

## Some Like it Hot: Exploring the Archaeobotany Of Roasting Features in Southern British Columbia

Natasha Lyons<sup>\*</sup>, Anna Marie Prentiss<sup>†</sup>, Sandra Peacock<sup>‡</sup>, and Bill Angelbeck<sup>§</sup>

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*Roasting features, also known as earth ovens, have been used by First Nations Peoples since the late Holocene to cook food for both immediate consumption and winter storage. Across southern British Columbia, earth ovens built by Salish communities in low- and mid-elevation meadows and riverine villages were part of carefully coordinated, multi-layered annual patterns of movement within the landscape to harvest and produce food. In this paper, we examine the patterning of floral—and to a lesser extent, faunal—data from earth oven complexes located in four village and four upland sites, finding differences between assemblages that appear to relate to the nature and diversity of use between site types. Our preliminary results support the contention that earth ovens in village contexts were used in more ways, and potentially by a wider array of cooks, than those in upland contexts. This analysis forms a first step towards a broader and more detailed study of ancient plant production as rendered through the lens of earth ovens in upland and lowland settings across southern British Columbia.*

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Roasting features, also known as earth ovens, have been used by First Nations Peoples since the late Holocene to cook food for both immediate consumption and winter storage (Figure 1). Root foods<sup>1</sup>, in particular, were an important source of carbohydrates and were cooked *en masse* using hot rock technology by communities across Western North America (Peacock 1998, 2002; Thoms 1989, 2008). In southern British Columbia (BC), earth ovens built by Salish communities in low and mid elevation meadows and riverine villages were part of carefully coordinated, multi-layered annual patterns of movement within the landscape to harvest and produce food.

Archaeological investigations of earth ovens in BC began in the 1970s (Pokytylo and Froese 1983), and since then numerous studies have been conducted across the interior plateaus of BC, Washington, and Oregon. Several of these projects analysed archaeobotanical remains in site-specific contexts (eg. Carney 2016; Ketcheson 1979; Hayden and Mossop Cousins 2004; Lyons 2013, 2017a; Nicolaidis 2010; Peacock 2013; Prouty et al. 2004; Stenholm 1985, 2000; Wollestonecroft 2000, 2002; and see Cheatham's 1988 settlement pattern analysis of the Upper Willamette Valley, Oregon) but this study is the first to compile and compare these data at a regional scale for BC.

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<sup>\*</sup> Corresponding Author: Ursus Heritage Consulting & Department of Archaeology, Simon Fraser University. 11500 Coldstream Creek Road, Coldstream, BC, V1B 1E3. (natasha@ursus-heritage.ca)

<sup>†</sup> Department of Anthropology, University of Montana

<sup>‡</sup> Department of Community, Culture, and Global Studies, Associate Professor Emeritus, University of British Columbia—Okanagan

<sup>§</sup> Department of Anthropology and Sociology, Douglas College

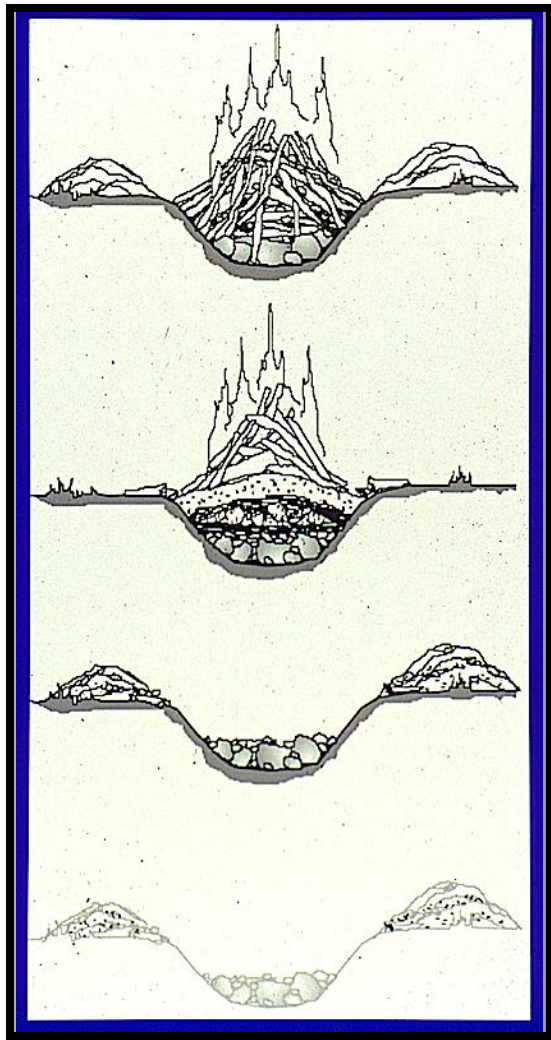


FIGURE 1. Schematic of an earth oven's construction (Peacock 1998).

