Palaeoethnobotanical Research at Port au Choix

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INTRODUCTION

PLANTS PROVIDED PREHISTORIC PEOPLES with foods, medicines, dyes, fuel, and the raw materials for the manufacture of tools and utensils, and the construction of dwellings and other facilities. Palaeoethnobotany (also known as archaeobotany) is the branch of archaeology that deals with the recovery and interpretation of plant remains from archaeological contexts (Pearsall 1989). This type of research is currently our best source of information on plant use in prehistory. At Port au Choix several prehistoric components, excavated by M.A.P. Renouf (1985, 1987, 1994, 1999, 2002), have been sampled for palaeoethnobotanical analysis. This paper focuses on the laboratory analysis of samples from Maritime Archaic (6290-3340 cal BP)[1] and Recent Indian (2110-1330 cal BP) contexts at the Gould site (EeBi-42), which is located in the town area of Port au Choix (Renouf et al. 2000; Renouf and Bell 2000a). It begins with an outline of previous palaeoethnobotanical research in the province, and ends with a consideration of the potential for future research. A complete list of the Latin names, authorities, and common names of plant species referred to in this paper appears in Appendix 1.

The interpretation of archaeological plant remains follows a few basic assumptions concerning archaeological site formation. Some plant specimens may enter a site from the local environment (including the site itself) without human intervention, while others are brought on site because of their economic or social importance. Plant remains, and especially seeds, can be brought on site by animals and insects, or through the action of wind (seed rain) or water (e.g., Beattie and Culver 1982; Miksicek 1987). For example, conifer needles might be blown into a campfire, or come from boughs used as bedding. Insect predation on seeds is one concern

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for the Gould site, since insect remains were recovered from 31 (23%) of the samples and from all levels.

Plant remains do not survive well in the acidic soils of eastern Canada, although peatland environments seem to be less destructive to macrobotanicals. Carbonization is the best form of preservation on prehistoric sites. In fact, in most archaeological studies only charred botanical specimens are assumed to date to the time of occupation (Minnis 1981). Hearth features are the most likely source of charred plant remains, at least for species that are generally prepared and/or consumed around the fire (see Monckton 1992: 22). Charred seeds recovered from hearth features may represent waste from foods that were eaten raw, such as berries, or ingredients of cooked meals or heated medicines. Fuel wood species can be identified from charcoal fragments. Charred plant remains might also be recovered from hearth deposits that were scattered after site abandonment, or dumped in refuse middens. Food species that were not prepared or consumed around the hearth are less likely to be represented at sites, and species eaten as greens may also be poorly represented.

Previous Research

Palaeoethnobotanical research has developed slowly in eastern Canada, despite a longstanding regional interest in ethnobotany (e.g., for summaries see Arnason et al. 1981, and Moerman 1998). In particular, much useful ethnobotanical research was conducted among the Montagnais (Innu), Micmac (Mi'kmaq), and Maliseet during the late nineteenth and early twentieth centuries (e.g., Speck 1917; Tantaquidgeon 1932; Speck and Dexter 1951, 1952). During the 1960s and 1970s important advances were made in archaeological recovery techniques and sampling strategies (e.g., Lennstrom and Hastorf 1995), and information on plant remains began to appear in archaeological site reports (Crawford 1999). However, it was another decade before archaeologists in this province began routinely to collect samples for the recovery of plant remains. Since very little of this, and earlier, research has been published, a detailed review is provided here in order to put the Port au Choix analysis into historical perspective, and to indicate the range of plant macroremains that have been recovered in this province.

In Newfoundland and Labrador, the first significant palaeoethnobotanical report described seed samples recovered from Norse deposits at L'Anse aux Meadows (EjAv-1), on the Great Northern Peninsula (Dawson 1977). Seeds recovered from 31 bulk samples were identified at the Biosystematic Research Institute in Ottawa. At least twelve species were represented in the samples, and information was provided on their probable origin and climate associations. Specimens of one edible nut species, *Juglans cinerea* (butternut), are believed to have been brought to the site by the Norse (Wallace 2000). All other species could be found on the modern list of species from the site (i.e., W.J. Meades et al. 1975). Four edible berries were identified, including *Prunus pensylvanica* (pin cherry), *Fragaria virginiana* (strawberry), *Amelanchier bartramiana* (serviceberry), and *Cornus suecica* (dogwood). Other possible edible species represented were *Heracleum maximum* (cow parsnip) and *Lathyrus japonicus* (beach pea). Seeds from *Ipomea* (morning glory), *Poaceae* (grasses), *Carex* (sedges), *Picea glauca* (white spruce), and *Rubus acaulis* (Arctic bramble) were considered to be more likely representative of the site environment.

Despite this promising beginning at L'Anse aux Meadows, palaeoethnobotanical research was put on hold for another decade. In 1990 the author began offering a palaeoethnobotany laboratory course as part of the archaeology curriculum at Memorial University. Archaeologists in the province were encouraged to submit sediment samples, and the first systematic sampling of a prehistoric site specifically for the recovery of plant remains was attempted at the historic Beothuk site at the The Beaches (DeAk-1), in Bonavista Bay (Deal and McLean 1996). A comprehensive review of palaeoethnobotanical evidence from this and five other Beothuk components was recently published (Deal and Butt 2003). This study included an inventory of 24 plant species believed to have been utilized by the Beothuk, based on archaeological, ethnohistoric, and linguistic evidence.

The first palaeoethnobotanical remains reported from Maritime Archaic contexts in this province were recovered from samples collected in 1997 by David Reader from two sites in the town of Bird Cove, north of Port au Choix. Kevin Leonard (1998) processed sediments taken from test trenches from the Big Droke (EgBf-11) and Caines (EgBf-15) sites. The Big Droke samples yielded 50 uncharred *Rubus* sp. (raspberry) seeds, one uncharred *Cornus canadensis* (bunchberry) seed, 24 charred *Picea* needles, and five charred *Abies balsamea* needles. The Caines site samples included five uncharred *Rubus* specimens, 23 charred *Picea* needles, and 14 charred *Abies* needles. The absence of charred edible berry seeds led Leonard (1998: 5) to suggest that both sites were probably not occupied in late summer/early fall, when most edible berries are available. Seventy-seven pieces of charcoal were also collected. These fragments were considered to represent remnants of fuel wood burned at the site and were identified as "virtually all softwood" (Leonard 1998: 5).

