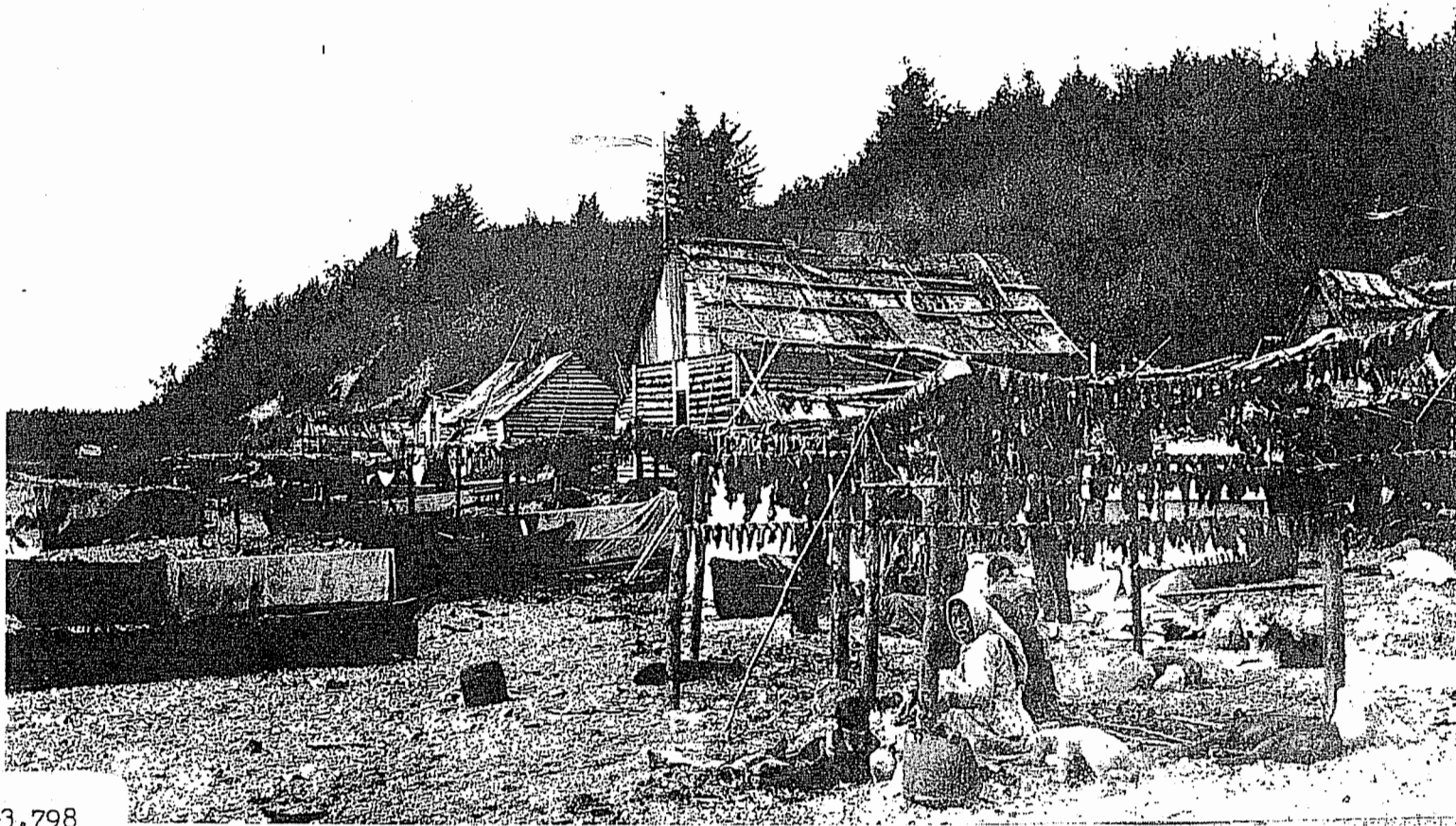


Culturally Modified Trees at Bartlett Cove, Glacier Bay National Park, Alaska



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Lew

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Archaeological Survey Cultural Resource Inventory Historic Property Evaluation Archival and Historic Research

**Culturally Modified Trees
at
Bartlett Cove,
Glacier Bay National Park, Alaska**

by

Michael Lewis and Charles M. Mobley

1994

Abstract

Glacier Bay has a history of traditional use by the Native Tlingit of Hoonah. A common feature there and elsewhere in the forests of southeastern Alaska are culturally modified trees (CMTs) -- scarred trees, as much as several hundred years old, resulting from traditional Native bark and wood gathering from live trees. Now, most of Glacier Bay is part of Glacier Bay National Park, and the National Park Service (NPS) has an administrative headquarters at Bartlett Cove. While planning new staff housing at Bartlett Cove, NPS recorded 15 CMTs in the project area. Four scarred spruce trees were squarely in proposed cabin sites and access roads. Consultation with the State Historic Preservation Officer and the Native people of Hoonah determined that the CMTs were not eligible to the National Register of Historic Places. Even so, an agreement was made that NPS would use tree-ring dating to see what years the four CMTs had been bark-stripped, or blazed. The agreement further specified that a report would be prepared for distribution to the people of Hoonah and other interested parties. After NPS officials had conducted the field research and collected the tree-ring samples, Charles M. Mobley & Associates was contracted to analyze the information and write up the report, under P.O. 1443PX970094296.

As it turned out, one of the samples was too rotten to count its rings, leaving three analyzable specimens. Two were from dead CMTs, so the exact year of scarring couldn't be determined. The other sample had compressed rings, and the ring counts at two different areas of the sample weren't the same. So, for all three trees, the analysis produced a range of time during which the cultural scarring could have taken place, rather than one exact year for each tree. However, the ranges for each tree are identical - the trees were scarred sometime between 1900 and 1906 A.D.

The analysis indicates that traditional Native bark-stripping was practiced at Bartlett Cove in the very early 1900s. One of the dated CMTs -- a blazed tree -- was suggested to be a survey marker delineating the original boundary of Hoonah Tlingit Charles S. Judson's Alaska Native Allotment, filed in 1912, but there is no firm evidence to suggest that is the case. The small number of dated CMTs and the lack of a baseline tree-ring chronology developed from un-scarred trees limits interpretations, but the Bartlett Cove CMTs have potential for yielding further insights into the type and timing of traditional Native forest use in Glacier Bay.

Culturally Modified Trees at Bartlett Cove, Glacier Bay National Park, Alaska

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(cover) A Tlingit summer camp at Bartlett Cove photographed by George T. Emmons in 1888, labeled with the caption "'Khart-heenee' (Salmon water) a summer village of the Hoonah Kow at the entrance of Glacier Bay, Alaska 1888. The fish frames show the strips of Salmon and Halibut drying." Note the bark used to roof the structures, and the dugout canoes (covered with tarps to prevent them from drying out). Negative #338436, G.T. Emmons collection, Department of Library Services, American Museum of Natural History.

Culturally Modified Trees at Bartlett Cove, Glacier Bay National Park, Alaska

Introduction

The National Park Service's (NPS) administrative headquarters for Glacier Bay National Park is at Bartlett Cove, within the Park boundaries. In 1992, when plans were being made to build new employee housing, NPS archaeologists Steve Klingler and Megan Partlow documented a group of fifteen culturally modified trees (CMTs) in the new housing area. The trees had partly healed scars showing where bark had been removed many years before. The archaeological survey was done to comply with Section 106 of the National Historic Preservation Act of 1966.

