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Article abstract

Despite low productivity rates and sparse tree cover in the circumpolar region, the Inuit identify woody plants and their products as important parts of their diet that provide essential nutrients and medicine. However, evidence of historic and prehistoric Inuit plant use is less well known. This article presents archaeobotanical research from two 18th-century Inuit sites in Northern Labrador. At both sites, abundant botanical remains were recovered, suggesting woody plants were consumed as food, used as medicines, and modified for many valuable purposes. These results are consistent with Inuit ethnobotanical studies, suggesting that woody plants contribute important elements to the Inuit economy today and have done so in the recent past.

The shrubs in the forest: The use of woody species by 18th-century Labrador Inuit

Cynthia Zutter*

Résumé: Les arbustes de la forêt. L'utilisation des plantes forestières par les Inuit du Labrador au XVIII^{e} siècle

Malgré un faible taux de productivité et une couverture végétale éparse dans la région circumpolaire, les Inuit considèrent les plantes forestières et leurs produits comme des parties importantes de leur alimentation, car elles leur fournissent des nutriments essentiels et des produits médicinaux. Cependant, on connaît moins la manière dont les Inuit des époques historiques et préhistoriques utilisaient les végétaux. Cet article présente une recherche archéobotanique portant sur deux sites inuit du XVIII^{e} siècle au nord du Labrador. Dans les deux sites, des restes végétaux ont été retrouvés en grande quantité, ce qui suggère que les plantes forestières étaient utilisées comme nourriture, pour usage médical, ou qu'elles étaient modifiées en vue de nombreux usages. Ces résultats corroborent les études ethnobotaniques chez les Inuit, indiquant que les plantes forestières apportent d'importants éléments à l'économie des Inuit et qu'elles le faisaient aussi dans le passé récent.

Abstract: The shrubs in the forest: The use of woody species by 18th-century Labrador Inuit

Despite low productivity rates and sparse tree cover in the circumpolar region, the Inuit identify woody plants and their products as important parts of their diet that provide essential nutrients and medicine. However, evidence of historic and prehistoric Inuit plant use is less well known. This article presents archaeobotanical research from two 18th-century Inuit sites in Northern Labrador. At both sites, abundant botanical remains were recovered, suggesting woody plants were consumed as food, used as medicines, and modified for many valuable purposes. These results are consistent with Inuit ethnobotanical studies, suggesting that woody plants contribute important elements to the Inuit economy today and have done so in the recent past.

Introduction

Current ethnobotanical evidence suggests that woody plants and shrubs, in addition to other vascular plants, were an important resource that Arctic peoples relied upon for

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food and medicines as well as for utilitarian purposes such as tools, support beams for structures and, possibly, shamanistic ritual practices (Black et al. 2008; Blandeau 1994; Cuerrier et al. 2011, Dristas 1986; Inuvialuit elders with Bandringa 2010; Jones 2010; Lazarus and Aullas 1990, 1991, 1992; Murray et al. 2005; Smith 1973). These findings are important, as they place the traditional meat-dominated Inuit diet of fish, sea, and land mammals in a broader context; in some cases, especially in western Arctic and subarctic regions, plant resources contribute up to 15% of the total diet (Young and Hall 1969). Recent nutrition and/or health research also includes plant foods when describing the benefits of country food in the diet of the Inuit (Kuhlein et al. 2006; Mackey and Orr 1987; Wein et al. 1996).

The study of prehistoric plant use by northern peoples is less well known and rarely included in Arctic archaeological research (Lepofsky et al. 2001; Zutter 2009). Despite the scarcity of archaeobotanical studies, recent evidence suggests that plants may have played a significant role in the lives of Inuit across the circumpolar region (Earley and Zutter 2012; Guiry et al. 2010; Hartery 2006; Lepofsky et al. 2001; Pigford and Zutter 2010; Zutter and Pigford 2007; Zutter 2009). This article compares new archaeobotanical data from the Oakes Bay I site, in the Nain region of Labrador, with the results of previous work at Uivak I (Zutter 2009), with particular attention paid to woody plants in these data sets. The goal is to elucidate the variety and manner in which 18th-century Inuit used these types of plants.

Research area and sample provenance

Tree cover is sparse along the coast of north-central Labrador, occurring mainly in isolated patches of spruce *krummholz* (*Picea glauca*) amid a landscape dominated by woody shrubs and low-lying vegetation. Plant diversity and productivity is low with only approximately 200 vascular plants, most of which are woody shrubs. This forest tundra represents a transitional zone between the low Arctic and the subarctic. Average annual temperature is ca. - 4°C, and annual precipitation ca. 900 mm, at least 50% of which falls as snow (Environment Canada 2012). The climate is influenced by the exchange between the atmosphere and the ocean, specifically the Labrador Sea and the Labrador Current, and creates sub-surface features of discontinuous permafrost.

