

Chapter 2: The ethnoecology of *moolks* (Pacific crabapple, *Malus fusca*) by the Gitga'at people in Hartley Bay, British Columbia

"We used to have fun, see who was going to pick the most...climbing up the *moolks* trees" – Elizabeth Dundas

2.1 Introduction

Pacific crabapples (*Malus fusca*, (Raf.) C.K. Schneid.), as shown with my literature review in the first chapter of this thesis, have been an important resource for Indigenous Peoples throughout the coastal regions of western North America where this species occurs. The fruit was widely eaten (Turner, 1995; Turner and Thompson, 2006) and was historically an important trade item (Turner, 1995; Turner, 2004; Turner and Bell, 1973). The hard wood was used for making tools and implements (Turner, 2007) and the bark (and sometimes leaves and root bark) was an important medicine (Gunther, 1973; Turner and Hebda, 1990). Throughout the rest of this chapter I will often refer to Pacific crabapple as *moolks*⁶, its name in *Sm'algyax*, the language traditionally spoken by several Coast Tsimshian peoples, including the Gitga'at.

As stated in chapter 1, *moolks* can be considered a "cultural keystone species" for the Gitga'at. Historically, crabapples were not only widely used and traded, but there are suggested and documented cases of anthropogenic translocation reflected in crabapple trees growing in atypical habitats and outlying locations (Burton, 2012; Downs, 2006; Johnson, 1997; Turner *et al.*, 1990), and of people managing crabapple 'orchards'

⁶ Occasionally I will also refer to the fruit of the *moolks* as berries, particularly in quotations, as this is a colloquial term the interviewees often used. While the elders often called *moolks* fruits 'berries', botanically they are not morphologically similar to fruit types commonly considered berries, such as blackberries (*Rubus* spp.) or blueberries (*Vaccinium* spp). Botanically, apple fruits are considered to be a pome.

(Downs, 2006; Turner, 2004). Furthermore, several Indigenous groups, including the Gitga'at, recognize different named varieties of crabapple, based mainly on the characteristics of their fruit (Compton, 1993; Turner and Thompson, 2004). While the number of groups that recognize named varieties documented in this literature review is restricted, anecdotal evidence indicates that recognition of varieties may be more widespread than is represented in this literature review, both with regards to the number of Indigenous groups that recognize varieties, and the number of varieties that are recognized (Douglas Deur, pers. comm.; Chief Adam Dick, pers comm.; Nancy Turner, pers comm.). This was also seen Marjorie Hill's comment (from this study) that there were many *moolks* varieties in Gitga'at territory, but she didn't know the names for all of them.

In addition to the Gitga'at, Compton (1993) recorded that the Hanaksiala, Haisla and Kitasoo all also differentiate between a regular sour variety and a sweet-fruited variety, as well as the Haihais and Heiltsuk being aware of differences but not specifically differentiating varieties. The Haisla and Hanaksiala people commented that the sweet crabapples are distributed sparsely compared to the regular crabapples, and they only grow in areas relationally distant from the regular crabapples (such as at Kildala and the head of the Kitlope River). The Kitasoo recognized their sweet variety because the fruit was smaller than regular crabapples (Compton, 1993), a feature that the Gitga'at also recognize with the sweet variety they have. Based on Compton's (1993) linguistic analysis, the Kitasoo term for 'sweet crabapples' is *ga səsi*, similar to the Gitga'at term, since they also speak a Tsimshianic language, and the term for the sweet crabapple for the Hanaksiala and Haisla people is *qemq^oec*. Both of these terms are

differentiated from the terms for regular crabapples. One of Compton's (1993) interviewees identified the sweet variety as being Indian Plum (*Oemleria cerasiformis*), but as this species does not grow this far north (Klinkenberg, 2010), it was likely mis-identified.

This fine level of Indigenous varietal differentiation has been noted for other species as well (Deur, 2000; Garibaldi 2009; Peroni *et al.*, 2007). Deur (2000) noted that some highly cultivated plant species on the Northwest coast appear to produce larger, sometimes sweeter fruits, and some plant populations that have had a history of intense or prolonged cultivation appear to be distinct from populations not exposed to this. As can be seen in the results of this thesis, and throughout the literature I presented earlier, when management practices and human selection cease, varietal differentiation has frequently diminished. These varieties may be disappearing either because management was allowing specific varieties to flourish (Deur, 2000), or because people do not recognize these varieties anymore due to knowledge loss. Deur (2000) suggests that some of these domesticates, or proto-domesticates, may have disappeared relatively recently after contact, and thus have not been recorded. While these ideas are largely conjecture at this point, with studies such as this one, and others, we may be able to elaborate on the possibility of species that have been culturally influenced to adopt unique varieties, by recording TEK and conducting morphological, ecological and genetic surveys.

Currently crabapples are not used as frequently as in the past in Indigenous Peoples' diets, and much of the knowledge about the different varieties that were recognized, and about harvesting, processing and serving techniques for the fruits, is disappearing, as is knowledge about the management of the trees and key locations of

crabapple populations (Turner and Turner, 2008). One of the reasons I was interested in studying this species is that the different varieties recognized by some Indigenous groups, lead to a more differentiated classification scheme for this plant than is reflected in western science (Klinkenberg, 2010).

Ethnoecology is often defined as a multidisciplinary study examining the relationship of how humans interact with the environment around them, both with regards to biotic and abiotic factors (Nazarea, 1999). Here I present knowledge shared by Gitga'at elders during interviews and conversations, and from my own participation, regarding ethnoecological details about how they recognized and used different crabapple varieties, traded these fruits to other indigenous groups, tended the trees and recognized harvesting rights.

2.2 Methods

Ethnoecological and ethnobotanical studies examine the complex links between humans and their environments, creating a multidisciplinary approach that includes concepts and methods from a range of social and natural sciences (Alexiades, 1996; Martin, 1995; Nolan and Turner, 2011; Schultes and von Reis, 1995). In this particular study, I collected and analyzed my data using a mix of methods that included interviewing, participant observation, taxonomy and ecology.

2.2.1 Introduction to the community

The groundwork for this project was started several years ago. Throughout my undergraduate degree, I have visited several Indigenous communities, but in particular I spent time with the Gitga'at in Hartley Bay, and the Kwakwaka'wakw in Kingcome Inlet, under the guidance of Drs. Nancy Turner and Doug Deur on my committee.

Through these experiences, and my reading of the literature, I realized that crabapples are an important resource for many Pacific Northwest Indigenous Peoples, and these people exhibit similar relationships to this species. This comparative perspective led me to recognize the broader question of the regional and local importance of this species.

I was originally introduced to the Gitga'at community at Hartley Bay in August of 2007, when I visited the community with my supervisor, Dr. Nancy Turner, as an undergraduate student. At the time, the community members I talked with seemed receptive to the possibility of a project documenting their knowledge of crabapples, so when I started an M.Sc. degree at the University of Victoria in September 2010, I continued to explore this research opportunity.

In January 2011, I emailed a letter to Chief Albert Clifton (*Wamoodmx*, head chief of the village, Killer Whale), Chief Ernie Hill Jr. (*Snaxe'et*, head Eagle chief) and Killer Whale matriarch Mrs. Helen Clifton with a more detailed project outline. After an appropriate time interval, I called Chief Albert Clifton and received verbal permission to proceed with the planning of this research, in particular applying for grants and completing an application for Human Subject Research Ethics approval through the University of Victoria.

2.2.2 Interviewee recruitment

In May 2011 I visited the community and was re-introduced by Nancy to matriarch Mrs. Helen Clifton and Chief Ernie Hill Jr., to discuss my planned fieldwork season for the fall of 2011. In late August 2011, I returned to Hartley Bay to become more familiar with the community and commence interviews, and stayed until the middle

of December 2011. I interviewed elders and adults (aged about 60-90 years old) in the community who either currently harvested and preserved *moolks*, or had knowledge of past experience with this fruit. This group of people not only knew about the cultural importance of *moolks*, but also hold knowledge to varying degrees of the different varieties and techniques of management, ownership of stands, and harvesting and processing of fruit. I interviewed people who had agreed to share this knowledge, not only to be preserved in the written records, but also to convey it to the younger generations of the Gitga'at community. Mrs. Helen Clifton's guidance in the beginning of this research was extremely important. She provided suggestions of people to talk to, and helped me learn which questions to ask. This study includes information from interviews with seven Gitga'at participants, with comments from two additional people.

2.2.3 Ethics consent

As a part of my commitment to securing approval from the Human Research Ethics Board at UVic (Ethics Protocol Number 11-262), before commencing an interview, all participants were given a letter of information about the project and a consent form to sign if they had agreed to participate, outlining constraints around ongoing consent, anonymity of data, confidentiality, rights to withdraw from the study, potential risks, dissemination of results and disposal of data, which is required when learning about cultural information (Appendix 1). I obtained verbal consent from all of the elders that I interviewed to go to the harvesting locations and collect fruit, leaf and branch samples for morphological measurements and genetic profiling. Some community members and leaders raised concerns, both when I initially re-contacted the community in January 2011, and

during my fieldwork in the fall of 2011, that I should not disclose the locations of particular *moolks* trees I might learn about in my research. Therefore, although I recorded the sites and locations of these trees on maps with the assistance of elders, I agreed not to release these maps outside the community. However copies of these maps are archived at the Hartley Bay Band Office. Specific *moolks* tree locations are therefore not disclosed in this thesis, and neither these locations nor even the general fall harvesting camp location are delineated here.

2.2.4 Interview process

I conducted initial interviews with Gitga'at participants between September and December of 2011, using a semi-structured interview format. Interviews were conducted in English, but all interviewees also knew the local indigenous language of *Sm'algyax*, so could contribute words and phrases pertaining to *moolks*. Interviews typically lasted one to two and a half hours, and occurred in the participant's home. Interview questions can be found in Appendix 2. Through responses to these questions, I learned basic ethnobotanical information about *moolks* (focusing on fruit use, but also on uses of other parts of the tree) specific to the Gitga'at, including how and where the *moolks* are collected, the timing of the harvest, processing techniques (including tools used), how each different variety was and is recognized and used and the cultural significance and linguistic terminology specific to *moolks* and its varieties. I also asked questions about ownership practices, translocation events, management or tending of crabapple trees, and the significance of *moolks* in a Gitga'at worldview.

In my first field season I was not able to take elders up to traditional crabapple

harvesting locations. However, Ken Josephson, Department of Geography, UVic, created four poster-sized maps from composite images of Gitga'at territory taken from www.bing.com/maps. I asked participants to point out locations of *moolks* varieties and other cultural information on these maps during interviews. In my second field season, August-September 2012, I conducted follow-up interviews to capture elements or questions I had missed the first time and provide clarification on certain points. I also arranged to take one of the elders to the location where *moolks* were traditionally harvested, to provide on-the-ground-knowledge and insights.

