SAA Session Decolonizing Diet: Supporting Indigenous Food Sovereignty thru Archaeology

Organizers: Anna Antoniou & Elspeth Geiger

How can Archaeobotany be put into Service of Katzie Food Sovereignty?

Natasha Lyons (natasha@ursus-heritage.ca, Ursus Heritage Consulting, Simon Fraser University), Tanja Hoffmann (University of Cambridge; Katzie First Nation), Roma Leon (Katzie First Nation), Mike Leon (Katzie First Nation) & Michael Blake (University of British Columbia)

Draft, 6 March 2022

Not to be cited or shared without express permission

Abstract: How can archaeobotany be put into service of food sovereignty? Archaeobotany is a field of study that helps to establish the long and deep ties that First Nations communities in British Columbia have to their ancestral lands, which largely remain unresolved in a legal context, having never been ceded as historic land claims. To date, comprehensive archaeobotanical data sets have never been used in land use and occupation claims, yet they have significant potential to convincingly bridge the contact/pre-contact divide required by Western legal frameworks. For Katzie First Nation, a Coast Salish community in southwestern British Columbia, documenting the scope and continuity of ancient and historic resource management practices provides baseline data not only for rights and title claims but for food sovereignty initiatives that seek to envision and pursue land management practices in the present. In this paper, we present a landscape level analysis of archaeobotanical data that illustrates the ties between Katzie land use of the deep past and the asserted future. We describe how Katzie First Nation is using archaeobotanical data to challenge settler legal structures and policy jurisdictions in pursuit of regaining land tenures for the restoration of a critical cultural keystone place.

Note for SAA session readers: We started to write this paper and it came out in a flurry! Do not feel like you need to read its entirety. We look forward to discussing ideas with all of you in the session. Thanks! Natasha, Tanja, Roma, Mike & Michael

Introduction

Archaeobotany is a field of study that helps to establish the long and deep ties that First Nations communities in British Columbia, as elsewhere on Turtle Island, have to their ancestral lands and waterways. In B.C., the lands and waters where communities live were, for the most part, never ceded to colonists and rights and title claims remain largely unresolved. To date, comprehensive archaeobotanical data sets have never been used as evidence in land claims and legal cases, yet they have significant potential to document the nature, scope and continuity of ancient and historic resource use and management practices. Knowledge garnered from archaeobotanical investigations can provide baseline data not only for rights and title but for food sovereignty initiatives that seek to envision, adapt and reinstate ancient land management practices. We present a landscape level analysis of archaeobotanical data that illustrates the ties between Katzie use of their lands and waters in the deep past and their asserted futures. We describe how Katzie First Nation is using archaeobotanical data to

challenge settler legal and policy jurisdictions in pursuit of regaining land tenure for the restoration of a cultural keystone place (Cuerrier et al 2015) and its vast richness of floral and faunal resources.

The q̓áy̓cəy [Katzie] are hən̓q̓əmin̓əm̓ speaking peoples of the ethnographically known Coast Salish. Katzie territory encompasses a significant portion of Metro Vancouver, a large urban area located in southwest British Columbia, Canada. Katzie are water people and their territory includes one of the largest freshwater tidal lakes in the world, which in turn supports one of the largest historic wetland systems in the province, known today as Widgeon Slough. Prior to forced removal from their lands, and subsequent dyking and draining of their territory to facilitate settler agriculture, infrastructure, and settlement, Katzie managed the gifts provided by this diverse landscape, working to ensure they upheld the reciprocal relationships established by generations upon generations of their ancestors (Hoffmann et al. 2021). It is Katzie's goal to restore and re-imagine traditional management practices within the Widgeon foodshed drawing on principles of Katzie customary law so as to help return Katzie people to their wetlands and assert a sustainable future. The stakes are incredibly high as rapid urban-expansion threatens to encroach on the few remaining cultural landscapes and their critical resources (Hoffmann et al 2022a).

Sovereignty In Context:

Indigenous communities have historically deployed a number of strategies to reclaim portions of their lands and waterways, including treaty negotiations, legal cases for rights and title, and direct actions such as blockades, protests, and territorial re-occupations (Armstrong and Brown 2019:15; Feltes and Coulthard 2022; Simpson 2017). As Martindale and Armstrong (2019:60) observe, part of the rationale for this multi-pronged approach is that "In Canada, like many settler-colonial countries, Indigenous peoples have found greater traction to confront colonial disenfranchisement in courts than in legislation. Canadian court rulings have led to the recognition of Aboriginal rights, including title, often in the face of government policy that does not (Coulthard 2014; Harris 2003)." A primary goal of sovereignty pursuits is to procure the land base necessary to re-establish food security and sovereignty. Food sovereignty is defined as the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems (Nyéléni Declaration 2007).

Syilx scholar Jeanette Armstrong (2020:37) states that "[f]ocusing on Indigenous food sovereignty is one way to protect the environment by bringing into balance the skewed view that commercial interests are the only value that must be protected for the people by those in governance." Food sovereignty frequently involves the restoration of cultural keystone places, or those that exhibit particularly high biodiversity, cultural importance, and intensive use for a cultural group, including the associated habitats and resources that support them (Cuerrier et al 2015; Garibaldi and Turner 2004; Lepofsky et al 2017). In places where they have regained jurisdictions, contemporary Indigenous communities of the Pacific Northwest are experiencing a profound renaissance in rehabilitating traditional foodways, ritual and governance structures through the restoration of clam gardens, food gardens, forest gardens, camas prairies, and other culturally-arbitered ecosystems (Armstrong et al in press; Groesbeck et al 2014; Hoffmann et al 2022a; Lepofsky and Armstrong 2018; Reynolds and Dupres 2018; Turner 2020).

Katzie, alongside many other nations, operate within the varied and complex sovereignty context of British Columbia. In 2019, the province enshrined the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in provincial legislation (DRIPA), a move that is actively shifting the political landscape and providing a strengthened basis upon which a wide range of sovereignty initiatives are being pursued. It is within this milieu that Katzie is negotiating with the federal, provincial, and municipal governments in order to regain management over portions of the Widgeon Creek watershed. This watershed is a relatively-intact remnant of the historic Pitt Polder wetland that is widely acknowledged as among the most ecologically diverse and sensitive remaining natural habitats in the rapidly urbanizing landscapes of the Lower Fraser River Valley of British Columbia, Canada (Hoffmann et al 2022a). As a relatively accessible and intact eco-cultural landscape, Katzie has declared the whole of the watershed as a cultural keystone place.

Below, we first focus on several elements of archaeobotanical knowledge generated at a landscape level across Katzie territory. Second, we show how this ancestral knowledge can shed new light on land use planning in the Widgeon Creek watershed. And finally, we discuss what this methodology means for Katzie and Indigenous food sovereignty practices in the Pacific Northwest.

Questions of Space & Time:

Space and time are two of the key dimensions of archaeological research. The third dimension—material evidence, or 'data,'—is marshalled within space-time frameworks in order to answer these broad space/time questions about the past. Taken together, they provide a framework for organizing and interpreting an enormous range of cultural information, providing a unique counterpoint to understandings of the past drawn from more recently situated disciplines such as ethnohistory, ethnography, and historical ecology. Archaeological knowledge gives us time depth, spatial expanse, and the material remnants of many ancestral voices, whereas studies grounded in more recent history provide the specific richness of individual names, languages, relationships, knowledges, locations and practices within a relatively constrained synchronic scope. In the Pacific Northwest, we are fortunate to possess both: an extensive archaeological record in addition to expansive documentation of Indigenous community knowledges and experiences from contact times forward, in many cases, to the present. Underlying both forms of data is a rich body of oral history that provides deep time cultural foundations upon which we can construct a rich and detailed narrative. Together these respective data sources enable us to look at categories of knowledge with a cumulative eye.