Archaeobotanical samples were recovered from two archaeological sites: the more northerly site Uivak I (HjCl-11), on Okak Point, and Oakes Bay I (HeCg-08), on Dog Island (Figure 1). Both sites are close to the edge of the fast sea ice, ideal for sea mammal hunting in the winter (Woollett 2007). Each site used to be a group of typical communal Inuit houses that had been built by carving deep impressions into the ground, by reinforcing the side walls with boulders and rock slabs, and by erecting a roof of sod and skin supported by wooden or whale-bone beams (Kaplan 2012). The entranceway was a deep tunnel with a pit to trap cold air before one could enter an open room with a paved rock floor, lamp stand(s), an interior cooking area, and raised sleeping platform(s) along the outer walls (Woollett 2003, 2007). These pit-style winter houses continued to be used in Labrador into the late 19th and early 20th centuries.

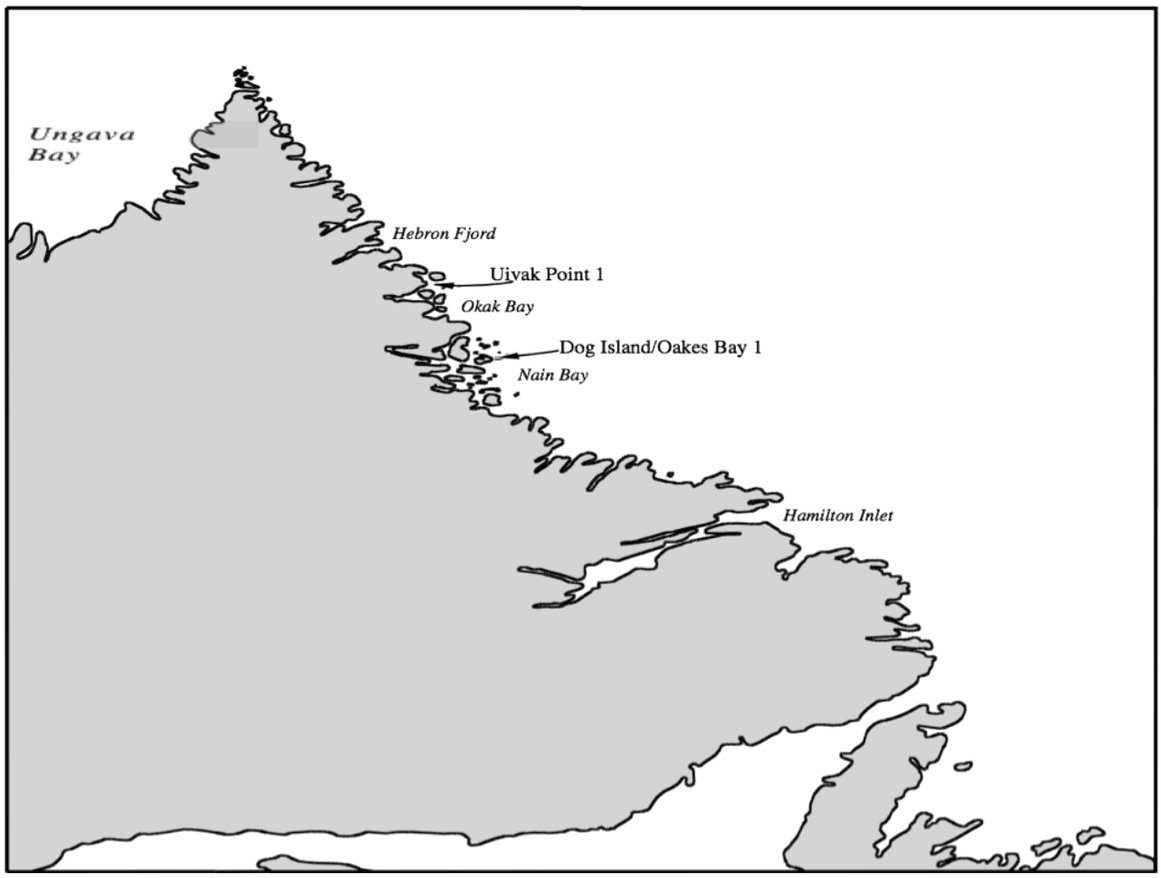

Figure 1. Labrador map with Uivak I and Oakes Bay I sites

Uivak I is on a raised beach terrace overlooking Okak bay and consists of nine large semi-subterranean communal Inuit houses occupied during the 18th century (Figure 2). House 7 was the largest of the group, measuring 18 m by 12 m and was extensively excavated in 1993, 1994, and 1996 (Kaplan 2009) (Figure 3). Thirty-two square-metre units were excavated in House 7 to uncover an entranceway with a cold trap, a stone-paved house floor, raised platforms along the back and side walls, and lamp stands fashioned out of bone in the midst of the floor (Kaplan 2012: 29). Soil samples were collected from selected excavation units that represented different contexts of the house: the sleeping platform; the floor; and the entranceway. Complementary samples of a similar volume were retrieved in 10 cm increments from a column section in the House 7 midden. An interesting sample, shaped like a human coprolite, was also recovered from under the sleeping platform (Zutter 2009; Zutter and Pigford 2007). Samples were collected from a variety of archaeological contexts (midden, sleeping platform, entranceway, and floor) to aid in reconstructing the full suite of past human behaviours within the house itself.