The first palaeoethnobotanical studies at Port au Choix were student projects, which identified seed specimens recovered from Groswater and Dorset Palaeoeskimo contexts dating about 2990-1180 cal BP (Burry and Reader 1990; Greeley and Macey 1991). Plant macroremains were recovered at the Port au Choix field laboratory using a primitive "tub" style flotation system in which soil samples were immersed in water and the light fraction (seeds) floated to the top where they were skimmed off (e.g., Pearsall 1989: 76). Burry and Reader (1990) examined specimens from five samples from a Dorset site at Point Riche (EeBi-20) and three samples from the Dorset Phillip's Garden site (EeBi-1). Ninety-three seed specimens were identified in one of the Point Riche samples from a refuse midden (Eastaugh 2002), which was originally identified as part of a house feature (Renouf 1986: 24-31). These included 52 uncharred and three charred *Poaceae* (grasses) seeds, 41 uncharred *Euphorbia* (spurge) seeds, one uncharred fragment of *Carex* sp. (sedge), and one unidentified charred seed fragment. If the spurge seeds are correctly identified then they are intrusive from the modern flora, since only three species are identified for the province, and they are all introduced (S.J. Meades et al. 2000: 78). From the Phillip's Garden samples, one uncharred *Cardamine pensylvanica* (bitter cress) seed was identified from a bone-filled pit (Feature 7) located on a rear sitting platform within a dwelling (Feature 1). Greeley and Macey (1991) examined specimens from four additional samples from Phillip's Garden as well as two samples from the Groswater site at Phillip's Garden West (EeBi-11). Eight uncharred seed specimens were identified, all from Phillip's Garden. Seven specimens were from a pit (Feature 33) within another dwelling (Feature 14) and one specimen was from the culturel level (Level 2A) within that dwelling. Six specimens were identified as sedges (*Carex* sp.), while one specimen from the pit feature was tentatively identified as a *Crataegus* sp. (hawthorn). The sedges are considered to be part of the natural site environment. Hawthorns produce edible fruit, but since this specimen is uncharred, it is probably also from the site environment (Speck and Dexter 1951, 1952).

Other Palaeoeskimo sites sampled for student palaeoethnobotanical projects include Parke's Beach (DgBm-1) in the Bay of Islands, Dildo Island (CaJa-2) in Trinity Bay (Crowley and Hartery 1997; Howse and Drouin 2000), Peat Garden North (EgBf-18) at Bird Cove (Penney and Clarke 2000), and the Fleur de Lys soapstone quarry site (EaBa-1) on the Baie Verte Peninsula (Metcalfe and Morris 2000). The Parke's Beach sample was collected by David Reader (1997) and came from the "discard perimeter" of a Groswater dwelling (House 1). This was a large sample, weighing 2,680 grams. Seventy-three uncharred specimens were identified, which included 71 *Sambucus* sp. (elderberry), one *Rubus* sp. (raspberry), and one *Ranunculus* sp. (buttercup). Based on the excellent faunal preservation in this deposit, it is possible that elderberries and raspberries were part of the original diet of the occupants of the site. A Dorset component was also identified at this site, and one sample, weighing 2,716 grams, was processed as a student project (Howse and Drouin 2000). This sample yielded 29 charred and seven uncharred seeds. The charred seeds included *Sambucus* sp. (elderberry) seeds and three *Prunus pensylvanica* (pin cherry) stones. The uncharred seeds included three *Rubus* sp. (raspberry) seeds, one *Ranunculus* sp. (buttercup) achene, two *Poaceae* (grass) seeds, and one unidentified seed fragment. The presence of charred elderberry and pin cherry specimens can be construed as evidence that the Dorset at this site were eating these edible berries, and probably raspberries as well. The buttercup and grasses were considered to be part of the site environment, although they do have cultural uses (see below).

The remaining sites are associated with the Dorset Palaeoeskimo. Bill Gilbert in 1995 tested the Dildo Island site (Gilbert 1996). A small sample, weighing 344 grams, came from one excavation unit (Unit 1, Area B2, Zone 1) and was processed, but produced only three charred *Abies balsamea* (balsam fir) needles. Another Dorset component was sampled at Peat Garden North, which is situated on a palaeo-beach terrace on the Dog Island Peninsula, near Bird Cove (Reader 1999). Two one-litre sediment samples were processed in the Memorial University prehistory laboratory, one from a house feature (which also produced soapstone bowl fragments and utilized flakes), and a second sample from a midden deposit on the house perimeter (Penney and Clarke 2000). Plant remains from two species were identified in the house feature, one charred *Abies* needle and one uncharred *Cornus canadensis* (bunchberry) seed. A single charred *Picea* needle was recovered from the midden sample. The two charred needles may be present due to cultural activities, such as the burning of fuel wood or bedding materials. The bunchberry seed may be a food remnant or an inclusion from the local forest floor. John Erwin (1999) at Fleur de Lys sampled one additional Dorset component, from a waterlogged deposit (Unit 6, Level J) in front of the main soapstone quarry face. In 1997, a carved wooden ladle was recovered from this deposit, along with numerous tree branches and twigs. The sample yielded one uncharred *Cornus canadensis* (bunchberry) seed, one uncharred *Rumex* sp. (sheep sorrel) seed, one *Poaceae* (grasses) specimen, four unidentified seed specimens, and a single charred conifer needle. Considering the excellent wood preservation at the site, the seeds may also date to the time of site use. The Montagnais (Innu) used sheep sorrel steeped in hot water as a remedy for rheumatic pains (Tantaquidgeon 1932: 266). However, bunchberry and sheep sorrel are also part of the modern flora at the site (Martin and Alyward 1998).

