapsing the five-point scale to a binary scale (never-rarely and sometimes-always). Table A-3 summarizes harvesters who are more likely than the average survey respondent to participate in these activities, with the exception of harvesters who got their start picking berries through other outdoor experiences. With this group, there is a statistically significant trend in that they are less likely than the average harvester to hunt or fish, gather other plants or fungi, or engage in the study of nature during a berry picking event.

- These results indicate that for those harvesters for whom big huckleberry plays a more central role in their lives economically, socially, and culturally, the Forest is also important for a suite of other activities that they also engage in while out picking berries:
    - Harvesters who have been picking berries on the MBS for fifteen years or more and those who typically pick more than one gallon of berries in a given season are more likely to hunt or fish during a berry-picking event.
    - Harvesters whose level of education is less than a bachelor's degree and those who live in rural areas are more likely than the average harvester to hunt & fish, gather other plants & fungi, and study nature during a berry picking event.
    - Harvesters who identify with a race/ethnicity other than white are more likely to gather other plants or fungi and study nature during a berry-picking event.
    - Harvesters over the age of fifty are more likely to engage in nature study during a berry-picking event.
    - Harvesters who got their start picking berries through an interest in wild foods harvesting, those for whom berry picking is at least sometimes the primary motivation for a visit to the Forest, and those who typically pick more than one gallon of berries in a given season are all more likely than the average harvester to gather other plants or fungi, study nature, or engage in cultural or spiritual activities during a berry-picking event.
    - Conversely, harvesters who got their start picking berries through other outdoor experiences are *less likely* than the average harvester to hunt or fish, gather other plants or fungi, or study nature during a berry-picking event.
- Nature study may be a good proxy for harvester knowledge regarding changes in huckleberry production, and the ecology of huckleberry habitats. The following groups were more likely than the average harvester to say they engaged in nature study during

a berry-picking event:

- Harvesters whose level of education is less than a bachelor's degree
- Harvesters who identified their race/ethnicity as other than white
- Harvesters over the age of fifty
- Harvesters who live in rural areas
- Harvesters who got their start picking berries through an interest in wild foods harvesting
- Harvesters who at least sometimes travel to the MBS for the primary purpose of picking berries
- Harvesters who typically pick more than one gallon of berries in a season.

## Barriers to Harvesting

Survey participants were asked to respond to a series of questions regarding barriers to harvesting that they experience using a 1 – 5 scale, where 1 is *never* and 5 is *always*. Figure A-18 shows the results for each barrier.

On the 1 – 5 scale, the average for each barrier was as follows:

| Barrier | Average response |
| --- | --- |
| Personal disability | 1.16 (*never*) |
| Personal safety | 1.17 (*never*) |
| Harvest regulations | 1.20 (*never*) |
| Other pickers | 1.61 (*rarely*) |
| Transportation costs | 1.70 (*rarely*) |
| Concern that berries were picked over | 1.82 (*rarely*) |
| Did not know where to pick berries | 1.92 (*rarely*) |
| Road closures | 1.94 (*rarely*) |
| Lack of time | 2.74 (*sometimes*) |
| Poor berry year | 2.75 (*sometimes*) |

Five types of barriers to harvesting had statistically significant variations related to harvester demographics and practices. These included "lack of time" (time), "poor berry year" (bad year), "felt unsafe" (safety), "did not know where to pick berries" (knowledge), and "road closures" (roads). These were evaluated for correlations between observed variations and harvester demographics and practices by collapsing the five-point scale to a binary scale (*never-rarely* and *sometimes-always*).

Table A 4: Pct. harvesters more likely to experience barriers to harvesting big huckleberry on the MBS

**Percent of harvesters by demographic and harvester practices who experience greater barriers to harvesting on the Forest than the study mean**

| | Time | Bad year | Safety | Knowledge | Roads |
|---|---|---|---|---|---|
| **STUDY MEAN (*sometimes-always*)** | **68%** | **72%** | **5%** | **32%** | **33%** |
| Res Rural | | 84% | | | 47% |
| Ed bac | 71% | | | | |
| Ed > bac | 80% | | | | |
| Exp > 15 yr | 75% | 85% | | 23%* | 43% |
| Race/ethnicity other than white | | | 10% | | |
| Family tradition | | 83% | | | 41% |
| Wild foods | | | | | 42% |
| Harvest primary | 75% | 80% | | | 42% |
| Harvest > 1 gal | | 79% | | 23%* | |

**Negative correlation*

Table A-4 summarizes harvesters who are more likely than the average survey respondent to experience at least one of these barriers to harvesting at least some of the time, with the exception of harvester knowledge, where harvesters with more than 15 years experience on the MBS, and those who typically harvest more than one gallon in a given year were less likely than the average harvester to say that lack of knowledge was a barrier to their harvesting.

- "Road closures" was the second most commonly cited barrier to harvesting. This barrier is experienced more often experienced by harvesters who live in rural areas, who have been harvesting on the Forest for 15 or more years, by those who got their start harvesting due to an interest in wild foods harvesting or as a family tradition, and those who at least sometimes go to the Forest for the primary purpose of picking berries.

- "Poor berry year" can be considered a proxy for harvester knowledge, assuming that a harvester must "know" that it is a poor berry year before it can be a barrier to harvesting. Harvesters who were more likely to know that is was a poor berry year include those for whom berry picking appears to be a more central activity in their lives, including long-time harvesters, people who live in rural areas, and those who got their start picking berries because it is a family tradition.

- The linkage between harvester knowledge and certain harvester demographics and practices is also reflected in the fact that harvesters with 15 years or more experience picking berries on the MBS, and those who typically harvest more than one gallon of berries in a given year were *less* likely to indicate that not knowing where to pick berries is a barrier to their harvesting activities.

- Harvesters who indicated that their race/ethnicity is other than white were twice as likely to indicate that "feeling unsafe" was sometimes a barrier to harvesting berries on the MBS.

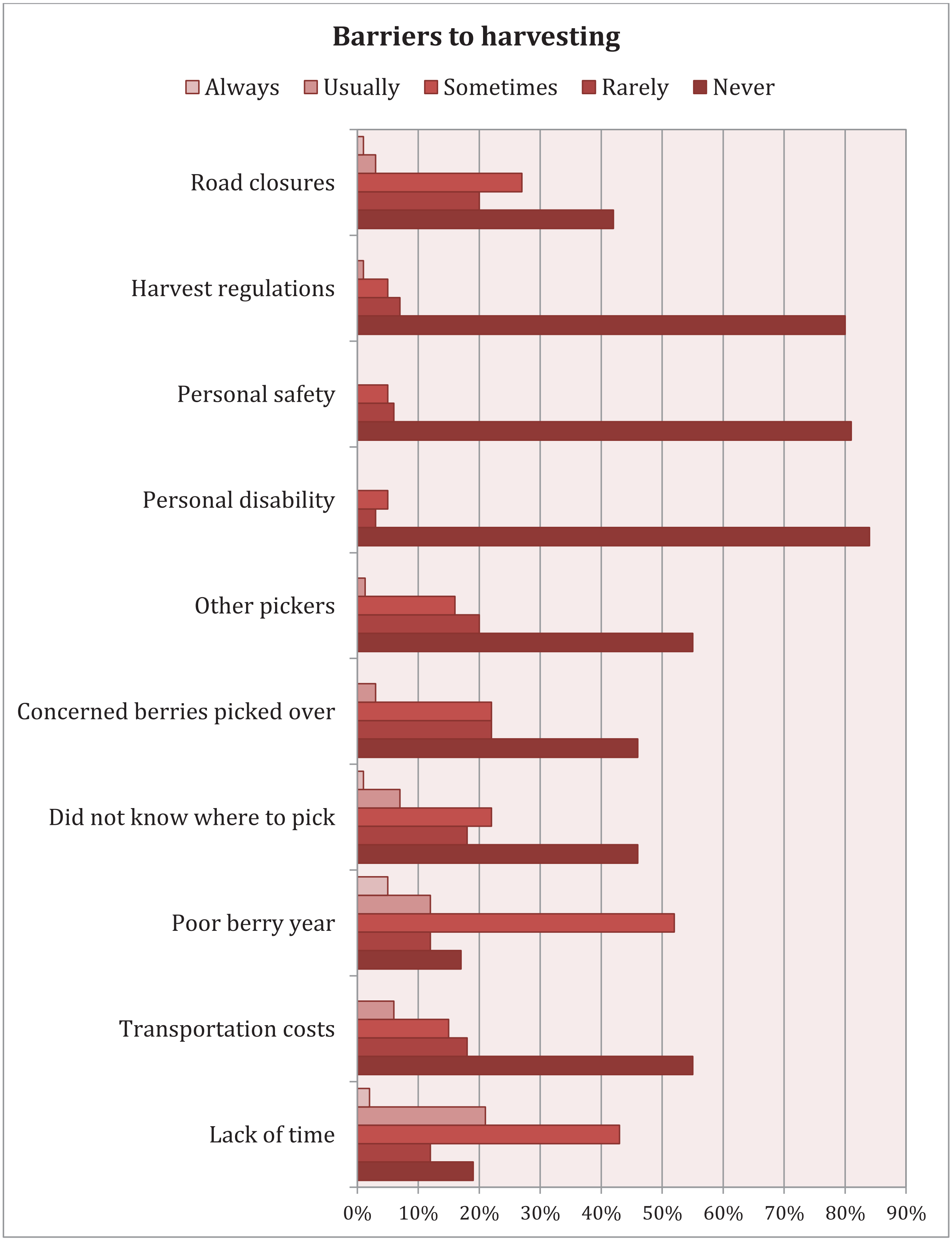


**Figure A 18: Barriers to harvesting**

# Study recruitment flier and harvester survey

**Mt. Baker-Snoqualmie Forest**

## Big Huckleberry* Study 2012

***Do <u>you</u> pick or harvest big huckleberry on the Mt. Baker-Snoqualmie National Forest?***

***<u>We'd like to hear from you!</u>***

**What is this study about?** The big huckleberry harvester study is examining big huckleberry harvesting practices, abundance and accessibility on the Mt. Baker-Snoqualmie National Forest, and we need your help. Your voluntary participation will help us to understand the social, economic, and cultural significance of big huckleberry to the people who pick and harvest them, as well as barriers to harvesting on the Mt. Baker-Snoqualmie Forest.

**Why is this study important?** Big huckleberry harvesters have expressed concern about potential loss of habitat, effects of road closures on access, and growing interest in big huckleberry harvesting. This study will help us to better understand current levels of harvesting on the Mt. Baker-Snoqualmie Forest, and the importance of big huckleberry to the people who harvest them.

**Who should participate?** Anyone who picks or harvests big huckleberry on the Mt. Baker-Snoqualmie Forest, and is over the age of 18, and would like to share their perspectives is invited to volunteer.

**How can I participate?** You can participate in this study by:

- **<u>Taking a 10-minute online survey</u>: http://tinyurl.com/huckleberrysurvey**
- **<u>Participating in an interview</u> about your big huckleberry harvesting experiences on the Mt. Baker-Snoqualmie Forest.**

**How will information gathered in this study be used?** Over the next decade, the Mt. Baker Snoqualmie Forest will be developing management plans that have the potential to affect abundance of, and access to, big huckleberry gathering areas. We hope that the study results will help to ensure that big huckleberry harvester values and concerns are taken into account in planning and decision-making processes.

**Who is conducting the study?** This study is a collaborative effort between the Mt. Baker-Snoqualmie Forest and the Tulalip Tribes. Joyce LeCompte-Mastenbrook, Environmental Anthropologist, University of Washington, has been contracted to conduct the study.

**To participate in this study, or for more information, contact:**
**Joyce Mastenbrook at jklm@uw.edu or 888.224.9439**

*** Big huckleberry (*Vaccinium membranaceum*), also known as mountain, black, or thin-leaf huckleberry occurs on the Mt. Baker-Snoqualmie Forest from 2,500 to 6,000 feet in elevation. Big huckleberry matures in late summer.**

Figure A 19: Study flier

**Mt. Baker-Snoqualmie National Forest**

# Big Huckleberry* Study 2012

***Do you pick or harvest big huckleberry on the Mt. Baker-Snoqualmie National Forest?***

## Please take a few minutes to fill out this confidential survey!

**What is this survey about?** This survey is about big huckleberry picking & harvesting practices, and abundance & accessibility on the Mt. Baker-Snoqualmie National Forest, and we need your input. Your voluntary participation will help us to understand the social, economic, and cultural significance of big huckleberry to the people who pick and harvest them, as well as barriers to picking & harvesting on the Mt. Baker-Snoqualmie National Forest.

**Who should participate?** Anyone who picks or harvests big huckleberry on the Mt. Baker-Snoqualmie National Forest and is over the age of 18.

**How will the information gathered be used?** Over the next decade, the Mt. Baker Snoqualmie Forest will be developing management plans that have the potential to affect abundance of, and access to, big huckleberry gathering areas. We would like to help ensure that harvester values and concerns are taken into account in planning and decision-making processes.

**Who is conducting the study?** This study is a collaborative effort between the Mt. Baker-Snoqualmie Forest and the Tulalip Tribes. Joyce LeCompte-Mastenbrook, environmental anthropologist, has been contracted to conduct the study.

**For more information contact Joyce Mastenbrook at jklm@uw.edu or 888.224.9439**

**This survey is available online at: http://tinyurl.com/huckleberrysurvey**

***Big huckleberry (*Vaccinium membranaceum*), also known as mountain, black, or thin-leaf huckleberry occurs on the Forest from 2,500 to 6,000 feet in elevation. Big huckleberry matures in late summer to early autumn, and typically has shiny, blue-black fruit.**

!
Huckleberry Harvester Study
c/o Joyce LeCompte-Mastenbrook
UW Department of Anthropology
Box 353100
Seattle, WA 98195-3100

Big Huckleberry Study
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**Introduction.** People harvest many kinds of wild berries in Washington State, from the coast to the high mountains. **In this survey, we are interested in your experiences with big huckleberry,** the shiny blue-black fruit that occurs in the mountains at middle to high elevations. Please answer the following questions by placing an "X" or checking the box most appropriate to your situation. _You are free to decline to answer any of the questions._ **Your participation in this study is important. Thank you for taking the time to fill out this survey!**

**1)** Have you **ever** picked or harvested big huckleberry on the Mt. Baker-Snoqualmie National Forest? (Choose one)

| Yes | No | Not sure |
|---|---|---|
| | | |

If "no" or "not sure" to question 1, please skip to question 4.