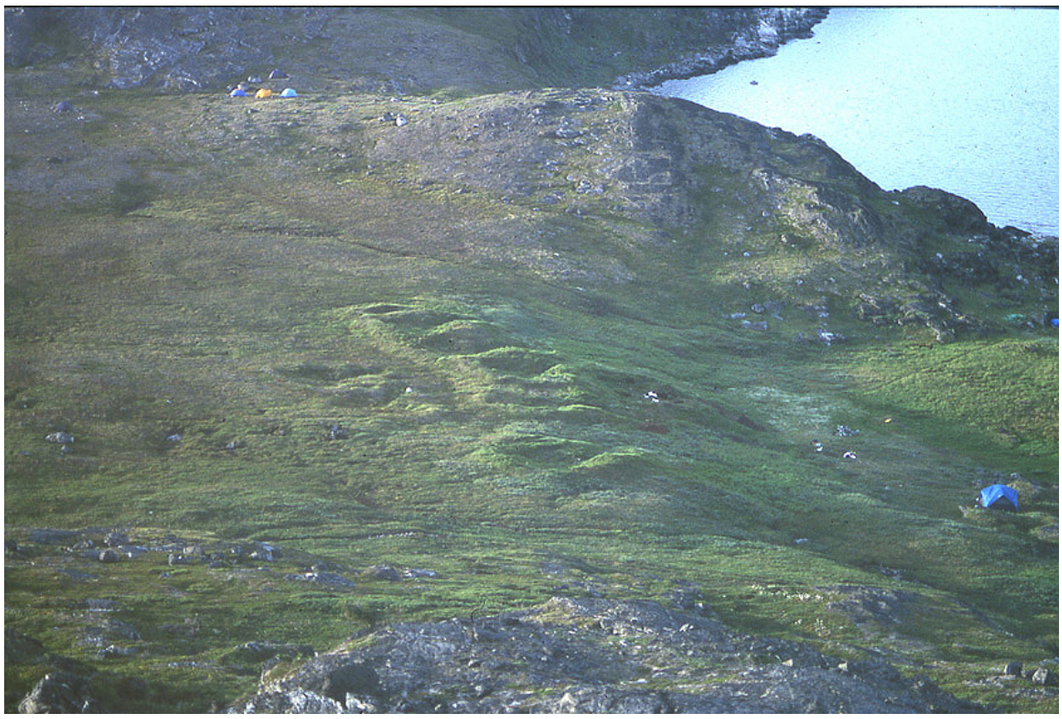

Figure 2. Uivak I site, Labrador, 2010. Photo by Cynthia Zutter.

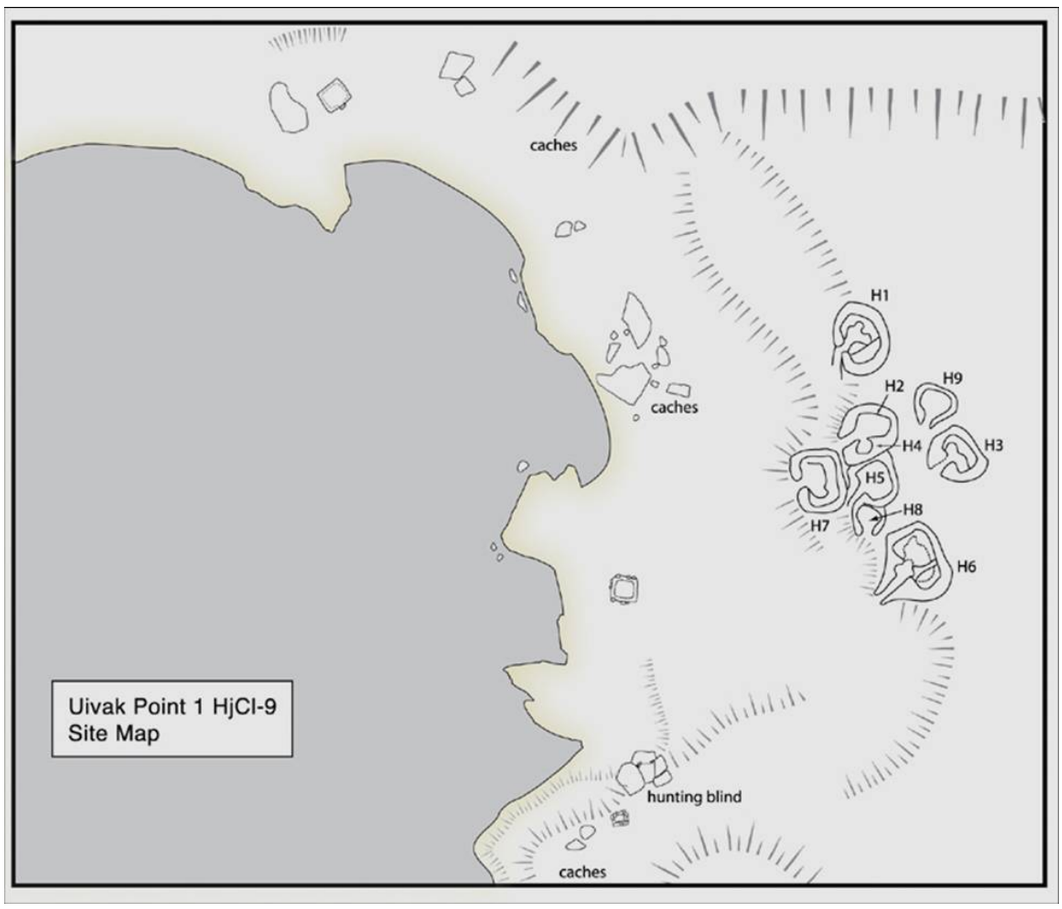

Figure 3. Uivak I site map (source: Woollett 2003 by permission).