2.2.5 Interview analysis

I recorded the interviews, when given permission, using a Zoom H1 recorder, and I transcribed them by listening to them with the help of ExpressScribe and typing them into a Microsoft Word document, creating a transcript record for each interview. I coded my interviews by copying my interview questions into a blank Microsoft Word document, and then, for each interview, inserting the relevant interview paragraph under the question that it answered. After using this broad sort, I continued to refine the interview paragraphs, and synthesized similar data between interviews, until I succinctly answered the interview questions with the collected data. Through this refinement, I identified themes, outliers and gaps in the interviews to address the research questions.

2.3 Results

2.3.1 Interviewee background

As noted, I interviewed seven elders, two men and five women in the Gitga'at community. I also had a casual conversation with one adult man, but did not conduct a

formal interview; additionally, Lynne Hill, the wife of Ernie Hill, Jr., assisted in a group interview with him and Marjorie Hill. All but one of the participants grew up in the village of Hartley Bay (the one who didn't had married into the community). While all the elders interviewed spoke *Sm'algyax* as well as English, nuances of accent and words could vary depending on where one or both of their parents had originally come from. The elders mostly learned their knowledge about *moolks* from grandparents, aunts and uncles. Much of this knowledge about *moolks* had been passed down to the participants by two very influential people in the community: Lucy Clifton (*No'o*) and Heber Clifton (*Hadi'ix*), the grandparents of several of the elders and the founders of the current village site in Hartley Bay, during the early to middle twentieth century (Turner *et al.*, 2012).

The names of the participants who so graciously helped me in this research are Hereditary Chief Albert Clifton (*Wamoodmx*), Hereditary Chief Ernie Hill, Jr. (*Snaxe'et*), Helen Clifton, Elizabeth Dundas, Belle Eaton, Marjorie Hill, Margaret Semigool ('Goolie') Reece, Lynne Hill and Rufus Reece. I learned unique stories from everyone, and a range of details on *moolks* harvesting and use. Much of the knowledge I recorded was told to me by multiple interviewees and so is not attributed to certain people here, but in some cases, when only one or two people reported some detail, I have attributed it to them. This research could not have been done without the help and knowledge from every single one of the elders with whom I worked. The quotes in the tables below are from single interviewees, but the sentiments represented in each quote were often expressed by more than one person.

2.3.2 General Gitga’at Knowledge of *moolks*

All of the participants interviewed in this study knew about and used *moolks* as an edible fruit. In addition, Hereditary Chief Ernie Hill, Jr. had heard of a man using the tough wood of the *moolks* tree to substitute for a broken propeller on the engine of his boat in an emergency situation. No other uses of the wood, or medicinal uses of *moolks* were noted, nor did anyone share stories or legends that mentioned *moolks*.

Overall, people recognized five distinct varieties of *moolks* (Table 2.1), as well as having a category for over-ripe fruits of any variety (*dickwan*). However, Marjorie Hill also noted “there’s lots of different kinds up at Old Town, but I wouldn’t know what to call them.” The fruit of the five varieties was recognized as being different both visually and in taste, and were often used for different purposes. The physical descriptions and usage patterns of each of these varieties are further delineated later, in Section 2.3.10.

Table 2.1. *Moolks* varieties, as identified by Gitga’at interviewees. English translations from Turner and Thompson (2006).

Variety name	English translation	Brief description
1. <i>Gasasii</i>	“long legs”	small sweet tasting crabapples with long stems on the fruit
2. <i>Bu’uxs</i>	A word referring “to a move in the game of marbles”	larger crabapples that stay green when ripe; very sour tasting
3. Auntie Edith’s or Grandma <i>Dawł</i> ’s <i>bu’uxs</i>	The patch of <i>bu’uxs</i> belonging to a certain individual	Crabapples slightly smaller than <i>bu’uxs</i> ; sour tasting
4. <i>Moolks sigawgaaw</i>	“crow’s crabapples”	crabapples red on one side when ripe; sour tasting
5. <i>Sm-moolks</i>	“real crabapple”	a residual category of crabapples; the most common type, not belonging to one of the other varieties, sour tasting
6. <i>Dickwan</i>	over-ripe fruits	skin brown, flesh soft (almost liquid)

2.3.3 Location of *moolks* harvesting

Moolks are common throughout the entire Gitga'at territory, but they were mostly harvested in the estuary and river system where the Gitga'at fall harvesting camp has traditionally been located, an approximately 45-minute power boat ride away from Hartley Bay. The fact that this is a traditional *moolks* harvesting locale is partly due to the fact that the people would have been living there in the fall, when the *moolks* fruits are ripe, as they were harvesting other foods as well. Marjorie Hill also noted, however, that "they don't pick *moolks* around here [Hartley Bay], they [are] wild" and that the area around the fall camp has "the best *moolks*". Due to the need to protect these harvesting locations, they will not be named in this thesis, nor will a specific map of the area be provided. A map of the Gitga'at territory in its entirety is provided in Chapter 1 (Figure 1.2). Location was an important identifying characteristic when people were determining the variety. Each variety was said to grow in different parts of the estuary and river system at the fall harvesting camp, but several of these variety-specific areas were located relatively closely to each other (i.e. within 100 m). *Moolks* found outside these specific harvesting locations were often classified as the *sm-moolks* variety, since *sm-moolks* refers generally to any *moolks* not classified as being in one of the other four varieties.

During my fieldwork at the fall harvesting camp, I observed that the *moolks* trees tend to have a clumped distribution (higher concentration of trees per unit area) and a somewhat ordered appearance in some locations, which is structurally different from wild populations I have encountered in my personal observations in many different geographical areas through British Columbia. Through these observations and records in the literature, areas with a history of intensive historic occupation tend to exhibit the characteristics described above. At the Gitga'at fall harvesting camp, the locations were

crabapples were found clustered where also areas where the river was edged with a wide swath of grasses and sedges (Figure 2.1). While my interviewees did mention the transplantation of *moolks* trees, which I describe in detail below, these were isolated incidents. No description was provided as to why the trees are arranged in this growth pattern, which I refer to as ‘orchards’, although it could be hypothesized that this is an unintended result of management practices, such as inadvertently leaving fruit behind while harvesting. As well, while this growth pattern may reflect the natural spread of crabapples by sucker shoots, some trees are widely spaced, which indicates other (perhaps human assisted) factors may also be at play in some locations.

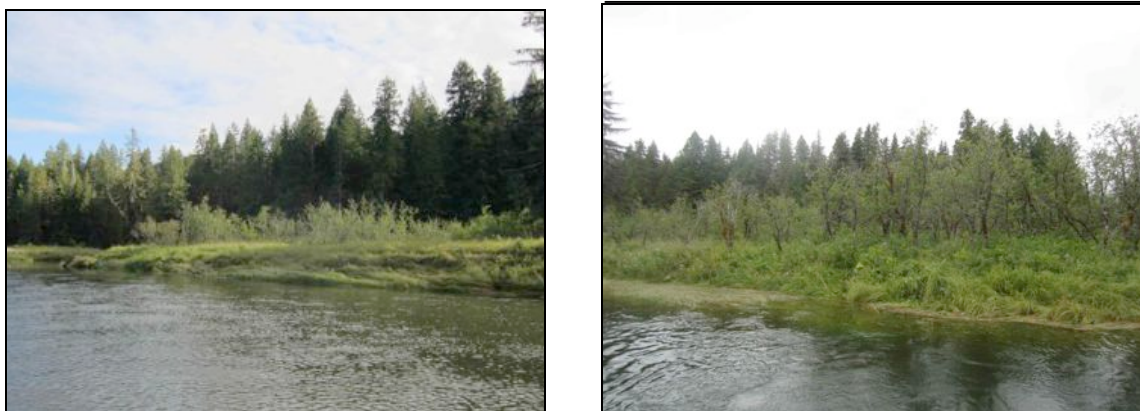


Figure 2.1. Two *moolks* “orchards” along the riverbanks at the fall harvesting camp, in their natural habitat, showing how the trees are grouped together, 30 August 2011.

2.3.4 Ownership of *moolks*

There were some locations where *moolks* could be harvested by anyone and everyone in the Gitga’at community. The entire river and estuary system of the fall camp, plus the area along Douglas Channel between the camp and present-day Hartley Bay is the traditional territory of the chief of the head clan, the *Gispwudwada* (Killer Whale) clan. When Hartley Bay was resettled, *Hadi’ix* (Heber Clifton) led this clan. The position was later held by *Hadi’ix*’s youngest son, Johnny Clifton, *Wahmoodmx* (the late husband of Helen Clifton), and the current chief is Hereditary Chief Albert Clifton, Johnny and

Helen's son, who now holds the name *Wahmoodmx*. Under traditional protocol, people of all clans could harvest throughout the whole area, but they would give some crabapples, salmon, or other harvested resources to this chief as a tribute, before harvesting for themselves in this area.

While *moolks* throughout the majority of the fall camp estuary and river system did not fall under the care of any particular individual, there were two specific *moolks* locations in this region that belonged to identified individuals, women in the generation or two earlier than that of the elders to whom I talked (mid-late 1800's). The first of these, already mentioned, are the *moolks* trees that belonged to Grandma *Dawł*, or Auntie Edith Robinson. Edith (*Dawł*) Robinson (*neé* Clifton) was *No'o* and *Hadi'ix's* daughter and Johnny Clifton's sister. I was told that she was given rights to this harvesting spot from her mother-in-law. Edith was a member of the *Laxsgiik* (Eagle) clan, but she was married to William Robinson, who belonged to the *Ganhada* (Raven) clan through his mother's lineage. Edith's mother-in-law, Agnes Robinson, was married to the *Gispwudwada* (Killer Whale) hereditary chief, Ambrose Robinson (*Inta'wii Waap*). Edith was adopted into the *Ganhada* clan by her mother-in-law, through which she received the name "*'Wii Sawgm Gyemk*", and the *moolks* harvesting site that came with this name, plus any other associated resources, despite being born into the *Laxsgiik* clan through her mother (*No'o*, Lucille Clifton). Other people could not pick these *moolks* without express permission from Edith. Another owned patch of *moolks* close to Grandma's *Dawł*'s patch, was a harvesting spot belonging to *Jiis-um-gil-howly*, Flora Bates (*'Wii Hanax*, Killer Whale), wife of James Bates (*Yellam*, Eagle), but I did not learn any more details about this instance.