Figure 1 and Table 1 orient us to and provide a snapshot of the temporal and spatial breadth of Katzie plant use in the Pitt Polder wetlands, the primary low-lying core of their territory. The asserted Katzie homeland was once comprised of a mosaic of graded wetlands--sloughs, marshes, bogs, and fens--that were managed to sustain optimal biodiversity (Hoffmann et al 2021, 2022a). We know this from Katzie knowledge (KLUOS; Suttles 1955), the partial fragments of documentation from colonial agents and administrators, ethnographic accounts, and historical and reconstructed maps. One such map is a compilation of some 30 plant communities of the Fraser Lowland floodplains between 1859 and 1890 created by North, Dunn and Teversham in the late 1970s (North et al 1979; North and Teversham 1984). Until recently, the intricate biodiversity exhibited on this map would have been considered a natural characteristic produced by rich deltaic soils. Today, based on the combined work of Indigenous scholars

and practitioners along with historical ecologists, archaeologists, and ethnobiologists, we can clearly see this landscape as set of interconnected aquatic and terrestrial ecosystems that were carefully managed according to reciprocal relationships between people and place. These relationships manifest as management practices aimed at creating and maintaining habitats at specific stages of succession for peak productivity (Hoffmann et al 2016; Lyons et al 2021; and see cf. Armstrong et al 2021; Deur and Turner 2005; Lepofsky and Armstrong 2018; Toniello et al 2019; Turner et al 2021). The archaeobotanical indices explored below give us a view into the earlier antecedents of some of these practices.

In Figure 1, we present a palimpsest of data showing elements of ancient and historical land use by hundreds of generations of Katzie people and their proto-Coast Salish ancestors focused on plant resources. Katzie reserve lands assigned in the late 19th century, and still in use today, are represented (Hoffmann 2017; Hoffmann et al 2021; Mohun 1880), as well as historically and currently documented wapato patches (*Sagittaria latifolia*) and bog cranberry (*Vaccinium oxycoccus)* marshes. Widgeon Slough, located in the Widgeon Valley within the larger Widgeon Creek Watershed and situated on the east side of the Pitt River near the south end of Pitt Lake, is the subject of the later stages of this paper. Five major archaeological sites with analysed archaeobotanical assemblages from contemporary asserted Katzie territory are also shown on the map, including DhRp-52, DhRp-16, Port Hammond, Park Farm, and the Pitt River site. The time depth of these occupations, all of great duration, is presented in Table 1, along with an overview of the archaeobotanical assemblages.

Figure 1. Sites of plant use and management in asserted Katzie territory drawn from archaeology, oral history, Katzie knowledge and practice

Table 1. Overview of Archaeobotanical Assemblages Analyses in Asserted Katzie Territory

Site/Component	Site Dates	Sampled Component Dates (if different)	No. Samples (Total Vol [Litres])	N seeds[a,b] (density)	Site Type	Source
DhRp-52 Wet site	5800-2700 BP	All	60(30.5)	10,206 (334.6)	Winter/ multi-season village site	Lyons et al 2010 (Hoffmann 2010)
DhRp-52 Dry site	"	All	41(41)	153(3.73)		Lyons and Leon 2010 (Hoffmann 2010)
DhRp-16	~2400-contact	800 BP	7(7)	117(16.7)	Winter/multi-season village at IR-2	Lyons et al n.d.
Pitt River (DhRq-21)[b]	4500 BP-contact	Kroeker deposit (1400BP), earth ovens dated ca. 800 BP	Unknown	Unknown	Multi-component warm season occupation/ summer village	Patenaude et al. 1985
Pitt River (DhRq-21)	"		15(29)	250(8.62)		Lyons 2020
Port Hammond (DhRp-17)	Marpole phase: 2400-1500 BP		7(~6)	67(11.16)	Winter/multi-season village	Antiquus 2001
Park Farm (DhRq-22)	4850-3900 BP (flood event @ 3900)		Unknown	Unknown	Winter/multi-season village	Spurgeon 2000

a. Note that site formation processes are distinct in wet vs. dry archaeological sites. Uncharred and charred plant macroremains are considered ancient in wet-site deposits, whereas in these specific contexts, only charred macroremains are considered ancient in the dry sites.
b. Density is calculated as seeds/litre for the whole assemblage.
c. The Pitt River site is within the asserted and claimed territories of both Katzie and Kwikwetlem First Nation.

Katzie oral histories tell how Swaneset, a powerful ancestral being, created and shaped the Pitt Polder wetlands and its expansive system of streams and sloughs so as to provide an abundance of foods for the people in perpetuity (Jenness 1955:13). In looking at the picture presented in Figure 1, all ancient Katzie sites depicted are associated with plant management via archaeobotanical evidence (with the exception of current wapato populations in Widgeon Marsh). Several archaeological sites also contain proxy evidence of plant use and management (Copp et al 2019). Katzie oral histories tie Katzie origins to wetland landscapes and the management of wetland resources and the people:plant:wetland

relationship is understood as a cornerstone of Katzie culture. Like the waters upon which it is based, this relationship flowed and fluxed with the changing wetlands. The distribution of ancient Katzie sites shows that earlier occupations were established in the southwest corner of the Pitt River delta, while sites inhabited in later times are situated in the deltaic wetlands to the northeast. Geomorphological evidence confirms that the delta prograded from southwest to northeast, eventually infilling the whole of the fjord-like gap that once existed at the foot of the steep mountain ranges (Clague et al 1991). Katzie ancestors understood that many slough-edge resources, such as wapato, were best managed along the leading edge of the prograding delta, and their villages followed this edge for millennia. This understanding implies that Katzie practitioners knew that the riverine environment was ever-evolving and their own farming and subsistence practices and policies must follow suit (KLUOS; and see Anderson 1996; Berkes 1999; Turner 2014). Even from this imperfect and time-collapsed representation of Katzie plant use, the deep time and scope of practice are evident.

Despite hard won battles by First Nations to have their oral histories admitted as a reliable evidentiary basis upon which to prove their continued management and occupation of their territories over millennia (Armstrong and Martindale 2019; Borrows 2001; Feltes and Coulthard 2022; Hogg and Welch 2020, 2021), the courts continue to rely on western scientific forms of evidence to corroborate (and in some cases challenge) the veracity of oral historical evidence (Miller 2011). Though frustrating for many Indigenous knowledge keepers, this circumstance has inspired a new generation of Indigenous and accomplice scholars to locate ways to situate the strengths of western science in service of Indigenous priorities. Archaeobotanical evidence provides both supporting evidence for Katzie's sovereignty claims, and substantive data that can be used to re-establish plant management regimes that were interrupted—but importantly, *not eradicated*—by 200 years of colonial interference.

We begin our analysis with this macro-level time/space framework as a starting point, and below, we look at increasingly finer scales of analysis. First, we describe common units of archaeobotanical measure (diversity, ubiquity, and abundance). Next, we present examples illustrating how these measures, as applied to site components throughout asserted Katzie territory, corroborate Katzie oral histories that firmly anchor Katzie people in place. Finally, we discuss how the methods of archaeobotanical analysis can be used in service to Katzie's desire to re-establish ancient foodways as one element of their wider sovereignty initiatives.

