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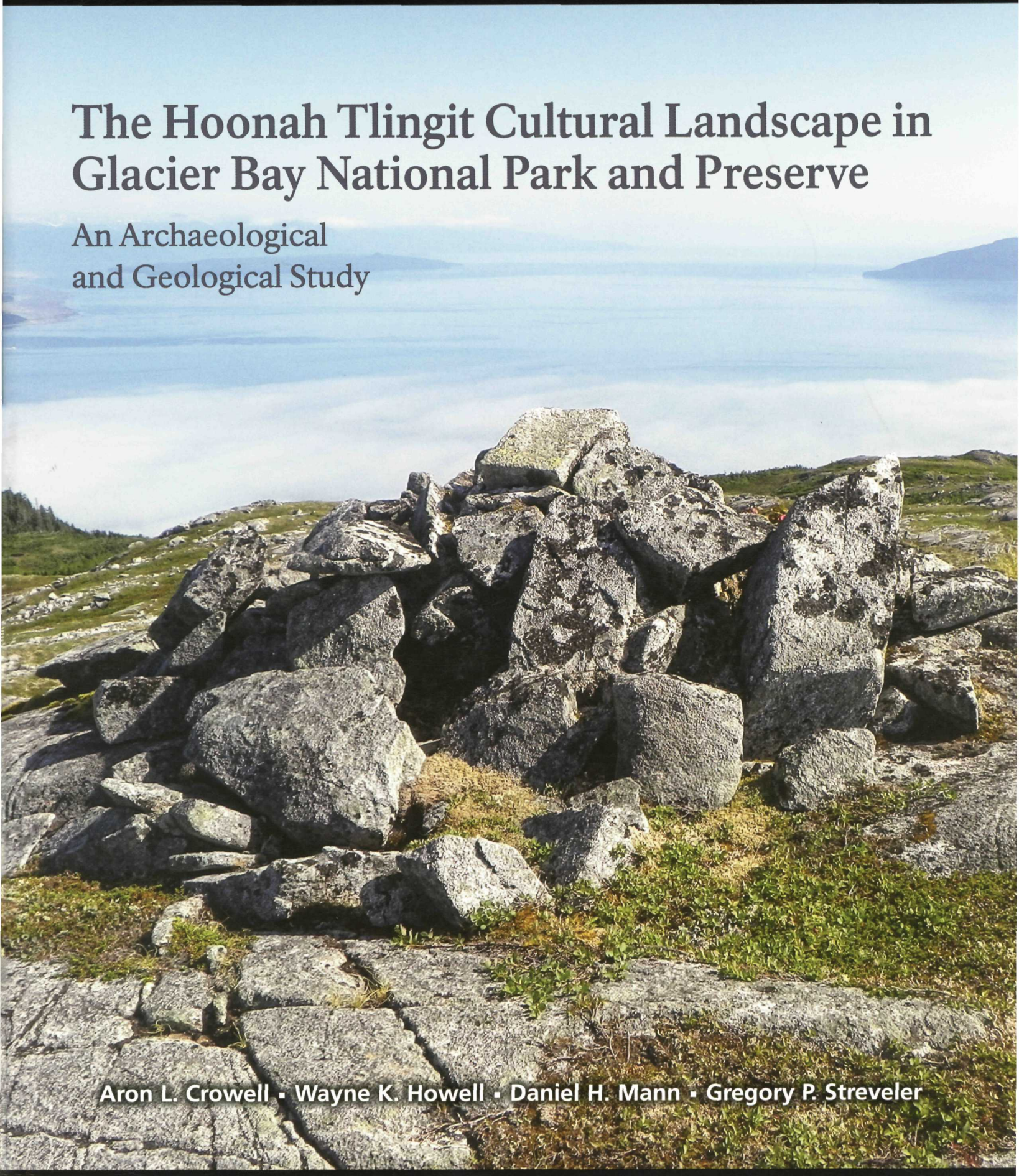
Glacier Bay National Park and Preserve

The Hoonah Tlingit Cultural Landscape in Glacier Bay National Park and Preserve

An Archaeological and Geological Study



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Dear Reader:

We are pleased to share with you this publication on the archaeology of Glacier Bay National Park and Preserve. This interdisciplinary study combines the fields of archaeology, ethnography and geology to enrich our understanding of past human use in this dynamic and ever changing landscape. The field work for this report was conducted in 1995 in a collaborative effort between the National Park Service's Alaska Regional Office, Glacier Bay National Park and Preserve, the Smithsonian Institution's Arctic Studies Center and the University of Alaska Fairbanks. The Hoonah Indian Association was consulted throughout the project and provided two students to assist in the survey and excavation work. Following the 1995 season the researchers continued to build on the knowledge gained that first season and their expanding understanding of the Hoonah Tlingit response to rapid landscape change has resulted in several professional publications and is reflected in this new volume. It is our hope that this report will help park visitors to better understand and appreciate the human dimensions of this magnificent park.

If you would like a copy of *The Hoonah Tlingit Cultural Landscape in Glacier Bay National Park and Preserve* please contact Michele Jesperson at: michele_jesperson@nps.gov or by phone at: 907-697-2606 or Greg Dixon at the Regional Office in Anchorage greg_dixon@nps.gov or by phone at: 907-644-3465.

Thank you for your interest in the cultural resources of Glacier Bay National Park and Preserve.

Susan Boudreau

Susan L. Boudreau
Superintendent

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Glacier Bay National Park and Preserve
Gustavus, Alaska

2013

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Front cover: View of S'íx' Tlein [Big Dish], taken from Point Carolus looking southeast down Icy Strait toward Hoonah

Back cover: Image of canoes and paddlers from the Salt Chuck pictograph site (49-XMF-003) on Icy Strait

The Hoonah Tlingit Cultural Landscape in Glacier Bay National Park and Preserve: An Archaeological and Geological Study

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Chapter 1: The Cultural Landscape of Xunaa Káawu

An interdisciplinary survey of western Glacier Bay National Park and Preserve (GLBA), jointly conducted in 1995 by the Smithsonian Institution, National Park Service, and University of Alaska Fairbanks, examined Tlingit archaeology, history, and settlement patterns in the setting of a geologically dynamic coastal environment. Research collaboration with the community of Hoonah, initiated at the time of the survey and continuing to the present, has contributed to a shared conception of the Glacier Bay region as a storied cultural landscape on which the lives of ancestral generations are inscribed in memory, oral tradition, and indigenous place names. Traditional history complements the results of archaeological and geological studies, and the commensurability of these different ways of knowing about the past is affirmed by this and other recent work (Connor et al. 2009; Crowell and Howell 2013; Hoonah Indian Association 2006; Monteith et al. 2007; Thornton 2008, 2012).

OVERVIEW AND SUMMARY

The 1995 project area (Figure 1) extended from Icy Point on the Gulf of Alaska coast to Point Carolus at the western entrance to Glacier Bay. This glacially sculpted southeastern Alaskan shoreline comprises the central portion of Xunaa Káawu, the traditional territory of the Hoonah Tlingit people. In its totality, Xunaa Káawu encompasses the outer coast from Sea Otter Creek (north of Cape Fairweather) to south of Lisianski Strait ; Icy Strait to Point Couverden and adjacent inlets including Dundas Bay and Taylor Bay; the shores of Glacier Bay and Excursion Inlet; and the northern part of Chichagof Island. The coasts, embayments, coastal forests, and rivers of this extensive area were traditionally used for hunting, fishing, and settlement in different seasons of the year (Emmons 1991; Goldschmidt and Haas 1998). Over 40 indigenous archaeological sites have been recorded in Xunaa Káawu as a whole (Table 1) including winter villages, summer fishing camps, forts, cabins, rock shelters, cemeteries, cairns, and rock paintings. Sites are concentrated on the north side of Icy Strait, an area that has long been noted for its rich food resources and large number of former Tlingit settlements (Emmons 1887).

The survey was conducted under the aegis of the National Park Service's Systemwide Archaeological Inventory Program (SAIP) and was one of a series of related projects undertaken in the coastal national parks that border the Gulf of Alaska (Schoenberg 1995). Principal investigators Aron L. Crowell and Daniel H. Mann led SAIP studies in Kenai Fjords National Park, Katmai National Park and Preserve, and Wrangell-St. Elias National Park between 1993 and 1996 (Crowell and Mann 1996, 1998, Crowell 2011b). Alaska SAIP built on the foundation of the *Exxon Valdez* Cultural Resource Program, which in the aftermath of the 1989 oil spill reported over 300 previously unknown sites in the central and eastern Gulf of Alaska, bringing the regional total to more than 1200 (Mobley et al. 1990; Haggarty et al. 1991). This large number of sites demonstrates intensive indigenous use and occupation of the coastal zone, particularly in areas where diverse marine resources are concentrated (Crowell and Mann 1998; Crowell et al. 2003; Erlandson et al. 1992).

SAIP studies were intended to assess the number, extent, and occupation dates of coastal sites within the boundaries of the Gulf of Alaska parks; to interpret geographical patterns of coastal settlement and resource use; and to obtain baseline data for the management and protection of cultural resources. Archaeological and geological field studies were closely coordinated in recognition that southern Alaskan shorelines are high-energy boundary zones where earthquakes, volcanic eruptions, glacial advances, isostatic submergence and uplift, and storm erosion can all affect the preservation and condition of archaeological sites.

Our six weeks of combined field research in Glacier Bay National Park and Preserve (May 18 to July 1, 1995) were highly productive, yielding new data for sites found during earlier surveys (Ackerman 1964, 1965, 1968; Sealaska Corporation1975) and identifying 12 previously unreported sites with ages ranging from 5000 years to less than a century. In almost every instance, the physical traces of ancestral occupation can be linked to traditional oral accounts of past places, people, and events (Dauenhauer and Dauenhauer 1987; Emmons 1887; Goldschmidt and Haas 1998; Swanton

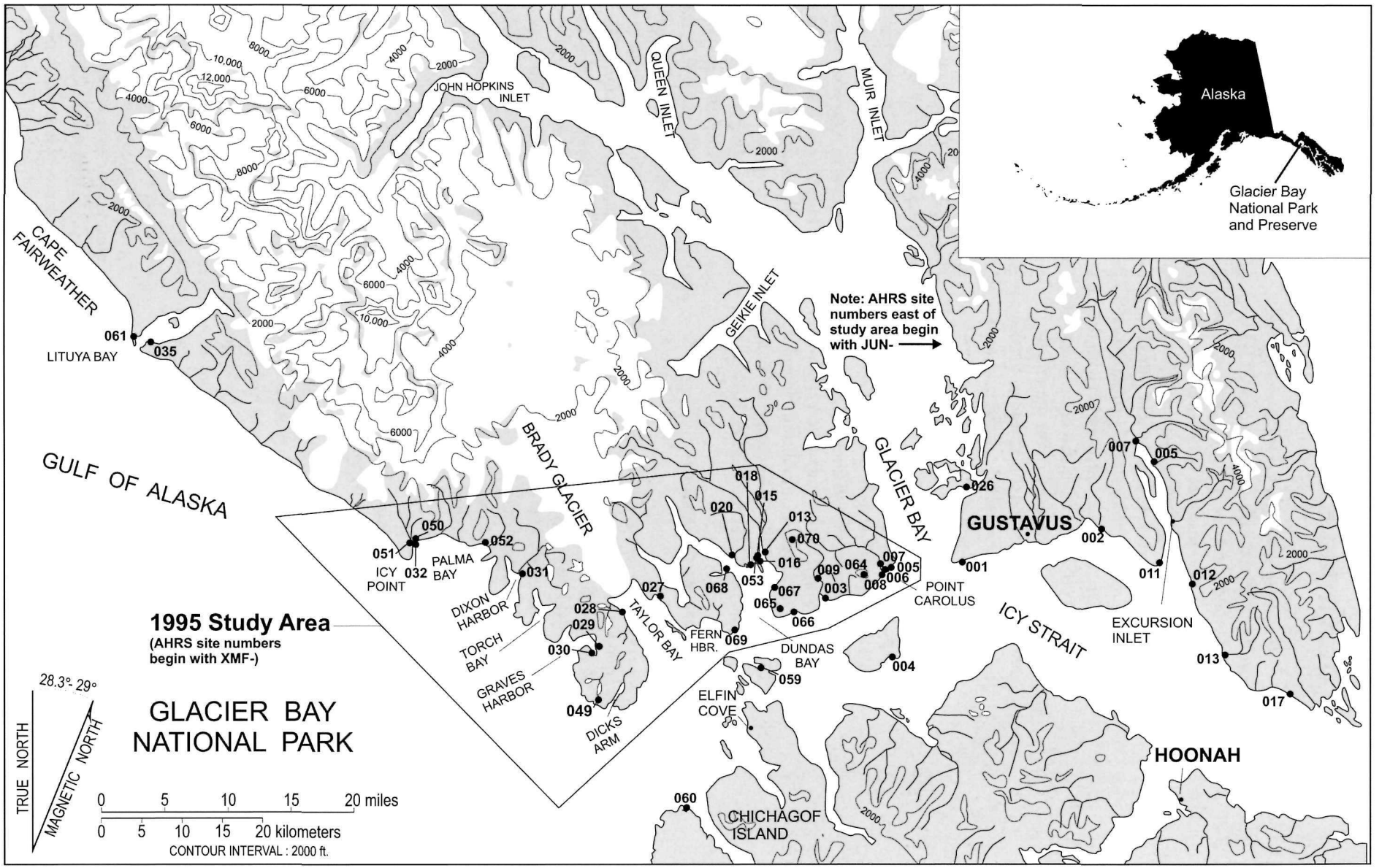


Figure 1: 1995 SAIP study area and Tlingit archaeological sites in Glacier Bay National Park and Preserve

Table 1: Hoonah Tlingit archaeological sites, Glacier Bay National Park and vicinity

AHRS no.	Site name	Location	Site type	Estimated occupation dates	*Calibrated C14 date(s) (most likely intercept at 2 SD)*	Site Data
LITUYA BAY						
XMF-035	Passage Rock Village	Lituya Bay, south shore	Village	18th-19th centuries		Ackerman 1968:3, 90; DeLaguna 1972:123; Sealaska Corporation 1975:768-769
XMF-061	La Chausee Spit Village	La Chausee Spit, north entrance to Lituya Bay	Large village	18th-19th centuries		Sealaska Corporation 1975:764-765
OUTER COAST (PALMA BAY TO POINT SPENCER)						
XMF-029	Graves Harbor Camp 1	SE corner of Graves Harbor	Recent camp	20th century		Ackerman 1968:6-7
XMF-030	Graves Harbor Camp 2	SE corner of Graves Harbor	Recent camp	20th century		Ackerman 1968:6-7
XMF-031	Dixon River Camp	Dixon River mouth	Modern cabins	20th century		Sealaska Corporation 1975:752; **this report**
XMF-032	Ibach Cabin	Kaknau Creek	Modern cabins	20th century		Ackerman 1968:7
XMF-049	Point Villaluenga	Point Villaluenga	CH/FCR midden	15th – 17th century	cal A.D. 1471-1681 (Beta 92857)	Moser 1902:381; Hoonah Indian Association 2006; **this report**
XMF-050	Kaknau Creek 1 (Xaatgutu.aan)	Kaknau Creek, Palma Bay	Shell midden/ village	A.D. 1780-1790	cal A.D. 1649-1894 (Beta 86695)	Goldschmidt and Haas 1998:56-57; Sealaska Corporation 1975:828-829; Hoonah Indian Association 2006; **this report**
XMF-051	Kaknau Creek 2	Kaknau Creek, Palma Bay	Midden	3000 B.C.	cal 3099-2903 B.C. (Beta 86692)	**This report**
XMF-052	Boussole River (Gaanaxáa.aan)	Boussole Bay	CMTs	Late 18th – early 19th century		Swanton 1909:1, 57-58; Goldschmidt and Haas 1998:57; Hoonah Indian Association 2006; **this report**
TAYLOR BAY						
XMF-027	Keixitu.aan	East side of	Modern cabin	20th century;		Vancouver 1984: Vol. 4:1344; Goldschmidt

Table 1: Hoonah Tlingit archaeological sites, Glacier Bay National Park and vicinity, continued

		Taylor Bay	foundations; mortuary poles observed in 1794	undiscovered older component		and Haas 1998:56; Ackerman 1968:8; Sealaska Corporation 1975:604, 770; Hoonah Indian Association 2006
XMF-028	Asgutu.aan	West side of Taylor Bay	Modern cabin; older village probably closer to glacier	20th century; undiscovered older component		Vancouver 1984 Vol. 4:1344; Goldschmidt and Haas 1998:56; Ackerman 1968:8, 90; Sealaska Corporation 1975:770; Ackerman 1968:8; Hoonah Indian Association 2006
DUNDAS BAY						
XMF-013	L'istee	Dundas River	Village and fort	18th – early 20th century	cal A.D. 1725-1814 (Beta 92865)	Goldschmidt and Haas (1998:55-56); Ackerman 1968:8-11, 93-96; Ackerman 1964:17,23; Sealaska Corporation 1975:759; **this report**
XMF-015	Dundas River Cemetery	Dundas River	Cemetery	1901-1928		Ackerman 1964:21-27; Ackerman 1968:89; Sealaska 1975:756-757
XMF-016	Tlingit Smokehouse	Dundas River	Wooden house	1900s-1930s		Ackerman 1964:17-23; Ackerman 1968:89; Sealaska 1975:754-755
XMF-018	Dundas Bay Rockshelter	West of Dundas River	Rock shelter with remains of canoe	Late 19th/ early 20th century		Ackerman 1964:27-30; Ackerman 1968:89
XMF-020	Old Dundas River	West of Dundas River	Cabin and cabin foundation	Mid-20th century		Ackerman 1964:29; Ackerman 1968:89; **this report**
XMF-053	Dundas Bay Fort (Xakwnoowú, L'éiw Noowú, Xunaa Káawu Noowú)	Dundas River	Fort	Possible early occupation about 5400 B.C.; used as fort ca. 1150 – 1770s A.D.; lower midden site ca. A.D. 1880 – 1900	***Possible early phase:*** cal 5618-5206 B.C. (Beta 92860) ***Fort deposits:*** 1038-1694 A.D. (Beta 92858, 92859, 92860, 92861, 92862)	Emmons 1887; Goldschmidt and Haas 1998:550; Swanton 1908:327; Menzies 1993:160-161; Olson 1967:30; Hoonah Indian Association 2006; Thornton 2008:65; **this report**
XMF-065	Point Dundas Cairns	Point Dundas	Rock features	Unknown		**This report**
XMF-067	Point Deed Foundation	Dundas Bay	Modern cabin	1930s-1940s		**This report**