In this paper, we compare floral (and to a lesser extent, faunal) data from earth oven complexes located in four village and four upland sites across southern BC (Figure 2). All of these sites were created by Salish-speaking ancestors. The majority are within the Interior Salish territories of

contemporary St'át'imc, Nlaka'pamux, and Secwepemc Nations who live in an arid and mountainous region and built their traditional villages on lower elevation river terraces and their upland base camps in montane parklands. A single village site in our sample is located in the Upper Fraser Valley, in contemporary Sts'ailes territory (Figure 2). Situated near the transition zone between the Coast and Interior Salish regions, this site has a wetter and more temperate ecology than those in the adjacent interior. All communities represented here had historical (and likely ancient) exchange relationships, either meeting directly at annual salmon-fishing sites such as those in the Fraser Canyon and at the Fountain, near Lillooet, or participating in active down-the-line trade between regions (Teit 1906:231; Turner 1997:30–31; Turner and Loewen 1998).

In the following analysis, we ask what differences can be inferred in the patterning of earth oven contents between sites, what these patterns suggest about the plant use activities conducted at these different site types, and how these fit within broader patterns of movement, harvest, and production. We describe root resource production strategies and the archaeobotanical expectations that derive from these activities, outline our methods and taphonomic considerations, present the results of our analysis, and use these preliminary findings to identify patterns of ancient plant use at a regional scale. This analysis forms a first step towards a larger and more comprehensive study of ancient plant production as rendered through the lens of earth ovens built and used for millennia by Salish communities across southern BC.

