WHERE THE WILD THINGS GROW: A PALAEOETHNOBOTANICAL STUDY OF LATE WOODLAND PLANT USE AT CLAM COVE, NOVA SCOTIA

SARA J. HALWAS

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By

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Department of Anthropology
Memorial University of Newfoundland
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Abstract

Recent palaeoethnobotanical research carried out at the Clam Cove site in the Minas Basin region of Nova Scotia has added new information to the study of Late Woodland (1500-450 BP) hunter-gatherer groups in this area. Flotation of sediments from the Clam Cove site revealed a modest compliment of plant species which made this location ideal as a temporary camp utilized during lithic collection trips to Scots Bay. Flotation and charcoal analyses also uncovered evidence of species not previously recovered at the Clam Cove site, including beech (*Fagus grandifolia*), poplar (*Populus* sp.), strawberries (*Fragaria* sp.) and blueberries (*Vaccinium* sp.). Most floral remains reflect a strong reliance on local plant species easily gathered from the immediate area. The comparison of these plant species to those identified at the village sites at Melanson and St. Croix also shows a consistent pattern of plant use between habitation and temporary campsites within the region.

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I dedicate this thesis to my family and friends.

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Chapter 1 Introduction

1.1 Introduction

This thesis concerns palaeoethnobotanical research at a small Late Woodland (1500-450 BP) site in Nova Scotia. Palaeoethnobotany is the collection, processing, identification, analysis and interpretation of floral remains from archaeological contexts to gain an understanding of human and plant interactions. By examining the relationships between humans and plants within a culture, important information about the culture can be gained (Popper and Hastorf 1988:1). Plant remains can inform us about what prehistoric people ate, used to treat illness and heal wounds, and burned for heat and to cook food.

My research focuses on the Clam Cove site (BhDc-5), on the Bay of Fundy coast of Nova Scotia (Figure 1.1). This site has both historic and prehistoric components. Although there was a historic saw mill located on the western half of this site, it is primarily a Late Woodland site which retains a portion of a once large shell midden. This site was selected for a number of reasons. First the shell midden portion of the site has excellent floral preservation. It is largely composed of soft shell clam shells (*Mya arenaria*), which have partially neutralized the naturally acidic soil, creating an area where seeds, charcoal and other organic compounds have been preserved. Second, this site was previously excavated and established as a Late Woodland site (Erskine 1964a; Deal 2004a). A radiocarbon date of 2170 +/- 140 BP (Beta-49257) (Morlan 2001), obtained from a charcoal sample from the only feature uncovered (Deal 2003), also identified a small Middle Woodland component. Third, limited archaeobotanical research at Clam Cove (Hiseler and Linehan 1990) indicated promise for more intensive palaeoethnobotanical analyses. Finally, previous research projects in the wider Minas Basin area, focusing on lithic and ceramic artifacts and faunal remains, have provided a basic understanding of the social and cultural contexts, settlement and subsistence patterning, and movement of groups across landscapes (see Nash and Stewart 1990; Deal and Butt 1991; Deal, Godfrey-Smith and Kunelius 1995).

Figure 1.1: The Clam Cove site, Nova Scotia (Courtesy of NASA satellite imagery www.rapidfire.sci.gsfc.gov/gallery).

In other words, previous studies provide a solid temporal and cultural base on which to study human and plant interactions. The primary goal of this thesis is to learn which plants Late Woodland groups utilized through the recovery and identification of floral macroremains. Ethnohistorical sources provide suggestions for potential uses for the identified species and allow me to examine intangible social and cultural aspects of Late Woodland groups.

1.2 Objectives and Structure of Thesis

By achieving the primary goal of this thesis, I can answer two questions about Clam Cove. Why was Clam Cove utilized in the first place, due to its outlier position on Cape Split? How does Clam Cove fit into wider settlement and subsistence, and group movement patterns of Late Woodland groups in the Minas Basin? To answer these questions I have broken this thesis into seven chapters. The first chapter introduces my research and objectives, and identifies the theory of floral studies and the cultural theoretical approach for my analysis. Chapter two identifies the previous fieldwork, artifacts and archaeological context from contemporary sites in the Minas Basin region (namely the Melanson and St. Croix sites) as well as Clam Cove. Site function and chronology are established for all sites and a discussion of seasonality is offered based on faunal remains. The third chapter discusses the past palaeoethnobotanical research of the Melanson, St. Croix and Clam Cove sites and sets up the palaeoethnobotanical research of the thesis. I am focusing on the charcoal and seeds recovered from the shell-bearing (midden) deposits found at Clam Cove. An analysis of the seed macroremains is given in chapter four through a discussion of ethnohistoric food and medicinal plant species by Mi'kmaq and Malecite groups. Chapter five offers similar information on fuel, medicinal and edible species identified in the charcoal samples. Many of the macroremains represent the modern vegetation found on site (i.e., spruce and fir seeds and cone fragments). The information gleaned from the plant species discussed in chapters four and five will then be compared to floral remains recovered from the Melanson and St. Croix sites to gain a better understanding of resource availability and subsistence patterns of Late Woodland foraging groups in the Minas Basin in chapter six. Chapter seven briefly reiterates my achieved objectives and offers a brief discussion on the future of palaeoethnobotany in Nova Scotia.

1.3 Theory of Floral Remains

It is important to note that only recently (post-1980s) has the recovery and analysis of floral remains been incorporated into large scale archaeological projects, instead of being typed as a short report and appended at the back of larger site reports. Plant remains can identify ecological factors, possible edible and medicinal species, and fuels and building materials, as well as give insight into magico-religious rituals and other ideological aspects of past cultures (Alexiades 1996:xii; Hather and Mason 2002:1; see Gremillion 1997a; Hastorf and Popper 1988). Understanding how plant remains are incorporated into the prehistoric botanical record is necessary for analyzing recovered plant remains in archaeological sites.

Plants undergo a series of transformations from primary collection by a culture to final recovery, quantification and recording by archaeologists (Miksicek 1987). Cultural and archaeological factors affect the recovery and analysis of floral remains. Cultural factors include site type, collection, processing, discard, and final use or storage. Archaeological factors include excavation, laboratory sampling, processing, and analytical techniques (Miksicek 1987). In archaeology, only charred seeds are considered ancient (Minnis 1981), but a number of preservation contexts, such as waterlogged, frozen, and extremely dry conditions, can preserve uncharred macroremains. The preservation context of midden sediment at Clam Cove is discussed fully in chapter four.

1.3.1 Cultural Factors

Two cultural factors, processing and discard, directly affect the analysis of recovered macroremains. Culturally important plants can be processed at the collection ground, or brought back to the camp. A unique way to examine this aspect is through a modified application of the Schepp Effect (see Rathje and Schiffer 1982). Originally applied to faunal remains, this hypothesis states that the amount of butchering depends on an animal's size and the distance from the kill to home base. For a large animal, only the best parts will be returned to the camp. When adapted to plants, it can read the more processing a plant has to undergo on site the more waste products will be produced (Miksicek 1987:229). This can be interpreted in a number of ways. If there is little evidence of on site processing, then either the group processed the plant at the collection site, they processed the plants on site and there are no or very few surviving remains, or they imported a particular product (Mikisicek 1987:224).

Discarding of plant wastes introduces complex interpretations of macroremains. There are three types of plant refuse to consider: *de facto* refuse, primary refuse and secondary refuse. *De facto* refuse is usable materials abandoned in an activity area; for example, pots of beans which were recovered from a house floor at the Ceren site in El Salvador (Sheets 1992:43) would be considered *de facto* refuse. This type is also very rare, but when found indicates a precise use for the plant found. Primary refuse is more common and includes trash found at the location of use; for example, hearths and roasting pits. Secondary refuse is the most common and is the dumping of trash into designated areas, most notably a midden (Miksicek 1987). Both primary and secondary refuse are important factors in understanding the plant remains from Clam Cove, Melanson and St. Croix. Both Melanson and St. Croix had primary refuse in the form of living floors, hearths and pit features. Noting possible areas where processed plants were discarded at each site helped me interpret the recovered remains. It is also very important to understand potential sources of the seeds and other macroremains one recovers.

Briefly, seeds can come from directly using the seed, indirectly using the fruit, or plant, or natural seed rain (Minnis 1981). Since the likelihood of finding seeds outweighs that of finding vegetal structures, it is necessary to understand that the seeds recovered may not have been the focus of prehistoric collection. A full discussion of the seed sources and how they relate specifically to Clam Cove is found in chapter four. Through the examination of the ethnohistoric record of plant use, it becomes clear that most of the plants recovered from Clam Cove and the other Woodland sites were utilized for the body of the plant and not the seeds themselves.

Segregating the natural seeds from the culturally significant seeds is difficult. One example from the Near East (Miller 1996) illustrates this problem aptly, though I am not faced with the same problem. Miller's research focused on reexamining Flannery's (1969) original hypothesis of a broad spectrum revolution in the Neolithic. Flannery stated that through his work at the Ali Kosh site, there was a significant increase in small wild plant seeds and a decrease in grains, therefore, the people must have began to exploit wild plants over agricultural products. Miller (1996) revisited Ali Kosh and discovered that the high frequency of wild plant to cereal grains was due to the people using dung as fuel. What Flannery was identifying as a food source for humans was actually a food source for the livestock, and a fuel source for the humans (Miller 1996:527).

Other environmental factors which can challenge the interpretation of human plant use include faunalturbation, floralturbation, wind and water action, and erosion and depositional processes. Faunalturbation includes burrowing animals and insects, and animals that collect seeds, or nuts, like squirrels and pack rats. Some insects, like leaf harvester ants, collect flowers and stock pile them in their burrows. Typically large concentrations of pollen and/or seeds suggest cultural use (Minnis 1981), but if the macroremains were stockpiled by animals or insects, they could be misinterpreted (Miksicek 1987).

1.3.2 Archaeological Factors

Archaeological factors which could add to analytical misrepresentations include collecting adequate samples and determining the correct processing procedure. Taking a standardized sample volume from each context assures an accurate representation of rarer species without the hassle and expense of processing huge volumes of sediment. Sampling strategies vary, but blanket sampling (collecting a predetermined volume from each level of each unit) is a good practice (Pearsall 2000). By sampling each arbitrary and natural level of each unit and feature uncovered, a complete sample of the entire archaeological site is retrieved. This way no context or feature is under- or over-represented. There can be a bias toward features, especially hearths, when collecting sediment samples for floral remains. If only features are sampled, potentially important information from the rest of the site may be lost (Pearsall 2000). Therefore blanket sampling ensures a representative sample of all excavation contexts; the large samples can be subsampled later in the laboratory.

1.3.3 Processing Sediment Samples

There are a number of ways to process a sample. Dry screening samples through geological sieves, will result in 100% seed recovery but the mechanical action breaks up seeds, and the sample should be dried first. If the sample is wet and then dried, seeds may contract and break during the drying process. Flotation is one of the most common botanical recovery practices and overcomes these problems. Flotation can be preformed in the field with a bucket and small meshed strainer, or in the laboratory with a large forced air machine. In any case, it is necessary to identify which recovery method works best for the specific project. Flotation machines have a high rate of recovery (see Watson 1988), but there are some issues. Water levels must be maintained in the large froth machines so overflowing and the loss of samples does not occur. As well, adding too much frothing agent can result in over active bubbles and the loss of macroremains. The above discussion is a brief illustration of some issues surrounding the recovery and analysis of macroremains. Each project and site is different and sampling and recovery techniques should be decided on a project-by-project basis.

1.4 Theoretical Approach

A cultural ecological approach will inform my analysis of the floral macroremains recovered at Clam Cove. Simply stated, cultural ecology assumes that floral and faunal resources, lithic materials and other ecological factors are important in settlement choice for any group of people. The "belief that societies will be more or less adapted to their material environment and therefore the characteristics of those societies can be explained in terms of such adaptations" (Johnson 1999:144) is vital to the understanding of Late Woodland Period and the Clam Cove site. Late Woodland groups are best characterized as hunter-gatherers who have adapted to their environments by efficiently exploiting the resources around them. Therefore, it is useful to view the Late Woodland groups who utilized Clam Cove through hunter-gatherer settlement and mobility strategies.

According to Kelly (1983) the mobility patterns of hunter-gatherer groups reflect how they organize themselves to cope with problems of resource acquisition. Late

Woodland groups in the Maritimes had to move periodically to obtain required resources as they became available (i.e., in seasonal rounds). Seasonal resources were harvested in a variety of ecological zones. Seasonal rounds have been characterized by Binford (1980) as residential and logistical mobility patterns. These two archaeologically identifiable types of movement are the basic ways in which hunter-gatherers organize themselves to best exploit resources in their area. Residential mobility is the movement of all members of a camp from one location to another, while logistical mobility is the movement by small groups on task specific trips (Kelly 1983:278).

Binford also differentiates between foraging and collecting strategies. Foragers gather the resources around the residential camp each day, returning to the camp at night. More important to this thesis is Binford's definition of collectors. Collectors are foragers who acquire resources through logistical movement, in which small groups leave the larger group for a period of time to collect resources at a distance. These resources are processed at logistical camp sites and transported back to the main camp for use and storage (Binford 1980:10).

Both residential foraging and logistical collecting are believed to be have been practiced during the Late Woodland period in the Maritime Provinces. According to Deal (2001b), Late Woodland groups in southwestern New Brunswick, from the coastal and interior regions of the St. Croix/Passamaquoddy Bay area to the interior Saint John drainage system, used cold weather residential camps as a base for small groups to exploit local resources (Deal 2001b). Black in his study of the Bliss Islands (1992) concurs with Snow's (1980) observation that Late Woodland populations likely concentrated in a few large villages at the heads of tide of major rivers and participated in local small group resource procurement. Most resources would have been procured in this way, but it has been suggested that trade between large villages for certain items such as lithics or birchbark, was also established in the Late Woodland (Loring 1988). For example, a number of sites in the Tracadie Estuary, northeastern New Brunswick, such as the Barnaby's Nose site, exhibit non-local resources including Maine cherts, Scots Bay cherts and chalcedonies, Ramah chert from northern Labrador, and Munsungun cherts (Keenlyside 1990:7). These lithic resources would have been gathered through logistical procurement or long distance trade. Keenlyside suggests that these sites were occupied to exploit the large eel and Gaspereau populations in the rivers (1990:8). In Prince Edward Island, Late Woodland midden sites were identified as summer fishing camps, likely utilized by groups from mainland Nova Scotia (Pearson 1966:105). It is within this wider context of Late Woodland settlement patterning that the Clam Cove site can be situated.

Initial research at Clam Cove identified it as a special task camp involved in the exploitation of lithic resources (Erskine 1964a). Its position as an outlying logistical task camp has been stated but not focused on. Late Woodland resource exploitation around the Minas Basin area was likely characterized by logistical movements from residential camps to various resource areas (e.g., Scots Bay). The site lies within reach of a Late Woodland quarry site at Davidson's Cove, located across Scots Bay. Larger prehistoric camps or village sites, dating to the Woodland Period (Figure 1.2), have been identified at Melanson, located approximately 10 kilometers up the Gaspereau River and 30 km from St. Croix (Nash and Stewart 1990; Godfrey-Smith, Deal and Kunelius 1997). The St. Croix site is situated at the head of the tide on the St. Croix River (Deal and Butt 1991).

Figure 1.2: Late Woodland village sites (Courtesy of NASA satellite imagery www.rapidfire.sci.gsfc.gov/gallery).

Another large site probably existed along the Cornwallis River, at Starr's Point above the campsites. It is likely that groups from all these village sites visited Scots Bay to collect lithic materials. It is suggested in the next chapter that various groups likely utilized Clam Cove as a temporary campsite during trips to collect lithic raw materials.

Chapter 2 Archaeology of Clam Cove

2.1 Introduction

Various geological features have influenced the ecology of the Minas Basin area. The specific faunal and floral resources found at and around the Clam Cove site made this area highly attractive to Late Woodland groups. Previous archaeological studies completed at Clam Cove show a continual use of the area from the Middle Woodland to the historic period (2300 to 450 BP) (Deal 2004b). This chapter describes the natural history of the Minas Basin with special attention to Clam Cove. Details of the archaeological excavations of the Late Woodland village sites at Melanson and St. Croix will also be presented. Finally, archaeological investigations at the Clam Cove site establish a temporal and cultural base for later floral analyses.

2.2 Natural History of the Minas Basin Area

The Minas Basin is the eastern extension of the Bay of Fundy, created by the peninsular Cape Split extending into the Bay of Fundy. It borders Kings county to the southwest, Hants county to the south, Colchester county to the northeast and Cumberland county to the northwest (Cann, MacDougall and Hilchey 1965). Cape Split is located in Kings County, Nova Scotia and is composed of two rock formations: the North Mountain basalt formation underlying the Scots Bay formation. The North Mountain basalts give Cape Split its shape and height. Cape Split is a 6 km long peninsula which gracefully arcs 150 degrees toward the Fundy shore (Gibson 1992:1). The latter formation is the youngest in the county and is a sedimentary rock composed of sandstones with calcite, quartz and agate inclusions (Cann, MacDougall, and Hilchey 1965). This is the source of the Scots Bay cherts used by prehistoric populations in this area.

Gulliver soils make up the Scots Bay and Cape Split area. They are found on almost level or sloping terraces and composed of gravelly material derived from the coarse basalt parent materials. These soils are composed of three strata (color determined by the Munsell chart): the A horizon, a dark grayish brown loam (10YR 4/2), the B horizon, a yellowish brown gravelly loam (10YR 7/4), and the C horizon composed of fine light olive brown gravel (2.5Y 5/4). These strata overlay a base of parent rock cobbles. Level areas can be cultivated into hay land, pastures, or potato fields (Cann, MacDougall, and Hilchey 1965). Steeper slopes, like those found on Cape Split, are generally shallow and not suitable for cultivation.

Tides in the Bay of Fundy are some of the most extreme in the world, exceeding 15 meters on the Minas Basin shore (Gibson 1992: 6). Due to this extreme tidal action, the colder, saline Atlantic Ocean currents mix with warmer, less saline river waters. The mixing of these two types of water decreases the over all temperature of the Bay of Fundy lowering the temperature on Cape Split (Gibson 1992:32). It can be as much as 15 degrees centigrade cooler on Cape Split than in Wolfville, a 40 minute drive away. Regular tidal action and winter storms also erode the shoreline as much as one meter per year in places. Where farm land meets the water, dykes have been erected to slow eroding banks. In extreme tidal years (e.g., April 6, 1977), the tides surge over the dykes and flood the farmland that lies behind (Gibson 1992:32).

All the above features influence the flora and fauna of the area. Past botanical, zoological and archaeological studies throughout Nova Scotia and Isle Haute, the small island northwest of Cape Split (Figure 2.1), describe a wide variety of plant species in various ecosystems. Forested soils sustain spruce (*Picea* sp.), fir (*Abies balsamifera*), maple (*Acer* sp.), birch (*Betula* sp.), poplar (*Populus* sp.), and alders (*Alnus* sp.) (see Appendix B for a complete list of tree species). The herbaceous undergrowth includes shade tolerant grasses and sedges, dogwood (*Cornus* sp.), blue-bead lily (*Clintonia borealis*), twin flower (*Linnaea borealis*), ferns and mosses. Open, or disturbed, areas contain a mixture of grasses, like timothy (*Phleum pretense*), sedges (*Carex* sp.), thistles (*Cirsium* sp.), knapweed (*Centaurea* sp.), buttercups (*Ranunculus* sp.), asters (*Aster* sp.), goldenrod (*Solidago* sp.), vetch (*Vicia* sp.), clover (*Trifolium* sp.), horsetail (*Equisetum arvense*) and raspberry (*Rubus* sp.) (Wilson 2000:14).

Faunal species on Cape Split coincide with those reported in the 1997 study of Isle Haute by the Nova Scotia Museum including white–tailed deer (*Odocoileus virginianus*), grey seals (*Halichoerus grypus*), harbour seals (*Phoca vitulina*), deer mice (*Peromyscus maniculatus*), red squirrels (*Tamiasciurus hudsonicus*), American mink (*Mustela vison*), bald eagles (*Haliaeetus leucocephalus*), loons (*Gavia* sp.), black duck (*Anas rubripes*), eiders (*Somateria* sp.), red breasted merganser (*Mergus serrator*), turkey vultures (*Cathartes aura*), osprey (*Pandion haliaetus*), peregrine falcon (*Falco peregrinus*), raven (*Corvus corax*), great blue heron (*Ardea herodias*), and many other bird and invertebrate species (Wilson 2000:27).

Faunal species identified from archaeological studies around Nova Scotia include beaver (*Castor* canadensis), black bear (*Ursus americanus*), moose (*Alces alces*), muskrat (*Ondatra zibethica*), river otter (*Lutra canadensis*), woodland caribou (*Rangifer caribour*), raccoons (*Procyon lotor*), Canada goose (*Branta canadensis*), great auk (*Pinguinus impennis*), crab (*Cancer* sp.), mussels (*Modiolus* sp.), and clams (*Mya* sp.) (Erskine 1998:90).

2.3 Previous Archaeological Research

John Erskine was an amateur archaeologist associated with the Nova Scotia Museum in the 1950s and 1960s. His interest in lithics utilized by prehistoric populations in the Minas Basin area led him to look for quarry and habitation sites in this and surrounding regions.

Erskine conducted a number of excavations in the Minas Basin area including sites on Gaspereau Lake and Gaspereau River, where he uncovered Late Archaic and Woodland components (1998:16). Gaspereau Lake is 27 km up stream from the mouth of the Gaspereau River, which flows into the Minas Basin. He suggested that these sites were used for smoking gaspereau (alewife) (*Alosa pseudoharengus*) in the early summer (1998:17). He mentions that the lithics found at these sites are predominantly North Mountain materials, and compares the contracting stem points to those found at the large "Indian campsite near Melanson, [which is] one of the largest in the province" (1998:16), located at the mouth of the Gaspereau River.