Table 1: Hoonah Tlingit archaeological sites, Glacier Bay National Park and vicinity, continued

XMF-068	Dundas Island Site	Dundas Bay	Camp	1900 – 1930s		**This report**
XMF-069	Point Wimbledon	Mouth of Dundas Bay	Small village	15th – 17th century	cal A.D. 1448-1665 (Beta 92865)	**This report**
XMF-070	White Cap Cairns	Summit of White Cap Mountain, Dundas Bay	Rock features	Unknown		Ackerman 1964:23; **this report**
ICY STRAIT						
XMF-003	Salt Chuck Pictograph	Icy Strait east of Point Carolus	Rock paintings	Unknown		Stevens 1972:28; **This report**
XMF-004	Willoughby Cove Pictographs	Lemesurier Island	Rock paintings	Unknown		Stevens 1972:28
XMF-005	Point Carolus	Point Carolus	Cache pits	Late 19th/ early 20th century		Ackerman 1964:17; Ackerman 1968:89
XMF-006	Carolus River Smokehouse 1	Point Carolus	Wooden plank structure	Late 19th/ early 20th century		Ackerman 1964:14; Ackerman 1968:89
XMF-007	Carolus River Village	Point Carolus	Log cabins, smokehouse	1910s-1920s		Ackerman 1964:6-14; Ackerman 1968:89; Sealaska Corporation 1975:751; **this report**
XMF-008	Carolus River Smokehouse 2	Point Carolus	Wooden plank structure	Late 19th/ early 20th century		Ackerman 1964:14-17; Ackerman 1968:89
XMF-009	Salt Chuck Smokehouse	East of Point Dundas	Wooden plank structures	Late 19th/ early 20th century		Ackerman 1964:17; Ackerman 1968:89
XMF-059	Inian Cove Village	Inian Islands	Reported village site	Late 19th/ early 20th century		Goldschmidt and Haas 1998; Sealaska Corporation 1975:724-725
XMF-060	Soapstone Cove Village	Yakobi Island	Reported village site	Late 19th/ early 20th century		Goldschmidt and Haas 1998; Sealaska 1975:740-741
XMF-064	Mount Carolus Cairns	Summit of Point Carolus	Rock features	Unknown		**This report**
XMF-066	Point Dundas Village	Icy Strait east of Point Dundas	Small village, cache pits, grave, CMTs	17th – early 20th century	cal A.D. 1610-1694 (Beta 92855)	Sealaska Corporation 1975:828-829; **this report**
JUN-001	Wooshkeetaan Sib House	Point Gustavus	Wooden lineage house	Late 19th/ early 20th century		Ackerman 1965:1-2; Ackerman 1968:90
JUN-002	Salmon Stream	Icy Passage	Plank	Late 19th/ early		Ackerman 1965:2; Ackerman 1968:91

Table 1: Hoonah Tlingit archaeological sites, Glacier Bay National Park and vicinity, continued

	Camp	east of Gustavus	smokehouse, tent platform	20th century		
JUN-011	Excursion Inlet Burial	Entrance to Excursion Inlet	Gravehouse	About 1890		Ackerman 1965:6-10; Ackerman 1968:91
JUN-012	Cabin Point	Icy Strait	Recent camp	Early 20th century		Ackerman 1965:10; Ackerman 1968:91
JUN-013	Homeshore Lineage House	Icy Strait	Plank lineage house	1870s-1900s		Ackerman 1965:10-36; Ackerman 1968:91
GLACIER BAY						
JUN-026	Lester Island Village	Lester Island, Glacier Bay	Village, graves, saltery	1880s-1900s		Ackerman 1964:2-5; Ackerman 1968:89; Sealaska Corporation 1975:766-767
EXCURSION INLET						
JUN-005	Cannery Village	East shore of Excursion Inlet	Village, cemetery	1900s-1940s		Ackerman 1965:3; Sealaska Corporation 1975:546-549; Goldschmidt and Haas 1946:89
JUN-007	Wooshkeetaan Smokehouse	Head of Excursion Inlet	Plank smokehouse	1900s-1920s		Ackerman 1965:3-5; Ackerman 1968:91

Table 1: Hoonah Tlingit archaeological sites, Glacier Bay National Park and vicinity, continued

1909). In addition, many sites are denominated by indigenous toponyms that reflect their cultural and historical significance (Hoonah Indian Association 2006; Thornton 2012).

Geological investigations in 1995 focused on coastal landform histories and long-term trends in relative sea level (RSL) (Mann and Streveler 1997, 2008). Fluctuations in RSL have had substantial impacts along the GLBA coast, particularly during the late Little Ice Age when the weight of advancing ice in Glacier Bay depressed shorelines over a large region. During this high stand, coastal settlements were submerged and archaeological sites were eroded away. Recent studies indicate that the glacial advance in what is now Glacier Bay took place between A.D. 1700 - 1770, completely filling the fiord and pushing out into Icy Strait (Connor et al. 2009; Lawson et al. 2010). Oral traditions describe the pre-surge landscape and the flight of Tlingit residents from their former settlements in the path of the glacier, contributing to knowledge of the dynamic Holocene environment and the challenges it posed to human occupation (Connor et al. 2009; Monteith et al. 2007).

The archaeological record of the northern Tlingit region illustrates pioneering coastal settlement more than 11,000 years ago (Ackerman et al. 1979); broad spectrum maritime subsistence by about 7500 years ago (Ackerman et al. 1985; Davis 1989, 1996; Holmes et al. 1989); mid-Holocene intensification of salmon fishing and shellfish harvesting (Davis 1989; Moss 1989, 1998); and population growth combined with increasing social complexity (Ames 1994; Ames and Maschner 1999; Crowell 2000; Davis 1990; Matson and Coupland 1995; Moss 1998, 2004). During the Late Period of the last 1500 years, new developments included the appearance of substantial winter villages and plank-walled pit houses; the expansion of trade networks for native copper, obsidian, and iron; new artistry in metal, bone and stone; and the construction of fortified settlements in a milieu of increased competition and warfare (De Laguna 1960; De Laguna et al. 1964; Moss and Erlandson 1992).

While these phases of Tlingit cultural history are preserved at several sites in and near GLBA including Groundhog Bay 2 (49-JUN-020) and Xakwnoowú fort in Dundas Bay (49-XMF-053), most surviving archaeological remains in the park are no older than about 300 years due to the destructive effects of Little Ice Age sea level rise and glacial expansion. Sites of the last two centuries coincide with the period of Western contact that commenced with Russian, French, Spanish, and English explorations in the late 18th century AD (De Laguna 1972; La Perouse 1994; Dixon 1789; Pierce and Donnelly 1979; Vancouver 1984) and continued through succeeding decades of Tlingit interaction with Western traders, settlers, missionaries, government, and commercial enterprises (Black 1957; Krause 1956; Worl 1990). The historical archaeology of Glacier Bay National Park and Preserve and nearby Icy Strait is therefore exceptionally rich, preserving a record of indigenous response to increasing world-system incorporation (Crowell 2011a). Our concluding analysis summarizes changes in settlement patterns, material culture, and ancestral lifeways that can be reconstructed from the archaeological and oral historical evidence of this period.

PEOPLE IN A CHANGING COASTAL ENVIRONMENT

At the time of the Wisconsin late glacial maximum about 18,000 years ago a massive ice cap covered Icy Strait and Cross Sound and spread out onto the continental shelf, although areas along the Gulf of Alaska coast both north and south of this ice tongue appear to have remained as unglaciated refugia (Mann and Hamilton 1995). The ice retreated before 14,000 years ago and withdrew far up the Y-shaped fiord of Glacier Bay during the warmer temperatures of the early Holocene (Lawson et al. 2010). Taylor Bay and Dundas Bay were also deglaciated at this time.

Over the subsequent Neoglacial period from 6,000 to 1,500 radiocarbon years before present, ice readvanced into lower Glacier Bay as far as Willoughby Island, pausing there as temperatures rose during the Medieval Warm Period (Connor et al. 2009). Tlingit people settled on the broad outwash plain that built up in front of the quiescent Glacier Bay glacier, calling this area S'é Shuyee [land at the end of the glacial silt] (Figure 2). This period is described in oral tradition (Black 1957; Cruikshank 2001; Dauenhauer and Dauenhauer 1987:244-291; Emmons 1887; Hall 1962) and preserved in Tlingit toponyms that designate former village sites and geographical features (Connor et al. 2009; Hoonah Indian Association 2006; Thornton 2008). L'awshaa Shakee. aan [town on top of the sand mountain] was

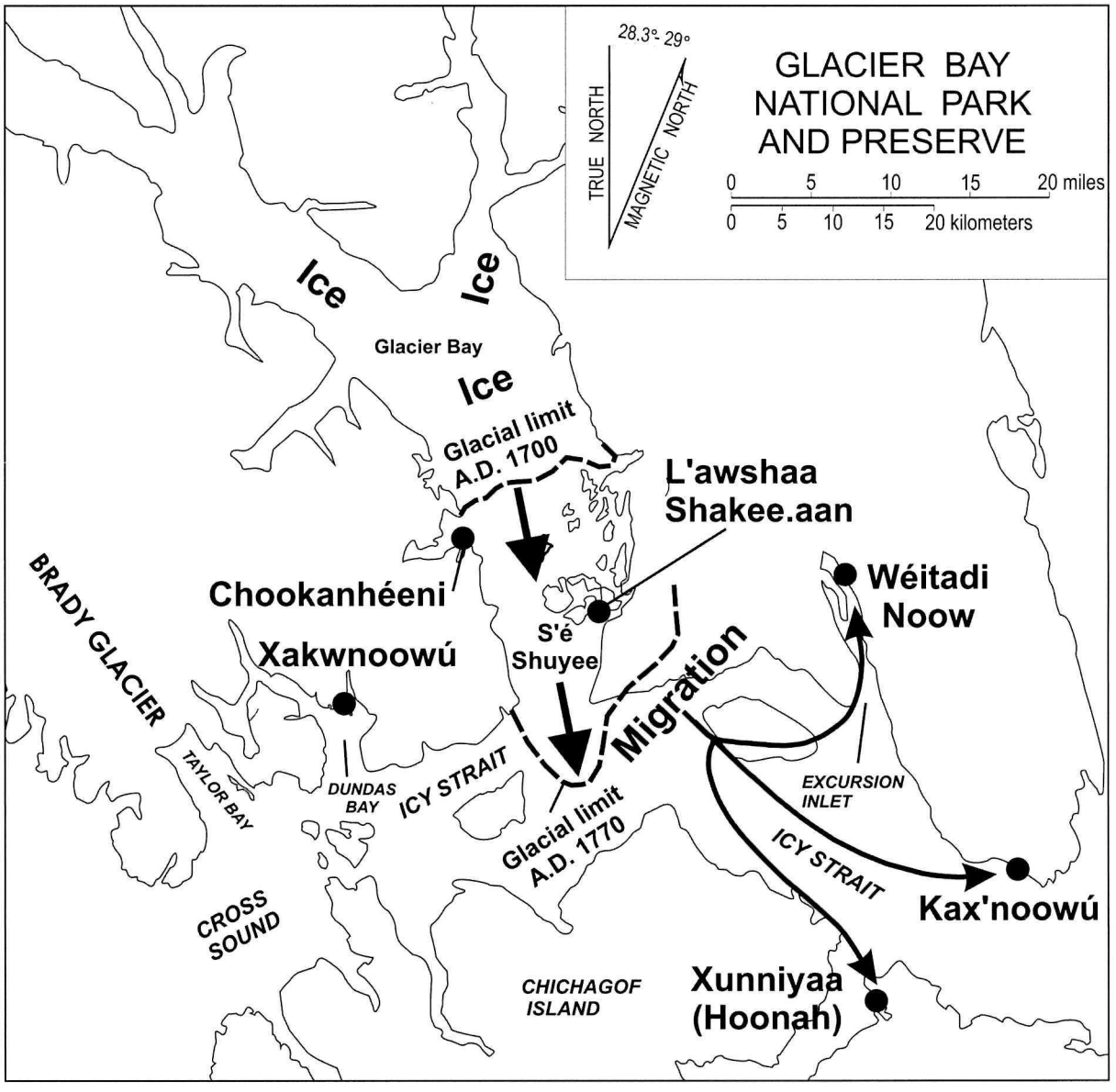


Figure 2: The late Little Ice Age advance in Glacier Bay and Tlingit migration to new settlements

the main winter settlement, located in the vicinity of present day Bartlett Cove on the eastern side of the valley. Several other settlements - likely summer fishing villages – were situated on the western edge of the valley along a stream called Chookanhéeni [grassy creek].

Beginning in about A.D. 1700 toward the end of the Little Ice Age (A.D. 1300 - 1900), the long-stationary Glacier Bay ice surged forward and overran these settlements. Dendrochronological analyses of over-ridden and buried trees south of Lester Island show rapid advance through the lower bay between A.D. 1720 - 1735 (Lawson et al. 2010:13), with ice protruding maximally into Icy Strait by A.D. 1770 (Connor et al. 2009:390). The displaced Glacier Bay clans dispersed to new settlements, the proto-Kaagwaantaan to Kax'noowú [grouse hen fort] on Icy Strait, the Wooshkeetaan to Wéitadi Noow [fort of the young woman in seclusion] in Excursion Inlet, and the Chookaneidi and T'akdeintaan eventually to Xunniyaa [lee of the north wind] in Port Frederick (Emmons 1887; Hoonah Indian Association 2006). "Xunniyaa" was later transcribed as Huna and finally Hoonah, the present name of the town. Archaeological data (Ackerman 1965:42-53) verify that the refuge village of Kax'noowú was established some decades before A.D. 1825, although the exact date has not been determined.

Brady Glacier also advanced during the late Neoglacial, reaching nearly to the mouth of Taylor Bay by A.D. 660 - 780 then retreating during the Medieval Warm Period to approximately 24 km north of its present terminus by A.D. 1225 - 1305 (Derksen 1976). Brady Glacier readvanced during the Little Ice Age

to near its present position (10 km from the mouth) by about A.D. 1880, and has undergone only minor fluctuations since (Capps et al. 2011). The Taylor Bay villages of Asgutu.aan and Keixitu.aan were probably not overrun by the Brady Glacier's Little Ice Age expansion and both were reported as intact settlements by the Vancouver expedition in A. D. 1794.

The immense mass of late Little Ice Age ice in Glacier Bay caused isostatic depression and a corresponding increase in relative sea level to about 4 m (± 1 m) above its current height along Icy Strait, the highest level reached in at least 8000 years (Larsen et al. 2005; Mann and Streveler 2008; Motyka et al. 2007). This pronounced environmental change, which peaked in about A.D. 1800, may be commemorated in northern Tlingit oral traditions recounting the "great flood" caused by the supreme being called Nass Shakee Yéil [Raven at the head of the Nass River] or by Yéil [Raven], whom Nass Shakee Yéil created at the beginning of the world (De Laguna 1960:131; Swanton 1909:16-17, 120-121). In those stories, rising waters force people to climb to mountaintops where they dwell in stone-walled houses or "nests." Lichen-encrusted stone cairns and circles, apparently built as memorials to the flood, are found on White Cap Mountain, Point Dundas, and Mount Carolus in Glacier Bay National Park (discussed below) as well as atop numerous peaks on Chichagof Island and Baranov Island (De Laguna 1960:52, 57, 131; Hunt 2010). The distribution of these features coincides with the area of maximum isostatic depression, which centered on Glacier Bay (Larsen et al. 2004). The objective impacts of a 4 m (or possibly somewhat higher) rise in relative sea level during the Little Ice Age, while not as dramatic, would have included the flooding of shoreline villages, the suppression of productive intertidal zones, possible saltwater flooding of salmon spawning lakes, and elimination of boat landing beaches along the predominantly steep, rocky coastline.

One response to deteriorating conditions of the Little Ice Age appears to have been northward migration to Yakutat Bay and Icy Bay, where Kaagwaantaan, L'uknax.ádi, and Teikweidi clans from along Icy Strait and the Alexander Archipelago arrived during the mid-18th century to early 19th centuries and merged socially with Eyak and Ahtna populations already residing there (De Laguna 1972:226-228).

Isostatic rebound has been underway since the beginning of glacial retreat in Glacier Bay, which commenced prior to George Vancouver's visit in A.D. 1794 and has since progressed some 120 km up the fiord. As a result, relative sea level in lower Glacier Bay, Dundas Bay, and along Icy Strait has been declining at a rate of 1.4 to 2.0 cm per year (Motyka et al. 2007; Larsen et al. 2004, 2005). The gradual reemergence of coastal land over the last two centuries is evident from the correspondence between increasing forest age and distance from the present shore, observable throughout the area. Old-growth spruce, hemlock, and yellow cedar forests occupy elevated terraces now set back from the water's edge while younger trees and alder brush fringe the modern beaches. Tlingit village and camp sites dating to the last 200 years are located on this emerging terrain, reflecting post-Little Ice Age resettlement.