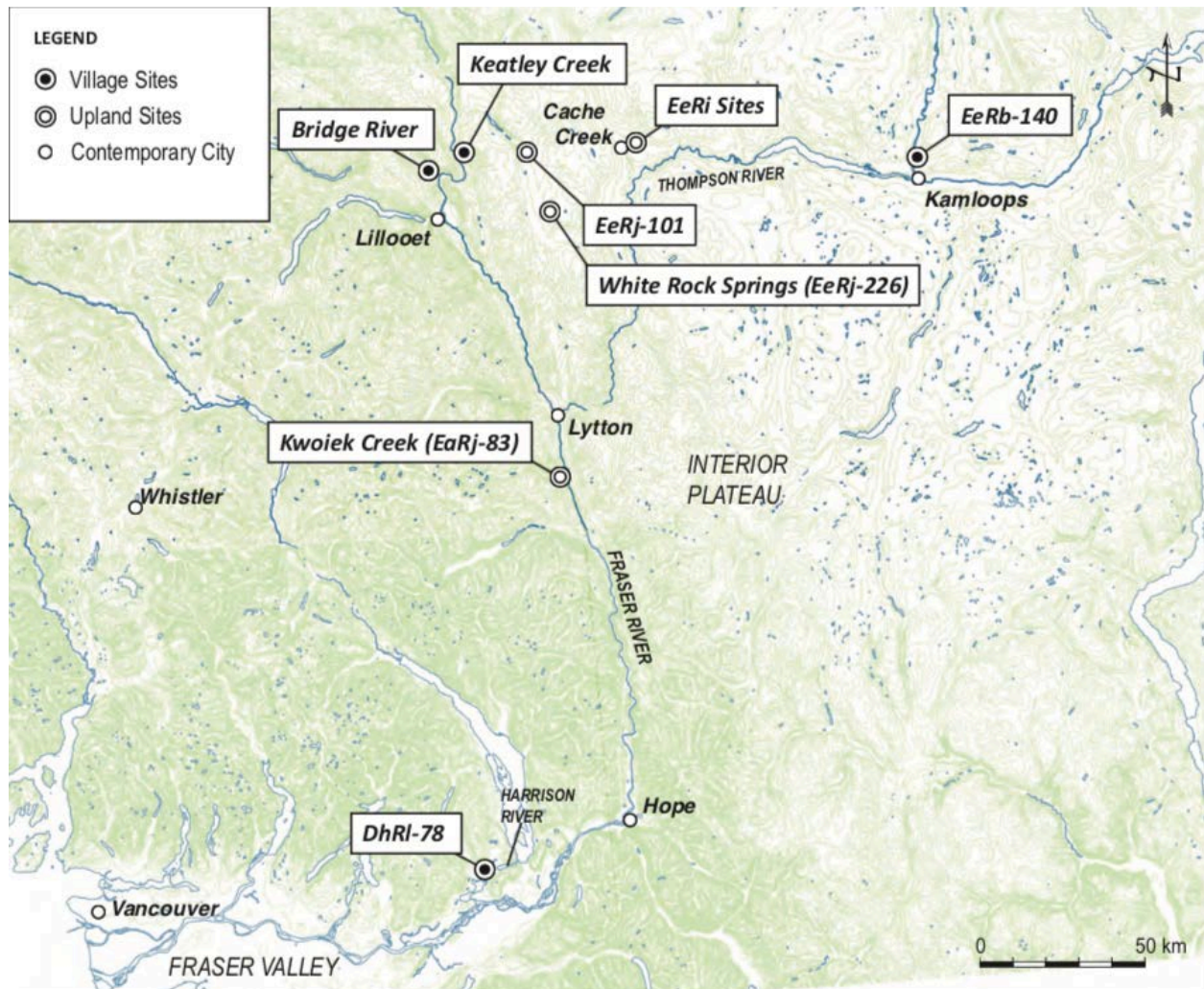


FIGURE 2. Earth oven complexes at village and upland sites across southern BC represented in this analysis.

### Salish Plant Use & Archaeobotanical Expectations

The traditional diet of Salish communities relied heavily on salmon, ungulates, berries and “root” foods. First Nations across southern BC managed root resources through traditional practices such as landscape burning, aerating the soil, and selective harvesting (Lepofsky and Peacock 2004; Peacock and Turner 2000; Turner and Peacock 2005; Turner 2014). In coastal BC, root resources such as camas (*Camassia quamash*), bracken fern (*Pteridium aquilinum*), and wapato (*Sagittaria latifolia*) once flourished in lowland prairies and wetlands

(Hoffmann et al. 2016; Norton 1979; Turner and Kuhnlein 1983). In interior BC, root resources such as nodding onion (*Allium cernuum*; Figure 3), desert-parsley (*Lomatium macrocarpum*), and spring beauty (*Claytonia lanceolata*) can grow at both upper and lower elevations but concentrate in montane meadows (Alexander 1992; Turner 1992). Root resources could thus be harvested through much of the growing season at different elevations depending on the scheduling choices of harvesters, taste preferences, and coordination with other seasonal resources.





FIGURE 3. Freshly harvested wild onions (*S. Peacock*).

Root resources were usually processed in the vicinity of the meadows from which they were harvested. Some root foods contain the undigestible polysaccharide inulin and require the heat, steam, and extended cooking time offered by earth oven technology to make them edible (Mullin et al. 1997; Peacock 2008; Turner et al. 1990:31; Wandsnider 1997). Roots must be cooked in quantity to make the time needed to harvest them and prepare an earth oven worthwhile. It is estimated that a full week was necessary to ready the hundreds of litres of roots that would roast in pits 1.5 to 4 metres across (Dawson 1891:20; Turner 1992:430). This procedure includes (Figure 1): building or re-digging the pit; collecting fuel, rocks, and vegetation for insulation; harvesting and preparing the roots; and the cooking itself, which can take a few hours to several days (Peacock 2002; Turner 1992:430).

Upland base camps are situated next to root-digging grounds that were historically considered common property amongst Interior Salish nations (Teit 1900:294, 1906:256, 1909:573), though specific ovens and camping sites may have been customarily used by particular families (Nicolaidis 2010:24–25). Trips to large base camps in Botanie Valley and Potato Mountain were often

coordinated with the mid-August hunt, bringing families from many interrelated communities from different nations to harvest and socialize (Alexander 1992:118–122; Turner 1992:423–427). The primary use of earth ovens was the preservation of root foods, but fish, game, berries, and lichen could also be cooked or used as flavourings (Alexander 1992:127–28; Steedman 1930:478; Teit 1900:237; Turner et al. 1990:24). Based on this picture, our expectation is that we will see evidence for a specialized focus on root food production in earth ovens in upland contexts, utilizing a limited variety of highly localized resources. This narrow focus in addition to the taphonomic processes outlined below, suggests that both macroremain density and diversity will be low in these ovens.

