Some Like it Hot: Exploring the Archaeobotany Of Roasting Features in 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. 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.

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[1], 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; Nicolaides 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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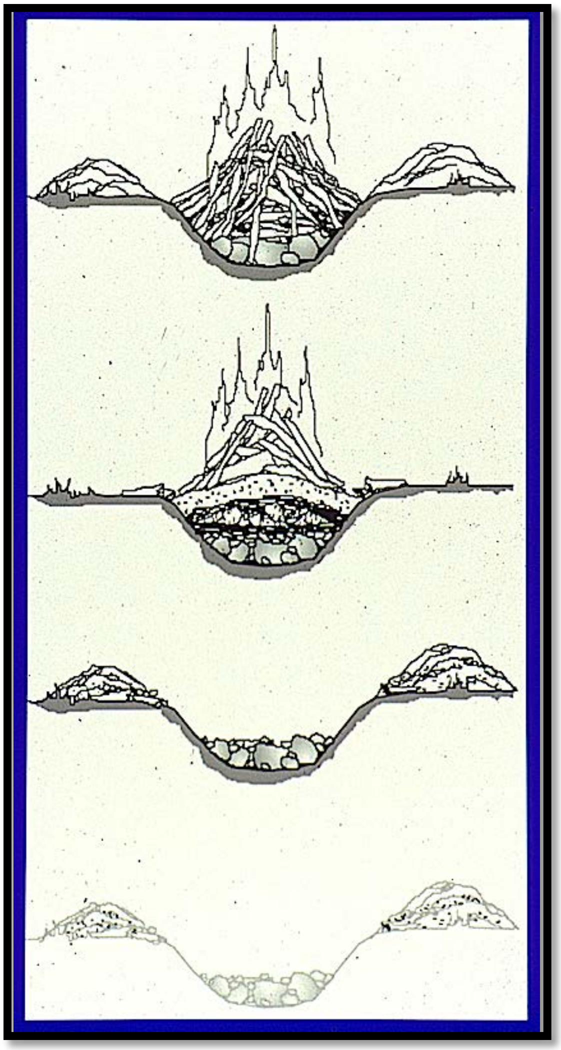

FIGURE 1. Schematic of an earth oven's construction (Peacock 1998).

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.