Oakes Bay I is on a wet, boggy slope along the shore of an inlet on the west side of Dog Island. It includes the ruins of seven large sod-house depressions of various sizes dating to the 17th and 18th centuries (Kaplan and Woollett 2000) (Figure 4). In 2002, five square-metre units were excavated from the interior of House 4 from the sleeping platform to the middle of the floor. A two-by-two metre unit was also collected from the House 1 midden (Figure 5) (Woollett 2006). Soil samples were collected from differing excavation units on the floor and sleeping platform within this house as well as from the House 1 midden. It should be noted that the local population still uses this area for harvesting of berries, especially crowberry (*Empetrum nigrum*) and cloudberry (*Rubus chamaemorus*). Birch (*Betula*), willow (*Salix*), Labrador tea (*Ledum*), and fireweed (*Epilobium latifolium*) grow *in situ* on this site, and there is evidence of rodent disturbance.

The current archaeobotanical research is part of a larger multidisciplinary palaeoeconomic project led by Dr. James Woollett (Université Laval) and focused on the 18th-century Labrador Inuit subsistence economy within the context of environmental (e.g., Little Ice Age cooling) and cultural changes (e.g., European/Moravian missionary settlement), both of which directly influenced Inuit society (Kaplan and Woollett 2000; Lemus-Lauzon et al. this issue; Roy et. al. 2012; Woollett 2007).

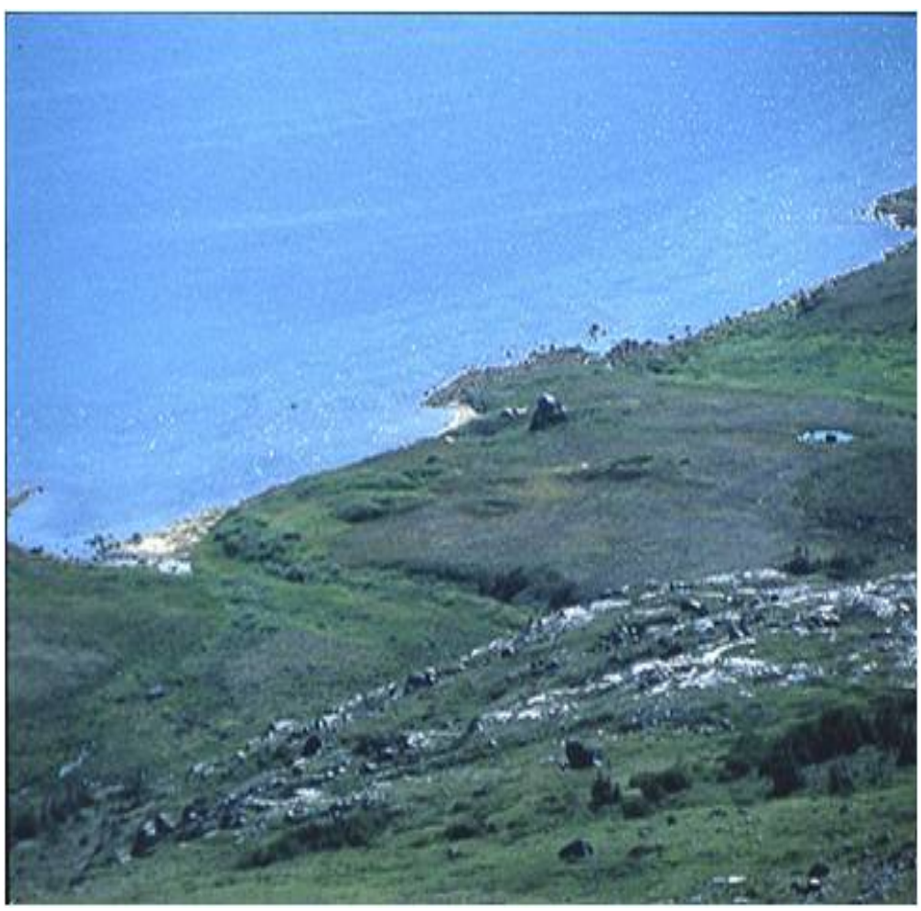

Figure 4. Oakes Bay I site, 2005. Photo by Cynthia Zutter.