Little Ice Age conditions were destructive to the archaeological record, both in Glacier Bay where existing and former settlements were erased by advancing ice and all along the coast, where shoreline sites formed at earlier Holocene sea levels were flooded and eroded. As a result, most known Tlingit sites in GLBA (Figure 1, Table 1) date to the last two centuries and are located on once-submerged land that has reemerged since the Little Ice Age high stand. A few earlier Holocene sites survive because they were built above contemporary sea level (e.g. fort sites on cliffs or islands) or have been tectonically uplifted (cf. the Kaknau Creek 2 site below). At Ground Hog Bay 2, deposits ranging in age from 10,180 - 350 radiocarbon years before present occupy an early Holocene terrace that was not reached by Neoglacial or Little Ice Age transgressions (Ackerman et al. 1979).

RESEARCH DESIGN AND METHODS

Known changes in relative sea level influenced our search techniques. Forest succession provides an important guide to following the shoreline of A.D. 1800, when the Little Ice Age transgression reached its peak. Old growth spruce and hemlock forests remain in place above this limit, while younger spruce, alders, and understory vegetation occupy land abandoned by the sea over the course of the last two centuries. Shoreline sites dating to the Little Ice Age maximum are located at this

successional margin, often well inland from the current beach. In the forest, surface indications of settlement (other than culturally modified trees) may be entirely absent, so that discovery of cultural deposits requires subsurface testing by means of auger and shovel probes. At some sites, house depressions and platforms, cache pits, cabin foundations, and other surface features may be discerned. Vegetation anomalies, such as areas cleared of trees, may also indicate the locations of former settlements.

Geomorphological investigations at each survey location revealed the local imprint of past events such as isostatic sea level change, tectonic uplift or subsidence, outwash and burst flooding from Brady Glacier, volcanic eruptions, dune formation, and stream terracing. Altitudes of the highest barrier beaches now forested with Sitka spruce were used to estimate the height of the most recent marine limit, and heights above mean lower low water (MLLW) were determined using closed-circuit leveling by autolevel and stadia rod (for detailed methodology see Mann and Streveler 2008). This coordinated work was an invaluable aid to the discovery and interpretation of archaeological sites.

We mapped sites at two levels of detail: 1) tape and compass field sketches in combination with shoreline leveling transects to determine elevations above MLLW, and 2) complete three-dimensional mapping of site areas and features using an optical transit, also tied to MLLW in order to maintain a common reference point for archaeological and geological studies. At many sites we hand-excavated small test pits or trenches in order to recover artifact, bone, and radiocarbon samples in secure stratigraphic contexts. Test unit excavations were documented with detailed maps; artifacts and bone were cataloged and provenienced in three dimensions; soil was screened (1/4 and 1/8 inch mesh) for small item recovery; and excavations were backfilled. In the following chapters, results for the Outer Coast and Icy Strait portions of the study area are presented as survey narratives, followed by individual reports for each of the 13 sites where we conducted mapping and subsurface testing.

ACKNOWLEDGEMENTS

Glacier Bay National Park and Preserve is the traditional territory of the Hoonah people, and their stories, names, and ancestral histories are linked to every place on the land. We respect the profound importance of this relationship and appreciate the generous cooperation extended to us by the Tlingit community and the Hoonah Indian Association. Field studies and analysis were supported by the National Park Service (NPS), the Smithsonian Institution, and Glacier Bay National Park and Preserve. In addition to the authors, the Glacier Bay field team in 1995 included National Park Service archaeologists Jeanne Schaaf and Angela Demma; Judith Brakel (Icy Strait Environmental Services); undergraduate interns Leslie Hines and Rebecca Stair; and high school volunteers Michael Mills (Hoonah), William Abbott (Hoonah), Ross Smith (Gustavus), and David Crowell (Anchorage). Susan Bender (National Park Service, Anchorage) analyzed the faunal remains.

All place names are derived from *Tlingit Place Names of the Huna Káawu* (Hoonah Indian Association 2008) with spellings standardized in reference to *Haa Léelk'w Hás Aaní Saax'ú: Our Grandparents' Names on the Land* (Thornton 2012).

Chapter 2: The Outer Coast from Icy Point to Cape Spencer

Archaeological and geological research along the Gulf of Alaska coast from Icy Point to Cape Spencer was supported by the *M.V. Steller* (Dan Foley, captain) during May 18 - 25, 1995. Due to time and logistical constraints we prioritized locations commemorated by Tlingit oral tradition and place names or which appeared to have geomorphological potential for indigenous settlement. The latter include protected coves with sloping beaches suitable for boat landings, elevated shoreline terraces, and river mouths offering level ground and access to salmon fishing. Relatively few such situations occur on the outer coast, which south of Icy Point is dominated by steep-walled fiords, barren glacial forelands, high energy pocket beaches, and silt-choked bay heads. In consideration of these factors, the locations targeted for onshore SAIP investigations included western and eastern Palma Bay; inner Dixon Harbor; portions of Graves Harbor; the Point Villaluenga area; and Dick's Arm (Figure 3). Reconnaissance of these locations resulted in the discovery of four previously unknown archaeological sites. We also visited and reassessed several 20th century settlements and camps that were reported by Ackerman during his brief outer coast survey in 1965 (Ackerman 1968:6-7) as well as locations included in the Sealaska Corporation's catalog of Native cemetery and historic sites (Sealaska Corporation 1975). We did not examine Torch Bay, which is steep-sided and offers few, if any places with potential for occupation.

SURVEY NARRATIVE

Palma Bay

Palma Bay, named "Baia de Palma" in 1792 by Spanish explorer Alessandro Malaspina, is a broad, south-facing embayment that extends 12 km between Icy Point to the west and Astrolabe Peninsula to the east. Its middle section is the surf-pounded glacial foreland between Mount Marchainville and DeLangle Mountain, deposited by a former tongue of Brady Glacier. This rocky terrain, difficult to access by boat and crossed by numerous braided stream channels, appeared to have little attraction for settlement and was not examined. It also has a history of repeated scouring by outburst floods from a proglacial lake at the head of the Palma River valley, most recently in about 1918 (Derksen 1976:57-59). We focused our efforts instead on areas of high archaeological potential around Icy Point and in Boussole Bay and Astrolabe Bay, two protected inlets at the eastern end of Palma Bay.

According to Hoonah Tlingit oral tradition, Icy Point was the location of the historic settlement of Xaatgutu.aan [village nestled in the spruce roots] and continued to be used into the early 20th century as a transit camp for outer coast hunting and trading expeditions (Goldschmidt and Haas 1998:56-57; Hoonah Indian Association 2006; Sealaska Corporation 1975). We worked at Icy Point from May 21 - 23, surveying the forested Little Ice Age beach terraces east of Kaknau Creek. Here we recorded a late 18th century camp designated as Kaknau Creek 1 (49-XMF-050). We also found traces of mid-Holocene occupation on a 30 m bluff on the creek's west bank, the Kaknau Creek 2 site (49-XMF-051). Details of these investigations are discussed below in individual site reports. We saw no trace of two cabins built by Joe Ibach (49-XMF-032) that Ackerman reported near the mouth of Kaknau Creek in 1965 (Ackerman (1968:7), although we did relocate the Icy Point hot spring just to the west of the creek mouth (Ackerman 1968:7; Sealaska Corporation 1975:828-820).

During May 24 - 25, the SAIP team surveyed Boussole Bay and Astrolabe Bay. Inshore areas of both inlets comprise the front of a glacial outwash plain that was deposited during the Late Neoglacial lateral expansion of a tongue of Brady Glacier between 1960 and 1230 radiocarbon years ago (Derksen 1976:35). There are active sand dunes at the head of Astrolabe Bay , and at the northwest corner of Boussole Bay there is a stabilized dune overlying outwash gravels, on which we found a grove of bark-stripped spruce trees. These culturally modified trees are situated inland from the Little Ice Age barrier berm and probably date to just before or after European contact. Designated as the Boussole River Site (49-XMF-052, described below), the old dune is probably the location of a former fishing settlement called "Gānaxá-hīn" [Gaanaxáa.aan] (Swanton 1909:57). The name Gaanaxáa [not translatable] is applied to the

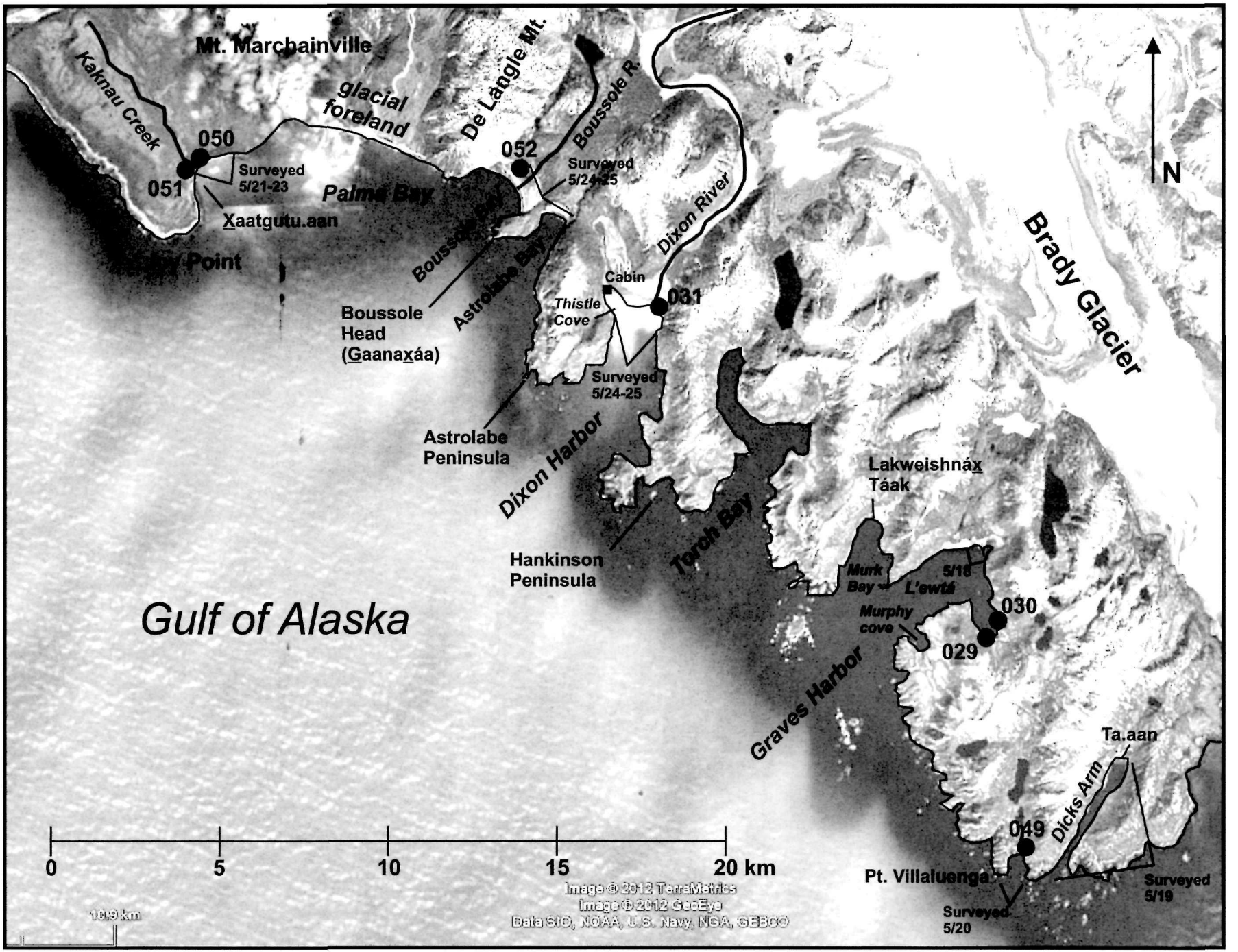


Figure 3: Outer coast survey locations, Glacier Bay National Park and Preserve

sea arch at Boussole Head and the Boussole River site is the only likely location for the fish camp that was said to be located nearby.

Dixon Harbor

Dixon Harbor is a narrow, steep-walled glacial fiord bounded to the north by Astrolabe Peninsula and to the south by Hankinson Peninsula, both cresting at over 600 m in elevation. The Dixon River, which drains an outwash plain on the flank of Brady Glacier, enters the northeast corner of the harbor, and Thistle Cove branches to the northwest. Active dunes at the mouth of the river and along the eastern shore of Thistle Cove are formed from white granitic sands carried downstream off the Brady outwash plain. The Dixon River valley has been subject to repeated glacial outburst floods, which scoured vegetation from the valley floor in about 1894 and 1920 (Derksen 1976:59). This suggests that there is relatively little prospect of finding intact archaeological deposits along the Dixon River or at its mouth that would be older than these most recent floods.

On May 24 we surveyed areas of Thistle Cove including the inner third of the western shore, the head of the cove, and the eastern side up to the mouth of the Dixon River. The western shore, where the beach is composed of schist and slate shingles, rises steeply to a 30 m bedrock terrace mantled with thick forest soils and old-growth hemlocks and yellow cedars. The eastern uplands are similar but the beach and beach dunes are composed of granitic sands.

At the head of Thistle Cove a stream plunges to the shore over the lip of a 10 m bedrock terrace. Remains of a log cabin are located at the base of this shelf about 200 m to the west. Only the lower three courses of undressed, corner-notched logs remain, outlining the base of a 3.4 m by 3.4 m structure. We observed plastic debris, modern window glass, wire nails, fishing lures, and other artifacts indicative of mid to late-20th century use. A wrecked boat keel and Chrysler marine engine block were lying in the nearby intertidal zone. We shovel tested and augered extensively in level upland areas behind the cabin but did not discover any additional cultural remains. Several culturally modified trees and numerous sawn stumps were noted in the forest.

On May 25 we examined the Dixon River mouth, where sand dunes reach to the top of a 10 m marine terrace. We briefly tested the terrace and placed numerous shovel and auger probes in Little Ice Age and more recent beach ridges adjacent to the river mouth. The latter showed thin humus and subsoil over coarse sand with occasional buried ground surfaces, indicative of active fluvial deposition and reworking.

We revisited Dixon River Camp (49-XMF-031), a mid-20th century settlement located about 100 m east of the river mouth on a fluvial terrace approximately 5 m above the river bed. This landform is covered with mature spruce trees and a dense stand of devil's club. Sealaska investigator Yancey Herem documented a seasonal camp here in 1975, noting a log cabin foundation and two other wooden structures with an estimated age of 40 + years (Sealaska Corporation 1975:752). We found the Sealaska marker stake (iron with an aluminum cap labeled "Hist. Site 775") but could not relocate any structures amidst the dense undergrowth. Shovel tests indicated thin forest soils (8 - 10 cm humus and subsoil) over sand, with no charcoal or other cultural traces.

We were unable to examine the eastern shore of Dixon Harbor, which is quite steep but has several potential site locations around the outermost unnamed cove and on the tombolo beach connected to Sugarloaf Island.

Graves Harbor

Graves Harbor is a deep fiord with islands and skerries flanking its 4.5 km wide mouth, including Graves Rocks and Libby Island. Its three inner branches are headed by glacial streams and tidal mud flats. The northern branch or Murk Bay is called Lakweishnáx T'áak in Tlingit [back of Lakweishnáx] and is fed by Annoksek Creek. This area has probably been subject to recurrent flooding due to sudden drainage from the Trick Lakes adjacent to Brady Glacier (Derksen 1976:59). The central branch, fed by an unnamed creek, is called L'ewtá [head of sand]. The third, southeastern branch is unnamed and here Ackerman found two recent camp sites he called Graves Harbor Camp 1 (49-XMF-029) and Graves Harbor Camp 2 (49-XMF-030) (Ackerman 1968:6-7).

SAIP work in Graves Harbor was restricted to several specific areas. We surveyed the central bay head (L'ewtá) on May 18, finding an outwash delta carved by present and former channels and carpeted with glacial boulders, probably reworked by Late Neoglacial drainage from the Brady Glacier (Derksen 1976:35;

Mann and Streveler 1997:10). Along the shoreline, a series of beach levels covered with young spruce and a few hemlocks steps down from the Little Ice Age barrier berm, representing the isostatic decline of relative sea level and regrowth of the forest over the last 200 years. We dug subsurface tests in upland areas all around the cove, finding deep forest soils layered over sand. We also tested around the backshore lagoon and on both sides of the river mouth. No cultural traces or culturally modified trees were found. We also looked at beach terraces and uplands on the north shore of the southeastern branch, where recently bark-stripped yellow cedars and yellow cedar stumps were noted.

We were not able to examine Murphy Cove in 1995, nor were we aware of the Tlingit place name indicating a former settlement there called Aangóonk' [portage town] (Hoonah Indian Association 2006). In 1998 Wayne Howell visited this area with Nora Marks Dauenhauer, whose family spent winters at Aangóonk' during the 1930s. The family would put its seine boat aground on the last big tide of November and then overwinter in canvas wall tents. The men did repair work on the boat while supplementing their incomes by trapping and carving miniature totem poles from local yellow cedar. On a high spring tide they would refloat the boat and travel to Juneau to sell their pelts and souvenirs and buy supplies for the summer salmon fishing season. Following the season they would return to Juneau to resupply for winter, make a prolonged stop in Hoonah for fall ceremonial activities, and return to Aangóonk' for another winter. The cycle continued until World War II, when the War Department forbade citizens from leaving Icy Strait (Nora Marks Dauenhauer, personal communication to Wayne Howell, 1998).