Due to time constraints, all the student projects cited above dealt with small samples. Thirteen taxa were identified at the five Palaeoeskimo sites, although only two species, *Prunus pensylvanica* (pin cherry) and *Sambucus* sp. (elderberry), can be reasonably argued to represent foods consumed at the time of occupation. This seems to conform to the traditional view that plant foods were not significant for Palaeoeskimo or historic Inuit diets. However, a recent palaeoethnobotanical study at an eighteenth-century Inuit site at Uivak Point (HjCl-9) in Okak Bay, Labrador, seems to contradict this notion. Zutter (2000) identified over 15,500 plant specimens, representing 26 taxa, from 27 bulk sediment samples from this site. The samples were taken from house floors, sleeping platforms, and the midden, as well as one coprolite specimen and off-site control samples. Cultural samples averaged 300 specimens/litre compared to less than 20 specimens/litre for off-site samples. *Empetrum nigrum* (crowberry) seeds were found in every sample, and *Picea glauca* (white spruce) was very common. The coprolite sample yielded 10,023

Empetrum and 143 *Vaccinium* sp. (blueberry) seeds, which represent over 1,000 berries.

The high recovery rate at the Uivak site permitted some useful observations concerning the associations of specific categories of macrobotanicals and cultural features. Based on modern ethnobotanical and ethnographic research (e.g., Hawkes 1916: 33-37; Porsild 1937; Holtved 1967: 142-144; Dritsas 1986), five plant use categories were identified: 1) coniferous needles and seeds, 2) berries and other edible plants, 3) other usable plants, 4) fuel plants, and 5) weedy plants. Zutter (2000: 4) also stressed the importance of berry crops to Arctic peoples in the scheduling of subsistence activities. Other recent studies on historic Inuit archaeological sites in the eastern Arctic have also produced useful evidence of plant use for food, fuel and clothing insulation (e.g., Böcher and Fredskild 1993; Bresciani et al. 1991; Laeyendecker 1993). Furthermore, Bresciani and others (1991: 157) reported coprolite specimens with large amounts of lichens and plant pollen from several species, including *Poaceae* (grasses), *Betula michauxii* (dwarf birch), *Cassiope tetragona* (white Arctic bell-weather), *Empetrum nigrum* (crowberry), *Salix* sp. (willow), and *Oxyria digyna* (mountain sorrel).

Port au Choix Palaeoethnobotanical Project

In 1998, a larger scale project was initiated at Port au Choix, in conjunction with M.A.P. Renouf's excavations at the Gould site (EeBi-42; Figure 1), which had both Maritime Archaic and Recent Indian occupations (Renouf and Bell 1999, 2000b, 2001). Sediment samples of approximately five litres were taken from each feature and level within excavation units. Features are distinct sediments or concentrations of artifacts that are believed to represent areas of past human activity. Levels are the recognized natural and cultural stratigraphic units across the excavation: Levels 1-2 are the upper levels and are associated with the Recent Indian occupation of the site, Levels 3-6 are lower levels and are associated with the Maritime Archaic occupation; Level 7 is the natural substratum. Teal describes these levels in detail (2001: 23-26).

In the fall of 1998, a crew of undergraduate students, directed by Cindy O'Driscoll, began to process the sediment samples for the recovery of plant remains. This initiative has continued through a series of student grants, under the title of the Port au Choix Palaeoethnobotanical Project. To date, 207 samples have been processed, all of which were collected during the 1998 and 1999 excavation seasons. Of these samples, 138 have been completely sorted and specimens identified, including ten samples processed as student projects (Newhook and Wells 1999; Boyde et al. 2000; Brake and Corrigan 2000). Five of the latter were recovered from features that were subsequently reclassified as natural phenomena, and therefore are not included in this study. Thus, 133 completed samples were used in

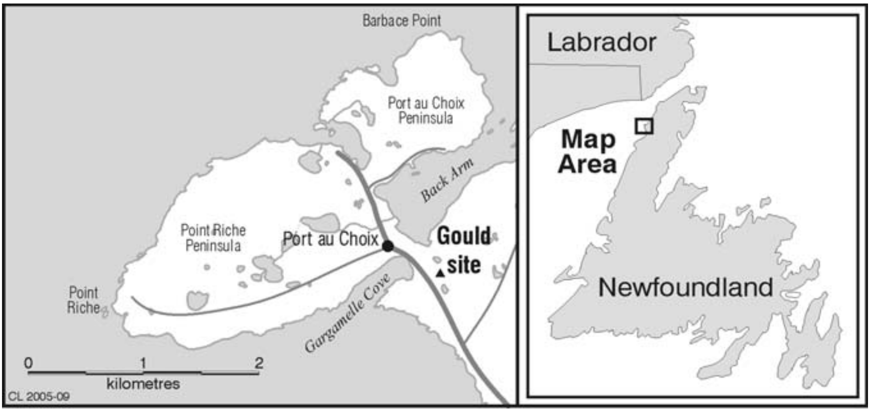

Figure 1. Location of the Gould site.

this study: 23 samples from thirteen Maritime Archaic features, 78 samples from Maritime Archaic stratigraphic levels, fifteen samples from six Recent Indian features, and seventeen samples Recent Indian stratigraphic levels.