The low-lying villages in our sample occur in vicinity of major salmon-bearing waterways, specifically the Fraser, Thompson, and Harrison Rivers. While some communities lived at their primary villages only in winter and others year-round—depending on factors such as resource density, topography, and social organization—they were nevertheless the most intensively occupied site type with the widest variety of socioeconomic activities (Lepofsky and Lyons 2003). We focus

our sample on data from features that are clearly earth ovens as opposed to large hearths. Ovens are distinguished by the presence of a rim, basin and toss zone, and an immense amount of fire-cracked rock (Peacock 1998; Pokytylo and Froese 1983). Given the range of economic, social, and ritual activities occurring in village sites, we expect to see a wider variety of plant resources cooked in village ovens, and an increased presence of both faunal and non-local plant remains, reflecting more generalized public consumption in village contexts. The range of plant-related activities represented in these features suggests that we will see higher densities and diversities of plant foods.

### Archaeobotanical Data & Analysis

For this analysis, we compiled archaeobotanical data and noted the presence of fauna from nine contexts at eight archaeological sites across southern BC (Figure 2) reported in published sources and the grey literature. These sites include two assemblages from separate earth oven complexes at Bridge River; one is a layer of oven-like hearths within Housepit 54 (Lyons 2017a) and the other is a sample of ten ovens interspersed between pithouses within the village (Dietz 2005). Oven complexes located on the peripheries of villages include DhR1-78 on the Harrison River (Lyons and Ritchie 2017), EeRb-140 on the south Thompson River (Wollstonecroft 2000, 2002; Wollstonecroft and Baptiste 2016), and Keatley Creek (EeR1-7) in the mid-Fraser Canyon (Hayden and Mossop Cousins 2004). Upland contexts include White Rock Springs (EeRj 226; Nicolaidis 2010) and EeRj-101 in the upper Hat Creek Valley (Ketcheson 1979; Pokytylo and Froese 1983), EaRj-83 on upper Kwoiek Creek in the Fraser Canyon (Angelbeck and Hall 2018; Lyons 2013), and a cluster of sites near Cache Creek (EeRi; Peacock 2013). All sites date to the late pre-contact period (<2500 cal BP); because of the small sample of sites represented, no effort is made here to look at chronological patterning. Sample sizes within assemblages vary but are generally adequate to permit cross-site comparison (Table 1). The

Keatley Creek and EeRj-101 data only allow ubiquity analysis.

The preservation of ancient plant remains within the archaeological record of southern BC must be assessed through a consideration of both natural and cultural site formation processes (Minnis 1981; Pearsall 2000). The charred plant remains that usually compose the archaeobotanical record in the Pacific Northwest are not subject to natural attrition through decay and microbial activity that uncharred plants are, though they are subject to trampling and other mechanical processes on deposits (Lepofsky 2004). Only charred plant macroremains are considered archaeological in the analysed assemblages. There are several additional limitations in the compiled data set. First, root foods are notoriously hard to find in the archaeobotanical record: not only were root resources always protected by vegetation and care during the cooking process, but when charred, they tend to fragment into tiny amorphous and unrecognizable bits. Wollstonecroft has had some success identifying root foods from the BC Plateau using scanning electron microscopy (Wollstonecroft and Baptiste 2016), while Kooyman and Peacock are currently experimenting with identifying the presence of root foods using phytolith analysis. Calcined bone fragments occur in many of these earth oven assemblages, reflecting the cooking of game or the secondary deposition of refuse (Kusmer 2000).

In our results, we consider the patterning of archaeobotanical macroremains and the presence of fauna in earth oven assemblages from village and upland contexts in southern BC. To allow comparison between assemblages from different sites, we present three measures: ubiquity (percent presence by context), density (measured as parts per litre using identified plant parts, including seeds, hazelnut shell, and bulb parts) and diversity (measured as the number of identified taxa [NIT] including all macroremains except charcoal). We use ecological knowledge to determine the presence of non-local species.

### Results

We organize our results into three sections. We look first at archaeobotanical markers of plant food processing in earth oven complexes within village contexts and, second, at those in upland contexts.