NPS officials consulted the State Historic Preservation Officer (SHPO) and the Tlingit people of Hoonah about the trees' significance, and it was determined that the CMT grove was not eligible to the National Register of Historic Places. However, plans were made to study a sample of the CMTs, to see what they could tell about the history and past use of Bartlett Cove. Eventually, to clear the construction area, four CMTs were cut down, and whole sections from each were kept as tree ring samples. It was expected that a count of the growth rings would indicate when the

bark-removal had taken place. This report contains the results, and was written and distributed in keeping with the wishes of the SHPO and the Hoonah Tlingit.

Glacier Bay, and particularly Bartlett Cove, were favored locations for traditional Native subsistence activities, especially for the Tlingit people of Hoonah, according to oral history, some historic accounts, and archaeological evidence from Lester Island. But the Bartlett Cove area has seen less subsistence activity since the federal purchase of Native allotments and formation of Glacier Bay National Park, so recent documentation is limited.

Dendrochronological -- or tree-ring -- analysis of CMTs from Bartlett Cove, coupled with information about traditional forest use, was expected to shed light on the specific type and timing of past activity on an Alaska Native Allotment claim filed by Charles S. Judson at Bartlett Cove in 1912. In the larger picture, such data can help reconstruct patterns of Tlingit expansion into this area after the glacial retreat of the 17th and 18th centuries.

Traditional Native use of tree bark for food and building materials

This was their summer camp; they were laying in a supply of skins and oil against their winter needs....These shelters consist of a square frame of poles, loosely covered by strips of spruce bark, from a foot to eighteen inches wide and eight or ten feet long, laid on the framework, and held in place by slender poles placed over them. This bark must of course be brought from a distance, since trees large enough to furnish such bark do not grow in the neighborhood. At most of these bark shelters, skins of the hair seal still on the drying frames, were leaning against the wall, outside, and in some cases had been thrown up on the roof.

Grinnell (1901:60, 158) describing a Tlingit sealing camp at Disenchantment Bay visited by the Harriman Alaska Expedition in 1899, as cited in de Laguna (1972:314).

often meant removing large sections of bark from living trees. Sometimes wood was removed, as well. The resulting scars, even when fairly large, don't usually damage the tree enough to kill it. So the tree continues to grow, with successive layers of new growth accumulating each year, gradually growing over the edges of the original scar. In cross section, this

new healing growth appears as two lobes of curved tree rings which curl over the old scar surface year after year.

The ring made during the season when bark was stripped is clearly visible in a tree ring sample. The number of rings produced since the bark stripping occurred can be counted, giving the exact calendar year (Mobley and Eldridge 1992). Because of the curve of the rings in the growth lobe, however, the small cylinder of wood obtained using a standard tree increment borer can't be used to interpret the tree rings on a CMT (Mack 1982; Mack and Hollenbeck 1985). Instead, a chainsaw must be used to cut at least a pie-shaped slab from the scar face and one adjacent healing lobe. When the tree is dead or going to be cut down anyway, a whole round is the best sample for tree ring interpretation.

The shape of cultural scars on trees can be highly variable, depending on the method of bark or wood removal, the vigor of the tree, and the subsequent climate and how it affected the weathering of the scarred surface. Even so, types of scars can often be correlated with the cultural activity that produced them.

Traditional methods of stripping bark from trees typically leave either triangular scars, or rectangular scars.

Rectangular scars are formed when an axe or adze is used to make horizontal cuts at the top and bottom of the bark to be removed. A triangular scar is formed when only the bottom of the bark is cut; the bark is then pulled out and up, tearing with a taper that follows the natural fiber and ends at a point as much as 15 or more feet above the ground. Other scar shapes include creases -- which occur when the two healing lobes grow so much as to practically meet, and internal scars -- which are hidden scars buried in the tree after the lobes do actually meet.

Scientific investigation of culturally modified trees began with isolated studies in the northwest United States and British Columbia, until researchers in British Columbia began extensive work in the early 1980s (Arcas Associates 1984). Archaeologists in Alaska occasionally noted bark-stripped and blazed trees, but, at first, little attention was paid to them (Wilsey and Ham 1975; Ackerman and Gallison 1981:26-27; Mobley 1984:17). More and more study has since demonstrated their anthropological value in understanding past Native and non-Native forest use in the Tongass National Forest (Mobley 1989, 1994a, 1994b; McCallum et al. 1991; Mobley and Eldridge 1992). Research has focused on traditional

subsistence uses of cedar, spruce, and hemlock for food, shelter, and crafts. However, an equally important potential for CMT study involves their occasional use as survey markers for Native Allotments and other survey and land development.

Although the presence of CMTs in the Glacier Bay area is generally recognized, no systematic survey or analysis has been attempted. This study of the Bartlett Cove sample is the first step in that direction.

Background

The Setting

Bartlett Cove is on the east shore of Glacier Bay, northeast of Point Gustavus on Icy Strait and eight miles by road northwest of the village of Gustavus. The cove is protected on the north by Lester Island, where it narrows to the outlet of Bartlett River. The NPS construction project is on the south shore at the narrow east end of Bartlett Cove (Figure 1).

This part of Glacier Bay was covered by ice during the last glacial advance until the mid-eighteenth century. When Captain George Vancouver visited the area in 1794, glacial ice was visible a few miles above Icy Strait, approximately at

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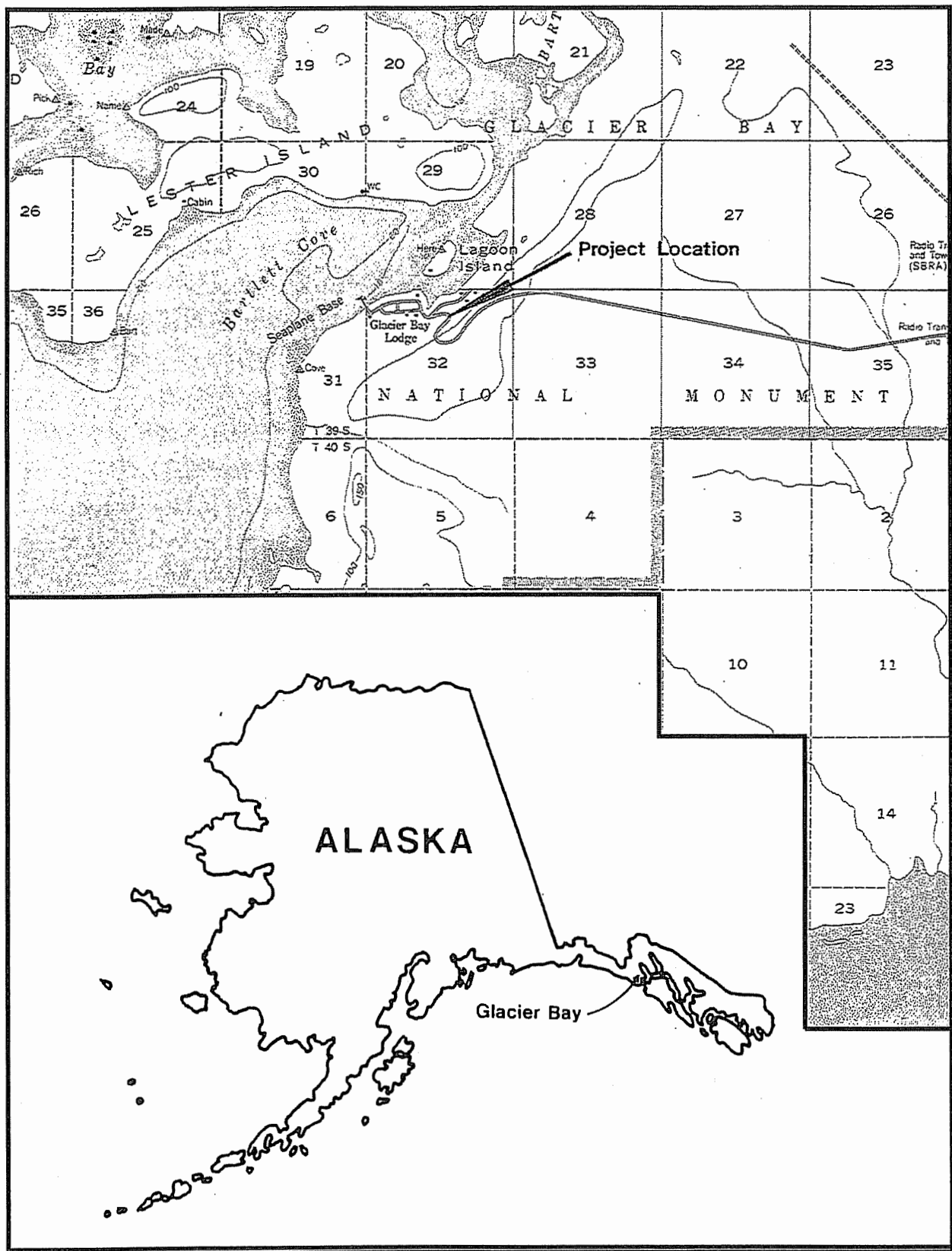