In 1958 Erskine did some collecting, testing and mapping at the Melanson site (Figure 2.1). His limited test-pitting identified a hearth feature, some Middle and Late Woodland pottery and projectile points. These artifacts allowed him to suggest that this site was seasonally used by Woodland groups during the summer to catch gaspereau and smelt (1958:4). He also recorded the St. Croix site (Figure 2.1) in the 1960s in one of his many reports to the Nova Scotia Museum (McEachen 1996:58), after he was shown a collection of materials owned by Clarence Burton. Although he did not formally excavate, he did dig a few test pits, but declared the site completely disturbed (Deal *et al.* 1994). In his report on St. Croix, Erskine mentions that materials recovered extend from the Late Archaic to the Late Woodland and that salmon (*Salmo salar*) and gaspereau were once abundant in the St. Croix River (Erskine 1986:103).

Figure 2.1: Late Woodland sites in the Minas Basin Region (Courtesy of NASA satellite imagery www.rapidfire.sci.gsfc.gov/gallery).

After Erskine completed his excavations in the mid 1960s, archaeology in the Minas Basin area was sporadic. In 1965, George F. MacDonald (National Museum of Canada), resumed excavations at the Melanson site in hopes of uncovering a Palaeo-Indian component similar to the Debert site. Unfortunately, the only conclusion MacDonald drew was that the Melanson site was mixed Archaic and Woodland, stretching over a long period of time (Nash and Stewart 1990:37). In 1986, the Melanson site (BgDb- 1 to7) was formally excavated by Ronald J. Nash and Frances L. Stewart (1990). Their excavation and subsequent analysis, which included information from previous excavations and private collections, suggests that the Melanson site was a large Woodland (or Ceramic Age) village, one of the largest excavated and recorded prehistoric sites in the Minas Basin area. This site was utilized from the Middle Woodland through the Late Woodland based on the projectile point types and ceramic typologies (see Petersen and Sanger 1991). Radiocarbon dates established a range of 1760 +/-60 BP to 560 +/-60 BP; a thermoluminescent date of 500 years +/-20% suggests the site was occupied into the historic period (Nash and Stewart 1990:117).

Faunal remains included small amounts of terrestrial mammals and marine fish and invertebrates. Despite the paucity of faunal materials recovered from the Melanson site, it is still located near a variety of rich terrestrial and aquatic ecozones (see Jan 1986). As Erskine pointed out previously, gaspereau were highly abundant and the likely reason for the placement of this site. The Gaspereau River was a more likely location for aboriginal settlement, as opposed to the nearby Cornwallis River, because of the abundance of gaspereau and other fish, as well as the easy route to the Scots Bay chert outcrops (Stewart 1990:165). The site was probably used from spring to fall and during trips to the Scots Bay outcrops, groups would fish in the Minas Basin and then bring the acquired resources back to the main camp (Stewart 1990:171). Sediment samples were also collected for the recovery of floral and faunal macroremains because evidence of these remains was scarce in previous excavations (1990:56).

In 1988, Michael Deal (Memorial University) began the Minas Basin Archaeological Survey Project, designed to reconstruct prehistoric land and resource use patterns of the Minas Basin area (Deal 2004a:2). This large scale survey uncovered new prehistoric sites and re-located old sites in this area, including the St. Croix site (BgDf-1), the Davidson's Cove site (BhDc-2) and the Clam Cove site, which were originally reported by John Erskine.

The St. Croix site is a large Woodland site extending half a kilometer along the southeastern river bank of the St. Croix River. The mouth of the river, which flows into the Avon River and out into the Minas Basin, consists of a large estuary flat composed of fine sandy loams and silty clay loams. The river banks are well drained, sandy alluvial deposits. The area around St. Croix is rolling lowland plains, dissected by various small river valleys (Cann, Hilchey, and Smith 1954: 10-12). This soil, combined with a warm temperate climate, allowed for the growth of a temperate mixed hardwood and coniferous forest; mixed spruce and fir dominate on ridges. Around the Minas Basin shore, birch and maple preside on hilltops, and red spruce and hemlock are found in depressional places. Most herbaceous plants are members of the grass family, and can be found covering the cultivated areas, pasture lands and salt marshes.

In 1988, the Minas Basin survey team determined that the St. Croix site was much larger than previously assumed and there were portions of the site which remained undisturbed, contrary to Erskine's original report (Deal *et al.* 1994). Excavations uncovered a large quantity of diverse materials extending across the entire Woodland period (Early, Middle and Late) suggesting that it was in use for roughly 1500 years as "a large campsite or village where one or more groups collected to exploit anadromous fish runs in the spring and/or fall seasons" (Deal, Godfrey-Smith and Kunelius 1995:4). The ceramic types found include four Vinette 1 type sherds, designated to the Early Ceramic period or Ceramic Period 1 (ca. 3050-2150 BP), and a number of sherds from Ceramic Periods 4-6 (1350 -400 BP) (Petersen and Sanger 1991). The majority of the vessels date to the Ceramic Period 6 or the Late Woodland (Deal, Godfrey-Smith and Kunelius 1995). Thermoluminescent dating (TL), which gives a direct date on a ceramic sherd, was completed on a six sherds from the St. Croix site. These dates, ranging from 2600 to 1150 BP, concur with the radiocarbon date (2500+/-120 BP) received on associated charcoal (Deal 1995; Godfrey-Smith, Deal and Kunelius 1997). Sediment sampling for the recovery of floral and other macroremains also took place. Charred faunal remains recovered through flotation were so fragmented that they could only be identified to large, medium and small mammals. The only identifiable specimen was a right distal tibia of a fox (*Vulpes fulva*) (Deal *et al.* 1994).

The Davidson's Cove site, identified during the 1988 survey, was excavated in 2003 (Deal 2004a). It is a lithic workshop site, located on two terraces along the Thorpe Brook in Scots Bay. This is the most likely lithic source area that the Woodland groups would have been visiting from Melanson, St. Croix and Clam Cove. Evidence suggests that this site was used only as a workshop and not a habitation site. Likely, groups were reducing cores to preforms or other transportable shapes and sizes, leaving the finished cores and debitage behind (Deal 2004a).

2.4 Previous Research at Clam Cove

In 1964, Erskine excavated three separate areas of two shell midden deposits, which ran along the cliff edge. He notes in his brief 1964 site report that "the old people of Scots Bay remember when these shell heaps were more extensive and they used to pick up "arrowheads" at the foot of the cliffs" (Erskine 1964a:1). Two corner-notched projectile points in the MacDonald collection attest to this. These two points were uncovered in the ruined foundations of a barn on the MacDonald farmstead, located at the beginning to the trail on Cape Split. These two points were likely collected at Clam Cove, as no further evidence of prehistoric activity was found at the MacDonald farm.

The first excavation area Erskine identified was located in the northern portion of the site and was less than a square yard, shallow, and discontinuous. It yielded a few remains of clam, mussel, and whelk shells, no bone or pottery, and a small amount of lithic flakes. Only two scrapers were uncovered, which led Erskine to conclude that this area was the edge of the camp where few activities other than preliminary shaping of blanks took place (Erskine 1964a:1). The second excavation area was much larger, incorporating over eight square yards of the top of a narrow ridge in the southern extremity, which had eroded on either side. Excavations here were not extensive;

Erskine scraped at an exposed face of the slope revealing lithic flakes and a hand axe. After these discoveries, he stopped to excavate properly, but this was not recorded. It is likely that Erskine's first two excavation areas were located very near the cliff edges in 1964, and have since eroded away.

The third excavation area was located at the crest of a ridge and incorporated seven square yards. Here Erskine uncovered cooking pits with ash and trampled clam shells around a foot deep. A few pot sherds, a sturgeon (*Acipenser sturio*) plate, two rodent bones of either woodchuck (*Marmota maonax*)or porcupine (*Erethizon dorsatum*), white-tailed deer (*Odocoileus virginianus*) bones (including a skull), mussels (*Mytilus edulis*), a whelk (*Colus* sp.) shell and rock (*Thais lapillus*) shells were also uncovered. The deer bones were fashioned into flakers and the knob of a moose splint awl was found as well. Erskine suggests that the sturgeon was caught in a weir located near the clam bed on the beach below, and that this area was not a habitation site but a 'chipping' station used to reduce local Scots Bay cherts into workable preforms while waiting for the tides to recede uncovering the fish weirs on the beach (Erskine 1964a: 2). He linked Clam Cove to other Late Woodland sites in the area including Melanson, and sites in the St. Margaret's Bay-Musquodoboit area as part of a lithic trade route (Erskine 1964b:2). Figure 2.2 includes some artifacts recovered by Erskine in his 1964 excavations.

Figure 2.2: Artifacts from the Clam Cove site collected by John Erskine (1964) (Photo courtesy of Deal 2004).

The Clam Cove site was re-visited in 1988 and the profile of a small, slumped portion of the site was excavated (Figure 2.3) (Deal 2004a). From this south facing profile a column sediment sample was taken for the recovery of floral remains. Deal returned to the Clam Cove site in 1989 with a small crew and excavated 12.5 m^2 of the site (Figure 2.3). This excavation yielded both prehistoric and historic artifacts, and a possible floor feature with a radiocarbon date of 2170 +/- 140 BP (Beta-49257) (Morlan 2001). This feature and date established a Middle Woodland component at the site.

Deal and the author continued excavations at Clam Cove in 2004 and 2005 (Halwas 2005). The 2004 field season, though short, yielded a number of historic and prehistoric artifacts, including a corner notched projectile point and other artifacts

(Halwas 2005). In addition 24 liters of sediment were collected for the recovery of floral remains.

The 2005 field season was more extensive than the previous year; units were opened in both the midden and non-midden soils. Most of the excavation was concentrated in the northern portion of the site, upslope from the 1989 excavation units (Figure 2.3). Another 30 litres of sediment was collected for the recovery of floral remains.

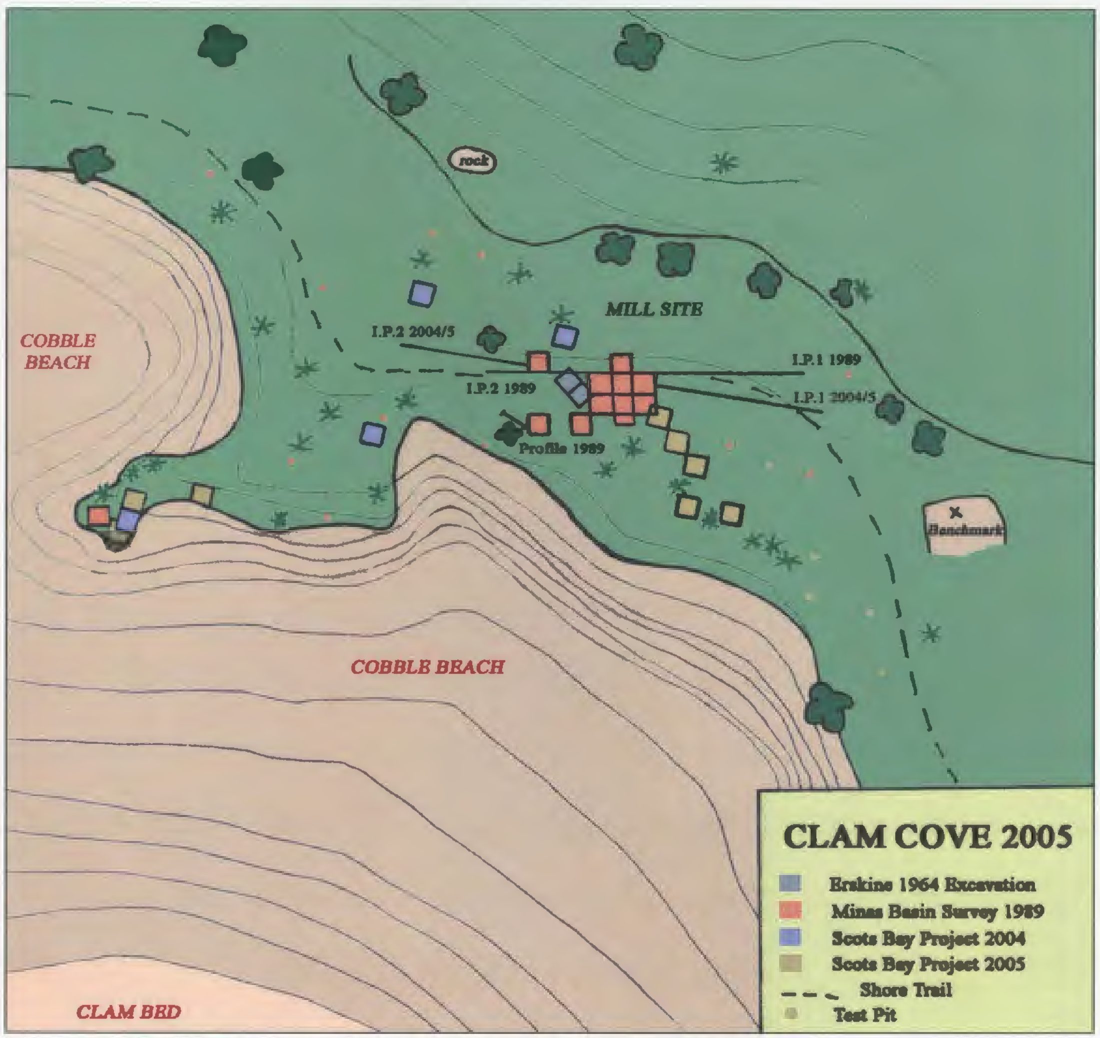

Figure 2.3: Clam Cove site map (Courtesy of Deal 2005).

2.5 Methodology

The stratigraphy of the Clam Cove site begins with a thin layer of sod composed of spruce and fir needles and some herbaceous materials. The cultural layer is directly underneath the sod, with some artifacts found within the sod. The cultural layer is made up of dark yellow red brown soils, generally 30 to 40 cm deep, but is deeper in the midden. The sterile layer below is dark yellow red. The oldest materials are found in the interface between the cultural and sterile layers. The shell bearing deposit at the southern end of the site seems relatively undisturbed. Slumping has caused some mixing of the dark organic, shell midden soils and the red yellow sterile layer, in some cases soils from the sterile layer is found on top of the shell bearing sediments. Due to the large spruce, fir and maple trees there are large roots throughout the site. There are also many boulders, of varying sizes, probably present as glacial till.

The 1989 datum was set in the northern portion of the site. When the 1989 datum could not be relocated (likely the stake was removed), a new datum was established in 2004. Off this a 20 meter base line was established running northeast/southwest by surveyor's level and the non-shell bearing (non-midden) units in the northern portion of the site were established. The level was moved to the 20 meter mark in order to shoot in the units located in the shell bearing (midden) deposit in the southeastern portion of the site. Between the 1989, 2004 and 2005 excavation seasons, 23.5 units were excavated to sterile soil; four units contained midden sediments and 19.5 units contained non-midden sediments. Furthermore, approximately 55 litres of sediment was collected for later processing and analysis of recovered floral macroremains.

2.6 Results

The shell midden units were the most productive on site; the majority of lithic cores and the two groundstone plummets and the only projectile point of the 2005 season were unearthed in Unit 6, while the copper fragments and fish vertebrae were recovered from Unit 8. The pottery recovered, however, was found in the northern non-midden area of the site. Units 7, 9 and 10 from 1989 and Unit 3 from 2005 contained pottery sherds; the 1989 units also had associated charcoal. The pottery recovered included dentate designs indicative of the Middle Woodland and dragged designs indicative of the Late Woodland (Petersen and Sanger 1991). Historic artifacts were also uncovered. Nails, glass and iron fragments were scattered in the upper most portion of most non-midden units. These artifacts are remnants of the historic saw mill located on site in the 1920s (Deal 2004a).

2.6.1 Feature 1

The only culture feature (besides the shell midden) from the Clam Cove site is a deep depression (or pit) which was revealed during the 1989 excavation (Figure 2.4). The feature was located in Unit W8-9 N9-8, 20 cm below datum (DBD) and is composed of a brown silt compact floor with dentate pottery sherds, charcoal, and calcined bone fragments (Figure 2.5). This cultural layer is sandwiched between a disturbed grey silt deposit on top and the sterile reddish brown silts below. The entire feature likely extended between Units 5, 7, 9 and 10. The charcoal was sent for radiocarbon dating and returned a date of 2170 +/- 140 BP (Beta-49257) (Moran 2001). This feature established the continued use of this site from the Middle Woodland to the historic period.

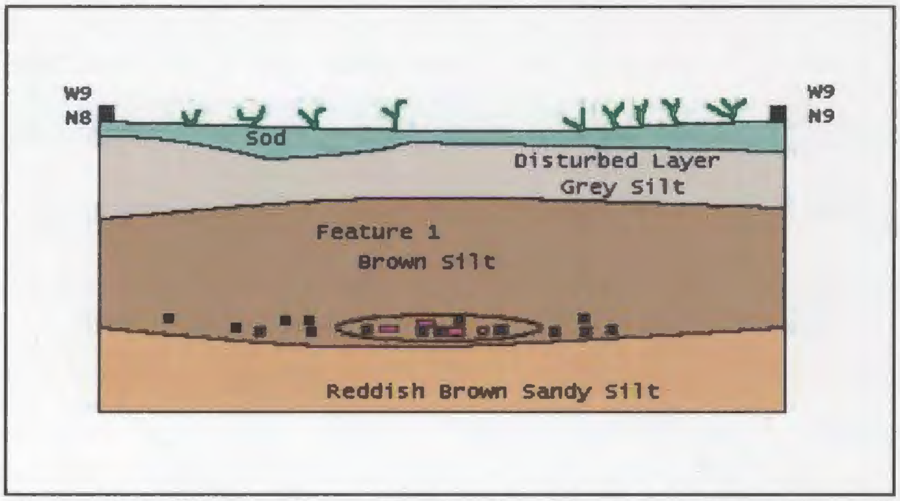

Figure 2.4: West wall profile showing Feature 1 from Clam Cove (1989).
Black squares = charcoal, red squares = pottery sherds.

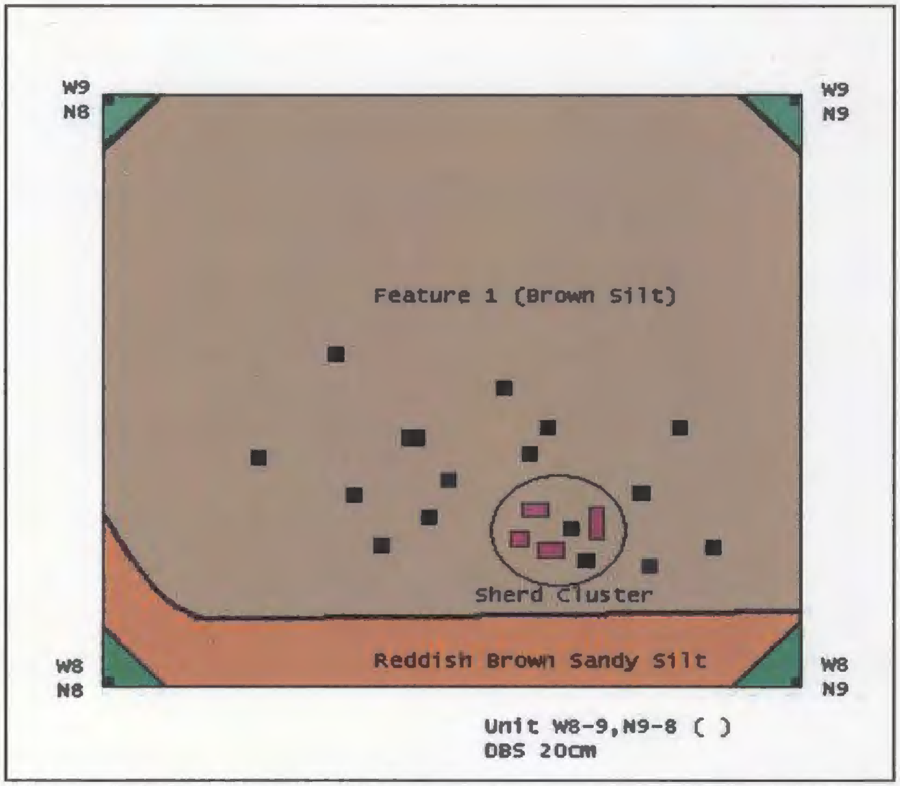

Figure 2.5: Floor plan of Feature 1 from Clam Cove (1989).
Black squares = charcoal, red squares = pottery sherds.

2.6.2 Artifacts

2.6.2.1 Lithics: Chipped stone

A total of 175 chipped stone artifacts was recovered from the four excavations. The Davidson's Cove quarry site, across Scots Bay, is the likely source of the raw material used for lithic artifacts at Clam Cove. Lithic artifacts found at Clam Cove are made from pink green jasper/agates that become a deep red when heat treated. Chalcedonies, some that appear clear as glass, while others appear smoky, are used less frequently. Light pink colored siltstones and white quartz appear along the beaches and are used less frequently than the jaspers and chalcedonies (Deal 2004a).

Two complete projectile points, three bases and two tips of broken points were uncovered at the site (Figure 2.6). The complete points and bases have been identified as corner notched points indicative of the Late Woodland period in the Maritimes. One is made of Scots Bay chert, two are of jasper, two are white quartz, and one is chalcedony. Some of the broken points indicate a leverage use, as if they were used to open clam shells or for a prying function. Other fractures reflect a force applied to the tip of the point, resulting in a broken tip. This may have been from a stabbing motion or use as a projectile point for hunting (Mounier 2005: pers. comm.).

Figure 2.6: Corner notched projectile points from the Clam Cove site (Photo by Lavers 2006).