In the third section, we look at evidence for fuel and matting in earth ovens from all nine complexes. We present the ubiquity analysis of root foods, fleshy fruits, nutshell, and fauna in Table 1, and the density and diversity indices in Figures 4 and 5

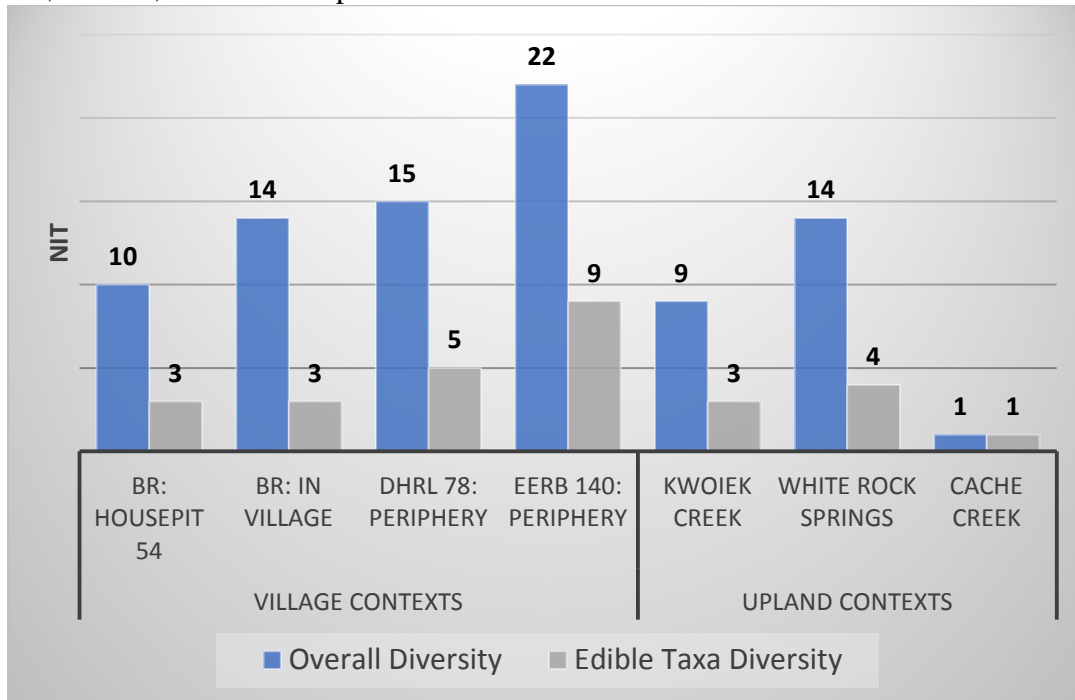


FIGURE 4. Diversity of overall vs. edible plant taxa across contexts.