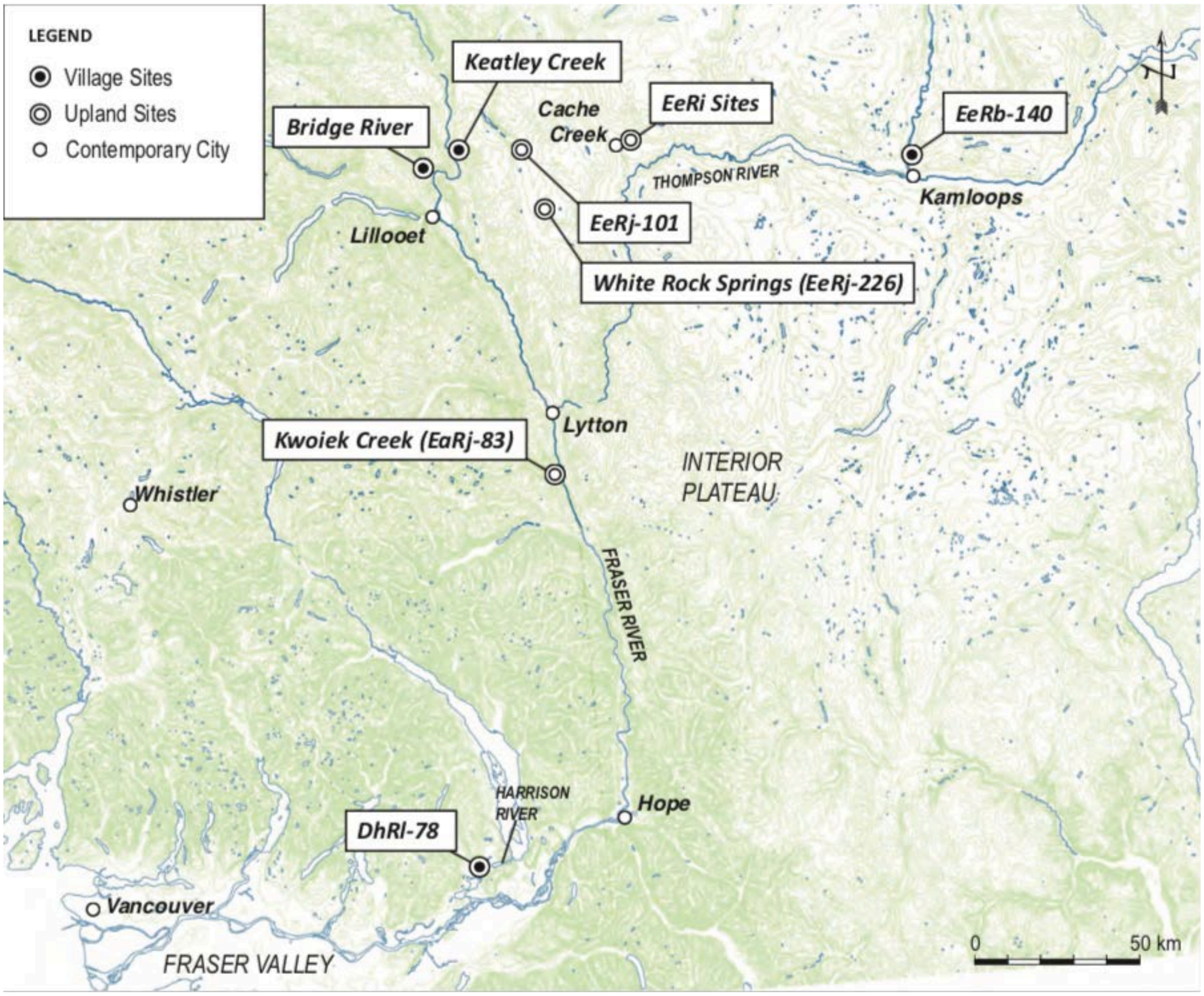

FIGURE 2. Earth oven complexes at village and upland sites across southern BC represented in this analysis.

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 polysaccaride 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 (Nicolaides 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 DhRl-78 on the Harrison River (Lyons and Ritchie 2017), EeRb-140 on the south Thompson River (Wollestonecroft 2000, 2002; Wollestonecroft and Baptiste 2016), and Keatley Creek (EeRl-7) in the mid-Fraser Canyon (Hayden and Mossop Cousins 2004). Upland contexts include White Rock Springs (EeRj 226; Nicolaides 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

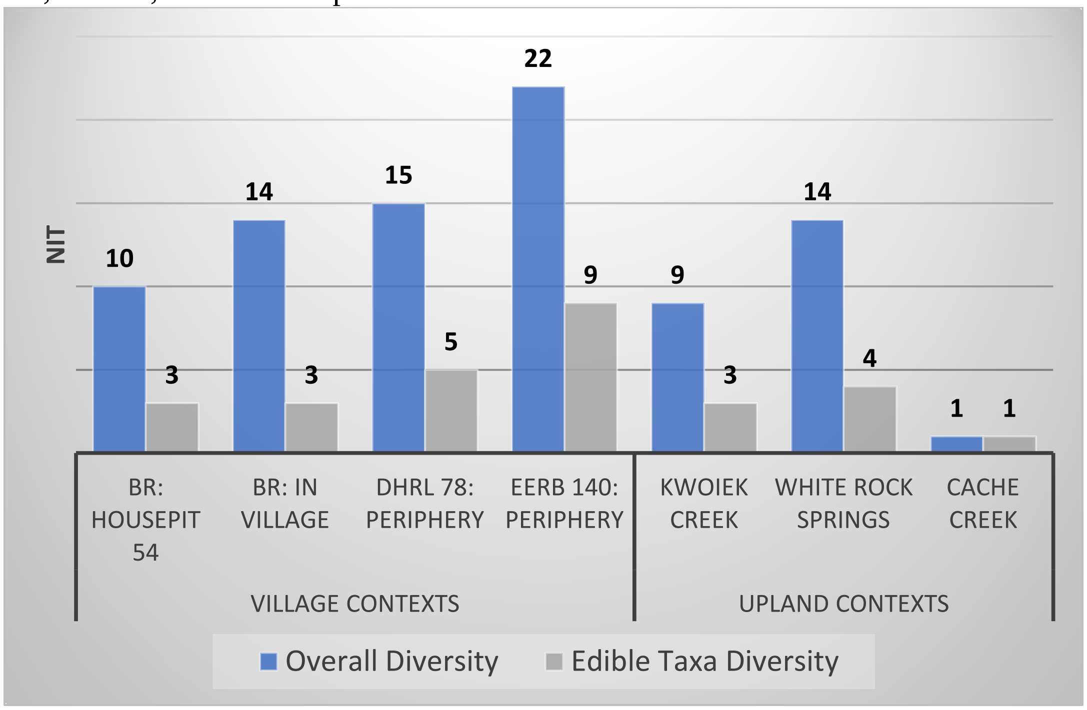

FIGURE 4. Diversity of overall vs. edible plant taxa across contexts.