2.3.5 Management of *moolks*

When asked directly if they managed *moolks* trees to increase the quantity or quality of their fruit, several of the interviewees said no. It seems that some elders do not consider their practices to officially be “management” techniques. However, when they were asked for more details, several of the practices and guidelines they described (Table 2.2), including monitoring the trees and harvesting the fruit in a sustainable way, could be considered to constitute management strategies. These practices could be so engrained in their view of resource care that they would not consider them to be specific management practices associated with *moolks*.

People followed several guidelines when picking *moolks*. One of these was that you shouldn't break the branches, or cut the trees down when you were picking. I was told of one instance where someone did cut the trees down, for easier picking (supposedly in the last 20 years or so), and, it was said, they didn't grow back. Many people were not happy when this happened. Another guideline people followed was to pull out small non-*moolks* trees and bushes that were growing around the base of the *moolks* trees, and generally clean up or clear the area of brush.

This reportedly reduced competition for nutrients, and possibly increased sunlight levels as well, for the *moolks* trees, and allowed people to spot the wild animals (particularly bears) that also love picking *moolks*, before they approached too closely. Since women were the main harvesters of *moolks*, they also did most of the “managing”, but occasionally men would as well. Another common theme running through people's interviews was also that the *moolks* aren't nearly as plentiful as they used to be, which is said to be because people are not picking them anymore. It was also said that the fruit are

of poorer quality than formerly, at least in the current memory of the elders to whom I talked.

Through the practice of clearing and cleaning up around the trees, people would have created a more open landscape than would likely have occurred without this human intervention. As well, when both humans and bears picked fruit, they would be pruning the trees, creating opportunities for new growth and opening up the canopy. Fruit would also likely be forgotten and left behind in the ground (or in the case of bears, deposited in their excrement) which would increase the density of crabapples trees when the seeds germinated. As I discuss in section 2.3.13 concerning the current state of the *moolks*, it was obvious to me that the landscape had been influenced by human interference, as described, but that when I visited, the trees were looking overgrown and unhealthy (see Figure 2.12). Both the photographic evidence, and the interview quotes from the elders in Table 2.2 supports the idea that this landscape evolved in conjunction with the management practices described above, but they have fallen into disuse in recent times, which has greatly reduced the quantity and quality of *moolks* trees and fruit.

Almost everyone said that *moolks* were managed in the fall, just before people picked the fruits. Albert Clifton added to this that they would prune and clear away before they started picking in the fall, but would also go up in the early spring to care for the *moolks*, after visiting the spring camp. As Elizabeth Dundas described with her quote in the table below, *moolks* trees themselves were not manipulated during phenological events such as blooming or sprouting. This made the fall season the obvious time of year to manage, coincidentally the time of the year when people were also inhabiting the area. Since management practices involve time and energy, not all trees were managed.

Elizabeth Dundas mentioned that only the special varieties in localized regions were taken care of; since the *sm-moolks* variety can be found everywhere, these trees would have been too numerous to practice frequent management on, especially when they occurred outside of region surrounding the fall harvesting camp.

Table 2.2. Quotes from Gitga'at elders relevant to the quality of *moolks*.

Context	Quote	Interviewee
<i>Moolks</i> aren't growing as well as they used to	"You're just...clipping them off, but, like I say...I think the <i>moolks</i> fields up there grew so well because the people were picking them all the time and it's just like any...plant, you're taking [the] shoots off, and so then it grows well".	Helen Clifton
<i>Moolks</i> are bad quality	"They're <i>gwe'a</i> [poor] looking now... cause they're not picked...because nobody picks it anymore."	Marjorie Hill
Timing of management	"You can't touch them while they're still blooming...or early in the spring...cause they're starting to sprout"	Elizabeth Dundas

2.3.6 Transplanting *moolks*

I was told about three instances of *moolks* being transplanted. In the first instance, several people told me about *gasasii* trees being moved from where that particular variety grows at the traditional fall harvesting camp to behind 'the big house' in Hartley Bay. 'The big house' was the name for the house where *No'o* and *Hadi'ix*, along with several of their adult children and their families lived. I heard differing stories about whether Herbert and Mabel Ridley (Belle Eaton's parents) or Bob and Mary Clifton moved these tree, but either way, Belle Eaton commented that they were moved down because people wanted "to see if they'll grow here...to see if they'll grow good." Several *gasasii* trees were planted in this location. The exact date of when these trees were brought down was not known, but Helen Clifton said that when she moved to Hartley Bay in 1942, they

were already growing behind the house. In fall, 2011, I found one small tree behind the big house (Figure 2.2), which several elders identified as being of the *gasasii* variety based on its fruits (see Figure 2.11, Section 2.3.10). However, when I looked again in fall 2012, the tree was gone. It appears that when maintenance crews were removing invasive Himalayan knotweed (*Polygonum polystachum*) in the summer of 2012, they also took out the tree by accident.



Figure 2.2. The *gasasii* tree planted behind ‘the big house’ in Hartley Bay, BC, now gone, 29 November 2011.

At the same time these *gasasii* trees were moved down to Hartley Bay, a few other *gasasii* trees from this same original location were moved to a different spot within the general harvesting area, behind the smokehouses that were next to the camp houses where people lived while they were harvesting at the fall camp. The elders said that the trees aren’t there anymore. It was thought they were taken out when the old smokehouse was torn down. Goolie Reece said that they moved trees to this place because they “just wanted to do it”. When I was visiting the fall camp in the fall of 2012, I did not notice

any *moolks* trees growing around the houses, which supports the elders' worry that they have been taken out.

Elizabeth Dundas described the third case of transplanting. Her father moved a few trees down from an unknown location at the fall camp to the area behind her old house in Hartley Bay (which has since burned down) because “he just wanted to see how it would be...in Hartley Bay”, and Elizabeth remembered the fruit tasting sweeter from the transplanted trees. Elizabeth remembered them growing well at first; “It started to grow, but...it’s dying off now”. Somehow, she said, the variety appears to have changed too. She wasn’t sure which variety he moved, but she thought it was *sm-moolks*, or maybe *gasasii*. When we went to look at trees still present in the area, she said that it seemed that the variety had changed and she thought it was either *sm-moolks* or *moolks sigawaaw* now. However, this could be due to different trees now occupying this area than were originally transplanted here.

In all of these cases, the interviewees said that the trees would have been moved in the fall, after the fall harvesting was finished.⁷ All said that small *moolks* trees were dug up and moved to the new locations. *Gasasii* was the most common variety moved, most likely as it has sweet fruit, and people preferred to eat that one, particularly raw. Helen Clifton told me that there used to be a lot more *moolks* trees around the village of Hartley Bay, but they were chopped down as the village was developed. In addition to *moolks* being transplanted, several people also talked about highbush cranberries (*ʔaaya*, *Viburnum edule*) and stink currants (*waakyl*, *Ribes bracteosum*) being moved between various parts of the fall camp and Hartley Bay (Helen Clifton, Elizabeth Dundas).

⁷ As mentioned, Elizabeth Dundas told me that you “couldn’t touch them” when they are blooming, or in the spring, which would include transplanting them.

In all of the above cases, the transplanting incidents described to me were fairly isolated, involving only a few trees, and occurred fairly recently (approximately in the last 100-125 years). However, as I talk about in this chapter (particularly in sections 2.3.5 and 2.3.13), crabapple trees cluster in pockets of high stem density along the banks of the riverine and estuarine systems that are proximally located to the fall harvesting camp where the Gitga'at not only harvested *moolks*, but also other berries and animals. When this is compared to the pattern crabapple trees grow in outside of areas with a history of management (Wyllie de Echeverria, pers. obs.), it can be seen that theoretically unmanaged trees are much more widely scattered, and have a lower stem density per unit area.

Several people suggested that *moolks* grew so much better at the fall camp because the soil composition is different – the areas where the sweet *moolks* grow are quite sandy: “I guess it likes the river...they just don't grow here [Hartley Bay]” (Marjorie Hill). Helen Clifton noted that transplanted *moolks* may have been in a less productive environment at Hartley Bay since where they grow near the fall harvesting camp is an extremely rich riverine/estuarine system, fertilized by rotting salmon moved around by bears, which might have enhanced their growth; “This river system, [is] what made those berries grow so good”. It could be seen from the elders' comments that they believe the *moolks* grow quite well up at the fall camp in part due to an optimum soil composition and lots of fertilizer. However, I do not believe that this would solely count for the high density pattern. In Chapter 1, I reviewed several descriptions in the literature of crabapple growing near old (even possibly abandoned at the present time) camps (Downs, 2006; McDonald, 2005; Moss, 2005), and Burton (2012) even reported that the

Nisga'a people would bring crabapple trees with them when they moved to a new camp. I believe that the growth and density pattern we are seeing with regards to *moolks* on the landscape at the fall camp demonstrate the interactions between people and *moolks* for many generations, creating these orchard-like landscapes.

2.3.7 Timing of harvest

2.3.7.1 Season

In times past, people would usually go up to the fall harvest camp in June or July, and live there until they returned to Hartley Bay in late October or early November. According to Helen Clifton, they knew it was time to return to Hartley Bay when there was snow on the highest mountain across the channel, named '*Hali la mootk*'. During this time, *moolks* were usually collected between late August and mid-October, depending on seasonal variability. People told me that as they were already residing at the fall camp, fishing for salmon, they would monitor all species of berries until they were ripe and ready to pick. Some of the different *moolks* varieties ripened sooner or later than others, but in general the ripening timeframe for *moolks* is relatively short. There appeared to be considerable overlap in ripening times, and there was not total agreement on the order in which the varieties ripened, however this was probably due to external factors such as where people were harvesting, which of their elders were directing them, and inter-year seasonal variability. It is likely that *moolks* would have potentially been harvested at different times and in a different order depending on how the weather that year had affected the fruit ripening times. Chief Albert Clifton thought the *gasasii* ripened the first of any other *moolks*, at the end of August, Elizabeth Dundas said *sm-moolks* were ripened "later on" compared to *moolks sigawaaw* and *gasasii* and that *bu'uxs* may have been collected last, at the end of September (Helen Clifton,

Elizabeth Dundas), however Belle Eaton and Goolie Reece said *gasasii* ripened at the end of September, which would make *gasasii* the last variety of *moolks* to be harvested.

2.3.7.2 Indicators for start of harvest

There were several different ways to tell that the *moolks* fruits were ripe. Chief Albert Clifton noted that all the *moolks*, including sour varieties, would become slightly sweeter when ripe. This could in part be explained by the levels of stored sugar increasing throughout the growing season as fruit ripens, also seen in other fruits (Minore and Smart, 1975). Almost everyone also mentioned that most of the varieties would change colour as the fruit ripened, to varying degrees. Depending on the variety, the fruits would have a red-yellowish tinge to them, with even the green *bu'uxs* becoming more yellowish. In addition, several elders commented that ripeness was indicated through the colour of the seeds, as they would change from white to brown with maturity.