There is a wide range of complete and fragmented bifaces made from locally collected jaspers, chalcedony, and Scots Bay cherts. There is only one large biface tip which is made from dark grey/black jasper which does not originate near Scots Bay. This stone would have been transported to the area. Unifaces include thumbnail scrapers, end scrapers, a thumbnail scraper/spokeshave, retouched flakes and utilized flakes. These tools are made from similar raw materials as the bifaces and projectile points, but also include a couple of utilized siltstone flakes. Numerous lithic cores were uncovered in the 2005 excavation (Figure 2.7). These are of jaspers, some heat-treated, chalcedonies, and siltstone, and found throughout the site. In the midden though, there were distinct dumping episodes present in unit 6. Both cores and lithic debitage pockets were uncovered throughout the unit, likely representing a number of different dumping events. A few beach cobble hammerstones were uncovered with minimal pecking on one end.

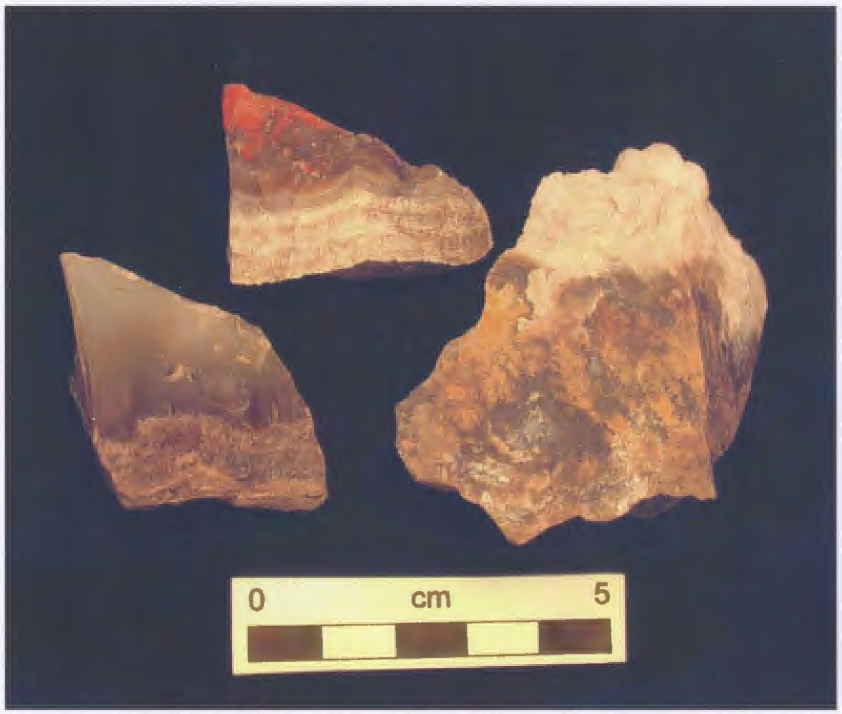

Figure 2.7: Cores from the Clam Cove site (Photo by Halwas 2006).

2.6.2.2 Lithics: Groundstone

Two ground slate pieces were recovered during Erskine's excavations, two small ground plummets and a fragment of a groundstone artifact from the 2005 excavations. The plummets (#187 & 207) are small ground beach cobbles shaped like a peanut, roughly 3.5cm long, 2 cm wide and 1.5cm at the thickest section (Figure 2.8). The last groundstone artifact (#225) is 5.7cm long, 4cm wide and 2.1cm thick; it has two ground facets. It may have been a broken adze or celt from the Late Archaic brought to the site by the Late Woodland people.

Figure 2.8: Plummets from the Clam Cove site (Photo by Halwas 2006).

2.6.2.3 Copper

A few copper fragments were recovered at Clam Cove. Erskine uncovered a small fragment of native copper during his excavations, while two small historic pieces were identified during the 1989 excavations. The first is the plate from the butt of a musket, and the other is a complete 1867 Nova Scotia penny. The other fragments were tiny flattened nodules of native copper. The historic plate and the native copper were found in units containing shell bearing sediments, while the penny was surface collected in the northern portion of the site in non-shell bearing sediments.

2.6.2.4 Ceramics

A number of pottery sherds from a maximum of seven vessels were uncovered in units located near the northern portion of the site. Deal identified all pottery sherds and vessels from Clam Cove (Deal 2004a). The first vessel is comprised of a single shell tempered sherd which Erskine unearthed during his excavations. The second vessel is comprised of 11 rim sherds, measuring 13 cm. It is a cord wrapped stick design, indicative of the Late Woodland (Figure 2.9).

Figure 2.9: Late Woodland vessel from Clam Cove (Photo by Halwas 2006).

The third vessel is comprised of 122 sherds and has a dentate design (Figure 2.10). Charcoal associated with these sherds returned a radiocarbon date of 2170 +/- 140 BP (Morlan 2001). The sherds and charcoal concentration comprise the only feature found at Clam Cove and establishes a Middle Woodland component at the site. The fourth vessel is comprised of eight neck sherds with a dragged design on them. The fifth vessel is a single interior body sherd with no discernible decoration. The sixth vessel is a single body sherd with dentate decoration. The seventh vessel is comprised of two body sherds with a dragged design. Charcoal was collected with the third vessel, but has not been radiocarbon dated. The dentate design is common in Middle Woodland pottery. Figure 2.11 illustrates pottery sherds from vessels four to seven.

Figure 2.10: Middle Woodland vessel from the Clam Cove site (Photo by Halwas 2006).

Figure 2.11: Dragged design (Left) and dentate design (right) ceramic sherds from the Clam Cove site 2006 (Photo by Halwas 2006).

2.6.2.5 Faunal Remains

Faunal remains from Clam Cove are mostly broken and a few whole soft shell clam shells (*Mya arenaria.*), mussels (*Mytilus edulis*), *Colus* sp., *Helicodiscus* sp., *Thais lapillus*, and a few charred bone fragments. Erskine identified deer (*Odocoileus* sp.) long bones, moose (*Alces alces*) molars, and a moose long bone unearthed from his excavations (1964a; 1964b), while 17 charred mammal bone fragments, a bird bone, and a fish vertebra were uncovered during Deal's excavations (Halwas 2005).

2.6.2.6 Floral Remains

The two small sediment samples collected in 1989 (about 100 grams) and 12 of the 24 litres collected during the 2004 field season were processed and the macroremains identified and analyzed (Hiesler and Linehan 1991; Halwas 2004). Over half (18 out of 30 litres) of the collected sediment samples from 2005 were processed. Chapter 4 details the collection, processing, identification and analysis of the 1989, 2004 and 2005 sediment samples.

2.7 Discussion

Based on the few artifacts recovered, this site has been previously identified as a Late Woodland temporary camp site where a small group was exploiting the natural environment for daily living (Erskine 1964b; Deal 2004b). I concur with this analysis. The corner notched projectile points and cord wrapped stick impressed pottery are indicative of the Late Woodland period in the Maritimes (Petersen and Sanger 1991).

The groundstone plummets could have been used as net sinkers, as Erskine concluded that the basalt outcrop was utilized by groups as a fish weir during the occupation of the site (Erskine 1964a). All but one of the lithic artifacts are from the Scots Bay chert, likely quarried at the Davidson's cove site, and small cores were brought over to work into points or scrapers, evidenced by a broken preform. The native copper fragments found are not unusual but are too small to be identified further. Copper can be found at Cape D'Or across the Bay of Fundy to the west (Erskine 1998:78), or at Parrsboro, potentially identified as the source of the Melanson copper fragment (Nash and Stewart 1990:93). The ceramic vessels are few, only seven, and only one of these was associated with a living floor, (or pit) feature. This floor and associated ceramics and charcoal, identifies a Middle Woodland component. Unfortunately no other features have been positively identified, so it is difficult to state how many people lived at the site. The absence of post holes suggests that their structures sat on the surface like historic wigwams. Few faunal remains have been identified to species, but charred bone fragments are from terrestrial animals. Erskine did identify a moose bone awl from his excavations, and other large and medium terrestrial animals are common in the area. Therefore, it is probable that this site was used in the spring to fall months, when the clam bed would have provided enough food for a small group of people who were collecting lithics across Scots Bay, working them into transportable forms, and subsisting on the vegetation and animals in the immediate area.

2.8 Conclusion

The Clam Cove, Melanson, and St. Croix sites are the only extensively excavated Late Woodland sites in the Minas Basin area. Until now research at these sites have focused on the faunal, lithic and ceramic evidence, which have contributed much information to the discussion, but have not been able to fully explain how groups survived at the site. The palaeoethnobotanical evidence from the Melanson and St. Croix sites, reviewed in Chapter 3, illustrates that the local vegetation included a familiar collection of species utilized by the Late Woodland groups. A collection of species they looked for when setting up the temporary campsite at Clam Cove.

Chapter 3 Palaeoethnobotanical Research In the Minas Basin Area

3.1 Introduction

There has been a paucity of botanical research done prior to the 1980s in the Maritimes. This changed in the 1980s when a number of researchers in New Brunswick, and Nova Scotia appended floral components to their archaeological site reports (Deal 2004b). This chapter looks at past palaeoethnobotanical research in Nova Scotia concentrating on earlier work at the Melanson, St. Croix and Clam Cove sites. The preliminary floral analysis broadens the site function and seasonality of these sites and identifies edible and medicinal uses of the recovered species. Analysis of the floral remains suggests a compliment of plant species was utilized by Late Woodland groups; this set of species seems to be important when identifying suitable areas to set up temporary campsites.

3.2 Previous Palaeoethnobotanical Research

Palaeoethnobotanical studies in the Maritimes began with ethnobotanical records of the aboriginal groups during the early period of European contact; Samuel de Champlain (1966), Marc Lescarbot (1914), Pierre Biard (1959), Nicolas Denys (1908), Chrestien Le Clercq (1910), and Sieur de Diereville (1933) are among the most reliable writers. This information was supplemented by botanical and ethnographic work during the middle of the late 20th century (Speck and Dexter 1951, 1952; Wallis and Wallis 1955). Unfortunately many of these early accounts are vague or inaccurate.

Furthermore, later studies relied on information from aboriginal groups who did not distinguish between European introduced species and native species (Deal 2004b).

Nevertheless, the collection of ethnobotanical information provided the impetus for studying plant remains from archaeological contexts in the late 20th century. These lists, which documented the plants used for food, medicine, and building materials, supplied the first species lists referenced for plant identifications. From these lists the first comparative collections were compiled in Nova Scotia (Deal 2004b). The primary types of plant remains recovered from archaeological contexts previous to the 1980s consisted of remains that could be identified during excavation, such as fiber woven textile fragments (see Whitehead 1987); sediment samples were initially taken for the recovery of small lithic and faunal remains. The interpretation and analysis of recovered floral remains generally consisted of short lab reports in the appendices of larger site reports (e.g., Deal 1990). The recovery of plant remains from archaeological contexts in remained sporadic until 1980, when charred seeds were recovered at the Fulton Island and the Mud Lake Stream sites in New Brunswick and identified by Hal Hinds (Hinds 1975; Deal 1991). His work inspired Maritime archaeologists, like David Christianson and Michael Deal, to collect sediment samples for the recovery of floral macroremains (Deal 2004b). Deal was also the first to incorporate palaeoethnobotanical studies in all his research designs (Leonard 1996:23).

The palaeoethnobotanical research which Deal conducted while excavating Woodland period sites in the Minas Basin area, specifically the Melanson and St. Croix sites, resulted in the recovery of a wide variety of charred and uncharred seeds and other floral macroremains which aided in the analysis of these sites. Palaeoethnobotanical information was able to help identify site function by providing evidence of plant species used for food, medicine, fuel and building materials (Deal 2004b).

3.3 The Melanson site

The Melanson site consists of seven excavation areas, BgDb-1 to 7. The excavation areas extend from the head of the tide westward, paralleling the Gasperau River. Lithic and ceramic studies on various areas of the Melanson site indicate that it was utilized throughout the Woodland period, with the earliest settlement of people in the eastern portion. There is a distinct movement from the eastern portion downstream from the Middle to Late Woodland periods (Kristmanson 1991:116). I am concentrating on the west extension of the site, BgDb-7, where the only floral study was conducted. The floral remains recovered from this site were from four pit features. These pits were all partially excavated in a checker board pattern implemented by Nash and Stewart (1991). Their analysis suggests they were not refuse or burial pits, but could have been ritualistic, for sweat baths or cooking pits (Nash and Stewart 1991:69).

Feature 1 is a large undisturbed tub-shaped pit; it occupied most of the excavated unit and likely extends into adjacent units. Artifacts include chipped stone tools, side notched points and ceramic sherds (Nash and Stewart 1991). Charred raspberry/blackberry (*Rubus* sp.), pin cherry (*Prunus virginiana*), and sedge (*Carex* sp.) seeds were recovered through flotation (Deal 1991). A lithic activity area surrounding a hearth and fire pit was uncovered a meter from the first feature. Though only half of the feature was excavated, it was revealed that the hearth was framed by stones, yielding a large amount of charcoal and ash (Nash and Stewart 1991). No charcoal samples were available for identification, but flotation of the sediment sample recovered a large amount of lithic microdebitage and a large amount of floral macroremains. Raspberry/blackberry, pin cherry, wood sorrel (*Oxalis stricta*), elderberry (*Sambucus canadensis*), lamb's quarters (*Chenopodium alba*), water pepper (*Polygonum hydropiper*), mints (Laminae), grasses (Graminae), and fir (*Abie balsamea*) macroremains were recovered through flotation (Deal 1991). A similar pit to Feature 1 was uncovered four meters to the east in Unit 3; only the eastern portion was excavated. The other half of the pit remains unexcavated in the adjacent square. A grooved maul, a small faunal sample and a number of boulder-sized stones were found. Flotation of the sediments recovered raspberry/blackberry, cherry, wood sorrel, elderberry, lamb's quarters, and mint seeds. The last feature was uncovered in Unit 5 and may represent a living floor. It is constructed of a grey ash layer, fine charcoal and a scattering of stones which are also found throughout the rest of the unit. A radiocarbon date of 560+/- 60 BP was obtained (Nash and Stewart 1991). Flotation of these sediments resulted in the recovery of fir tree buds and needles, hemlock (*Tsuga canadensis*) needles, and raspberry/blackberry, crab apple (*Pyrus* sp.), staghorn sumac (*Rhus typhina*), lamb's quarters, chickweed (*Stellaria* sp.), knotweeds (*Polygonum* sp.), water pepper, grasses, and mint seeds (Deal 1991).

The floral remains from Melanson (Table 3.1) concur with the suggested uses of the features by Nash and Stewart (1991). Few floral remains were recovered from Feature 1 and the similar pit feature from Unit 3, which suggests that they were probably not used as refuse, storage or cooking pits. It is likely that the charred macroremains found in these two pits were displaced from the hearth feature situated between them.

The largest variety and number of recovered species were from the hearth feature and possible living floor (Deal 1991). Nash and Stewart (1991) uncovered discrete chipping events around the hearth, suggesting that it was utilized as a work station. Both the hearth and living floor are likely places to consume food, prepare beverages and medicines. Many of the plant species represent common foods, such as raspberries, cherries, elderberries, sumac, wood sorrel, crab apple, lamb's quarters, water pepper, and mint seeds. Pin cherries, raspberries and elderberries were popular fruits collected by the historic Mi'kmaq; the bark of some species of plum and wild cherries (*Prunus* sp.) was also boiled for tea to drink or for a medicine (Arnason *et al* 1981). The leaves of wood sorrel were collected and eaten raw, sometimes with sumac sprouts and shoots (Kuhnlein and Turner 1991). Sumac berries could be pressed and the juice drank cold, or boiled for a hot tea (Arnason et al. 1981). Elderberries need to be boiled prior to eating, but were a very common food for the Mi'kmaq and Malecite (Kuhnlein and Turner 1991:147; Erichsen-Brown 1979). An interesting note about the pin cherry seeds is they may be evidence of Aboriginal horticulture (Nash and Stewart 1990:181).

The possibility that certain *Prunus* species were tended was originally suggested by Gorham (1943). Gorham mapped Canada plum distribution in the northeast originally to understand the spread of a certain aphid, but in doing so he noticed that these plums had been planted around historic buildings and prehistoric settlements (1943:9).

Archaeobotanical evidence of this plum has been found on archaeological sites in New Brunswick, including the Skull Island Burial site excavated by Kevin Leonard (1996).

Table 3.1: Charred macroplant remains from the Melanson site
(adapted from Deal 1986:183).

Scientific name	Common name	Plant part	Number recovered
Abies balsamea	Balsam Fir	needles	38
Abies sp.	Balsam Fir	Buds	3
Carex sp.	Sedge	Seed	1
Chenopodium album	Goosefoot	Seed	22
Chenopodium sp.	Goosefoot	Seed	4
Echinochloa crusgalli	Barnyard grass	Seed	2
Graminae	Grass family	Seed	9
Labiatae	Mint family	Seed	12
Oxalis stricta	Wood Sorrel	Seed	4
Polygonaceae	Polygonum family	Seed	5
Polygonum hydropiper	Water Pepper	Seed	3
Polygonum natans	Water Smartweed	Seed	1
Polygonum sagittatum	Arrow-leaved Tear Thumb	Seed	4
Polygonum sp.	Knotweed	Seed	2
Prunus pensylvanica	Pin Cherry	Seed	3
Prunus sp.	Plum	Seed	3
Prunus sp.	Plum	Fruit	1
Pyrus sp.	Wild Crab-apple	Seed	1
Rhus typhina	Staghorn sumac	Seed	140
Rosaceae	Rose family	Seed	1
Rubus sp.	Raspberry/blackberry	Seed	255
Ruppia maritima	Ditch-grass	Seed	11
Sambucus canadensis	Elderberry	Seed	57
Stellaria sp.	Chickweed	Seed	6
Tsuga canadensis	Hemlock	needles	29
Viburnum sp.		Seed	1
Unknown		Seed	4
Unknown		Fruit	1
Total			**617**

Many of the edible species also had medicinal properties. Wood sorrel, chickweed and fir all contain medicinal properties. Fir needles were boiled and taken as a tea to treat scurvy, which also may have been considered a popular drink. Hemlock (*Tsuga canadensis*) needles were recovered and were steeped as a treatment for kidney troubles, the inner bark was steeped to treat diarrhea (Arnason *et al.* 1981). Ethnohistorical medicinal uses by the Mi'kmaq and Malecite also include sumac teas for sore throats and *Viburnum* roots were steeped to make a tea to counteract irregular menstruation. *Polygonum* and *Rumex* species were used by the Ojibwa to treat a variety of ailments, from stomach aches to epilepsy (Arnason *et al.* 1981:2289). The tubers of these species are also edible and likely represent a common food source (Deal 1990:182). In general, these identified plants point to a summer/fall occupation of the site, though many of the berries can be dried for winter storage (Deal 1990:181).

3.4 The St. Croix site

The few charred macroremains and identified charcoal fragments seem to cluster in or around the uncovered features, or bone and pottery concentrations. This site was utilized over a long period of time by numerous groups who came for the spring and fall anadromous fish runs from the nearby river (Godfrey-Smith, Deal, and Kunelius 1997). Since the area was covered in trees at the time, groups would have set up tents in the open areas, reusing the same areas, year after year. Some of the uncovered features are deep, extending down four levels and covering four to six meters. In other areas of the site, scatters of bone and ceramic sherds are prevalent.

Deal blanket sampled the St. Croix site during the 1990 and 1993 field seasons. A total of 31 sediment samples was collected from each level of each excavation unit.

Generally pinch samples (small amounts of sediment gathered throughout the level) were collected, but three features and one $20cm^2$ column from the north end of the three meter profile cut along the former river bank were sampled. From each sample collected, a 150 ml subsample was extracted and processed by simple flotation. The flotate was originally analyzed by Kevin Osmond (1993) and Kim Jenkins and Rob Lackowicz (1991). Only 15 units provided sediment samples with charred macroremains or identifiable charcoal samples. Recovered uncharred and charred macroremains are listed in Table 3.2 and represent locally collected species recorded in the ethnographic literature (see Arnason *et al.* 1981).

Edible species identified from recovered charred seeds include cherry (*Prunus* sp.), blueberry (*Vaccinium* sp.), elderberry, raspberry, hawthorn (*Crataegus* sp.), and bunchberry (*Cornus canadensis*). These berries were collected by the historic Mi'kmaq, and eaten fresh or dried. Other species recovered, such as the lamb's quarters and dock (*Rumex* sp.), were collected for their stems, roots and leaves (Arnason *et al.* 1981). Cherries were eaten fresh, dried or cooked, and elderberries were cooked prior to eating (Kuhnlein and Turner 1991). Some of the berry plants also had medicinal properties; the berries, leaves and runners of blueberries were used as a general tonic to promote health, while elderberry bark was used as a tea (Lacey 1993:84). Bunchberry leaves were softened and applied as poultices, or a tea was made by infusing the entire plant in water, to treat bedwetting and stomach ailments (Lacy 1993).

Charred needles of fir, eastern white pine (*Pinus strobus*), and red spruce (*Picea rubens*) were recovered. These species, along with other spruces (*Picea* sp.), birches

(*Betula* sp.) and red oak (*Quercus rubra*), represented by uncharred needles in the flotates, are common on site and in the area (Cann, Hilchey and Smith 1954:16). The bark of spruce and fir can be boiled to make a tea to relieve sore throats or used just as a beverage, and fir buds are natural laxatives (Arnason *et al.* 1981). Consuming the tea from boiled spruce needles cures scurvy and was used often by European sailors (Erichsen-Brown 1979:8).