Scant traces of the Marks family's activities are visible today, only a few pieces of metal strewn in the woods. However, the cut yellow cedar stumps we noted around Graves Harbor may be attributable to the Marks family's presence, as well as bark stripping scars seen on some of the cedars. According to Nora Dauenhauer, these might be evidence of her grandmother's habit of making Tlingit "snoose" from a mixture of tobacco, shredded yellow cedar bark, and wood ash.

Point Villaluenga

Just inside the outer island at Point Villaluenga, or Naguk̲ K'i [at the base of the flowing stream] is a small protected cove that offers a good gravel beach for landing small boats. A stream known in Tlingit as Anax̲ Séet [passage through the land] enters this cove from the northeast, draining several interior lakes. This stream carries a run of red salmon. We surveyed and shovel tested the river banks and adjacent areas on May 20, discovering a charcoal midden about 270 radiocarbon years old that we called the Villaluenga River Site (49-XMF-049), described below.

Dicks Arm

Dicks Arm is a narrow, shallow inlet at Cape Spencer, 4.5 km long and flanked by steep ridges that rise to between 300 - 500 m. An intermittent marine terrace extends along the north shore at about 12 m above present high tide. On May 19 we examined on foot the terraces and shoreline around the inner third of the arm, including the bay head where a small stream enters. The survey included examination and subsurface testing on an 8 m high bluff on the east side of the stream, which appeared to have ancient occupation potential. Old growth spruce and hemlock forest is rooted here in 35 cm of dark brown forest humus over schist bedrock. No cultural traces were found on the bluff, although many of the trees have blown down, making surface examination extremely difficult. No cultural traces were found in the root wads of fallen trees.

Numerous shovel tests along the terraces, lower creek margins, and shorelines were also negative, showing only natural soil profiles. We did locate a small grove of culturally modified trees on the terrace along the eastern shore, 1.5 km from the head. Bark stripping scars are present on at least a dozen yellow cedar and spruce trees, some partially healed, indicating that the activity took place some years ago.

Our failure to locate any archaeological sites in Dicks Arm was surprising given Tlingit place names and oral traditions that refer to use of this area. A settlement at the head of the arm was called Ta.aan [sleep town] or, alternatively, Naguk̲wa.aan [town at the face of *naguk̲* ; *naguk̲* means 'flowing stream' (Hoonah Indian Association 2006). A village and burial site at or near the head of Dicks Arm, reported by George Dalton, is listed as Site #5 on the Sealaska Corporation heritage survey, Area V (Sealaska Corporation 1975:828-829). Emmons recorded additional details in his unpublished notes about Hoonah clan histories, writ-

ing that, "Nook hook heen [or Naguk Héen; Emmons meant the village but this is actually the name of the stream itself], on a salmon stream that flows into a bay on the outer coast above Cape Spencer, is spoken of as a Tuk tane tan [T'akdeintaan] village where some Tchuconnadi [Chookaneidi] lived, others claim that is was only occupied in the summer season; no evidence of it remains." Concerning a location on Cape Spencer – probably Dicks Arm – Kendall Williams said, "Cape Spencer has a good sockeye stream, and in the old days we would pick up sockeyes on our way back from sea otter hunting. Our clan claims that place and used to have some houses there...The foundations of old houses were there when I was a young fellow" (Goldschmidt and Haas 1998:56).

From this information, we conclude that the settlement was probably located beside the salmon stream at the head of the bay or perhaps on the adjacent bluff where we searched in the tangled forest blow-down without success. Additional study of this area is needed.

SITE INVESTIGATIONS

Four new archaeological sites were found as the result of 1995 SAIP reconnaissance of the coast between Icy Point and Cape Spencer: Kaknau Creek 1; Kaknau Creek 2; the Boussole River Site; and the Point Villaluenga Site.

Kaknau Creek 1 (49-XMF-050)

Kaknau Creek 1 (49-XMF-050) is a shell midden representing early post-contact Tlingit occupation along the north shore of Palma Bay, just east of Icy Point (Figure 4). SAIP test excavations in 1995 produced a small collection of artifacts representing both indigenous manufacture and late 18th century trade with Russian, British, or American sea otter companies. The site may be the settlement known in Hoonah Tlingit oral tradition as Xaatgutu.aan [village nestled in the spruce roots] (Hoonah Indian Association 2006). Situated in a forested area on the highest Little Ice Age beach terrace, Kaknau Creek 1 offers a rare glimpse of Tlingit subsistence economy during the period of maximum coastal submergence.

Historical Background. In early June 1788, British trader James Colnett, captain of the *Prince of Wales,* bartered for sea otter skins at a location "six or 7 leagues from Mt. Fairweather," a distance equal to 18 to 21 marine miles (De Laguna 1972:131-132). De Laguna suggested that this location was Palma Bay. The mate of the *Prince of Wales* briefly explored the bay in the ship's boat, and in his unpublished journal Colnett wrote that, "At this place was a house & garden neatly fenced in, & European plants growing, but only saw 8 women, a lad, & a boy" (quoted in De Laguna 1972:131). Trade was conducted offshore with a Tlingit canoe party and no further details were recorded about the settlement. De Laguna suggested that the cultivated plants noted by the mate were indigenous tobacco. Colnett's geographically non-specific observations probably pertained to the Icy Point area, although it is also conceivable that the ship encountered Tlingit residents at Boussole River at the southeast end of Palma Bay (see Boussole River site discussion below). Mark Williams testified in 1946 that men from Hoonah used to travel by canoe to Lituya Bay for seals and to Dry Bay for sea otters. On the way north they would camp at a location inside Icy Point called Xagauta.aan [Xaatgutu.aan] (Goldschmidt and Haas 1998:56-57). The time was before 1912, when sea otter hunting was banned by federal law. Kendall Williams participated in these hunting expeditions, which he undertook for the last time in 1912. Williams remembered that "Icy Point was one place we used to stop on the way to get sea otter. We fished for halibut there. The T'akdeintaan people owned from Icy Point northward" (Goldschmidt and Haas 1998:57). David Kadashan of Hoonah reported Icy Point as a "legend site" (Sealaska Corporation 1975:828-829) but details pertaining to this attribution are unavailable.

Other Huna Tlingit place names are informative about the cultural geography of the Icy Point area. "Kaknau Creek" is derived from Kahaakw Héeni [salmon egg creek]; the hot spring near the creek mouth is T'aay X'é [hot spring's mouth]; and a safe boat anchorage along the north shore of Palma Bay is called Yéil Yakwdeiyí [Raven's boat ramp] (Hoonah Indian Association 2006).

Setting and Landscape. Icy Point shelters the north shore of Palma Bay from northerly and westerly winds and surf, but the gravel/cobble/boulder beach at Kaknau Creek is still exposed to storm waves from the south and southeast. Even under such conditions, the creek mouth offers a safe landing when it is flooded by high

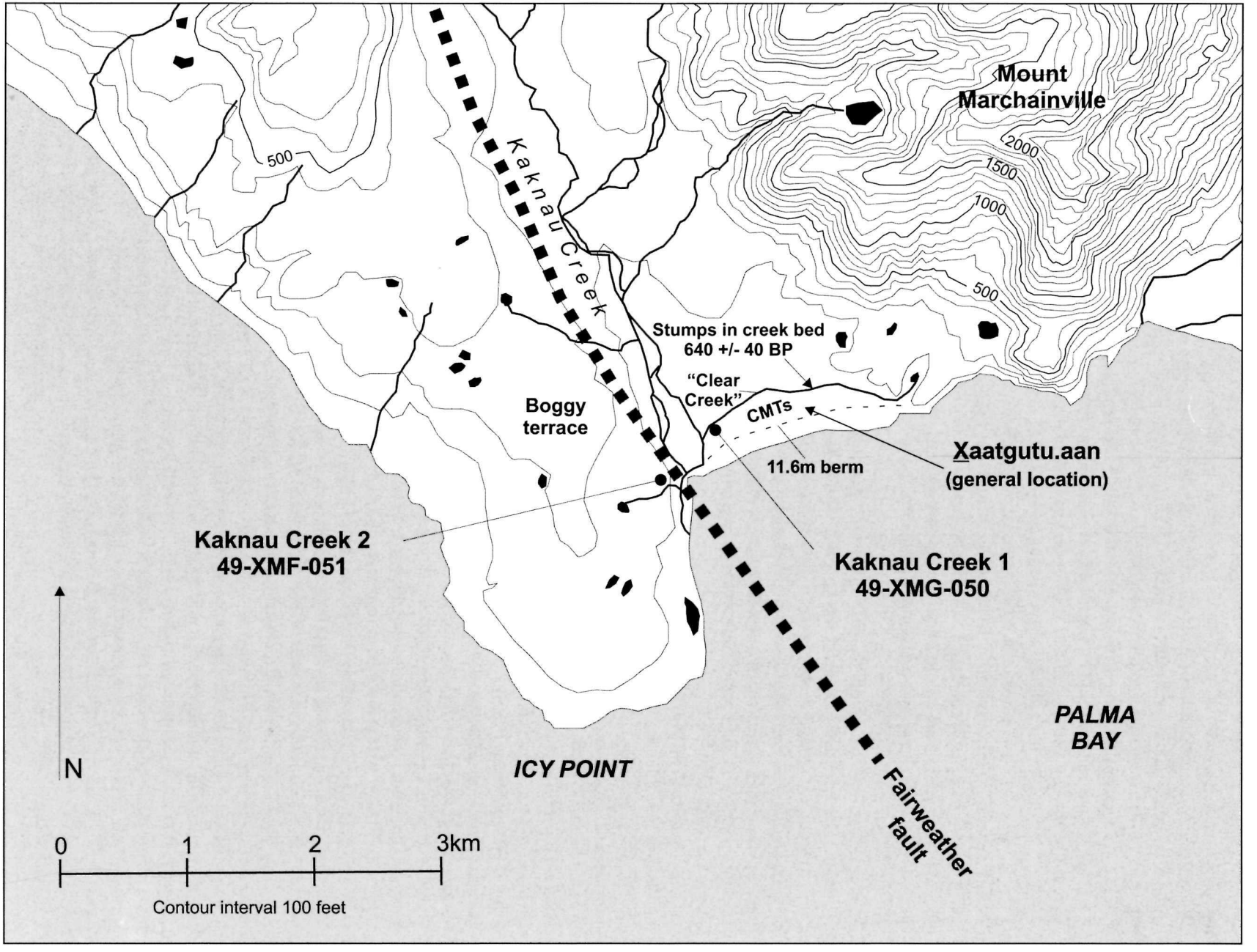


Figure 4: Icy Point and Kaknau Creek with site locations

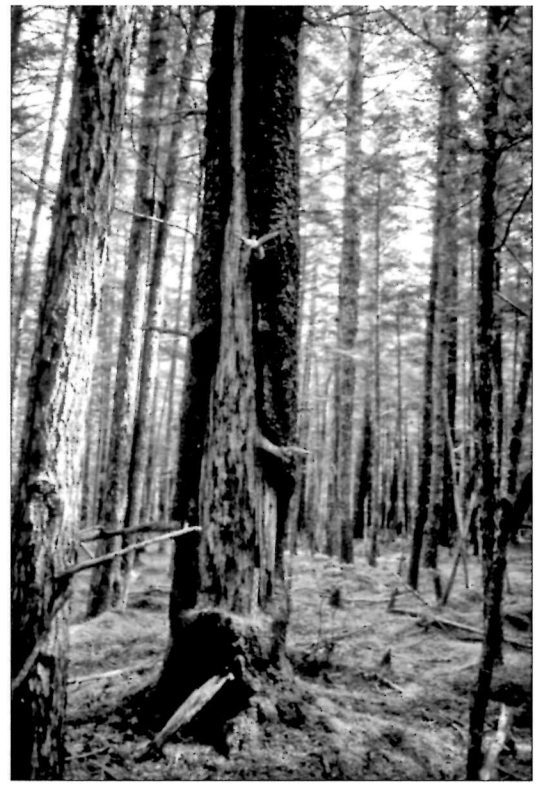


Figure 5: Bark stripping scars on spruce trees east of Kaknau Creek on highest Little Ice Age terrace

tide. On voyages north from Cross Sound to Lituya Bay the mouth of Kaknau Creek would have been the last possible refuge before undertaking a dangerous run along nearly 40 km of straight, unprotected coastline.

Kaknau Creek is fed by Finger Glacier and several unnamed freshwater streams. Salmon (species data not available) spawn in the creek and probably in its headwater lake. Other resources in the area include harbor seal, halibut, mountain goat, Sitka deer, and plant and animal foods from the intertidal zone.

Kaknau Creek and its tributaries drain the southeastern end of a topographic trough that traces the downthrown eastern side of the Fairweather Fault (Figure 4). The Fairweather Fault marks the boundary of the North American Plate to the east and the Pacific Plate to the west, and is prone to frequent tectonic activity. Icy Point, the bedrock prominence west of the fault line, has a history of tectonic uplift (see discussion of the Kaknau Creek 2 site below). In contrast, Kaknau Creek and adjacent terrain to the east appear to have experienced tectonic subsidence, indicated by the discovery in 1995 of spruce stumps rooted *in situ* in the bottom of "Clear Creek" (informal field name), a small stream and tidal slough that enters Kaknau Creek from the east near its mouth (Mann and Streveler 1997:8). One of these stumps, at altitude 3.3 m above mean lower low water (MLLW), was radiocarbon dated to 640 +/- 40 (Beta 86381, conifer wood, $\delta^{13}C = -27.9$). It and surrounding trees appear to have been broken off at ground level and then been buried by marine silts, sands, and gravels, suggesting that the forest of six and half centuries ago underwent rapid coseismic lowering.

The more recent geomorphological history of Kaknau Creek and adjacent terrain has been controlled by isostatic changes in relative sea level, in particular the Little Ice Age transgression that reached its peak in about A.D. 1800. A relict barrier beach berm dating to this event extends eastward from the mouth of the creek, rising to a height of 11.6 m above MLLW (Mann and Steveler 1997:8; Mann and Steveler 2007: Table 2). The berm is forested with old growth spruce and hemlock forest, and is anchored at its east end by bedrock outcrops. Trees on this ridge are up to 1.75 m in diameter at breast height with estimated ages of 200 years or more. Descending from this high berm on the north side are a series of scarps at elevations of approximately 10 m, 8 m, and 7 m above MLLW, covered with progressively younger vegetation. These levels are shorelines of a former saltwater lagoon inside the barrier beach and trace the decline of relative sea level since the Little Ice Age maximum.

Cultural Features and Investigations. Archaeological investigations were directed toward discovery of possible sites on the terraces east of Kaknau Creek, an area approximately 1600 m long by 200 m wide and bounded to the north by Clear Creek. Reconnaissance of this locale included about 30 auger and shovel tests to check for subsurface cultural indications, all negative. At least 40 culturally-modified spruce and hemlock trees were noted on the upper terraces, some bearing triangular bark stripping scars (Figure 5) and others marked with deeply cut rectangular cavities for sap collection (Mobley and Eldridge 1992). Where discernible, cut marks appeared to have been made

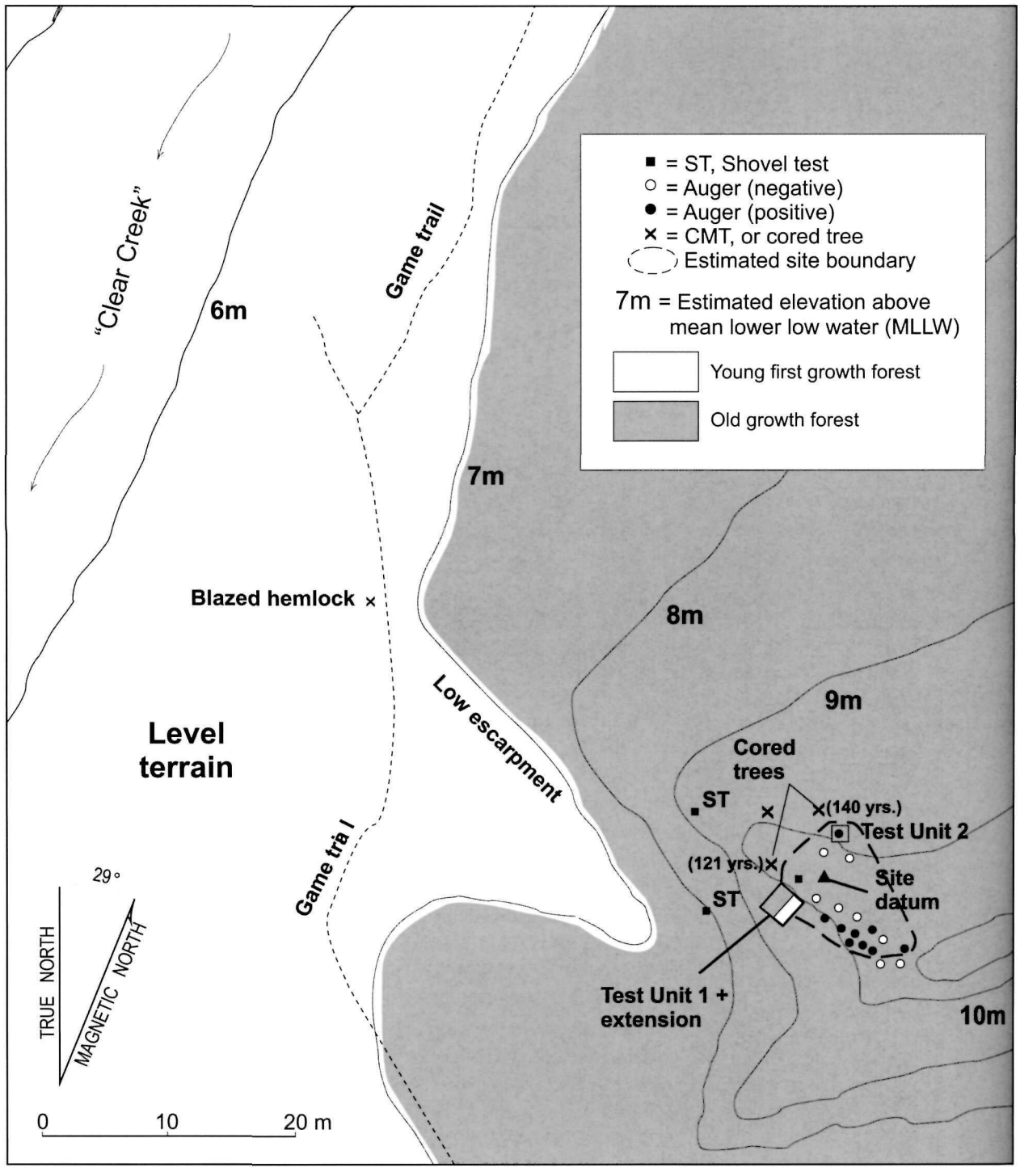


Figure 6: Kaknau Creek 1 site (49-XMF-050) showing estimated midden extent and archaeological testing

with metal tools. A tree core drilled through the healing scar of one bark-stripped spruce showed about 50 years of regrowth since the injury, indicating a mid-1940s date. Other bark modifications, including scars on trees that have since died and extensively decayed, may be much older.