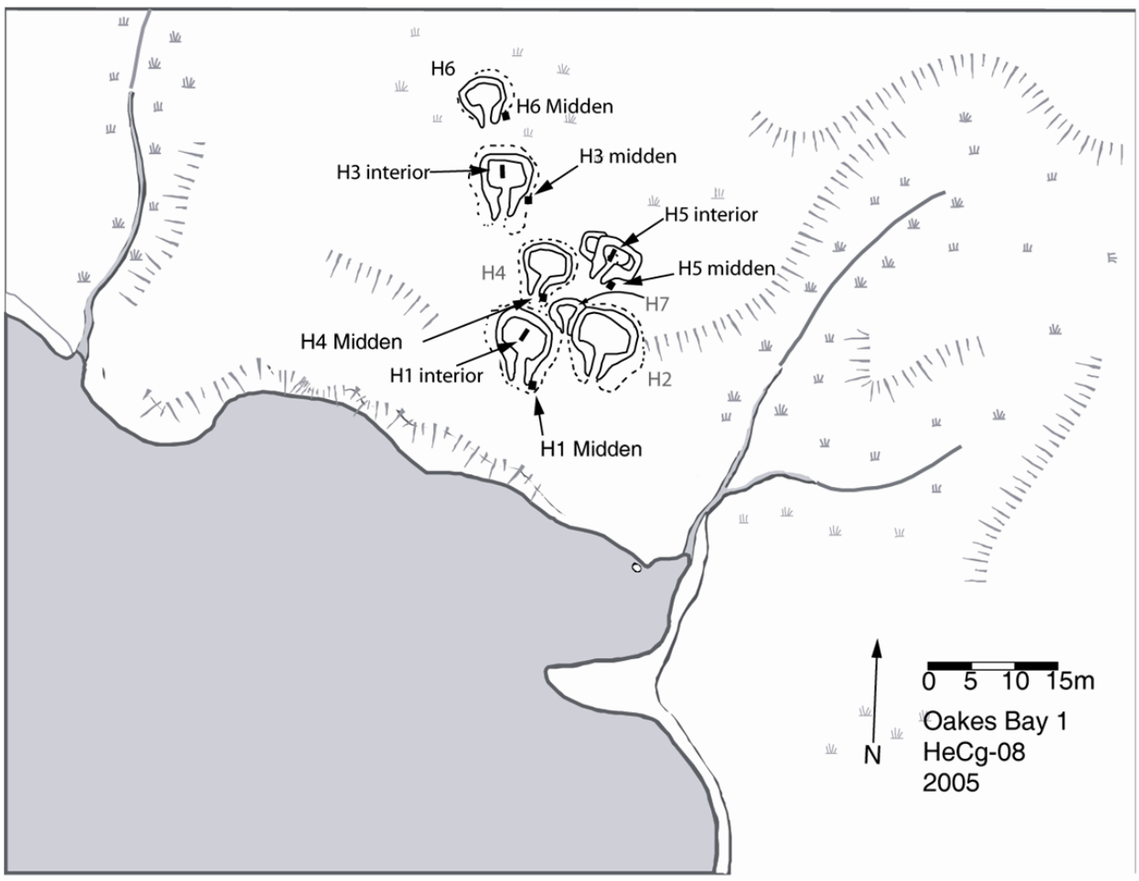

Figure 5. Oakes Bay I site map (source: Woollett 2003 by permission).

Methods

Twenty-seven bulk soil samples were analysed from the Uivak I site and approximately 30 from the Oakes Bay I site following standard archaeobotanical methods (Pearsall 1989). At both locales, samples were collected from contexts not only inside the houses, i.e., the floor and sleeping platform, but also outside the houses in associated midden deposits. For comparative purposes, a set of samples was also retrieved from an offsite locality to provide an example of naturally occurring macro-botanical remains in local soil deposits.

With preservation conditions being excellent at both sites, one litre of soil was used from the Uivak samples and only 500 ml from the Oakes Bay samples. Each sample was wet-sieved in the Anthropology lab at MacEwan University, Edmonton, through #20 (0.85 mm) and #30 (0.65 mm) mesh Tyler screens to disperse mineral sediment and to facilitate sorting of identifiable floral remains from the indeterminable residue. All sediments from both screens were examined under a low power binocular microscope (x12 to x50). All macro botanicals were identified using seed reference collections at MacEwan University along with various seed identification manuals (Berggren 1969; Delroit 1970; Martin and Bartley 1961). Nomenclature follows the

Annotated Checklist of the Vascular Plants of Newfoundland and Labrador (Meades et al. 2000).

Results

Uivak I

Over 15,500 macro botanicals from 26 distinct plant taxa were recovered from the Uivak I site (for table of absolute numbers and taxa variety see Zutter 2009: 25). Macro botanicals from woody plants represented over 90% of the total. Crowberry (*Empetrum nigrum*) was ubiquitous and had the highest concentration of seeds/litre, with over 10,000 recovered in the coprolite sample (see Zutter and Pigford 2007 for in-depth analysis of coprolite sample). Spruce (*Picea glauca*) needles were also present in many samples, with concentrations as high as 500/litre in the sleeping platform samples. On average, the concentration of macro botanicals was approximately 270/litre for all samples. The sleeping platform samples had the highest variety of plant taxa, up to 14 different types in one sample, while the midden had higher concentrations of macro botanicals than the other excavation units. Herbaceous and wetland species, including *Montia fontana, Cerastium, Silene*, and *Cyperaceae* taxa, were found in low concentrations in the entranceway and house floor samples, possibly representing modern *in situ* plant growth.