**2)** **If yes,** for **how many years** have you been picking or harvesting big huckleberry in the MBS Forest?

| Number of years | Less than 2 | 2 to 5 | 6 to 10 | 11 to 15 | More than 15 | Not sure |
|---|---|---|---|---|---|---|
| | | | | | | |

(Choose one)

**3)** **In gallons**, about how many big huckleberries do you pick or harvest on the Mt. Baker-Snoqualmie National Forest in a **typical year**? (Choose one)

| Number of gallons | Less than 1 | 1 to 5 | 6 to 10 | More than 10 | Not sure |
|---|---|---|---|---|---|
| | | | | | |

**4)** How did you get started picking big huckleberries? (Choose one)

| | Family tradition | Economic opportunity | Interest in wild foods harvesting | Through other outdoor experiences |
|---|---|---|---|---|
| | | | | |
| **Other (please describe)** | | | | |

**5)** Have you picked or harvested, or do you plan to pick or harvest big huckleberry on the Mt. Baker-Snoqualmie National Forest **in 2012?** (Choose one. If "no," or "not sure," skip to question 8.)

| Yes | No | Not sure |
|---|---|---|
| | | |

**6)** **In gallons**, about how many big huckleberries have you personally picked or harvested so far on the Mt. Baker Snoqualmie National Forest **in 2012?** (Choose one)

| Number of gallons | None | Less than 1 | 1 to 5 | 6 to 10 | More than 10 | Not sure |
|---|---|---|---|---|---|---|
| | | | | | | |

**7)** **In gallons,** About how many big huckleberries **in total** do you personally **plan to** pick or harvest **in 2012?** (Choose one)

| Number of gallons | None | Less than 1 | 1 to 5 | 6 to 10 | More than 10 | Not sure |
|---|---|---|---|---|---|---|
| | | | | | | |

**8)** How do you typically use the big huckleberries that you pick or harvest from the Mt. Baker-Snoqualmie National Forest? (Please mark the appropriate box for each use)

| | Never | Rarely | Some-times | Usually | Always |
|---|---|---|---|---|---|
| **Eat fresh** | | | | | |
| **Preserve for later use (freeze, can, dry)** | | | | | |
| **Serve on special occasions** | | | | | |
| **Give away as gifts** | | | | | |
| **Barter or trade** | | | | | |
| **Sell** | | | | | |
| **Other (please describe below)** | | | | | |
| | | | | | |

**9)** Is big huckleberry picking your **primary focus** when you travel to the Mt. Baker Snoqualmie National Forest and harvest? (Choose one)

| Never | Rarely | Some-times | Usually | Always |
|---|---|---|---|---|
| | | | | |

**10)** What other activities have you engaged in, or do you plan to engage in, **during** your big huckleberry picking excursions on the Mt. Baker-Snoqualmie National Forest in 2012? (Please mark the appropriate box for each activity)

| | Never | Rarely | Some-times | Usually | Always |
|---|---|---|---|---|---|
| **Hunting & fishing** | | | | | |
| **Gathering other plants or fungi** | | | | | |
| **Camping** | | | | | |
| **Hiking** | | | | | |
| **Nature study** | | | | | |
| **Spending time with friends or family** | | | | | |
| **Cultural and/or spiritual activities** | | | | | |
| **Artistic activities** | | | | | |
| **Other (please describe below)** | | | | | |
| | | | | | |

**11)** Which of the following towns is closest to where you harvested, or will harvest **most of** the big huckleberry that you have picked or will pick on the Mt. Baker-Snoqualmie National Forest in 2012? (Choose one)

| Nearest town | Enumclaw | North Bend | Darring-ton | Sky-komish | Sedro-Wooley | Not sure |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Other (please describe)** | | | | | | |

**12) How many hours** did it take you, or do you expect it to take you, to travel from your home to the berry patch where you picked or will pick big huckleberry on the Mt. Baker-Snoqualmie Forest in 2012? Please provide your "one way" travel time. (Choose one)

| Number of Hours | Less than 2 | 2 to 4 | More than 4 |
|---|---|---|---|
| | | | |

**13)** Have any of the following barriers **ever prevented you** from harvesting or picking big huckleberry on the Mt. Baker-Snoqualmie National Forest? (Please mark the appropriate boxes for each barrier)

| | Never | Rarely | Some-times | Usually | Always |
|---|---|---|---|---|---|
| **Lack of time** | | | | | |
| **Transportation costs** | | | | | |
| **Poor berry year** | | | | | |
| **Did not know where to pick berries** | | | | | |
| **Concern that berries are picked over** | | | | | |
| **Other pickers** | | | | | |
| **Personal disability** | | | | | |
| **Felt unsafe** | | | | | |
| **Worried about regulations** | | | | | |
| **Road conditions** | | | | | |
| **Other (please describe)** | | | | | |

**Demographic information (All responses are optional and confidential).**

**14)** What is your zip code?___________________________________________

**15)** In what year were you born?________________________________________

**16)** Do you consider yourself to be low, middle or high income?____________________

**17)** What is the highest level of education you have completed?____________________

**18)** With which racial &/or ethnic groups do you identify?_______________________

**19)** Is there anything you'd like to add that we haven't yet asked?__________________

______________________________________________________________

**Your participation in this survey is important! Thank you for taking the time to respond.**

**<u>Optional:</u>** To better understand the perspectives of harvesters, we are also conducting in-depth interviews, which take about one hour. If you are interested in participating in a confidential interview about your big huckleberry harvesting experiences on the Mt. Baker-Snoqualmie National Forest, please provide your name & contact information below, or contact the principal investigator, Joyce LeCompte-Mastenbrook at jklm@uw.edu or 888.224.9439

Name_____________________________________________________

Email &/or phone number_____________________________________

## Harvester interview protocol

**I. <u>Introduction</u>**

My name is ________________________ and I am working on a project to better understand the social, economic, and cultural importance of big huckleberry harvesting on the Mt. Baker-Snoqualmie Forest to the people who pick and harvest them, as well as barriers to harvesting them on the Forest.

Big huckleberry harvesters have expressed concern about potential loss of habitat, effects of road closures on access, and growing interest in big huckleberry harvesting. This study will help us to better understand current levels of harvesting on the Mt. Baker-Snoqualmie Forest, and the importance of big huckleberry to the people who harvest them.

Over the next decade, the Mt. Baker Snoqualmie Forest will be developing management plans that have the potential to affect abundance of, and access to, big huckleberry gathering areas. We hope that the study results will help to ensure that big huckleberry harvester values and concerns are taken into account in planning and decision-making processes.

With your permission, I would like to interview you about your perspectives on big huckleberry harvesting on the Forest. The interview will take about 60 minutes, and with your consent, I would like to record the interview. Your participation in this interview is voluntary, and you may choose to stop the interview at any time. You are also free to decline to answer any questions or parts of questions that I ask you.

Before we begin, I'd like to give you a copy of my statement of consent, which explains the voluntary nature of the interview, how I intend to use the information, and how I will protect your confidentiality. Please take a moment to look this over and let me know if you have any questions or concerns.

[Begin interview, ask to begin audio recording]

**II. <u>I'd like to begin by asking you some general questions about the importance of big huckleberry harvesting on the Mt. Baker-Snoqualmie Forest to you, your family, and your community.</u>**

- Do you gather big huckleberry on the Mt. Baker-Snoqualmie Forest?

  [if no, continue here… if yes, skip to next section…]

  - Have you previously been involved in plant gathering? [If yes, ask for more information, including why this person no longer gathers big huckleberry. If no, ask for more information as to why this person does not gather big huckleberry, including whether or not they have a desire to do so].
  - Do you know of anyone in your family or community who does gather big huckleberry? [If yes, gather information about who/what/where/how]
  - Can you recommend anyone else who is involved in big huckleberry gathering that I should contact?
    - [If no to these two questions] Can you provide any insights as to why people might not be gathering big huckleberry?
    - Do you see any benefits to encouraging people to get involved in big huckleberry gathering? What kinds of plants do you gather? [prompt with list]

**[If yes, pick up here]**

- How long have you been gathering big huckleberry? [Ask if they have been gathering on the Mt. Baker-Snoqualmie Forest for this entire time, or if they have gathered in other places as well].
- How did you get started gathering?
- How did you learn to identify and collect them?
- How much time do you spend gathering big huckleberry in a typical season?
- Has your gathering activity changed over time?
- Do you use any special tools to aid your gathering (i.e., basket, rake)?
- When you gather big huckleberry, do you typically gather by yourself or with other people?
- Have you been involved in teaching other people how to find, identify, gather or use big huckleberry?
- Do you gather any other plants, plant parts or fungi in addition to big huckleberry?
- [if yes], what other types of plants and fungi do you harvest? [ask about quantities of and uses for other items]
- When out gathering berries, do you engage in other activities too?
- Do you participate with any groups or formal organizations that promote plant gathering and/or share information about plants, plant gathering and/or processing?
- In gallons, how much big huckleberry do you typically gather in a given year?
- How do you use the berries that you collect? Do you process them in any way?

- [If processed] Is this something that you do by yourself, or do you work with others?

- Do you ever donate your berries, give them as gifts, exchange or sell them?
  - [If donate or give] Where or to whom do you donate them? Is this something that you do by yourself, or do you work with others?
  - [If barter/exchange] Please describe the transaction. Do you have any way to place a value on the exchange?
  - [If sell] What kind of market or venue do you use to sell your berries? How much money do you make by selling them?
- What are the main reasons that big huckleberry gathering is important to you?
- Have you ever had difficulty obtaining enough big huckleberry to meet your needs? [If yes, what were the circumstances: i.e., personal/social/ecological]
- If you were not able to gather big huckleberry, how would you or your family or your community be affected? What alternatives, if any, would you seek?
- Have you ever purchased big huckleberry, or any products made with big huckleberry? [If yes, where, when and from whom purchased]

**III. <u>Next I'd like to ask you some specific questions about the places where you gather big huckleberry.</u>**

- What kinds of places to you gather big huckleberry from? [i.e., open meadows, forests… what are the habitats like]
- How far do you have to travel to get to your berry picking sites? (approximate miles and time)
- How do you get to the places where you gather?

- Can you provide general locations where you gather big huckleberry? (I will use this information for analytic purposes only; any information will be generalized so that specific locations will not be disclosed)
- How did you find out about the areas where you gather?
- Why do you gather big huckleberry in the locations that you choose?
- Do you tend to go to the same places to harvest big huckleberry each year, or do the locations where you harvest change from year to year?
- Are the places where you gather big huckleberry important to you for any other reasons besides plant gathering?
- Have you observed any changes over time to the areas where you gather big huckleberry?
- Have you observed any changes over time to the quality or quantity of the big huckleberry that you harvest?
- Are you aware of any stewardship or restoration activities occurring in the places where you gather your berries?
- Do you ever encounter any barriers to gathering? [If yes, please describe specific situations]
- Do you know if other people also gather big huckleberry in the same areas that you do? [if yes, prompt for details].
- Have there been any tensions or conflicts over picking in these areas? [If yes, with whom and why? What were/are the conflicts and what steps – if any – were taken to avoid or resolve them?]
- Do you feel that big huckleberry gathering is risky or dangerous? [If yes, how so?]

- Are you concerned with possible health risks associated with big huckleberry gathering? [If yes, how so? What measures do you take in order to reduce these risks?]

IV. **<u>Next I'd like to ask you some specific questions about the berries themselves.</u>**

- <u>In a given year</u>, do you notice differences in the quality or quantity of big huckleberry in the places where you harvest (for instance, do you notice differences in the size, flavor, or quantities of berries on bushes from one patch to another)?

- [if yes], what kinds of differences have you noticed? What do you think causes these differences?

- Have you observed differences in huckleberry fruit production <u>from year to year?</u>

- [If yes], what kinds of differences do you notice? What do you think causes these differences?

- Do you know if gathering big huckleberries has any impact on the plants, or habitats, or other organisms that share the habitat?

- Do you do anything to improve the quality or promote the health of the berry plants or their habitats, or to ensure a future berry supply?

V. **<u>Now I'd like to ask you a few questions about the kinds of planning and policies related to plant gathering.</u>**

- Are you aware of any restrictions or regulations related to big huckleberry gathering on the Mt. Baker-Snoqualmie Forest? [If yes, do you know if these policies are enforced? Are you concerned about how these policies impact you?]

- Do you think that your needs and values as a big huckleberry gatherer are being addressed by current planning efforts and policies on the Mt. Baker-Snoqualmie Forest? If so, how? If not, please describe your concerns and explain how your needs might be better addressed.

- Have you observed any changes in attitudes held by public land managers about plant gathering?

**VI. <u>We're almost finished with the interview. Because I am also interested in seeing if there are any social patterns associated with traditional plant gathering, I am asking people to share some basic information about themselves to the degree they're comfortable.</u>**

- What town do you live in, or is closest to your home?
- How long have you lived there?
- Do you rent or own your home?
- How many people live in your household?
- Do you consider yourself to be low, middle or high income?
- What is your occupation?
- What is the highest level of education that you've completed?
    - ☐ High school
    - ☐ Two-year college degree
    - ☐ Four-year college degree
    - ☐ Professional degree
    - ☐ Master's degree
    - ☐ PhD
- What year were you born?
- Where were you born?
- Which racial and/or ethnic groups do you identify as?

VII. **I have just a few final wrap-up questions to ask.**

- Is there anyone else who is involved with big huckleberry gathering that I should contact? [If yes, ask for specific contact info].
- Would you like me to follow up with you regarding the results of this study?
- Would you be willing to allow me to accompany you sometime when you go out big huckleberry gathering? If so, what is the best way for me to follow up with you to arrange this opportunity?
- Is there anything that you'd like to add that we haven't had a chance to discuss yet?

**That's all the questions I have! Thank you very much for sharing your time and insights.**

Appendix B

# HISTORICAL ECOLOGIES OF SWƏTIXʷTƏDXʷ IN THE DUWAMISH-GREEN-WHITE RIVER WATERSHED.

Burke Museum Archaeological Research Collections Fellowship

Final Report (November 2014)

**Historical ecologies of *swətíxʷtəd*[75] in the Duwamish-Green-White River Watershed**

## INTRODUCTION

Expanding on the Burke Museum's "Puget Sound Traditional Foods" database, this project uses archaeobotanical, ethnographic, and historical evidence to enhance our understandings of the co-production of people, plants, and place in the historic Duwamish-Green-White River Watershed. I compare the archaeobotanical record with regional ethnographies to analyze the role that plants played in pre-contact Coast Salish diets, and the interplay between the particular nutritional and ecological properties of plants and Coast Salish daily life. The primary goals of this project were 1) to augment the Puget Sound Traditional Foods database with more information about plant use (both for food and as technologies), 2) to gain greater insight into indigenous stewardship of upland terrestrial habitats, and 3) to investigate the relationship between social networks and plant foods. Secondary goals include the identification of future research directions and also barriers to enhancing our understandings of ancient plant use and management in western Washington - including the relative strengths and limitations of using ethnographic analogy and evolutionary ecology as conceptual and theoretical frames.

Plants were an integral part of the Coast Salish food system prior to Euro-American colonization, and continue to be integral to the traditional foods revitalization, food sovereignty and ecological restoration efforts of Coast Salish communities in the present (Krohn 2007, Krohn and Segrest 2010). Historically, plants constituted from 20 – 30% of the caloric intake consumed by Northwest Coastal peoples (Murdock 1967). Plant foods were an essential component of

[75] "All manner of plants" (Bates, Hess & Hilbert 1994)

traditional Northwest Coast diets, providing dietary fiber and crucial micronutrients not available through the consumption of animal foods (Kuhnlein & Turner 1991), particularly for children and pregnant and nursing women (Norton 1985). In addition to their dietary importance, plants played central roles in the entire food systems, and thus the social systems of Northwest Coast peoples, from the marking of seasonal time, to the organization of labor and the maintenance of relationships to ensure access to important food plants, to the fashioning of digging sticks, basketry, mats, and nets for harvesting and processing, to the use of fuel wood for cooking fires, and the creation of implements for cooking, serving, consumption and storage of both plant and animal foods (cf. Ballard 1950, Gunther 1973, Norton 1985, Turner 2000). Given that the harvest and stewardship of plant resources fell primarily, though not exclusively to Northwest Coast women, the study of people-plant relationships is also inevitably a study of women's contributions to the well-being of a community (Norton 1985, Smith 1940, Snyder 1964).

Much of what we know about historical people-plant relations in the Coast Salish world comes from late 19th to mid-20th century ethnographers working within the paradigm of Boasian historical particularism. In many cases these ethnographies provide rich detail and some kind of conceptual framework about pre-Euro-American Coast Salish life. But historical particularism also tends to result in the production of ahistorical ethnographic accounts, leaving the impression that nothing changed for perhaps thousands of years (cf. Collins 1974, Elmendorf 1960, Gunther 1973, Haeberlin & Gunther 1930, Smith 1941, Snyder 1964, Suttles 1951 & 1955). The archaeobotanical record on the other hand has the potential to contribute to a more dynamic understanding of historical people-plant relations. In particular, archaeobotany has been used in other settings on the Northwest Coast to evaluate anthropogenic landscape modification, processes of resource intensification and plant cultivation, and human adaptation to environmental change (reviewed in Lepofsky et al 2013).