The Kaknau Creek 1 site (Figure 6) was discovered by following the edge of the highest Little Ice Age terrace to its western end near the confluence of Clear and Kaknau creeks. At peak sea level, this location would have been the bank of the backshore lagoon, close to its outlet to the sea and almost certainly a prime fishing location as well as a protected place for landing canoes and camping.

A trowel-cut profile of the bank edge revealed a slumping midden of charcoal and marine shells that descended from the bench above (Figure 7). No house depressions or other cultural features were on visible on the terrace surface. A series of 15 auger tests revealed that charcoal-rich deposits cover an area of about 80 m^2. One of the auger tests produced

Figure 7: Kaknau Creek 1 site (49-XMF-050) on terrace above "Clear Creek," with test excavation in bank midden

a broken blue glass bead and another yielded fragments of calcined sea mammal bone. The ages of two adjacent trees (not actually rooted in the midden) were estimated at 121 and 140 years on the basis of cores extracted with an increment borer. The first tree had 113 growth rings at a height of 1 m and the second had 132 rings, and an initial growth correction of eight years was added to both.

The bank profile cut was expanded to a 1 m x 1.4 m test trench (Test Unit 1). The stratigraphy of this unit (Figure 8) consisted of loose organic debris and forest humus (Stratum 1) overlying a 10 cm cultural layer (Stratum 2) composed primarily of marine shell (chitons, mussels and snails) with some fish, bird and sea mammal bone, charcoal, and small angular fragments of fire-cracked rock up to 10 cm across. The shells were mostly whole and uncrushed. Clean beach sand lay directly underneath. A second test pit (Test Unit 2, 1 x 1 m) in the eastern part of the midden revealed a 2 - 9 cm cultural level lying just beneath the humus and above beach sand. It was composed of beach gravels and sand mixed with charcoal, a few pieces of fire-cracked rock, pockets of forest soil and spruce bark, several unrecoverable traces of calcined bone, and a thin scatter of artifacts. Marine shell was not present in Test Unit 2. Soils from both units were dry-screened through 1/8" mesh and about 5 liters of bulk midden samples were collected.

Charcoal from Test Unit 2 (Stratum 2) was radiocarbon dated to 170 +/-60 (Beta 86695, wood charcoal, $\delta^{13}C = 0$) (Table 2). The uncalibrated date centers on A.D. 1780, while the most likely dendrocalibrated intercept at two standard deviations (Reimer et al. 2004) is cal A.D. 1649 - 1894 ($p = .828$).

Artifacts – Test Units 1 and 2. Artifacts from Kaknau Creek 1 provide an independent, although imprecise, means of assessing the date of occupation. Based on ethnohistoric and comparative archaeological data, the assemblage from Test Units 1 and 2 could conceivably represent an occupation date as early as the A.D. 1750s or as late as A.D. 1840, although we suggest a median estimate of A.D. 1780 - 1790 (see below). Raw materials from the site, including iron, copper, and glass, occur across a wide range of dates in southern Alaskan sites.

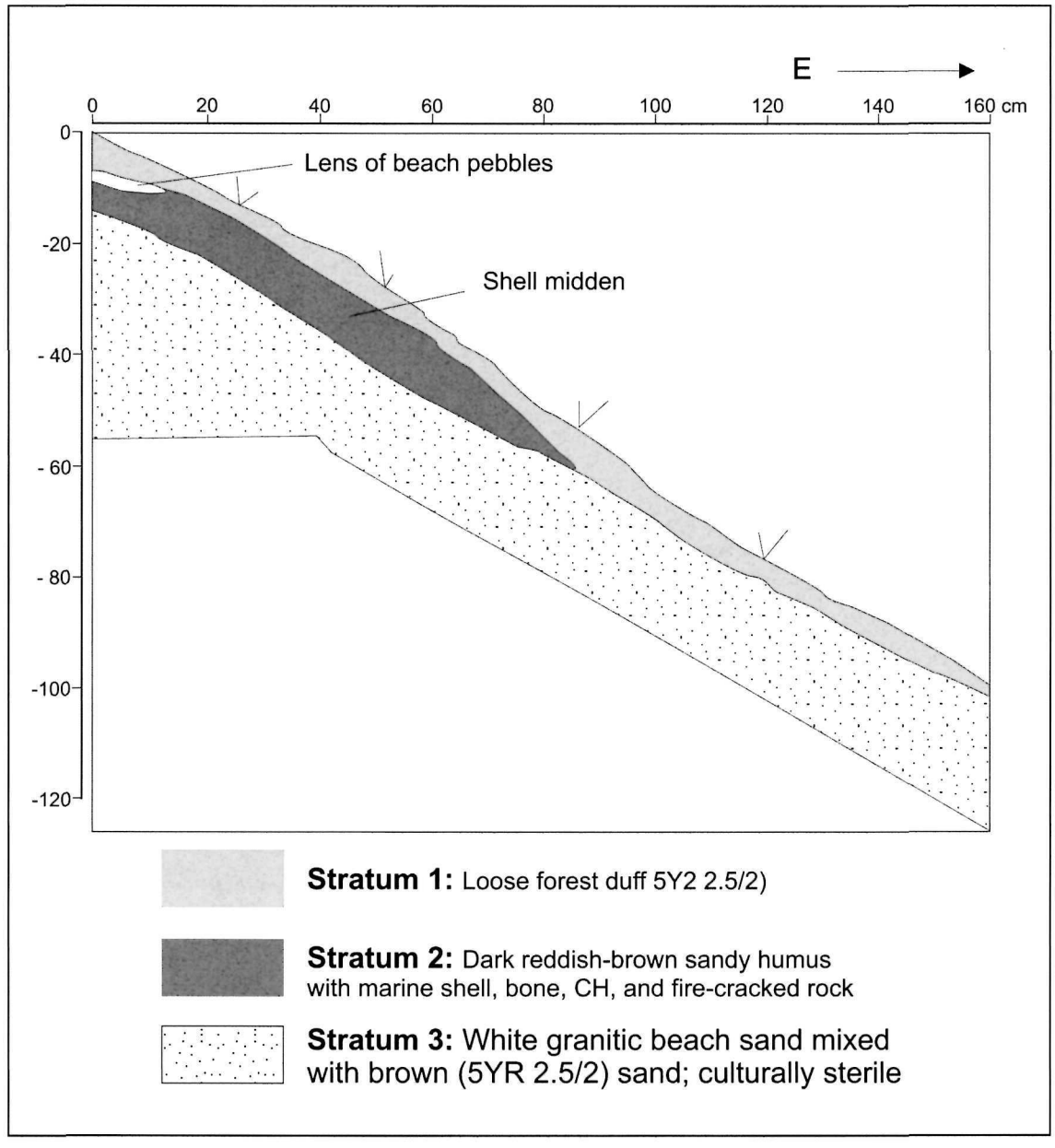


Figure 8: North wall profile of Test Unit 1 on edge of creek bank, Kaknau Creek 1 site (49-XMF-050)

Iron, obtained from wrecked ships that arrived on the Japanese/Alaska current (and possibly through long-distance trade from Siberia) was in widespread Native circulation long before Western contact (De Laguna 1956:60-65; De Laguna et al. 1964:87-88; Emmons 1991:183-189; Quimby 1985) and Native techniques for working it were highly developed (Acheson 2003). The earliest Western explorers observed that the Tlingit also possessed many objects made from native copper, including knives, neck rings, bracelets, ornaments, and arrow points (Emmons 1991:175-179; La Perouse 1994:105), and copper artifacts have been found in Northwest Coast sites up to 2500 years old (Cooper et al. 2008; Matson and Coupland 1995:199-298). Primary sources for this metal were deposits on the Copper and White rivers in the Yukon Territory, and the Tlingit conducted extensive trade for copper with the Ahtna and Southern Tutchone.

Turning to the glass artifacts, beads were observed in Chugach and Tlingit possession during late 18th century "first contact" situations (e.g. Beaglehole 1967:1418; Dixon 1789:168), indicating acquisition through indigenous trade that extended to Russian-influenced areas further west in the Aleutians (after 1741) and central Gulf of Alaska (by the 1760s). Similarly, Zaikov observed that Chugach people near Kayak Island already had fragments of green bottle glass by 1783, a date when Russian, Spanish, and English exploration of Southeast Alaska was still at a very early stage (De Laguna 1972:112; Pierce and Donnelly 1979:2).

Table 2: Standard and calibrated radiocarbon dates, GLBA SAIP survey 1995

Beta Analytic Sample	AHRS #/ Site Name	Structure/ Feature	Test Unit	Stratum	Material	C14 date	Calibrated (2 SD) and Estimated Probability*
OUTER COAST SITES							
86692	XMF-051 Kaknau Creek 2		Cutbank section		CH	4380 +/- 40	3262-3251 B.C. (.013) **3099-2903 B.C. (.987)**
86695	XMF-050 Kaknau Creek 1		TU-2	S-2	CH	170 +/- 60	**A.D. 1649-1894 (.828)** A.D. 1905-1953 (.172)
92857	XMF-049 Point Villaluenga		TU-1	S-2	CH	270 +/- 50	**A.D. 1471-1681 (.857)** A.D. 1739-1752 (.012) A.D. 1762-1802 (.106) A.D. 1937-1951 (.025)
DUNDAS BAY SITES							
92865	XMF-013 L'istee		Profile 3, 30 – 60 cm below surface	S-3	CH	210 +/- 40	A.D.1530-1537 (.005) A.D. 1635-1696 (.308) **A.D. 1725-1814 (.498)** A.D. 1835-1847 (.008) A.D. 1850-1877 (.020) A.D. 1917-1952 (.160)
92860	XMF-053 Dundas Bay Fort (Xakwnoowú)		TU-1	S-5	CH	6420 +/- 120	**5618-5206 B.C. (.958)** 5166-5117 B.C. (.025) 5109-5077 B.C. (.016)
92859	XMF-053 Dundas Bay Fort (Xakwnoowú)		TU-1	S-3	CH	520 +/- 60	**A.D. 1297-1466 (.100)**
92858	XMF-053 Dundas Bay Fort (Xakwnoowú)		TU-1	S-2	CH	460 +/- 70	A.D. 1315-1356 (.076) **A.D. 1388-1529 (.728)** A.D. 1540-1634 (.196)
92864	XMF-053 Dundas Bay Fort (Xakwnoowú)	House 1	TU-5	S-4	CH	790 +/- 80	**A.D. 1038-1306 (.970)** A.D. 1363-1385 (.030)
92862	XMF-053 Dundas Bay Fort (Xakwnoowú)	House 1	TU-5	S-3	CH	320 +/- 60	**A.D. 1448-1665 (.990)** A.D. 1785-1793 (.010)

Table 2: Standard and calibrated radiocarbon dates, GLBA SAIP survey 1995, continued

92861	XMF-053 Dundas Bay Fort (Xakwnoowú)	House 1	TU-5	S-2	CH	240 +/- 50	A.D. 1489-1603 (.227) **A.D. 1610-1694 (.358)** A.D. 1727-1813 (.317) A.D. 1839-1841 (.001) A.D. 1854-1858 (.002) A.D. 1862-1866 (.002) A.D. 1918-1952 (.093)
92863	XMF-053 Dundas Bay Fort (Xakwnoowú)		TU-3	S-3	CH	120 +/- 50	A.D. 1670-1779 (.394) **A.D. 1799-1943 (.596)** A.D. 1950-1954 (.009)
92856	XMF-069 Point Wimbledon		TU-1	S-3	CH	320 +/- 60	**A.D. 1448-1665 (.990)** A.D. 1785-1793 (.010)
ICY STRAIT							
92855	XMF-066 Dundas Village		TU-1		CH	240 +/- 50	A.D. 1489-1603 (.227) **A.D. 1610-1694 (.358)** A.D. 1727-1813 (.317) A.D. 1839-1841 (.001) A.D. 1854-1858 (.002) A.D. 1862-1866 (.002) A.D. 1918-1952 (.093)

* Highest probability dates are bolded. Estimates generated by Calib 5.0.2 program (Reimer et al. 2004)

Dimensions of artifacts are given in centimeters (cm) unless otherwise specified, using the abbreviations L (length), W (width), T (thickness), and Dm (diameter).

Stone tools

Cobble spall scraper (GLBA-00497:5373; Figure 9D). L = 7.3; W = 6.1; T = 1.0. An ovoid flake of gabbro, struck from a water-rounded cobble, with a distinct bulb of percussion. There are coarse flake removals around the whole margin. Retouched cobble spalls were heavy-duty skin scrapers and possibly also used for cutting or scraping of meat, wood, slate, or other materials. They have been found at interior and Gulf of Alaska/Northwest Coast sites of all time periods (e.g. Clark 1974; Crowell and Mann 1998; Davis 1989; De Laguna et al. 1964, 1975; Heizer 1956; Matson and Coupland 1995). Cobble spalls occur in post-contact northern Tlingit components such as Grouse Fort (Ackerman 1968:63), indicating that (as among interior Athabascans) these tools were preferred for certain tasks such as scraping heavy hides even after metal implements became available.

Large flake scraper (GLBA-00497:5387; Figure 9E). L = 11.7; W = 5.8; T = 1.2. A pointed, non-cortical flake of gabbro, with chipping along the longest edge.

Whetstones or abraders (GLBA-00497:5374, 5375; Figure 9F,H). Dimensions of the larger (5375) are L = 9.9; W = 6.0; T = 2.0; of the smaller (5374) L = 7.8; W = 6.0; T = .7. Both whetstones are made of dense, fine-grained, tabular metamorphic rock and have flat, smoothed surfaces on one face only. Whetstones occur in southeast Alaskan sites of all time periods (e.g. De Laguna et al. 1964:115-116; Davis 1989:174, 209, 293), and were used for smoothing of stone and wood.

Greenstone percussion flake (GLBA-00497:5537). L = 1.9; W = 1.6; T = .2. This is a percussion flake produced by thinning of a bifacial tool.

Metal artifacts

Copper knife blade (GLBA-00497:5383; Figure 9A). L = 10.2; W = 2.0; T = .1. The knife has a pointed blade and a squared proximal end that might have been hafted in wood or wrapped with spruce root. The metal is thin and dented as if from pounding, suggesting that it is worked native copper rather than commercial sheet stock. De Laguna found 48 copper artifacts at the pre-1775 Old Town site in Yakutat, including knives, arrowheads, pins, hooks, bracelets, rings, and coils, although none of the knife blades is identical in form to the Kaknau Creek example (De Laguna 1964:99-105, Fig. 10 and Pl. 14). She believed that all of the Old Town artifacts were made of native copper and this was confirmed for two of the projectile points by neutron activation analysis (Cooper et al. 2008). Other finds of archaeological copper in the Tlingit region include an arrowhead, spoon, and a cut circle (possibly part of a mask) at Grouse Fort, dating to ca. A.D. 1820 - 1850 (Ackerman 1965:43; 1968:30-31) and a decorative "tinkler" cone from the Late Period Daas Haat Kanadaa fort near Angoon (De Laguna 1960:126, Pl. 10l), which was dated to between about A.D. 1050 and A.D. 1670 (Moss et al. 1989:538). The upper level at Groundhog Bay 2 (radiocarbon dated to 1495 +/- 85 BP) did not contain any metal (Ackerman 1968:62-66).

Iron fragments (GLBA-00497:5384). The midden sample included two non-identifiable lumps of iron rust, the larger one (2 x 3 cm) heavy enough to contain some solid metal.