Figure 1. Map showing Bartlett Cove and the project location, from USGS Juneau (B-6) quadrangle, 1:63,360 scale. Each square equals one square mile.

what's now Bartlett Cove. By the time John Muir (1915) visited Glacier Bay in 1879, the ice had retreated 50 miles up the bay. These historical accounts support NPS tree-ring counts on Point Gustavus that suggest spruce trees migrated into the area south of Bartlett Cove around 200 years ago.

The land around Bartlett Cove is typical of recently glaciated surfaces around Glacier Bay. The rocky shorelines give way inland to low hills and ridges of glacial moraine and glacial outwash deposits. To the south, larger terminal moraines mark the farthest advance of the last glacier. The construction site is on a moraine of sandy soil, poorly-sorted gravels, and large boulders, approximately 30-50 meters high, running northeast-southwest parallel to the shore of Bartlett Cove.

The forest contains dense stands of spruce with occasional hemlock, shifting to alder and willow near the shoreline. The trees blow down easily due to the poorly formed soils, resulting in considerable soil turnover. High bush blueberry and devil's club dominate the understory. Ground cover consists mainly of mosses and ferns.

Land animals in the area include deer, [?]groundhogs, ^{mar mof s r}porcupines, black bears, land otters, marten, wolverines, and wolves. Marine animals include sea otters, seals, hooli-

The movement of the Ice Age forced us out of Glacier Bay, we didn't abandon it. **Richard Dalton, Sr., President of the Hoonah Traditional Tribal Council**

gan (eulochon), and four species of salmon. The intertidal zone is particularly rich with limpets, snails, barnacles, mussels, clams, crab, starfish, sea urchins, sponges, and several species of seaweed.

Human Occupation

It's likely that nearby Tlingit Natives began using the Bartlett Cove area as soon as the last glacier melted off and plants and animals returned. The lower part of Glacier Bay has been occupied for the last 200 years by the Tcukanadi and Daqdentan clans of Hoonah Tlingit (Goldschmidt and Haas 1946). Before the village of Hoonah was established on Chichagof Island to the south, there was a village on Lester Island, across Bartlett Cove from the study site (Goldschmidt and Haas 1946; Ackerman 1964).

Hoonah oral traditions tell of people in the Bartlett Cove area before the last glacial advance, when the eastern arm of Glacier Bay was a large ice-locked lake. It is said that, at that time, four clan houses were abandoned as the glaciers advanced up

The inner bark of the spruce and hemlock forms an important part of the food supply of the Haida, Tlingit and Tsimshian. The southern Indian eats pine bark... The scrapings are molded into cakes about a foot square and an inch thick, dried and preserved for winter's use. It is eaten like dried fish, with oil as a sauce.

Niblack 1890:277-278

Glacier Bay. The Tcukanadi clan moved to the site of present day Hoonah, to return to Bartlett Cove after the ice retreated (Dauenhauer and Dauenhauer 1987). Although oral traditions do not record the chronology of these events, geologists have found evidence of a large lake in east Glacier Bay, and evidence of well-established spruce-hemlock forests around Bartlett Cove that predate the last glacial advance (Cooper 1923). Thus the geological evidence allows for the possibility of pre-glacial human occupation in Glacier Bay.

In the 1960s archaeologist Robert Ackerman found two prehistoric sites near Glacier Bay, occupied from 500 to several thousand years ago. The earliest contained tiny stone slivers made by human hands, called microblades, that could be 9,000 years old, while the more recent site

was similar to historic Tlingit camps (Ackerman 1964).

Goldschmidt and Haas (1946) recorded oral histories indicating the importance of Bartlett Cove as a subsistence location. In the spring, summer, and fall, people caught salmon and hunted seal, trapped fur-bearing animals, hunted deer and bear, gathered vegetables and berries, gardened, and collected marine plants and animals from the intertidal zone. Tree products were used to build dwellings and smokehouses, as well as for food and medicine.

The area's principal historic archaeological locality is the Lester Island Village (JUN-026), the site of a Euroamerican saltery and cannery (established in 1883 and abandoned by 1910), a Hoonah summer fish camp, and a log cabin, general store, and trading post established by Dick Willoughby (Black 1957:23). Ackerman (1964) discovered four historic house pits southwest of the saltery, which he attributed to the Native village, and a cemetery with at least seven graves on a bluff overlook-

Years ago there was a cannery at Bartlett Bay, which was abandoned for want of salmon, but, strangely enough, another one was being erected there this season... 1900-1901 observation in Jacot (1959)

Bartlett Cove was an important place for the native people. I have a dwelling and two smokehouses there; also a garden with rhubarb, strawberries, raspberries, cranberries and soapberries. I had two trap lines around the lake above Bartlett Cove. The last time I trapped there was about eight years ago, but since I have become too old my sons used these trap lines until it (Glacier Bay) was made a reserve. I have fish lines and trap lines in my house. We used to get sockeyes and cohoes in the Cove and land otter in that area. I also have a trapping cabin on the lake - formerly had two or three cabins on the trap line. This place belongs to the daqdentan clan and has belonged to my family for a long time. I am the fifth generation to use it. Albert Jackson, speaking with Goldschmidt and Haas (1946:90)

ing the saltery. An earlier National Park Service survey (Jacot 1959) reported ten graves in the cemetery, as well as a cache of guns found west of the cemetery and saltery (Figure 2).

In a series of letters, August Buschmann, son of Peter Thams Buschmann (who purchased the saltery site in 1896), stated that another cannery was constructed "across

the Cove east of the saltery" in 1899 (Buschmann 1960). And Jacot (1959) points out mention of two canneries in Senate Document Volume 14 of the 56th Congress, 2nd Session, 1900-1901. These may both relate to the pilings visible in the 1912 Judson allotment application.