Questions of diversity:

Diversity is an ecological measure used in archaeobotany to look at the scope and breadth of plant usage in particular contexts. Diversity of plant use activities by an Indigenous community—such as harvesting, processing, consumption, storage, crafting, feasting--reflects the community's access to and use of a set of biodiverse ecosystems, meaning those that are healthy and thriving, usually maintained in this state through subtle anthropogenic interventions (Armstrong 2017; Armstrong et al in press; Lepofsky and Lertzman 2008; Turner and Peacock 2005; Turner et al 2021). Here, we employ the term diversity, measured simply as number of identified taxa (NIT), at several scales to think about both the nature and spectrum of plant resources used by ancestral Katzie peoples for foods, medicines, and technologies. Subsequently, we use a simple ubiquity analysis to compare the percent presence of plant resources between contexts.

At a landscape level, 52+ plant taxa representing 31 plant families have been identified archaeobotanically in 7 archaeological components across asserted Katzie territory. This inventory encompasses 6 coniferous and 46 deciduous taxa identified from plant macroremains including seeds, needles, nutshell, cones, leaves, buds, stems, wood and plant fibres derived primarily from dry sites and one significant wet-site component, DhRp-52. The plant assemblages include a range of wetland and emergent taxa such as various sedges (Cyperaceae), water-plantain (*Alisma triviale)*, water-nymph (*Najas flexilis)*, and horsetails (*Equisetum* spp.); riparian plants such as red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa)*, thimbleberry (*Rubus parviflorus)* and salmonberry (*Rubus spectabilis)*; and plants that thrive in mixed deciduous regeneration forests, like cascara (*Rhamnus purshiana)*, beaked hazelnut (*Corylus cornuta)*, and Pacific crabapple (*Malus fusca*).

In Figure 3, we present diversity measures for all taxa (excluding wood and charcoal, which is differentially identified between assemblages) and edible taxa for each site component. The components are organized along the x-axis by their antiquity, left being oldest. The respective archaeobotanical assemblages were collected and analysed at different times by a variety of analysts and vary greatly in size, sampling strategies and analysis techniques. Because of the variability in sampling between assemblages, the relative differences between diversity measures are suggestive rather than absolute (Lepofsky and Lertzman 2005). Nevertheless, the extremely well-sampled wet-site at DhRp-52 has one of the highest overall archaeobotanical diversities of any site analysed in the Pacific Northwest (n=36). The most recently analysed component of the very long-lived Pitt River site has a diversity in the upper range for the region (n=24), and both the DhRp-52 dry site and DhRp-16 are in the mid-range (cf. Lyons 2017). Diversity measures for edible taxa alone are more modest but not insignificant, and are discussed in greater detail below.

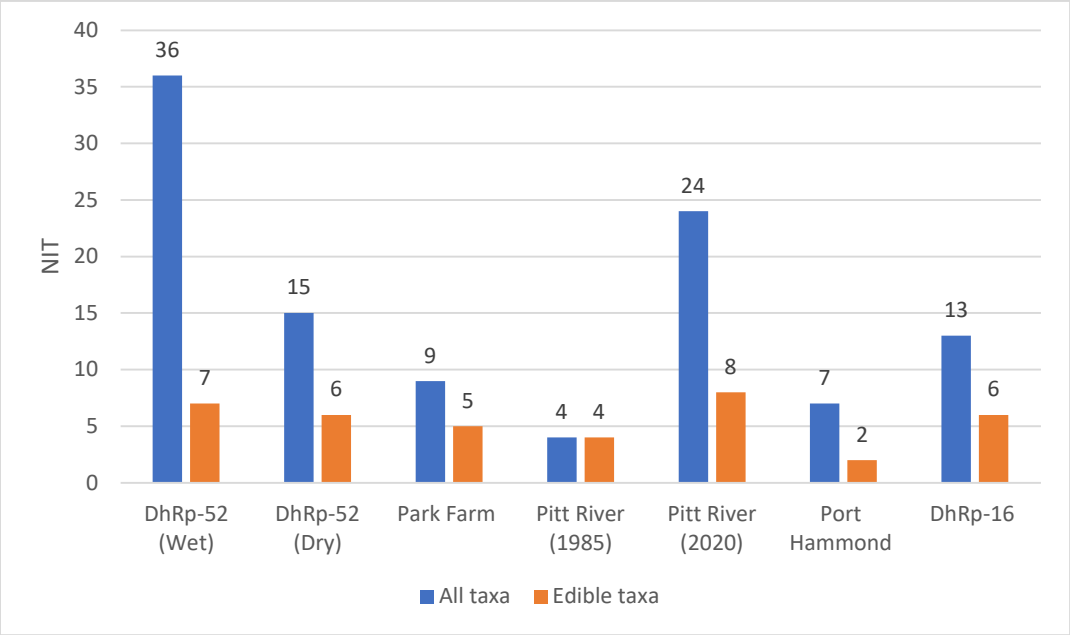

Figure 3. Diversity of archaeobotanical assemblages from 7 ancient components in asserted Katzie territory

In Table 2, we present a ubiquity chart for edible taxa (n=16 identified to genus or species) compiled by site component. Ubiquity, tabulated as percent presence within or between contexts, is a generalized measure that helps to alleviate sampling and preservational differences between assemblages (Marston 2014). Wild strawberries (*Fragaria* spp.), for instance, are present in 2 of 7 site components within those represented, yielding a ubiquity of 28.6%.

A wide variety of plant food resources are found in Table 2, all of which have greater or lesser ethnobotanically known uses by Katzie and other Coast Salish communities in the past and present (KLUOS; Suttles 1955, 2005; Turner 2014). Based on his work with Katzie knowledge keeper Simon Pierre in the mid-20th century, Suttles (1955:26) noted both the richness and desirability of wetland plant resources in Katzie territory:

> [T]he unusual extent of low, seasonally flooded lands in Katzie territory gave them an unusual abundance of several bog and marsh plants. The two most important of these were the [bog] cranberry and the wapato *(Sagittaria latifolia,* commonly called "Indian potato"). Katzie territory was famous for these, and in the fall outsiders came from a number of other tribes to gather them.