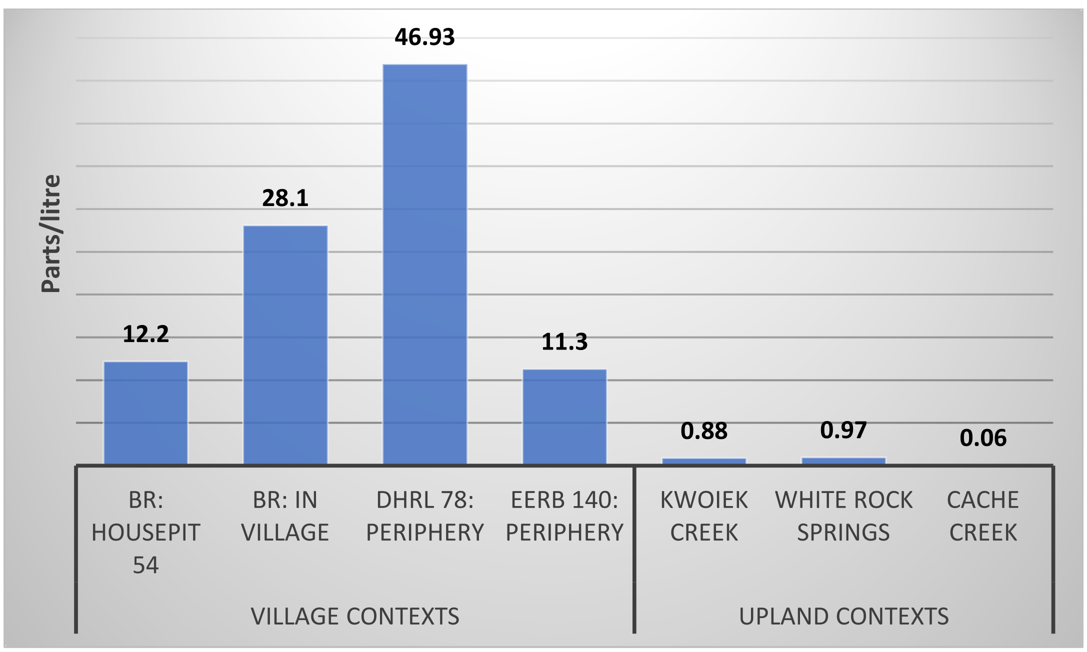

FIGURE 5. Combined density of seeds, hazelnut shell, and bulb parts.

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

Context				Root foods				Fruits and nuts												Fauna
		No. Ovens	Volume (L.)	Camas (*Camassia* spp.)	Desert-parsley (*Lomatium* spp.)	Wild onion (*Allium* spp.)	Unidentified	Blueberry (*Vaccinium* spp.)	Currant/gooseberry (*Ribes* spp.)	?Elderberry (*Sambucus* spp.)	Hazelnut (*Corylus cornuta*)	Kinnikinnick (*Arctostaphylos uva-ursi*)	cf. Oregon grape (*Mahonia* spp.)	Red-osier dogwood (*Cornus sericea*)	Raspberry (*Rubus* spp.)	Saskatoon berry (*Amelanchier alnifolia*	cf. Soapberry (*Shepherdia canadensis*)	Wild cherry (*Prunus* spp.)	cf. Wild rose (*Rosa* spp.)	Micro-fauna & fish bone
Village Contexts	*BR: Housepit 54*	3	34.4				T			S		S				S				F
	BR: in Village	10	31.4				T	S		S						S				F
	Keatley: Periphery	8			T	B	B, T			S					S					F
	DhRl-78: Periphery	4	36.0	B, T			B, T			S	N			S		S		S		F
	EeRb-140: Periphery	1	75.0			T	T	S	S	S	N			S	S	S, T		S		F
Upland Contexts	*Kwoiek Creek*	1	4.0				T					S								F
	White Rock Springs	3	35.0			B	T					S	S		S		S		S	
	EeRj-101	5				B														F
	Cache Creek	5	17.0													S				
Ubiquity (% Presence)				11.1	11.1	44.4	77.8	22.2	11.1	55.6	22.2	33.3	11.1	22.2	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*)[2] 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.