The condition of the fruit itself was the only indicator of ripeness. Since people were already at the fall camp, they would be monitoring the *moolks* visually, but they would stay busy harvesting other resources in their seasonal round (Section 2.3.7.5).

2.3.7.3 Level of ripeness preferred for harvesting

The *moolks* fruit were picked when they were almost ripe, "...because it doesn't take long for them to turn [become over-ripe, or *dickwan*] when it starts to rain" (Helen Clifton). *Moolks* fruits could be a bit harder and not fully ripe when they were picked because they would soften during the cooking process. Sometimes, however, people would allow some fruits to become very soft, dark brown and over-ripe, either on or off the trees, a stage called *dickwan* (described in section 2.3.10).

2.3.7.4 Rules about picking

The interviewees noted several general rules around picking *moolks*, although these were more similar to guidelines than firm rules (Table 2.3). For example, pregnant women wouldn't be allowed to pick because they might fall and hurt themselves. Another general rule was that the harvest would be shared with people who were not able to harvest anymore, such as some of the elders. In many of the interviews, it was mentioned that in the early days, the timing of when people would move to different areas throughout the seasonal round was organized by *No'o* and *Hadi'ix*. They would coordinate the rest of the village as they moved around, as they were responsible for providing for the village. *Hadi'ix* would organize the transportation and *No'o* would tell everyone when it was time to move. Another rule was that since not everyone owned a canoe, if you were invited to join someone else's canoe, such as *Hadi'ix*'s, you would give them some portion of your harvest in exchange for food and transportation (Chief Ernie Hill, Jr.). As well, if you contributed to someone's harvest beyond this, they would give a feast, or honour you with a gift (Turner *et al.*, 2012).

Although the *Gispwudwada* clan did not own individual *moolks* trees, because they were responsible for the entire area, all the people would pick for the *Gispwudwada* clan first when they were harvesting food at the fall camp. In return, *No'o*, as the head *Gispwudwada* chief's wife and *Laxsgiik* Matriarch, customarily gave a big feast in the fall "to feed all the people." Thus, everyone would help contribute towards this feast with their first harvest of the year for *moolks* and many other foods (Turner *et al.*, 2012). All interviewees described this tradition:

If the chief, or the chief lady had planned to have a fall feast, then the women would go and pick the *moolks*...for the chief lady...for the amount that she required, because she's gonna use that for her dessert...So then as soon as she has enough, then the *moolks* are free to anybody to pick (Helen Clifton)

Table 2.3. Quotes in context for harvesting rules

Context	Quote	Interviewee
Pregnant women don't pick <i>moolks</i>	"I guess sort of a known fact, pregnant women don't go...and pick...the <i>moolks</i> , you can work on them when they bring them back."	Helen Clifton
Share resources with those not able to harvest anymore	"They all worked together...and the sharing, there was no, sort of individual... you know... I got this, this is for me...[we] shared with elders that weren't physically fit. Our people say that it is returned to you"	Helen Clifton
<i>Hadi'ix</i> provided transportation	"He's the only one that had the big boat, and all the other people just had little canoes. When he's gonna go to <i>Kiel</i> [spring harvest camp], then the whole, he tows the whole bunch back"	Marjorie Hill
<i>No'o</i> plans seasonal movement	"Whatever <i>No'o</i> does, the whole village does it, as long as she doesn't move, nobody goes...So the whole village will have their share"	Marjorie Hill

2.3.7.5 Other resources harvested at the same time

The region around the fall camp produces a plethora of resources used by the Gitga'at people. Harvesting *moolks* was part of the seasonal round, along with other fruits (Table 2.4) and species of fish, mammals, birds and marine invertebrates (Table 2.5). The ripening and hunting/harvesting times of all these species would fit together, and people would move seamlessly between resources. As Helen Clifton said:

Berry picking is just part of doing the salmon. Yeah, there'd be salmon, they're doing coho and hump [humpies]... when the fishing's sort of over, the fishing is at a certain part [they have enough, and the berries are ripe], then it's time to... go for those berries.... And it just fits... into what they're doing there.

Table 2.4. Plant resources collected at the fall harvesting camp, in approximate order of ripening.

Sm'algayax name	English name	Latin binomial
<i>mak'ooxs</i>	Salmonberry	<i>Rubus spectabilis</i>
<i>miháaʔ</i>	dwarf mountain blueberry	<i>Vaccinium caespitosum</i>
<i>xwooksil</i>	Oval-leaved blueberry	<i>Vaccinium ovalifolium</i>
<i>smmaay</i>	Alaska blueberry	<i>Vaccinium alaskaense</i>
<i>k'apk'oop</i>	Canadian bunchberry	<i>Cornus unalaschensis</i>
<i>dzawes</i>	salal	<i>Gaultheria shallon</i>
<i>dahdee</i>	bog cranberry	<i>Vaccinium oxycoccos</i>
<i>waakyil</i>	gray stink currant	<i>Ribes bracteosum</i>
<i>ʔaaya</i>	highbush-cranberry	<i>Viburnum edule</i>

Helen Clifton noted that salmonberries ripen in different locations throughout the Gitga'at territory at different times. The salmonberries at the fall harvesting camp were a late ripening variety generally harvested between the end of July and the middle of September. Chief Albert Clifton mentioned that “huckleberries” (probably including red huckleberry, *Vaccinium parvifolium* and blueberries, *Vaccinium* spp.) were harvested at the camp as well⁸.

⁸ Since the term ‘huckleberries’ is used colloquially to refer to both *maay* (black mountain huckleberry, *Vaccinium membranaceum*) or *wüʔééxs* (red huckleberry, *Vaccinium parvifolium*) it was unclear to me which species is present, but due to a higher prevalence of *wüʔééxs* in the region (Turner and Thompson, 2006), I hypothesize he is talking about this species.

Table 2.5. List of fish, mammal, bird and marine invertebrate species, gathered at the fall harvesting camp. Salmon species are listed in approximate order of harvesting.

<i>Sm'algyax</i> name	English name	Latin binomial
<i>stmoon</i>	Pink (humpback) salmon	<i>Oncorhynchus gorbuscha</i>
<i>gyi'it</i>	Sockeye (red) salmon	<i>Oncorhynchus nerka</i>
<i>wüüx</i>	Coho (silver) salmon	<i>Oncorhynchus kisutch</i>
<i>gayniis</i>	Chum (dog) salmon	<i>Oncorhynchus keta</i>
<i>nanaat</i> or <i>†gümüik</i>	Ducks (either mallard or sawbill)	<i>Anas platyrhynchos</i> or <i>Mergus</i> sp.
<i>ha'ax</i> or <i>†ii'wn</i>	Geese (either Canada or Snow)	<i>Branta canadensis</i> or <i>Chen caerulescens</i>
<i>gaboox</i>	Cockles	<i>Clinocardium nuttallii</i>
<i>wan</i>	Blacktailed deer	<i>Odocoileus hemionus</i>
<i>o'ol</i>	Black bear	<i>Ursus americanus</i>
<i>mati</i>	Goat	<i>Oreamnos americanus</i>
<i>sts'ool</i>	Beaver	<i>Castor canadensis</i>
<i>awta</i>	Porcupine	<i>Erethizon dorsatum</i>
<i>†ioon</i>	Moose	<i>Alces alces</i>

Chief Albert Clifton and Goolie Reece both said that moose have appeared in the area only more recently. Clams were also dug towards the end of the fall, but they were not found near the harvesting camp: they were dug closer to Hartley Bay after people left the fall camp, in middle to late November. A condensed version of the Gitga'at yearly seasonal harvesting round can be found in Appendix 3, including how *moolks* and other fall resources fit in.

As well as harvesting wild foods during the late summer and fall, many of the elders referred to their grandparents having gardens either around their houses, or in nearby locations at the fall camp, often growing root vegetables such as potatoes, carrots and beets. While domesticated plants have been around since contact, such as potatoes, from information gathered in my literature review, and through interviews, I believe that *moolks* orchards would predate contact. Part of what leads me to believe this is that people did not specifically state that they left fruit behind, or specifically plant *moolks*

sprouts near the already existing trees when picking to increase density. The examples of transplanting learned about in interviews all referred to moving a few trees to a new location as an experiment. Therefore, the movement and planting of *moolks* trees and seeds as people were harvesting to create these ‘orchards’ was so ingrained in their world view, that it was not specifically realized and commented upon.

2.3.8 Harvesting *moolks*

2.3.8.1 Collection

It was not considered proper etiquette to break off *moolks* branches, but since they are quite “strong and flexible” (Helen Clifton), it is relatively easy to either pull the branches down or climb up into the tree to pick the *moolks* (Helen Clifton, Elizabeth Dundas). Chief Ernie Hill Jr. described using a gaff hook from a boat to pull down branches, to bring the fruit into reach. When people picked *moolks*, they would pick off the entire cluster of apples together, including attached leaves, which were left on the fruit bunches “if you’re going to keep it for a few days” (Marjorie Hill), partly to protect them from bruising in the containers. They would then place the *moolks* bunches in cedarbark baskets strapped to their backs or, more recently, in burlap sacks or plastic buckets or pails. In these containers the *moolks* were transported to the boat, and then to the fall camp, and finally to Hartley Bay, where they were processed. *Moolks* could be transported more easily and needed less pre-preparation than some of the other berries because they were picked while still hard, and protected during transport by the leaves left attached to the bunches.

As noted, black bears really like *moolks*, so people had to listen and watch carefully for bears while they were picking. Helen Clifton commented that bears look like

humans when they are picking: “They’re up on their hind legs and...their front paws...or they’re pushing the branch down just like we do, down to the cub.” To scare the bears away from the areas where people were picking, women would bang pot covers together and whistle, both before disembarking from the boats and while they were picking. Goolie Reece also mentioned that she remembers the older women commenting that the smoke from their pipes scared animals away. As a further precaution, whoever was in the boats (often men, or the older women) would usually carry a gun. People would always go to pick *moolks* in groups: “You never go alone when you pick *moolks*. The whole village goes, a canoe with all the women, to pick *moolks*” (Marjorie Hill). This was, in part, to protect each other from accidents and threats, such as bears.

All the elders talked about how they used to pick huge quantities of *moolks*. “They used to...come home, [with] big baskets full of berries” (Elizabeth Dundas), and “*No’o* picked lots...there’s so much *moolks* up at Old Town” (Marjorie Hill) were common sentiments. As noted previously, people are harvesting less today both in frequency and quantity, and some people say the *moolks* appear to be decreasing in quality, perhaps because they are not being picked regularly. The elders also recall fond memories from the time their childhood days: “We used to have fun, see who was going to pick the most...climbing up the *moolks* trees” (Elizabeth Dundas).