Yet plant materials in general have received inadequate attention in archaeological studies on the Northwest Coast (Lepofsky et al 2001, Lepofsky & Lyons 2013, Lepofsky 2004, Losey & Stenholm 2003). Archaeobotanists argue that this can be attributed to assumptions in the archaeological community about the relative unimportance of plant foods in relation to marine resources – particularly salmon – as well as assumptions regarding the preservation of plant remains in archaeological sites (Lepofsky 2004, Losey & Stenholm 2003). Furthermore, when paleoethnobotanical studies are undertaken within larger archaeological projects, substantive and important portions of their results end up as appendices in larger final CRM reports. This synthesis project is the first to bring the archaeobotany of the Puget Sound region out of the back pages of CRM reports and use them to shed light on ancient people-plant relationships in western Washington.

## CONCEPTUAL FRAMEWORK

I used both ethnographic analogy and ecological anthropology to interpret the archaeobotany of the watershed. Ethnographic analogy in part draws on Marion Smith's watershed model of politically autonomous, highly networked villages. According to Smith, the Puget Sound Coast Salish people perceived and described "ethnical" differences between villages based upon their topographic position. Of relevance here are the *sxwəljáb* (saltwater people), *stologwábc* (river people), and *łalebiuq$^{u}$* (inland people). In addition to these, Blukis-Onat (1988) proposed adding a "mountain-lake" environmental zone of permanent inland residences above ~300m. In her "prehistoric highlands model," she hypothesizes that depopulation in the region began to occur quite early (16$^{th}$ – 18th century), and that as montane populations dwindled, the people remaining in these villages moved to lower elevations. Support for this model comes from Blukis-Onat's own work with Sauk-Suiattle and Upper Skagit communities and the reports of early explorers. The model is also supported by Colin Twedell's ethnographic work in the Snoqualmie and Stillaguamish watersheds (1974), and Nooksack ethnohistories (cf. Amoss 1978).

I also draw on the ethnographic analyses of Wayne Suttles, who more than any other ethnographer in the region endeavored not only to describe, but also to explain the links between variations in social organization and environmental variability on the Northwest Coast. Suttles employed an adaptationist framework to attempt to explain how the highly networked Coast Salish social system worked to ameliorate challenges of spatial and temporal variability, including both periodic shortage and surplus in Coast Salish food systems (Suttles 1959, 1962, 1968). Still, with the exception of his examination of the early adoption of the potato on the Northwest Coast, Suttles' models did not consider changes in food systems over time.

Ecological approaches to changes in Northwest Coast foods systems have focused on processes of intensification of resource production and exploitation, which archaeologists of the region argue may have been prompted by population increase, resource depression, changing climactic conditions, or some combination of these (Burtchard 2007, Kopperl et al 2011, Lepofsky et al., 2003 & 2005). Kenneth Ames has proposed that indigenous practices of plant cultivation may have been the most viable option for intensification of food production on the Northwest Coast (Ames 2005). These practices of tending typically perennial species of plants included burning, weeding, tilling, transplanting, and pruning (Norton 1985, Turner and Peacock 2005), and have been collectively referred to as "low-level food production" (Smith 2005).

At the same time, as Blukis-Onat argues, the concept of "resource exploitation" is overly anthropocentric (and ethnocentric as well), and thus does not reflect a Coast Salish world-view

(Blukis-Onat 2002). Rather, drawing on the linguistic work of Jay Miller and Vi Hilbert, she proposes the Lushootseed concept of "*tiχdxʷ*." In Coast Salish languages, expressing the extent of "control" that a person has in taking some action is obligatory. In the full sense the English gloss "control" reflects a kind of mindfulness and means 'to take care of, hope for, indicate regard for, show concern' (Miller and Hilbert 1993: 238). The proper term is closer to 'caring' and reflects a way of life in which each person has responsibility for others more than the self. People are respected as leaders because they take care of their own responsibilities and help out others, "like the care shown by birds for their young, this word *tiχ*" (Miller and Hilbert 1993:239).

In the present as in the past, status as a high-class person, or *siʔáb*, (a derivative of *ʔiʔáb*, or "wealth") is predicated on one's capacity for generosity. The capacity to accumulate and share food and wealth revolves around the possession of specialized knowledge, or *gʷəd̓ádad* ("advice") about one's own heritage and the responsibilities inherent in maintaining good relations with human and non-human others. Someone who is *siʔáb* maintains good relations through *tiχdxʷ*. Blukis-Onat proposes that "cultivation" in the broadest sense is possibly the most appropriate term in English to express this perspective:

> It applies to the improvement and preparation of land by loosening or digging, to planting and tending a crop, and to nurturing and fostering the growth of plants. The term also applies to enhancing human relations through means of education and social refinement [...] Cultivation applies to the totality of cultural interaction, both within a community and without (Blukis-Onat 2002:128).

Cultivation thus entails maintaining good relations by living up to one's responsibilities to care for other people, spirit powers (*skəlálitut*), plants and animals, and the land. With respect to plants and animals, *tiχdxʷ* may involve active and deliberate manipulation of movement or breeding of a population over some period of time so as to make the population more easily accessible to immediate or future use (Blukis-Onat 1993:129).

## Methods

Washington State's Department of Archaeology and Historic Preservation (DAHP) maintains a searchable database of all recorded archaeological sites in the state. I used ArcGIS 10.1 to create maps of the historical, "pre-engineered" boundaries of four watersheds (the Snohomish/Snoqualmie/Stillaguamish (SSS), Cedar, Duwamish/Green/White (DGW) and Puyallup) - and the USGS quadrangle maps that fall within them. I then used the USGS quads layer in DAHP to search the database for sites falling within each watershed, and prepared a spreadsheet listing site number, name and type (N=590). From this list I prepared an additional spreadsheet comprised solely of sites where archaeobotanical studies had been conducted. I included the sites with either macrofossil or residue analyses, or both (n=32). For each site, I recorded all botanical specimens noted in each report, sample quantities analyzed, analytic period and site type (*sensu* Kopperl et al 2011 see tables B-1 & B-2), watershed, site orientation, and noteworthy contextual details. It is common in archaeobotanical practice to consider non-charred plant remains as evidence of bioturbation, and these were excluded from the list.

Table B 3 summarizes the sites in each watershed by orientation. Initially I had hoped to compare the archaeobotanical differences between each watershed. However, given time constraints, and the fact that the sites located within the DGW comprise a complete array from the saltwater to the mountains, and that with a few notable exceptions (discussed below), the sites not located within the watershed generally do not add new botanical information to that which is found within the DGW, I chose to focus most of my analysis on the 17 sites that fall within the DGW. Although they are technically not within the DGW, I included the two West Point sites (45KI428 & 45KI429) in the analysis so that there would be a sufficient number of saltwater sites for statistical comparison between site orientations.

**Table B 1: Analytic period**

| Analytic Period | |
|---|---|
| 1 | 14-12k cal BP |
| 2 | 12-8k cal BP |
| 3 | 8 - 5k cal BP |
| 4 | 5 - 2.5k cal BP |
| 5 | 2.5 - 1k cal BP |
| 6 | 1 - .5k cal BP |
| 7 | .5 - .2cal BP |

I used SPSS 22 and Excel 2010 to statistically analyze the botanical arrays of each site within the DGW by four dependent variables – site orientation, analytic period, sample quantity, and site type. *Site orientation* refers to a general location on the landscape (saltwater, downriver, inland, and montane), and as a mode of examining Marian Smith's watershed-oriented "ethnical" model described in the introduction, is the primary variable of interest. Differences in the botanical array by *analytic period* may signal changes in the use or presence of botanicals over time. To better account for the possibility of more recent changes in botanical arrays, I divided Kopperl et al.'s 2011 "analytic period 5" into three analytic periods for a total of seven Table B 1. *Sample quantity* refers to the number of samples analyzed per site, and includes macrofossil (both flotation and "spot" samples), residue, and FTIR analysis (see Table B 3). Significant differences in the distribution of botanicals by sample quantity would signal that sample size has an effect on the number of species found in a particular site. *Site type* is a subsistence-oriented schema that attempts to capture site differences based upon inferences about the types and intensity of activities that took place at a given site (Kopperl et al 2011:107 - Table B 2). This "dependent" variable is admittedly somewhat circular, as in theory; categorization of site type should follow from the evidence – including archaeobotanical evidence. However, no significant difference across site types may be suggestive of the extent to which archaeobotanical evidence is taken into account in site interpretation.

**Table B 2: Site typology**

| Site typology | Kopperl 2011 | This study |
|---|---|---|
| Base camp | 1 | 1 |
| Multi-resource field camp | 5 | 2 |
| Resource procurement fish/shellfish | 7 | 3 |
| Resource procurement fishing | 8 | 4 |
| Resource procurement lithic quarry | 11 | 5 |
| Specific resource field camp | 13 | 6 |

There is a commensurability problem when it comes to comparing the results between studies because of the variation in approaches to archaeobotanical analysis by individual analyst and by type of study (e.g., macrofossil v. residue analysis). To address this problem, I transformed all numeric data to a simple presence-absence matrix. Following Nancy Stenholm's schema for categorization and grouping of botanical arrays, I then tallied each site by number of conifers, edible tissue, hardwoods, and "other." I then created a sub-group of categories for the edible tissue, comprised of fruits, roots, nuts, seeds, and "other." With the exception of "processed edible tissue" (PET) categories, and generics in the "other" category (i.e., moss, fern), I included in each of these tallies only the data that was at least tentatively identified to botanical family. To address potential commensurability issues related to sample quantity differences between sites, I created a second set of independent variables for each group based on the proportion of each category within the two groups.

I also used GIS to develop a visual model of the historic Coast Salish cultural landscape in the Duwamish-Green-White watershed. In addition to the layer incorporating archaeological sites, I digitized the rivers, lakes, wetlands, prairies, bogs and trails represented on mid-19$^{th}$ century GLO maps to visually represent potential plant gathering areas and anthropogenic habitats. I also incorporated layers representing the ethnographic villages and plant-related places recorded by T. T. Waterman in the late 19th century (Waterman 2001), along with a few montane sites recorded by Marian Smith in the early 20th century (see Figure B 3 and Figure B 4). The plant-related places include sites whose place names are the names of plants, generic place names where plants were likely gathered (i.e., "prairie"), and places where Waterman mentioned in his notes that plants were gathered. An asterisk before the name on the map notes this last group. The digitized trail and early road system noted on GLO maps indicates potential connections between places where people gathered and processed plants and ethnographic villages (Figure B 5 & Figure B 6).

## RESULTS

The botanical array across the 17 sites in the DGW watershed is quite diverse, both in terms of species composition and in terms of the variability between sites. In total there are 87 botanical types represented in the array: 16 conifers, 23 hardwoods, 11 "other" botanicals (Table B 4) and 37 edibles comprised of 20 fruits, 10 roots, 2 species of nut, 1 species of seed, and 4 "other" edibles (Table B 5). There is evidence of berry, root, and goosefoot seed processing at nine of the sites within the watershed.

The updated database adds twelve edible types to, and excludes six from the original Burke database. Crowberry (*Empetrum cerasiformis*), currant/gooseberry (*Ribes sp*), and tentative identifications of thimble- and trailing blackberries *Rubus parviflorus and R. ursinus,* respectively) are new additions to the "fruits" category, along with dogwood (*Cornus sp*), which was moved from the "other" edible tissue list. Italian plum, grape, and plantain, which were all identified in the Duwamish 1 site, were on the original list but excluded here because they are non-charred, modern intrusions. Knotweed, bulrush and legume (*Fabaceae*) were moved to the non-edible "other" category [these could be debated]. I also created a separate category for "seeds," meaning processed seeds, and moved the *Chenopodiums* to this category (discussed below).

The number of root types doubled from the five identified in the original database. This is mainly due to the addition of three plant families identified through residue analysis on biface tools from the Enumclaw Plateau; Apiaceae, Asteraceae, and Liliaceae. These families are most representative of culturally important "root" foods (aka geophytes) that would have grown in the open prairies so emblematic of that area. For example, these may represent Gairdner's Yampah (*Perideridea gairdneri*) or other "Indian" carrots or biscuit roots in the Apiaceae family, Balsam-root (*Balsamorrhiza sagittata*) in the Asteraceae, and any number of a whole suite of plants in the Liliaceae, including tiger lily (*Lilium columbianum*) and northern rice-root lily (*Fritillaria camschatensis*). The roots of all these foods would be prime candidates for processing with biface tools. The other two additions include bracken fern root identified at West Point (KI429), and fawn lily (*Erythronium spp)* at the Buck Lake site on Mount Rainier.

Three of the species identified in archaeological sites in the watershed, including fawn lily, crowberry (*Empetrum nigrum*), and *Chenopodium,* are not mentioned as culturally important species in either Gunther's (1945) hallmark synthesis of the ethnobotany of western Washington, or Marian Smith's treatment of Puyallup-Nisqually ethnobotany (1940).

Statistically, both the botanical array and the edible botanicals across sites have a non-linear distribution. And in almost every case there is as much (or more) variation within the dependent variable categories as there is between them. Nevertheless Kruskal-Wallis tests for sample independence indicate that there are statistically significant differences at the .05 level for the conifer and edible botanicals in relation to analytic period, and at the .10 level for roots in the edible array in relation to site orientation. There was no significant difference in either the site type or sample quantity dependent variables. This is true for tests of all the archaeobotanical sites studied, as well as only those within the Duwamish-Green-White watershed.

Analytic Period: The botanical arrays for analytic periods 3 through 7 are shown in Figure B 1, below. The differences between analytic periods in terms of edibles are most likely attributable to the relatively high proportions that are present in AP 3. This represents analysis of 8 samples from three strata at Buck Lake (45PI438), located in Mount Rainier National Park at an elevation of roughly 1585m. These samples are from ~6-8k BP, and include *Vaccinium* fruit, which is probably big huckleberry (*V. membranaceum)* or Cascade blueberry (*V. deliciosum*), and large quantities of ~ *Erythronium,* or fawn lily, goosefoot (*Chenopodium sp.*) as well as other processed fruits and plant starches that were not identified to species. This particular site skews the pattern in the data in terms of the effect of analytic period on the proportion of edible plants as compared to other botanicals in archaeological sites. Yet given that the site is old and exposed, the archaeobotany of Buck Lake also underscores the important point that indigenous people have been harvesting and processing plants in the Cascade Mountains of Washington State for millennia, *and* that substantive evidence of their doing so can be found even given these challenging spatial and temporal circumstances.

The proportion of conifers across analytic period follows a normal distribution, which reaches its apex in AP5 (2.5k BP). However, the left side of the distribution (AP's 3-4) spans a 6,500 year period and includes data from only 5 of the 17 sites, while the right side (AP's 5-7) spans only a 2,500 year period, yet includes data from 16 of the 17 sites in the DGW. Nevertheless, the proportion of conifers in the archaeobotanical record decreases beginning with AP 5 (2500 BP), while the proportion of hardwoods increases. This is counterintuitive, because the pollen record for the Puget Sound basin indicates that forest species composition transitioned from tundra to hardwood dominated savannah in the mid Holocene, and to a conifer dominant landscape by the late Holocene (Brubaker 1988, Dunwiddie 1986, Gavin et al 2003, Leopold & Boyd 1999, Lertzman et al 2004). For example, the culturally central western-red cedar (*Thuja plicata*) was well established between 3,000 & 3,500 years BP (interestingly, however, it is apparently present in the archaeobotany of Buck Lake at 6780 BP). Therefore, it seems reasonable to expect that the archaeobotanical record would also reflect this transition.