Glass artifacts

Drawn glass bead, fragments (GLBA-00497:5366; Figure 9C). L = 2.6 mm; Dm = 2.7 mm. The bead is a light greenish blue, drawn (or "tube") type with a slightly irregular shape that indicates hand manufacture. This type (commonly in greenish blue or white glass; more rarely dark blue, green, red, or yellow) is present at the earliest Russian contact era sites in southern Alaska and continues through the 19th century, although blue shades are relatively infrequent after about 1830 (Crowell 1997:160-177). Small numbers of white and greenish-blue drawn beads were found at Grouse Fort (Ackerman 1965:46; 1968:32). Drawn beads were made in China and imported by both Russian fur traders and the Hudson's Bay Company. De Laguna named them "Glacier Island" beads after their occurrence

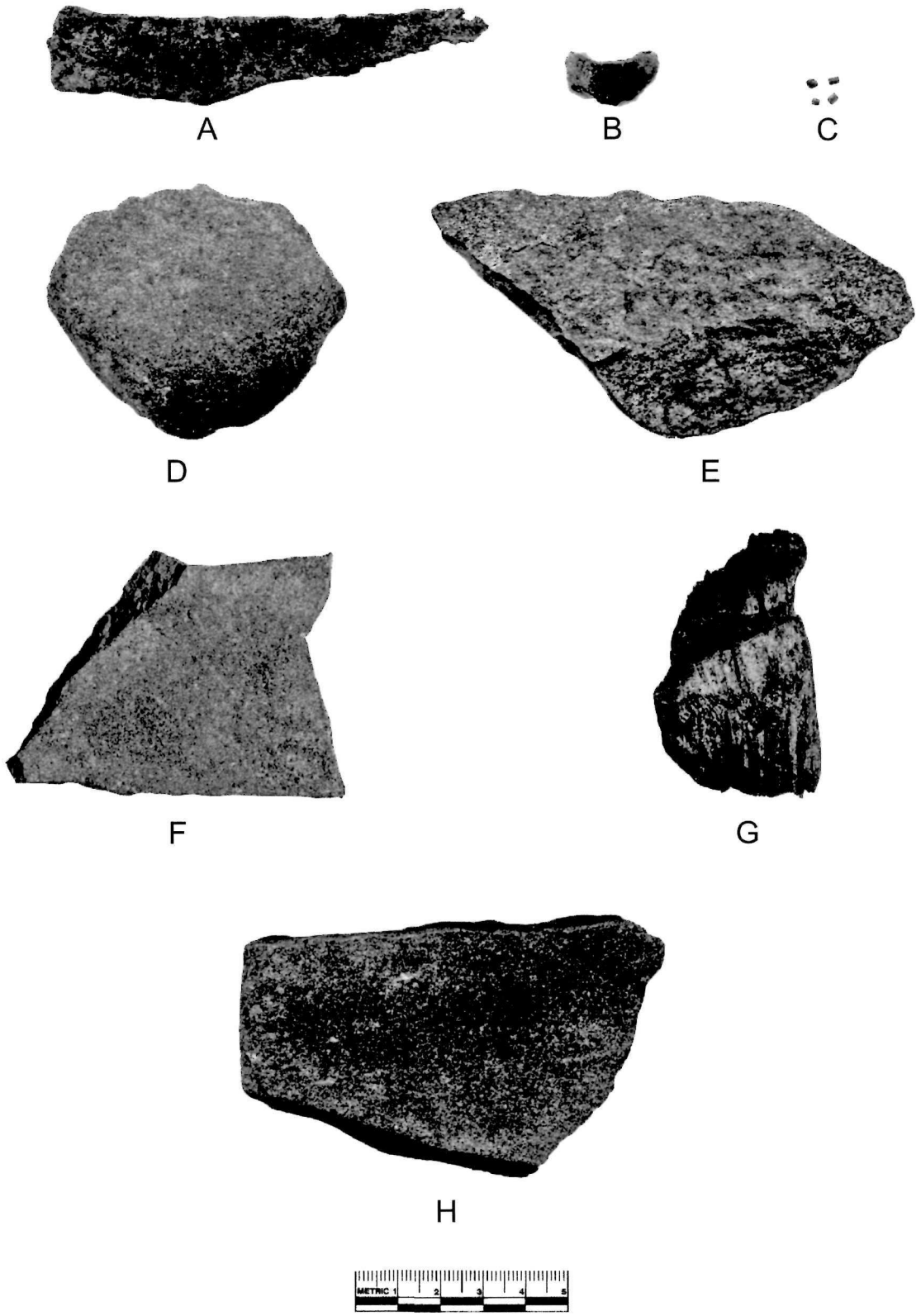


Figure 9: Artifacts from Kaknau Creek 1 (XMF-050): (A) copper knife; (B) bottle glass scraper; (C) glass trade bead; (D) cobble spall scraper; (E) flake scraper; (F) whetsone/abrader; (G) wood fragment with chop mark; (H) whetstone/abrader

in protohistoric cave burials on Glacier Island in Prince William Sound (De Laguna 1956:211) and they are called "China" or "Canton" beads in historical documents relating to the Northwest Coast fur trade (Ross 1990:48). Dixon (1789:176) noted that the Tlingit at Yakutat in 1787 already had "plenty of beads" and placed little value on them as barter goods; furthermore, dark blue and green were the only colors desired.

Scraper made from bottle glass (GLBA-00497:5380; Figure 9B). L = 2.2; W = 1.3; T = .2. This piece of dark green bottle glass has been retouched along one edge to make a small "thumbnail" scraper. A shard of retouched green glass was also found at Grouse Fort (Ackerman 1965:46) and a green bottle fragment was one of the only items of definite European origin found at Daas Haat Kanadaa (De Laguna 1960:127). Bottle and window glass scrapers have been reported at protohistoric and early contact period sites on Kodiak Island (Clark 1974:147; Crowell 1997:179-181), the Kenai Peninsula (Crowell et al. 2008), and the Nushugak River (VanStone 1968). The color and thickness of the Kaknau Creek 1 example suggest that it comes from a mold-blown wine bottle. Like beads, glass (used as a raw material very similar to obsidian) spread very early and possibly well in advance of direct Western contact in the eastern Gulf of Alaska.

Wood

Wood with chop mark (GLBA-00497:5376; Figure 9G). L = 6.4; W = 3.9; T = 1.2. This chip of wood, burned along one edge, has a linear depression cutting across the grain on one side, .5 cm wide and .3 cm deep. This appears to be a chop mark from a stone tool. One side of the cut is sliced relatively cleanly but the bottom is broad and crushed, indicating that it was made by an obtuse angle tool such as a stone adze.

Although no single artifact from Kaknau Creek 1 provides a definitive date, the assemblage as a whole indicates strong continuity of traditional materials and technology with the addition of world-system imports associated with the first decades of interaction – direct or indirect – with Western traders. Leaving aside the iron as chronologically ambiguous and assuming the copper knife is an indigenous tool made of native metal, items of regional origin (four stone tools and the copper knife) outnumber Western imports (bead and glass fragment) by 5 to 2, comprising 71% of the collection. If this ratio held for a Kaknau Creek 1 sample of larger size, it would be comparable to the earliest post-contact sites included in Hobler's analysis of material culture change on the central Northwest Coast (Hobler 1986). Indigenous tools comprised 49% to 98% of the artifacts at four sites in Hobler's "early" cluster, one of which was an already-abandoned village when Alexander Mackenzie visited it in A. D. 1793. The types of materials found in the early central Northwest Coast sites – rare beads and glass, a few copper and iron tools, but no ceramics or firearms – are similar. In addition, ethnohistoric observations suggest that the high point of English and American fur trading in the Tlingit region was in about A.D. 1804 - 1807 (Krause 1956:39-42), by which time there had already been a relatively large influx of foreign goods in greater abundance and variety than are represented at Kaknau Creek 1. Based on present evidence we suggest that the artifacts at Kaknau Creek 1 are most consistent with a date of about A.D. 1780 - 1790, reinforcing the radiocarbon result. Expanded excavations and a larger artifact sample would be needed to refine our understanding of both the date of the site and the activities that took place there.

Faunal Analysis. Faunal material was derived entirely from the bank edge deposit (Test Unit 1) with the exception of three small pieces of sea mammal bone found in an auger probe into the terrace midden above. Bulk samples from Test Unit 1 were screened in the lab through 1/16" mesh to fractionate out very small fragments of shell and bone, which were not included in the analysis. The remaining specimens (n = 1593) are enumerated in Table 3. Susan Bender of the National Park Service identified the fauna using comparative collections from the University of Victoria and University of Illinois (Bender 1997). The assemblage was dominated by invertebrates (n = 1365, or 85.7%) of which 70% (n = 960) were Black Katy chiton (*Katharina tunicata*) and 17% (n = 228) were green sea urchin (*Strongylocentrus drowebachiensis*.) The remaining invertebrates were mussels (*Mytilus edulis*), snails (*Gastropoda cocculina, G. trichotropsis, G.*

Table 3: Faunal identifications, Kaknau Creek 1 (49-XMF-050)

Taxon	Test Unit 1 and auger test in midden (NISP)	Subtotals	Percent of total sample
Sea mammals			
Phoca vitulina (harbor seal)	1		
Unidentifed sea mammal	16		
Total sea mammals		17	1.1%
Land mammals			
Ungulate (goat, sheep, or deer)	9		
Unidentified land mammal	2		
Total land mammals		11	0.7%
Birds			
Anas sp.	1		
Unidentified bird	1		
Total birds		2	0.1%
Fish			
Oncorhyncus sp. (salmon)	26		
Salmonidae	37		
Pleuronectidae (flat fish)	10		
Unidentified fish	125		
Total fish		198	12.4%
Invertebrates			
Katharina tunicata (Black Katy chiton)	960		
Polyplacophora sp. (chiton)	4		
Mytilus edulis (mussel)	135		
Gastropoda cocculina	1		
Gastropoda trichotropsis	1		
Gastropoda searlesia	1		
Cirrepdia sp.	21		
Strongylocentrus droebachiensis (green sea urchin)	228		
Strongylocentrus sp. (sea urchin)	11		
Barnacle	3		
Total invertebrates		1365	85.7%
Total	1593	1593	100.0%

searlesia), barnacles, and unspeciated chitons and urchins. Fish (n = 198, 12.4 % of the total sample) included salmon (*Onchorhynchus* sp.) and flatfish (*Pleuronectidae* sp.) Sea mammals (n = 17), were represented by harbor seal (*Phoca vitulina*) and unidentified fragments. A small number of land mammal bones (n = 11) included pieces from the metapodial of a small cervid (probably mountain goat). Bird specimens (n = 2) included an unidentified duck.

The invertebrate species are typical of bedrock-dominated intertidal zones and are not found in significant numbers today on the gravel and cobble beaches near the site. This suggests either that they were obtained elsewhere, possibly Torch Bay where *Katharina tunicata* is abundant, or else were formerly present nearby because of different shoreline conditions that obtained at the height of the LIA transgression. At that time the present beach would have been underwater, while bedrock exposures now elevated above the intertidal zone – for example, at the eastern end of the Kaknau Creek terraces – might have supported chitons, mussels, and other shellfish. In general, shellfish were harvested in the spring (Oberg 1973) although both De Laguna (1960:92) and Moss (1989:112) report that chitons were consumed throughout the year and highly prized.

Salmon were clearly important to the residents of Kaknau Creek 1, and although species identifications were not possible at least some of the *Onchorhynchus* remains appear to be from king and red salmon. Palma Bay remains an important locale for commercial king salmon fishing and salmon of one or several species run in Kaknau Creek. The flatfish remains in the Kaknau midden recall Kendall Williams' remark that outer coast voyagers fished for halibut in Palma Bay during stopovers on expeditions to Lituya Bay and Dry Bay.

Discussion. The Kaknau Creek area, including 49-XMF-050 and other sites that may be discovered there, is an important resource for Hoonah Tlingit cultural history of the last two centuries or more. The oral history of Xaatgutu.aan reflects the Tlingit heritage of long-distance seafaring, while artifacts from Kaknau Creek 1 reveal regional interaction and trade with both indigenous and Western nations. Well-preserved faunal remains document subsistence patterns during the altered climatic and coastal conditions of the Little Ice Age. The site is of particular importance to the T'akdeintaan clan, as it lies at the heart of their historic territory on the outer coast.

Kaknau Creek 1 has the potential to yield important new information about the early decades of Tlingit-Western contact. With an estimated occupation date of A.D. 1780 - 1790, it fills a gap between late pre-contact settlements – Old Town in Yakutat Bay, Dundas Fort, and the upper component at Groundhog Bay 2 – and the numerous sites reported here and by Ackerman which document Tlingit lifeways and cultural change over the course of the 19th and early 20th centuries.

Colnett's visit to Palma Bay in the summer of 1788 adds an intriguing dimension to what can be inferred from oral history and archaeology. Colnett indicated that the crew of the ship's boat encountered women and boys at the small settlement they visited, and that there was a house and garden. These details suggest that Xaatgutu.aan was an established seasonal village at that time rather than just a transitory camp for outer coast voyagers. This is consistent with its traditional place name, Xaatgutu.aan, meaning 'village nestled in the [spruce] roots' as well as with the toponym Kaháakw Héeni, or 'salmon egg creek,' which draws attention to an important resource that was available to residents. Faunal remains from the Kaknau Creek 1 site, which include salmon, shellfish, harbor seal, waterfowl, and possible goat confirm a broad range of spring and summer subsistence activities with particular emphasis on intertidal collecting.

Future archaeological research in the Icy Point/Kaknau Creek area should be directed toward expanded excavation and data recovery at the 49-XMF-050 site; intensive survey of the Kaknau Creek drainage and terrace complex to discover additional occupation areas that are likely to be present; documentation and dating of culturally modified trees; and geomorphological studies to further refine our understanding of the changes in the coastal environment over the last several centuries. New methods in non-destructive metallurgical analysis and the sourcing of native copper (Cooper at al. 2008) could be applied to Kaknau Creek 1 specimens to increase understanding of indigenous trade networks.

Kaknau Creek 2 (49-XMF-051)

The Kaknau Creek 2 site (49-XMF-051) consists of buried charcoal and fire-cracked rock atop a 30 m high beach terrace on the west bank of Kaknau Creek (Figure 4). A single radiocarbon date from the base of the cultural deposit represents a calibrated age of over 5000 years.

Historical Background. Icy Point and Kaknau Creek are historically and archaeologically documented as a summer occupation area, fishing locale, and stop-over point during canoe journeys north to Lituya Bay and beyond (see discussion above for Kaknau Creek 1, above). The Kaknau Creek 2 site, although presently known from very limited testing, indicates that human use of the area may extend back into the middle Holocene period.

Setting and Landscape. Kaknau Creek follows the line of the Fairweather Fault, and land to the west side of the stream, including Icy Point and the Kaknau Creek 2 terrace, has been uplifted at the average rate of about 0.7 - 0.8 cm per year (Mann and Streveler 1997:9). An exposed geological section near the top of the terrace, described by Mann and Streveler (1997:8-9), traces its Holocene history (Figure 10). At the base of the section, overlying bedrock, are thick beds of gravel and sand that represent a high energy beach environment like the intertidal zone at the creek mouth today. These deposits become finer in an upward direction, signaling uplift of this section first into a stream mouth environment and then to a supratidal position where fine sands were deposited by wind.

A band of charcoal and fire-cracked rock occurs near the base of these aeolian sands, suggesting initial human occupation of what at that time was a beach along the west bank of Kaknau Creek. A radiocarbon sample dated to 4380 +/- 40 (Beta 86692, wood charcoal, $\delta^{13}C = -26.8$) was taken from the section at this level, which lies 5.5 m above bedrock and approximately 30 m above present MLLW. The most likely calibrated

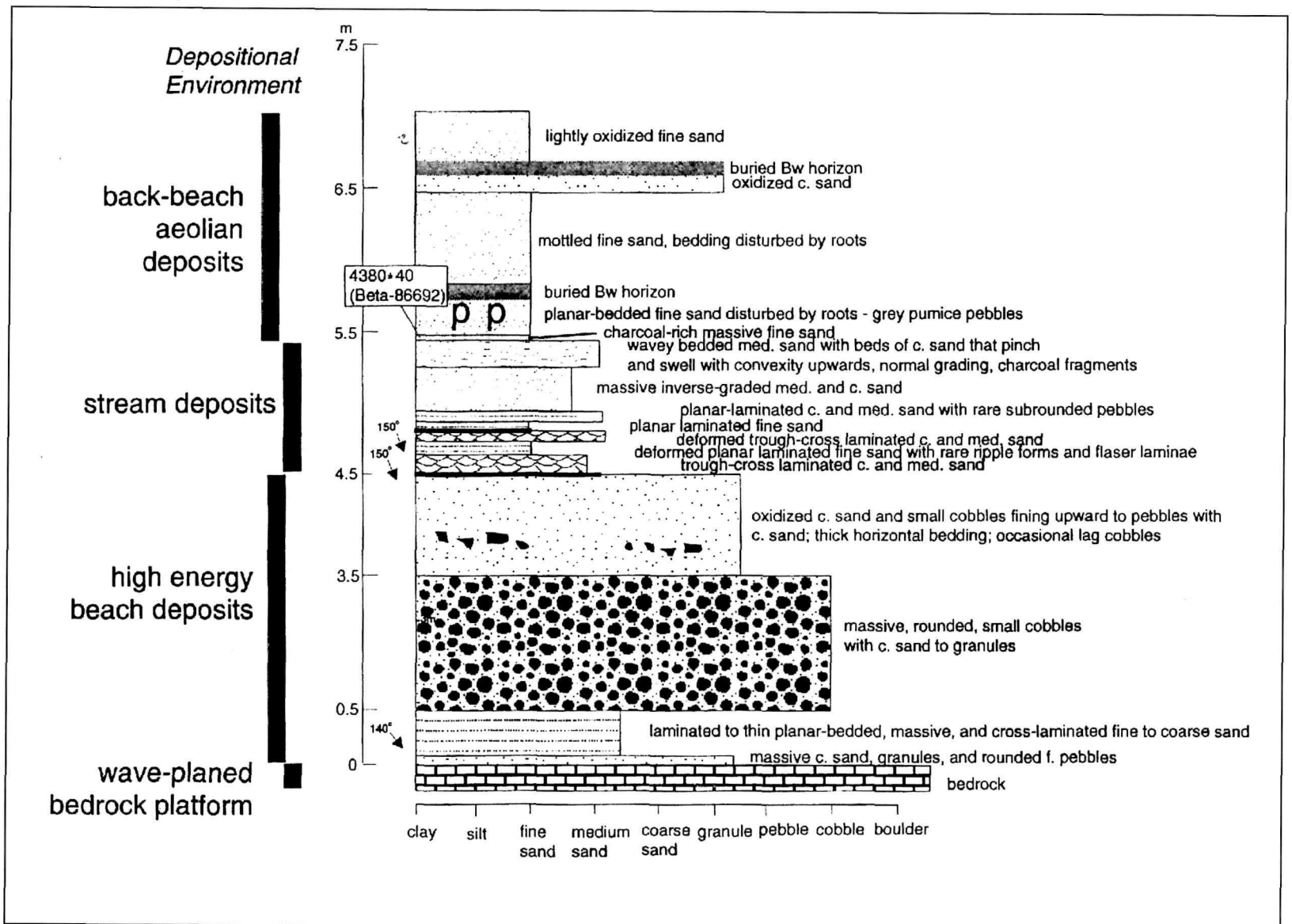


Figure 10: Geological section at edge of Kaknau Creek 2 bluff

interval for this date (p= .987 at two sigma) is 3099-2903 B.C. (Table 2; see also Mann and Streveler 1997). Above the dated horizon are layers of windblown sand with oxidized root traces and two buried "B" horizons which indicate that the ground surface was stabilized by vegetation and then reburied. Scattered charcoal continues upward through the lower part of this sequence. Pebbles of gray pumice are mixed with sand just above the dated charcoal layer, possibly from the most recent eruption of Mt. Edgecombe in about 2220 B.C. (Beget and Motyka 1998).