A photograph by Emmons (1991), of "the Hoonah summer village, *Khart Heenee*, Salmon Waters, at Bartlett Cove, near the entrance of Glacier Bay, 1888," shows at least five substantial houses, many fish drying racks, and half a dozen dugout canoes (see cover). Of note are the roof coverings -- rectangular slabs of bark lapped over each other as shingles

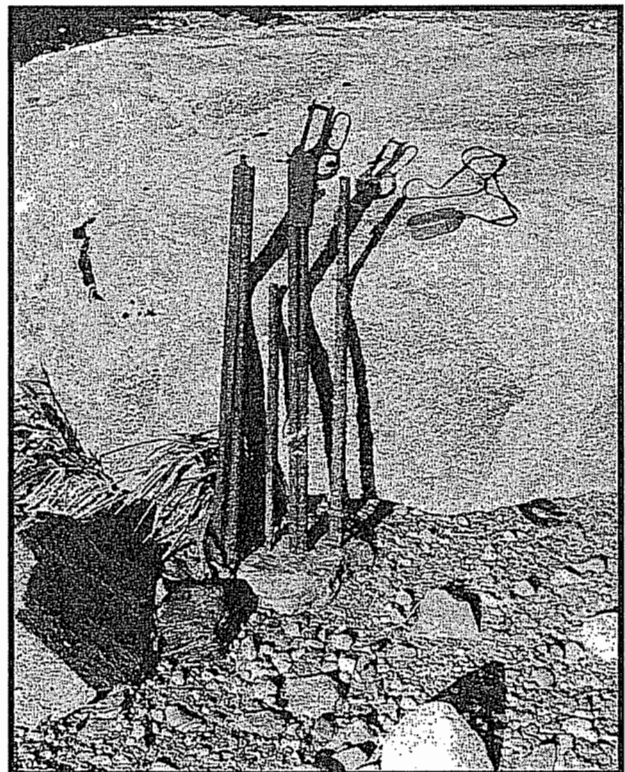


Figure 2. This cache of guns was found partially buried under a Sitka spruce tree on Lester Island in the 1950s.

I was raised in Hoonah and Bartlett Cove, as a child. My dad, Albert Jackson, owned that property – 360 acres. The government paid him \$800 for a right-of-way, not outright purchase. There was a community house there. Different families had different niches in that community house. My dad had smokehouses there for everyone to use. Some people brought tents. There was a huge rock, and we used to play on it. We used to put up our winter supply of food - fish, seal-meat - then take it to Hoonah. We just got what we needed – nothing was wasted. It was happy times for us.

Ruth Lokke, Juneau

and held down with poles. Almost identical bark-roofed houses were photographed at a Tlingit summer camp at Disenchantment Bay, in 1899, by the Harriman expedition (de Laguna 1972:314,; pls. 72-80).

One of six Hoonah villages reported by Swanton (in Goldschmidt and Haas 1946:87) is Gathini, said to be located north of Dry Bay. The authors point out the possible inaccuracy of these village locations, since “Swanton’s [1909] data were gathered at Sitka and Wrangell, with no indication that he visited other villages.”

In 1912, Charles S. Judson applied for a Native Allotment on the

south shore of Bartlett Cove (Figure 3). The September 1914 survey report by Jno. P. Walker, U.S. Surveyor, describes the allotment and said it was marked with four corner stones and a number of survey marker trees.

Intertidal pilings at that location have been assigned AHRS number JUN-050. The survey conducted by Klingler and Partlow in 1992 found

The land embraced in Alaska Allotment Survey No. 40 is situated on the south side of Bartlett Bay, south of a large island, in the Bay, on the south shore of which is an Indian settlement.....The only improvements on the claim is an old cabin, noted as being near corner No.1, which is a log cabin, built of small logs, the roof of which is practically gone from decay, and containing no floor. The cabin was formerly used as a smoke-house for drying salmon, tho does not appear to have been used for many years.

Along the north boundary of the claim, on the shore line, as indicated in the notes, are some old piling still standing, where was formerly located a saltery for salting salmon. This was owned, however by white people, tho none of the old buildings are now standing.

(Walker 1914)

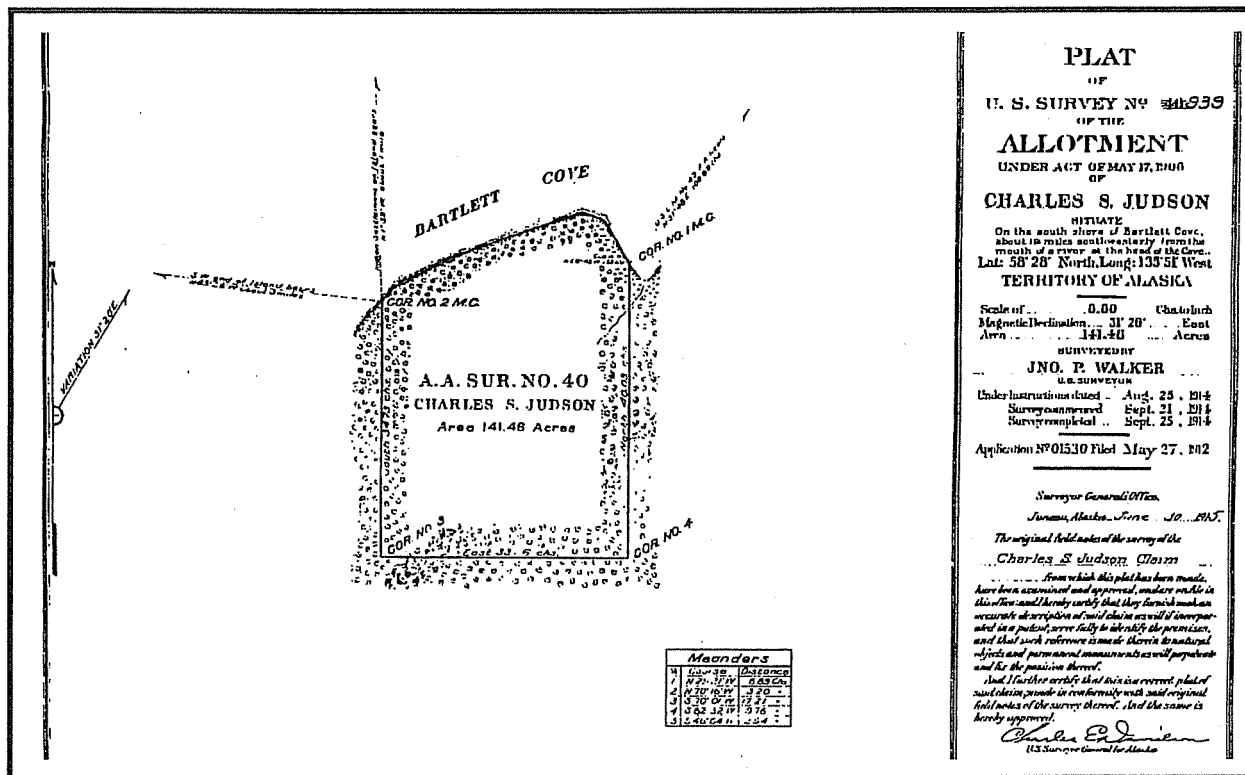


Figure 3. Plat of Charles S. Judson allotment (USS 939)

remains of a telephone line across the study area, and several trees with cultural scars (Klingler 1992).