Table 2. Ubiquity of edible plant taxa at across asserted Katzie territory

		% PRESENCE by SITE Component							
Plant taxon	**Common name**	DhRp-52 / Wetsite	DhRp-52 / Dry site	DhRl-16	Park Farm	Port Hammond	Pitt River 1985	Pitt River 2020*	**Ubiquity (%)**
	Vol (L) Sampled	30	41	7	?	~6	?	29	**>113L**
Arctostaphylos uva-ursi	Kinnikinnick		x					x	**28.6**
Corylus cornuta	Beaked hazelnut	x							**14.3**
Crataegus douglasii	Black hawthorn	x		x					**28.6**
Fragaria spp.	Strawberry					x		x	**28.6**
Gaultheria shallon	Salal	x	x	x	x			x	**66.7**
Oemleria cerasiformis	'Indian' plum						x		**14.3**
Oxycoccus oxycoccus	Bog cranberry			x				x	**28.6**
Mahonia spp.	Oregon grape		x	x	x				**42.9**
Maianthemum dilatatum	False lily of the valley						x	x	**28.6**
Pyrus fusca	Pacific crabapple	x					x	x	**42.9**
Prunus spp.	Wild cherry				x		x		**28.6**
Rosa spp.	Wild rose		x						**14.3**
Rubus spp.	Raspberry genus	x	x	x				x	**57.1**
Sagittaria latifolia	Wapato	x							**14.3**
Sambucus racemosa	Red elderberry	x	x	x		x		x	**71.4**

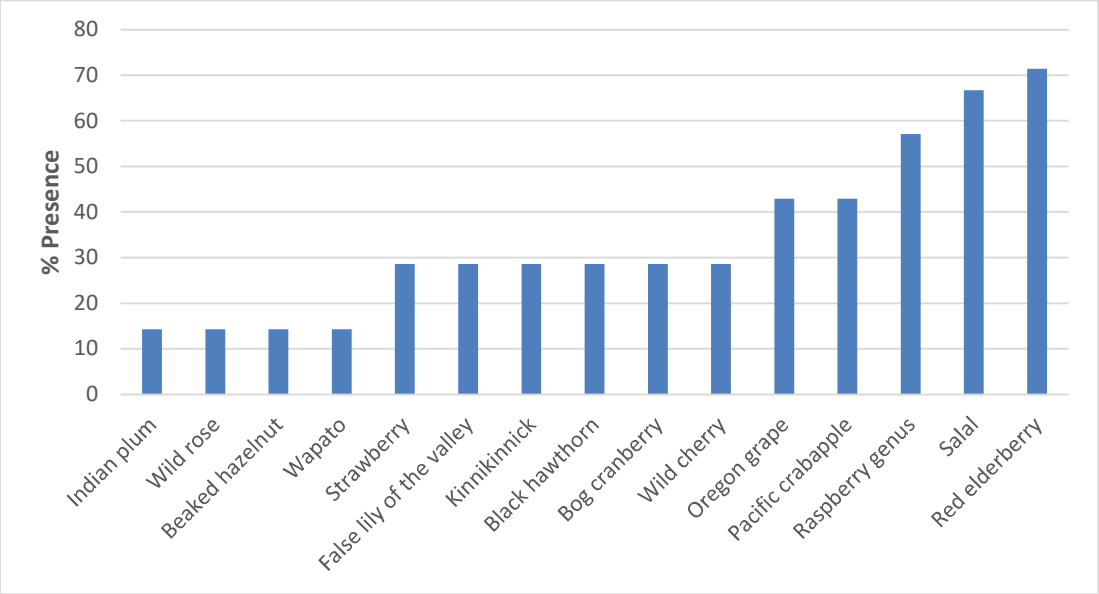

Figure 4. Ubiquity distribution of edible taxa from 7 site components in asserted Katzie territory

In Figure 4, we show an overall ubiquity distribution of the plant resources represented in Table 2. Despite the small number of analysed archaeobotanical assemblages in asserted Katzie territory, and thus overall limitations in sampling, this distribution is extremely evocative. The most ubiquitous taxa—salal, red elderberry, and raspberry genus—are ecological 'generalists', or shrubs that grow in a wide variety of site types. All three were processed en masse by historic Coast Salish communities, and together they are the most common plant food taxa found archaeobotanically on the Northwest Coast (Lepofsky and Lyons 2013; Lyons 2017). Most all of the resources represented from ancient contexts in the figure have multiple known uses to coastal First Nations (Turner 2014), including detailed knowledge in the Katzie community (KLUOS). Some of the relatively common uses of different plants, for example, include the use of black hawthorn (*Craetagus douglasii*) and strawberry as both food and heart medicine, kinnikinnick (*Arctostaphylos uva-ursi*) as food and smoke leaf, and wild cherry (*Prunus* spp.) and Oregon grape (*Mahonia nervosa*) as food and dye (MacKinnon et al 2009; Turner 2014). Taxa that grow in more specialized environments, like wapato and bog cranberry, have lower ubiquity, but often incredible densities where they are archaeobotanically present, explored in the next section.

Questions of abundance:

At a still closer scale of analysis, we look here at some site-specific archaeobotanical patterns that speak to the question of abundance across asserted Katzie territory. Abundance of plant macroremains generally reflects the nature and intensity of plant use in a given context (Lepofsky and Lyons 2003), while relative abundance can indicate the differences between plant use activities across space. In Coast Salish territory, families and communities often overwintered in large villages and spent the warm seasons moving and visiting between different kinds of resource camps; this lifestyle entailed highly sophisticated ecological knowledge and multi-layered scheduling (Turner 2014). Plant resources were harvested and variously processed throughout the growing season at known and named locations, such

as tə̓qeʔəm (salalberry-place), located on the eastern shore of Pitt Lake (Suttles 1955:15-16). Salal berries usually ripen late in the summer or early fall, and may have been harvested and mass processed at this place during the fishing season. Soft-stemmed bulrush, known locally as tule (*Scirpus lacustris*), was (and is) harvested from marshlands during this same general period at the peak of their growth cycle, and dried and bundled for winter matting and basketry projects (R. Leon pers. comm. 2021; Turner 1998:109).

From an archaeobotanical perspective, we can measure abundance in a number of ways. Density is the most common, but proportions, ratios, and counts can all be used to compare abundance between contexts (Marston 2014; Pearsall 2001). The archaeobotanical examples we discuss derive from assemblages with vastly different sample sizes, but nevertheless add to an overall picture of the harvesting, processing, consumption, storage and exchange of plant foods in pre-contact times across the landscape.

Our first look is at the relative abundance of bog cranberries at the site of DhRp-16, located on the banks of the Fraser River. The sampled context, dated to about 800 years ago, is small but significant, representing 7 litres of sediment from seven different locales, five of which are processing features. From a ubiquity perspective, all 5 feature samples contained bog cranberries whereas the two non-feature samples did not. Overall, bog cranberries comprise a full 58% of this small assemblage (n=68 of 117 charred seeds). Due to historic dredging, the location and pathways of ancient slough channels in the Pitt Polder are today largely lost, but prior to this disruption, Langley Bog (and several others) would have been a short canoe trip to DhRp-16, a large multi-season village. Along with sphagnum moss, mountain goat wool (*Oreamnos americanus*), wapato and sturgeon (*Acipenser transmontanus*), bog cranberries were an important item of exchange following the salmon fishery on the Fraser River (Duff 1952: 74). Katzie people traditionally owned many of the cranberry bogs in the Pitt Polder, and visiting harvesters had to obtain permission from the bog owners before they could pick them, likely a means of ensuring that berries were picked at the proper time (Suttles 1955: 24-26, 2005). Berries were generally harvested green and steam-cooked until red and soft, and could also be stored raw in wet moss (Turner 1995:86). Called qʷəmcaˊ·l ɬ in həṅq̓əmiṅəṁ, cranberries were enjoyed with eulachon grease (*Thaleichthys pacificus;* Katzie knowledge).