As was stated in the timing section above (2.3.7.1), some varieties were harvested at different times, but even when different varieties were being picked at the same time, people recalled that *No’o* told them to keep each variety separated. Belle Eaton said that they would try to pick just one kind into each basket so that they didn’t have to sort them later, since different varieties would be used for different purposes. People would pick

systematically throughout the harvesting area, going to a different place each day, depending on what was ripe and when (including *moolks* and other fruits). Goolie Reece explained:

They pick them [*moolks*] at a certain place one day, and the next day they go to another different place...the next day, they were up there to pick that, and they go out every day...We go up the high tide in the morning, and high tide at night, is the best place to go, the best time to go is in the morning, go up in the morning, and we stay up there all the time, the tides low, you can't get down...Sometimes we just pick certain things a day, the next day we'd go for something else...Just about the one day, they'd go out for *moolks*, and the next day maybe for blueberries or something, but just one kind at a time...Yeah, maybe two days in a row they'd be going out for, until they get enough, then they'd go for blueberries and the same thing.

People stayed up the river for a whole tidal cycle because the higher reaches of the river can only be accessed at high tide, and the tidal fluctuations are so extreme that the water is too shallow to go down the river at low tide (Goolie Reece).

2.3.8.2 Who picks

It was mostly women who were responsible for the *moolks* trees. The younger women, and sometimes boys, would climb the trees and do the majority of the picking and carrying, and the elders (*No'o* and the other women of her generation) would oversee the work, sorting the different kinds to keep them separate, and making sure everything was going smoothly (Turner *et al.*, 2012). The men would be spending more of their time salmon fishing, but they, or one of the older women (such as *No'o*), would usually be in charge of the boats, taking the women to the different harvesting sites in the vicinity of the fall camp. Marjorie Hill mentioned that young boys would usually be responsible for running the baskets from the trees down to the boat. Each age group of women had her own role in *moolks* harvesting:

So, a long time ago the women would take pots or pot covers and clang them... as they're getting off [the boat], and then somebody, a younger woman, would get off to go check around to see if there's any... bears around, somebody's watching the boat, somebody's banging lid covers... together, the noise, you just don't... go... and pick. And so sometimes older women would sit and look after the canoe, and then the younger women are the ones going up to pick the berries, and then you'd have a stronger woman that would push that branch down and hold it down while the other women are picking... so you gotta make sure the older woman in the canoe, and... you've got these... young, I guess, strong, adult women below the bush and then you've got the younger ones putting their weight on and pushing that, that loaded [branch] down... (Helen Clifton).

2.3.8.3 Containers used in harvesting *moolks*

Because *moolks* fruits are relatively hard when they are picked, people could use a variety of containers for harvesting. As noted previously, today it is common to use plastic pails or buckets, or some kind of burlap or cotton flour sacks, but before the prevalence of plastic and metal containers, women used to make baskets out of strips of inner western redcedar bark. The general term for baskets is *ts'ilaa*. Helen Clifton noted that they would use a special type of weaving to create an open mesh, and that after the baskets were made, they would “put it into a creek, fresh water, that...strengthens it, it dries back up again, it renews the whole... thing.” Either animal sinew or old cloth rags would be used to make tumplines⁹ or shoulder straps and the baskets could be carried easily. The exact size varied, but the baskets fell into two general size categories. The smaller ones were called *'yuustl* and measured approximately 15cm by 15cm, but were sometimes slightly larger. From the photo (Figure 2.3), it can be seen that this basket measures about 15cm² at the bottom, but flares slightly at the top. Based on this basket, with a height of approximately 25cm, the volume would be just over 5600 cm³. These

⁹ A tumpline refers to a strap which is placed across the top of the head, with both ends attached to the container it is being used to carry. This lets the weight of the container be supported by the carrier's back and spine

baskets were usually carried on a woman's front, with the straps going over her shoulders (Goolie Reece). People would pick from the *moolks* tree directly into the 'yuusl basket, and when it was full they would empty it into a larger basket until the larger basket was full. These larger baskets were said to range in size from 30cm by 30cm to about 46cm by 30cm, to an un-remembered depth. The large basket is called a *duuʔk*, but the term *galtsa* was used when a person wanted to indicate that they were carrying the large basket. Belle Eaton mentioned that for the bigger baskets they would sometimes line the inside of the basket by sewing in recycled fabric. These large baskets were either carried on the picker's back, hung from a branch, or placed on the ground, and they were the ones that were carried down to the boat:

That's where you fill that, that little basket up, you dump it in the big one...and you'd have to be pretty strong to lift that basket up...that bigger basket off...the branch (Elizabeth Dundas).



Figure 2.3. (a) Top and (b) side views of a 'yuusl basket from Helen Clifton's collection, 12 September 2012).

2.3.9 Preparation of *moolks*

From time to time children would enjoy climbing trees and eating the fruits straight off the tree (Goolie Reece, Rufus Reece), sometimes dipping them into small bags of sugar, but in general *moolks* were very rarely eaten raw with no preparation. Chief Albert Clifton said that sometimes they would eat them fresh when they were at the fall camp, but it would have only been the *gasasii* variety. The only time they regularly ate *moolks* raw was when they were at the *dickwan* (very soft, over-ripe) stage.

Moolks were cooked and preserved in at least five different ways (Table 2.6), and all interviewees made all types of preserves. These preservation techniques for each variety are further investigated in Section 2.3.10. If the *moolks* had not finished ripening between the time when they were picked and when the people returned to Hartley Bay and were ready to preserve them, sometimes the fruits were allowed to sit for a while to finish ripening (Chief Albert Clifton). After they had started to ripen, if the people had not returned to Hartley Bay yet, or if they did not have time to preserve them, they could be kept in water to halt the ripening process (Helen Clifton, Marjorie Hill). Goolie Reece noted that they would try to preserve *moolks* that didn't have "spots" (possibly rotten bits) on them.

Table 2.6. Preservation techniques for *moolks* fruits and the varieties used.

Preservation techniques	Description	Varieties used
1. <i>Moolks</i> and grease	whole fruits mixed with grease and sugar	<i>bu'uxs</i> and Grandma <i>Dawt's bu'uxs</i>
2. Thick jam	whole fruits preserved with a thick syrup to make jam	<i>moolks sigawgaaw</i> and <i>sm-moolks</i> , occasionally <i>gasasii</i> , <i>bu'uxs</i> and <i>dickwan</i>
3. Preserves	whole fruits preserved in a watery syrup	<i>gasasii</i> , occasionally <i>moolks sigawgaaw</i> and <i>sm-moolks</i>
4. Mashed jam	fruits mashed up to make a jam	unknown, but potentially <i>moolks sigawgaaw</i> and <i>sm-moolks</i>
5. Jelly	juice from boiling fruits strained to make jelly	<i>moolks sigawgaaw</i> and <i>sm-moolks</i> , occasionally <i>dickwan</i>

In all of the above cases, the leaves were removed before the fruits, with stems still attached, were simmered in hot water – “steamed” – for about five minutes (Elizabeth Dundas), or just long enough so that they became soft enough to pull the stems out easily – but not so much that they would be squashed between the fingers when they were held, and until the fruits were “sort of...yellowy” (Helen Clifton) and translucent. Several people noted that, after simmering, the fruits were drained and run under cold water to cool them down quickly, an essential step to stop their continued cooking. Once the stems were removed, through a process called ‘*buldax*’ (“when you take them off the stems”, Marjorie Hill), people would continue with whichever recipe they were going to use. When I assisted Belle Eaton in making thick jam in the fall of 2011, I noticed that after this simmering and de-stemming process, the *moolks* smelled very lightly of applesauce. If people just wanted to keep the cooked fruit and not continue with one of the preservation techniques after removing stems, they would again cover them with water and keep them in a cool place, such as a smokehouse, changing the water

periodically to keep it fresh, until they were ready to make jam, mix *moolks* with eulachon grease, or any of the other preparations (Belle Eaton, Goolie Reece).

During interviews, I asked about the differences between how *moolks* are prepared now, versus in the past. The elders found this question hard to answer, as preparation methods have been fairly similar in the living memory of the elders interviewed. Some differences include stainless steel pots and freezers being used more now instead of crocks and smokehouses, but canning techniques have been used this whole time. However, answers hinting at this question can be seen as faint threads running through this discussion. Before contact with fur traders and the Hudson's Bay Company (late 1700s-early 1800s), the Gitga'at would not have had canning jars, ceramic crocks, wooden barrels, enamel pots, stoves or sugar. According to Nancy Turner (pers. comm.), canned fish became widely available in the 1880's, so people would likely have been canning since then, first with metal cans, and then with glass jars. Helen Clifton noted that people use glass jars more now since metal cans have become more expensive. Marjorie Hill explained that before people had stoves, they would cook the fruit by dropping hot rocks from the fire into containers holding the fruit and water. These containers were most likely bentwood boxes before contact, and enamel pots after. Mixing *moolks* with eulachon grease was the traditional way of eating the fruit at feasts, but while all the elders I interviewed remembered *moolks* and grease being served at feasts, they had also been jarring *moolks* since they were young.

Sugar and canning methods have been around for a long time: "When jars and sugar came about, then they preserved them, made jelly and jam...from them, it was adapting to...the new ways of the day" (Helen Clifton). Today *moolks* are cooked in

stainless steel pots and stored in glass canning jars, but before these came into use, they would have been cooked in enamelware pots. Aluminium pots are never used because the *moolks* are highly acidic and would dissolve some of the aluminium (Helen Clifton). *Moolks* were formerly stored in ceramic crocks, and sometimes wooden barrels, after steaming (Helen Clifton, Belle Eaton, Marjorie Hill Goolie Reece). Each variety of *moolks* would have been kept in its own separate crock (Helen Clifton, Belle Eaton). All preserving began with the above process, including removing the stems following steaming. Since the introduction of sugar (which has been available for as long as several of the elders could remember), it has also been a vital ingredient in all these recipes. None of the elders I talked to knew what had been used as additional sweeteners before sugar was introduced. Helen Clifton did not think that they would have used molasses as a sweetener, although it was apparently introduced even before refined sugar. Marjorie Hill said, “Oh, sugar, they just didn’t use [any] sugar [for sweetening before refined sugar]”, so I hypothesize they were likely more used to the natural sweetness of the fruits and berries around them. Also, Elizabeth commented that the jams, jellies and *moolks* and grease never had any other preservatives other than sugar, but sometimes people use pectin nowadays. *Moolks* can be kept much longer before being made into preserves now that there are freezers. For a very different kind of use, Rufus Reece told me that he had placed *moolks* inside a fish when baking it, also including *maay* (blueberries) and *dzawes* (salal).