Methods

The methods of this study are tied to its purpose. The purpose is to describe the significance of culturally modified trees within National Park Service headquarters at Bartlett Cove. Subsistence use in Glacier Bay has decreased in the last fifty years since Glacier Bay National Park was formed. Information about traditional Native use of specific locations in and around Glacier Bay is disappearing as elderly Native men and women pass on. Analysis of the age and distribution of

CMTs in the Bartlett Cove area, along with ethnohistorical research on traditional Tlingit subsistence practices, may help us understand the history and prehistory of the Glacier Bay area.

Fieldwork

On July 27, 1992, NPS archaeologist Steve Klingler, NPS Resource Management Specialist Mary Beth Moss, and NPS Chief of Maintenance Wilbur Cannon, walked over the project area to inspect culturally modified trees (CMTs) (Klingler 1992). Klingler and NPS archaeologist Megan Partlow numbered and mapped 15 CMTs, and plotted six other, un-num-



Figure 4. NPS archaeologist Megan Partlow stands next to CMT #1.



Figure 5. NPS archaeologist Megan Partlow points to a ceramic insulator imbedded in CMT #3.

bered CMTs. In 1993, NPS anthropologist Tim Cochrane visited the site and noted other CMTs, which he sketched on a map. Noting an apparent “linearity” between CMT #s 3, 13 and 11, Cochrane suggested the trees may have marked the east boundary surveyed for the Charles S. Judson allotment. He found more in a subsequent trip to the site in 1994, leading NPS to believe that there are probably other CMTs which have not been recognized and recorded in the vicinity of the project area.

Klingler, in 1992, instructed the tree-felling crew to cut and mark rounds from four CMTs in the proposed road. He and Moss photographed CMTs in the project area and mapped their approximate locations on the “Water Treatment Plant” architectural drawing. Sometime later, CMT #s 1, 3, 4 and 14 were cut down (Figures 4, 5, 6, and 7), and cross-sections including the bark-strip scar were removed and marked. The rounds were apparently stored at the construction location for some time before they were shipped to a NPS warehouse in Anchorage, and CMT #3 became water soaked and rotten, breaking into two large outer sections of the original round, and a smaller section from the center of the tree.

Literature Review

After contracting the analysis and write-up of this study to Charles M. Mobley & Associates on March 30 of 1994, NPS archaeologist Karlene Leeper supplied the authors with reports for the Bartlett Cove construction project. These documents included Steve Klingler's survey report and his original color slides, as well as background material concerning early explorations and archaeological investigations in the Glacier Bay area. Additional archaeological and ethnological information came from the accession and documentation files of the University of Alaska Museum Archaeology Department, and the University of Alaska-Fairbanks library and archives.

Laboratory Analysis

Four CMT samples (#s 1, 3, 4, and 14) were moved from the NPS warehouse in Anchorage to the Dendrochronology Lab at the University of Alaska Fairbanks. Each sample was marked with its sample number -- in yellow paint on the bark, and with red plastic flagging nailed to the cut surface.

CMT #3 was too rotten for accurate ring counting. The three intact samples were sanded on one cut sur-



Figure 6. NPS archaeologist Megan Partlow stands next to CMT #4.



Figure 7. NPS archaeologist Megan Partlow stands next to CMT #14.

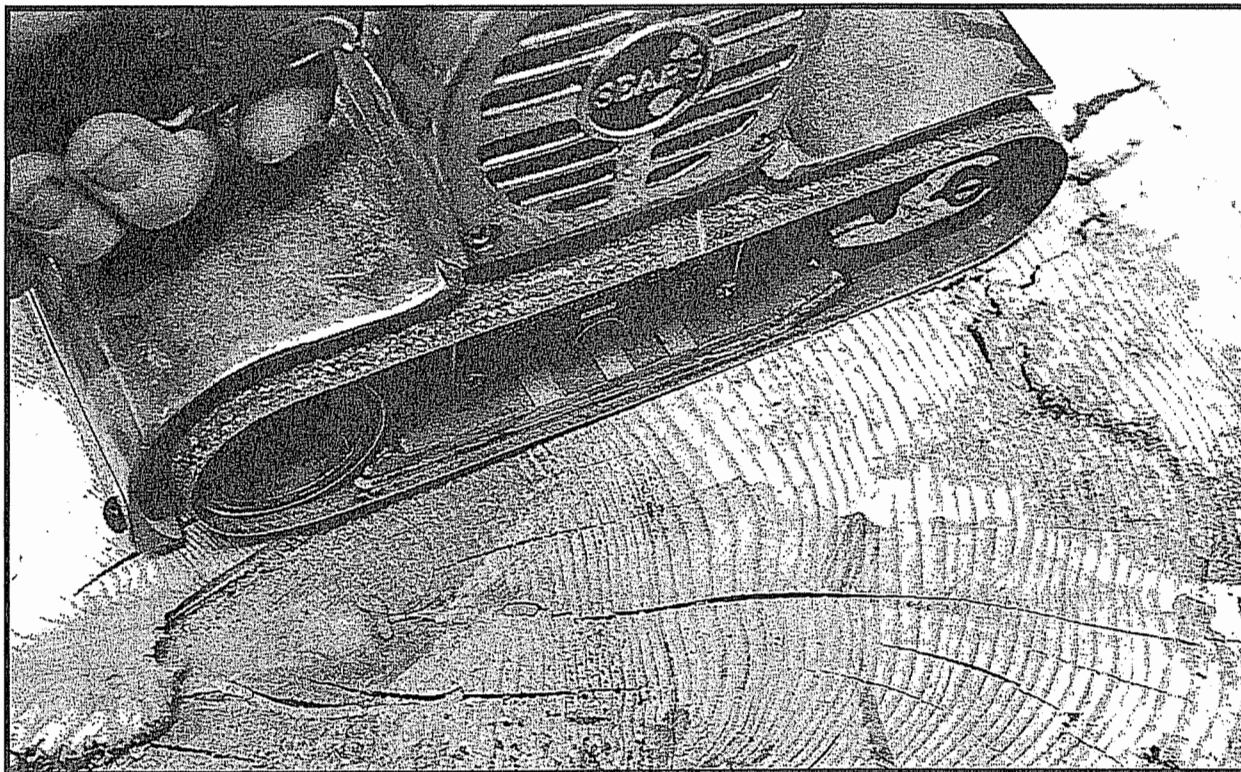


Figure 8. A belt sander was used to obtain a smooth surface on each sample, making it easier to count the rings.

face with an electric belt sander (Figure 8), using successfully finer grades of sandpaper. Two smooth surfaces on each sample provided two locations for ring counting from the outermost (most recent) ring to the pith at the center of the tree.

Tree rings were counted using a Bausch & Lomb binocular microscope, which especially helped to identify rings in areas of compressed growth (Figure 9). Ring counts were made in two locations to account for missing and/or additional rings. The ring corresponding to the season of bark-stripping was followed around to verify it's location at both sides of the bark-stripping scar.

Oral History

To supplement the archival research, information was requested by telephone from Hoonah Tlingit residents knowledgeable about past cultural activity in the Bartlett Cove area. While all the people contacted said that more information could be

CMTs are particularly useful because they can be dated to the exact year, whereas often people's recollections are not that specific unless it's linked to an event like a birth or death. Bob Schroeder, Alaska Department of Fish & Game, Subsistence Division, Juneau.