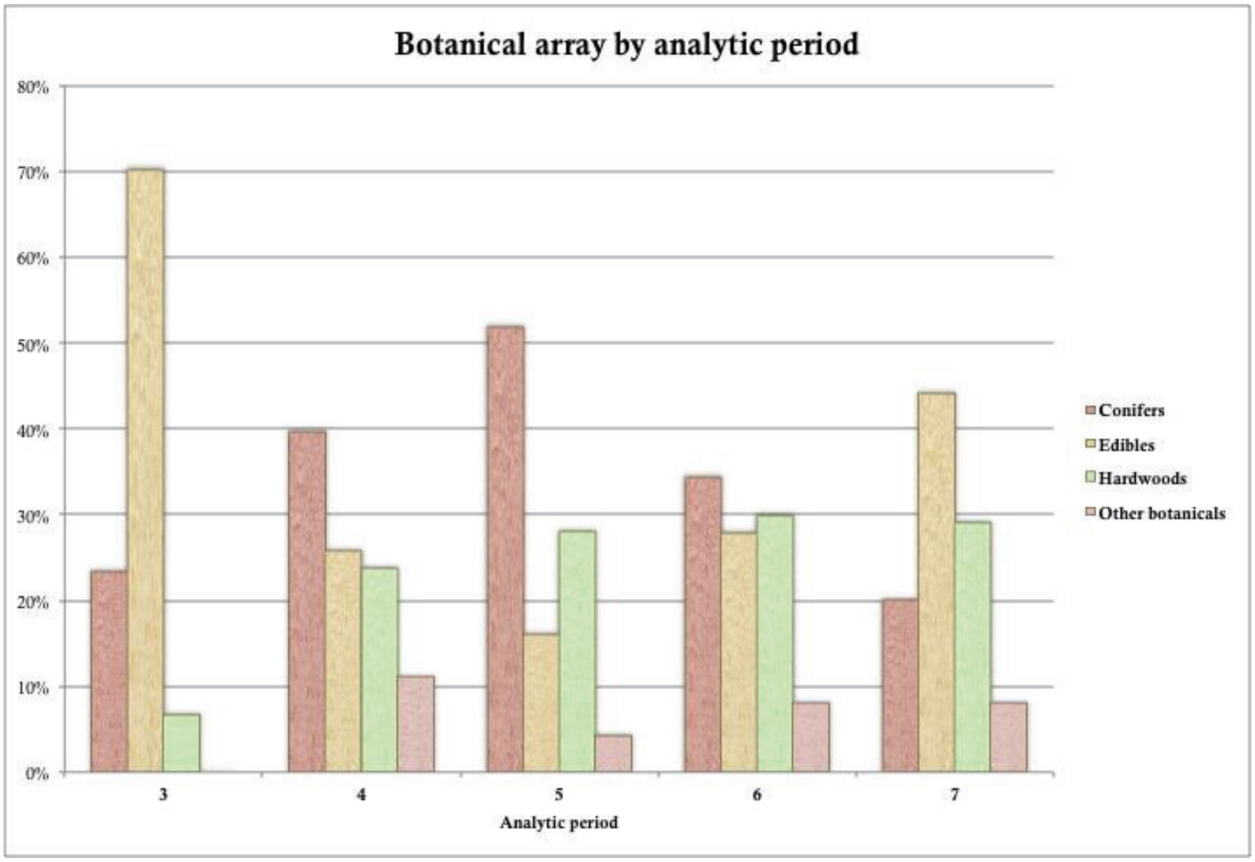


**Figure B 1: Mean of botanical array by analytic periods**

The statistically significant difference between AP's in the proportion of conifers represented in the archaeobotanical array may reflect a general trend from hardwood to "old-growth" conifer-dominated forest in the early Holocene before 2.5k BP, followed by increasing anthropogenic modification of the forest and/or choices about fuel wood after 2.5k BP. This should be especially true for sites where certain types of food – including fruits and geophytes - were processed, as hardwoods seem to have been a preferred type of wood for smoking and potentially for pit-cooking and therefore would have been sought out for this purpose, while conifers – particularly Douglas-fir (*Pseudotsuga menziesii*) seem to have been more commonly associated with hearths and were presumably more ubiquitous across the landscape. The proportion of hardwoods to conifers is substantively higher in four of the nine sites where plant food processing was identified. These include White Lake (AP7), Renton High School (AP7), Lwalb Old Channel One (AP6), and 45KI717 (AP7). There are more conifers than hardwoods in the botanical arrays at Duwamish 1 (AP's 5-7), Allentown (AP6), the George Nelson Allotment Site (AP7), and at Buck Lake (AP). Only residue analysis was conducted at the Muckleshoot Tribal School, and there are very few hardwoods to choose for processing at the montane Buck Lake site.

Charcoal and pollen analysis also potentially point to evidence of anthropogenic landscape modification. For instance, high quantities of charcoal in macrobotanical samples not taken from hearths, or high quantities of charcoal or dominance of early seral species in the pollen record may signal practices of anthropogenic burning. There is some evidence of this from five sites in the watershed, all of which occur at the inland sites on the Enumclaw Plateau or the montane sites in the Cascades. There is evidence of prior fires at 45KI717 on the Enumclaw Plateau (AP7 – based on charcoal and pollen analysis), and at Mule Springs (AP5 – charcoal analysis) and the Naches Lithic Scatter (AP5 – charcoal analysis), but the reports are agnostic as to whether any of these fires were natural or anthropogenic. The George Nelson Allotment site on the Enumclaw Plateau (AP7) is located right on the edge of the historic boundary of the Muckleshoot prairie. Lewarch *et al.'s* (2000) comparison of soil samples from different parts of the site indicated that the prairie-forest ecotone persisted for at least 400 years and perhaps longer. Without human intervention, trees would likely have invaded the prairie. At Buck Lake, Tweiten (2007) identified an increase in charcoal frequency beginning ~2700 BP. This is contemporaneous with the regional pattern of decreased charcoal frequency and regional archaeological models of resource intensification, and is most likely the result of anthropogenic fires.

Site Orientation: The proportion of edibles by site orientation is illustrated in Figure B 2, below, and clearly shows the higher relative proportion of root foods in the inland and montane sites. This pattern in part can be attributed to the inclusion of the results of residue analysis from the Muckleshoot Tribal School and 45KI717 in the roots category.

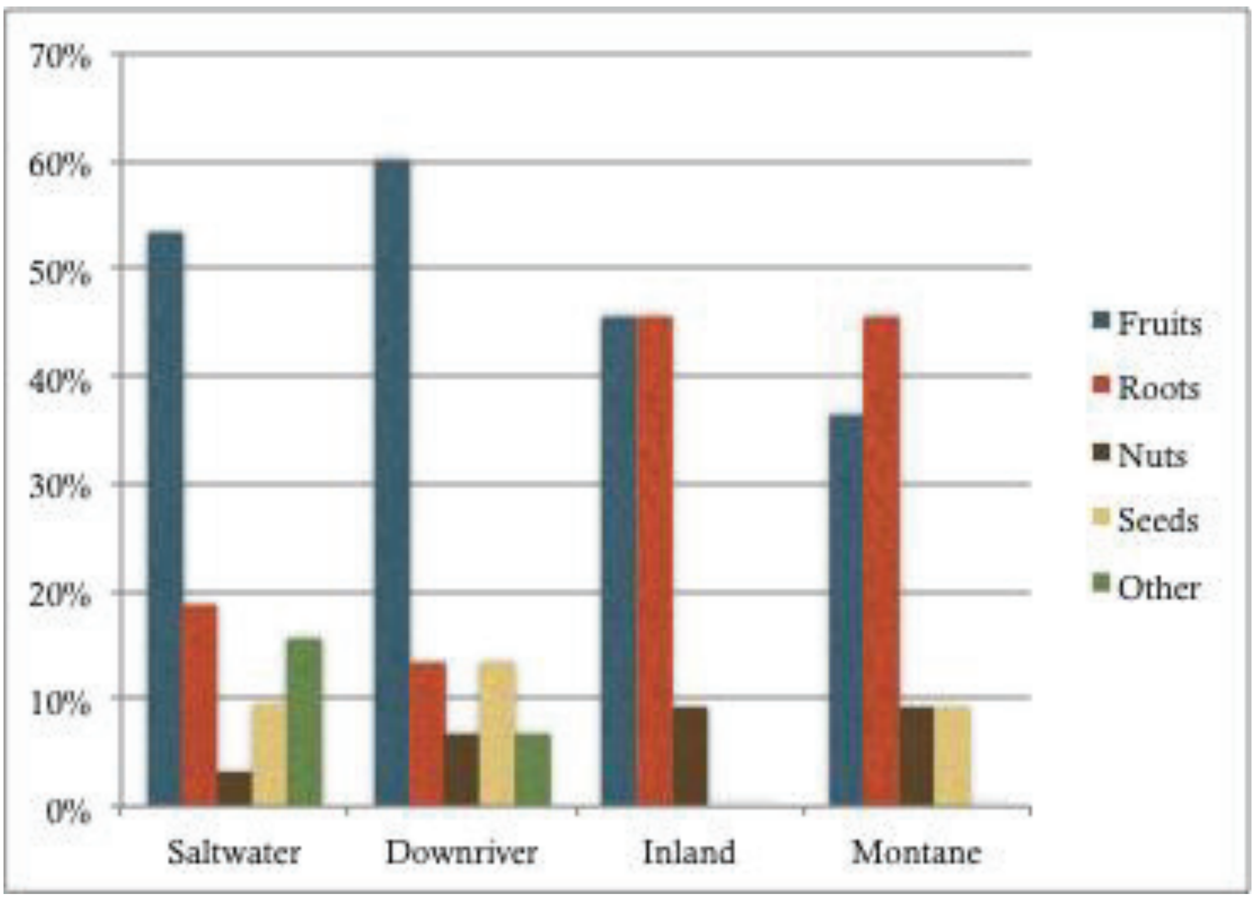


**Figure B 2: Proportion of all edibles by site orientation**

Of the ten root types identified in the watershed, only the generic "processed roots" unequivocally occurs in all four of the site orientations (Table B 5). Stenholm tentatively identified processed camas at the Naches Lithic Scatter, which is located at an elevation of about 1525 meters. Camas does not grow at this elevation, and was probably carried there by someone who was using it for sustenance as they traveled. This is also likely true for other energy dense edibles found in the montane sites, including a piece of processed hazelnut cake at Fryingpan Rockshelter and processed goosefoot seeds identified at Buck Lake.

GIS analysis: The study area overview map (Figure B 3), includes all of the archaeological sites identified from the DAHP database, and ethnographic places recorded by Waterman. The four montane ethnographic place names are based on Marian Smith's field notes. These three sources of data alone give some indication of the extent to which the watershed was a densely populated, humanized landscape long before Euro-Americans arrived. Waterman recorded 14 ethnographic villages and 39 plant-related places within the study area. Of the plant-related places, 31 of them occur within a 3-mile radius of at least one of the ethnographic villages, as do 12 of the 17 archaeobotanical sites in the watershed (4 of these are the montane sites – far from ethnographically recorded villages) (Figure B 4). Many of the plants co-occur in the ethnographic and archaeobotanical data, including bulrush, camas, chokecherry, crabapple, ironwood, Oregon ash, red elderberry, salal, and strawberry. Ethnographically recorded plants that definitely do not appear in the archaeobotanical record include cattail, cranberry, "fossil fern," horsetail, serviceberry, and skunk cabbage, and possibly blueberry and/or huckleberry. Several of the plants included in the plant-related places are important for the production of materials, including cattails (mats), horsetail (polishing wood, basketry imbrication), ironwood (digging sticks, cooking stakes), Oregon ash (canoe paddles), and skunk cabbage (wrapping food for drying and steaming, and as pit cook layers).

The GLO maps provide some ecological context to the archaeobotanical and ethnographic sites; the trails and early road systems (most likely developed from indigenous trails) noted by land surveyors shows the relationship between potential gathering areas and villages. This is especially true for the inland sites on the Enumclaw Plateau (Figure B 6), where there is an extensive system of prairies, cranberry bogs, and wetlands, many of which are clearly connected by trail and early road systems to ethnographic villages. Surveyors noted very few trails along the Duwamish, Black and lower White river systems, and there are also fewer prairies noted on these maps (Figure B 5). It is possible that by the time this area was surveyed, processes of colonization had obliterated this part of the system.

## Discussion

In this discussion I summarize three facets of this synthesis project: 1) differences in the archaeobotanical and ethnobotanical record, 2) evidence for resource intensification in the archaeobotanical record, and 3) what the archaeobotanical record of the DGW might tell us about Coast Salish social relations and networks.

<u>Discrepancies between the archaeobotanical and ethnobotanical record:</u> Early ethnographers of the region with an interest in ethnobotany recorded uses for hundreds of plants by western Washington indigenous communities. Only a fraction of these are identified in the archaeobotany of the DGW, and so it is surprising to find fawn lily, crowberry and goosefoot in the archaeobotanical record, but not in the ethnobotanical record of western Washington. However, each of these plants is mentioned as being culturally important elsewhere.

The harvesting of fawn lily is mostly documented for indigenous communities living on the plateau (Hunn 1990, Turner 2004). Historically, large quantities were typically harvested in late summer, along with other montane plants, particularly mountain huckleberries. Nlaka'pmx elder Annie York said that during times of scarcity, people would also travel to the mountains to harvest fawn lily and other montane roots as survival foods earlier in the year (Turner, Deur and Mellott 2011:9).

Crowberry is a circumboreal and highly prized cultural food in the north. It forms dense mats in muskeg, tundra and subalpine habitats. Many northern indigenous groups consume large quantities of these berries and have rich cultural traditions related to their harvesting and consumption (Moerman 1994, Turner 2004, Turner 2010). Although it is more commonly associated with more northern latitudes, crowberry does also grow in boggy areas at lower elevations in the Puget Sound basin. Seven *Empterum* seeds were identified as one of only two edible plant species at the Duwamish Riverbend site (the other being *Sambucus*), and this is the only site in the study area where crowberry was identified. It is an intriguing find, because Blukis-Onat interprets Duwamish Riverbend as a place where "commemorative" burning took place. This interpretation was supported by the (almost) complete lack of plant food remains in the samples that were analyzed (however, there *were* a lot of calcined fish and mammal bones).

*Chenopodium,* or goosefoot, is an amaranth relative and is widespread throughout North America. It is the most commonly identified edible plant in the DGW after elderberry and the generic "processed fruity" category. It was found in saltwater, downriver and one montane site (Buck Lake), but not in any of the inland sites on the Enumclaw Plateau. There are no native species of goosefoot that grow at higher elevations, which suggests that someone transported the seeds there. It is not clear whether these identifications represent just one or more than one species. Goosefoots are ruderal plants that are among the first to colonize disturbed areas. There is some sense in the archaeobotanical reports that this is what at least in part accounts for their ubiquity. But there are enough individual seeds in several archaeological sites to suggest that they were being intentionally toasted for food.

There are many accounts of *Chenopodium* seeds being processed for food elsewhere, including pitseed goosefoot (*C. berlandieri*), which is common throughout North America, including the Northwest Coast. This species was cultivated as a cereal crop in the northeastern US prior to Euro-American colonization, and is also valued for its leafy greens. Strawberry spinach (*C. capitatum*) was identified to species at Allentown. This is the only instance where a *Chenopodium* was identified to species in the DGW. This plant grows everywhere in North America except the southeastern US. It seems to have been more common to use the bright red, fresh fruits of this plant for medicine, dye and body adornment, as opposed to using the seeds for food. Strawberry blite is also ubiquitous in archaeological sites along the Fraser River. As is true for the Puget Sound basin, this plant is also absent from western British Columbia's ethnobotanical record (Lepofsky and Lyons 2013).