2.3.9.1 Preparation Methods

Mixing *moolks* with grease¹⁰ was how people generally served the fruit traditionally, and this is the way they would serve them as a dessert at feasts and other important gatherings (Turner *et al.*, 2012). “They used to have it [*moolks*] in the wintertime...when they’re at the feasts” (Belle Eaton). Sometimes *moolks* would be served in the grease by themselves and sometimes mixed with *ʔaaya* (highbush cranberries) and *sm-maay* (blueberries). Almost all the elders described this method of preservation, but Belle told me that she particularly loves it like this.

Before the *moolks* were added to eulachon grease, they were simmered and destemmed, as described above, and then they were “really cook[ed]...before you put it in the grease” (Elizabeth Dundas). After the *moolks* were cooked, it was important to dry out the ‘belly button’ of the fruit (the small indentation on the opposite side of the fruit from the stem), called the *t’i’ik*. If moisture was left in this indentation the *moolks* would mold when they were in the grease. “You know when you are putting [the fruit] in whipped grease, they had to be dry, you know, the little, little [*t’i’ik* – belly button]...you have to really dry, otherwise the mold develops there [*yeenk*, mouldy]” (Marjorie Hill). After the *moolks*, including the *t’i’ik*, were entirely dry, the grease would be whipped to

¹⁰ ‘Grease’ is the oil rendered from a small fish native to the waters of the Pacific Coast of North America, eulachon or candlefish (*Thaleichthys pacificus*). This fish was important as a food source for Indigenous People all along its range, and the oil, or ‘grease’ was an important source of fatty acids, and was widely traded between groups (Lloyd, 2011; Turner and Loewen, 1998). Eulachons are harvested, and the oil pressed out, as the fish travels up the major coastal rivers to spawn, so it was not harvested by the Gitga’at people, who did not have eulachon rivers in their territory (Turner *et al.*, 2012). Every place where grease is made has a distinctive taste to its grease (Chief Ernie Hill, Jr.), probably due to different techniques in processing. The grease was formerly stored in wooden barrels or casks. Several elders agreed they would use grease from the Nisga’a people for mixing with their *moolks*, since it whips better, so you didn’t need as much, and it has a stronger taste, as compared with the grease from Kemano and the Kitimat, in which they used to dip their dried halibut (Turner *et al.* 2012).

make it frothy. First, some water was added to it, and then the mixture was whipped by hand. Marjorie Hill demonstrated this in her interview. You have to hold your hand in a special position: flat, with the palm facing down towards the bowl, and then your fingers curved up to make the back of your hand into a concave shape. This is quite a difficult position to hold without lots of practice. The grease is whipped up with the water until it starts to become thick and foaming, and turns white. At this stage, the *moolks*, any other berries, and sugar are added, and then whipping continues until the right consistency is reached (Hartley Bay School, 1997; Turner *et al.*, 2012). Chief Ernie Hill Jr. noticed that they were having problems whipping the grease one year when they wanted to treat everyone at a feast, and the grease wasn't whipping properly. So they tried using rainwater instead of tap water and it worked much better. He surmised this was because the chemicals now found in tap water prevented the grease from whipping properly.

After the grease was whipped to satisfaction, the *moolks* and grease would be kept either in the pottery crocks described previously (Helen Clifton, Belle Eaton, Goolie Reece) or in wooden barrels like those in which un-whipped grease was stored (Marjorie Hill, Goolie Reece). Goolie Reece remembered the barrels sometimes being lined with cloth, old cloth flour sacks or the leaves of *w'nax* (skunk cabbage, *Lysichiton americanus*). These containers for *moolks* and grease would then be stored in a cool place, such as in a smokehouse. Sometimes the *moolks* would be stored in the whipped grease for a long time before it was eaten, and at other times the *moolks* would be added just before eating. At a feast, they would serve this delicacy as a dessert in shared bowls in the middle of the table, and would eat it with mountain goat horn spoons called *adaweek* (Chief Ernie Hill, Jr.). Since the women of the clan are responsible for

preparing and serving at feasts, they would also be in charge of preparing the *moolks* and grease dishes.

The “thick jam” consists of the whole cooked fruit, including the seeds and skins, but no stems. Helen Clifton suggested that *maay* (blueberries) or *dzawes* (salal) could be added, but people also just ate straight *moolks* jam. Helen Clifton didn’t like “thick jam” as much as the strained preserves because you have to spit the seeds out, but it was Belle Eaton’s favourite kind of preserved *moolks*. Her process of making it is documented in Figures 2.4-2.8, from the preliminary boiling to remove the stems (done before all preparation methods), until the jam was placed in jars. After the stems are removed, the *moolks* are covered with water, to about 2.5 cm above them, and the cooking pot (in this case, the soup pot was approximately 6L) brought to a ‘roiling’ boil for 20 minutes. Sugar is then added, enough to make a really thick syrup (about 1 litre of sugar for a pot of *moolks*), and the clean jars are sealed immediately.



Figure 2.4. a) close-up photo of the *moolks* fruit before boiling, compared to b) after boiling. At this stage, the *moolks* would have been covered with water and boiled for about 5 minutes, or until soft enough to remove stems, and then run under cold water, 16 September 2011.



Figure 2.5. a) Photo of Belle Eaton removing the stems from the *moolks* fruit after they have been boiled, and run under cold water, with b) a close-up of the stringy bits that attach the stems inside the fruit, 16 September 2011.



Figure 2.6. a) fruit in the pot after the stems have been removed and b) a close-up. Belle let the *moolks* sit overnight, before completing the next step, which was to cover (plus about 2.5 cm) with water and the fruits boiled for about 20 minutes, before about 1 quart of sugar is added (17 September 2011).



Figure 2.7. a) *moolks* after the sugar was added, and b) a close-up view. The fruits are boiled for about another 20 minutes to make a really thick syrup, 17 September 2011.



Figure 2.8. a) the *moolks* after the sugar has been added and they have been boiled for the requisite amount of time. b) While the jam is still hot, it is poured into canning jars and the heat helps seal the lids, 17 September 2011.

To make *moolks* ‘preserves’ (Helen Clifton, Elizabeth Dundas, Belle Eaton, Goolie Reece), a process similar to that of preserved peaches, pears, etc. is used, where the fruit sits in a more watery syrup than when making thick jam (Figure 2.9). After destemming, the *moolks* are boiled for approximately 15 minutes, and then placed into jars and a hot water/sugar syrup was poured over them in the jar, “like [in] canned fruit” (Belle Eaton). The preserves are served in a little dessert dish, “just the way you’d eat preserved peaches, without it being a thick jam” (Helen Clifton). Helen further noted, “...it’d be like a fruit salad, because you could add any other wild fruit to it.” For example, Elizabeth Dundas described that *maay* (blueberries) could be added and sometimes these two were also mixed with *ksiiw̓*, the cambium from *Abies amabilis*, silver fir or *Tsuga heterophylla*, western hemlock (Turner *et al.*, 2012).



Figure 2.9. Preserved moolks from Helen Clifton, two different fruit sizes.

For mashed jam, the preparation method is similar to that of thick jam, but the cooked *moolks* are mashed up with the hands, and the pulp is left in, instead of keeping the fruit whole. After the stems are removed, the *moolks* are covered with water, reheated on the stove and allowed to boil for about 20 minutes. Once the fruits are soft, they are mashed up and sugar is added, in equal parts to the quantity of *moolks*. After mashing, the fruits are then boiled again, and the mixture immediately put into clean jars while still hot; the jars seal right away, so they can be kept for a long time (Elizabeth Dundas, Rufus Reece). Boas (1921) also described crabapples being eaten mashed by the Kwakawaka'wakw, but he said they ate it with eulachon grease after mashing.

The majority of the elders described the preparation of jelly to include cooking the fruits 'really well' after removing the stems, and then draining the resulting mixture through cloth flour sacks, sugar bags, or some other kind of mesh bag to capture the juice, which is then used to make the jelly. Both Chief Albert Clifton and Helen Clifton preferred this jelly to the other types of preserves.

Moolks in grease would have been eaten typically in the fall or winter as a dessert at large feasts. *Moolks* prepared through one of the canning methods (thick jam, preserved, mashed jam, jelly) would have been eaten at any time of the year, as long as the preserves lasted. Belle Eaton said that one of her sons enjoys eating thick jam so much that she has to make a large amount each fall to keep him in supply.

2.3.9.2 Tools and containers

Several types of containers were described for use in the preparation and storage of *moolks*. ‘Crocks’ made of pottery, or ceramic, were about 0.5m tall with straight sides, with mouths about 0.3m wide, and with a fitted lid (Figure 2.10). Helen Clifton estimated the thickness of the ceramic to be about 1.5 cm thick on the bottom, and 1 cm thick on the sides. They were used only after contact, and came either from the Hudson’s Bay Company (Helen Clifton) in the early 1800s (Gitga’at Nation, 2004) or from Father William Duncan (Marjorie Hill), a missionary in the region in the late 1800’s (Gitga’at Nation, 2004). Helen Clifton said that these crocks would mostly have been used to store grease, *moolks*, and other berries (such as highbush cranberries), and, once filled, they were kept in a cool place, such as a smokehouse. They are not used anymore, although there are still a few buried in people’s basements.

Wooden barrels were also used for storing food items at least in the time of the elders memory (from the early 1900’s), but are not currently used. Helen Clifton suggested the barrels, or casks were used more for holding salted meat, fish and caviar. Goolie Reece mentioned that these barrels vary in size and both she and Marjorie Hill

said that “stink eggs”¹¹ were commonly stored in them, but *moolks* and grease were occasionally as well. Goolie Reece added that even when people had access to barrels, most preferred to use the ceramic crocks.

Marjorie Hill also mentioned the use of enamel pots, described as being large and grey, for storing *moolks* and grease, and the use of ‘metal cans’ for storing jammed *moolks*. *No’o* would use the enamel pots instead of barrels, and as Marjorie Hill explained, “She [*No’o*] was happy when she got those!” The metal cans were obtained from the loggers who were felling trees at the fall harvesting camp, during the recent past (within the last hundred years).

Before the wooden barrels and ceramic crocks were introduced, most likely in the early-mid 1800’s, people would have stored *moolks* in pits in the ground and in cedar boxes (Helen Clifton). Currently people tend to use glass canning jars for storing the jam and jelly (Goolie Reece).

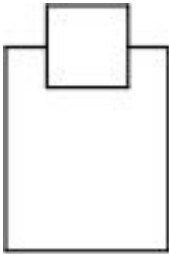


Figure 2.10. A line drawing demonstrating how the lid fits into the ceramic crock.