Laboratory Methodology

All of the Memorial University laboratory projects have employed a simple IDOT-style flotation device to recover plant remains (Pearsall 1989: 43ff.). This consists of an aluminium frame with two U-shaped flanges, which support a 0.5-millimetre-mesh copper screen. It is lowered into a large plastic container and water is added to about three-quarters of the height of the frame. The device is agitated to separate organic materials from sediment. This form of flotation produces three fractions — a flot that is skimmed off the surface, a coarse fraction that collects in the bottom of the screen, and a fine fraction that collects in the bottom of the container. Each fraction is retained and allowed to dry, although nearly half of the fine fraction is lost when the container is drained. The entire flot is examined for plant remains, as well as a small sample of the coarse and fine fractions. For student projects a small portion of each sample was also put aside, before flotation, for dry screening using a series of geological sieves. Seed and needle specimens were removed from dried flots under a binocular microscope and stored by family or genus in individual gel caps in plastic vials. Species identifications were made by comparison with a collection of more than 500 modern species, as well as several seed identification manuals (e.g., Martin and Barkley 1961; Delorit 1970; Montgomery 1977). Checklists of modern flora are also available for the national parks at Gros Morne, Port au Choix, and L'Anse aux Meadows, as well as for the province in general (i.e., W.J. Meades et al. 1975; Bouchard et al. 1978; Rouleau 1978; NAL 1985; Anions 1994; S.J. Meades et al. 2000).

RESULTS

Flots contained the whole range of plant macrofossils expected from peaty deposits (Lévesque et al. 1988), including complete and fragmented seeds, leaves, needles, buds, stems, twigs, roots, charcoal, and sclerotia, as well as insect remains and egg cases. Sclerotia were ubiquitous, as they are at many archaeological sites in the Northeast. These are spherical bodies, 0.5 to 4 millimetres in diameter, that represent the resting structures (chlamydospores) of mycorrhizal fungi (*Cenococcum* spp.), which attach themselves to plant roots (e.g., *Abies* spp. and *Picea* spp.), and thrive in both poor and rich soils (McWeeney 1989: 228). Charcoal fragments and insect remains were also saved, but have yet to be identified. Insect remains (mainly red ants and beetles) were found throughout the site, and in every level.

The small recovery rates of macrobotanicals limit the possibilities of quantification to raw counts (number of individual specimens), raw diversity (number of taxa represented), ubiquity (species presence and absence), and density ratios (seeds or needles per volume or weight of sediment; see Miller 1988). Regarding results from Maritime Archaic contexts, in total, approximately fourteen litres of sediment were processed from features, with an additional 47 litres from level samples. Identified plant macroremains from the feature and level samples included 3,600 conifer needles, of which less than one percent (.86%) were uncharred (Table 1). Charred needles were typically recovered from fire-related features but were also widely distributed within level samples (i.e., occurring in 56% of the samples). Feature samples averaged 214.2 needle specimens/litre, compared to 11.6 specimens/litre for level samples. However, the density value for features drops to 24.5 specimens/litre if we exclude feature 20, identified as a charcoal concentration. One hundred and one seeds were recovered: 34 specimens from feature samples and 67 specimens from level samples. Seed specimens were recovered from nine of the thirteen features and all four levels. Only eighteen of the seeds were charred: nine from features and nine from level samples. The identified plant macroremains represent at least seventeen plant species (Table 2).

Regarding results from Recent Indian contexts, approximately fifteen litres of sediment were processed from six features, and an additional ten litres from level samples. These samples yielded 3,380 coniferous needles, with a feature density of 161.5 specimens/litre, compared to 91.4 specimens/litre for level samples (Table 3). Charred needles were recovered from five of the six features, and in six of seventeen level samples. A total of 68 seed specimens were identified, of which only three specimens from two hearth features (Features 9 and 26) were charred. The density values for seed specimens recovered from features (2.2 seeds/litre) and

Table 1. Plant remains from Maritime Archaic Features and stratigraphic levels

Feature # Description	Volume (litres)**	Picea Needles	Abies Needles	Density Needles/Vol	Seeds	Density Seeds/Vol
1 Small depression	1.000	0	0	0	4u, 1c	5.0
11 Culturally modified spruce log	1.250	12c	13c	20.0	5u	4.0
12 FCR in whitened gravel	1.450	3c	13c	11.0	2u	1.4
18 Small pit	0.500	0	0	0	0	0
20 Charcoal concentration*+	2.025	180c	773c	1335.3	3u, 6c	4.4
22/29 FCR/charcoal concentration	1.975	3c	7c	5.1	1u	0.5
23 Small pit	0.500	0	1u, 3c	8.0	0	0
24 *Small hearth*	0.200	5c	0	25.0	0	0
28 Charcoal	1.500	83c	205c	192.0	6u	4.0
36 *Bone cluster*	0.750	0	1c	1.3	2u, 2c	8.0
43 Pit	0.750	0	0	0	1u	1.3
86 Pit	0.850	0	0	0	0	0
413 T-shaped pit	1.500	0	0	0	1u	0.7
Feature Totals:*+	14.250	286c	1u, 1015c	214.2	25u, 9c	2.4

Stratigraphic Level	Volume (litres)**	Picea Needles	Abies Needles	Density Needles/Vol	Seeds	Density Seeds/Vol
Level 3	12.125	1u, 14c	1u, 37c	4.4	21u, 3c	2.0
Level 4	23.975	2u, 150c	4u, 194c	14.6	17u, 2c	0.8
Level 5	10.125	6u, 79c	15u, 41c	13.9	18u	1.8
Level 6	1.000	1u, 1c	1c	3.0	5c	5.0
Level Totals:	47.225	10u, 244c	21u, 272c	11.6	56u, 10c	1.4

*   u=uncharred, c=charred.

*+   Feature 20 also included 1751 charred conifer needles not separated by species (n=3053).