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

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 (Nicolaides 2010) and EeRj-101 (Ketcheson 1979; Pokytylo and Froese 1983).

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 DhRl-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 (*Balsamhoriza sagitatta*), 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.

References Cited

Alexander, Diana
1992 A Reconstruction of Prehistoric Land Use in the Mid-Fraser River Area Based on Ethnographic Data. In *A Complex Culture of the British Columbia Plateau*, edited by Brian Hayden, pp. 99–178, UBC Press, Vancouver.

Angelbeck, Bill, and David Hall (editors)
2018 Archaeological Investigations at Kwoiek Creek: Mitigative Excavations for the Kwoiek Creek Hydroelectric Project near Lytton, B.C. Arrowstone Archaeological Research and Consulting. Heritage Inspection Permit 2011-0362. Prepared on Behalf of Kanaka Bar Indian Band, Lytton, BC, and Kwoiek Creek Resources Limited Partnership, North Vancouver, BC

Carney, Molly
2016. Paleoethnobotanical and Geoarchaeological Analyses at the Flying Goose Site, 45PO435. Unpublished master's thesis, Washington State University, Pullman, WA.

Cheatham, R. D.
1988 Late Archaic Settlement Pattern in the Long Tom Sub-Basin, Upper Willamette Valley, Oregon. University of Oregon Anthropological Papers 39, University of Oregon, Eugene, OR.

Dawson, George
1891 *Notes on the Shuswap People of British Columbia*. Transactions of the Royal Society of Canada, Ottawa.

Dietz, Catherine A.
2005 Structure, Function, and Dating of External Cooking Features at the Bridge River Site. Unpublished masters thesis, Department of Anthropology, University of Montana, Missoula.

Hayden, Brian and Sara Mossop Cousins
2004 The social dimensions of roasting pits in a winter village site. In *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*, edited by William Prentiss and Ian Kuijt, pp. 140–154. University of Utah Press, Salt Lake City.

Hoffmann, Tanja, Natasha Lyons, Debbie Miller, Alejandra Diaz, Amy Homan, Stephanie Huddlestan, and Roma Leon
2016 Engineered Feature Used to Enhance Gardening at Mid-Late Holocene Site on the Pacific Northwest Coast. *Science Advances* 2, e1601282 (2016). Doi: http://advances.sciencemag.org/content/2/12/e1601282

Ignace, Marianne, Nancy Turner, and Sandra Peacock (eds)
2016 In *Secwepemc People and Plants: Research Papers in Shuswap Ethnobotany*. Society of Ethnobiology, Tacoma, WA.

Ketcheson, Maureen
1979 Floral Analysis of Archaeological Sites EeRj-1, CF9 and HP1, EeRj-46, EeRj-55A and 55D, EeRj-71, EeRj-92, and EeRj-101, Hat Creek Valley. Report on file with the Department of Anthropology, University of British Columbia, Vancouver.

Kusmer, Karla
2000 Zooarchaeological analysis at Keatley Creek ll: Socioeconomy. In *Socioeconomic Interpretations: The Ancient Past of Keatley Creek*, Vol. II, edited by B. Hayden, pp. 119–134. Archaeology Press, Department of Archaeology, Simon Fraser University, Burnaby.

Lepofsky, Dana
2004 The Northwest. In *People and Plants in Ancient Western North America*, edited by Paul

Minnis, pp. 367–464. Smithsonian Books, Washington, D.C.

Lepofsky, Dana, and Sandra Peacock
2004 A Question of Intensity: Exploring the Role of Plant Foods in Northern Plateau Prehistory. In *Complex Hunter-Gatherers Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*, edited by W. Prentiss and I. Kuijt, pp. 115–139. The University of Utah Press, Salt Lake City, UT.

Lyons, Natasha
2013 Palaeoethnobotanical Analysis of four sites on Kwoiek Creek, British Columbia. Report prepared for Arrowstone Archaeology. On file with Kanaka Bar Indian Band, and Innergex Renewable Energy, Longueuil, Québec.