These three species highlight the point that the plants identified in archaeobotanical studies have the potential to enhance and challenge ethnohistorical understandings of ancient plant use (Lepofsky and Lyons 2013). Their presence raises interesting questions about changes in the diet over time, and also about ethnobotanical methods. Had these foods been forgotten by Gunther and other ethnographers' time? Does their absence have more to do with the "informants" that ethnographers worked with, and the plants they focused on, than the food practices of indigenous people?

The relative abundance of certain species in both the archaeo- and ethnobotanical records can also point to the historical significance of plants that are no longer widely used today. This is the case for red elderberry (*Sambucus racemosa*), which was a very important food in the Puget

Basin according to the ethnobotanical record. It has the highest vitamin C content of any of the Puget Basin fruits, and it was common to store them in underground containers to eat during the winter months. The seeds are also very high in cyanide producing glycosides and so the berries must be processed or the seeds spit out prior to consumption. Pasteurization is apparently a common solution to this problem, and this, along with preservation, was probably the rationale behind the method of processing described for Puyallup-Nisqually people:

> The fruits were boiled and put into loosely woven baskets, which had been well-lined with maple leaves. The basket was carefully covered with the same kind of leaves and submerged in a running stream. It took about a month for the berries to cure and be ready to eat. When finished they formed a thick paste 'as yellow as butter.' After the basket was opened it had to be kept in the water and the paste was used regularly until it was gone. Elderberry paste was mixed with other dried berries to heighten their flavor (Smith 248).

Red elderberry is extremely common in archaeological sites throughout its range on the Northwest Coast, where it is frequently found in abundance (Losey *et al* 2002). For instance, David Rhodes identified 4,750 elderberry seeds in a pit at Sbabadil, which Chatters interpreted as a "berry pit" used for winter storage of this fruit (Chatters 1981). It was important enough historically to have at least one of the plant-related places named after it. Yet, while it is ubiquitous on the landscape and produces fruit in abundance, red elderberry is rarely consumed or discussed in Coast Salish communities today.

<u>*tiχdx$^w$* - cultivation of relationships with place:</u> Though there is no direct evidence for manipulation of the landscape or specific species of plants in the watershed, there is abundant indirect evidence for practices of anthropogenic burning, particularly inland and in the mountains.

The increase in the proportion of hardwoods from AP5 forward may be indirect evidence of resource intensification, signaling an increase in processing foods for storage, and/or maintaining sites in an early seral state. Plant processing and the differences between fuel woods also demonstrate knowledge of the different properties of wood, such as heat intensity and length of burn time. Different types of plants and animals require different processing strategies. For example, wapato cooks quickly, while camas takes up to two days to cook. Wapato can be stored fresh for several months and is cooked in hot ash or coals just before the tubers are to be consumed (Suttles 1955, Turner 1995). Camas is immediately processed in pit ovens for at least a couple of days, after which it can store for years (Suttles 1951). Many berries (salal, *Rubus* and *Vaccinium* spp.) are boiled and pressed into cakes, then dried on racks using low heat and smoke. At Duwamish 1 and Renton High School, fish and shellfish were alder-smoked to preserve them (Stenholm KI23, KI501), at White Lake, maple coals were used for cooking wapato (Stenholm KI438). Oceanspray was used for drying shellfish at Duwamish 1. It is reasonable to infer that the extensive knowledge of wood properties that were employed to ensure the desired outcome in food processing would also extend to knowledge of fire effects on the broader landscape.

Evidence of continuity of the forest-prairie ecotone for at least 400 years from the George Nelson Allotment site on the Enumclaw Plateau, and charcoal analysis at Buck Lake have the strongest evidence for anthropogenic burning. At Buck Lake, Tweiten's results indicate resource intensification at ~2700 BP. He proposes that the purpose of burning was to maintain productive beargrass harvesting sites. It is more likely that the purpose of burning was to maintain an open habitat that supported a suite of culturally important plants and animals, including beargrass.

The botanical array of inland Enumclaw Plateau sites is replete with many culturally significant root foods, all of which require light to survive. Nineteenth century cadastral maps clearly indicate a network of small prairies connected by trails on the Enumclaw Plateau (Figure B 6). These prairies would have been ideal root gathering habitat. Muckleshoot tribal members still gather camas from some of them today. There is no logical reason for these prairies to exist without intentional burning. Berries would also thrive in them, particularly on forest edges.

Two of these historic prairies include Meridian Prairie, or *t'aqaʔadi,* "salalberry place," (Waterman 2001:159) and Jenkins Prairie. Early settlers remembered this latter area (now a county park) for the Indian people who, as late as the 1930s, pitched their "teepees" and harvested camas at the site (Storm 2002:504). Remnant oak groves, camas, and other culturally important food plants that have been identified at Jenkins Prairie, as well as the presence of fire scarred Douglas-fir trees, strongly suggest that this was a place that was culturally maintained by the ancestors of contemporary Muckleshoot people (ibid.).

The Enumclaw plateau constituted portions of the homelands of both the *skoʔpabš* and *smulkamish* (White River) people, whose descendants are now collectively known as the Muckleshoot. People have been occupying the plateau since before the Osceola mudflow, which about 5,600 years ago, inundated the plateau and portions of the Green River valley with more than one-half a cubic mile of mud that travelled from the flanks of Mt. Rainier at a rate of perhaps 50 miles per hour (Hedlund 1974). Archaeological investigations conducted by Gerald Hedlund and his Green River Community College students in the 1970s yielded nineteen sites on the plateau. The largest and longest occupied of these tended to be located in or near open prairies (Hedlund 1983). Hedlund concluded that these prairies "were human-caused or kept open by deliberate burning on a regular basis, perhaps as often as twice a year" (Hedlund 1983:114). This claim stems from the considerable time depth of occupation at these sites. As also noted in Lewarch *et al.'s* data recovery report at the George Nelson Allotment site, Hedlund infers that if they had not been deliberately maintained, these prairies would have inevitably reverted to closed canopy western hemlock and cedar forests, which would have rendered them unsuitable for occupation.

Joe Nimrod, a Muckleshoot tribal member who provided testimony to the Indian Court of Claims in 1927, implied that the Enumclaw plateau was a cultivated place when he stated that "All of the land between the two rivers was good for farming – that is the reason the white people drove the Indians out."[76] The ICC testimony of Joe Bill, also Muckleshoot, suggests that prescribed burning was a social institution. Bill indicated that the people "had a ruling,"[77] regarding the burning of underbrush, and that it was *customary* to do so "about every 3 years, in the fall of the year to keep 'big timber' from burning."[78]

The prevalence of cultivated prairies on the Enumclaw Plateau, as well as the higher abundance of carbohydrate dense foods – particularly roots - in inland and montane sites may be related phenomena. Carbohydrate dense foods help to meet caloric needs in diets with lower fat content (Speth and Spielman, cited in Spurgeon 2003). The practice of substituting carbohydrates for fat may have been true for inland people, for whom land mammals were a much more important part of the diet than they for saltwater people. Furthermore, the all-important anadromous fish would have lost substantial body fat by the time they had swum all the way to these inland villages. The ethnographic record also substantiates the greater importance of root foods in the diets of inland people, where "root gardens" are more commonly mentioned in relation to inland dwellers. Inland people living on the drainages of the Nooksack, Upper Skagit and Sauk rivers maintained family owned root plots in several prairies near their villages. In these they grew and harvested the roots of bracken fern (*Pteridium aquilinum*), "wild carrot,"[79] tiger lily (*Lilium columbianum*), camas (*Camassia quamash*), wild onion (*Allium cernuum*) and

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[76] Testimony of Joe Nimrod, Duwamish *et al* 1933:174
[77] Testimony of Joe Bill, Duwamish *et al* 1933:161
[78] *ibid.*
[79] Probably *Perideridia gairdneri* but possibly also *Conioselinum pacificum.* See Compton 1993 for a discussion of the 'ambiguity' around which species "Indian carrot" might have been.

other roots. These plots were 3 – 4 acres and marked off with stones or sticks. The people maintained them by tilling, weeding, and replanting the seeds, bulbils, cormlets, and tillers of the plants that grew in them. The rights to harvest from the Upper Skagit plots passed through the matrilineal line. It was not necessary for a woman to live in the village to dig roots from these plots, and women traveled from distant villages to harvest in them (Amoss 1978, Ellen Selkanum 1933:513-515, Collins 1974). This may also have been true on the Enumclaw Plateau.

*tiχdx$^w$* - cultivation of relationships with people: As noted in the "conceptual framework" section above, ethnographers of the region suggest that spatial and temporal resource variability and the highly networked social worlds of the Coast Salish are correlated. A brief, general model of what was a highly complex and variegated system is that much, but not all of what the inhabitants of each autonomous village required for their sustenance was available within close range of the village. See for example the 3-mile buffers around each village in Figures B 4, 5 and 6, which is an estimate of what would have been available to a given village within an hour's walk.

Access to resources not available within the vicinity of a village could be obtained through trade, or by travelling to more distant harvesting areas. Access to sites that were distant from a village could occur in different ways – some places were well-known sites where people gathered yearly and were not "owned" by anyone. Certain villages or families were responsible for the care of other places, and access to them was typically predicated on being a relative of the caretaker. These kinds of relations were most often facilitated through marriage, which extended access not only to gathering sites, but also to certain kinds of knowledge about the harvest and use of particular resources. These types of arrangements were most commonly exchanged between in-laws as a kind of "dowry" (Johnny Moses, pers. comm.).

Sharedness of gathering sites was not necessarily based on the closeness between villages, and was not necessarily strongest *within* a watershed. For example, there are instances where villages closest to one another rarely interacted. Waterman noted that the residents of "Flea's House" and "A Big Jam of Logs," though located practically next to one another on the lower White River, rarely interacted:

> The people [at a Big Jam of Logs] were wealthy and very "superior." They treated their neighbors of the village of [Flea's House] in a rather high-handed way. When they had a feast...they would not take the trouble to send an invitation. They just turned a canoe over, and pounded on it. "The people from the other village," my informants say "would hear that pounding, and come without being otherwise invited." I am told that there were two trails along the river between the two villages. The upper one was used by the [Big Jam of Logs] people only, the lower by their neighbors. People from this vicinity went in the summer time to the vicinity of Three Tree point to camp. This summering place is on the shore of the Sound across a range of hills (Waterman 2001:46).

There would have been numerous potential benefits to participating in a broad social network, including amongst other things an extension of access to valued foods not occurring within vicinity of a particular village, access to better quality or quantity of foods than what was available around the immediate village, as well as an expanded social safety net, including potential buffers against seasonal shortages or unexpected mishaps within a given village.

Most of the explicit ethnographic examples have to do with the harvest of marine resources, although the example above of root gardens in northwestern Washington is a floral example. Given the energy investment in maintaining productive root gathering sites it would make sense that access to them would be regulated. Even within the broad category "roots," the variation not just in food type but also micronutrient availability is important to consider. There are substantive nutrient differences between different kinds of root foods. Most notably, as it is extremely high in iron, wapato beds are an iron "sink." Iron-rich nutrient sources tend to be limited, not just in the Puget Sound Basin, but in many landscapes (Dr. Terry Maresca, pers. com.). Table B 6: Nutrient content comparison of selected Puget Sound Coast Salish animal and plant foods for instance, shows the differences in nutrient content between commonly consumed aquatic animals and plants. Wapato has a limited distribution on the landscape and does not appear to have grown anywhere on the Enumclaw Plateau. Although it was not identified at any of the inland archaeobotanical sites, it is possible that inland people traveled to places on the Black River to harvest or exchange for this plant, as well as to wapato gathering sites in the Puyallup watershed, such as present-day Wapato Creek. Trade in wapato as well as their habitats as draws for distant communities is well-documented for the Fraser and Columbia Rivers (Darby 2005, Spurgeon 2003, Suttles 1951). Suttles (1951) describes extensive wapato beds at Katzie on the Fraser River that were seasonally "owned" and maintained by families. Extended family members would travel from other places along the Fraser, and from as far away as Vancouver Island to harvest in them (Arvid Charlie, pers. com.). The importance of wapato in the Puget Sound area has generally been overlooked, despite the fact that wapato beds were common on the shores of Lake Washington prior to the lowering of the lake, and the hints of its importance in the ethnographic record. One of the place names Waterman collected for a shallow wetland in what is now Magnuson Park – "digging in the water," probably refers to wapato. Skagit people would travel from the north to harvest wapato at Juanita Bay (Collins 1974).

Perhaps saltwater and river people also traveled up-river to harvest or exchange root and other prairie foods growing on the Enumclaw Plateau. There are some small prairies within the vicinity of the mouth of the Duwamish River, at Alki Point and on the shoreline of Elliot Bay (Figure B 5). Given the ecological differences in habitat types between these shoreline prairies and the rich soils of the Enumclaw Plateau, they probably supported different species and were perhaps less productive.

In the montane sites, the identification of both goosefoot seeds and fawn lily in the same

~6780 BP sample at Buck Lake raises interesting questions about from where the people who left these remnants of their meals had traveled. Given the above discussion about fawn lily being an important root food on the east side of the Cascades but not on the west side, it is possible that the fawn lilies at Buck Lake were harvested and processed by plateau people. The evidence of both *Erythronium* processing and processed goosefoot at Buck Lake suggests possible connections between people living on both the east and west side of the Cascades. There are many examples of big huckleberry gathering sites as places where interior and coastal people gathered in late summer. People inhabiting the inland Coast Salish villages were most familiar with the mountains and these places. Montane plants including big huckleberry and beargrass as well as mountain goat wool were probably also traded with downriver and saltwater people on the DGW.

## CONCLUSION – SUMMARY AND FUTURE RESEARCH DIRECTIONS

This archaeobotanical review gestures toward the "unrealized potential" (Lepofsky *et al* 2011) of the archaeobotanical record for understanding not just ancient plant use, but also for addressing questions of broader interest to archaeologists and descendant communities on the Northwest Coast. Analysis of the archaeobotanical record in the Duwamish-Green-White watershed provisionally affirms archaeological theories about resource intensification ~2,500 – 3,000 years BP. The study also provides some preliminary insight into how the location of particular plant foods in the watershed may have played a role in Coast Salish social organization as documented in the ethnographic record. There are significant differences in plant foods between coastal, downriver, inland, and montane sites in the DGW, particularly when it comes to root foods. These differences surely influenced the organization of social life, including the timing and organization of task groups to take advantage of the temporal overlap of spatially disbursed species. The archaeobotany also suggests ways in which exchange or direct access to plant harvesting sites through the expansion of social relationships beyond the immediate village may also have expanded access to a nutritionally diverse diet – particularly with respect to access to iron-rich wapato. The higher proportion of root foods in the inland and montane sites suggests dietary differences between saltwater and inland, where carbohydrates may have played a more important role. This in turn may have shaped the extent to which landscapes were managed for culturally important root foods on the Enumclaw Plateau.

Ultimately, though, this synthesis project raises more questions than it answers. For example, there is no unequivocal evidence that wapato was harvested by inland villages or traded between inland inhabitants and those living in wapato rich areas. Accomplishing this would require amongst other things improved identification techniques in archaeobotany. For instance, there is an overabundance of unidentified starchy "PET" tissue in the archaeobotanical studies reviewed for this project, and this is presumably generally true for the broader Northwest Coast. Primarily because of its usefulness in the study of domestication processes worldwide, starch grain analysis is a well-developed archaeobotanical method. Given the nutritional and cultural importance of geophytes and other carbohydrate sources in the historic diets of Northwest Coast people, those methods can and should be incorporated into archaeobotanical practice in this region. Organic residue analysis is another tool that should be more widely incorporated into Northwest Coast archaeobotanical studies. Although the results are limited to presence-absence (and in this case, to plant family), it picks up information that may not be found in macrofossil analysis. A comparative analysis of stone tools, including mortars, pecking tools, and bifaces from select sites has the potential to add substantively to our understanding of ancient plant use and processing. Those who conduct these studies should be well versed in Northwest Coast ethnobotany, and should have reference collections that include the resources necessary to accurately identify the presence of locally available materials, ideally to genus at a minimum.