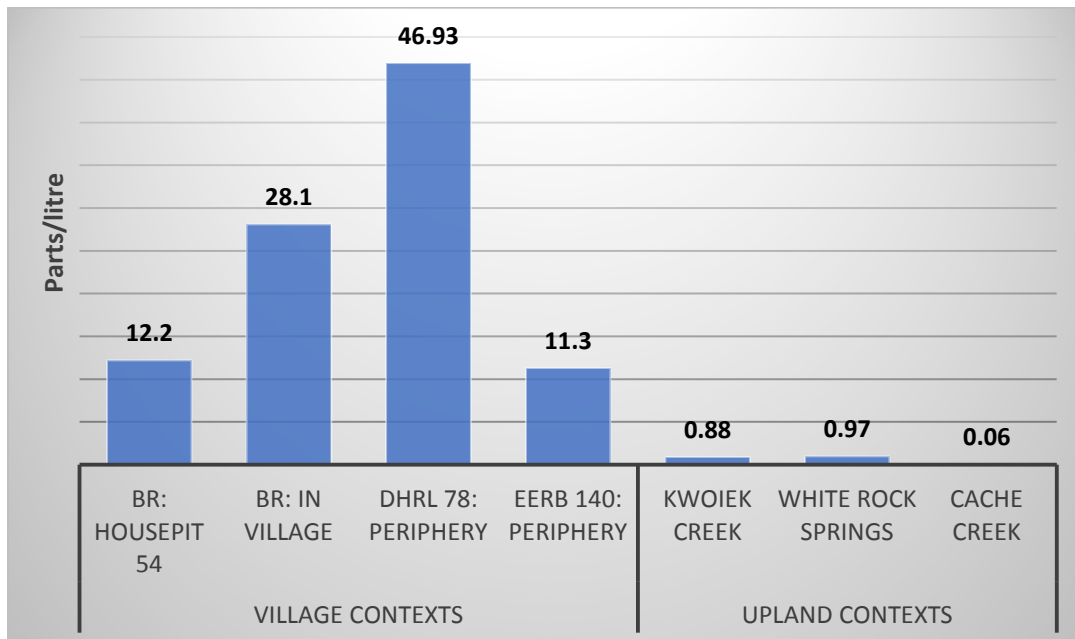


FIGURE 5. Combined density of seeds, hazelnut shell, and bulb parts.



TABLE 1. Ubiquity of root foods, fleshy fruits, nutshell, and fauna across contexts.

Context	Root foods		Fruits and nuts										Fauna					
	Volume (L.)	No. Ovens	Unidentified	Wild onion ( <i>Allium</i> spp.)	Desert-parsley ( <i>Lomatium</i> spp.)	Camas ( <i>Camassia</i> spp.)	cf. Oregon grape ( <i>Mahonia</i> spp.)	Kinnikinnick ( <i>Arctostaphylos uva-ursi</i> )	Hazelnut ( <i>Corylus cornuta</i> )	?Elderberry ( <i>Sambucus</i> spp.)	Currant/gooseberry ( <i>Ribes</i> spp.)	Blueberry ( <i>Vaccinium</i> spp.)		Raspberry ( <i>Rubus</i> spp.)	Saskatoon berry ( <i>Amelanchier alnifolia</i> )	cf. Soapberry ( <i>Shepherdia canadensis</i> )	Wild cherry ( <i>Prunus</i> spp.)	cf. Wild rose ( <i>Rosa</i> spp.)
<i>BR: Housepit 54</i>	34.4	3	T				S		S					S				F
<i>BR: in Village</i>	31.4	10	T				S		S					S				F
<i>Keatley: Periphery</i>		8	T, B, T				S		S				S					F
<i>DhRL-78: Periphery</i>	36.0	4	B, T				S	N	S				S		S			F
<i>EeRb-140: Periphery</i>	75.0	1	T	T			S	N	S				S, T		S			F
<i>Kwoiek Creek</i>	4.0	1	T				S											F
<i>White Rock Springs</i>	35.0	3	B	T			S		S				S		S			F
<i>EeRj-101</i>		5	B															F
<i>Cache Creek</i>	17.0	5											S					
<b>Ubiquity (% Presence)</b>			11.1	11.1	44.4	77.8	22.2	11.1	55.6	11.1	22.2	33.3	33.3	55.6	11.1	22.2	11.1	77.8

B=bulb part; N=nutshell; T=tissue; S=seed; F=fauna

A ‘cf.’ denotes a probable and a ‘?’ denotes a possible identification.



### *Plant Food Processing in Village Contexts*

Overall diversity of plant taxa is generally higher in village than in upland contexts, while the diversity of edible species is relatively low in both site types. (Figure 4; cf. Lyons 2017b). The densities of edible resources are moderate to high in all village contexts (Figure 5). Abundant plant foods in village assemblages include what is probably blue elderberry (*?Sambucus cerulea*)<sup>2</sup> in both earth oven complexes at Bridge River (>70%; Lyons 2017a); Saskatoons (*Amelanchier alnifolia*) at EeRb-140 (>45%), in addition to a broad spectrum of secondary plant food resources (Wollestonecroft 2000, 2002); and camas at DhRl-78 (>95%), an edible root food that was likely acquired through exchange with coastal communities (Figure 6; Lyons and Ritchie 2017). While the edible plant taxa in village contexts are generally dominated by fleshy fruits, bulbs are found in 40% of contexts. Unidentified tissues that may be the remnants of root foods and faunal remains are present in all assemblages (Table 1).

### *Plant Food Processing in Upland Contexts*

Archaeobotanical assemblages from upland earth ovens have low diversities of edible plant taxa and extremely low macroremain densities (Figures 4 & 5). While these ovens are situated in historically managed meadows where root foods flourish,

evidence for them is sparse. Wild onions were identified in two of four sites, kinnikinnick (*Arctostaphylos uva-ursi*) in three of four, and Saskatoon (Figure 7) and raspberry taxa (*Rubus* spp.) in one of four contexts (Table 1). Fauna and unidentified tissues were identified in half of the upland assemblages.