Oakes Bay I

Approximately 3,000 macro botanicals have been recorded from the Oakes Bay I site, representing 16 taxa (Zutter 2012: Tables 1 and 2). Average concentration of macro botanicals in all samples was 286/litre, indicating similar preservation conditions to those at Uivak. Macro botanicals from berry-producing shrubs, including both seeds and leaves, were dominant in all excavation contexts, contributing more than 50% of the total in all samples. Crowberry (*Empetrum nigrum*) was ubiquitous, but spruce needles were less common and more concentrated in the midden and floor samples than on the sleeping platform. The midden samples had the highest concentration of macro botanicals and largest variety of taxa per sample. Catkins and nutlets of woody shrubs, such as *Alnus* and *Betula*, were common in the surface levels of the excavation units. These macro botanicals are rarely preserved in archaeological samples and may be the *in situ* plants growing on the site today.

Offsite samples

Offsite samples are present-day *in situ* plant communities and provide a record of naturally occurring vegetation. In both areas, the samples had low concentrations of macro botanicals (~30/liter) likely due to low plant productivity. In the Uivak locality, the sample was composed mainly of herbaceous seeds and leaves from birch (*Betula*)

and willow (*Salix*), while the sample from the Oakes Bay region had mainly leaves from *Empetrum* and *Vaccinium* taxa.

Comparative results

At both locations, the onsite samples had average concentrations of macro botanicals that were 10 times higher (~200/litre) than those from the offsite naturally occurring plant communities. It seems that plants were in fact being brought into the houses at Uivak and Oakes Bay. The house floor samples at both sites were dominated by woody plant residues, including leaves from crowberry (*Empetrum nigrum*) and birch (*Betula*) taxa as well as seeds from crowberry and herbaceous plants. The sleeping platforms had the highest concentration of coniferous needles, especially at Uivak, along with crowberry seeds and leaves, and alder and birch catkins and/or nutlets. The midden was a conglomeration of taxa, with seeds from mainly edible woody plants including crowberry (*Empetrum nigrum*), bearberry (*Arctostaphylos uva-ursi*), and blueberry (*Vaccinium sp.*), as well as spruce needles and herbaceous taxa.

Discussion

To facilitate comparison and interpretation of the macro-botanical results from differing archaeological sites and contexts, the plant taxa were condensed into four general vegetation community/plant use categories based on Arctic ethnobotanical research (Blondeau 1994; Cuerrier et al. 2011; Dristas 1986; Griffin 2001; Inuvialuit elders with Bandringa 2010; Jones 2010; Lazarus and Aullas 1990; 1991; 1992; Porsild 1953; Smith 1973; Wilson 1978). As can be seen in Table 1, the categories and their associated plant taxa are: 1) woody or medicinal plants; 2) woody edible plants, including berry seeds and leaves; 3) wetland; and 4) grasses and herbs. This last category of macro botanicals may be modern contaminates, representing present-day growth at the archaeological site.

The offsite samples (Figure 6) from the vicinity of Uivak and Oakes Bay were composed of a combination of all categories—various plant taxa that are common in the subarctic vegetation of the area (Lamb 1984). The offsite samples differ markedly from the onsite samples. For example, the woody species are represented by low concentrations of leaves from *Empetrum nigrum*, *Betula*, and *Salix* with no conifers and few seeds. This confirms that 18th-century Inuit were indeed selecting certain plants and berries, mainly crowberry and spruce, from the surrounding vegetation and bringing these back to the site for a variety of purposes.

Comparison of the sleeping platform samples from Uivak I and Oakes Bay I shows marked differences (Figure 7). The woody or medicinal plants category contributed over 80% of the total at the northern Uivak site, while at Oakes Bay, this category was less than 50% and the edible woody plants were more common. There is an interesting north-to-south trend, whereby sites in the south used fewer conifers than those in the

north. Current tree cover is similar in both locales, although spruce forests are within 5 km of the Uivak site on Okak Island. At both sites, it is apparent that coniferous branches and woody twigs provided bedding and insulation on sleeping platforms. Berry seeds were also present, being possible remnants of meal consumption in this space.

Table 1. Labrador plant categories and their Inuit cultural applications.