The identified charcoal specimens were predominantly spruce. Three birch and three fir specimens were also identified. This could identify a warm season occupation, as there are a number of different hardwoods available on site. Yellow birch (*Betula lutea*), beech (*Fagus grandifolia*), and hemlock provide high heat fire and long burning firewood. Spruce and fir both turn to ash quickly, leaving few charred fragments and have a low heat producing fire (Residential Wood Heating 2002; Wood Heat Org. 2006). The predominance of spruce charcoal at St. Croix suggests that they were choosing this species because they did not require a high heat fire, and they were burning a lot of it, hence the large amount of recovered charcoal. This supports the notion that numerous groups were in the area during the spring to fall to harvest the anadromous fish species. Large amounts of wood would have been necessary for a large group for cooking and other functions, but if they were there during the warm summer months, then a low heat fire from spruce would have been sufficient.

Table 3.2: Recovered macroplant remains from the St. Croix site (adapted from Deal 2006).

Scientific name	Common name	Plant part	Number Uncharred/Charred
Abies balsamea	Balsam Fir	Needles	118/3
Betula papyrifera	White Birch	Seed	4/0
Chenopodium alba	Lamb's Quarters	Seed	2/0
Cornus canadensis	Bunchberry	Seed	0/1
Crataegus sp.	Hawthorn	Seed	1/0
Juniperus sp.	Juniper	Needle	9/0
Graminae	Grass	Seed	4/0
Picea mariana	Black Spruce	Seed	2/5
Picea sp.	Spruce	Needles	66/5
Pinus strobus	Eastern White Pine	Needles	66/11
Pinus strobus	Eastern White Pine	Seed	1/0
Polygonum sp.	Knotweed	Seed	5/0
Prunus pensylvanica	Pincherry	Seed	1/0
Prunus serotina	Black Cherry	Seed	35/15
Prunus sp.	Cherry	Seed	3/2
Quercus borealis	Red Oak	Acorn	9/2
Rubus sp.	Raspberry/blackberry	Seed	2/0
Rumex sp.	Dock	Seed	11/6
Sambucus canadensis	Elderberry	Seed	6/1
Senecio sp.	Ragwort	Seed	2/0
Vaccinium sp	Blueberry	Seed	2/0
Unidentified		Seed	2/1
Total			**351/52**

Many of the charred species were found in the units surrounding the features or concentration areas. This patterning could be a demonstration of the McKellar hypothesis (see Rathje and Schiffer 1982), which states that only the smallest seeds will be recovered from regularly cleaned hearths and swept floors (Miksicek 1987). Unfortunately there are no distinct floor features or hearth features to solidify this suggestion. It is more likely that this patterning is a result of many people using the same site over numerous years, and kicking or moving materials around through regular daily activities.

3.5 Past Palaeoethnobotanical Research at Clam Cove

When Deal began excavating the Clam Cove site in 1989, he collected two small sediment samples for seed recovery and analysis. About 50 grams of sediment was collected and processed in the Palaeoethnobotany class in 1991 (Hiseler and Linehan 1991). From this sample, a number of charred and uncharred seeds from the modern vegetation were uncovered (Table 3.3). These include alder (*Alnus* sp.) seeds and grass seeds. Recovered seeds from edible plants include raspberry or blackberry, elderberry and chokeberry (*Aronia* sp.), while wood-sorrel was used for medicinal purposes (Hiseler and Linehan 1991). Raspberries and blackberries were used for food by historic Mi'kmaq, and are found within the Scots Bay area (about a 20 minute walk from Clam Cove).

Table 3.3: Recovered macroplant remains from the Clam Cove site (1989)
(adapted from Hiseler and Linehan 1991).

Scientific Name	Common Name	Part Charred/Uncharred	Number Recovered
Alnus rugosa	Speckled Alder	Seed uncharred	5
Sambucus canadensis	Common Elder	Seed uncharred	2
cf. Cruciferae	Mustard Family	Seed uncharred	3
Glyceria cf *melicara*	Mannagrass	Seed uncharred	5
Rumex martimus	Golden Dock	Seed uncharred	4
Aronia cf *prunifolia*	Chokeberry	Seed uncharred	3
Rubus sp.	Raspberry/Blackberry	Seed uncharred	25
Rumex maritimus	Golden Dock	Seed uncharred	3
Barbarea vulgaris	Yellow Rocket	Seed charred	1
Rumex maritimus	Golden Dock	Seed uncharred	1
Unidentified		Seed charred	1
Total			**53**

3.6 Conclusion

The preliminary floral studies at the Melanson and St. Croix sites recovered a large variety of edible and medicinal plants located around hearth, pit and living floor features. The macroremains have provided evidence supporting previous ideas about site and feature function. Analysis of the plant remains indicate a number of common edible and medicinal species recovered from both village sites.

Two main types of macroremains were recovered from Clam Cove. Sediment samples collected during the 2004 and 2005 field seasons were processed for floral remains, while charcoal fragments were collected during the 2005 filed season for later identification. Charcoal samples not sent for radiocarbon dating from previous seasons were also identified. The identifications and analysis of the recovered floral remains is detailed in the next chapter. It will be shown in the analysis of the floral remains from Clam Cove include that similar plant species are found at the village sites, and identify a specific set of plants which seem to be known and used by Late Woodland groups.

Chapter 4 Seed Macroremains

4.1 Introduction

Lithic, faunal and ceramic analyses identify Clam Cove as a Late Woodland temporary campsite which was utilized repeatedly for about 2000 years. The plant evidence discussed in this chapter looks at the floral macroremains recovered from the 2004 and 2005 field seasons at Clam Cove. These macroremains indicate a variety of food and medicinal species on site and around the immediate area which could sustain a small group of people camping at Clam Cove for a short period of time.

This chapter begins by discussing which plant macroremains represent ancient usage. Site ecology and ethnographic food and medicinal uses of the prehistoric species are then examined, along with a brief discussion of possible construction materials. The chapter ends with a blending of the artifacts and ecofacts already discussed into a comprehensive look at the Clam Cove site in the Late Woodland.

4.2 Ancient versus Modern Seeds

My primary concern about the recovered macroremains from Clam Cove is that only 2% of seeds recovered are charred. Seeds generally decompose quickly in the soil because they lack dense structures, therefore, only charred macroremains are considered ancient unless there is a specific reason to consider otherwise (Minnis 1981). I argue that the nature of the midden sediment provides a good context for labeling the uncharred macroremains as ancient.

Seed may be preserved in archaeological deposits due to favourable burial environments (Shackley 1981:110). Midden sediments are one example of a favourable burial environment for the preservation of uncharred floral and faunal materials. As early at the late 1800s, naturalists noticed that shell middens preserved animal bone and ceramics (Jones 1864:224), two materials normally destroyed by the acidic soils common in Nova Scotia (Gibson 1992:4). Miksicek notes that high calcium carbonate concentrations can preserve uncharred seeds for very long periods of time (1987:218). It is the high concentrations of calcium carbonate from the large amount of soft shelled clams that preserve uncharred bone and seeds in midden sediments (Spiess 1988:174; Waselkov 1987:148). Other studies have proven that very wet, very dry and frozen conditions all preserve uncharred organic remains. Archaeobotanical studies on desiccated plant remains from Egyptian tombs (Kunth 1826), water logged deposits from Switzerland (Heer 1866), and frozen contexts (Rudenko 1970) cite preserved uncharred seeds. A midden from Peru showed excellent preservation of uncarbonized seeds (Miksicek 1987:217), burial sites from New York yielded uncharred sunflower achenes (Crawford 1999:231), and botanical specimens in the southwestern United States have survived because of the extremely dry environment (i.e., uncharred squash seeds from Puebloan ruins, Minnis 1981:147). Newt Kash shelter in Kentucky (Gremillion 1997b) has uncharred seeds in storage pits which remained undisturbed for a millennium. In these cases, the context of the recovered botanical remains is very important. Keepax (1977:108) also notes in regards to differential preservation of seeds that though charred remains will probably be ancient, it does not mean that all uncarbonized material is definitely modern. For these reasons I am including the recovered uncharred seeds from the midden sediments in my analysis. Further strengthening my decision to include these sediments is a radiocarbon date retrieved from clam shells collected during the 2004 field season. This sample was returned with an 1150 +/- 70 BP (Beta-204761) (Hood 2005). This date secures the undisturbed portion of the midden as Late Woodland.

The addition of the midden specimens increases the percentage of seeds I can include in my analysis from 2% to 41% (Table 5.3). The midden specimens include 47 identified species, opposed to the 14 identified species recovered from charred specimens. Including the midden samples in my analysis increases my sample size which will include potentially important food and medicine species otherwise excluded.

4.2.1 Sources of Prehistoric and Modern Seeds

Understanding where floral remains came from and how they were deposited at archaeological sites is very important. As discussed in Chapter 1, seeds found in archaeological contexts can be deposited in a variety of ways: natural seed rain (both modern and prehistoric), wind, water, animal action, and deliberate placement by humans. Naturally occurring seeds are the most serious problem when dealing with archaeological sediment samples. Naturally occurring seeds or natural seed rain are those seeds produced by vegetation currently growing on site. Plants produce many seeds every year which are deposited into the soil. Plowing, root holes, dry cracks, downwashing, earthworms, and insect and animal burrowing in the soil all aid in the vertical displacement of seeds. Ants are especially tiresome, and large ant hills can seriously contaminate sediment samples with modern or natural seeds (Minnis 1981:145).

Prehistorically introduced seeds can be from natural seed rain, or from direct and indirect usage. Seeds used as such are the most important, as they can be linked to specific dietary needs or medicinal uses. For example, seeds from fruits show a direct use of the berry. Seeds from indirect resources utilization can reveal important information as well. Indirect use refers to utilizing other parts of a plant, and having the seeds being charred either accidentally through falling in a fire during processing or deliberately through burning the detritus. For example, grasses with still attached seed heads, could be used for thatching roofs. If the house burnt down, seeds would be preserved (Minnis 1981:145).

Modern seed rain accounts for the majority of uncharred seeds in the non-midden sediment samples from Clam Cove. Most modern inclusions throughout the units are due to insect disturbances. Many of the units had a large amount of black and red ant remains as well as beetle wings, bodies and eggs sacs in the flot. Unit 4 from 2004 and Unit 8 from 2005 had the most insect disturbance. The other midden units, 6 and 7, had relatively few ant and beetle remains, attesting to their undisturbed nature. Cross contamination during sampling and recovery was virtually eliminated due to the very careful collecting and processing procedures outlined in Pearsall (2000:69).

A major problem with ancient seed rain includes seeds which blew in to a fire and are accidentally charred and preserved, but were not utilized by a prehistoric group. It is nearly impossible to segregate these seeds from utilized ones (Minnis 1987:145), and I am including the tree and shrub species in this section. Spruce seeds are recovered in huge numbers because of the presence of many spruce trees on site, many of which over hang excavated units.

4.3 Methodology

During the 2004 and 2005 field seasons 54 litres of sediment were collected for the recovery of floral remains. We only collected sediment samples from the cultural level (Level 1) which ranged from 30 to 70 cm in depth. A blanket sampling strategy was used, which samples each level of each unit excavated. Pinch samples were taken from throughout each level, resulting in a random sampling of every unit. Each sample was approximately two litres and two samples were taken from each of the non shell bearing units, while the shell bearing units were sampled more intensively. For these samples, a tarp was laid down and the midden sediments were screened through 6mm mesh to remove large shells and any artifacts missed during excavation; then 2 to 4 litre samples were collected. The dark organic sediments were preferred over lighter sediments. Half of the collected sediment samples were stored at the Nova Scotia Museum in Halifax while the other half was transferred to Memorial University for processing. Arbitrarily selected samples from each unit were processed in one of three ways: dry screening, simple flotation or forced air flotation.

4.3.1 Processing the samples

Five samples were dry screened. Each sample was spread out on clean paper toweling on a tray and left to dry. After the weight and volume were measured, the sample was run through a series of nested geological sieves: 6mm, 1.7mm, and .5mm. It is important to note that each flot from all processing procedures was sorted by hand in its entirety. The majority of samples were processed by flotation. Two samples were processed by simple flotation, where the sample was placed in a bucket of water and stirred. The resulting flot was scooped off with a 1mm mesh tea strainer and placed on clean paper toweling to dry. The remaining samples were processed by the forced air flotation system at Memorial University. This system is similar to the Flote-Tech machine-assisted flotation system reviewed by Hunter and Glassner (1998). This machine has two large tanks, one for flotation and the other as a water reservoir. The tanks are connected by a recirculation tube at the bottom. The tubs are filled by an outside water source. The water and air intake hoses suspended in the flotation tank forces air into the water to create bubbles which break up the sediment and release the organics which float on the surface. The water and air amounts are adjustable with levers and must be watched to make sure that the machine does not overflow. The flotation tank has an inset metal tray with a 6mm mesh screen bottom, where the sample is poured, another metal tray with a .5 mm screen bottom, inset over the reservoir tank to catch the flot as it flows from the flotation side. The water and air are turned on to agitate the water, then the sample is poured into the metal screen and the organics are dislodged from the soil. At this point a frothing agent, like dish detergent, can be added to create a froth flotation machine. Froth creates bubbles which attract organic material and increase the amount of recovered materials in the flot (Pearsall 2000). The inorganic waste matrix falls through the 6mm screen and settles at the bottom of the tank. The organics and small lithics, pottery and other light materials flow from the flotation tank through the sluiceway onto the .5mm mesh screen over the reservoir tank (Hunter and Glassner 1998:146). Once the flow of materials over the sluiceway has ceased, the water and air are turned off. Both the light fraction in the .5mm screen and the heavy fraction in the 6mm screen are collected and laid out to dry. The sludge at the bottom is removed via a tap at the bottom, and the tank is ready for another sample. It can accommodate 20 litres of sample at a time (Hunter and Glassner 1998:147, 150) which made it ideal for processing the large amounts of sediment collected from the midden units.

4.4 Results

The methodology I utilize for processing sediment samples identifies the species listed in tables for each section of the discussion. The full listing of each family, genus and species recovered from all excavation years and units can be found in Appendix A.

From a combined volume of 29.74 litres of sediment, 5463 seeds were recovered from all archaeobotanical sampling from 1989 to 2005. Seed densities from Clam Cove are shown in Table 4.1. The recovered seeds include 24 families, 53 genera and at least 84 species, as there are a few unidentifiable specimens. The charred species are listed in Table 4.2 and the midden species are listed in Table 4.3.

Table 4.1: Seed densities for the Clam Cove site, all field seasons.

Totals	**Clam Cove 1989-2005**			
	Volume	**Charred**	**All Seeds**	**Density**
Entire site	29.740 L	116	5462	183.65
Midden	19.280L	73	2352	121.99
Non Midden	10.460L	43	3111	270.84

There were 117 charred seeds and 2352 seeds recovered from midden sediments. The midden sediments have a very high seed density of 122 seeds per litre, which is an excellent recovery rate that I attribute to processing large sediment volumes and sorting complete samples instead of subsampling. The charred seed recovery rate is significantly lower at 4 seeds per litre. As I have identified the midden sediments as a suitable context for prehistoric seed recovery, the seed density rate for prehistoric seeds (midden seeds plus charred seeds) is 128 seeds per litre.

Table 4.2: Charred species recovered from Clam Cove 1989-2005.

Family	**Genus species**	**Common Name**	**Part**	**No.**
Betulaceae	*Alnus* species	Alder	Catkin	1
Betulaceae	*Betula papyrifera*	Paper Birch	Seed	3
Betulaceae	*Betula populifolia*	Grey birch	Cone	1
Betulaceae	*Betula* species	Birch	Cone	1
Brassicaceae	*Barbarea vulgaris*	Yellow Rocket	Seed	1
Brassicaceae	*Nasturtium officinale*	Water Cress	Seed	1
Chenopodiaceae	*Corispermum hyssopifolium*		Seed	1
Cornaceae	*Cornus canadensis*	Bunchberry	Seed	1
Cyperacea	*Eleocharis* species		Seed	1
Ericaceae	*Vaccinium corymbosum*	Highbush Blueberry	Seed	46
Najadaceae	*Potamogeton* species	Pondweed	Seed	24
Oxalidaceae	*Oxalis stricta*	Wood Sorrel	Seed	19
Pinaceae	*Picea* cf *glauca*	White Spruce	Seed	5
Rosaceae	*Aronia* species	Chokeberry	Seed	1
Rosaceae	*Prunus* species	Cherry	Seed	1
Rosaceae	*Rubus* species	Raspberry/blackberry	Seed	1
Unidentified		Fruits and seeds		9
Total				**117**

4.5 Plant Uses

The highest number of genera recovered is from the Aster family, which is one of the largest North American plant families, with 49 genera and over 15,000 species (Roland and Smith 1969). Many of these species were used for both food and as medicine by historic Mi'kmaq and Malecite groups (Arnason *et al*. 1981). Other families, including the Pine family, Birch family and Grass family, represented by the uncharred modern seeds, likely reflect the current environment. Fungal sclerotia were also recovered in very large amounts (Appendix A). Fungal sclerotia (*Cenococcum graniforme*) are black, spherical resting structures of varying sizes produced by mycorrhizal fungi and found throughout most soils world wide (McWeeney 1989:228). Often they are mistaken for seeds; and are considered here to represent the local fungi environment. Most of the prehistoric seeds have recorded food or medicinal uses by historic Mi'kmaq and Malecite groups, while some of the prehistoric seeds, such as the tree species, likely reflect the environment during the Late Woodland period.

4.5.1 Ecology

The majority of specimens recovered fall into this category. There are 1053 prehistoric needles, cones, bracts, catkins, and thorns. The uncharred specimens (n=492) likely also represent the local vegetation when the site was in use, as the ecology of Clam Cove has not changed much in the last 6000 years (Shaw, Gareau, and Courtney 2002:1872). Seeds, needles, bracts, cones and catkins of tree and woody species currently growing at Clam Cove include white and red spruce, balsam fir, yellow and paper birch and speckled and green alder. Herbaceous species, represented by seeds, florets, and flower heads, include a variety of grass species, mustards, asters, thistles, and mosses. Interestingly, the majority of species identified in the non midden sediments are those with no recorded ethnohistorical use: Ox eye daisy, common barberry, sedges, rushes, white mulberry, barnyard grass and other grass species.

Table 4.3: Macroremains from midden sediments at Clam Cove 2004/05.

Family	*Genus species*	Common Name	Total Number
Asteraceae	*Aster cordifolius*	Heart leaved aster	1
	Cirsium sp.	Thistle	1
	Taraxacum officinal	Dandelion	1
	Compositae	Aster	5
Berberidaceae	*Berberis vulgaris*	Common barberry	4
Betulaceae	*Alnus rugosa*	Speckled alder	14
	Alnus sp.	Alder	31
	Betula lutea	Yellow birch	56
	B. papyrifera	Paper birch	205
	Betula sp.	Birch	10
	Betulaceae	Birch family	19
Brassicaceae	*Barbarea vulgaris*	Yellow Rocket	2
	Brassica species	Mustard	3
	Diplotaxis sp.		1
	Nasturtium sp.	Water cress	2
Caprifoliaceae	*Sambucus canadensis*	Common elderberry	11
Chenopodiaceae	*Corispermum hyssopifolium*		1
	Lechea villosa	Pinweed	1
Cornaceae	*Cornus canadensis*	Bunchberry	5
Cyperaceae	*Eleocharis* sp.		1
	Scirpus sp.	Bulrush	1
Ericaceae	*Vaccinium angustifolium*	Low sweet blueberry	1
	V. corymbosum	Highbush blueberry	36
	V. vacillans	Early sweet blueberry	1
Fabaceae	*Trifolium repens*	Clover	1
	Vicia sp.	Vetch	1
Najadaceae	*Potamogeton* sp.	Pondweed	24
Pinaceae	*Abies balsamea*	Balsam fir	31
	Larix laricina	Tamarack	12
	Picea glauca	White spruce	1332
	Picea marianara	Black Spruce	17
	Picea sp.	Spruce	29
Poaceae	*Arrhenatherum elatius*	Tall oat grass	1
	Anthoxanthum ordatum	Sweet vernal grass	1
	Graminae	Grass	12
	Echinochloa crusgalli	Barnyard grass	40

	Glyceria sp.	Mannagrass	19
	Sorghastrum nutans	Indian grass	1
Polygonaceae	*Rumex acetosa*		8
	R. acetosella	Sheep sorrel	2
	R. longifolius	Long leaved dock	2
	R. maritimus	Golden dock	8
	R. obtusifolius	Broad leaved dock	7
	Rumex sp.	Dock	4
Rosaceae	*Fragaria virginiana*	Strawberry	4
	Rubus sp.	Raspberry/blackberry	190
	Prunus virginiana	Pin cherry	1
Taxaceae	*Taxus canadensis*	Ground hemlock	1
		Unidentified	32
Total			**2352**

The few species which did have recoded uses, like the Polygonum species and yarrow, may have been used, but there is no evidence of it at Clam Cove. These species likely represent local vegetation.

4.5.2 Edible Plants

Many of the species recovered have recorded food uses by Mi'kmaq and Malecite groups in the Maritimes (Table 4.4). A variety of plants utilized for their berries are represented in the flot. It is difficult to say with 100% certainty that the identified species were utilized, if they were in fact utilized at all, by Late Woodland groups. Most ethnohistoric records include many of the species recovered from the Clam Cove site. It is very likely that many of the European species which were introduced during the historic period were not used by Late Woodland groups. But it can be argued that the native species were utilized by Late Woodland groups, for the groups who occupied the site probably did not totally alter the food and medicinal plants or processing techniques during the 1000 years of seemingly stable environmental and cultural conditions.

Prehistoric specimens include bunchberry (*Cornus canadensis*), highbush blueberry (*Vaccinium corymbosum*) (Figure 4.1), low sweet blueberry (*V. angustifolium*), early sweet blueberry (*V. vacillans*), raspberry/blackberry (Figure 4.2), elderberry (Figure 4.3), strawberry (*Fragaria virginiana*), and pin cherry (Figure 4.4). These berries can be collected during the summer and fall and either eaten fresh or dried for winter storage; blueberries were also pressed for the juice.