2017a Palaeoethnobotanical analysis of the Bridge River 2 & 3 Occupations of Housepit 54 at the Bridge River Site, Southwestern B.C. Report on file with the Department of Anthropology, University of Montana.

2017b Plant Production Practices among Ancient First Nations of the Lower Fraser River Region. In *Archaeology of the Lower Fraser River Region*, edited by Mike Rousseau. Archaeology Press, Simon Fraser University, Burnaby, BC.

Lyons, Natasha and Morgan Ritchie
2017 The Archaeology of Camas Production and Exchange on the Northwest Coast: with Evidence from a Sts'ailes (Chehalis) Village on the Harrison River, B.C. *Journal of Ethnobiology* 37(2):346–367.

Minnis, Paul
1981 Seeds in Archaeological Sites: Sources and Some Interpretive Problems. *American Antiquity* 46(1):143–152.

Mullin, W.J., Sandra Peacock, Dawn Loewen and Nancy Turner
1997 Macronutrient content of Yellow Glacier Lily and Balsamroot; root vegetables used by Indigenous Peoples of northwestern North America. *Food Research International* 30(10):769–775.

Nicolaides, Monica
2010 The Proof is in the Pits: A Paleoethnobotanical Analysis of Earth Ovens from the White Rock Springs Site (EeRj 226), an Ancient Root Processing Locale on the Canadian Plateau. Unpublished master's thesis, Department of Archaeology, University of Calgary, Calgary, AB.

Norton, Helen
1979 The Association between Anthropogenic Prairies and Important Food Plants in Western Washington. *Northwest Anthropological Research Notes* 13:175–200.

Peacock, Sandra
1998 Putting Down Roots: The Emergence of Wild Plant Food Production on the Canadian Plateau. Unpublished Doctoral Dissertation, University of Victoria, Victoria, BC.

2002 Evidence for Prehistoric Root Resource Processing on the Canadian Plateau. In *Hunter-Gatherer Archaeobotany*, edited by L. Mason and J. Hather, pp. 44–61. Antony Rowe Limited, Chippenham, Wiltshire.

2008 From Complex to Simple: Balsamroot, Inulin, and the Chemistry of Traditional Interior Salish Pitcooking Technology. *Botany* 86:116–128.

2013 Report on the Archaeology and Paleoethnobotany of Earth Ovens from the Cache Creek. Landfill Project Area. Report on file with Terra Environmental, BC.

Peacock, Sandra and Nancy Turner
2000 "Just Like a Garden": Traditional Resource Management and Biodiversity Conservation on the Interior Plateau of British Columbia. In *Biodiversity and Native America*, edited by Paul Minnis and Wayne Elisens, pp. 133–179. University of Oklahoma Press, Norman.

Pearsall, Deborah
2001 *Paleoethnobotany: A Handbook of*

Procedures, 2nd edition. Academic Press, New York.

Pokytylo, David and Patricia Froese
1983 Archaeological Evidence for Prehistoric Root Gathering in the Southern Interior Plateau of British Columbia: A Case Study from Upper Hat Creek Valley. *Canadian Journal of Archaeology* 7:127–157.

Prouty, G. L, B. L. O'Neill, and T. J. Connolly
2004 Aboriginal Plant Use at Chalker and Long Tom Sites. In *A Holocene Geoarchaeological Record for the Upper Willamette Valley, Oregon: The Long Tom and Chalker Sites*, edited by B. L. O'Neill, T. J. Connolly, and D. E. Freidel, pp. 211–220. University of Oregon Anthropological Papers 61, University of Oregon, Eugene, OR.

Steedman, Elsie V.
1930 Ethnobotany of the Thompson Indians of British Columbia: Based on Field Notes by James Teit. Extracted from the 45th B.A.E. Annual Report, Washington, DC.

Stenholm, Nancy
1985 Botanical Assemblage. In *Summary of Results, Chief Joseph Dam Cultural Resources Project, Washington*, edited by S. Campbell, pp. 421–453. University of Washington, Seattle, WA.

2000 Botanical Analysis for the Calispell Valley Archaeological Project. In *The Calispell Valley Archaeological Project Final Report: 4*, edited by W. Andrefsky, G. Burtchard, K. Presler, S. Samuels, P. Sanders, and A. Thoms, pp. 14.1–14.66. Center for Northwest Anthropology, Washington State University, Pullman, WA.