Plant name	Common name	Plant type	Cultural use(s)
Category 1: Woody or medicinal plants			
Larix sp.	Tamarack	Woodland/scrub	Bedding, fuel
Juniperus sp.	Juniper	Woodland/scrub	Bedding, fuel, medicinal
Picea mariana	Black spruce	Woodland/scrub	Bedding, fuel, medicinal
Ledum palustre	Labrador tea	Woodland/scrub	Bedding, fuel, medicinal
Salix sp.	Willow	Woodland/scrub	Bedding, fuel, medicinal
Alnus crispa	Alder	Woodland/scrub	Fuel, bedding, woven mats
Betula sp.	Birch	Woodland/scrub	Fuel, bedding, woven mats
Populus sp.	Poplar	Woodland/scrub	Fuel, bedding, woven mats
Category 2: Woody edible plants			
Arctostaphylus uva-ursi	Bearberry	Woodland/scrub	Food, medicine
Empetrum nigrum	Crowberry	Woodland/scrub	Food, tea, fuel, bedding
Vaccinium sp.	Blueberry	Woodland/scrub	Food
Category 3: Wetland			
Eriophorum spp.	Cotton grass	Wetland	Food, lamp wick, bandages, medicine
Carex sp.	Sedges	Wetland	Woven mats, floor covering
Juncus sp.	Sedges	Wetland	Woven mats, floor covering
Category 4: Grasses and herbaceous plants			
Capsella bursa-pastoris		Grassland	Modern contaminate
Cerastium sp.		Grassland	Modern contaminate
Eleocharis sp.		Grassland	Modern contaminate
Epilobium latifolium (cf. Chamerion latifolium)	Fireweed	Grassland	Disturbed areas with edible young leaves and roots
Galium sp.		Grassland	Modern contaminate
Montia fontana		Grassland	Modern contaminate
Silene sp.		Grassland	Food for caribou/hares
Stellaria sp.		Grassland	Modern contaminate

Sources: Blondeau 1994; Cuerrier et al. 2011; Dristas 1986; Inuvialuit elders with Bandringa 2010; Jones 2010; Lazarus and Aullas 1990, 1991, 1992.

The floor samples from the two sites were also slightly different. Uivak I samples had high percentages of edible woody plants and herbaceous taxa, while the Oakes Bay floor mainly had berry seeds with some medicinal or woody leaves (Figure 8). In both cases, the floor was likely the collection area for garbage that did not make it to the

outdoor midden. The grasses and herbs at Uivak probably represented plants that thrive in disturbed trampled areas, like a floor. Leaves and seeds from alder, birch, and Labrador tea on the Oakes Bay floor may have represented deposits of twigs left by cleaning of bedding from sleeping platforms or as base insulating cover over the paving stone floors.

The midden samples were similar (Figure 9), with approximately 80% of the macro botanicals from the woody edible plant category. This high percentage of berries and edible plants likely represents deposition of human waste onto the midden, possibly from coprolites, similar to the one recovered from the Uivak site (Zutter and Pigford 2007). Numerous berry seeds in coprolite-like midden deposits were also recovered from the Qeqertasussuk site in West Greenland (Meldgaard 2004: 80). The remaining 20% of the macro botanicals in the midden samples were a combination of categories 1, 3, and 4. Coniferous needles were probably the result of periodic cleanings of the house and sleeping platforms, while the presence of seeds from grasses and herbs was possible *in situ* growth on the midden itself.

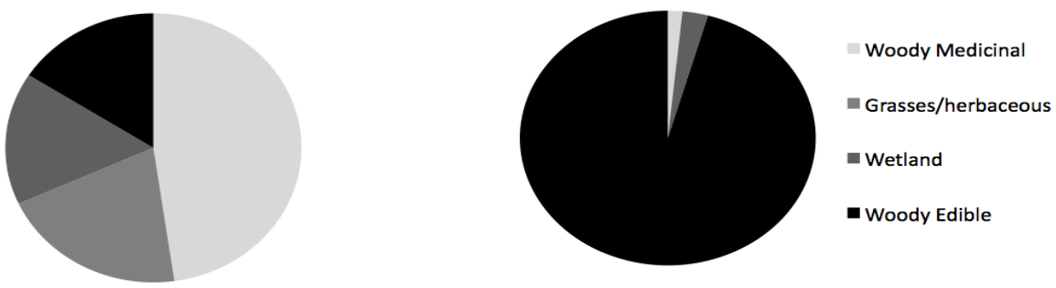

Figure 6. Offsite samples from nearby Uivak I (left) and Oakes Bay I (right).

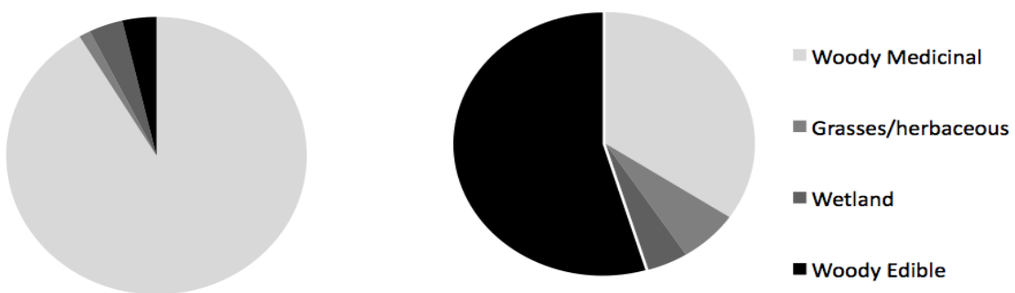

Figure 7. Sleeping platform contexts from and Uivak I (left) and Oakes Bay I (right).