The study also raises methodological questions about counting and consistency in archaeobotany. Because there seems to be no generally agreed upon protocol for data analysis in the field, I resorted to converting all of the data for this study into a "presence-absence" matrix. This results in substantive loss of potentially important information with respect to quantitative differences between sites. Although flotation methods were generally consistent between the four archaeobotanists whose work contributed to this study, methods of counting were not. There are basically two choices when it comes to assessing quantity in archaeobotany – counting by weight or by number (NISP), both of which have their problems. Counting pieces of things is not particularly informative if you think about, for example differences in the relative strength of different types of wood and how easily they might break. Counting seeds is potentially informative, but many fruits contain multiple seeds (i.e., *Vaccinium*), or are aggregate fruits (i.e., *Rubus*). When it comes to sites containing large quantities of one type of seed (i.e., red elderberry), is counting each one necessary? And how should one account for a seed fragment? Weight is a potentially good measure of seeds, but how do you calibrate to account for differences in seed size and quantity of seeds per unit of fruit? Weight also seems a potentially good method for wood and roots, but then how does one account for the size and density of different species and vegetative parts? If the capacity to meaningfully compare the differences between archaeobotanical data in the region is a desirable goal, this is an issue that can and should be resolved through the development of consistent protocols between archaeobotanists working in the region. In a similar vein, the informational value of the data collected will increase when archaeobotanists are involved in research design from the onset of a project and have input regarding provenience and sample quantities obtained from archaeobotanical sites.

Returning to the hypothesis of dietary differences across the watershed, there are several further studies that could help to clarify this question. Doing a similar synthesis study of faunal remains within the DGW watershed could potentially shed light on exchange and harvest beyond the immediate village area. With the exception of the camas, goosefoot seed, and hazelnut identified in the montane sites, I did not find strong evidence of the movement of plants or plant parts beyond where we would expect to find them. It is possible that this type of evidence might be present in the faunal remains. The faunal remains could also help to clarify whether the diets of inland people were in fact lower in fat than the diets of saltwater and river people. The faunal remains could also give a clearer sense of the iron content available from the animal foods that were consumed in the watershed. This in turn has the potential to contribute to our understanding of the relative contribution of iron-rich plant foods to ancient diets.

Extending this synthesis to a cross-watershed comparison would also be extremely helpful in validating the preliminary interpretation of dietary variation from the saltwater to the mountains, and could also help to tease apart regional variations in the diet. This would require identification of watersheds where an array of archaeobotanical studies similar to that of the DGW already exists, or where there is strong potential to conduct new studies. The headwaters of both the Skagit and Nisqually are in the Cascades, and both terminate in the Puget Sound, making them strong potential candidates for a comparative analysis. This project could also be extended to the plateau, which would facilitate a comparison between coastal and plateau diets. This in turn could help us to understand the cross-Cascade connections noted in the ethnographic record (i.e., Collins 1974, Smith 1941, Snyder 1964) and to some extent in montane archaeological sites. This could be particularly informative in a study focused on geophytes, given the apparently greater importance of root foods in plateau diets (cf. Hunn & Selam 1990). These studies would also greatly benefit from the inclusion of culturally grounded perceptions of nutrition and nourishment. This could best be accomplished through further linguistic and narrative analysis of historical materials, guided by the expertise of contemporary cultural experts.

This project has also only begun to connect Coast Salish social institutions and networks with the historic food system. There is more to be learned about the role of the autonomous, decentralized Coast Salish political system and cultural practices of generosity in ensuring human physical wellbeing, and buffering against long and short-term risk. Linguistic and narrative analysis would be helpful here as well, as would a detailed analysis of the ethnographic record with regard to the interconnections between villages, gathering sites, and particular families. We also need to better understand population levels and how this changed over time. Developing culturally grounded food consumption patterns per capita, combined with fine-grained ecological analysis of potential habitat for classes of plant foods (i.e., fruits, starches) would help us to better understand the amount of land area required to maintain a given population. These in turn might help us to develop more fine-grained inferences about social relations across the landscape, and also about resource cultivation and processes of resource intensification.

There is also great potential for archaeobotany to contribute substantively to understandings of processes of colonialism and its effects on Coast Salish food systems. For example, historical archaeology seems undervalued and underexplored in the region. Like this synthesis project, much emphasis in regional archaeology is on reconstructing a pre-contact way of life. Yet there are many sites across and beyond the watershed that may help us to better understand specific processes of disruption wrought by colonialism. Historical archaeobotany, combined with ethnohistory, natural history, and histories of changes in land-use and ownership could help to clarify the specific ways the Coast Salish food system changed with processes of colonization and the effects of these changes on Coast Salish people.

A focus on changes in types and quantities of carbohydrates could be particularly productive. There is much literature on the rapid adoption of the potato in Puget Sound region, as well as effects of flour and fat (specifically frybread) on indigenous health in general. Such a study should examine the specific effects of removal to reservations, assimilation policies focused on farming, incorporation of commodity foods into the diet, and changes in land-use (ownership, habitat conversion, pollution, etc.) on presence of, and access to geophytes. The social and ecological transformation of the Duwamish River is a major example but there are many others across the landscape (i.e., privatization, land conversion such as draining of wetlands and appropriation of prairie habitats for farming on the Enumclaw Plateau; fire suppression policies and changes in land ownership, including effects of privatization and public lands management policies in montane habitats).

Finally, there is a need for analysis of contemporary food gathering practices and barriers to harvesting traditional foods. Many of the fruits identified in archaeobotanical studies continue to be harvested, although not necessarily without difficulty or concern for the wellbeing of these plant foods (i.e., big huckleberry). Crabapple and elderberry, although they were once very important foods, are not commonly eaten or discussed. There is a great nutritional diversity of traditionally consumed geophytes, and most of them are no longer eaten. Camas is still routinely harvested, and there are many eco-cultural restoration efforts involving camas. Northern rice-root lily, Allium sp. and tiger lily are still harvested, though not as commonly as camas. Wapato is not harvested in the Puget Sound region anymore, although there are restoration projects elsewhere (i.e., on the lower Columbia and at Yakama). Habitat degradation is certainly a concern with wapato (pollution and suitable habitat for its flourishing). A better understanding of contemporary harvesting and consumption practices, as well as the reasons for them could help guide tribal decision-making with regard to land acquisition, restoration, and mitigation projects.

## TABLES AND FIGURES

### Table B 3: Archaeobotanical sites

| Drainage | Orientation | Site Number | Site Name | Analysis type | Citations | Archaeobotanist |
|---|---|---|---|---|---|---|
| **SSS (n=7)** | | | | | | |
| | Saltwater | 45SN093 | Harbour Pointe | MF | Kopperl 2005 | Stenholm App. D |
| | | 45SN393 | None | MF | Miss *et al* 2008 | Johanessen App. G |
| | Inland | 45KI263 | Fall City Riverfront Park | MF | Schumacher & Burns 2005 | Stenholm App. 5 |
| | | 45KI464 | stuweyuqw | R | Blukis-Onat 2001 | ? |
| | | 45SN100 | Biderbost | MF | XX | Stenholm 2014 |
| | | 45SN303 | Buse Timber Sales A & B | FTIR | Chatters & Cooper 2011 | Cummings *et al* App. F |
| | | 45KI724 | Racing Stable Site | MF | Bernick et al 2009 | Johanessen App. C |
| | Montane | 45KI291 | Skykomish Rock Shelter | MF | Gough & Galm 1988 | Stenholm App. 1 |
| **Cedar (n=4)** | | | | | | |
| | Inland | 45KI25 | (Chester Morse Lake) | MF | Samuels 1993 | Stenholm Ch. 12 |
| | | 45KI32 | (Chester Morse Lake) | MF | Samuels 1993 | Stenholm Ch. 12 |
| | | 45KI299 | (Cedar River Levee) | MF | Samuels 1993 | Stenholm Ch. 12 |
| | | 45KI839 | Bear Creek | MF, R | Kopperl 2010 | Johanessen App. D; Yohe App. E |
| **DGW (n=18)** | | | | | | |
| | Saltwater | 45KI23 | Duwamish 1 | MF | Blukis-Onat 1987 | Stenholm Ch. 13 |
| | | 45KI428 | West Point A | MF | Larson & Lewarch 1995 | Stenholm App. 7 |
| | | 45KI429 | West Point B | MF | Larson & Lewarch 1995 | Stenholm App. 7 |
| | River | 45KI051 | Sbabadil | MF | Chatters 1981 | Rhode |
| | | 45KI059 | Tualdud Altu | MF | Chatters 1987 | Rhode |
| | | 45KI431 | Allentown | MF | Larson 1996 | Stenholm App. 3 |
| | | 45KI438 | White Lake | MF | Larson 1996 | Stenholm App. 3 |
| | | 45KI501 | Renton High School | MF | Lewarch 2006 | Stenholm App. 4 |
| | | 45KI703 | Duwamish Riverbend | MF | Blukis-Onat 2010 | Johanessen Ch. 12 |
| | | 45KI815 | Lwalb Old Channel One | MF | Schultze et al 2013 | Johanessen Ch. 8 |
| | Inland | 45KI450 | George Nelson Allotment Site | MF | Lewarch et al 2000 | Stenholm App. 1 |
| | | 45KI717 | XX | MF, R, FTIR | Willis 2008 | Yost *et al*. App. E |
| | | 45KI733 | Muckleshoot Tribal School | R | Kopperl 2006 | Parr App. F |
| | Montane | 45KI435 | Mule Spring | MF | Miss & Nelson 1995 | Stenholm App. H |
| | | 45MB227 | Naches Lithic Scatter | MF | Blukis-Onat 1988 | Stenholm Pg. 96 |
| | | 45PI043 | Fryingpan Rockshelter | MF | Lubinski & Burtchard 2005 | Stenholm 2002 |
| | | 45PI438 | Buck Lake | MF | Burtchard 2009 | Trieu-Gahr 2009 |
| **Puyallup (n=3)** | | | | | | |
| | Saltwater | 45PI0974 | Hylebos estuarine Midden | MF | Shandry *et al* 2010 | Johannesen App. E |
| | River | 45PI0930 | šaťčqád | MF | Elder & Sparks 2010 | Mastrogiuseppe App. C |
| | | 45PI1967 | Shash Hox Cid | MF | Shufelt 2009 | Diedrich App. D |

### Table B 4: Botanical array: non-edible tissue

| SiteNumber | | 45KI0023* | 45KI0428 | 45KI0429 | 45KI0051 | 45KI0059 | 45KI0431* | 45KI0438* | 45KI0501* | 45KI0703 | 45KI0815* | 45KI0450* | 45KI0717** | 45KI0733** | 45KI0435 | 45MB0227 | 45PI0043* | 45PI0438* | Waterman Place Names | Saltwater | Downriver | Inland | Montane | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample qty | | 69 | 46 | 44 | 1 | 1 | 4 | 4 | 23 | 22 | 12 | 4 | 3 | 10 | 2 | 1 | 3 | 10 | | | | | | |
| Orientation | | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | | | | | | |
| Sitetype | | 5 | 1 | 1 | 5 | 5 | 5 | 13 | 8 | 5 | 7 | 1 | 5 | 5 | 5 | 11 | 5 | 5 | | | | | | |
| AnalyticPeriod | | 5 | 6 | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 7 | 7 | 5 | 5 | 4 | 3 | | | | | | |
| **Conifers** | | | | | | | | | | | | | | | | | | | | | | | | |
| Cedar (unspecified) | | ■ | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Cedar (western red) | *Thuja plicata* | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | ■ | | | | ■ | ■ | | ■ | | 3 | 5 | 0 | 3 | **11** |
| Cedar (white) | *Thuja occidentalis* | ■ | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Cedar (yellow) | *Cuppresus nootkatensis* | ■ | | ■ | | | | | | | | | | | | | | | | 2 | 0 | 0 | 0 | **2** |
| Cuppresaceae | *Cuppresaceae* | ■ | ■ | ■ | | | | | | | | | | | | | | | | 3 | 0 | 0 | 0 | **3** |
| Douglas-fir | *Pseudotsuga menziesii* | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | | ■ | | | | 3 | 4 | 3 | 1 | **11** |
| Fir | *Abies sp* | ■ | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Hemlock | *Tsuga sp* | | ■ | ■ | | | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ | | ■ | ■ | | 2 | 5 | 1 | 3 | **11** |
| Juniper | *Juniperus sp* | ■ | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Larch | *Larix sp* | ■ | | | | | | | | | | | | | | ■ | | | | 1 | 0 | 0 | 1 | **2** |
| Pinaceae | *Pinaceae* | ■ | ■ | ■ | | | ■ | | | | | | | | | | | | | 3 | 1 | 0 | 0 | **4** |
| Pine (Shore/lodgepole) | *Pinus contorta* | ■ | | | | | | | ■ | ■ | | | | | | | | | | 1 | 2 | 0 | 0 | **3** |
| Pinus | *Pinus* | | ■ | | | | | | ■ | ■ | | | ■ | | | | | ■ | | 1 | 2 | 1 | 1 | **5** |
| Spruce | *Picea* | ■ | ■ | | | | | | | | | | | | | | | | | 2 | 0 | 0 | 0 | **2** |
| True fir | *Abies sp* | | ■ | | | | | | | | | | ■ | | ■ | ■ | | ■ | | 1 | 0 | 1 | 3 | **5** |
| Yew | *Taxus sp* | ■ | | | | | | | ■ | ■ | | | | ■ | | | | | | 1 | 2 | 1 | 0 | **4** |
| **Hardwoods** | | | | | | | | | | | | | | | | | | | | | | | | |
| Alder | *Alnus sp* | ■ | ■ | ■ | | | ■ | | ■ | ■ | ■ | | | ■ | | | | ■ | | 3 | 4 | 1 | 1 | **9** |
| Betulaceae | *Betulaceae* | ■ | | ■ | | | | | ■ | ■ | | | | | | | | | | 2 | 2 | 0 | 0 | **4** |
| Birch | *Betula* | ■ | ■ | | | | | | ■ | | ■ | | | | | | | | | 2 | 2 | 0 | 0 | **4** |
| Cascara | *Rhamnus purshiana* | ■ | | | | | ■ | | | | | | | | | | | | | 1 | 1 | 0 | 0 | **2** |
| Dogwood | *Cornus (cf nuttallii)* | | | | | | | | | | ■ | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Elderberry | *Sambucus sp* | | ■ | | | | | | | | | | | | | | | ■ | | 1 | 0 | 0 | 1 | **2** |
| Hackberry | *Celtis sp* | | | | ■ | | | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Hazelnut | *Corylus cornuta* | ■ | | | | | | | ■ | | ■ | ■ | | | | | | | | 1 | 2 | 1 | 0 | **4** |
| Ironwood | *Holodiscus discolor* | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | ■ | | | | | | | | X | 3 | 5 | 0 | 0 | **8** |
| Madrone | *Arubutus menziesii* | | | | | | | | | | ■ | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Maple (bigleaf) | *Acer macrophyllum* | | | | | | ■ | | ■ | ■ | | | | | | | | | | 0 | 3 | 0 | 0 | **3** |
| Maple (unspecified) | *Acer sp* | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | | | | | | 3 | 5 | 2 | 0 | **10** |
| Maple (vine) | *Acer circinatum* | | | | | | | | ■ | ■ | | | | | | | | | | 0 | 2 | 0 | 0 | **2** |
| Mock-orange | *Philadelphus lewisii* | | ■ | ■ | | | | | | | | | | | | | | | | 2 | 0 | 0 | 0 | **2** |
| Oak | *Quercus garryana* | | | | | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | **0** |
| Oregon ash | *Fraxinus latifolia* | | | ■ | | | ■ | ■ | ■ | | ■ | | | | | | | | X | 1 | 4 | 0 | 0 | **5** |
| Poplar | *Populus sp* | ■ | ■ | ■ | | | ■ | ■ | ■ | | | | | | | | | | | 3 | 3 | 0 | 0 | **6** |
| Prunus (cf bitter cherry) | *Prunus (cf emarginata)* | | | | | | | | ■ | ■ | | | ■ | | | | | | | 0 | 2 | 1 | 0 | **3** |
| Rosaceae | *Rosaceae* | | | | ■ | ■ | | | | | | | | | | | | | | 0 | 2 | 0 | 0 | **2** |
| Salicaceae | *Salicaceae* | | | | | | | | | | | | | | | | ■ | | | 0 | 0 | 0 | 1 | **1** |
| Sumac | *Rhus sp* | ■ | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Willow | *Salix sp* | ■ | | | | | | ■ | | | | ■ | | | | | | | | 1 | 1 | 1 | 0 | **3** |
| Wormwood | *Artemisia sp* | | | | | | | | | | | | | | ■ | | | | | 0 | 0 | 0 | 1 | **1** |
| **Other tissue** | | | | | | | | | | | | | | | | | | | | | | | | |
| Bulrush | *Scirpus sp* | ■ | | | | | | | | | | | | | | | | | X | 1 | 0 | 0 | 0 | 0 |
| Bunchgrass | *Festuca sp.* | | | | | | | | | | | | | | | | ■ | | | 0 | 0 | 0 | 1 | **1** |
| Cattail | *Typha latifolia* | | | | | | | | | | | | | | | | | | X | | | | | |
| Chickweed | *Stellaria sp* | | | | | | ■ | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Fabaceae | *Fabaceae* | | | | | | ■ | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Fern | *X* | | ■ | | | | | | | | | | | | ■ | | | | X | 1 | 0 | 0 | 1 | **2** |
| Horsetail | *Equisetum sp* | | | | | | | | | | | | | | | | | | X | | | | | |
| Knotweed | *Polygonum* | | | | | | ■ | | | | | ■ | | | | | | | | 0 | 1 | 1 | 0 | **2** |
| Moss | *X* | | | | | | | | | | | | | | ■ | | | | | 0 | 0 | 0 | 1 | **1** |
| Poaceae | *Poaceae* | ■ | | ■ | ■ | | | | | | | | | | | | | ■ | | 2 | 1 | 0 | 1 | **4** |
| Seablight | *Suadea* | | | | | ■ | | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Sedge | *Carex sp* | | | | | | | | | | | | | | | | | ■ | | 0 | 0 | 0 | 1 | **1** |
| Skunk cabbage | *Lysichiton americanum* | | | | | | | | | | | | | | | | | | X | | | | | |
| Snowberry | *Symphoricarpos albus* | | | | | | | | | | | | ■ | | | | | | | 0 | 0 | 1 | 0 | **1** |
| Woodruff | *Galium sp.* | | | | | | | | | | | | | | ■ | | | | | 0 | 0 | 0 | 1 | **1** |
| **Conifers** | | **13** | **8** | **6** | **0** | **0** | **4** | **3** | **6** | **6** | **2** | **2** | **3** | **2** | **3** | **4** | **1** | **4** | | **27** | **21** | **7** | **12** | **67** |
| **Hardwoods** | | **10** | **7** | **7** | **2** | **1** | **7** | **5** | **11** | **7** | **8** | **2** | **2** | **2** | **1** | **0** | **1** | **2** | | **24** | **41** | **6** | **4** | **75** |
| **Other tissue** | | **2** | **1** | **1** | **1** | **1** | **3** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **3** | **0** | **1** | **2** | | **4** | **5** | **2** | **6** | **17** |
| **Total botanicals by site** | | **25** | **16** | **14** | **3** | **2** | **14** | **8** | **17** | **13** | **10** | **5** | **6** | **4** | **7** | **4** | **3** | **8** | | **55** | **67** | **15** | **22** | **159** |