Teit, James
1900 The Thompson Indians of British Columbia. The Jesup North Pacific Expedition. *Memoirs of the American Museum of Natural History* 2(4):163–392.

1906 *The Lillooet Indians*. Memoirs of the American Museum of Natural History 4(5). American Museum of Natural History.

Théry-Parisot, Isabelle, and Auréade Henry
2012 Seasoned or Green? Radial Cracks Analysis as a Method for Identifying the use of Green Wood as Fuel in Archaeological Charcoal. *Journal of Archaeological Science* 39(2):381–388.

Thoms, Alston
1989 The Northern Roots of Hunter-Gatherer Intensification: Camas and the Pacific Northwest. Unpublished doctoral dissertation, Washington State University, Seattle, WA.

2008 The Fire Stones Carry: Ethnographic Records and Archaeological Expectations for Hot-rock Cookery in Western North America. *Journal of Anthropological Archaeology* 27:443–460.

Turner, Nancy
1992 Plant Resources of the Stl'átl'imx (Fraser River Lillooet) People: A Window into the Past. In *A Complex Culture of the British Columbia Plateau*, edited by Brian Hayden, pp. 405–469. UBC Press, Vancouver.

1997 *Food Plants of Interior First Peoples*. Royal British Columbia Museum Handbook, UBC Press, Vancouver.

2014 *Ancient Pathways, Ancestral Knowledge: Ethnobotany and Ecological Wisdom of Indigenous Peoples of Northwestern North America*. McGill-Queen's University Press, Montreal, QC and Kingston, ON.

2017 Re Styecwmenu´le' cws-kucw: How We Look(ed) after Our Land. In Secwépemc People, Land, and Laws: Yerí7 re Stsq'ey's-kucw, *edited by Marianne and Ron Ignace, pp. 145–219. McGill-Queens University Press, Montreal and Kingston.*

Turner, Nancy and Harriet Kuhnlein
1983 Camas (*Camassia* spp.) and Riceroot (*Fritillaria* spp.): Two Liliaceous ''Root'' Foods of the Northwest Coast Indians. *Ecology of Food and Nutrition* 13:199–219.

Turner, Nancy and Dawn Loewen
1998. The Original ''Free Trade'': Exchange of

Botanical Products and Associated Plant Knowledge in Northwestern North America. *Anthropologica* XL:49–70.

Turner, Nancy, and Sandra Peacock
2005 Solving the Perennial Paradox: Ethnobotanical Evidence for Plant Resource Management on the Northwest Coast. In *Keeping It Living: Traditions of Plant Use and Cultivation on the Northwest Coast of North America*, edited by D. Deur and N. Turner, pp. 101–150. University of Washington Press and UBC Press, Seattle and Vancouver.

Turner, Nancy, Lawrence Thompson, M. Terry Thompson, and Annie York
1990 Thompson Ethnobotany: Knowledge and Usage of Plants by the Thompson Indians of British Columbia. Royal British Columbia Museum Memoir No. 3, Victoria.

Wandsnider, LuAnn
1997 The Roasted and the Boiled: Food Composition and Heat Treatment with Special Emphasis on Pit-hearth Cooking. *Journal of Anthropological Archaeolog*y 16:1–48.

Wollstonecroft, Michéle
2000 The Fruit of Their Labour: A Paleoethnobotanical Study of Site EeRb-140, A Multi-Component Open-Air Archaeological Site on the British Columbia Plateau. Unpublished master's thesis, Department of Archaeology, Simon Fraser University, Burnbaby, BC.

2002 The Fruit of Their Labour: Plants and Plant Processing at EeRb-140 (860±60 uncal B.P. to 160±50 uncal B.P.): A Late Prehistoric Hunter-Gatherer-Fisher Site on the Southern Interior Plateau, British Columbia, Canada. *Vegetation History and Archaeobotany* 11:61–70.

Wollstonecroft, Michéle and Gladys Baptiste
2016 Linking the Archaeology and Ethnobotany: An Interpretation of Ancient Plant Remains from Stk'emlupsemc Traditional Territory. In *Secwepemc People and Plants: Research Papers in Shuswap Ethnobotany*, edited by Marianne Ignace, Nancy Turner, and Sandra Peacock, pp. 119–166. Society of Ethnobiology, Tacoma, WA.