Table 4.4: Edible species identified from Clam Cove 2004/05.

Genus	species	Common name	Part Used
Aronia	species	Chokeberry	berry
Asclepia	species	Milkweed	leaves, stems
Aster	*macrophyllus*	Large leaved Aster	leaves, stems
Brassica	family	Mustard	seeds, young leaves
Brassica	*juncea*	Indian Mustard	seeds, young leaves
Brassica	*kaber*	Common Mustard	seeds, young leaves
Brassica	species	Mustard	seeds, young leaves
Artemisia	*vulgaris*	Common Mugwort	whole young plant
Cirsium	species	Thistle	plant
Cornus	*canadensis*	Bunchberry	berry
Fragaria	*virginiana*	Strawberry	berry
Nasturtium	*officinale*	Water Cress	plant
Oxalis	*stricta*	Wood Sorrel	fresh leaves and shoots
Prunus	*virginiana*	Pin Cherry	berry
Rhus	*typhina*	Staghorn Sumac	berry
Rubus	species	Raspberry/blackberry	berry
Rumex	species	Dock	shoots
Sambucus	*canadensis*	Common Elderberry	berry
Scirpus	species	Bulrush	roots
Taraxicum	*officinal*	Dandelion	leaves
Taxus	*canadensis*	Ground hemlock or yew	berries, leaves
Trifolium	*repens*	Clover	seeds, flowers
Vaccinium	*angustifolium*	Low Sweet Blueberry	berry
Vaccinium	cf *vacillans*	Early Sweet Blueberry	berry
Vaccinium	*corymbosum*	Highbush Blueberry	berry
Vicia	species	Vetch	seeds, flowers

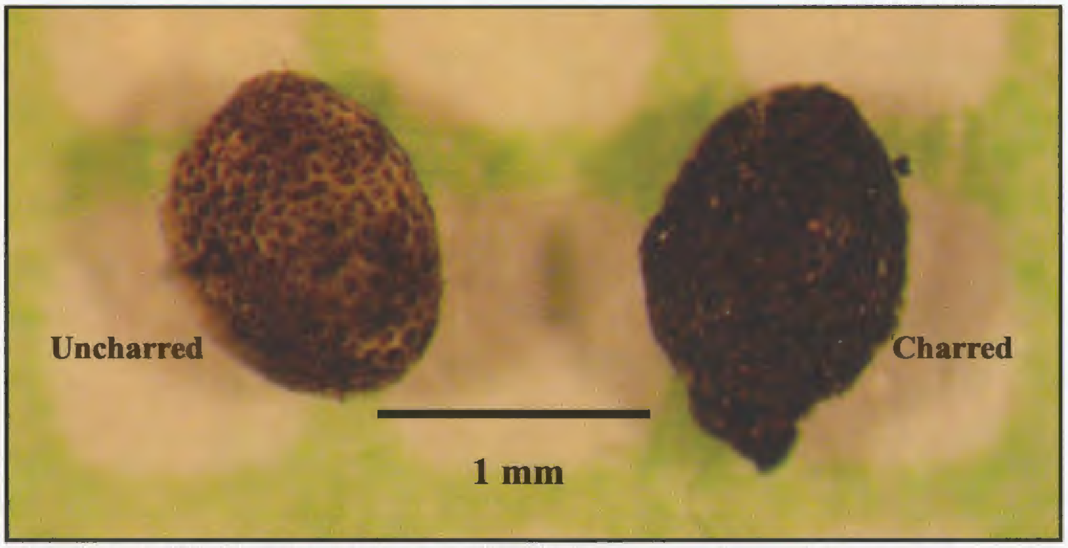

Figure 4.1: Highbush blueberry (*Vaccinium corymbosum*) (Photo by Halwas 2006).

Blackberries and raspberries have great nutritional value, as much as any apple or orange. They are high in Vitamin A and C, calcium and potassium (Lacey 1993:40). Elderberries were an important food source for Mi'kmaq and Malecite groups, but needed to be cooked before eating for they contained poisonous glycosides (Arnason et al. 1981; Erichsen-Brown 1979; Kuhnlein and Turner 1991:147).

Figure 4.2: Raspberry/blackberry (*Rubus* sp.) (Photo by Halwas 2005)

Seeds are 1.5 mm long, 1 mm wide and 1 mm thick on average.

Pin cherries were a highly prized food source used fresh, cooked, or dried and pounded for winter storage; plums (*P. nigra*), were also highly prized and potentially tended by Mi'kmaq groups in New Brunswick and Nova Scotia (Leonard 1996).

Figure 4.3: Elderberry (*Sambucus canadensis*) (Photo by Halwas 2006).

Figure 4.4: Pincherry (*Prunus pensylvanica*). Specimen from the Melanson site (Photo by Halwas 2006).

Many species identified were utilized for their stems, shoots, leaves and/or roots. Mi'kmaq and Malecite groups would eat fresh young dandelion greens, and boil and eat the young shoots, stems, flower buds, immature fruits and roots of milkweeds (*Asclepias* sp.) as a vegetable. Milkweed plants were also cooked with meat to flavor it. A few mustard species (*Brassica*) were used as condiments or the young shoots, and leaves were eaten as an herb. Ground hemlock twigs were boiled for a tea by the Mi'kmaq (Kuhnlein and Turner 1991:130, 142; Arnason *et al.*1981:2207).

There are prehistoric species identified at Clam Cove which have no recorded uses by Mi'kmaq or Malecite groups, but were utilized by other groups across Canada. Even though there is no direct evidence for use here, it is worth noting the species and uses. Seeds and flowers of the vetch and clover species were sometimes eaten by West coast cultures (Kuhnlein and Turner 1991:192). Watercress (*Nasturtium officinale*) was eaten as a salad plant by Iroquois and Algonquin groups (Arnason *et al.*1981:2207). Algonquin groups also used the shoots of dock (*Rumex*) as a substitute for rhubarb and ate them cooked, or mixed the fresh leaves and shoots with sorrel stems (*Oxalis)* because the tartness of the sorrel made a nice complement to the dock (Kuhnlein and Turner 1991:222: Arnason *et al.* 1981:2218). Bulrush (*Scirpus* sp.) roots were pounded into flour by a number of groups, while the Iroquois made a beer from ground hemlock berries, leaves, maple sugar and water (Arnason *et al.* 1981; Kuhnlein and Turner 1991).

An addition to the above discussion is the staghorn sumac (*Rhus typhina*), which is represented by a single uncharred seed recovered in a non-midden unit. Although this seed can not be considered prehistoric, it is recorded as an important food source. The shoots were peeled and eaten raw in spring; the fruits were eaten either fresh or dried. Boiling the fruits with maple sugar created a hot beverage, or they were soaked in water and sugar to make a lemonade type drink (Kuhnlein and Turner 1991:111; Arnason *et al.* 1981:2204). Mustard seeds were also found uncharred but were used by the Malecite to season meats, and salads; the leaves were also boiled as a vegetable (Arnason *et al.* 1981:2207; Kuhnlein and Turner 1991:142).

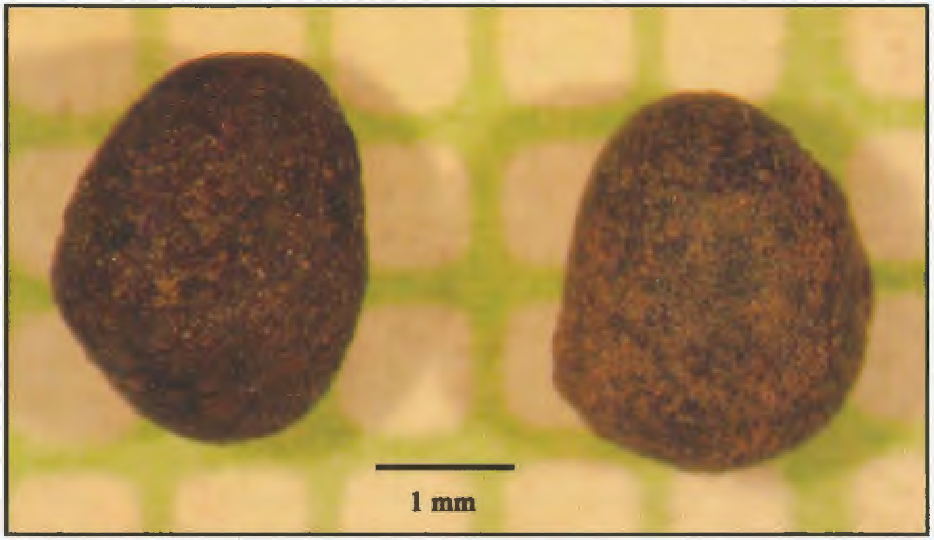

Figure 4.5: Staghorn Sumac (*Rhus typhina*). Specimen from the Melanson site (Photo by Halwas 2006).

4.5.3 Medicinal Plants

Many of the plant species used for food also had medicinal properties (Table 4.5). Malecite and Mi'kmaq groups used elderberry cones, berries and flowers as a purgative and soporific and scraped bark for an emetic and physic (Erichsen-Brown 1979:125; Arnason *et al.* 1981:2262; Lacey 1993:84). Fresh blueberries are considered a good general tonic, and rubbing the liquid from boiled leaves and roots on joints helped relieve rheumatism. Raspberry/blackberry runners were boiled for a tea which treated diarrhea and soothed the stomach; a tea from the berries and leaves healed canker sores in the mouth. Strawberry leave tea relieved stomach cramps, and by adding the roots and berries to the tea, it made a purifying blood medicine (Lacey 1993:42-46).

Table 4.5: Medicinal species identified from Clam Cove 2004/05.

Genus	species	Common name	Part used
Abies	*balsamea*	Balsam fir	needles, sap

Achillea	*millefolium*	Yarrow	seeds, flowers, leaves
Aronia	*species*	Chokeberry	Berry
Asclepia	*species*	Milkweed	white juice from stem
Cirsium	*species*	Thistle	Plant
Cornus	*canadensis*	Bunchberry	leaves, plant
Fragaria	*virginiana*	Strawberry	runners, leaves, berry
Larix	*laricina*	Tamarack	needles, inner bark
Oxalis	*stricta*	Wood Sorrel	Leaves
Picea	*species*	Spruce	Needles
Prunus	*virginiana*	Pin cherry	Bark
Rhus	*typhina*	Staghorn Sumac	roots, plant
Rubus	*species*	Raspberry/blackberry	Runners
Sambucus	*canadensis*	Common Elderberry	cones, berry, flowers
Taraxacum	*officinale*	Dandelion	Plant
Taxus	*canadensis*	Ground hemlock or yew	leaf, bark
Thuja	*occidentalis*	White Cedar	twigs, bark
Trifolium	*repens*	Clover	Plant
Vaccinium	*angustifolium*	Low Sweet Blueberry	leaves, roots
Vaccinium	*cf vacillans*	Early Sweet Blueberry	leaves, roots
Vaccinium	*corymbosum*	Highbush Blueberry	leaves, roots

Bunchberry tea helped kidney problems and childhood bedwetting; chewed leaves were applied to wounds to staunch bleeding and promote healing (Lacey 1993:80). Clover tea was used to reduce fevers, while the white juice, or milk, from milkweeds was rubbed on poison ivy rashes (Lacey 1993:87). A poultice from the cedar was wrapped around swollen hands and feet, and the inner bark of tamaracks was formed into a poultice to treat festering wounds (Lacey 1993:52, 55). Wood sorrel leaves were used as a diuretic; the whole plant was pressed to obtain the juice which was boiled down and applied to sores, or mixed with bear grease to treat cancer (Erischsen-Brown 1979:334).

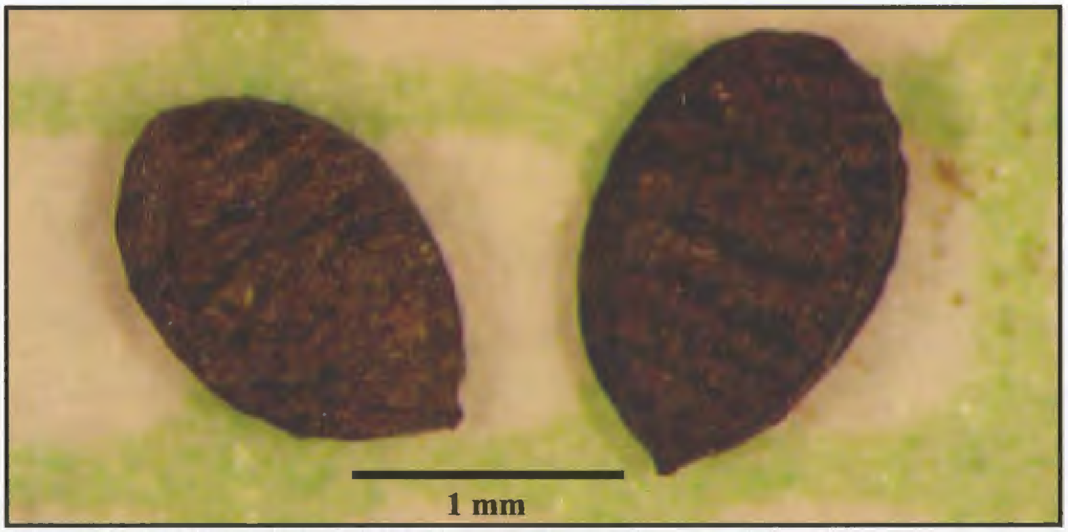

Figure 4.6: Wood Sorrel (*Oxalis stricta*); specimens charred. (Photo by Halwas 2006).

Similar to the food plants, some identified species had medicinal properties, but were not recorded as used by the Mi'kmaq or Malecite. Other groups did use these plants and so a detailed look is warranted. Chokeberries can be steeped to make a tea to cure colds; the berries were also eaten by some southern Ontario groups but not European settlers because the berry was too bitter (Erichsen-Brown 1979:162). Various parts of the dandelion were used by the Ojibwa to treat a variety of ailments including making a tea from the flowers and roots for backaches, a tea from the roots for heartburn, or combined with thistles for menstrual problems (Arnason *et al.* 1981:2257).

There are a few uncharred specimens from Clam Cove which have been identified to important medicinal species. Even though these seeds can not be included in the analysis, it is appropriate to acknowledge them here. Yarrow (*Achilles millefolium*) flowers and leaves were prepared as a tea by the Mi'kmaq to treat fevers and colds; the stalks were pounded into a pulp which was applied to sprains, bruises and swellings (Lacey 1993:95; Kuhnlein and Turner 1991:128; Erichsen-Brown 1979:400-01; Arnason *et al.* 1981:2251). Tea from sumac (*Rhus typhina*) roots was made for the purification of the blood, and the plant was used for sore throats and ear aches (Arnason *et al.* 1981:2245; Lacey 1993:58).

4.5.4 Construction

Grass is another large plant family found in North America. Comprised of 380 native species with another 100 introduced species, it remains a very complex family. The uses of grasses is limited in edible species (wild rice being the best known) but the dried or fresh stems of many grasses have been used to line cooking pits, weave baskets, or formed into brooms or mattresses (Kuhnlein and Turner 1991:98). Some species have been suggested as possible food sources, including panic grass (*Panicum* sp.) which was identified as uncharred seeds and florets in the Clam Cove flots.

4.6 Discussion

This exercise has shown the wealth of ethnohistorically recorded edible and medicinal plants available to Late Woodland groups at Clam Cove. The variety and abundance of species recovered makes the Clam Cove site an attractive area for the Late Woodland groups to have settled, especially for short periods of time while doing other things in the area. Many of the species, such as some of the asters, dandelions, bunchberries, clover, vetch, many of the grass species, and strawberries, can be gathered on site or near the site. A 20 to 30 minute walk radius from the site is all one would need to gather the other identified plant berries, roots, shoots, and leaves for food, or medicines. The various species could easily be gathered and dried or transported fresh in containers of leather, ceramic or even plant fibers. The majority of species could be gathered from spring to late fall, leaving a large window open for the site to be in use. When combined with the artifact information, the palaeoethnobotanical information points to a spring to fall occupation of Clam Cove.

4.7 Clam Cove during the Late Woodland

The Clam Cove site represents a temporary camp site likely utilized for short periods of time during the late spring to fall months, while gathering lithic resources across Scots Bay at Davidson's Cove. The large amount of core fragments and lithic debitage in the midden units indicates deliberate dumping episodes, likely collected from other areas of the site, such as around fires, and dumped onto the heap, along with other shell, and plant refuse. The lack of terrestrial faunal remains may indicate that this group was primarily utilizing the clam bed for protein and adding plant foods to round out their diets. The few faunal remains recovered were from large and medium mammals, like moose, deer, beaver and others found around the area. A complete bird bone was also recovered, indicating that water birds like ducks were probably taken as well.

These remains indicate that there are enough resources available at or around Clam Cove to make this site suitable for a short occupation through the warm season. . Berries, like blueberries, raspberries, elderberries, strawberries and cherries, were extensively gathered, and point to a later summer to early fall occupation. Dandelion, wood sorrel, bulrush and mustard species were likely gathered in the spring or early summer for the fresh stems, roots and leaves. Other plants, like raspberry and strawberry runners could be collected during the height of summer.

The midden shows the importance of clams; a large clam bed can be found 20 meters from the base of Clam Cove and can be accessed during low tide. The best time to dig clams is from late May to the end of July, during the full moon. The full moon provides the lowest tides of the month, extending the clam beds. As well, since clams are cold blooded, they should be collected during cooler weather when they are sluggish and easier to collect (Clark 2001). The extensive collecting and discarding of the clam shells at Clam Cove allowed for the preservation of many of the plant species

4.8 Conclusion

Around 40% of the recovered seeds can be placed in a Late Woodland context. These remains represent a variety of food and medicinal plants which have recorded ethnohistorical uses by Mi'kmaq and Malecite groups. The plant remains reveal that the site was probably used over the course of the summer months, a few weeks at a time, when it was necessary to collect more lithic raw material.

With this synopsis in mind, how does the Clam Cove site fit into the Minas Basin region in the Late Woodland? The next chapter describes and analyzes the charcoal samples collected from the Clam Cove and St. Croix sites. The charcoal samples not only increase our knowledge of the local ecology, through the addition of two previously unknown tree species, but also adds information on firewood selection, and ethnohistoric uses of tree species.

Chapter 5 Charcoal

5.1 Introduction

Charcoal is either naturally or culturally charred wood. Charring wood creates an inert substance, resistant to microbial attack, while generally retaining cellular characteristics which allow for species identification (Angeles 2001:245). Identified woods can provide evidence of past environments, patterns of firewood selection and subsistence activities such as building, heating and cooking (Rossen and Olsen 1985:445; Pearsall 2000:6; Smart and Hoffman 1988). It was for these reasons that charcoal samples were specifically collected for species identification during the 2005 field season. To complete this study, the remaining charcoal samples from 1989 and 2004, and remaining samples from the St. Croix site, were also identified. To aid my identifications, I created a comparative charcoal collection from Clam Cove.

This chapter begins with a discussion of the paucity of previous charcoal research in Nova Scotia, and a description of the experimental and archaeological charcoal samples. An account of potential uses, including local ecology and firewood selection, is offered. Finally, I will examine possible ethnohistorical uses of the identified tree species.

5.2 Charcoal research

Studies of charcoal from archaeological contexts are not new. Barghoorn's 1944 paper detailed how to collect, preserve and identify a number of plant macroremains, including charcoal, from archaeological contexts. Smith and Gannon (1973) embedded charcoal in wax resin to aid in their identifications, and Angeles (2001) suggested simple correction fluid, nail polish and a dissecting microscope to enhance wood features for clearer identifications. Minnis (1981) identified charcoal samples to gain an understanding of past firewood selection by reconstructing past vegetation and environment. Smart and Hoffman (1988) compiled a useful guide for using charcoal for environmental reconstruction and analysis of charred wood species found in archaeological contexts. Despite these and other papers on charcoal, its identification and analysis are still not widely published aspects of palaeoethnobotany.

5.3 Experimental Charcoal

Comparative charcoal collections have been created by other researchers for similar purposes (see Minnis 1981). Rossen and Olsen (1985) utilized controlled carbonization to create their collection of southeastern United States wood species. Their methodology included charring wood specimens submerged in sand in a portable furnace at 800º F (330º C) for 30-60 minutes. Although this procedure is very effective, there is a concern that the controlled experiment might not produce the same effects as charring in an open fire (Rossen and Olson 1985:448). Cooking pits and campfires produce uneven temperatures and the sustained heat may create different changes in the wood, rather than short term, even heating in a furnace. They also note that various parts of a tree may burn differently. For example, when a leaning tree burns, the underside of the trunk will char differently than the top of the trunk. A leaning trunk is composed of two types of cells, the cells on the underside of the tree are elongated, while the cells on the outer curve of the trunk remain shorter, allowing for the tree to bend. The different cells will char differently creating two different looking types of charcoal from the same trunk (Rossen and Olsen 1985:447; Raven, Evert and Eichhorn 1999).

5.3.1 Methodology

The comparative charcoal collection for Clam Cove was created on site by charring a one inch diameter branch from all local tree species found at Clam Cove. This procedure eliminated the problems Rossen and Olsen (1985) faced by duplicating open fire charcoal, similar to charcoal created at many archaeological sites. These samples include paper and yellow birch, red and moose maple, alder, balsam fir and spruce. All of the comparative samples were charred in a large fire built in an existing fire pit on site; each branch was removed after about half of the branch had charred. The charred section was gently broken off the branch by placing it in a labeled tin foil bag and applying pressure. This reduced the chances of the sample becoming lost, and provided packaging for transport. Unfortunately, the maple samples were not labeled properly, therefore these samples will only be used to determine genus. Spruce will only be identified to genus as they very difficult to identify to species, even with comparative samples (Core, Côté and Day 1976; Brown, Panshin and Forsaith 1949). Any of the identified spruce specimens could be white, red or even black spruce, as all are found in the Scots Bay area (Saunders 1970).