¹¹ “Stink eggs” or *üüskm laan* are salmon egg caviar. They are soaked in water until all the blood is leached out, and then fermented. If it is not prepared properly, very bad cases of food poisoning may result (Turner *et al.*, 2012, interviewees in this research).

2.3.10 Morphology and Uses of Specific Varieties

1. *Gasasii*

This variety was only one that the Gitga'at elders described as being small and sweet. As Helen Clifton said, it's "the one that our people would eat off the vine, it is sour, it is acidic...but it's chewable." Elizabeth Dundas said that *gasasii* and *sm-moolks* look the same: the biggest difference between them is the taste – *gasasii* being sweet and *sm-moolks* being sour. Belle Eaton said that *gasasii* have brown around the base, or on top (opposite the stem). Another distinguishing feature are its long stems, about as long as a person's finger, 4-5 cm. Goolie Reece told me that the name '*gasasii*' means 'legs,' referring to the stems being long like legs. Figure 2.11 shows fruit identified as being *gasasii*. Elizabeth Dundas observed that *gasasii* trees like growing in sandy soil, since the harvesting location where you find it has sandy soil, and it grows well there.

Gasasii fruits were mostly either eaten raw or made into preserves, but Chief Albert Clifton and Belle Eaton mentioned that they had made jam with them occasionally. When the *gasasii* was eaten raw, it was either eaten directly off the tree (Chief Ernie Hill, Jr.), or stored until the fruits became *dickwan*. Goolie Reece remembered, "They used to fill...a pillowcase full,...bring it home and...keep until Christmas." However, in general, the main method of preparation was as preserves, and this variety was the one most commonly preserved in this way, according to most of the elders. As Belle Eaton said: "You could preserve the *gasasii*, they're good for preserving... because the *gasasii*, they're sweet... they're really good, and they taste really good... when... you preserve them... but I've never, I think that's the only one

they used to preserve... and thick jam, yeah”. Chief Ernie Hill, Jr. said that you wouldn’t use *gasasii* for feasts.



Figure 2.11. *Gasasii* fruits from the tree in Hartley Bay that was identified by several elders as being of this variety, 12 November 2011.

2. *Bu'uxs*

The *bu'uxs* variety is said to have the largest fruit. The *moolks* were variously described as being about the size of quarters, or grapes or approximately 2 cm in diameter. Elizabeth Dundas drew an image of the size on my interview notes from memory, and it measured 1.25 cm. In general *bu'uxs* are *tsook* (which means that they stay green even when they are ripe), but both Helen Clifton and Marjorie Hill said that in some places they just turn slightly red (“kinda rust”) on one side (Marjorie Hill). *Bu'uxs* are said to be very sour.

The most common way that *bu'uxs* fruits were eaten was in grease, as a dessert at feasts. Both Elizabeth and Belle said that *bu'uxs* was the only variety used for this purpose: “That’s what they use for their dessert when there’s a feast” (Belle Eaton). They were not usually eaten raw due to sourness (Helen Clifton), but sometimes they were

used to make thick jam. However, this was not common, and it was thought that this only happened when people were low on grease.

3. Grandma *Dawŋ*'s *bu'uxs*

Grandma *Dawŋ*'s *bu'uxs* were also known as “Auntie Edith’s *bu'uxs*”, since Edith was *Dawŋ*'s English name, and these trees were owned by her. Grandma *Dawŋ*'s *bu'uxs* appear to be very similar to *bu'uxs*; Belle Eaton said that they were “a part of *bu'uxs*”. Goolie Reece mentioned they were slightly smaller than *bu'uxs*, and coloured like the regular *moolks* (*sm-moolks*), and Chief Albert Clifton told me that they were almost spherical. Marjorie Hill said that they also have red on one side and that “Grandma *Dawŋ*'s got the best *moolks*”. These *moolks* are also said to be sour.

Most of the elders mentioned that Grandma *Dawŋ*'s *bu'uxs* were also eaten in grease, so perhaps this variety was interchangeable with *bu'uxs* for this method of preparation. However, Goolie thought that maybe only Grandma *Dawŋ*'s *bu'uxs* were served with grease: “I know they used to pick big ones, that was grandma *Dawŋ*'s owns good for that...for mixing with grease.”

4. *Moolks sigawgaaw*

The *moolks sigawgaaw* variety was described as being quite small, having lots of fruit on the stem, being red on one side, and sour tasting. Marjorie Hill described them as “real pretty... those pretty little red ones”. Goolie Reece said that they are similar to *sm-moolks*, just more red. *Moolks sigawgaaw* were never used in the grease (Marjorie Hill) and hardly ever preserved (Belle Eaton), although it could be done “if you want to”

(Elizabeth Dundas). Overall, most elders said this variety was used for making thick jam and jelly.

5. *Sm-moolks*

Trees that were not specifically classified as one of the above varieties were often called *sm-moolks*. Most of the elders said that this variety was the most widespread, and grew “all over”. The prefix “*sm-*” is a term for ‘real’ or ‘authentic’ (Ts’msyeen Sm’algyax Authority, 2001). Due to this variability, different people described it in different ways. It was variously described as “medium-sized”, “big”, “round” and “looking like *gasasi*” (but not sweet tasting). These *moolks* were also said to be sour. *Sm-moolks* could be preserved (Elizabeth Dundas), but most elders used the fruit to make either thick jam and jelly.

6. *Dickwan*

As noted previously, the term *dickwan* means ‘over-ripe’, and it was only used to refer to *moolks*. The skin turns brown, and the flesh becomes very soft, almost liquid. All of the elders I consulted greatly enjoyed eating *moolks* in this state when they could get it. Despite tasting acidic, the *dickwan moolks* would become slightly sweeter in this over-ripening process, and it was easy to suck the liquid out, leaving the skins and seeds behind, although people said you couldn’t eat too many because “...you’ll get cracked, cracks in your tongue because of the acidity... of the *moolks*... it’s just like eating real sour, sour apple... you could only take so many bites of it, well [that’s] the way with *moolks*, even *dickwan*” (Helen Clifton). The elders told fond stories about eating the

dickwan, either straight off the tree, or by letting them ripen after picking – “if it’s been raining, they’re over-ripe, that’s when they go *dickwan* like... then you eat it before they go too far... you eat it, you know, and it cuts you on the tongue too... if you eat too much” (Belle Eaton).

All the varieties would be eaten when they were *dickwan* (Helen Clifton, Elizabeth Dundas), but most people preferred the *gasasii* variety, because even when they were in the *dickwan* stage, the other varieties were still sour. Almost all the elders reported that the *dickwan* fruits were favoured for eating fresh and raw, they were generally not preserved at that stage. As Helen Clifton described “just like a berry that’s starting to rot, or parts of... that’s the way that the *dickwan* is. So you wouldn’t let them get that far [over-ripe] if you were going to process them.” However, Elizabeth Dundas did describe some occasions when *dickwan* would be preserved. Albert Clifton and Elizabeth Dundas both mentioned making jam or jelly from *dickwan* fruits, but Belle Eaton said that she had never heard of either preserving them or making jam.

7. Miscellaneous

No particular variety was noted as being used for mashed jam, however, based on the other types of usage, I would expect that they would have used either *moolks sigawgaaw* or *sm-moolks*. In any case, there is some overlap in the use of each variety. Using different varieties differently was a general trend, but most people did use varieties interchangeably to some extent.

2.3.11 Words specific to *moolks*

One way in which the Gitga’at’s special connection to *moolks* is reflected was through language. In these interviews, two *Sm’algyax* words emerged as relating almost

solely to *moolks*. The term *t'i'ik*, which means a belly button or navel on humans, was used to refer to the small dimple found on the bottom of *moolks* fruits opposite the stem. This term was only used in reference to *moolks* and *ʔaaya* (highbush cranberry). The term *dickwan* refers to when the fruit is at an ‘over-ripe’ stage, and the *moolks* are the only fruit that was eaten at this stage of ripeness, since no other fruit ripens this same way, they simply rot, even store-bought apples.

2.3.12 Trade

The Gitga’at traded both seaweed and *moolks* to the Kitimat Haisla people in return for grease (Chief Albert Clifton), and sometimes they sold watermelon boxes (about 0.3m x 0.3m x 1m in size) full of *moolks* to the Kitkatla people for \$20 each (Marjorie Hill). The Gitga’at *moolks* were highly prized; the Gitga’at were known for having “the best *moolks*”, particularly the ones they harvested from the fall camp. The *moolks* from Kitkatla and Kitimat were not as highly regarded (Chief Ernie Hill, Jr., Marjorie Hill). Marjorie Hill commented that based on morphological characteristics, *moolks* could be identified to the precise region they were from: “By looking at the *moolks*, you know where they are from, you know which part they picked it from.”

2.3.13 Changes in *moolks* use

While the general techniques of how *moolks* are harvested, processed and served have stayed relatively constant across the generation of the elders I talked to and their parents’, and grandparents’, generations (Elizabeth Dundas) (mid 1800’s – early 1900’s), some of the technology has changed, such as using plastic buckets instead of cedarbark baskets, and stainless steel pots instead of enamelware pots, and before that, cedar boxes. However, all the elders agreed that the use of *moolks* has declined drastically over the

last few decades. They noted that people's palates are changing, and that *moolks* aren't as important a food as they have been in past times (Helen Clifton, Belle Eaton); the younger generations have lost the taste for it (Helen Clifton). Helen Clifton said that *moolks* are now considered "like a specialized food, a specialized berry, because you don't get that much of it anymore." In the last 15-25 years, people have been going to the fall harvesting camp only for weekend or day trips mostly for hunting and fishing (Chief Albert Clifton, Helen Clifton). Berries of all kinds are not being harvested in large quantities anymore, even though people are now harvesting in locations other than the traditional fall camp. Some food, like grease, is not as readily available anymore either (Helen Clifton), and this has changed how *moolks* are processed. Also, because people aren't picking as many *moolks* as formerly, and they have not been visiting the fall camp lately, almost all the elders have noted a decreasing abundance of *moolks*.

All the elders interviewed mentioned the importance of looking after the trees to ensure proper growth patterns and fruit production. When *moolks* are picked, the elders say they are more productive in subsequent years. As Elizabeth Dundas said, "I believe that's why they're...dying off, because the more you pick them, the more they grow." Since management of this special resource was done through simple acts such as taking off some shoots and picking the fruit bunches with attached leaves, if the fruits are no longer being harvested the trees, people fear, will fail to grow to their full potential, and the quality and quantity of the fruits will suffer. I believe that I saw evidence of this on the landscape. During this research I noticed many of the crabapple stands (orchards) in Gitga'at territory were looking unkempt, and the trees appeared to have broken trunks and to be overgrown (Figure 2.12). My observations of current orchard growth reinforces

the elders' opinions that because people are not picking the fruit very much anymore, the *moolks* are not doing as well as when they were picked and tended.