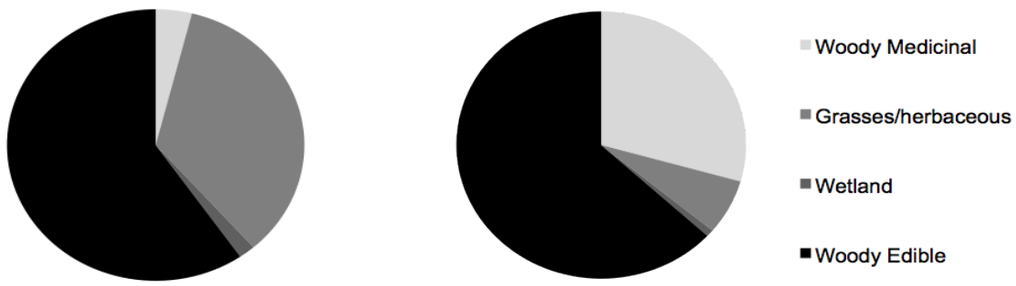

Figure 8. Uivak I house floor (left) and Oakes Bay I house floor (right).

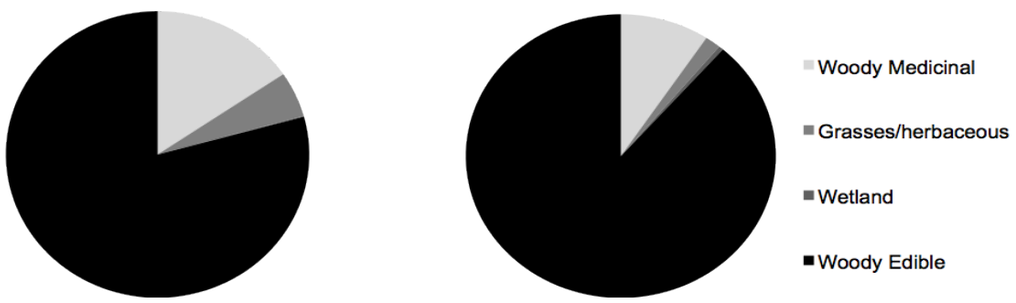

Figure 9. Uivak I midden (left) and Oakes Bay I midden (right).

Berries from woody shrubs are apparently the main plant resource across the Arctic. This result has been corroborated by a number of recent ethnobotanical studies among the Inupiat of Northwest Alaska (Jones 2010), the Inuvialuit in the Western Canadian Arctic (Inuvialuit elders with Bandringa 2010), and the Inuit of Nunavik (Cuerrier et al. 2011). All of these studies underline the importance of berry crops as well as leaves from woody shrubs for teas and other medicinal purposes. Not only are berries an important dietary resource for the Inupiat, Inuvialuit, and Inuit, they also form an integral part of their landscape and shape their seasonal rounds. In a study on the Gwich'in of the Mackenzie delta region, berries are highlighted as a key resource in their traditional diet (Murray et al. 2005), and recent studies of country food use amongst Labrador Inuit note that up to 832 kg of berries are consumed annually (Mackey and Orr 1987). Berries also contribute essential nutrients to the Inuit diet, being major sources of vitamins A and C (Kuhnlein and Soueida 1992; Kuhnlein et al. 2006). The most commonly eaten berry is crowberry or blackberry (*Empetrum nigrum*), which may be picked in the fall or left on the plant to sweeten until the spring. These berries are abundant and form an integral part of the local delicacy known as *akutuk*

(Eskimo ice cream), a mixture of sea mammal fat/blubber, berries, and sometimes desiccated ground organ meat (Jones 2010).

Arctic peoples and other Aboriginal groups commonly collected conifer branches and other woody twigs for insulation and comfort on their sleeping platforms (Moerman 1998). Woody twigs have been recovered from various historic Inuit sites as part of the Meta Incognita project (Laeyendecker 1992) and at the Palaeo-Eskimo site, Qeqertasussuk, in West Greenland (Böcher and Fredskild 1993). Spruce needles and cones may have been used as a cough medicine that also has antidiabetic qualities (Moerman 1998; Spoor et al. 2006). Another common woody shrub, Labrador tea (*Ledum palustre*), was often used as a hot beverage to relieve respiratory ailments and is prolific in the Arctic (Black et al. 2008; Griffin 2001; Spoor et al. 2006). Although *Ledum* grows at both sites, it was recovered only from the Oakes Bay samples, perhaps because it was not readily available in Uivak, as it may have been covered by snow. Another common berry that is a delicacy for present-day Inuit, the cloudberry/baked apple berry (*Rubus chamaemorus*), was not found at either site despite abundant fields of it in the vicinity of Oakes Bay. Perhaps cloudberry does not last into the winter as well as crowberry and is eaten too soon after it ripens in late summer (Jones 2010).

Conclusion

The results presented here provide important supplementary information on the use of woody plants by Inuit peoples in the past. It is evident that 18th-century Labrador Inuit relied upon a broad spectrum of woody plants and their fruit for various purposes despite limited availability. An ample variety of berries represented major sources of vitamins and medicines. Crowberry was mainly present in the winter houses at Uivak and Oakes Bay, perhaps because this hardy fruit was stored through the winter and consumed throughout the year. Spruce needles and branches provided insulation along sleeping platforms, while other woody shrubs may have been similarly used at the southern Oakes Bay site. Leaves and needles from spruce, willow, and Labrador tea were used as important medicines as well. Although certainly not the foremost food source, plant foods broadened the spectrum of the Inuit diet in the past and continue to do so.

Acknowledgments

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