Pitt River (DhRq-21) is a complex and multi-component site at the confluence of the Pitt and Fraser Rivers that saw near-continuous occupation of proto-Coast Salish peoples for some 4500 years. In the 1980s, a concerted foray into the nascent field of archaeobotany was conducted by archaeologists on deposits at this site (Patenaude 1985). This analysis yielded wildly surprising results: the berries of false lily-of-the-valley (*Maianthemum dilatatum*; also known as deerberry) were estimated to be processed in vast quantities within large intensively used earth oven features dating to ca. 800 BP. Charred seeds were present in 81 earth oven features that were either tested or excavated, with a total estimate of 450,000 seeds. The charred seeds were consistently found in association with the knots of hemlock wood (*Tsuga heterophylla*) and at times, with 'Indian' plum, another edible, leading the excavators to posit: "It is possible that the earth-oven features used to steam deerberries were also being used to steam wood pieces to make them more pliable for bending" (Patenaude 1985:ch.6). This plant is a common perennial herb in the local and wider region that grows in shaded and moist settings, but it was

not known as a preferred food to historic or contemporary Coast Salish communities (Ham and Broderick 1985; Turner 1995: 50-51), including Katzie. However, it was clearly turned into a food staple during the late pre-contact occupations at the Pitt River site. Experiments by the site's investigators determined that the berries are highly palatable cooked into a jam or paste (Broderick/Blake pers. comm.).

DhRp-52 is a site that has received a great deal of attention for its similarly long time span—some 2500 years of continuous occupation—and the ecological engineering of its slough edge to produce a massive wetland wapato garden (Hoffmann et al 2016). The garden was built on a human-made rock pavement and maintained at an appropriate aqueous state through hydrological manipulation for some 600 years beginning at 3800 BP, in a fashion clearly constituting wetland farming (Hoffmann et al 2016; Lyons et al 2018, 2021). Using these measures, the production of wapato amplified over time—tuber densities above the rock pavement were calculated at 55/m^3 *versus* 4.4/m^3 on the adjacent bank and midden. Wapato, clearly a staple food resource, was likely being processed and exchanged en masse in the mid-Holocene (Hoffmann et al 2022b). The broken tips of 74 wooden implements and a fragment of a tumpline were found directly beneath, above, or lodged within the rock pavement. A massive pit feature (242 m^2) filled with tons of fire-altered rock (FAR) situated on one side of the adjacent residential site was used most intensively in association with the wapato garden. The pit and nearby pithouse >90,000 manufactured stone disc beads that are often interpreted as markers of wealth-based inequality among ancestral peoples of the Pacific Northwest region (Coupland et al. 2016; Hoffmann et al. 2016). Wapato is xʷəq̓ʷáwl̓s in həńq̓əmińəm̓ and itself derives from wáptu in Chinook jargon (Spurgeon 2001:38), a term with very cosmopolitan distribution reflecting its role in both the subsistence and prestige economies of the Northwest (Hoffmann et al 2022b). For many Katzie members, learning about the wealth of their ancestors and the richness of their territory helped support the current resurgence in wapato farming through the Katzie ecocultural restoration plan (KFN 2017). The eco-cultural restoration plan identifies Widgeon Slough as the last remnant of the territory that approximates what the ancestrally-managed wetland environment would have looked like.

Spectacular as the wapato evidence is, a relatively unexplored botanical element at DhRp-52 is the incredible abundance of discarded nutshell. Whereas 3768 specimens of wapato were recovered from the DhRp-52 wet-site, so were 3213 shell fragments of beaked hazelnut (stθícəm), preserved uncharred in anaerobic water-saturated conditions (Hoffmann 2010:169). The greatest relative abundance of nutshell is on the slightly sloping bank above the wapato garden, where densities were measured at 45/m^3 and associated with deposits dating to 4600-4800 BP (Hoffmann 2016:Supp Materials). Hazelnuts were cultivated in tandem with Pacific crabapple (qʷəʔáp) and other edible species by many First Nations of the Pacific Northwest in 'forest garden' settings (Armstrong 2017; Armstrong et al in press). Hazelnuts were pruned differently according to intended use—either for their straight and pliable shoots for weaving and arrow shafts, or to develop the mast for their nuts and oil used for food and medicine (Armstrong et al 2018; R. Leon pers. comm. 2022; McDonald 2005:250). The discarded shell is so plentiful at DhRp-52 that we speculate the trees were being cultivated in proximity to the site. Hazelnuts continue to be valued and harvested by Katzie today.

Site-specific knowledge informs about the abundance and relative intensity of use of several culturally known keystone species and others unknown to today's practitioners in the Katzie and archaeobotanical communities. Restoring plant communities today will be done under alternate climate conditions and different circumstances.Katzie waterways flow far less than they once did due to extensive historic dyking by settlers, which has in turned affected tidal influences; in places there are substantive amounts of toxins in the water; and, water levels, temperatures, and weather events are drastically shifting. Nevertheless, the ancient and historically known Indigenous management practices form a bedrock foundation from which to work. Further, there has never been a greater need for local and sustainable land use practices and systems across the globe.

Discussion. Archaeobotany Applied to Katzie Food Sovereignty

Over the past 20 years Katzie researchers and plant practitioners have engaged in a number of studies aimed at understanding how ancient principles of reciprocal land and resource management remain embedded in their cultural landscape. The accrued findings from archaeobotanical studies within asserted Katzie territory are being used to understand and document the legacies of ancient and historic management practices within extant wetland systems and provide analogies with which to move forward with land use planning. Intact remnants of the once enormous Pitt Polder mosaic wetland system are currently managed by government regulatory bodies, many of whom restrict all human access to the most ecologically sensitive areas. Working from the premise that human participation is a fundamental component of creating maintaining the reciprocal relationships required to sustain high levels of biodiversity (Armstrong et al in press; Casas et al 2007; Ens et al 2016; Gadgil et al 1993), Katzie are taking steps to reinstitute Katzie sovereignty using customary law and contemporary adaptations to traditional plant management regimes throughout their territory, including in heavily regulated conservation areas like Widgeon Slough (Hoffmann et al 2021).

Katzie are taking concrete steps, as a sovereign nation, to access, research, repair, and manage the resources that have long provided nature's sustained abundance to its people. From a policy perspective, the Widgeon case is intensely complicated, involving regulatory agencies representing all levels of government, along with several conservation charities (Hoffmann et al 2021, 2022a). In 2020, after some 15 years of co-management negotiations with many of the vested regulatory agencies, Katzie proposed a scheme wherein the Widgeon Creek Watershed would be managed as a cultural keystone place that prioritises Katzie values and priorities. In Western researcher's parlance, cultural keystone places are indicative of the cultural significance of a place., For Widgeon, this translates to its densely layered and interconnected wetland resources, including keystone species such as sandhill cranes (*Grus canadensis*), wapato, bog cranberries, and salmon (*Oncorhynchus* spp.) spawning habitat (Hoffmann et al 2022a; and see Cuerrier et al 2015; Garibaldi and Turner 2004; Lepofsky et al 2017). Assembling this proposal called on many of the accumulated knowledges cited above—understandings of the sophisticated systems of Katzie use, occupancy, and management of their lands and waters across space and time; gauging the biodiversity and abundance inherent in past and present resource management practices; documenting seasonal rhythms of knowledge and movement to care for respective habitats, named places, and patterns of harvest; and imposing Katzie eco-cultural categories onto Western/Cartesian styles of mapping.

The challenges of such an undertaking are substantial but well worth the effort to Katzie leadership, stewards, and land-based practitioners. Climate change is of course shifting traditional Indigenous knowledge everywhere away from known baselines and requiring concerted and creative adaptations to land-based subsistence and travel. Still, the baseline knowledge of management practices for keystone species and their associated habitats within the Katzie wetlands is expansive and the opportunities for community engagement, including learning opportunities, restoring and creating accessible harvest areas, and many other cultural elements, are profound.