Table 2: Identified plant specimens recovered from Maritime Archaic feature and level (L) samples

	1	11	12	20	22	23	24	28	36	43	413	L3	L4	L5	L6
Fuel/Construction				1751c+											
A. balsamea needles	-	13c	13c	773c	7c	3c 1u	-	205c	1c	-	-	37c 1u	194c 4u	41c 15u	1c
Picea spp. needles	-	12c	3c	180c	3c	-	5c	83c	-	-	-	14c 1u	150c 2u	79c 6u	1c 1u
Total needles (n=3600)	-	25	16	2704	10	4	5	288	1	-	-	53	350	141	3
Edible Plants															
C. album (?)	-	-	-	1c	-	-	-	-	-	-	-	-	-	-	-
Compositae family	-	-	-	-	-	-	-	-	-	-	-	-	2u	-	4c
H. lanatum	-	-	-	-	-	-	-	-	-	-	-	-	1u	-	-
Potentilla sp.	4u	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P. pensylvanica	1c	-	-	4c	-	-	-	-	-	-	-	2c	-	-	-
Rubus idaeus	-	5u	2u	3u	-	-	-	6u	2u	1u	-	17u	2u	-	1c
Sambucus pubens	-	-	-	-	-	-	-	-	-	-	-	1c	-	-	-
V. angustifolium	-	-	-	1c	-	-	-	-	-	-	-	-	-	-	-

	1	11	12	20	22	23	24	28	36	43	413	L3	L4	L5	L6
Other Usable Plants															
Gramineae family	-	-	-	-	-	-	-	-	-	-	1u	-	-	11u	-
Contaminants															
Bidens sp.	-	-	-	-	-	-	-	-	-	-	-	1u	-	-	-
Carex spp.	-	-	-	-	1u	-	-	-	-	-	-	1u	12u	6u	-
Ranunculus sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	1u	-
Silene acaulis (?)	-	-	-	-	-	-	-	-	-	-	-	1u	1u	-	-
Viola sp.	-	-	-	-	-	-	-	-	2c	-	-	-	2c	-	-
Unidentified	-	-	-	-	-	-	-	-	-	-	-	1u	-	-	-
Totals seeds (n=101)	5	5	2	9	1	0	0	6	4	1	1	24	20	18	5

u = uncharred specimen, c = charred specimen, (?) = most likely species - identification based on modern plant lists for the province

Table 3: Plant remains from Recent Indian Features and stratigraphic levels

Feature/Level # Description	**Volume (litres)**	**Picea Needles***	**Abies Needles***	**Density Needles/Vol**	**Seeds***	**Density Seeds/Vol**
21 FCR/charcoal	2.475	2u, 2c	31c	14.0	12u	4.8
280 Burnt sand layer in hearth	2.100	96c	2u, 916c	482.9	3u, 1c	1.9
9 Charcoal-lined pit	3.500	2u, 42c	3u, 385c	123.4	5u	1.4
53 FCR cluster	1.075	0	0	0	0	0
26 Hearth	4.300	1u, 118c	801c*+	213.9	10u	1.9
2 Hearth	1.750	18c	36c	30.9	3u	1.7
Feature Totals:	15.200	5u, 276c	5u, 2169c	161.5	33u, 1c	2.2
Level 1	5.925	3c	1u, 7c	1.9	3u	0.5
Level 2	4.200	541c	373c	217.6	16u	3.8
Level Totals:	10.125	544c	1u, 380c	91.4	19u	1.9

* u=uncharred specimen; c=charred specimen.

*+ Specimen frequency was estimated at 400 needle fragments, based on counts from one vial.

Table 4: Identified plant specimens recovered from Recent Indian feature and level (L) samples

	2	9	21	26	280	L1	L2
Fuel/Construction							
A. balsamea needles	36c	3u, 385c	31c	801c	2u, 916c	1u, 7c	373c
Picea spp. needles	18c	2u, 42c	2u, 2c	1u, 118c	96c	3c	541c
Total needles (n=3380)	54	432	35	920	1014	11	914
Edible Plants							
Compositae family	1u	-	-	2u	-	-	-
T. officinale	-	2u	-	2u	-	-	-
Rubus idaeus	1u	1u	13u	-	1u	3u	16u
Contaminants							
Carex spp.	1u	13u	-	6u	1u	-	-
Silene acaulis (?)	-	-	-	1u	1u	-	-
Viola sp.	-	1c	-	2c	-	-	-
Total seeds (n=68)	3	17	13	13	3	3	16

u = uncharred specimen, c = charred specimen, (?) = most likely species - identification based on modern plant lists for the province

levels (1.9 seeds/litre) was very close. Identified plant macroremains represent at least eight species (Table 4).

Discussion

Two important factors affect the interpretation of the plant macroremains from the Gould site. First, plant remains do not survive well in the acidic soils of eastern Canada, yet peatland environments such as Port au Choix can be less destructive to macrobotanicals. However, other than wood, overall preservation at the Gould site is relatively poor in comparison to other peat deposits due to high humification of the peat. Humification refers to the processes by which organic matter decomposes to form humus. One significant find was a log (Feature 11) exhibiting what appear to be cut marks, which was excavated from a Maritime Archaic level at the site (Figure 2). The log was subsequently radiocarbon dated to 3830-3640 cal BP (Beta 120795). Peter Scott (Department of Biology, MUN) identified the wood as *Picea* sp. (spruce). A second, smaller spruce log (Feature 478) was discovered in a Maritime Archaic level, but it was not associated with cultural materials. Another small log (Feature 512), identified as *Betula papyrifera* (white birch), was found in the Recent Indian level and was directly associated with pieces of beaver hide, pottery sherds, and lithics.