In the laboratory, large charcoal fragments from each experimental specimen were fractured by hand or with a scalpel in three planes to facilitate identification of internal structures. A cross section allowed for the identification of growth rings, and parenchyma rays, springwood-summerwood boundaries. There are two type of longitudinal sectioning; radial and tangential. Radial sections are placed perpendicular to the bark and cut to the center of the sample. This reveals the same features as cross sectioning, but from a different angle. Tangential sectioning is parallel to the center and perpendicular to the radial plane; this reveals the ends of the rays (Figure 5.1) (Core, Côté and Day 1976). After sectioning, each sample was photographed in each plane, then labeled and stored in a small box surrounded with microfoam packing material for cushioning (Halwas 2005).

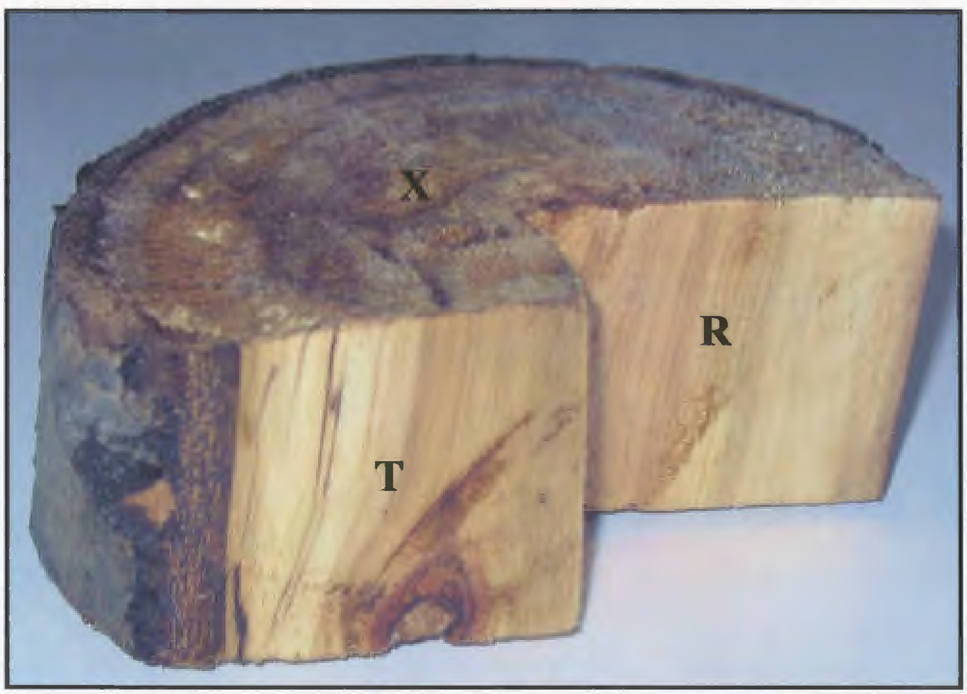

Figure 5.1: Three planes of wood section. Cross section (X), Radial section (R), and Tangential section (T) (Image Halwas 2006).

5.3.2 Softwood versus Hardwood

The term softwood or hardwood does not refer to the strength of the wood fibers. These terms are used to distinguish conifers or gymnosperms (the softwoods), trees which do not have a flower covering their seeds, from deciduous trees or angiosperms (hardwoods), trees with flowers covering their seeds. Conifers are made up of thick walled (lignified), long and narrow tubular cells called tracheids (Figure 5.2). These allow for secondary growth, enabling the tree to attain its large size. The thick walls of the cells are designed to retain moisture, therefore enabling these trees to withstand cold temperatures and droughts (Raven, Evert and Eichhorn 1999). Hardwoods have three types of cells: tracheids, like the conifers, and vessels (Figure 5.2) and companion cells. The vessels are short, wide tubular cells with thinner walls' while the companion cells are thin walled single cells found along side vessels to help them to function. Vessels enable trees to attain enormous sizes, for they allow a large amount of water and minerals to move throughout the tree. Water loss is greater in deciduous trees because the vessels are not as lignified as in conifers, therefore these trees are found in warmer climates. When deciduous trees grow in a temperate climate they must become dormant in the winters in order to survive (Raven, Evert and Eichhorn 1999).

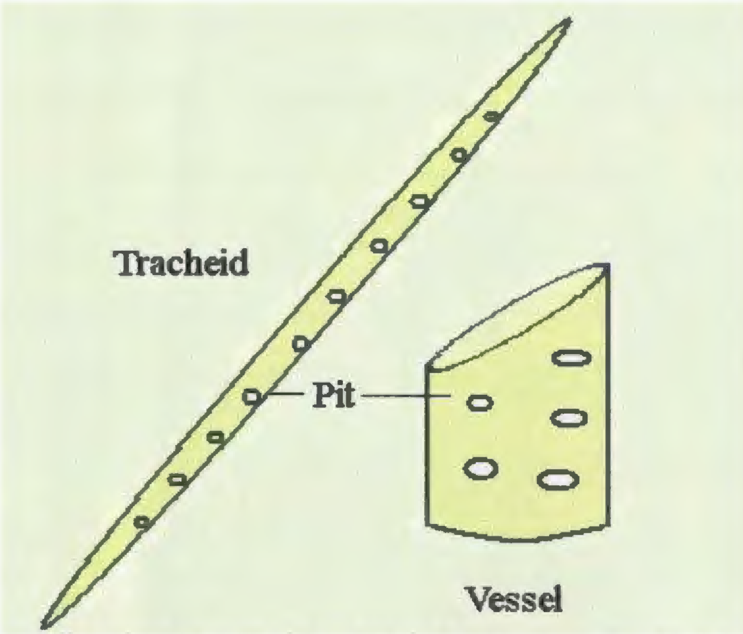

Figure 5.2: Wood (xylem) tissues are composed of tracheids and vessel elements.
(Image by Halwas 2006).

These two types of cells are among the main features used for wood identification. Growth rings, size and arrangement of rays, abundance of parenchyma, physical characters such as color, texture, hardness, and microanatomical features (vessel pit arrangement) are also used for wood species identification (Pearsall 2000:145). Due to carbonization, the wood shrinks and cracks are formed, altering or destroying many physical characteristics, such as color, texture, hardness and many microanatomical features. The majority of gross anatomical features such as the annular growth rings, presence/absence of vessels, and abundance and type of rays, remain intact and are relied on for identification (Asouti 2003).

Annual growth rings are the amount of wood added to the tree during the growing season in one year. In temperate zones, there is a lot of growth in the spring, less growth in the summer and no growth in the winter. These distinctions show up because each band is bordered by a narrow band of thick walled tracheids. If the vessels (pores) are larger in the spring wood than the summer wood, it is referred to as ring porous (Figure 5.3).

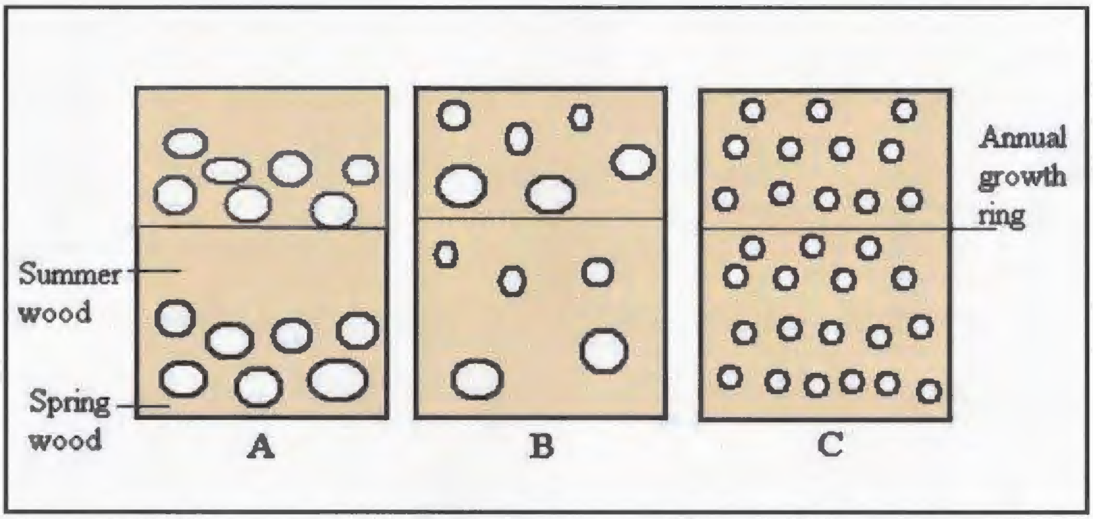

Figure 5.3: Ring porous (A), semi-ring porous (B) and diffuse porous (C) types of wood (Image by Halwas 2006).

If there is no real distinction between vessel size in the spring and summer wood, then it is diffuse porous (Figure 5.3). A combination of the two is referred to as semi-ring porous (Figure 5.3) (Pearsall 2000:147; Raven, Evert and Eichhorn 1999:664-5).

Rays are single or bundles of parenchyma cells formed into tissues which run horizontally through the tree to carry minerals from the center (heartwood) to the sapwood and bark. Parenchyma cells also line resin canals in conifers. The distribution and number of these cells and tissues differ between genera and species, a useful characteristic for identification (Pearsall 2000: 147; Core, Côté and Day 1976:21).

5.4 Archaeological Charcoal

5.4.1 Clam Cove

Throughout the 1989 and 2004 field seasons, archaeological charcoal samples were collected primarily for radiocarbon dating. The only charcoal sample sent for dating was from Feature 1 (1989), associated with Middle Woodland designed ceramic sherds, lithic debitage and calcined bone; it was returned with a date of 2170 +/- 140 BP (Beta-49257) (Morlan 2001). In 2005, however, charcoal samples were collected specifically for their later identification. In total, 63 charcoal samples were studied from the three field seasons.

Fortunately seven of the twelve units had suitable charcoal specimens. The samples from Unit 5 were collected from the stratigraphic layer beneath the level where the ceramic sherds were discovered. In Unit 10, the samples were uncovered in the same level as the Late Woodland ceramic sherds but the charcoal samples identified were not directly associated with the sherds. The charcoal recovered from Unit 7 was collected with the rim of the Late Woodland ceramic vessel. The Middle Woodland vessel, identified by the reconstructed rim, was uncovered in Unit 5. Other dentate decorated sherds also representing the Middle Woodland were found in Units 9 and 10. Only two of the four units from 2004 had suitable charcoal samples; Unit 1 had four samples and Unit 3 had six samples.

The 2005 charcoal samples were collected with later identification in mind, but only Units 1, 3, 5 and 6 contained any charcoal. Fortunately, Unit 1 had five separate charcoal samples from which to subsample, resulting in 18 identified specimens. Unit 3 only had two samples, but were found associated with dentate designed ceramic sherds; Units 5 and 6 both had five identified charcoal samples.

5.4.2 St. Croix

The charcoal samples originally collected for radiocarbon dating from the St. Croix site were also subsampled and identified to find possible correlates between them and the Clam Cove site. Most of the samples turned out to be ceramic fragments, so only five units and one feature were examined. Five charcoal samples from Unit B11 level 1, were associated with two projectile points, some ceramic sherds, and lithic flakes. Feature 90-2 represents a living floor that had bone fragments, core fragments and lithic flakes strewn throughout the level; charcoal was recovered with a few utilized cores and lithic flakes. Unit C9 had a few flakes associated with the recovered charcoal. Unit B5 contained an enormous amount of charcoal which was subdivided into seven subsamples from the first level and 16 samples from the second level. It is noted in the field report (Deal, Godfrey-Smith and Kunelius 1995) that Late Woodland ceramics were found throughout level 1, Middle Woodland ceramic sherds were only associated with level 2, while the very bottom of level 2 and top of level 3 were associate with Early Woodland ceramics.

5.5 Results

5.5.1 Clam Cove

Of the 71 samples, 54 samples were identified to the seven species currently located at Clam Cove. Those common species include spruce, fir, yellow and paper birch, red and moose maple and alder. The other 17 samples were identified as either poplar or beech, neither of which currently grows on site, but are common in the Scots Bay area and all over Nova Scotia (Saunders 1970; Roland and Smith 1969:341). The identified charcoal samples from Clam Cove are listed in Table 5.1.

Fortunately the 1989 samples had not dried out or crumbled badly in storage; 44 were identified as hardwoods- birch, alder, maple and beech. One was fir and four were deteriorated conifer specimens which could not be further identified. The 10 specimens from 2004 were identified to genus and include spruce, fir, maple and beech and/or aspen. Most samples were collected during the 2005 field season, and 35 subsamples were selected for further identification. Unfortunately only one sample was from the midden sediments. All but three of the 35 charcoal samples were identified to genus. The majority of identified specimens are hardwoods, including maples, birch, beech, and aspen. Only 11 samples were identified as softwoods. The three undetermined specimens were identified by the presence of vessels as hardwoods, but lack of other discernable features made further identification impossible.

Table 5.1: Identified charcoal from the Clam Cove site.

Year Unit	Sample Number	Softwood	Hard-wood Unid.	Maple, *Acer* sp.	Birch, Alder *Betula, Alnus*	Beech, Aspen *Fagus, Populus*
1989 Unit 1	2				1 paper birch 1 alder	
1989 Unit 3	1	1 fir				
1989 Unit 5	1				1 birch	
1989 Unit 7	8	1 crumbly & soft	1 very crumbly	1maple #1 1 maple	3 paper 1 yellow	
1989 Unit 10	8	3 all very deteriorated		1 maple#2 1 maple	1 birch sp. 1 paper birch, 1 alder	
1989 Unit 11	4			2 maple, 2 maple#2		
1989 Unit 12	2					2 beech
2004 Unit 1	4	2 spruce 1 fir				1 beech or aspen
2004 Unit 3	6	3 fir 1 spruce		2 maple #2		
2005 Unit 1	23	6 fir 4 spruce	1		3 birch	7 beech, 2 aspen
2005 Unit 3	2			2 maple sp.		
2005 Unit 5	5					5 beech
2005 Unit 6	5	1 fir	2	1 maple sp.	1 paper birch	
Totals	**71**	**23**	**4**	**13**	**14**	**17**

5.5.2 St. Croix

Of the 38 identified charcoal samples only three species were represented (Table 5.2). Three of the samples closely resemble paper birch, while the rest are spruce; a small number (n=3) did not have visible resin canals and may be fir. Four conifer specimens were too deteriorated to be identified further.

Table 5.2: Identified charcoal from the St. Croix site.

Unit Level Catalogue No.	Sample No.	Conifer	Fir (Abies)	Spruce (Picea)	Birch (*Betula)*
F 90-3: 1021	1		1 cf fir		
B5 L1: 1501	3	3 conifer			
B5 L1: 1505	1			1 spruce	
B5 L1: 1508	4			4 spruce	
B5 L2: 1539	3			3 cf spruce	
B5 L2: 1551	13			13 cf spruce	
F 90-2: 1520	1	1 conifer			
B11 L1: 830	5		1 fir	1 spruce	3 cf paper birch
B14 L1:1660	2		1 fir	1 spruce	
C9 L2: 1039	6			6 spruce	
Totals	**39**	**4**	**3**	**29**	**3**

5.6 Uses of the charred wood remains

There are a number of reasons for finding charred wood at the Clam Cove site. For example, Smart and Hoffman (1988) note that in order to understand the relationship between the charcoal assemblage and the prehistoric environment, one must consider the cultural and natural mechanisms which bring woody plants to the site, and the cultural and physical factors which affect burning and preserving the charred wood. The excavation, sampling and subsampling decisions and later identification of the materials must also be considered.

The cultural and natural mechanisms which affect the presence and preservation of wood species identified include tree species that naturally grow in or around the sites (Appendix B), the presence and type(s) of driftwood, the general or deliberate collection of firewood species, and the possibility of accidental burning. Burning of wood by natural fires should be considered, as well as possible inclusions of charcoal from the mill built in the 1920s or by modern campers at the site. There is a modern fire pit in the cleared space close to the datum point, and the fire for burning the experimental charcoal samples took place here.

For the Clam Cove and St. Croix assemblages, the majority of the charcoal samples had been recovered for radiocarbon dating when encountered. No methodology was in place to specifically look for charcoal at the site. Even when the collection of charcoal was a primary research goal, as it was in the 2005 excavation at Clam Cove, wide spread charcoal deposits were not encountered (only 4 of 8 units had any charcoal, and only unit 1 had a large amount recovered). Despite this, the small number of charcoal samples can still illuminate aspects of Late Woodland life.

5.6.1 Past Environments

There are nine species currently growing at Clam Cove: black, red, and white spruce, fir, paper and yellow birch, red and moose maple, and alder. All these species are native to Nova Scotia but do associate together in a variety of habitats.

Red spruce and balsam fir are the two most common species in Nova Scotia. They both prefer well drained soils but can live in cold swampy areas with black spruce. Both associate with other spruce, birch, and maple. Fir can also be found growing along side pine, tamarack and hemlock, and red spruce grows with beech (Saunders 1970). Red and black spruce will interbreed, making positive identifications difficult (Saunders 1970:24; Roland and Smith 1969:42). Black spruce generally associates with white and red spruce, balsam fir, and tamarack. White spruce (Figure 5.4), originally living along coastlines in Cape Breton (Roland and Smith 1969:42), has expanded its range throughout the province and can be found in pure stands or with other spruce, fir, tamarack, white birch and aspen (Saunders 1970:26).

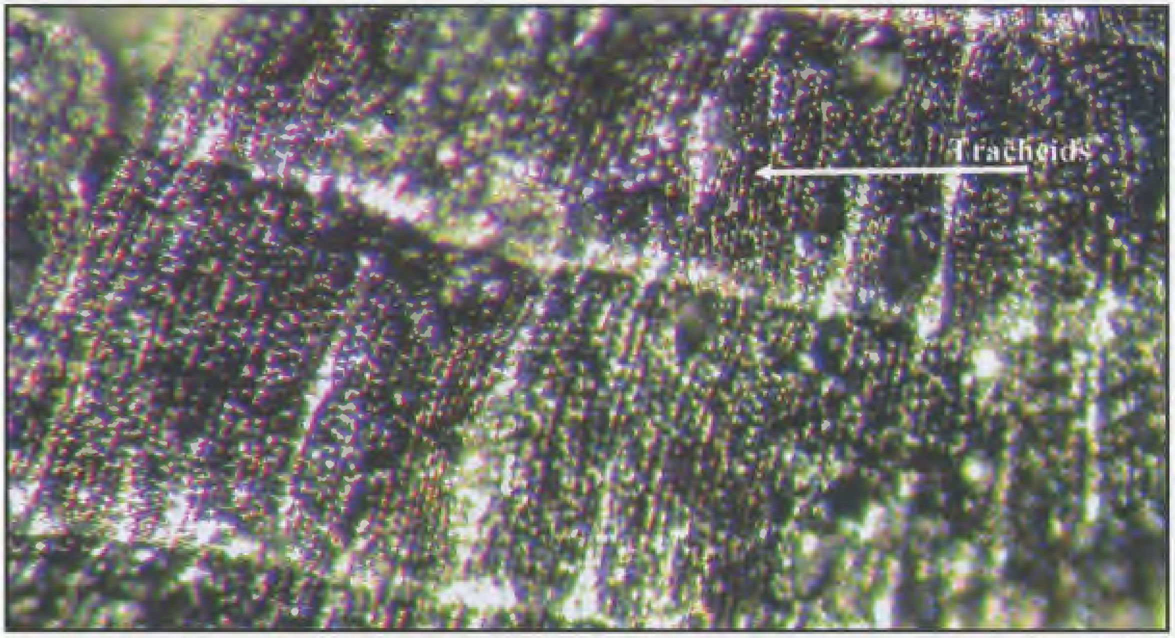

Figure 5.4: Cross section of White Spruce (*Picea* sp.) charcoal (Photo by Halwas 2005).

Of the two species of maple (Figure 5.5) found at Clam Cove, the striped or moose maple has the most uses. Found with other maples, red spruce, and hemlock on cool moist shaded slopes, it is browsed by similar animals as the mountain moose (Saunders 1970:81). The best known aspect of the red maple is its leaf, forever visible in the center of our flag. As well, the sap is tapped in the spring for maple sugar (Saunders 1970:78; Arnason *et al.* 1981:2203).

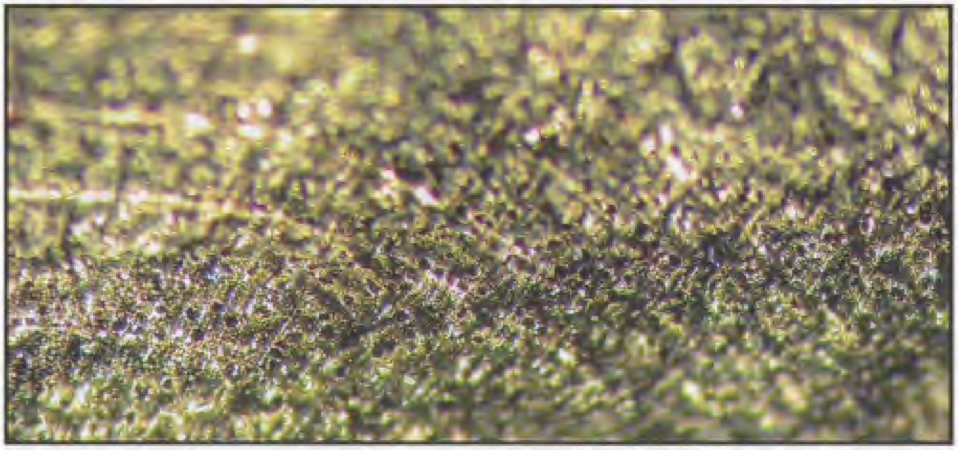

Figure 5.5: Cross section of Maple (*Acer* sp.) charcoal (Photo by Halwas 2005).