The restoration and management pieces themselves will require a lot of experimenting and tinkering. As examples, we look here at the cases of four species discussed in detail above. Bog cranberries, for their part, flourish in highly specialized, low-energy freshwater environments that take a long time to form and are extremely sensitive to change. The berries grow on sphagnum hummocks in the hugely productive Widgeon system alongside bog blueberries, Labrador tea, bog laurel and a variety of peat mosses. These resources are usually harvested alongside the hunting of migratory waterbirds (maʔaqʷ, e.g. Anatidae) during the fall. A present threat is the overgrowth of Labrador tea in these ecosystems at Widgeon, which is inhibiting the growth of the berry plants. The surging growth of Labrador tea may have to do with the relative moisture in and/or overheating of the bog matrix, and a Katzie-led research study is underway to learn more.

False lily-of-the-valley, the surprising food staple from the Pitt River site, is found in association with Pacific crabapple swamps throughout Widgeon Slough, growing densely alongside few-flowered sedge (*Carex pauciflora*) in open spaces (MetroVan 2016:11). The MetroVan ecologists who produced a biophysical report of Widgeon ecosystems had rarely seen this plant association, yet it is likely a common one throughout Katzie territory, including Mary Hill, near the Pitt River site (Ham and Broderick 1985), and other similar slough-edge locales. False lily-of-the-valley absolutely carpets the forest floor beneath crabapple and hazelnut in an extant forest garden at Ed Leon Slough in contemporary Sts'ailes territory, on the Harrison River (Ritchie pers. comm. 2020). Solomon's plume (*Maianthemum racemosum*), a closely related species, is considered a forest garden indicator species, alongside crabapple, hazelnut, and a variety of other edible resources (Armstrong et al 2021). It seems as though there is harvest potential for this association of resources in Katzie land use planning.

Beaked hazelnut does not grow in the marshlands but along sections of the benches that ring Widgeon Slough. Thus, unlike the case in most forest garden settings (Armstrong 2017; Armstrong et al in press), the tall hazelnut shrubs are not quite co-growing with crabapple, but are thriving adjacent to them, at an elevation gain of a metre to several above. A similar pattern is seen in at least one Sts'ailes forest garden, also situated near water level next to the Harrison River (Armstrong/Vanier pers. comm.). This echoes the ecological parameters noted by Pojar and McKinnon (1994:92) which specify that hazelnut prefers moist but well-drained soils in settings such as open forest, clearings and roadsides. Hazelnuts are favourable to several management practices, such as transplanting and low-level landscape burning, and in British Columbia, the species has a clear anthropogenic distribution created by Indigenous peoples who extended their range across vast distances (Armstrong et al 2018; Turner et al 2021). At Widgeon, there are several prospects for hazelnut management and use from a community perspective. Of note, the Eastern Filbert Blight has heavily impacted *Corylus avellana*, the commercial and introduced

species of hazelnut cultivated widely in the Pacific Northwest for its nut crop, but the blight causes little significant damage to species native to North America. Thus, there may also be commercial prospects.

Last but certainly not least, wapato is a keystone species in a cultural keystone place within the remarkably productive Widgeon Slough system. It is a fully to semi-aquatic (emergent) species that grows in still to slow-moving water, often with other emergents such as sedges (*Carex* sp.), tule, and cattails (*Typha* spp.) (Cooke 1997:183-84). The relatively small populations of wapato are stable and growing throughout the wetlands, but like many of these other aquatic taxa with similarly significant cultural uses, they flourish with cultural care and stewardship. The highly edible wapato tuber requires little cooking, is easy to store, and is also food to many kinds of waterbirds and rodents. It also absorbs toxic pesticides, heavy metals, and other foreign substances leached into the soil and water system, and in many such contexts, it is used in restoring toxic habitats but cannot be consumed (Garibaldi 2003; Hoffmann 2017). The wapato populations in Widgeon, however, grow in clean water, generally protected from agricultural and industrial pollutants, and are safe to eat. These populations thus constitute a critical resource to the Katzie that needs to be protected and enhanced.

Conclusions. Takeaways for Katzie & Indigenous Food Sovereignty Initiatives

Documenting Indigenous resource management, from the deep past through to the present day, contributes valuable support for both rights and title claims and for food sovereignty initiatives. This knowledge is being increasingly employed by First Nations as they re-assert and re-imagine Indigenous land management practices in the present and implement sustainable resource use strategies for future generations (Hogg and Welch 2020, 2021; Lyons et al 2021; Turner 2020; Turner et al 2013). While archaeobotany has been an underutilized methodology and data source in the Pacific Northwest, we hope that the ongoing work by Katzie demonstrates the continuity with largescale land management practices known from oral history, ethnography, ethnohistory.

In this paper, we have articulated how archaeobotanical knowledge is being effectively used to support Katzie's land use planning process in the course of their bid to regain management jurisdiction over Widgeon Slough. Katzie has utilized archaeobotany as a valuable research methodology to help establish ancient baselines of plant use, scope, and management practices in order to envision and create principles for the restoration of a cultural keystone place and its attendant resources. Profound continuities between pre- and post-contact Indigenous management practices allow us to use the tools of archaeology and archaeobotany in order to speak in a language that Western-schooled decision-makers understand and appreciate. For evidentiary claims, archaeobotany provides continuity with historically known plant use practices documented by ethnographers, ethnohistorians, and oral historians, thereby building a bridge across the pre/post-contact divide. The results of this work have great import for the stringent legal rules that require British Columbia First Nations to demonstrate the sufficiency, continuity and exclusivity of their land use and occupation (cf. Hogg and Welch 2020; Martindale and Armstrong 2019).

While using archaeobotanical knowledge to achieve nation to nation goals, these data hold a significantly different place within a Katzie worldview. For Katzie leaders, researchers, Elders and practitioners, learning about archaeobotany is just one way of bringing ancestral plant knowledge back into focus. It provides a gateway for re-connecting to Katzie lands and waters; to rebuilding relationships

to plants, place, each other, and the language; and to re-establishing food security and re-gaining sovereignty over a homeland displaced and disrupted by colonial rule (Hoffmann et al 2022c).

Acknowledgements.

References Cited

Anderson, Eugene
1996 Ecologies of the heart: emotion, belief, and the environment. Oxford: Oxford University Press.

Antiquus
2001 Archaeological Monitoring for Interfor's Dry Kiln Replacement Project at the Port Hammond Site (DhRp-17), Lower Fraser River, BC. Heritage Inspection Permit No. 2000-292. Report on file with BC Archaeological Branch, Victoria.

Armstrong, Chelsey Geralda
2017 Historical Ecology of Cultural Landscapes in the Pacific Northwest. PhD dissertation, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Armstrong CG, Dixon M, Turner NJ. 2018. Management and traditional production of beaked hazelnut (k'áp'xw-az', Corylus cornuta; Betulaceae) in British Columbia. *Human Ecology* 46(4):547-559.

Armstrong CG and Brown C. 2019. Frontiers are frontlines: An ethnobiology against ongoing colonialism. *Journal of Ethnobiology* 39(1): 14-31.

Armstrong CG, Miller JED, McAlvay AC, Ritchie PM, Lepofsky D. 2021. Historical Indigenous land-use explains functional trait diversity. *Ecology and Society* 26(2):6.