Cultural Features and Investigations. We excavated two 1 x 2 m test units into the surface of the terrace, in an attempt to recover *in situ* cultural materials (Figure 11). Test Units 1 and 2 were both extended to about 120 cm below the surface, penetrating the layers of aeolian sands that were recorded at the top of the geological section. Stratigraphy in both units was nearly identical and the south wall profile of Test Unit 2 (the closest to the geological section) is presented here (Figure 12). In this profile, we see an upper, non-cultural sequence of modern organic humus (Stratum 1), "A1" horizon dark brown loamy sand (Stratum 2), "B2" horizon dark grayish brown silty sand (Stratum 3), and "C" horizon oxidized reddish-brown sand (Stratum 4). These layers are the same as those marked on the geological section above the 5.5 m mark (Figure 10).

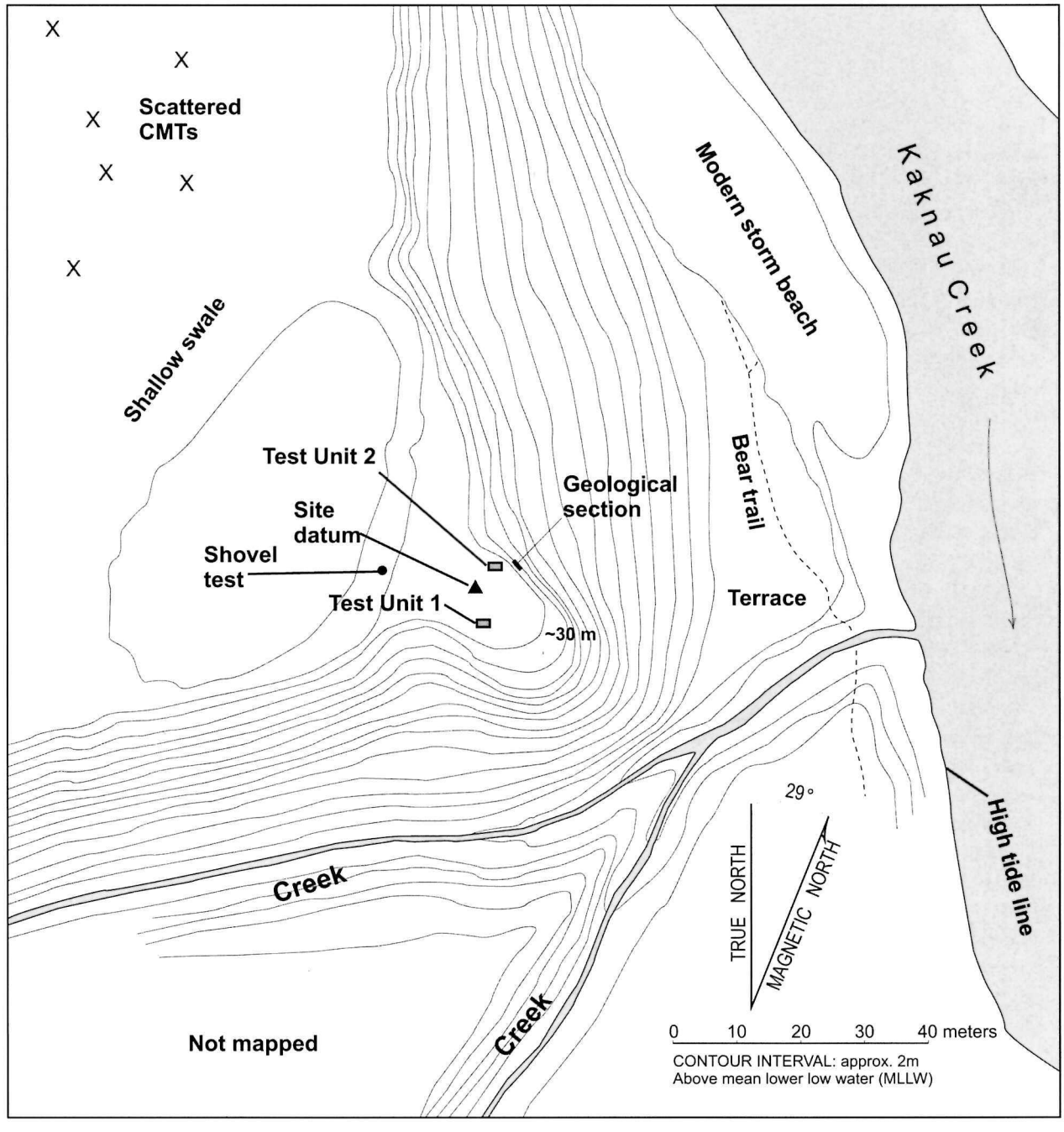
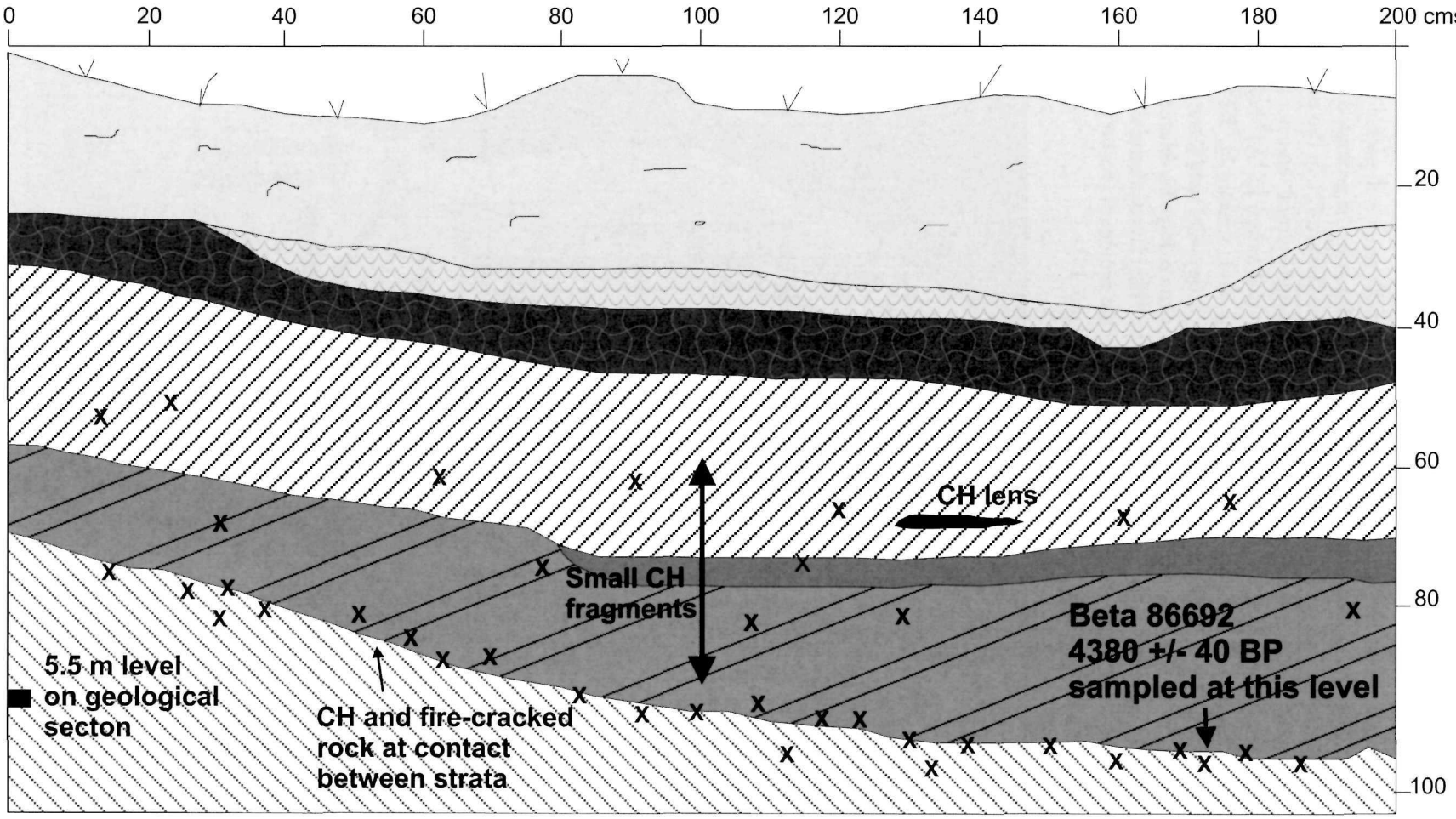


Figure 11: Kaknau Creek 2 site (49-XMF-051) showing locations of test excavations and geological section



Stratum 1: Moden humus with roots

Stratum 2: Very dark brown loamy sand 10 YR 2/2

Stratum 3: Very dark grayish brown silty sand 10YR 3/2. "B" horizon.

Stratum 4: Dk. reddish brown oxidized silty sand 5YR 2.5/2; scattered charcoal

Stratum 5: Dk grayish brown silt 10YR 3/2; scattered charcoal. Buried "B" horizon.

Stratum 6: Pumice and sand 10YR 3/4 with scattered CH, concentrated at bottom

Stratum 7: Compacted, mottled silt, color varying gray to dark reddish brown, pockets of sand; contains charcoal fragments

Figure 12: Excavation profile, south wall of Test Unit 2, Kaknau Creek 2 site (49-XMF-049)

The uppermost charcoal (in the form of scattered fragments) occurs near the bottom of Stratum 4 and continues down through a second, buried "B2" horizon (Stratum 5), through oxidized reddish sand mixed with pumice (Stratum 6), and into the top of a compact, mottled fine silt (Stratum 7). Fire-cracked rock and charcoal are concentrated at the interface of between S-6 and S-7, the same layer that was radiocarbon dated from the geological section. We note that scattered charcoal continues below into Stratum 7 (as it also does on the geological section), so that initial occupation may have been prior to the 3000 B.C. date.

The two units were not productive of cultural materials other than charcoal and a few fragments of fire-cracked rock. In Test Unit 2 at the very bottom of Stratum 6 we also found a single basalt percussion flake.

Discussion. The Kaknau Creek 2 and Kaknau Creek 1 sites, although nearly 5000 years apart in age, represent similar patterns of coastal land use. Now at very different elevations because of tectonic and isostatic changes in relative sea level, both sites were situated on sandy banks near the creek mouth/lagoon outlet, probably for summer salmon fishing or beach food harvesting. Kaknau Creek could have served as a safe and strategic haul-out and rest area for canoe travelers on the outer coast during the mid-Holocene, just as it did later on. Although Kaknau Creek 2 appears to be poor in artifacts, it is the oldest known archaeological component on the Gulf of Alaska coast between Cross Sound and Prince William Sound and may reward additional investigation.

Boussole River Site (49-XMF-052)

At the Boussole River Site (49-XMF-052) we discovered a concentration of culturally modified trees growing among wind-deposited sands adjacent to the Boussole River and well inland from the modern beach. This grove of culturally modified trees, situated near a productive salmon run, may mark the location of the settlement known in oral tradition as Gaanaxáa.aan.

Historical Background. Boussole Bay was named in 1929 to honor one of La Perouse's ships; Astrolabe Bay was named for his other vessel in 1883. In Tlingit, the sea arch at Boussole Head is called Gaanaxáa, possibly meaning 'the outside one' (Hoonah Indian Association 2006). Kendall Williams of Hoonah recalled in 1946 that "east of the point [Icy Point], inside the bay [Palma Bay], was a place called Gaanaxáa. I used to purse seine there; the last time was in 1919 when I caught 600 kings [salmon] there. It is now only used for trolling because the sockeye run is too early. In the old days we used to gather sea gull eggs there..." (Goldschmidt and Haas 1998:57).

The richest information about this location comes from a legend, "The Story of the Puffin," transcribed by Swanton at Sitka in 1904 (Swanton 1909:1, 57-58). The narrator was Deikeenaak'w, a Kaagwaantaan elder. The narrative begins, "There is a place called Gānaxá and a creek close by called Gānaxá-hīn wither many people used to go to dry salmon and do other work. One day some women went out from there at low tide to a neighboring island to dig shellfish. They brought their canoe to a place where there is a hole in the side of the island, but, when they endeavored to land, a breaker came in, upset the canoe, and drowned all of them except one." We discuss evidence below that Boussole Head (Gaanaxáa) was an island during the Little Ice Age, and was therefore the probable location of this tragedy; the "hole in the side of the island" would refer to its prominent wave-cut arch. The creek of the story is likely the Boussole River, where there is a run of red (sockeye) salmon.

The story continues, describing how the sole survivor of the canoe accident was a young woman who was saved by puffins that nested on the island; how she stayed to live among them; and how her wealthy father attempted to negotiate with the puffin chief for her return, offering canoes filled with sea otter, beaver, and marten skins. Finally, her mother thought to offer a grandfather's white hairs, which the puffins accepted in exchange for the girl, adding the hairs to their tufts. Sea gulls were the puffins' slaves at the time of these events, the story says, and still call out the names of Hoonah people when they visit Gaanaxáa. The story ends, "Because some of their people were drowned at that island, all of the T!A'q!dentān [T'akdeintaan] claim it. Later they built a house which they named after it."

"The Story of the Puffin" refers to the large populations of seabirds that nest at Boussole Head and relates that the sea gulls greeted people from Hoonah who traditionally came,

as Mr. Williams stated, to harvest eggs. Egg gathering takes place in spring, and this and other subsistence activities mentioned in the story – salmon drying, shellfish harvesting – suggest that Gaanaxáa.aan was a spring/summer settlement. The stripping of bark for food and roofing material, much in evidence at the Boussole River site, was also carried out in the early warm months of the year.

Setting and Landscape. Culturally modified trees are growing on an old, stabilized dune at the northwest corner of the Boussole River outwash plain. The dune is 350 m long and 70 - 80 m wide, extending between the river and the steep base of DeLangle Mountain (Figure 13).

The geomorphological history of this landform (Mann and Streveler 1997:9) is important for understanding its archaeological potential. Late Neoglacial expansion of the Brady Glacier resulted in deposition of an outwash plain that covered the valley of the Boussole River between about 1960 to 1230 radiocarbon years ago (Derksen 1976:35). This was followed by the growth and maturation of a spruce/hemlock forest on the outwash surface. At location 95-3 (Figure 13), a living spruce 1.75 m in diameter and at least 700 years old (from a partial ring count) was found to be rooted in outwash gravels, a remnant of this original forest. A dune of wind-deposited sand then encroached on the trees from the seaward side, partially burying them. At location 95-2, a living spruce (95 cm in diameter) was found growing up through over 130 cm of this sand (the base of the tree could not be reached with a shovel), with growth rings indicating an age of 424 years. The rings show abrupt suppression starting 347 years ago, probably indicating the onset of burial. Relative sea level was rising at this time (the Little Ice Age transgression), reaching its peak in about A.D. 1800 (Mann and Streveler 2008) when waves reworked the seaward edge of the dune to build a barrier berm that rises 5.5 m above present day extreme high tide (about 8.6 m above MLLW). Old growth forest survives on and inland of this berm, some trees apparently rooted in the sand and others on the gravel base below. Retreating waters since the Little Ice Age maximum left two wave scarps between the high berm and the intertidal zone, ground that is now vegetated by young spruce forest and alders.

This reconstruction admits the possibility that archaeological levels could be present beneath the culturally modified tree grove but that they are now covered by aeolian sands. Cultural deposits could be deeply buried at the base of the dune and/or at higher levels, although still below the depth of our shovel tests (see below).