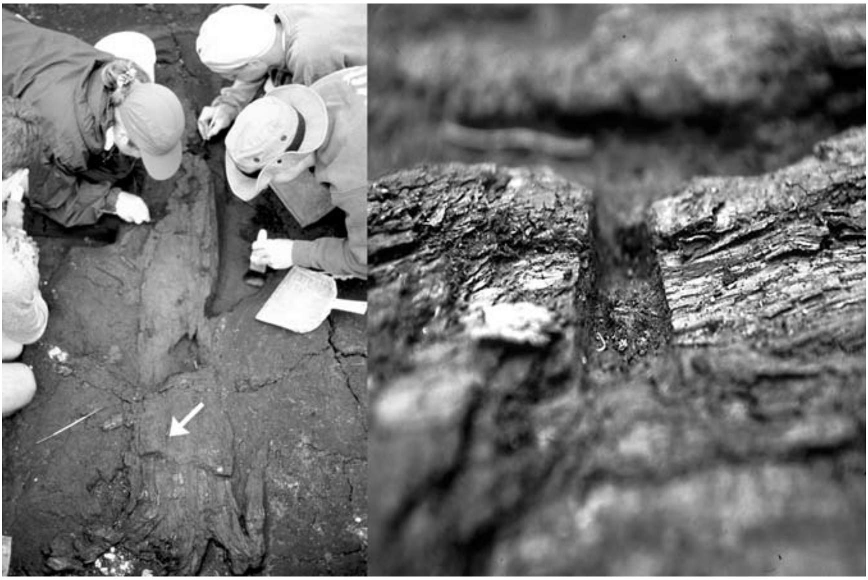

Figure 2. Recovery of Picea (spruce) log in from Maritime Archaic level of the Gould site (left) exhibiting cut marks (right). Photo: (l) M. Deal, (r) C. Hammond.

The preservation of wood in the Maritime Archaic levels suggests that many of the uncharred seed specimens from the site may also be very old. Seeds of certain species, such as *Rubus idaeus* (raspberry) have exceptionally hardy seed coats. Raspberry seeds were recovered from most features and many level samples at the Gould site and individual specimens generally had a well-worn exterior surface (Figure 3). The seeds recovered from Norse levels at L'Anse aux Meadow were also generally uncharred, and came from a similar peat environment (Dawson 1977).

The second factor affecting palaeoethnobotanical interpretations at the site is that pollen horizons from nearby Field Pond suggest that there were continuous burning episodes at the site during the periods of human occupation (Bell et al.

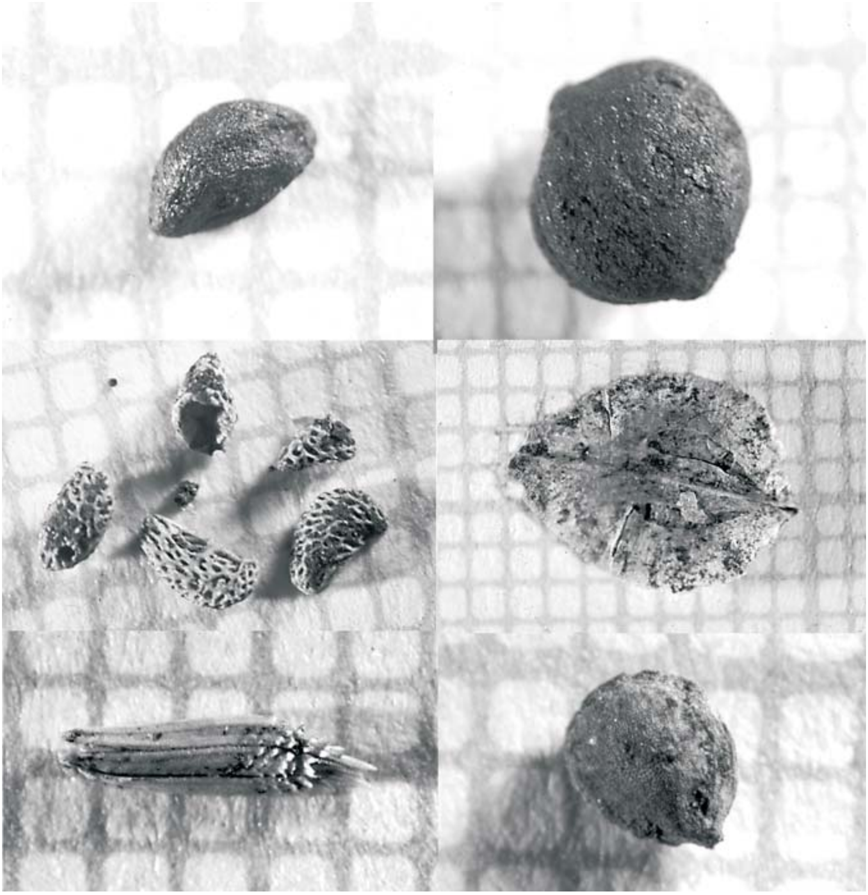

Figure 3. Selected plant macroremains from the Gould site: charred Vaccinium angustifolium *(upper left), charred* Prunus pensylvanica *(upper right), uncharred* Rubus *sp. (centre left), uncharred* Heracleum maximum *(centre right), uncharred* Taraxacum officinale *(lower left), and uncharred* Ranunculus *sp. (lower right). Scale is one square millimetre blocks on graph paper. Photo: R. Ficken.*

2003). The charred conifer needles recovered from level samples throughout the site may also be evidence for periodic burning of the habitation site, and they are particularly common in the Recent Indian level samples (i.e., 91.4 specimens/litre compared to 11.6 specimens/litre for Maritime Archaic level samples).

To aid in the cultural interpretation of the plant macroremains from the Gould site, a variant on Zutter's (2000) plant use categories is adopted here, namely, 1) edible plant species, 2) fuel/construction plant species, 3) other usable plant species, and 4) contaminants. The largest category of seed species from both Maritime Archaic and Recent Indian contexts is edible plants. Zutter (2000) stresses the importance of edible berries for Arctic peoples, but they were undoubtedly also important for groups living in temperate zones. Plants with edible berries dominated the Maritime Archaic samples, including *Prunus pensylvanica* (pin cherry), *Rubus* sp. (i.e., probably *Rubus idaeus*; raspberries), *Sambucus pubens* (elderberry), and *Vaccinium angustifolium* (blueberry) (Figure 3). The single charred blueberry seed and three of the charred pin cherry stones were from cultural contexts, as were nineteen uncharred raspberry seeds. These species have also been recovered from Recent Indian and historic Beothuk cultural contexts (Deal and Butt 2003: 23). *Rubus* specimens were common in the Maritime Archaic samples from Bird Cove (Leonard 1998), and charred *Rubus* sp. seeds have also been recovered from Middle and Late Archaic (c. 7000-3000 cal BP) contexts in Maine, along with a variety of other edible plant species (Asch Sidell 1999: Table 12.5). Raspberries were the only edible species identified in the Recent Indian samples at the Gould site, where they were recovered from four of six cultural features. If the raspberry seeds date to the time of occupation, then both groups were probably using this site at least during the summer and early fall seasons, when most edible berries are available.