Armstrong, Chelsey, Natasha Lyons, Alex McAlvay, Morgan Ritchie, Dana Lepofsky, Michael Blake
In prep Historical Ecology of Forest Garden Management in Ts'msyen Lahkhyuup and Beyond. For submission to *Land.*

Armstrong, Jeanette
2020 Living from the Land: Food Security and Food Sovereignty Today and into the Future. In Plants, People and Places: The Roles of Ethnoecology and Ethnobotany in Indigenous Peoples' Land Rights in Canada and Beyond, edited by Nancy Turner, pp. 36-50. McGill-Queen's University Press, Montreal.

Berkes, Fikret
1999 Sacred ecology: Traditional ecological knowledge and resource management. Philadelphia, PA: Taylor & Francis.

Borrows, J. (2001). Listening for a change: The courts and oral tradition. *Osgoode Hall LJ*, *39*, 1.

Casas, A. *et al.* (2007) 'In situ Management and Domestication of Plants in Mesoamerica', *Annals of Botany*, 100(5), pp. 1101–1115. doi:10.1093/aob/mcm126.

Clague, John, J. L. Luternauer, S. E. Pullan, J. A. Hunter, Postglacial deltaic sediments,
southern Fraser River delta, British Columbia. Can. J. Earth Sci. 28, 1386–1393 (1991).

Cooke, Sarah

1997 *A field guide to common wetland plants of Western Washington and Northwestern Oregon.* Seattle Audubon Society, Seattle, Washington.

Copp, Stan, Tanja Hoffmann, and Emily Wilkerson 2019 Blueberry Fields Forever (Not!)—The Carruthers Site, Lower Fraser Valley, British Columbia. In Waterlogged: Examples and Procedures for Northwest Coast Archaeologists, edited by Kathryn Bernick, pp.
77–96. Washington State University Press, Pullman.

Coulthard, Glen
2014 Red Skin, White Masks: Rejecting the Colonial Politics of Recognition. University of Minnesota Press, Minneapolis.

Coupland, Gary, David Bilton, Terence Clark, Jerome S. Cybulski, Gay Frederick, Alyson Holland, Bryn Letham, and Gretchen Williams
2016 A Wealth of Beads: Evidence for Material Wealth-Based Inequality in the Salish Sea Region, 4000–3500 cal B.P. American Antiquity 81:294–315.

Cuerrier A, Turner NJ, Gomes TC, et al. (2015) Cultural keystone places: conservation and restoration in cultural landscapes. *Journal of Ethnobiology* 35(3): 427-448.

Deur, Douglas, and Nancy Turner (editors)
2005 Keeping It Living: Traditions of Plant Use and Civilization on the Northwest Coast of North America. University of Washington Press, Seattle.

Duff, Wilson
1952 The Upper Stalo Indians of the Fraser Valley, British Columbia. British Columbia Provincial Museum, Victoria.

Ens E, Scott ML, Rangers YM, et al. (2016) Putting indigenous conservation policy into practice delivers biodiversity and cultural benefits. *Biodiversity and Conservation* 25(14): 2889-2906.
Feltes and Coulthard 2022, BC Studies

Gadgil M, Berkes F and Folke C (1993) Indigenous knowledge for biodiversity conservation. *Ambio*. 151-156.
Garibaldi, Ann, and Nancy Turner
2004 Cultural Keystone Species: Implications for Ecological Conservation andRestoration. Ecology and Society 9(3):1. Electronic document, http://www.ecologyandsociety.org/vol9/iss3/art1/

Groesbeck, A.S., K. Rowell, D. Lepofsky, A.K. Salomon. 2014. Ancient clam gardens increased shellfish production: Adaptive strategies from the past can inform food security
today. *PlosOne* 9(3). http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0091235
Ham and Broderick 1985

Harris, Cole
2003 *Making Native Space: Colonialism, Resistance, and Reserves in British Columbia*. Vancouver: University of British Columbia Press.

Hogg, Erin and John R. Welch
2020 Aboriginal rights and title for archaeologists: A history of archaeological evidence in Canadian litigation. Journal of Social Archaeology 20(2): 214-241.

2021 Expert Witnesses' and Lawyers' Perspectives on the Use of Archaeological Data as Evidence in Aboriginal Rights and Title Litigation. BC Studies 2011:13-41.

Hoffmann, Tanja (editor)

2010 Archaeological Excavations at DhRp-52, Heritage Investigation Permit #2007-097, Volume I: Final Permit Report. British Columbia Archaeology Branch, Victoria.

Hoffmann, Tanja, Natasha Lyons, Debbie Miller, Alejandra Diaz, Amy Homan, Stephanie Huddlestan, and Roma Leon
2016 Engineered Feature Used to Enhance Gardening at a 3800-Year-Old Site on the Pacific Northwest Coast. Science Advances 2. DOI:10.1126/sciadv.1601282.

Hoffmann, Tanja
2017 "Now we learn to live with it": Katzie cultural resilience and the Golden Ears Bridge. Unpublished Ph.D. dissertation. School of Resource and Environmental Management, Simon Fraser University.

Hoffmann, Tanja, Natasha Lyons, Roma Leon, Mike Leon, Michael Blake
2021 Integrated Plant Management Research in Action: Indigenous challenges to Settler Memory. Paper delivered at the Royal Anthropological Institute: Anthropology and Conservation Conference, 28 October 2021.

Hoffmann, Tanja, Natasha Lyons, Roma Leon
2022a Mobilizing Indigenous Heritage in Cultural Keystone Places for Climate Change Action. In Heritage as an Action Word: Uses beyond Communal Memory, edited by Susan Shea and Kelly Britt, in press.

Hoffmann, Tanja, N. Lyons, M. Blake, A. Martindale, D. Miller, C. Larbey
2022b Wapato as an important staple carbohydrate in the Northwest Coast diet: A response to Martin. American Antiquity, in press

Hoffmann, Tanja, Natasha Lyons, Roma Leon and Mike Leon
2022c Using 2-eyed seeing to understand archaeobotanical data within the context of land use planning at Katzie First Nation. Paper delivered at the Canadian Archaeological Association meetings, Edmonton, Alberta, 27 April 2022.

Jenness Diamond
1955 *The faith of a coast Salish Indian.* British Columbia Provincial Museum, Victoria.

Katzie First Nation
2017 Eco-Cultural Restoration in Katzie Traditional Territory. Report produced by the Katzie First Nation, Pitt Meadows, British Columbia.

KLUOS n.d.
Katzie Land Use and Occupancy Study. Database on file with Katzie First Nation.

Lepofsky, Dana and Natasha Lyons
2003 Modeling ancient plant use on the Northwest Coast: Towards an understanding of mobility and sedentism. *Journal of Archaeological Science* 30: 1357–1371.
Lepofsky, Dana, and Natasha Lyons
2013 The Secret Past Life of Plants: Palaeoethnobotany in British Columbia. BC Studies 179:39–83.

Lepofsky, Dana and Ken Lertzman
2005 More on sampling for richness and diversity in archaeobiological assemblages. *J. Ethnobiol.* 25, 175–188.

Lepofsky, D. and Lertzman, K. (2008) 'Documenting ancient plant management in the northwest of North America', *Botany*, 86(2), p. https://doi.org/10.1139/B07-094.