## Table B 5: Botanical array: edible tissue

| Site number | | **45KI0023*** | 45KI0428 | 45KI0429 | 45KI0051 | 45KI0059 | **45KI0431*** | **45KI0438*** | **45KI0501*** | 45KI0703 | **45KI0815*** | **45KI0450*** | **45KI0717**** | **45KI0733**** | 45KI0435 | 45MB0227 | 45PI0043* | **45PI0438*** | **Waterman place name** | Saltwater | Downriver | Inland | Montane | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample qty | | 69 | 46 | 44 | 1 | 1 | 4 | 4 | 23 | 22 | 12 | 4 | 3 | 1 | 2 | 1 | 3 | 10 | | | | | | |
| Orientation | | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | | | | | | |
| Site type | | 5 | 1 | 1 | 5 | 5 | 5 | 13 | 8 | 5 | 7 | 1 | 5 | 5 | 5 | 11 | 5 | 5 | | | | | | |
| Analytic Period | | 6 | 4 | 4 | 7 | 5 | 6 | 7 | 7 | 6 | 7 | 6 | 5 | 4 | 4 | 5 | 6 | 3 | | | | | | |
| **Fruits** | | | | | | | | | | | | | | | | | | | | | | | | |
| Bitter cherry | *Prunus emarginata* | | | | | | | 1 | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Blueberry | *Vaccinium sp* | | | | | | | | | | | | | | | | | | X | | | | | |
| Bog cranberry | *Oxycoccus oxycoccos* | | | | | | | | | | | | | | | | | | X | | | | | |
| Chokecherry | *Prunus virginiana* | | | 1 | | | | | | | | | | | | | | | X | 1 | 0 | 0 | 0 | **1** |
| Crabapple | *Malus fuscus* | 1 | | | | | | | | | | | | | | | | | X | 1 | 0 | 0 | 0 | **1** |
| Crowberry | *Empetrum nigrum* | | | | | | | | | 1 | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Currant/Gooseberry | *Ribes sp* | | | | | | | | | | | | 1 | | | | | | X | 0 | 0 | 1 | 0 | **1** |
| Dogwood | *Cornus sp* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Ericaceae | *Ericaceae* | | | | | | 1 | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Huckleberry | *Vaccinium sp* | | | | | | | | | | | | | | | | | | X | | | | | |
| June Plum | *Oemleria cerasiformis* | | | | | | | 1 | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Kinnickinnick | *Arctostaphyllos uva-ursi* | 1 | | | | | | | | | 1 | | | | | | | | | 1 | 1 | 0 | 0 | **2** |
| Mt. Ash | *Sorbus sitchensis* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Processed fruit | *X* | 1 | 1 | 1 | | 1 | 1 | 1 | | | | 1 | | | | | 1 | 1 | | 3 | 3 | 1 | 2 | **9** |
| Prunus | *Prunus* | | | 1 | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Rosehips | *Rosa sp* | 1 | | | | | 1 | | | | | | 1 | | | | | | | 1 | 1 | 1 | 0 | **3** |
| Rubus | *Rubus sp* | 1 | | 1 | 1 | | | | | | | | | | | | | | | 2 | 1 | 0 | 0 | **3** |
| Salal | *Gaultheria shallon* | 1 | | | | | | | | | | | | | | | | | X | 1 | 0 | 0 | 0 | **1** |
| Salmonberry | *Rubus spectabilis* | | | | | | | | | | | | | | | | | | | | | | | |
| Serviceberry | *Amelanchier alnifolia* | | | | | | | | | | | | | | | | | | X | | | | | |
| Sambucus | *Sambucus (cf racemosa)* | | | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | | | 1 | | X | 1 | 6 | 2 | 1 | **10** |
| Strawberry | *Fragaria sp* | 1 | | | | | | | | | | | | | | | | | X | 1 | 0 | 0 | 0 | **1** |
| Thimbleberry | *Rubus parviflorus* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Trailing blackberry | *Rubus ursinus* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Vaccinium | *Vaccinium sp* | | | | | 1 | | | | | 1 | | | | | | | 1 | | 0 | 2 | 0 | 1 | **3** |
| **Roots** | | | | | | | | | | | | | | | | | | | | | | | | |
| Allium | *Allium sp* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Apiaceae | *Apiaceae* | | | | | | | | | | | | 1 | | | | | | | 0 | 0 | 1 | 0 | **1** |
| Asteraceae | *Asteraceae* | | | | | | | | | | | | 1 | 1 | | | | | | 0 | 0 | 2 | 0 | **2** |
| Bracken fern | *Pteridium aquilinum* | | | 1 | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Camas | *Camassia sp* | 1 | | | 1 | | | | | | | | | | | 1 | | | X | 1 | 1 | 0 | 1 | **3** |
| Erythronium | *Erythronium sp* | | | | | | | | | | | | | | | | | 1 | | 0 | 0 | 0 | 1 | **1** |
| Liliaceae | *Liliaceae* | | | | | | | | | | | | 1 | | | | | | | 0 | 0 | 1 | 0 | **1** |
| Lomatium | *Lomatium sp* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Processed root or bulb | *X* | 2 | | | | | | | | | 1 | 1 | | | | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | **7** |
| Wapato | *Sagittaria latifolia* | | | | | | | 1 | 1 | | | | | | | | | | X? | 0 | 2 | 0 | 0 | **2** |
| **Nuts** | | | | | | | | | | | | | | | | | | | | | | | | |
| Acorn | *Quercus (cf garryana)* | | | | | | 1 | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Hazelnut | *Corylus cornuta* | 1 | | | | | 1 | | | | | [illegible] | | | | | 1 | | | 1 | 1 | 1 | 1 | **4** |
| **Seeds** | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp | *Chenopodium sp* | 1 | 1 | 1 | 1 | 1 | 1 | | | | 1 | | | | | | | 1 | | 3 | 4 | 0 | 1 | **8** |
| **Other** | | | | | | | | | | | | | | | | | | | | | | | | |
| Brassicaceae | *Brassicaceae* | | | | | 1 | | | | | | | | | | | | | | 0 | 1 | 0 | 0 | **1** |
| Clover | *Trifolium sp* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| Processed "glassy" | *X* | 1 | | | | | 1 | | | | | | | | | | | | | 1 | 1 | 0 | 0 | **2** |
| Processed seaweed* | *X* | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | **1** |
| **Fruits** | | **11** | **1** | **5** | **2** | **3** | **3** | **4** | **1** | **2** | **3** | **2** | **3** | **0** | **0** | **0** | **2** | **2** | | **17** | **18** | **5** | **4** | **44** |
| **Roots** | | **5** | **0** | **1** | **1** | **0** | **0** | **1** | **1** | **0** | **1** | **1** | **3** | **1** | **0** | **2** | **1** | **2** | | **6** | **4** | **5** | **5** | **20** |
| **Nuts** | | **1** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | | **1** | **2** | **1** | **1** | **5** |
| **Seeds** | | **1** | **1** | **1** | **1** | **1** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | | **3** | **4** | **0** | **1** | **8** |
| **Other** | | **3** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | | **5** | **2** | **0** | **0** | **7** |
| **All** | | **21** | **2** | **7** | **4** | **5** | **7** | **5** | **2** | **2** | **5** | **4** | **6** | **1** | **0** | **2** | **4** | **5** | | **33** | **32** | **11** | **11** | **87** |

Site number (*Plant processing - macrobotanical analysis. **Plant processing - residue analysis)

**Table B 6: Nutrient content comparison of selected Puget Sound Coast Salish animal and plant foods**

| Species- Latin | Common name | Part used | Food energy (kcal) | Protein g | Fat g | carb g | Vit. C (Ascorbic acid) mg | Vit.A (RE) | Calcium mg | Iron mg |
|---|---|---|---|---|---|---|---|---|---|---|
| *O. nerka* | sockeye | hard dried | 371 | 57 | 14 | 3.2 | 0 | 82 | 136 | 1.9 |
| *Thaleichthys pacificus* | Eulachon | smoked | 308 | 21 | 25 | 0.8 | 0 | 1183 | 30 | 12 |
| *O. kisutch/O. tshawytscha* | coho or chinook | kippered, canned | 266 | 31 | 16 | 0 | 0 | 15 | 38 | 1.7 |
| *O. nerka* | sockeye | kippered, canned | 190 | 30 | 7.7 | 0.7 | 0 | 0 | 68 | 1.3 |
| *O. kisutch/O. tshawytscha* | coho or chinook | smoked, canned | 150 | 23 | 5.9 | 1 | 0 | 84 | 60 | 1.8 |
| *Odocoileus hermionus* | venison | | 117 | 22 | 3.4 | 0.2 | 0 | 0 | 7 | 2.9 |
| | Mixed spp. clams | raw | 86 | 15 | 1 | 3.6 | 0 | 90 | 39 | 1.6 |
| *katharina tunicata* | gumboots | | 83 | 17 | 1.6 | 0 | 0 | 495 | 121 | 16 |
| *Clinocardium nuttalli* | basket cockle | steamed | 79 | 19 | 0.7 | 4.7 | 0 | 0 | 30 | 16 |
| *Stichopus californicus* | Sea cucumber | | 68 | 13 | 0.4 | 3.1 | 0 | 77 | 30 | 0.6 |
| *Clupea harengus pallasi* | Pacific herring | roe; from kelp | 59 | 11 | 0.8 | 2.6 | 0 | | 161 | 3.4 |
| *Octopus dofleini* | Octopus | | 57 | 12 | 0.6 | 0.9 | 0 | 0 | 24 | 5.3 |
| *Clupea harengus pallasi* | Pacific herring | roe; from hemlock branches | 56 | 9.6 | 1 | 4.4 | 0.6 | | 19 | 2.7 |
| | | | | | | | | | | |
| *Allium nuttalli*[1, 3] | Nuttall's onion | bulbs (fresh) | x | 2.8 | 0.2 | x | 15 | x | 29 | 1.5 |
| *Balsamorrihza sagitatta*[2] | Arrow-leaved balsam-root | roots (fresh) | x | 4.1 | x | x | x | x | x | x |
| *Camassia leichtlinii*[3] | Great camas | corms (fresh) | x | 1 | 0.1 | 16 | x | x | 19 | 0.6 |
| *Camassia quamash*[3] | Common camas | corms (fresh) | 61 | 0.9 | 0.1 | 15 | 4 | x | 17 | 1.6 |
| *Erythronium grandiflorum* | Avalanche lily | bulbs (fresh) | x | 2.9 | 0.3 | 22 | x | x | x | x |
| *Fritillaria camschatensis*[2] | Riceroot lily | bulbs (fresh) | 98 | 2.9 | 0.3 | 22 | 29 | x | 10 | 2.2 |
| *Lomatium cous*[1,3] | Biscuitroot | roots (fresh) | 127 | 1 | 0.4 | 30 | 17 | x | 79 | 3.6 |
| *Perideridia gairdneri*[3] | Gairdner's yampah | roots (dry) | 350 | 6.2 | 1.7 | 79 | 3 | x | 74 | 7.5 |
| *Sagitarria latifolia*[3] | Wapato/arrowhe ad | tubers (fresh) | 103 | 4.7 | 0.2 | 20 | x | x | 12 | 6.6 |
| | | | | | | | | | | |
| *Chenopodium album*[1] | Lambsquarters | seeds | 414 | 17 | 4.2 | 50 | x | x | 1017 | 63 |
| *Corylus sp.* | Hazelnut | nuts | 634 | 13 | 62 | 17 | 1 | 7 | 209 | 3.4 |
| *Quercus alba*[1] | White oak | nuts | 219 | 2.8 | 3.5 | 53 | x | x | 109 | x |

*1. Closest species to native varieties that grow in Puget Sound Basin* *2. Possible species only id'd to family in report* *3. Tentative identification*