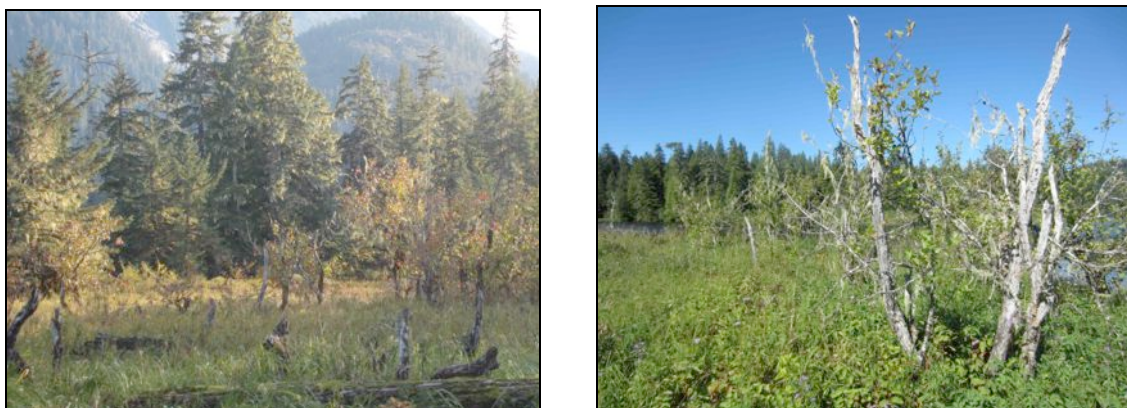


Figure 2.12. Pictures from Gitga'at territory showing (a) fallen trees and an unkempt landscape, 2 October 2011 and (b) dead, broken off main trunks with re-sprouted smaller side shoots, 31 August 2012.

Bad weather, possibly be due to a changing climate, is another factor identified as influencing *moolks*. The majority of the elders commented that in the last decade or so the weather has been unpredictable (Turner and Clifton, 2009) and this has been bad for the harvesting of many foods, including *moolks*, as can be seen in Marjorie Hill's lamentation that "they're [the *moolks*] not the kind I used to know." In the fall of 2011 when I was at Hartley Bay, there were very heavy rains, and this greatly affected all types of berries and fruits, including *moolks*, as they were not ripening at all (Goolie Reece) or were rotting before they could be harvested (Helen Clifton).

The last concern a few elders mentioned to me was their worry that, in addition to the lack of fruit picking and bad weather leading to a reduced amount of fruit, the *moolks* trees were also being affected by a rising sea level. Albert Clifton mentioned that he thought the tide height had risen by 38-40 cm in his memory, and he thought it was a strong possibility that the *moolks* would all disappear over the next 10 years if the water

keeps rising. Elizabeth Dundas said that “*No’o*’s own is dying off,” suggesting this was partly because of lack of picking, and partly “because of the water level” of the salt water is coming up too high, apparently a portent of changing sea levels. Goolie Reece mentioned that “the ones [*gasasii*] that were closer to the beach all died off. There was some more *gasasii* there, but they were shorter trees. But they’re all wiped out, there’s nothing there.” She thought the taller *gasasii* trees were still there, but said that the *moolks sigawgaaw* were gone as well. I did not investigate this further, but if the *moolks* trees are in fact dying off because of a rising sea level, this would be quite worrying, and it would further impact the availability of an already limited resource. If however, they are merely declining in quality because they are not being picked and managed any more, then these observations could potentially be reversed if people revitalized the *moolks* harvest.

2.4 Discussion and Conclusion

Moolks, as used by the Gitga’at and other Northwest Coast Peoples, has all the characteristics of a highly important cultural plant. The fruits have been a very important food for the Gitga’at, to the extent that they have extremely in-depth knowledge about the varieties and the subtleties of their use, and that people still use this fruit to this day, albeit in not as great quantities. The Gitga’at people have a long-standing and close association with *moolks*, and the elders I interviewed shared much detailed familiarity with *moolks*, expressed through their ownership, management and trade patterns, harvesting protocols, and folk species classification as seen through the interviews analyzed earlier. This type of knowledge is very important to record because as we have been seeing throughout this thesis, and in other studies, elders are growing older and not

all of this knowledge is being passed down to the younger generations. With my recording of this data, I hope to help store and record this knowledge for future generations. There has been some evidence that culturally recognized varieties (and possibly even domesticates or proto-domesticates) may disappear over time, as management practices cease (Deur, 2000), so by recording historical knowledge, we can apply this to the current landscape. Since the elders had a hard time identifying some of the sampled trees in the ecological part of this study to variety, this knowledge may already be becoming lost and blurred.

My research not only highlights the historical and modern day cultural importance and usage of this species, but also addresses concerns that elders and other members of the community have expressed recently. I have noted throughout this chapter that the use of *moolks* has been considerably reduced in the last few decades. While *moolks* are still harvested and eaten, people's diets have evolved with the introduction of store-bought food, and *moolks* have become a less important component in the Gitga'at nutritional regime. The influx of non-traditional food has led to the youths' taste in preferred food to change, and several of the elders mentioned that the youth don't favour many of the traditional foods, including *moolks*, anymore (Turner and Clifton, 2009). Because *moolks* are being harvested less frequently, and people are visiting the fall camp less often, this reduces the extent of care and management that was traditionally practiced on *moolks* trees. The management techniques that were described throughout this chapter by interviewees relate to what they remember doing in their lifetimes. There is no specific data either from this study or from the background literature I researched pointing to a specific timeline of management techniques. However, it is reasonable to assume, based

on other groups practicing similar techniques, and on the way the Gitga'at elders incorporated management techniques seamlessly into their worldview, that management techniques have been practiced for a greater depth of time than since contact. Another key concept relating to management as described in the interviews was that people often described crabapple trees as producing more fruit because people picked the bunches of fruit, as a form of pruning. This is important to mention, as it showed that people were aware that by using a specific technique, they could increase the amount of fruit they would be able to harvest. This is similar to statements by Nuu-chah-nulth berry pickers that picking salalberries by the cluster increased the production of berry clusters for that plant in the future (Turner and Peacock 2005).

Bad weather is another key factor in this reduction in *moolks* harvesting. Even if a changing palate was not leading to a change in the traditional foods that are harvested, the reduced ability to harvest due to lessened resource access is vital. During the fall of 2011, I experienced first hand the impacts of a surfeit of rain in the region. Several of the elders noted that many fruits and berries were either not ripening or were rotting on the bush, which limits the amount that could be harvested, and attributed this to the heavy rain. Not only was there inordinately heavy rainfall, but the weather in general was very unpredictable. Both 'bad' and unpredictable weather have been frequent over the last decade and more (Turner and Clifton, 2009). In fact, the preparation of seaweed, a spring resource (Turner and Clifton, 2006) was greatly impacted by the lack of sun in the summer of 2011. The final step in the seaweed processing happened in September that year, which was the latest Helen Clifton (pers. comm., 2011) had ever remembered it happening, as it is normally dried in June.

In addition, Helen Clifton (pers. comm., 2011) stated that an influx of rain also makes the water levels on the rivers in the area rise, flooding low banks and making it dangerous to travel along the river. She noted that it can take four or five days for the river to return to its normal level, so frequent rain will cause the rivers to stay higher longer. Several elders expressed concerns that some of the specific *moolks* harvesting locations, and maybe even whole varieties, could be disappearing. They surmised that this was due to rising water levels, possibly due to the increased rain flooding the rivers more. But this could also be attributed to a rising level of the ocean, an indication of broader climactic change. It has been predicted that sea levels may rise by as much as 50 cm in this century, and that these rates have been accelerating recently (IPCC, 2001; Kirwan and Murray, 2008). In Northern British Columbia specifically, Abeysirigunawardena and Walker (2008) documented an increase in sea level near Prince Rupert, BC, and as mentioned in the results of this chapter, Chief Albert Clifton recalled a rise of 38-40 cm in tidal height in his memory.

The coastal river system where the Gitga'at people traditionally harvested *moolks* is heavily influenced by tidal fluctuations, and this type of habitat is particularly at risk (Abeysirigunawardena and Walker, 2008). If a salt wedge moves further upriver with rising sea levels or increased wave action from large tides or surges, the water table and surrounding soils will develop increased salinity, and the riverbanks could be in danger of greater erosion. This physical feature can change the plant species composition of the landscape depending upon the salt tolerance of the plants living on the edge of the river, leading to a change – most likely a reduction – in harvestable resources, including *moolks*.

Moolks also play an important role in the ecosystem and foodwebs, including the seasonal food cycle of many non-human animals, particularly black bears. The fruits are ripe in the fall when the bears come down to rivers and estuaries to catch and eat salmon, so *moolks* fruits provide an important additional food source, as evidenced by the fruit-filled scat I saw firsthand, the Gitga'at warnings and discourse about being watchful for bears when harvesting *moolks*, and suggested management techniques such as clearing around the trees, to increase visibility and prevent surprise encounters with bears in the *moolks* orchards. If *moolks* are disappearing, whether due to rising salinity, soil erosion or other factors, this will alter the functioning of coastal estuarine ecosystems to the detriment of bears, humans and other species that use them as food. Bears are not only responsible for the transference of nutrients between the aquatic and terrestrial systems (Hocking and Reimchen, 2009), but if they do not consume enough food, they will not be able to hibernate and survive their winter sleep (Turner and Clifton, 2009).

Thus, there are many factors contributing to a reduced availability of *moolks* for the Gitga'at community, and all of these have led to *moolks* being a less important component in contemporary Gitga'at and other Indigenous Peoples' diets (Turner and Turner, 2008). Indigenous People have had to adjust to variation in resource availability for millennia (Turner and Clifton, 2009), and have retained their resilience by using techniques such as harvesting alternate resources, or trading. Now, however, they are being faced with a much greater challenge. As we enter a future that will probably involve drastic changes in species composition and environmental characteristics due to a changing climate (IPCC, 2007), it is vital to involve the Indigenous People that have lived in a close-knit relationship with the land they inhabit for centuries (Turner and

Clifton, 2009) in scientific and governmental management and policy decisions. As I showed through recording knowledge specifically about *moolks* from Gitga'at elders, Indigenous People hold much detailed knowledge, not only about specific species, but about how whole systems interact with each other. Learning detailed ecological knowledge from Indigenous People is vital to the current dilemma we as a species face, and creating links of collaboration between western scientific knowledge systems and traditional ecological knowledge systems is going to be necessary as we move into the future. However, despite all these changes at cultural and ecological levels, it could be seen through the elders engagement with this subject that *moolks* remain a vitally important component in both the ecosystem and for the Indigenous People that use it.