### *Fuel & Matting*

Charcoal analyses conducted for 5 of 9 assemblages (not shown) indicate that preferred fuels for pit-cooking were hot burners, such as redcedar (*Thuja plicata*) at DhRl-78, in the wetter belt of the Upper Fraser Valley, and Douglas-fir (*Pseudotsuga menziesii*) wood and bark at sites in the more arid interior. Radial cracks in Douglas-fir specimens at Bridge River suggest that it was dried before use, a common ethnographic practice (Dawson 1891:20; Teit 1900:236; Théry-Parisot and Henry 2012:386; Turner et al. 1990:109). Remnants of matting—used to insulate and protect plant foods—were recovered from four assemblages, including horsetails (*Equisetum* spp.) and raspberry (*Rubus* spp.) branches at DhRl-78 (Lyons and Ritchie 2017), grasses at EeRb-140 (Wollestonecroft and Baptiste 2016), and conifer branches with needles attached at EeRj 226 (Nicolaidis 2010) and EeRj-101 (Ketcheson 1979; Pokytylo and Froese 1983).



FIGURE 6. Ancient camas bulbs from DhRl-78 (Lyons and Ritchie 2017).



FIGURE 7. Ripening Saskatoons (N. Lyons).



## Discussion

Our indices show that edible plants identified in village roasting features across southern BC are somewhat more diverse and far denser than their upland counterparts. Some Salish villagers processed large and varied harvests of fleshy fruits and nuts local to their regions. The ubiquity analysis tells us that what is likely elderberries are found in 100% of village earth ovens, Saskatoons in 80%, and raspberry taxa (*Rubus* spp.), blueberry taxa (*Vaccinium* spp.) and wild cherry (*Prunus* spp.) in 40% (Table 1). Villagers at DhRI-78 focused on the intensive processing of camas likely procured through exchange (Lyons and Ritchie 2017). All villagers were cooking fauna in their earth ovens, and all ovens show significant re-use and sometimes re-purposing (see Wollestonecroft and Baptiste 2016). Earth ovens from upland contexts, by contrast, contain a limited diversity and density of plant foods. The small amount of seeds from fleshy fruits present in these ovens suggests that they were not processed for food but instead represent flavourings, casual in-season consumption, and/or the remnants of matting (Table 1; cf. Nicolaides 2010).

Our preliminary results support the contention that earth ovens in village contexts were used in more ways, and potentially by a wider array of cooks, than those in upland contexts by ancient Salish communities in southern BC. The most significant difference between site types is that the density of edible plants is an order of magnitude higher in village contexts (Figure 5), potentially indicating a higher intensity of use. High plant food densities, combined with the ubiquity of fauna in village ovens, suggest a more general and perhaps more flexible set of cooking and processing practices associated with village ovens. The more limited archaeobotanical evidence (and taphonomic constraints) from the upland ovens leaves us to infer their function from historical and traditional ecological knowledge (eg., Alexander 1992; Dawson 1891; Ignace et al. 2016; Teit 1900, 1906; Turner 1992, 2017). Clearly, many of these ovens were once used for root food production; what is

surprising is that half of the assemblages also contain at least some fauna.

Ultimately, we know that both site types were part of a larger kaleidoscope of seasonal movements within respective and overlapping territories of ancient Salish Nations. Here we have presented a partial picture of a larger whole. Moving forward, we know that very large sediment volumes are required to find edible plant taxa in earth ovens in all contexts, that microremain analysis (e.g., phytoliths, SEM, starch) should prove useful in discovering what was cooked in these ovens, and that combining small- and large-scale datasets is imperative for unearthing the original socioeconomic patterns of food production by Salish communities across the landscape.

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## Notes

1. Root foods, also known as geophytes, are underground storage organs such as corms, tubers, taproots, and bulbs. Root foods growing in the

Pacific Northwest with inulin include balsamroot (*Balsamorhiza sagittata*), yellow avalanche lily (*Erythronium grandiflorum*), camas, and many others (Peacock 2002).

2. The identification of this seed is uncertain. Lyons and Prentiss are pursuing ancient DNA analyses to try to determine if these seeds, which are ubiquitous in archaeobotanical assemblages in the mid-Fraser region, are indeed elderberries.

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