The two main species of birch found at Clam Cove include yellow birch and paper birch (Figure 5.6). Both species are very common and grow throughout the province, but paper birch prefer a more mineral laden soil and grow amongst aspens, willows and pin cherry; yellow birch like cool northern slopes, commonly growing with sugar and red maple, red spruce, hemlock and balsam fir (Saunders 1970:48, 50; Roland and Smith 1969:335-7).

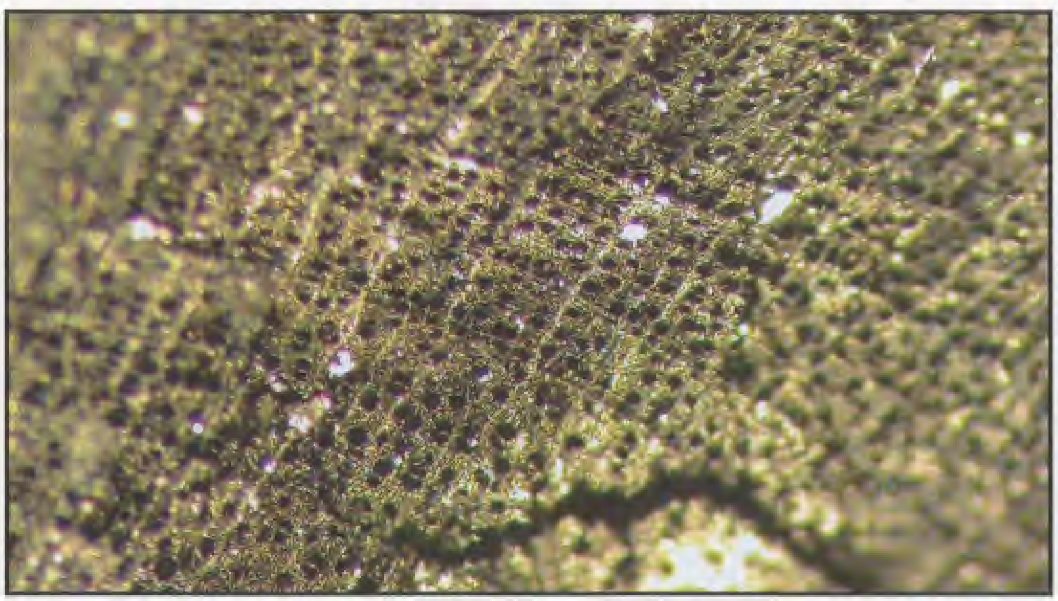

Figure 5.6: Cross section of Paper Birch (*Betula papyrifera*) (Photo by Halwas 2005).

Poplars and beech, not currently growing at Clam Cove, were identified from excavated charcoal samples. Both are native to the province and while beech associate with softwoods like hemlock, red spruce and white pine, aspens tend to grow along side other hardwoods especially birch, pin cherry, alder, and willow. Balsam poplar can be found with spruce and fir (Saunders 1970:44; Roland and Smith 1969:329). Poplar foliage is heavily browsed by moose, deer, rabbits and mice, while ruffed grouse eat the buds, and beavers enjoy the bark. Beech nuts are eagerly sought by mice, squirrels, bears, raccoons, and ruffed grouse (Saunders 1970:40-44, 56). Moose and deer browse on fir, and moose maple foliage, while birds, such as the ruffed grouse, eat the seeds; porcupines snack on the bark of fir trees (Saunders 1970).

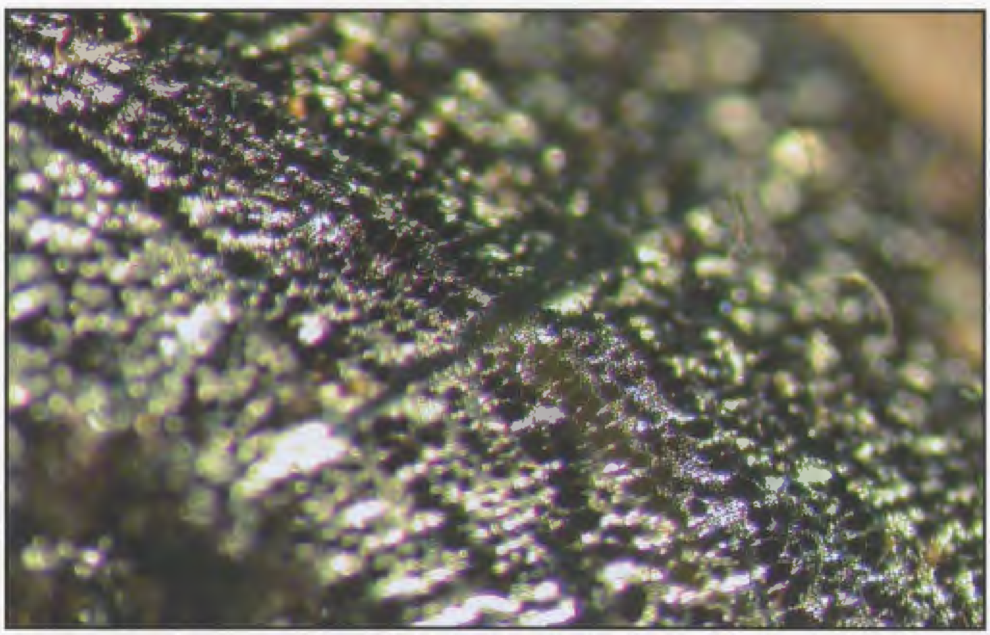

Figure 5.7: Cross section of Poplar (*Populus* sp.) charcoal (Photo by Halwas 2005).

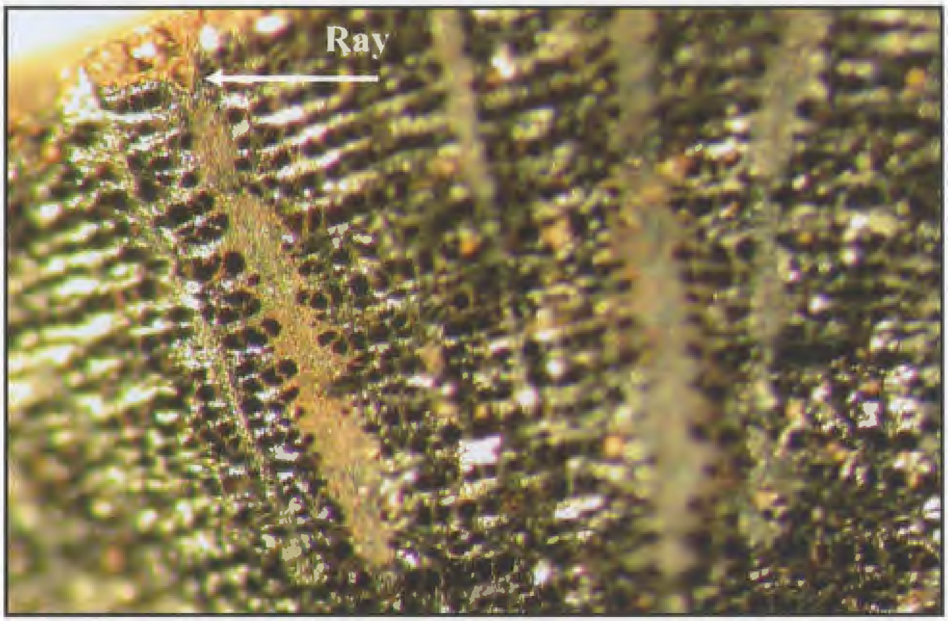

Figure 5.8: Cross section of Beech (*Fagus grandifolia*) charcoal (Photo by Halwas 2005).

5.6.2 Firewood Selection

From the above description there is a large selection of tree species Mi'kmaq and Malecite groups could have used for firewood. Two modern firewood studies, one by Natural Resources Canada (2002), the other by the Wood Heat Organization Inc.(2006), show that the denser the wood, the longer and hotter the fire. Dense woods also take longer to turn completely to ash. Of the species identified from the charcoal study, beech produces the highest amount of heat (27,800 BTU), while yellow birch, red maple and white birch all produce over 20,000 BTUs. Spruce and fir produce the lowest heat as they are the least dense woods, and turn to ash quite quickly (Asouti 2003). For household fireplaces, both studies recommend burning a combination of dense and less dense woods during the winter but softer woods, like pine, poplar, aspen, spruce and fir, are better during the spring to fall period when heating demands are less (Natural resources Canada 2002:50).

5.6.3 Ethnohistorical uses by Mi'kmaq, Malecite or pioneer groups

Mi'kmaq and Malecite practices of processing wood or bark for food and medicine may also have produced charcoal. Fragments of the ingredients could have fallen into the fire and been charred and preserved, or poor specimens originally collected for processing were tossed into the fire. Ethnohistorically, white spruce roots were steamed and split into long pliable ropes which Aboriginal groups used for sewing birch bark on canoes and decorating baskets (Saunders 1970:26). The Mi'kmaq and Malecite groups used the "white spruce for stomach troubles, scabs and sores, as a salve for cuts and wounds and the tea for scurvy" (Erichsen-Brown 1979:14). The tea was made by boiling the needles in water and drinking the liquid (Erichsen-Brown 1979:14; Arnason *et al.* 1981:2284).

Black spruce resin makes the best chewing gum and spruce beer can also be made by boiling the needles, then adding molasses, honey or maple sugar, and fermenting. Boiling the twigs and bark makes a cough medicine widely used (Arnason *et al.* 1981:2285; Lacey 1993:38). There are reports of people chewing the inner bark to cure laryngitis, or made into a tonic to reduce weight and sometimes for tuberculosis (Lacey 1993:38). Saunders (1970) and Erichsen-Brown (1979) both note that red spruce was frequently used to make spruce beer and tea for scurvy, and that likely a general spruce designation refers to red spruce.

The fir (Figure 5.9) was a very important medicinal tree to the Mi'kmaq and Malecite. They used the gum as a salve, but sap mixed with warm milk was taken to treat stomach ulcers. They steeped the cones and tops to make a tea for colic, colds and influenza (Lacey 1993:54). The inner bark was used to treat swelling and sores; the buds became natural laxatives, and the parts of the tree were generally used for bruises and burns (Arnason *et al.* 1981:2283; Erichsen-Brown 1979:19). Balsam fir resin was also highly prized by pioneers as a cure-all salve they made by melting the gum into a basin and mixing in beeswax and tallow (Erichsen-Brown 1979:19).

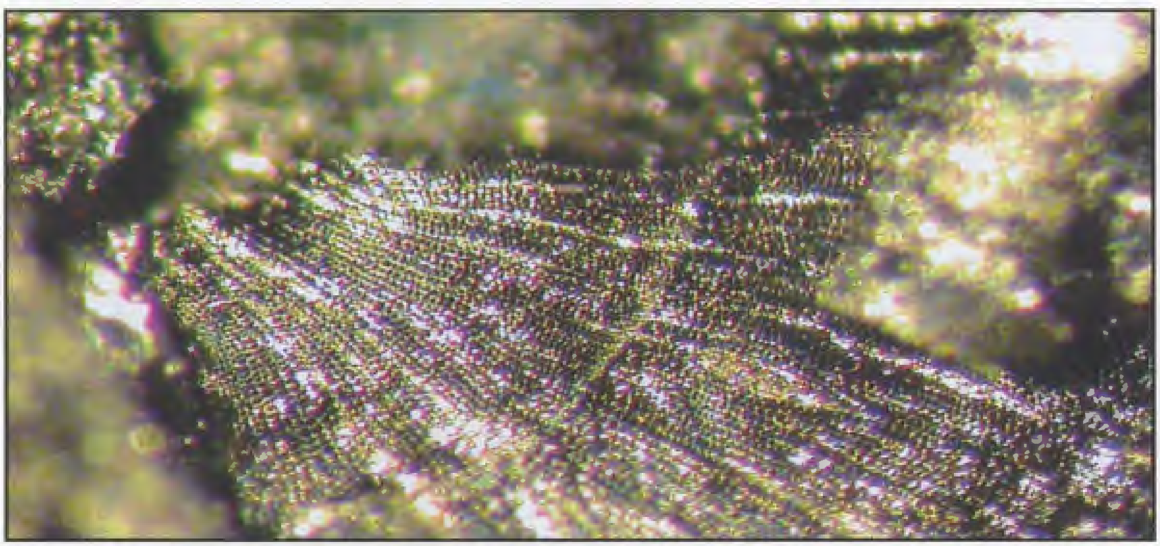

Figure 5.9: Cross section of Fir (*Abies balsamea*) charcoal (Photo by Halwas 2005).

Unlike other maples, which were mainly tapped for their sap to make maple sugar, the Malecite used moose maple wood in a concoction to relieve gonorrhea, kidney trouble, and spitting blood. The Mi'kmaq used the bark as a tea and for coughs due to colds; it could also be softened in water and applied to swollen limbs and sore eyes, and made into a beverage (Arnason *et al.* 1981:2228, 2242).

The best known use of either of the birches is paper birch for canoes, shelters, cooking pots, cups and plates. The yellow birch bark makes great kindling because of the high oil content (Saunders 1970:55); the bark was also steeped in water and the liquid rubbed on rheumatic body parts to ease pain. The bark was also chewed or taken as a tea to relieve indigestion and stomach cramps (Lacey 1993:51). The bark and twigs were boiled to make a tea which was used as a beverage by the Malecite, but to treat diarrhea by the Mi'kmaq (Arnason *et al.*1981:2231, 2259). Alders are also common at Clam Cove; the bark was used by the Malecite to treat ulcers of the mouth (Arnason *et al.* 1981:2259) and steeped to make a tea which treated stomach cramps, kidney ailments, fever and neuralgic pain. The bark and leaves were used to make poultices for festering wounds and cure lameness in the body (Lacey 1993:22).

Balsam poplar resin was a very popular balm used by Mi'kmaq, Malecite and pioneer groups. Trembling aspen bark could be boiled as a tea for the treatment of worms; beech leaves were used to treat syphilis ulcers (Arnason *et al.* 1981:2271, 2301; Erichsen-Brown 1979:60). The dried leaves of the beech tree were steeped to make a tea which treated tuberculosis and other chest complaints. Tea from the bark and leaves was a good general tonic, and is good for the kidneys, liver, and bladder (Lacey 1993:50).

5.7 Discussion

The majority of charcoal from Clam Cove was identified as hardwoods, specifically maple (including red maple), yellow and paper birch, beech and poplar; this suggests these were the most popular species for burning. Spruce and fir, which cover most of the site, may have been utilized more but their tendency to turn to ash quickly reduces the likelihood of their preservation. Since all species, except the beech and aspen, are currently growing on site, and the local vegetation has not changed significantly in the past 2000 years (Cann, D.B., J.I. MacDougall and J.D. Hilchey), it is likely that the beech and poplar were brought on site. Driftwood is a possibility as the tide flows in and out every 8 hours. A possible source of beech is Isle Haute, a small island off the tip of Cape Split in the Minas Basin, where small Late Woodland occupations have been identified (Christianson and Keenlyside 1997:8). Isle Haute was occupied roughly 600-800 years ago, contemporaneous to Clam Cove. Late Woodland groups would know beech and poplar burn very well and if these types of wood were found, either as driftwood or along their travels, they may have collected it for later use. There is a possibility that they brought beech from Isle Haute specifically to Clam Cove, especially for an extended stay. By taking into account the length of occupation, the cool climate and the amount of heat generated per species, the amount of recovered hardwood charcoal is an accurate reflection of species usage.

Cape Split is a cold place. Even in the summer the temperatures only reach 15 degrees Celsius on average; a fire could have been built every day during the field season. Groups of people living at Clam Cove for weeks at a time would have found a fire necessary. The possible living floor with a concentration of charcoal and Middle Woodland sherds provides evidence for this assumption. Unfortunately, all of the charcoal directly associated with the Middle Woodland sherds was sent for radiocarbon dating prior to charcoal identification. Fortunately this feature spanned four units and there was a suitable amount of charcoal for identification from the rest of the feature. The charcoal samples that were found in association with Late Woodland sherds, indicate that birch, maple and conifers were utilized for firewood. Birch, alder, maple and conifer specimens, found in the same level as Middle and Late Woodland sherds though not in direct association with the sherds, also indicate the preference of hardwoods over softwoods. In 2005, more Middle and Late Woodland ceramic sherds were uncovered, not associated with a feature but with a few fragments of charred maple wood.

The charcoal samples collected from midden units in 2005 match with the charcoal associated with the ceramic sherds. Maple, birch, and fir were recovered with soft shell clam fragments, a large amount of lithic flakes, cores, two plummets, and the base of a Late Woodland projectile point. The midden represents part of the remaining previously expansive refuse heap at Clam Cove. The charcoal found here likely also represents Late Woodland fires, presenting evidence for firewood selection. The charcoal was collected in a single sample and could be from a single dumping, but not necessarily a single fire. Generally a number of fires would have been built on top of one another before the hearth was cleaned. The evidence of a single dumping episode suggests that there were hearths utilized at the time, for an open fire would likely have been scattered around and not cleared and dumped into a refuse pit (Asouti 2003).

The majority of the 2005 field season samples were recovered from non-midden sediments, not associated with ceramics, though some were found in the same level as lithic flakes, and utilized cores and flakes. These samples include fir, spruce, birch, beech and aspen. Many of the non midden units are located close to large spruce, fir, and birch trees on site; many of the charcoal specimens are thin, tubular sections of charcoal, likely indicating burned roots from natural forest fires or from the period when the historic mill was in use. The poplar and beech however, would have been brought to the site.

The St. Croix charcoal presents a very different picture; the majority of samples were identified as conifers. Conifers do not give off a lot of heat, and generally turn to ash very quickly. Due to the large amount of identified conifer charcoal, a large amount of the wood must have been burned in order for so much to be preserved. This information suggests that conifers were either being processed for food or medicine, as per the above discussion on ethnohistoric uses, or they were being burned during warm periods when heating demands are less (Residential Wood Heating 2002). This could indicate a summer occupation when conifers would provide suitable cooking fires and ample smoke to combat mosquitoes, without creating unnecessary heat. Since the St. Croix site is located in a more open spot on the southwestern bank of the St. Croix River, it is much warmer in the summer than Clam Cove. The South and North mountains buffer it from the cold Bay of Fundy winds and the average temperature is around 25 degrees Celsius during the summer (Cann, Hilchey and Smith 1954:12). Therefore high heat producing firewood would not be necessary during the summer months, and the large amount of conifer trees found around the site would have sufficed for daily cooking.

5.8 Conclusion

Throughout this chapter I attempt to cover all possible explanations for the presence of charcoal at Clam Cove and St. Croix. The Clam Cove specimens reflect a cultural use of wood species during the Late Woodland mainly for firewood. The group utilized local hardwood species for their fires, but probably picked up better firewood species when encountered, either through travel to the site or as driftwood. The extensive use of hardwood likely represents the cooler summer temperatures at Clam Cove. The lack of concrete features does not allow for further analysis on dwellings, tools or other such things. The St. Croix sample illustrates the use of conifers for fires during warm summer months. Conifers make suitable cooking or medicine preparation fires while minimizing the heat produced.

The information gleaned from the Clam Cove charcoal analysis will be combined with the analysis of the seed remains from Chapter 4 and compared to the macroremains from the St. Croix and Melanson sites in an attempt to join these three contemporary sites into a model of resource use and movement around the Minas Basin. The final chapter discusses Clam Cove in the context of the Minas Basin, and draws together the information gleaned from the Melanson and St. Croix sites, to gain an understanding of plant use and movement around the area.

Chapter 6 Plant Use during the Late Woodland

6.1 Introduction

This final chapter looks at how Clam Cove fits into the Late Woodland period through resource utilization and movement around the Minas Basin based on the floral components of the Clam Cove, Melanson and St. Croix sites. The same ecozones are within range of each site and offered a specific set of edible and medicinal species. The recovered plant remains indicate that similar species were utilized at all three sites by the same groups of people.

6.2 Ecozones

There are a number of aquatic and terrestrial ecozones within the Minas Basin area which Nash and Stewart (1991) outline for the Melanson site but are also applicable to the St. Croix and Clam Cove sites (Figure 6.1). The aquatic zones include marine, mudflats, estuary, river and lakes. The most important aquatic ecozones for the Clam Cove site are the mudflats. This is the home of the soft shell clam which makes up the majority of midden sediments. The floral compliment of the mudflats is reduced to seaweeds which cling to the basalt rock outcrop which circles the clam bed. The estuary ecozone is particularly rich in plant species. This includes areas that are regularly washed by both saline and fresh water like dyke lands, marshlands, and low lying meadows. These areas support many saline tolerant species such as marsh grass (*Spartina)* and spike rush (*Eleocharis*), and support various fish and mammal species such as smelt, Atlantic tomcod, eels, gaspereau, moose, raccoon and fox (Nash and Stewart 1991:11). River and lakes zones include the plants which grow on the surface of the water such as waterlily (*Nymphaea* sp.). These two zones are more abundant in water birds, animal and fish species than plants. Lake and river fish species parallel estuary fish species while black bear, deer, moose, caribou, cougar, wolf, beaver, otter, mink, muskrat, raccoons, loons, ducks, cormorants, kingfishers and raptors can be found around the lakes and rivers (Nash and Stewart 1991:17).