The Maritime Archaic samples also produced two other species with edible parts, namely, a single uncharred specimen of *Heracleum maximum* (a.k.a. *H. lanatum*; cow parsnip) from a Level 4 sample (Figure 3), and a single uncharred *Chenopodium* sp. (goosefoot or lambsquarters) seed from a charcoal concentration (Feature 20). The condition of both seeds suggests that they are modern intrusive specimens. Both genera are used widely by native peoples across Canada as edible greens (Kuhnlein and Turner 1991: 115, 152), and cow parsnip may have been used at the Gould site if available. Rouleau (1978: 38) lists only one species of cow parsnip as native to Newfoundland, while he lists five species of goosefoot, all of which were introduced (Rouleau 1978: 14). *Chenopodium* is not listed in any of the three west coast National Park guides, but Bouchard and others (1978: 393) list *Chenopodium album* among the vascular species of the St. Barbe South District, which includes Port au Choix. Today this species is considered a weed that favours cultivated or waste ground (Roland 1998: 193).

Many plants of the *Asteraceae* (aster) family are also important food species, or are used as flavourings, beverages, or in food preparation (Kuhnlein and Turner 1991: 127). The one edible species in this family identified at the Gould site is *Taraxacum officinale* (common dandelion). This species is a component of the gravel beach vegetation zone at Port au Choix (NAL 1985: 50). Two specimens were recovered from each of two Recent Indian hearths (Features 9 and 26) at the site. The well-worn condition of all of these specimens suggests that they may actually date to the time of occupation. Young dandelion leaves are widely eaten in raw or cooked form by aboriginal populations, including the Mi'kmaq and Maliseet (Speck and Dexter 1951, 1952).

Four specimens of *Potentilla* (Cinquefoil) were identified in a small Maritime Archaic deposit that contained a variety of materials, including 47 small pebbles like those recovered from the cemetery site, fragments of at least two barbed bone points, red ochre, and faunal specimens from a number of species (Renouf and Bell 1999, 2000b). Three species in this genus are listed for the Port au Choix National Park (NAL 1985), and the two most widespread species, *Potentilla anserina* (silverweed) and *Potentilla fruticosa* (shrubby cinquefoil), are both edible. The former has an edible root and the leaves and stems of the latter are often brewed as a tea (Kuhnlein and Turner 1991: 239, 241). These species are given genus designations (i.e., *Argentina anserina* and *Dasiphora fruticosa*) in the checklist by S.J. Meades and others (2000: 112).

The second category is plants used for fuel and construction. Large amounts of wood charcoal were collected from both Maritime Archaic and Recent Indian features, but these specimens have yet to be identified to species. The dominant hardwood species available in the Port au Choix National Historic Site today are *Betula papyrifera* (white birch) and *Sorbus americana* (mountain ash) (NAL 1985: 61), and presumably these were available to the prehistoric populations. White birch was one of the most important species in the late prehistoric and historic periods, because its bark was used for canoes and containers. Mountain ash also produces an edible berry. Hardwoods are preferred as fuel because they burn longer and produce more heat than softwoods. Conifers burn more quickly, but are more important at coastal and island sites where hardwoods are in limited supply. The small birch log recovered from a Recent Indian level at the site was probably collected for fuel. *Abies balsamea* (balsam fir) and *Picea* sp. (spruce) needles were recovered from both Maritime Archaic and Recent Indian deposits. The latter could be *Picea glauca* (white spruce) or *Picea mariana* (black spruce). Since conifer needles are consistently associated with fire-related features, it is likely that fir and spruce wood were used as fuel wood. The spruce log recovered from the Maritime Archaic deposit may have also been intended for the hearth. Leonard (1998) also identifies the conifer charcoal at Big Droke and Caines as fuel wood. Ethnohistoric evidence for the Beothuk and other Algonkian groups of the region indicate that fir had many domestic uses, including boughs for bedding, and wood for dwelling poles and canoe parts (Deal and Butt 2003: 20). *Picea* boughs might also have been used for bedding, while spruce bark could be used for food preparation and storage containers, split spruce roots were used for sewing together bark sheets for containers and canoes, and spruce resin could be mixed with oil and ochre for caulking.

Grasses (*Poaceae* family) are included here in the other usable plant category. Twelve uncharred grass seeds were associated with the Maritime Archaic component, one from a large pit (Feature 413), which is possibly non-cultural, and eleven from level samples. We can probably assume that the Maritime Archaic and Recent Indians, like modern Algonkian groups, used grasses for various tasks. Wild grasses are often used for making cordage and basketry, for lining storage pits, and as layering between stored foods (e.g., Black 1980: 212). For example, a fifteenth-century Mi'kmaq archaeological site in Pictou, Nova Scotia, contained several types of cordage and basketry made from a variety of materials (Whitehead 1987). This includes species of grass and reeds that are also native to Newfoundland. A shipwrecked Breton sailor, Jean Conan, related that he slept on bedding made from dry white grass and moss, with a pillow made of reeds at a Beothuk camp near La Scie in 1787 (Bakker and Drapeau 1994). A Beothuk burial reported in the nineteenth century on Comfort Island contained an individual in a sitting position with a grass rope used to hold him in place (Howley 1915: 195).