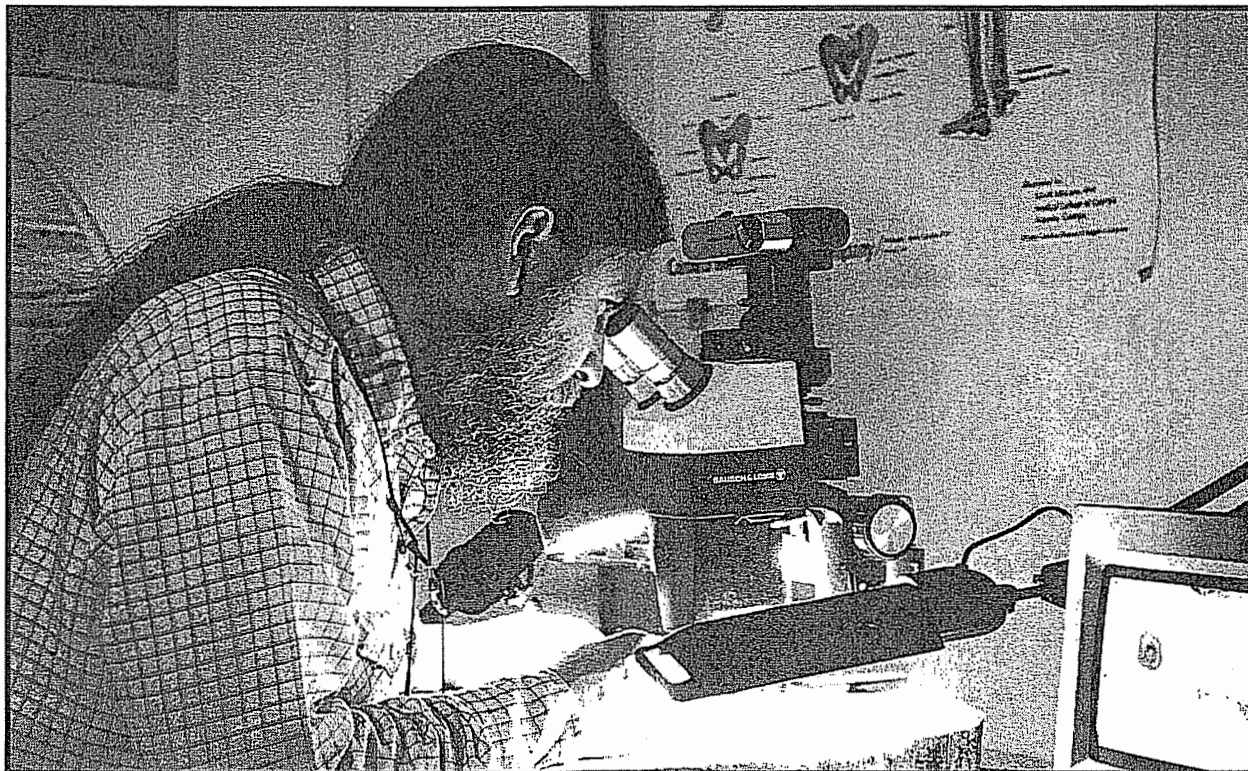


Figure 9. Michael Lewis counts tree rings using a binocular microscope at the University of Alaska Museum in Fairbanks.

made available under other interview arrangements, each graciously gave permission to use the specific quotes used in this report.

Results

Distribution of CMTs

Most of the 17 CMTs are near the east shore of the lagoon on Bartlett Cove (Figure 10), with CMT #15 and additional undocumented CMTs to the east and west -- outside the survey area (Klingler 1992). All except CMT #15 are on the gentle slope adjacent to Alder Creek or the

shore of Bartlett Cove. CMT #15 is located to the southwest on the highest point in the project area (Figure 11). The scars on the CMTs face all different directions (Figure 12). The orientation of CMTs #3, #5, and #15 were not recorded.

The original field research (Klingler 1992) and accompanying photographs indicate that five of the recorded CMTs were hacked to form a blaze -- a small scar at approximately arm's reach. The remaining CMTs had larger patches of bark removed. The five blazed trees generally follow the 50 to 60 meter contour of the slope. The bark-stripped CMTs appear clustered in three general areas,

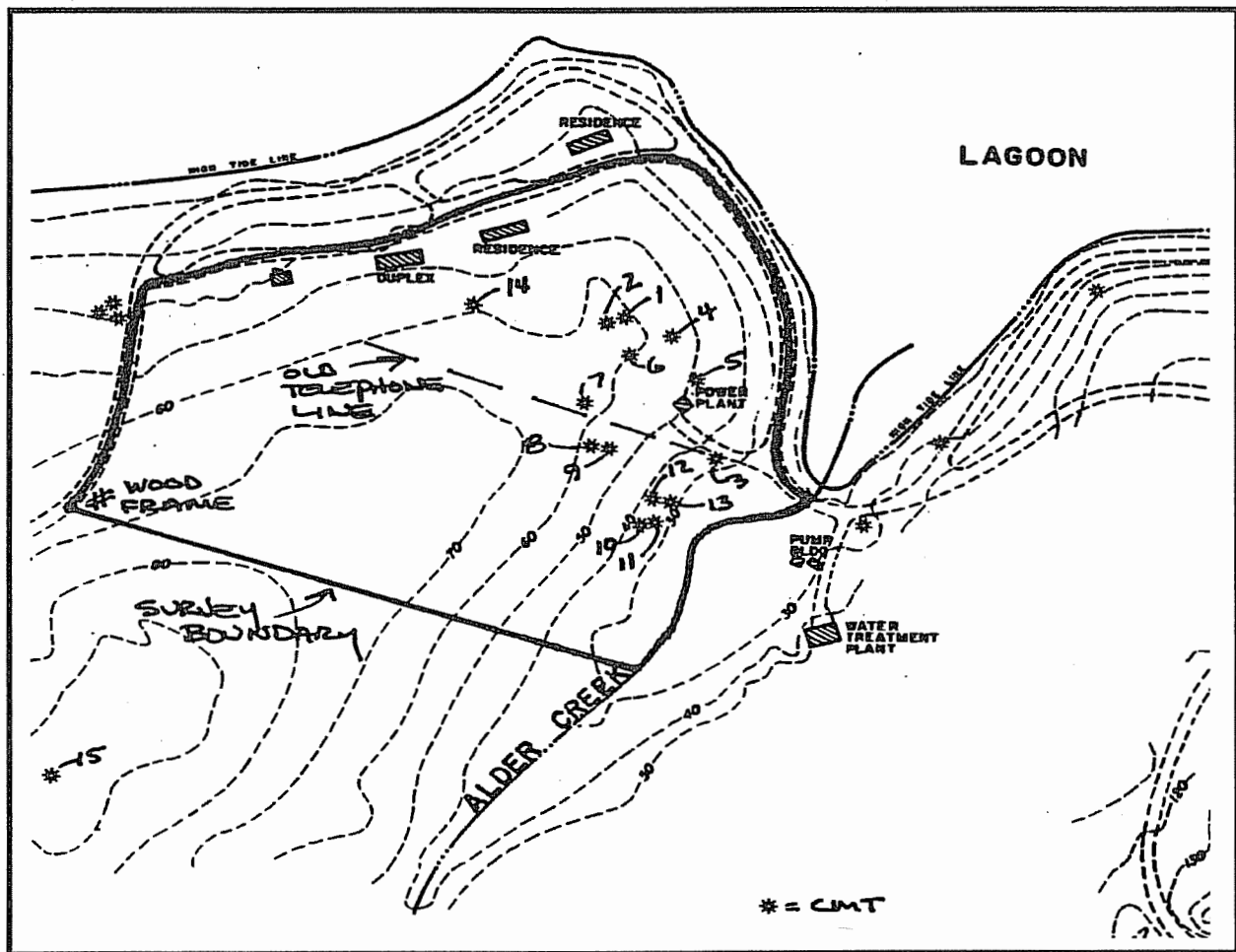


Figure 10. Map of CMTs found in survey area by Steve Klingler in 1992, from Klingler (1992).

though this may be due to the survey focusing on the area of planned construction.