Lepofsky D, Armstrong CG, Greening S, et al. (2017) Historical ecology of cultural keystone places of the Northwest Coast. *American Anthropologist* 119(3): 448-463.

Lepofsky, D. and Armstrong, C.G. (2018) 'Foraging New Ground: Documenting Ancient Resource and Environmental Management in Canadian Archaeology', *Canadian Journal of Archaeology/ Journal Canadien d'Archéologie*, 42, pp. 57–73.

Lyons, Natasha, Amy Homan, Roma Leon, Alejandra Diaz, Angela Ruggles & Teresa Leon
2010 Appendix L: Report on the Seed Assemblage from the DhRp-52 Wet site, Maple Ridge, BC. In Archaeological Excavations at DhRp-52, Heritage Investigation Permit #2007-097, Volume I: Final Permit Report. British Columbia Archaeology Branch, Victoria.

Lyons, Natasha and Roma Leon
2010 Appendix K: The Palaeoethnobotanical Assemblage from the DhRp-52 Dry Site. In Archaeological Excavations at DhRp-52, Heritage Investigation Permit #2007-097, Volume I: Final Permit Report. British Columbia Archaeology Branch, Victoria.

Lyons, Natasha, Roma Leon and Stephanie Huddlestan
n.d. Palaeoethnobotanical Analysis of DhRp-16. Report prepared for Katzie Development Limited Partnership, Pitt Meadows, BC.

Lyons, Natasha, Tanja Hoffmann, Debbie Miller, Stephanie Huddlestan, Roma Leon, and Kelly Squires
2018 Katzie and the Wapato: An Archaeological Love Story. Archaeologies 14:7–29. DOI:10.1007/s11759-018-9333-2.

Lyons, Natasha
2017 Plant Production Practices of Ancient First Nations in the Lower Fraser River Region. In *Archaeology of the Lower Fraser River Region*, eds. Mike Rousseau and Roy Carlson. Archaeology Press, Simon Fraser University, Burnaby, BC

2020 Palaeoethnobotanical Analysis of the Pitt River site (DhRq-21), Fraser Lowlands, BC. Report prepared for Brown and Oakes Archaeology, New Westminster, BC.

Lyons N, Hoffmann T, Miller D, et al. (2021) Were the Ancient Coast Salish Farmers? A Story of Origins. *American Antiquity*. 1-22.

MacKinnon, Andy, Linda Kershaw, John Thor Arnason, Patrick Owen, Amanda Karst, Fiona Hamersley-Chambers.
2009 Edible and Medicinal Plants of Canada. Lone Pine Publishing, Edmonton.

Marston chapter 9. Ratios and Simple Statistics in Paleoethnobotanical Analysis: Data Exploration and Hypothesis Testing chapter

McDonald, James
2005 Cultivating in the Northwest: Early Accounts of Tsimshian Horticulture. In Keeping It Living: Traditions of Plant Use and Cultivation on the Northwest Coast of North America, edited by Douglas Deur and Nancy Turner, pp. 240–273. University of Washington Press, Seattle.

MetroVancouver
2016 Widgeon Marsh Regional Park Reserve: Biophysical Summary. Report prepared by Alison Evely, R.P.Bio for Metro Vancouver.

Miller, B. G. (2011). *Oral history on trial: recognizing Aboriginal Narratives in the Courts*. UBC Press.

Mohun, Edward

1880 Minutes of Decision, Correspondence and Sketches —"Interrupted work Book No. 1"—GM Sproat, circa June 1879 to June 1880. Indian Reserve Commission interrupted work by retirement of Commissioner from office Lower Fraser River—below Spuzzum: Yale Indians Proper, Katzie Indians, Harrison River Indians, Semiahmoo Indians. Electronic document, http://jirc.ubcic.bc.ca/sites/jirc.ubcic.bc.ca/files/Volume%205.pdf

North, M, M. Dunn and J. Teversham
1979 Map of the Vegetation of The South Western Fraser Lowlands, 1858 – 1880. Lands Directorate, Environment Canada, Ministry of Supply and Services, Hull.

North, M. and J. Teversham
1984 The vegetation of the floodplains of the Lower Fraser, Serpentine, and Nicomekl Rivers, 1859 to 1890. Syesis 17:47–66.

Nyéléni Declaration
2007 Food Sovereignty Declaration of Nyéléni, Mali, https://nyeleni.org

Patenaude, Valerie
1985 *The Pitt River Archaeological Site, DhRq 21. A Coast Salish Seasonal Camp on the Lower Fraser River,* Volumes I and II. Unpublished report. Heritage Conservation Branch, Victoria,B.C.

Pearsall, Deborah
2000 *Palaeoethnobotany: a handbook of procedures*. 2nd edition. Academic Press, London.

Pojar, Jim and Andy MacKinnon, eds.
1994 *Plants of Coastal British Columbia including Washington, Oregon and Alaska.* B.C. Ministry of Forests and Lone Pine Publishing, Vancouver.

Reynolds, Nathaniel, and Christine Dupres
2018 The Pacific Crabapple (Malus fusca) and Cowlitz Cultural Resurgence. Journal of Northwest Anthropology 52:36–62.

Simpson, Leanne B.
2017 *As We Have Always Done: Indigenous Freedom through Radical Resistance*. Minneapolis: University of Minnesota Press.

Spurgeon, Terrence
2001 Wapato (Sagittaria latifolia) in Katzie Traditional Territory, Pitt Meadows, British Columbia. Master's thesis, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Suttles, Wayne
1955 Katzie Ethnographic Notes. Anthropology in British Columbia Memoir No. 3. British Columbia Provincial Museum, Victoria.

2005 Coast Salish Resource Management: Incipient Agriculture? In Keeping It Living: Traditions of Plant Use and Cultivation on the Northwest Coast of North America, edited by Douglas Deur and Nancy Turner, pp. 181–193. University of Washington Press, Seattle.

Toniello G, Lepofsky D, Lertzman-Lepofsky G, et al. (2019) 11,500 y of human–clam relationships provide long-term context for intertidal management in the Salish Sea, British Columbia. *Proceedings of the National Academy of Sciences* 116(44): 22106-22114.

Turner, Nancy

1998 *Plant Technology of First Peoples of British Columbia*. Royal British Columbia Museum Handbook. UBC Press, Vancouver.
Turner, Nancy and Sandra Peacock
2005 Solving the perennial paradox: Ethnobotanical evidence for plant resource management on the Northwest Coast. In D. Deur & N. Turner (Eds.), Keeping it living: Traditions of plant use and cultivation on the Northwest Coast of North America. Vancouver: University of British Columbia Press.

Turner, Nancy, Douglas Deur, and Dana Lepofsky
2013 Plant Management Systems of British Columbia First Peoples. BC Studies 179:107–133.

Turner, N.J. (2014) *Ancient pathways, ancestral knowledge: Ethnobotany and ecological wisdom of Indigenous Peoples of Northwestern North America* (2 vol). Montréal QB/ Kingston ON: McGill-Queen's University Press.

Turner, Nancy (editor)
2020 Plants, People and Places: The Roles of Ethnoecology and Ethnobotany in Indigenous Peoples' Land Rights in Canada and Beyond. McGill-Queen's University Press, Montreal.

Turner, Nancy J., Chelsey G. Armstrong, and Dana Lepofsky
2021 Adopting a Root: Documenting Ecological and Cultural Signatures of Plant Translocations in Northwestern North America. American Anthropologist, in press.