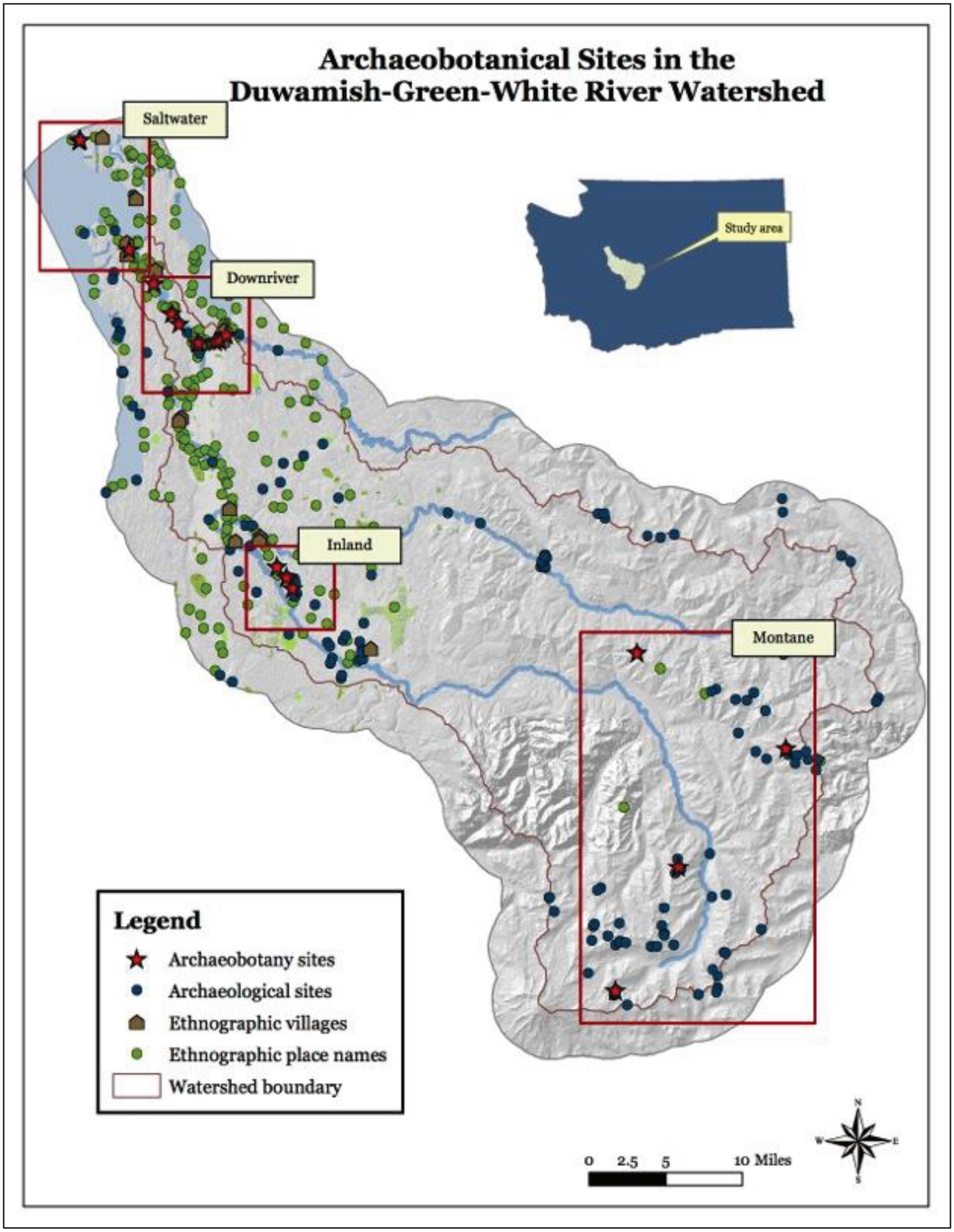


**Figure B 3: Overview map of the archaeobotanical sites in the Duwamish-Green-White river watershed**

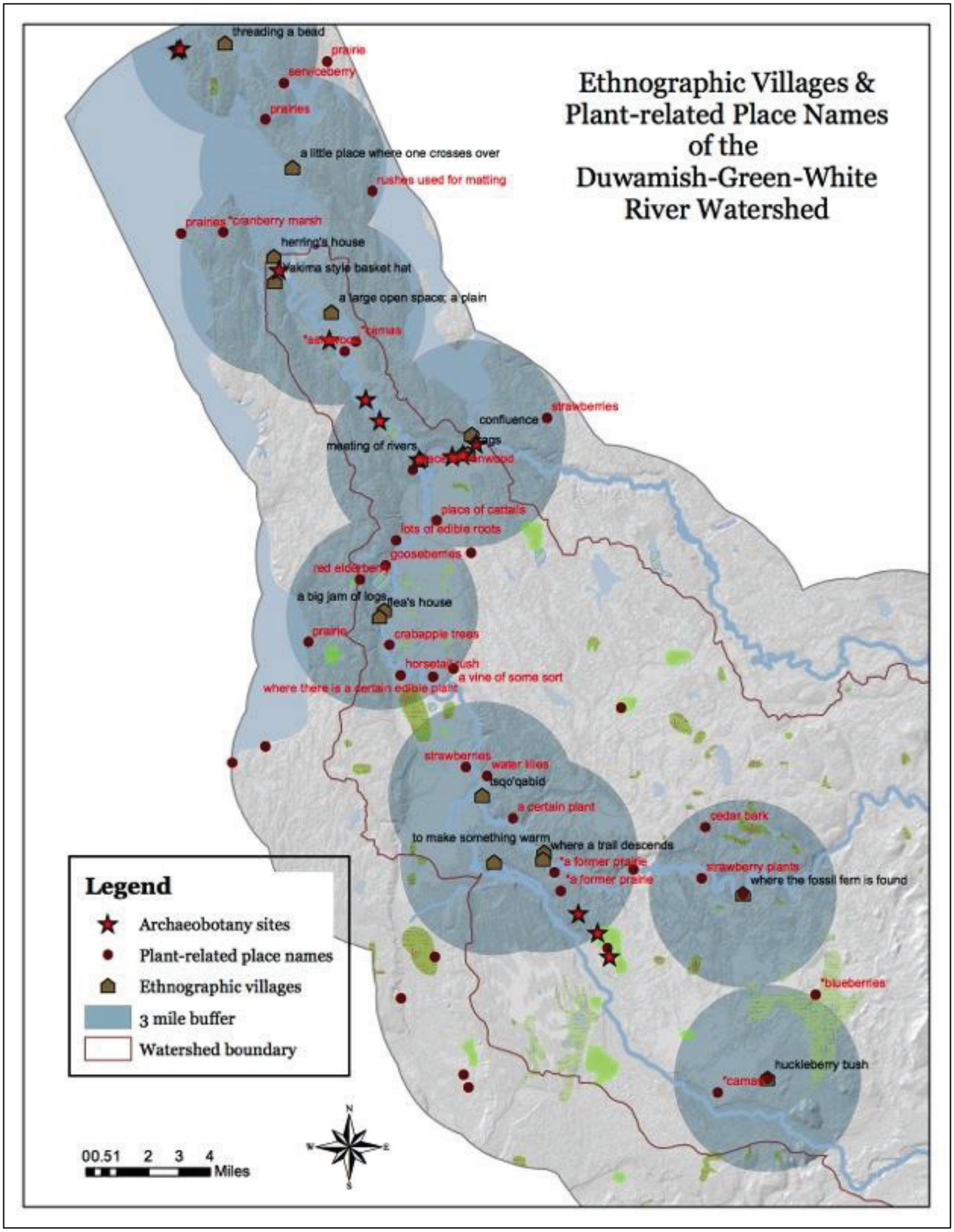


Figure B 4: Ethnographic villages and plant related place names of the Duwamish-Green-White river watershed

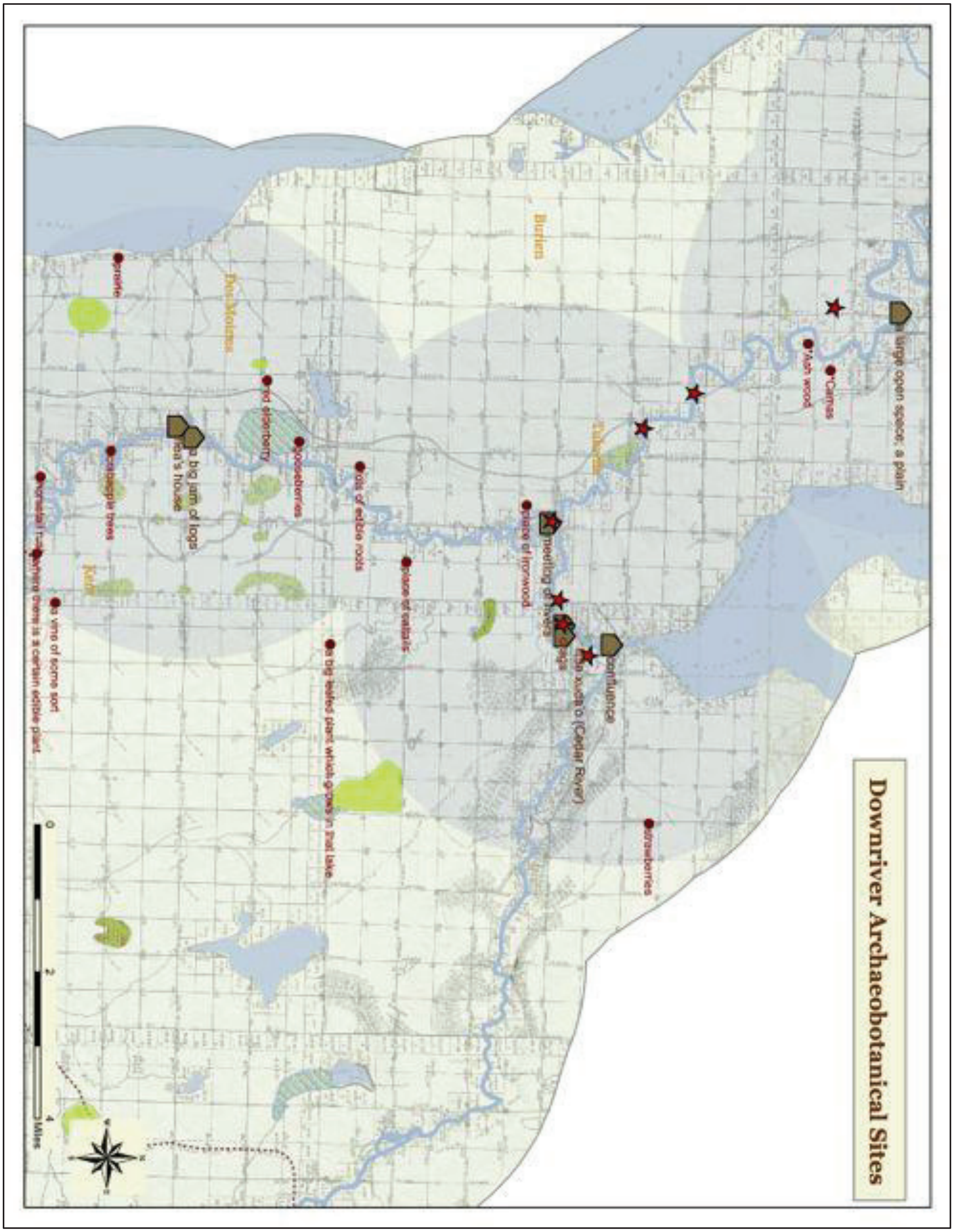


Figure B 5: Downriver archaeological sites in the DGW watershed

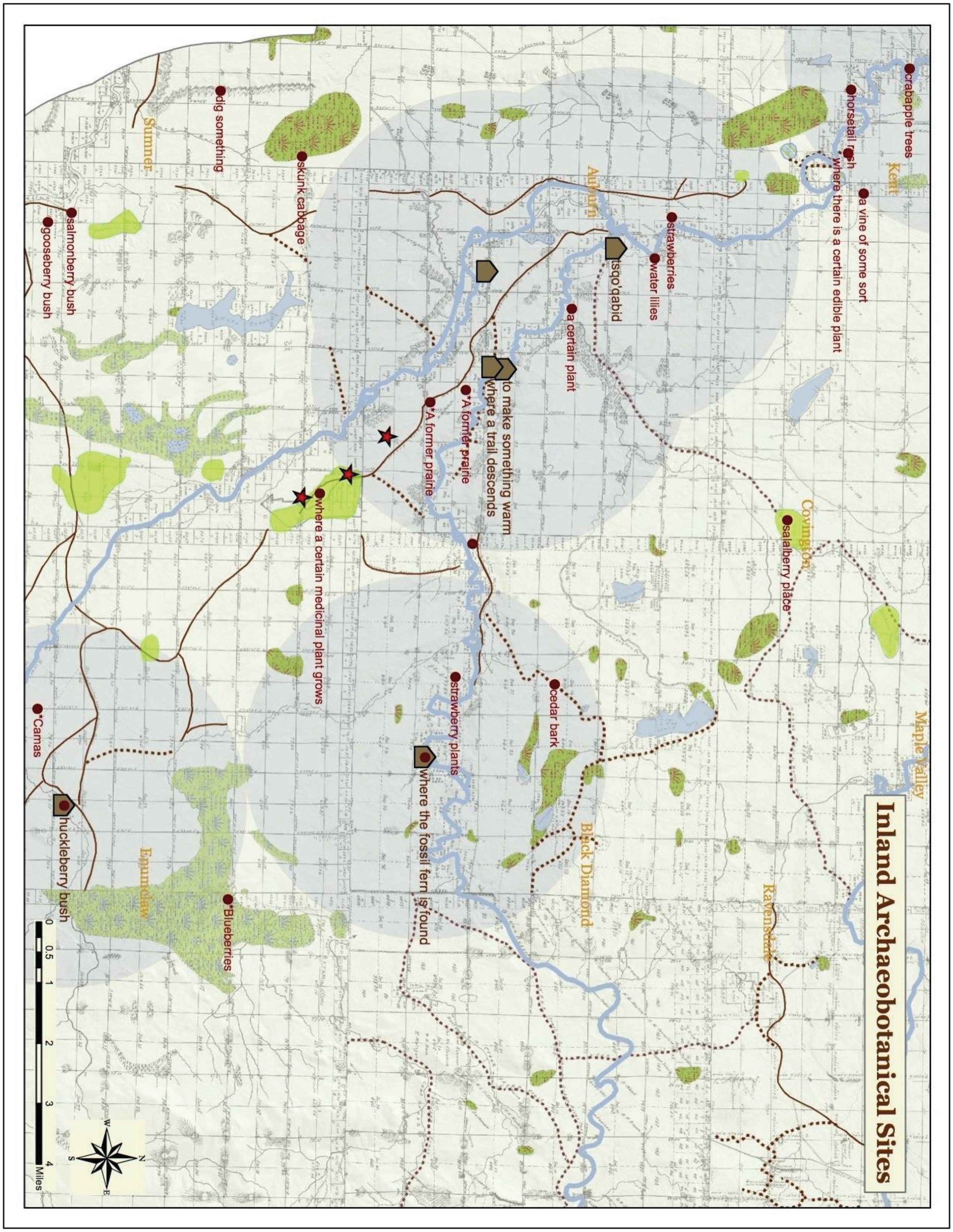


**Figure B 6: Inland archaeobotanical sites in the DGW Watershed**

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***Vitae***

A lifelong native of Washington State, Joyce LeCompte-Mastenbrook grew up camping, fishing, and, according to her grandfather, "just meditating" in the forests and along the shorelines of Puget Sound Coast Salish territory. She was introduced to the world of plants in her grandmother Maxine's garden. She lives in a food forest in northeast Seattle primarily tended by her husband, Keith. Joyce earned and Associate's Degree in landscape design from Edmonds Community College in 1999. In 2004, she graduated *magna cum laude* from the University of Washington with a bachelor's degree with distinction in anthropology, and a minor in South Asian studies. Joyce earned her doctoral degree in environmental anthropology in 2015.