There is no obvious pattern in CMT scar orientation, and factors that could have influenced the location of bark stripping on individual trees are not readily apparent on the survey photographs. Ground topography, growth characteristics of individual trees, or cultural “rules” or traditions may have influenced tree selection and scar orientation.

Dating of CMTs

Continued growth of the live tree after scarring results in healing lobes that gradually cover the sides of the scar, narrowing the scar face and sometimes completely covering it. Using dendrochronology, or tree-ring dating, a count of the yearly growth rings since the scar was made can accurately date it to the exact year. The easiest and most accurate dating is with a complete cross-section round. Since the Bartlett Cove CMTs

CMT	Age of Tree		Age of Scar		Year
	Count 1	Count 2	Count 1	Count 2	
#1 (dead)	144	144	86	86	1906 A.D.
#4 (live)	150	157	86	92	1906 A.D.
#14 (dead)	147	145	86	84	1906 A.D.

Table. 1. Ring counts for culturally modified trees, in years, with resulting dates.

in the estimates for those two trees is due to the fact that the trees were dead when they were cut in 1992 -- and may have been dead for up to six years or so. On CMT #4, the difference between ring counts at two different parts of the tree suggests that it, too, was scarred between 1900 and 1906.

Conclusions

Cultural Context of the CMTs

The CMTs at Bartlett Cove are comparable to other CMTs in the Pacific northwest coast (Mobley and Eldridge 1992). There are two types of cultural scars evident in the Bartlett Cove sample. Five trees exhibit small, localized, rectangular scars one to two meters above the ground, with many hack marks on the surface of the scar. Several of the scars have an angled lower margin. These scars may be blazes used to mark a boundary or trap line. All the samples appear to have been cut from spruce trees, but whether they were Sitka spruce or

White spruce is unclear. ??!

CMTs #14 and #3 are blazed trees, with the scar on CMT #14 dated 1900 - 1906. CMT #3 couldn't be dated. A ceramic insulator nailed to CMT #3 and a telephone line on the ground nearby may relate to the blaze.

The remaining CMTs have long narrow scars, many of which begin close to the ground and taper to a narrow point at the top, with few hack marks other than at the top and bottom. These scars are interpreted as the result of bark stripping. The Tlingit of southeastern Alaska put tree bark to many different uses, and -- if Emmons' 1888 photograph of a Native village at Bartlett Cove is any indication -- these trees could very well have been stripped to obtain bark slabs for use as roofing shingles on summer houses and smokehouses.

The bark strip scars on CMTs #1 and #4 were dated to between 1900 and 1906 -- the same range of years during which the blaze was made on CMT #14. It's possible that all the scarring occurred during a single visit to the site, sometime between 1900



Figure 13. In this cross-section of CMT #14, the cultural scar begins at the dark "scroll" at right. A very narrow ring of light-colored wood grew in the year following the scar, as a result of the tree's trauma. By the third year, however, the healing lobe had begun to encroach on the scar's margin.

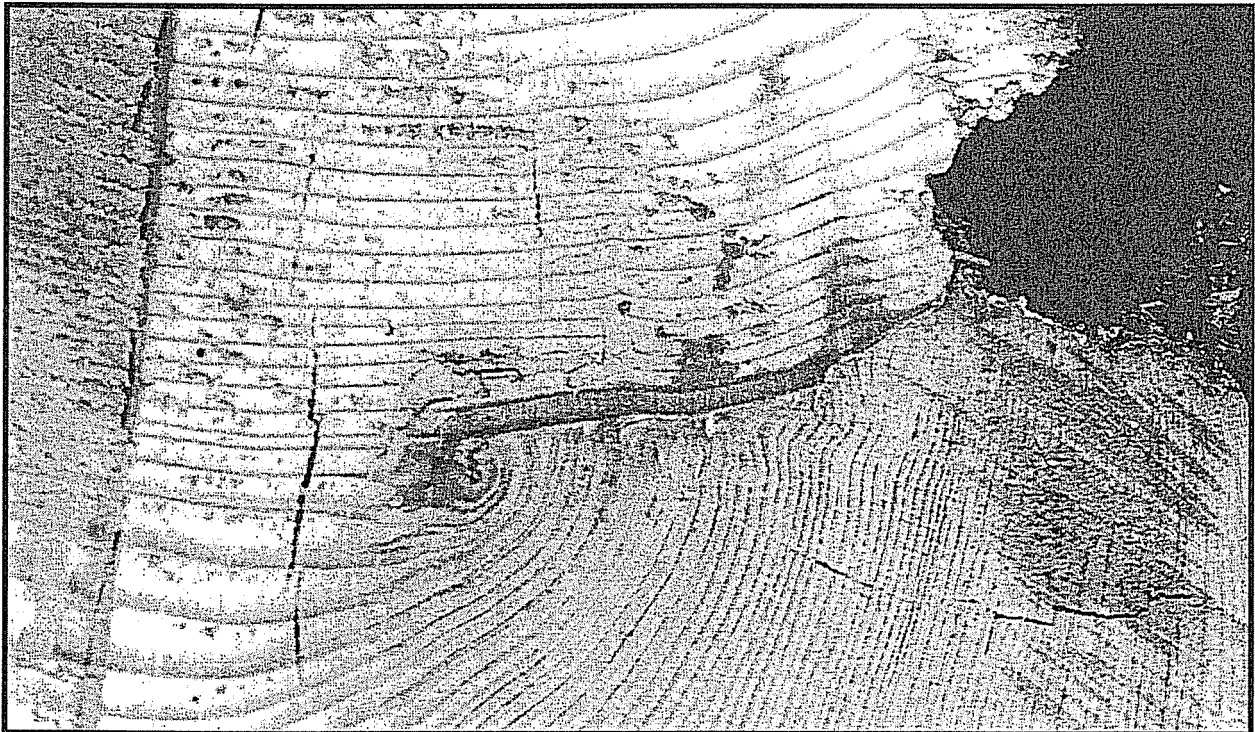


Figure 14. In this close-up of the rings from CMT #14, the wide dark discontinuous line extending from the "scroll" is the ring preceding the year of the bark-strip, stained by exposure to the air. As can be seen, the scar face exposed in 1992, at the upper right, did not represent the year preceding the bark strip, because seven or more rings had eroded from the face since the original scarring.

and 1906. Without a master chronology from unmodified trees, a precise year of scarring can't always be determined, because missing or double rings can't be accounted for. Eventually, with a base chronology, the year when CMTs #1 and #14 died can be determined, and then the samples can be dated precisely.

It's not clear what was going on at Bartlett Cove in 1906. The Buschmann saltery across Bartlett Cove employed Native labor throughout the period of its operation (Jacot 1959). The exact date it stopped operating is not known, but it was probably before 1910 (Jacot 1959). The pilings on the north shore of the survey area were driven in 1899 (Buschmann 1960), and, according to the Judson allotment survey, were abandoned by 1912 (Walker 1914). It's possible that the Bartlett Cove CMTs reflect a return to more traditional economic activities after the removal of the money economy based on the Buschmann saltery.