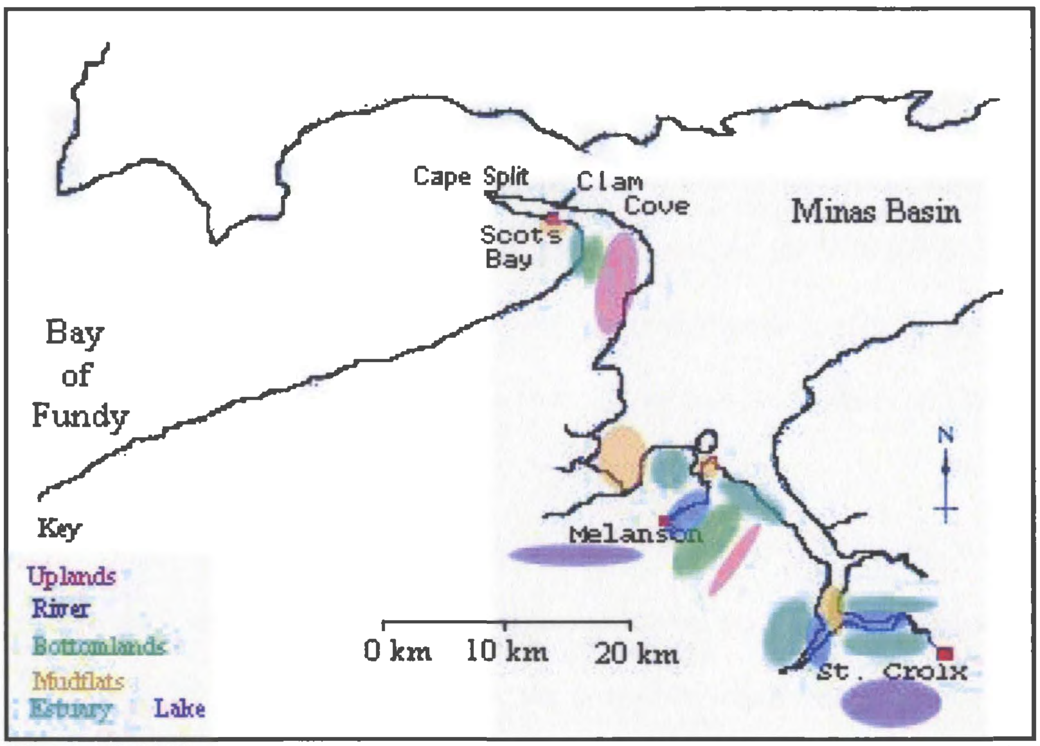

Figure 6.1: Ecozones for the Clam Cove, Melanson and St. Croix sites (adapted from Nash and Stewart 1991).

Terrestrial ecozones are not as well defined as the aquatic zones and are characterized by the plant cover, moisture content, sunlight amount, and nature of the soil (Nash and Stewart 1991:18). Despite this, these zones which include thickets and borders, ravines, uplands, bottom lands and bogs, house a large variety of trees, shrubs and herbaceous species. Thickets and borders are found along the margins of lakes, rivers, streams, ponds and bogs, and are also defined as the spaces between open and wooded areas. Alders, birch, highbush cranberries (*Viburnum*), pin cherries, chokecherries (*Prunus virginiana*), apple (Pyrus), raspberries (*Rubus*), hawthorns (*Crataegus*), hazelnuts, balsam poplar, and red maple are common species (Roland and Smith 1969). Watercress (*Nasturtium officinale*), rushes (*Juncus*), bulrush (*Scirpus*), and willow (*Salix*) are all common around stagnant lakes and slow moving rivers. Sluggish streams, ponds and marshes are home to manna grass (*Glyceria*), ditch grass (*Ruppia*), and water smartweed (*Polygonum natans*).

Ravines are steep sided valleys and support two types of vegetation. Spruce, hemlock, fir, pine, and ground hemlock can be found on the drier steep sides of the ravine, while the wet, shaded bottom of the ravine is home to sedges, buttercups, bunchberries, woodland strawberries, wood sorrel and chickweeds (Roland and Smith 1969).

Bottom lands are rich in alluvial soils deposited from constant flooding of U-shaped river valleys. On higher elevations oak, elm, maple, aspen, milkweeds, and some aster and grass species are found. On the lower elevations that may be periodically flooded hawthorn, cherries, poplars, willow, serviceberry, raspberry, and elderberry are found (Roland and Smith 1969; Nash and Stewart 1991). The uplands are found on the North and South Mountain and the Ridge (Nash and Stewart 1991:22). The highest elevations are covered in a mixed coniferous/deciduous forest of spruce, fir, hemlock, pine and birch. Much of Cape Split is composed of spruce, fir, birch and maple, with the majority of hardwoods found on the south facing slope (Saunders 1970; Roland and Smith 1969). The understory is composed of shade tolerant, wet to damp loving plants like bunchberry, ferns, mosses, sedges, and some grass species. Clearings for farming and logging are now overgrown with pioneer trees like fir, maples and alders, with grasses, pigweeds, dock, mustards, clover, vetch, thistles, dandelions, hawkweeds, wormwood, daisy, yarrow, and sumac in more open areas (Roland and Smith 1969). The bogs and swampy lands are home to tamaracks, black spruce, junipers, blueberries, and cranberries (Roland and Smith 1969).

6.3 Campsites and villages in the Late Woodland

Three sites are included in this model of movement around the Minas Basin during the Late Woodland. The villages on the Melanson and St. Croix Rivers are situated 30 km apart (Deal and Butt 1991), and had easy access to the high resource areas of the estuary, river and bottom lands. Excavations show evidence of pits, hearths, and living floors. Analyses describe each site as a locus for the harvesting of anadromous fish species, with many groups converging during the warm season (Nash and Stewart 1991; Deal 2004a). The small temporary campsite at Clam Cove was likely used during the late spring to late fall by small groups of people in the area to collect and work the Scots Bay cherts from Davidson's Cove. Resource areas around Clam Cove include the mudflats with a large functional clam bed, upland and estuary ecozones. The clam bed was likely harvested during the warm months; the upland mixed coniferous deciduous forest provided plenty of hardwoods for warm fires and the estuary zone offered a large compliment of edible and medicinal plant species within a 20 minute walk radius.

The plant species recovered at Clam Cove show some similarities with plant species identified at the Melanson and St. Croix sites. Common species utilized at all three sites are shown in Table 6.1, and include bunchberries, elderberries, cherries (both chokecherries and pin cherries) and fir trees. There are a larger number of correlates between the Clam Cove and Melanson sites which could point to Melanson as the potential home village for the groups utilizing Clam Cove. The Melanson site is closer to Clam Cove and a number of routes to Scots Bay were likely utilized in order to obtain the cherts and chalcedonies prized by groups living in this area (Nash and Stewart 1991).

While there are a few important similarities, there is a visible paucity of correlates between the Clam Cove and St. Croix sites. This is likely due to differential sampling and recovery. The Clam Cove site was intensively sampled because it is the focus of this research. The Melanson site provided a small number of samples with very good preservation contexts. St. Croix was blanket sampled but only 150 ml subsample was processed for floral remains.

Table 6.1: Uses for identified species from the Melanson, St. Croix and Clam Cove sites. (Use key: F= food, M= medicine, E= ecology, and Fire= firewood)

Genus species	Clam Cove	Melanson	St. Croix
Abies balsamea	F M Fire	F M	F M Fire
Acer sp.	Fire		
Alnus sp.	Fire		
Aronia sp.	F M		
Artemisia vulgaris	F		
Asclepia sp.	F M		
Aster macrophyllus	F		
Betula lutea	Fire		
Betula papyrifera	Fire		Fire
Brassica sp.	F		
Chenopodium album		F	F
Cirsium sp.	F M		
Conifer	Fire		Fire
Cornus canadensis	F M		F
Fagus sp.	Fire		
Fragaria virginiana	F M		
Laminaceae		F	
Larix laricina	M		
Nasturtium officinale	F		
Oxalis stricta	F M	F M	
Picea sp.	M Fire		M Fire
Pinus strobus			M
Polygonum sp.		F	
Populus sp.	Fire		
Prunus sp.	F M	F	F
Pyrus sp.		F	
Quercus borealis			F
Rhus typhina	F M	F M	
Rosaceae		F	
Rubus sp	F M	F M	
Rumex sp.	F		F
Sambucus canadensis	F M	F M	F M
Scirpus sp.	F		
Stellaria sp.		M	
Taraxacum officinal	F M		
Taxus canadensis	F M		
Trifolium repens	F M		
Tsuga canadensis		M	
Vaccinium sp.	F M	F	F
Viburnum sp.		F M	
Vicia sp.	F		

The charred materials from St. Croix (Table 6.2) indicate some similarities in plant species with the other two sites. They identify a number of common edible plants including lamb's quarters, bunchberry, chokecherry, black cherry, knotweed dock, elderberry and blueberry. Extensive sampling with larger volumes of sediment at the St. Croix site will likely reveal more charred specimens further linking the three sites botanically.

Table 6.2: Charred macroremains from St. Croix.

Scientific name	Common name	Number
Betula papyrifera	White Birch	1
Chenopodium alba	Lamb's Quarters	1
Cornus canadensis	Bunchberry	4
Crataegus sp.	Hawthorn	2
Juniperus sp.	Juniper	7
Graminae	Grass	2
Picea mariana	Black Spruce	9
Picea sp.	Spruce	64
Prunus serotina	Black Cherry	4
Prunus sp.	Cherry	
Prunus virginiana	Chokecherry	2
Rubus sp.	Raspberry/blackberry	1
Rumex sp.	Dock	7
Sambucus canadensis	Common Elderberry	2
Senecio sp.	Ragwort	1
Vaccinium sp	Blueberry	3
Total		**130**

6.4 Plant Resource Use and Movement

The majority of recovered plant species point to an early spring to late fall occupational round (Roland and Smith 1969; Kuhnlein and Turner 1991). In the spring maples are tapped for their sap and in early summer young mustard plants, docks, cattails, ferns and other species are collected. Crab apples, strawberries, pin cherries, bunchberries and cranberries are also ready June to July. By mid summer the first of the berries are ripening; chokecherries, chokeberries, serviceberries, raspberries and elderberries can be collected from July to August, along with thistles, and wood sorrel. The end of summer and early fall gives rise to the end of most berry plants, hawthorns, rosehips, and chickweed can be gathered (Roland and Smith 1969). Many species needed for their leaves, stems or roots would have been collected and dried for the winter. Enough of the necessary medicinal plants would be collected and preserved for later use and to last the wintcr sincc thcy would have returned the next spring to replenish their stocks.

The groups which lived at the Melanson and St. Croix sites settled there because of the high concentration of ecozones with large numbers of edible and medicinal species. When making logistical trips for lithic procurement, they would need to find the same ecozones and plants to support them. Clam Cove is across the bay from Davidson's Cove, the known quarry site for the ubiquitous Scots Bay cherts (Deal 2004a). The ecozones around Clam Cove include marine species such as shad (*Alosa sapidissma*), sturgeon (*Acipenser sturio*), Atlantic lobster (*Homarus americanus*), green crab (*Carcinus maenas*), rock crab (*Cancer borealis*), the Atlantic rock crab (*Cancer irroratus*) (Bromley and Bleakney 1984). The mudflats contained a large clam bed; the wet wood undergrowth in the mixed coniferous/deciduous forest provided bunchberries, maple and birch firewood, and fir and spruce for medicine. Within a 20 minute walk bottom lands and estuary ecozones located around the current town of Scots Bay would have provided other berries and open wood species.

The Clam Cove, Melanson and St. Croix sites are located within three major ecozones, suggesting that other Late Woodland sites may be located in areas where mudflats, estuary, and bottom lands converge.

6.5 Conclusion

The same plant species were constantly used and likely collected at every site used by the Late Woodland groups in the Minas Basin. These three sites indicate the heavy reliance on the same plant species for food, medicine, firewood, and other uses. These plants and the ecozones they were located in would be sought out when traveling around the area. The plant remains also indicate that the Clam Cove site was actually a central point between the quarry site and a number of rich ecological zones including mudflats, wet woods on site, and estuary and bottom land zones where the town of Scots Bay is currently located. These ecozones provided the same edible and medicinal species and trees for firewood as the village sites, which is why they chose this location.

Understanding that Late Woodland groups would have utilized areas with particularly important plant resources can aid in locating sites. The mudflat, estuary, bottom land and ravine ecozones were highly utilized at the Melanson, St. Croix and Clam Cove sites. These zones had similar plant species recovered and can suggest possible zones for other sites.

Chapter 7 The Future of Floral Studies in the Minas Basin

I have achieved the goals set out in the introduction of this thesis by recovering identifying and analyzing floral remains from the Clam Cove site. My analysis indicates a wide variety of plant species were available at Clam Cove to mobile hunter-gatherer groups during the Late Woodland. As well I have pinpointed a specific group of berry plants (blueberry, raspberry, elderberry, bunchberry and cherry) and medicinal plants (balsam fir, blueberry, elderberry, and wood sorrel) utilized not only at Clam Cove but at the village sites on the Melanson and St. Croix Rivers. It is likely that the group(s) which utilized these villages looked for these specific edible and medicinal plant species before setting up new campsites.

This research is a valuable first step toward implementing large scale floral studies throughout the Minas Basin region. Future studies could emulate Monckton's Huron palaeoethnobotanical study, in which he gathered floral data from four village sites to reconstruct the Huron diet and investigate how large populations could have been sustained with wild and domesticated plant foods (Monckton 1992:1). Intensive sampling procedures implemented at the Melanson and St. Croix sites might facilitate similar statistical analyses to learn about the dietary needs of Late Woodland groups. Hopefully this thesis has illustrated how floral data can increase our knowledge of intangible social and cultural aspects, and will serve as a model for future floral research in the Maritime Provinces.

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Appendix A

Complete list of plant species identified at the Clam Cove site 1989-2005 field seasons.

Family *Genus species* (Authority)	Common Name	Part	1989	2004	2005	Total
Anacardiaceae						
Rhus typhina (L.)	Staghorn Sumac	Seed		1		1
Asteraceae						
Achillea millefolium (L.)	Yarrow	Seed			1	1
Artemisia vulgaris	Common Mugwort	Seed			3	3
Aster cordifolius (L.)	Heart-leaved Aster	Seed		1	1	2
Aster macrophyllus (L.)	Large-leaved Aster	Seed			1	1
Aster sp. (L.)	Aster	Seed			1	1
Chrysanthemum leucanthemum (L.)	Ox-eye Daisy	Seed			2	2
Cirsium sp. (Mill.)	Thistle	Seed			1	1
Taraxacum officinale (Weber)	Dandelion	Seed		1		1
Compositea	Aster family	Flower		2	1	3
Compositea	Aster family	Seed		2	2	4
Asclepiadaceae						
Asclepia sp. (L.)	Milkweed	Seed			2	2
Berberidaceae						
Berberis vulgaris (L.)	Common Barberry	Seed			4	4
Betulaceae						
Alnus crispa (Ait.) Pursh	Green Alder	Seed		1	1	2
Alnus rugosa (DuRoi) Spreng	Speckled Alder	Seed	5	3	10	18
Alnus sp. (B. Ehrh.)	Alder	Catkin			2	2
Alnus sp.	Alder	Seed			2	2
Alnus sp.	Alder	Cone			27	27
Betula lutea (Britt.)	Yellow Birch	Seed		18	66	84
Betula lutea	Yellow Birch	Bract			1	1
Betula papyrifera (Marsh.)	Paper Birch	Seed		113	149	261
Betula populifolia (Marsh.)	Grey Birch	Cone			1	1
Betula sp. (L.)	Birch	Bract		2	7	9
Betula sp.	Birch	Cone		5	2	7
Betulaceae	Birch family	Seed		1	23	24
Brassicaceae						
Barbarea vulgaris (R.Br.)	Yellow Rocket	Seed	1		7	8
Brassica juncea (L.) Coss	Indian Mustard	Seed			1	1
Brassica kaber (DC) L.C. Wheeler	Common Mustard	Seed			1	1
Diplotaxis sp. (DC)		Seed			1	1
Nasturtium officinale (R.Br.)	Watercress	Seed			2	2
Brassicaceae	Mustard family	Seed	3			3
Caprifoliaceae						
Sambucus canadensis (L.)	Common Elderberry	Seed	4	3	22	29

Chenopodiaceae						
Corispermum hyssopifolium		Seed			1	1
Cistaceae						
Lechea villosa (L.)	Pinweed	Seed			1	1
Cornaceae						
Cornus canadensis (L.)	Bunchberry	Seed		1	18	19
Cupressaceae						
Thuja occidentalis (L.)	Eastern White Cedar	Seed			1	1
Cyperacea						
Eleocharis sp. (R.Br.)	Spike-rush	Seed			1	1
Scirpus sp. (L.)	Bulrush	Seed		2	5	7
Cyperacea	Sedge family	Seed		4		4
Ericaceae						
Vaccinium angustifolium (Ait.)	Low Sweet Blueberry	Seed			1	1
Vaccinium corymbosum (Torr.)	Highbush Blueberry	Seed		2	46	48
Vaccinium vacillans (L.)	Early Sweet Blueberry	Seed			1	1
Fabaceae						
Trifolium repens (L.)	Clover	Seed		1		1
Vicia sp. (L.)	Vetch	Seed			8	8
Juncaceae						
Juncus sp. (L.)	Rush	Seed			5	5
Laminaceae						
Stachys sp. (L.)	Hedge-nettle	Seed		1		1
Najadaceae						
Potamogeton sp. (L.)	Pondweed	Seed		1	23	24
Oxalidaceae						
Oxalis stricta (L.)	Wood sorrel	Seed			19	19
Pinaceae						
Abies balsamea (L. Mill)	Balsam Fir	Bract		1		1
Abies balsamea	Balsam Fir	Needle		1	31	32
Abies balsamea	Balsam Fir	Seed		1	1	2
Larix larincina (DuRoi)K. Koch	Tamarack	Seed		12	3	15
Picea glauca (Moench) Voss	White Spruce	Needle		57	1081	1138
Picea glauca	White Spruce	Seed		335	157	492
Picea mariana (Mill.) BSP.	Black Spruce	Needle	17	2		19
Picea rubens (Sarg.)	Red Spruce	Bract		1		1
Picea sp. (Dietr.)	Spruce	Cone		1		1
Picea sp.	Spruce	Seed	2	2	29	33
Picea sp.	Spruce	Bract		8	9	17
Poaceae						
Arrhenatherum elatius (L.) Mert. & Koch	Tall Oat Grass	Floret		1		1
Anthoxanthum *odoratum* (L.)	Sweet Vernal Grass	Floret			1	1

Echinochloa crusgalli (L.) Beauv.	Barnyard Grass	Floret		11	246	257
Glyceria sp. (L.)	Mannagrass	Floret	5	7	7	19
Graminae UNID 2	Grass	Seed			124	124
Graminae	Grass Family	Floret				
Panicum latifolium (L.)	Panic Grass	Floret		7	144	151
Setaria sp. (Beauv.)	Green Foxtail	Seed			1	1
Sorghastrum nutans	Indian Grass	Seed			1	1
Polygonaceae						
Polygonum natans (Eaton)	Water Smartweed	Seed			10	10
Polygonum sagittatum (L.)	Arrow leaved Tear Thumb	Seed			1	1
Rumex acetosa (L.)		Seed			10	10
Rumex acetosella (L.)	Sheep Sorrel	Seed		1	36	37
Rumex longifolius (L.)	Long leaved Dock	Seed			31	31
Rumex maritimus (L.)	Golden Dock	Seed	5		54	59
Rumex obtusifolius (L.)	Broad leaved Dock	Seed			21	21
Rumex sp. (L.)	Dock	Seed	3		21	24
Rosaceae						
Aronia sp.	Chokeberry (Medic.)	Seed	1		1	2
Fragaria virginiana (L.)	Strawberry	Seed			66	66
Rubus sp. (L.)	Raspberry/blackberry	Seed	26	614	667	1281
Rubus sp.	Raspberry/blackberry	Embryo			1	1
Rubus sp.	Raspberry/blackberry	Thorn	1			1
Potentilla sp. (L.)	Cinquefoil	Seed			268	268
Prunus virgininana (L.)	Pin Cherry	Seed			1	1
Taxaceae						
Taxus canadensis (Marsh.)	Ground hemlock /Yew	Seed			1	1
Unknown species Moss					55	55
Unknown species Conifer Bract					11	11
Unknown species Seed embryo			1			1
Unknown species Tree Buds				63	12	75
Unknown species Uncharred Seed			11		43	54
Unknown species Charred Seed					7	7
Unknown species Fruit					2	2
Totals			86	1292	4171	5463
Cenoccum graniforme	Fungal sclerotia		31	204	4162	4366

Appendix B

Complete list of tree species for the Minas Basin region.

Tree species available in the Minas Basin Region.

Family	Genus species	Authority	Common name
Aceraceae	*Acer negundo*	Linneaus (L.)	Manitoba maple
	A. pensylvanicum	L.	Striped/moose maple
	A. platanoides	L.	Norway maple
	A. pseudoplatanus	L.	Sycamore maple
	A. rubrum	L.	Red maple
	A. saccharinum	L.	Silver maple
	A. saccharum	Marsh.	Sugar maple
	A. spicatum	Lam.	Mountain maple
Betulaceae	*Alnus crispa*	(Ait.) Pursh	Green alder
	A. rugosa	(DuRoi) Spreng.	Speckled alder
	Betula lutea (also B. alleghaniensis)	Britton	Yellow birch
	B. papyrifera	Marsh.	Paper/white birch
	B. populifolia	Marsh.	Grey birch
Fagaceae	*Fagus grandifolia*	Ehrh.	Beech or American beech
Pinaceae	*Abies balsamea*	(L.) Mill.	Balsam fir
	Picea glauca	(Moench) Voss	White spruce
	P. mariana	(Mill.) B.S.P.	Black spruce
	P. rubens	Sarg.	Red spruce
Salicaceae	*Populus balsamifera*	L.	Balsam poplar
	P. grandidentata	Michx.	Largetooth aspen
	P. tremuloides	Michx.	Trembling aspen