A number of the species mentioned above, as well as *Ranunculus* sp. (buttercup), has medicinal properties, which might account for their presence at the site. The Montagnais (Speck 1917: 315) inhaled crushed buttercup leaves as a headache remedy. Two species are reported for the Port au Choix National Site, namely *Ranunculus acris* (common buttercup) and *Ranunculus cymbalaria* (seaside buttercup). Bark from cherry (*Prunus* sp.) trees and twigs of *Picea mariana* can both be boiled to make a cough medicine (Speck 1917: 314; Arnason et al. 1981: 2296-2297). Balsam fir twigs steeped in boiling water was used as a laxative by the Montagnais (Tantaquidgeon 1932: 261) and the gum was boiled and applied for back and chest pains (Speck 1917: 309; Tantaquidgeon 1932: 266). A tea made from the root of the cow parsnip (*Heracleum maximum*) is considered to be a general preventative medicine (Arnason et al. 1981: 2245).

The final category includes a wide variety of plants that are considered to be part of the modern site environment and are present in archaeological deposits as contaminants. For the Gould site this category includes *Bidens* sp. (beggarticks), *Carex* sp. (sedges), *Silene acaulis* (moss campion), and *Viola* sp. (violet). Specimens recovered from Maritime Archaic deposits come primarily from level samples while all of the Recent Indian specimens come from features. *Bidens* (beggarticks) is a genus of *Asteraceae* that has seeds with barbed awns which causes them to be unintentionally dispersed by animals. Rouleau (1978: 50) lists three species of *Bidens*, all considered to be introduced species, while S.J. Meades and other (2000: 37) lists only one widespread species (*Bidens frondosus*). *Carex* spp. (sedges) form one of the most diverse plant families of flora, with over 1,500 species, most of which are found in north-temperate and arctic zones (Roland 1998: 980). Sixteen species are listed for the Port au Choix National Site (NAL 1985), while 29 species are listed for L'Anse aux Meadows National Historic Site (W.J. Meades et al. 1975: 62-63), and 72 species are listed for Gros Morne National Park (Anions 1994: 148). *Silene acaulis* is listed as a component of the Rock Heath vegetation zone in the park, and is also found at Gros Morne (Anions 1994: 55-56) and L'Anse aux Meadows (W.J. Meades et al. 1975: 66). *Viola* species are not listed in the resource guide for Port au Choix, but nine species are listed for Gros Morne (Anions 1994: 156), and Bouchard and others (1978: 307) list eleven species for the St. Barbe District. All three *Viola* specimens are charred and come from Recent Indian hearths (Features 9 and 26), indicating that they were probably part of the site environment during that period.

Future Considerations

The careful palaeoethnobotanical sampling of archaeological sites is a potential source of information on plant use, site seasonality, and past site environment. Charred conifer needles were well represented in both feature and level samples from Maritime Archaic and Recent Indian contexts at the Gould site. Needles probably signify the use of these species for fuel and bedding, while most of the seeds represent edible plant species or site contaminants. Thus far, the Maritime Archaic deposits have yielded seven probable or potential species of edible plants, two fuel/construction species, one other usable plant species, and five species as contaminants. The Recent Indian sediments have yielded three probable edible plant species, three fuel/construction species and three species as contaminants. The presence of edible berry seeds indicates that the site was in use at least during the summer and early fall seasons.

Recovery rates of plant macroremains at the Gould Site were generally disappointing, especially from the Recent Indian features, which frequently contained fire-cracked rock and charred bone (Teal 2001: 29-35). Low seed density is a consistent problem at sites in this province (Deal and Butt 2003). This is partly due to the small sample sizes that are processed. A new forced-air flotation system has recently been constructed for the Memorial University Archaeology Unit, which is similar to the Flote-Tech machine assisted flotation system. The new setup is portable and can be run by direct current or a generator, so that more samples can be processed on site. The system will also allow the processing of larger samples of up to 20 litres. Similar systems have been shown to out-perform the manual IDOT system by a factor of four to eight times (Hunter and Gassner 1998: 155). The processing of larger samples, with a higher recovery rate, should increase the raw number of seeds recovered, as well as relative seed density and species diversity.

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Appendix 1: Alphabetical list of flora mentioned in text, with full Latin and common names (after S.J. Meades et al. 2000):

Abies balsamea (L.) Miller; balsam fir.
Amelanchier bartramiana (Tausch) M. Roem*;* mountain serviceberry.
Betula michauxii Spach; dwarf birch.
Betula papyrifera Marshall; white birch.
Bidens sp.; beggarsticks.
Bidens frondosus L.; devil's beggarsticks.
Cardamine pensylvanica Muhl.; bitter cress.
Carex spp.; Sedges.
Cassiope tetragona (L.) D.Don; white arctic mountain heather.
Chenopodium album L.; lambsquarters, goosefoot.
Cornus canadensis L.; bunchberry.
Cornus suecica L.; Swedish bunchberry.
Crataegus sp.; hawthorne.
Empetrum nigrum L.; crowberry.
Euphorbia sp.; spurge.
Fragaria virginiana Mill.; northern wild strawberry.
Heracleum maximum W.Bartram (=*Heracleum lanatum* Michaux); Cow parsnip.
Juglans cinerea L.; butternut.
Lathyrus japonicus Willd.; beach pea.
Oxyria digyna (L.) Hill; mountain sorrel.
Picea glauca (Moench) Voss; white spruce.
Picea mariana (Miller), Britton, Sterns and Poggenburg; black spruce.
Potentilla sp.; cinquefoil.
Prunus pensylvanica (L.) fil.; pin cherry.
Rubus arcticus L.; arctic bramble.
Rubus idaeus L.; common raspberry.
Rumex sp.; sheep sorrel.
Ranunculus sp.; buttercup.
Ranunculus acris L.; common buttercup.
Ranunculus cymbalaria Pursh; seaside crowfoot.
Sambucus pubens Michaux; red elderberry.
Salix sp.; willow.
Silene acaulis (L.) Jacquin; moss campion.
Sorbus americana Marshall; american mountain ash, dogberry.

Taraxacum officinale Weber; dandelion.
Vaccinium angustifolium Aiton; low sweet blueberry.
Viola sp.; violet.

Note

[1]Dates are expressed in the text in calibrated calendar years before present (cal BP) as either a one-sigma probability age range or a median probability single age.

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