The Judson Allotment

There's not much evidence to connect the CMTs at Bartlett Cove with the Judson allotment survey of 1914. Cochrane's perception of linearity among several of the CMTs is not borne out by the map of CMT loca-

tions, nor in the orientation of CMT scars (Klingler 1992). To the extent that the 1993 survey map can be correlated with the 1914 plat of the Judson allotment, the east border of the Judson allotment does not appear to coincide with the line of CMTs #3 and #11.

However, a 1920 review of the Judson allotment made by Walter B. Heiser of the General Land Office of the Department of Interior observed "...by reading the field notes of the survey, and from conferring with Albert Jackson, that the land surveyed is slightly different from that applied for, due to the necessity of the surveyor complying with regulations regarding salmon streams, reserved spaces, etc" (Heiser 1920). Thus, the blazed CMTs at Bartlett Cove may be associated with Judson's *original* application for the allotment, rather than the 1914 survey conducted by Jno. P. Walker.

Charles S. Judson is described in Walker's 1914 survey report as "a native Indian of Alaska, resides in the village of Hoonah in winter and fishes, usually with the Bartlett Bay bunch of Indians in summer, tho the past summer he worked at the canery (sic) at Yakutat. He possesses no special rights to the claim which he seeks. His filing on the claim is, in my judgement, simply one of a series of filings

of the family or tribe, of which Albert Jackson is the leader, and whose object is to corral the fishing privileges in Bartlett Bay." (Walker 1914)

Judson's clan affiliation is not mentioned, but at this time Hoonah was occupied by members of the Tcukanadi and Daqdentan clans, of the Wolf and Raven moieties, respectively, who intermarried (Goldschmidt and Haas 1946:35). Goldschmidt and Haas (1946:90) quote Albert Jackson: "This place belongs to the daqdentan clan and has belonged to my family for a long time." Although not stated, daqdentan clan land claims probably extended to the Bartlett Cove survey area, and Charles Judson's claim was likely made through his daqdentan clan membership or through marriage.

Spatial Arrangement of CMTs

The limited sample of CMTs at Bartlett Cove allows only some general guesses about patterns and their meaning. The blazed trees appear to bound an area containing most of the bark-stripped CMTs. The CMTs near the west shore of Bartlett Cove lagoon may be associated with the cabin noted in the 1914 survey report -- bark stripping may have related to the construction and/or operation of this smokehouse.

Summary

The scars on three CMTs from the Bartlett Cove survey area were made between 1900 and 1906. The CMTs coincide roughly with the 1912 Judson allotment, but are probably not directly associated with Walker's 1914 survey. The Bartlett Cove CMTs are in keeping with traditional Hoonah Tlingit cultural activity expected in the vicinity of Lester Island Village. They may represent a period of economic adjustment as residents of the Lester Island Village increased their traditional subsistence practices following the closure of the Buschmann cannery.

Analysis of the CMTs is limited by the small sample size and the lack of a base chronology of tree ring growth for the area. A larger sample would help discriminate between a one-time event and longer-term sub-

A couple of years ago I took my grandchildren -- four of them -- in a boat to Glacier Bay, and the excitement and joy when they saw Bartlett Cove! It was like coming home. An elder said he remembered when it was like a desert -- the sand was so fine, and always blowing. He was pointing to the tip of an island that has trees on it now. Mary Rudolph, Hoonah.

sistence use. A base chronology of tree ring growth would help reconcile, through cross-dating, discrepancies in tree ring counts as a result of missing or duplicated rings. It might also allow reconstruction of climate influences on subsistence activities.

Future studies of Glacier Bay CMTs would benefit from an expanded sampling strategy, in which a base chronology is established using core samples from ten to twenty non-cultural trees. With a base chronology, historically recorded climate records can be correlated with tree ring fluctuations. Then climate reconstruction can be projected back in time as far as the tree ring record will allow. This will make climate information available for periods before recorded climate histories, which may be useful in interpreting subsistence changes and population movements. CMTs can then be cross-dated to the base chronology to reconcile ring count differences, and dead CMTs can be accurately dated.

The CMTs available for study at Bartlett Cove could be addressed through a comprehensive management plan. Since development seems concentrated in the vicinity of the administrative headquarters, the agency could benefit from a detailed, accurate map of all the CMTs in the vicinity. This inventory should be accompanied by standard photogra-

I have taken seal, deer, grouse, gumboots, crab, clams, seaweed, mountain goat, ducks, geese and seagull eggs, duck eggs, nagoon berries, strawberries, blueberries, high bush cranberries, inner bark of Hemlock trees, sockeye salmon, silver salmon out of the rivers; King salmon, halibut, shrimp and both Kind and Tanner crab as well as Dungeness crab out of the bays.

Thomas L. Mills, Sr., writing about subsistence at Glacier Bay, in a 1991 letter to Secretary of the Interior Manuel Lujan.

phy and description of each tree. Then, a series of wedge samples cut from a selected group of the CMTs will give accurate information on the date of traditional Native forest use in this particular part of Bartlett Cove. By using care to cut the wedge samples leaving all of one healing lobe and part of the other (to serve as a structural "strut", and thus preserve the strength of the trunk), the CMTs should be damaged little more than they were when scarred in the first place.

When expanded to the greater Bartlett Cove area, a CMT inventory and a sampling program to tree-ring date them will help us understand the exact type and timing of forest use in this historically important subsistence area of the Hoonah Tlingit.

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Appendix A: CMTs at Bartlett Cove

- CMT #1** 1 meter X .6 m, extensive bark removal, in two sections, ground surface to three meters above ground. Ax marks at intersection. Rectangular lower scar, with lower margin near ground surface. Triangular upper scar extends 1.5 m above the rectangular scar.
- CMT #2** .5 m X .2 m rectangular blaze, approximately 1.5 m above ground. Hack marks throughout the scar.
- CMT #3** 1.3 m X .1 m rectangular blaze, 1.5 m above ground, extensive hack marks, ceramic insulator at about seven feet above ground.
- CMT #4** 1.4 m X .2 m rectangular scar with triangular upper surface, hack marks at upper margin.
- CMT #5** .5 m X .1 m rectangular blaze, 1 meter above ground, hack marks visible on scar surface.
- CMT #6** 1.2 m X .1 m rough-edged scar extending from approx. ground level to 1.5 meter above ground, bark damage extending above scar.
- CMT #7** 1.2 m X .6 m scar, extensive bark removal, 1 meter to 2.5 meters above ground, hack marks at upper surface, angled lower surface.
- CMT #8** 1.5 m X .25 m scar, triangular scar from ground level to 1.5 meters above ground, no hack marks visible.
- CMT #9** 4m X .4 m triangular scar from ground level to 4 meters above ground, heavy hack marks and wood removal in lower 1.5 meters.
- CMT #10** 4m X .4 m triangular scar from ground level to 4 meters above ground. Extensive rotting and wood loss in lower 2 meters.
- CMT #11** 2.1 m X .5 m rectangular scar .5 meters to 3 meters above ground, no visible hack marks.
- CMT #12** .7 m X .1 m triangular blaze, angled bottom, 2 meters above ground, hack marks.
- CMT #13** 2.3 m X .4 m rectangular scar, 1 meter to 3 meters above ground, heavy hack marks near top margin.
- CMT #14** .6 m X .1 m rectangular blaze with angled bottom margin, 1.5 meters above ground.
- CMT #15** 1.2 X .75 m rectangular scar, extensive bark removal ground level to 1.2 meters above ground. Sharp cut line at upper margin, triangular scar above cut line.