The geomorphological history of Boussole Head is also important for the interpretation of local archaeology and oral tradition. The tombolo beach that connects Boussole Head to the mainland is today occupied by a relatively young spruce/hemlock forest (less than 150 yrs) growing in thin soil over sand, indicating that the tombolo was submerged at the height of the Little Ice Age. Boussole Head (Gaanaxáa) was therefore an island at that time, as described in "The Story of the Puffin." In addition, a buried stump was found at location 95-1 on the tombolo (Figure 13), rooted 130 cm below the present ground surface. It appears to have been abruptly covered by marine sand, possibly in the same co-seismic event that submerged stumps at Kaknau Creek about 640 radiocarbon years ago (see Kaknau Creek 1 site discussion, above). Although the Boussole stump was not radiocarbon dated, it indicates that the tombolo dropped below sea level at some point prior to the Little Ice Age maximum, disconnecting Boussole Head from the mainland. The legendary reference to this geographical feature as an island could thus have considerable antiquity.

Cultural Features and Investigations. In search of subsurface cultural deposits we checked erosion exposures along creek banks at both ends of the dune and dug about 20 shovel probes along the barrier beach crest and in the area of culturally modified trees (inset, Figure 13). No charcoal or other cultural indications were found. However, these holes did not exceed .6 -1 m in depth and may have been too shallow to encounter any buried occupation levels.

We noted approximately 20 bark-stripped spruce and hemlock trees, most appearing to be quite old, with healed edges and rotten centers. Measurements were not taken. However, the modified trees are roughly comparable in size (about 1 m diameter at breast height) to the 400+ year tree cored at location 95-2. Downward cutting adze marks, made with a metal-edged tool, are preserved on one bark-stripped tree on the south bank of the Boussole River.

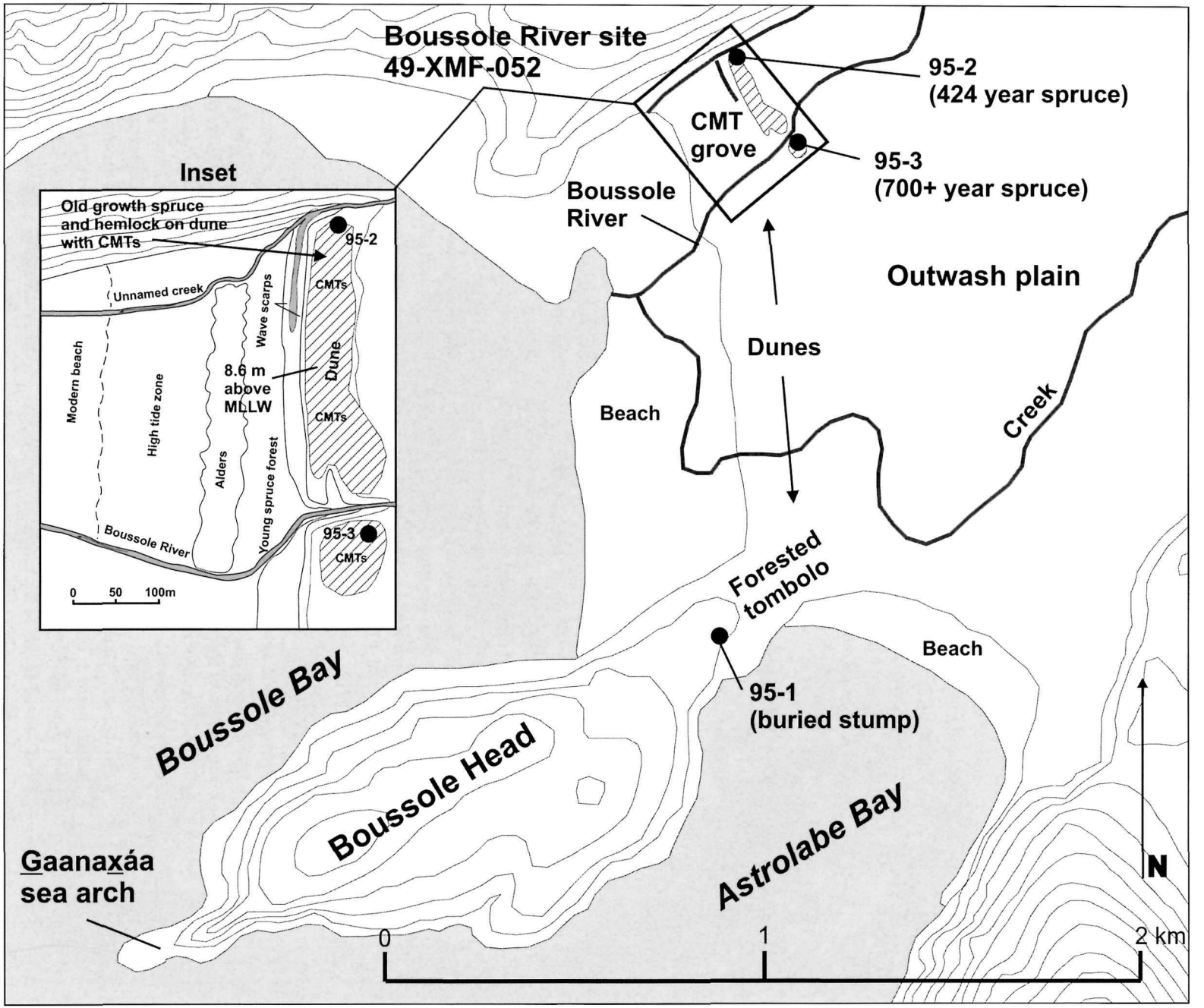


Figure 13: Boussole River Site (49-XMF-052) area map with site detail inset

Discussion. Oral tradition documents the presence of a summer settlement in the vicinity of Boussole Head, and the grove of culturally modified trees we found beside the Boussole River represents the most likely location. Its dates of occupation are uncertain; bark removal from the centuries-old trees at the site could have taken place as early as the 18th century A.D. and occupation levels this old or older may be buried in sand or lie entirely under the dune. From tree ring evidence (at location 95-2) we infer that the dune formed about 350 years ago. However, the 1700 year-old outwash surface that lies under the dune and extends inland from it was not altered by the Little Ice Age marine transgression, and it is possible that cultural deposits up to this age are preserved on it. Capacity for deep coring on the dune to test for buried cultural layers would be an essential asset for future investigations.

Point Villaluenga (XMF-049)

On a stream terrace beside the Villaluenga River we found traces of a Tlingit camp used in the 16th – 17th century A.D. The river and interior lakes that it drains are home to a small sockeye salmon run.

Historical Background. Moser's report on Alaska's salmon resources (Moser 1902:381) mentions that the Villaluenga River was "said to carry a few redfish" and recorded "An-nock-seet" as the local name for this stream. The Hoonah Indian Association's compilation of place names (2006) confirms Anax Séet [passage through the land] as the Tlingit name for the river. Point Villaluenga itself is Naguk K'i [at the base of Naguk] referring to its proximity to Dicks Arm (Naguk Héen).

Setting and Landscape. The "Villaluenga River" (unofficial name) is the outlet stream for a chain of interconnected freshwater lakes in the interior of the Cape Spencer peninsula. It discharges on a gravel/cobble pocket beach in a cove behind the islet at the tip of Point Villaluenga. A spruce-covered Little Ice Age barrier berm at the head of the cove rises about 5 m above modern extreme high tide (about 8 m above MLLW). The largest tree growing on this berm was dated by ring counts to 130 years, suggesting the berm was built about 150 years ago before isostatic sea level decline (Mann and Streveler 1997:10). A pond is trapped behind the berm (Figure 14). The lower river is bordered on both sides by a level bench about 5 m wide and elevated 1.0 - 1.5 m above the stream bed. This bench is interpreted as an erosion scarp cut along the estuarine portion of the river by high tides during the height of the Little Ice Age transgression.

Above this bench, the river banks and uplands are covered by deep forest peat (over 1 m thick in some places) and old growth yellow cedar/hemlock forest, indicating long-term stability. A geological section excavated next to the river above the tidal scarp (Figure 16) revealed a layer of tephra below the forest peat (which was here about 50 cm deep), probably Edgecumbe ash dating to ca. 11,300 years ago (Riehle et al. 1992). Below the tephra were glacial kame deposits from the last glacial maximum. This geological interpretation indicates that cultural sites along the river banks could potentially have any age back to the Late Wisconsin over 13,000 years ago, as long as they are elevated above the Little Ice Age tidal scarp This area deserves more focused investigation given its observed antiquity of landform and potential for early sites.

Cultural Features and Investigations. We examined and shovel tested around the margins of the backshore pond and up both banks of the river to its first source lake, about 700 m inland. On the east bank about 250 m downstream from the lake (adjacent to the geological section discussed above) we found charcoal and fire-cracked rock just below the surface on a level bench adjacent to a small feeder stream (Figure 14). This location is 4.8 m above the stream and well above the 1.5 m Little Ice Age tidal scarp.

Excavation of a 1 x 1 m test unit on the bench revealed 15 cm of recent forest peat (Stratum 1) overlying a 5 cm cultural level (Stratum 2). Stratum 2 consisted of charcoal stains and fragments, clusters of fire-cracked rock (angular, fist-sized quartz and schist), and lenses of wood ash in a matrix of coarse white sand. Underlying the charcoal and fire-cracked rock in one corner of the unit was a 2 - 3 cm bed of clean, fine river sand, possibly a prepared fire bed. Beneath Stratum 2 was deep, culturally sterile peat. No artifacts or debitage were recovered.

A charcoal sample from the cultural level returned a radiocarbon date of 270 +/- 50 (Beta 92857, wood charcoal, $\delta^{13}C = 0$, Table 2). Calibrated, the most probable calendar

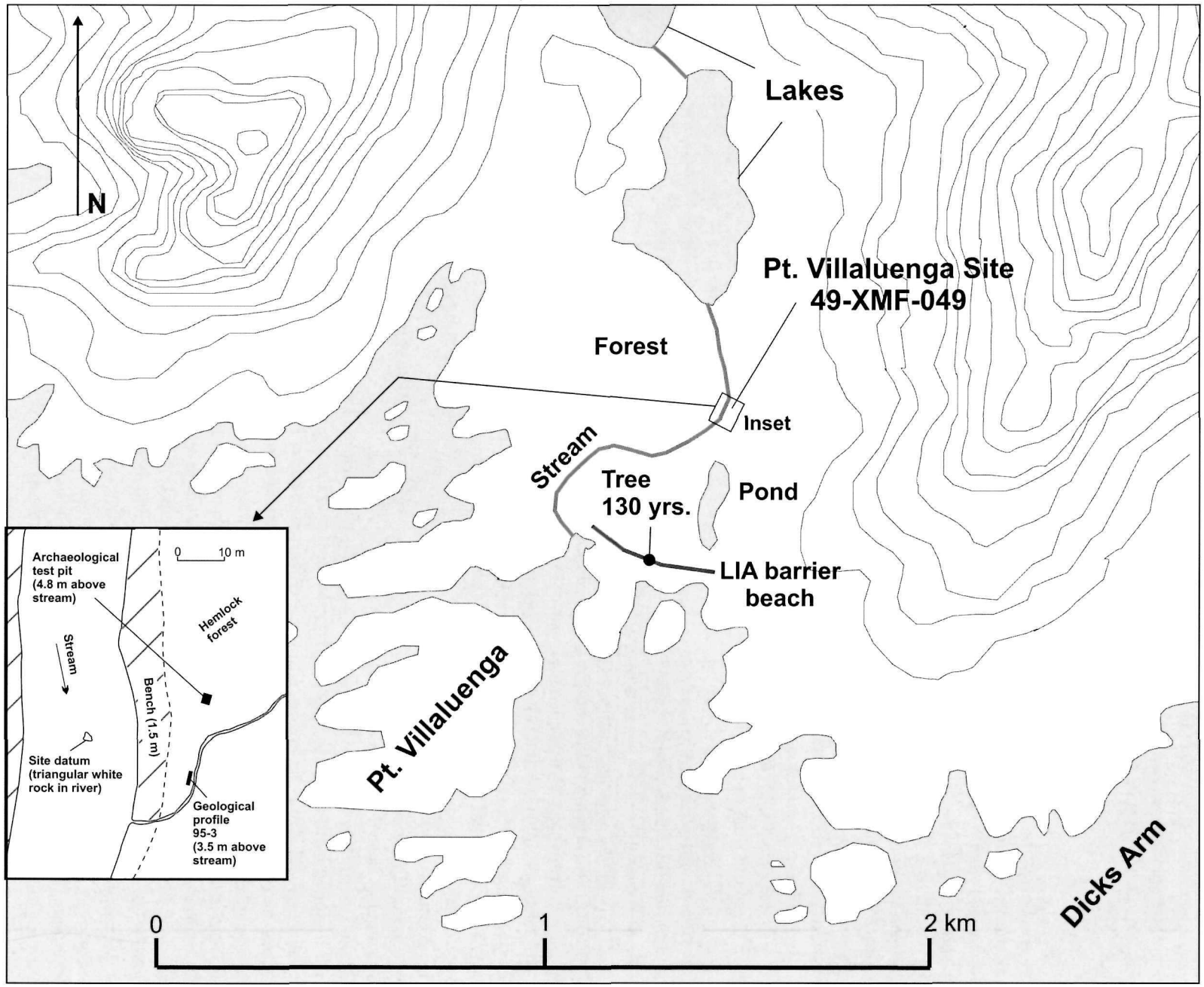


Figure 14: Pt. Villaluenga Site (49-XMF-049)

intervals at two sigma are A.D. 1471-1681 (p =.857) and A.D. 1762-1802 (p = .106).

We used an isolated white granite slab, lying awash in the center of the creek, as the measurement datum for a sketch map of the site (Figure 14). It stands out prominently on the dark creek bed, and reminds us of a passage from a story in Swanton (1909:47-48) called "Various Adventures near Cross Sound." In part it reads, "On their way home they saw in a small creek what appeared to be a little halibut, but on coming closer they found that it was only a white rock which had that appearance."

Discussion. SAIP investigations confirm Tlingit use of the Villaluenga River, almost certainly as a summer salmon fishing site, a century or more prior to Western contact. Our surveys and results were limited, however, and future survey work should be extended to include the interior lakes of the Villaluenga drainage.

Chapter 3: Taylor Bay, Dundas Bay, and Icy Strait

Following the outer coast work, the 1995 SAIP project moved to its second area of study – Taylor Bay, Dundas Bay, and the northern shore of Cross Sound and Icy Strait (Figure 15). This part of Glacier Bay National Park is rich in Hoonah Tlingit oral tradition and is known to have included the winter village of Asgutu.aan, the summer village of L'istee, the fort site of Xakwnoowú, and a number of seasonal camps and cabins. Emmons wrote that "possibly no section of southeastern Alaska is so marked by old living sites and [hunting] grounds [as] the shores of Icy Straits and Cross Sound. Its waters are rich in marine life and land animals are fairly abundant, these natural resources together with their intermediate position which gave them [the Hoonah Tlingit] the monopoly of the trade in copper with the Alsech [Alsek] and western people and those to the south ...made them one of the three richest and most important Tlingit tribes" (Emmons 1887).

Robert Ackerman's survey of Glacier Bay National Monument (Ackerman 1964, 1965, 1968) documented many of these locations, some of which we revisited. Our primary focus, however, was the discovery of new sites based on a geologically informed search strategy that also took into account the specific data of Tlingit ethnogeography.

SURVEY NARRATIVE

We established a camp at the mouth of the Dundas River, using it as a base from May 28 to July 1 to map and excavate at nearby Xakwnoowú [dry fort]; to undertake pedestrian surveys of the Dundas River, L'istee, and surrounding terrain; and to conduct Zodiac-supported surveys of the coastline. The geological team used the Dundas camp as a base to conduct its research on Icy Strait sea level history, accompanied by archaeologist Angela Demma. Archaeological studies around Dundas Bay included exploration of three mountain peaks – White Cap, Point Dundas, and Point Carolus – to document high altitude cairn and rock circle sites. Our planned activities in Taylor Bay, including a search for the village of Asgutu.aan, had to be curtailed because of a two-week absence of the principal investigator (Crowell) for a family emergency. In all, the 1995 SAIP project added eight new sites to the inventory of cultural resources in the Taylor/Dundas/Icy Strait area, discussed individually below.

Taylor Bay

The massive Brady Glacier flows into Taylor Bay from the north, grounding on extensive mudflats. At the base of Table Mountain to the west are several lakes with outlet streams that flow to the bay across forested deltas. On the east side are Taylor Island, a bedrock prominence that forms Fern Harbor, and a narrow neck of boggy land that divides Taylor Bay from the western arm of Dundas Bay. A portage trail, noted by Ackerman (1968:8), traverses this lowland from the head of Fern Harbor. The wide, funnel-shaped mouth of Taylor Bay, about 15 km across, opens directly onto Cross Sound. A prominent end moraine, representing the Brady terminus at the height of the Late Neoglacial (about 1200 years ago), extends underwater across the bay where this funnel narrows, near the midpoint of Taylor Island (Derksen 1976: Fig. 18). Any settlements or archaeological sites located inside this limit would have been obliterated by the Late Neoglacial ice. Fern Harbor is thus of particular interest because sites older than 1200 years are a possibility there.

Observations by the Vancouver expedition in A.D. 1794 pertain to Tlingit sites in Taylor Bay and to the position of the ice at the peak of the Little Ice Age, when the leading edge of Brady Glacier was substantially north of its Late Neoglacial maximum. Vancouver's lieutenant Whidbey reported the "ruins of a deserted Indian village" about five miles up the west side of the bay, and farther north the party encountered "an immense body of compact perpendicular ice, extending from shore to shore" (Vancouver 1984 Vol. 4:1344). Klotz (1899) compared Whidbey's charted location of this ice front with a map produced by the Canadian Boundary Survey in 1894, concluding that the Brady had made a re-advance of some five miles during the intervening century, overrunning the old village. Derksen, however, pointed

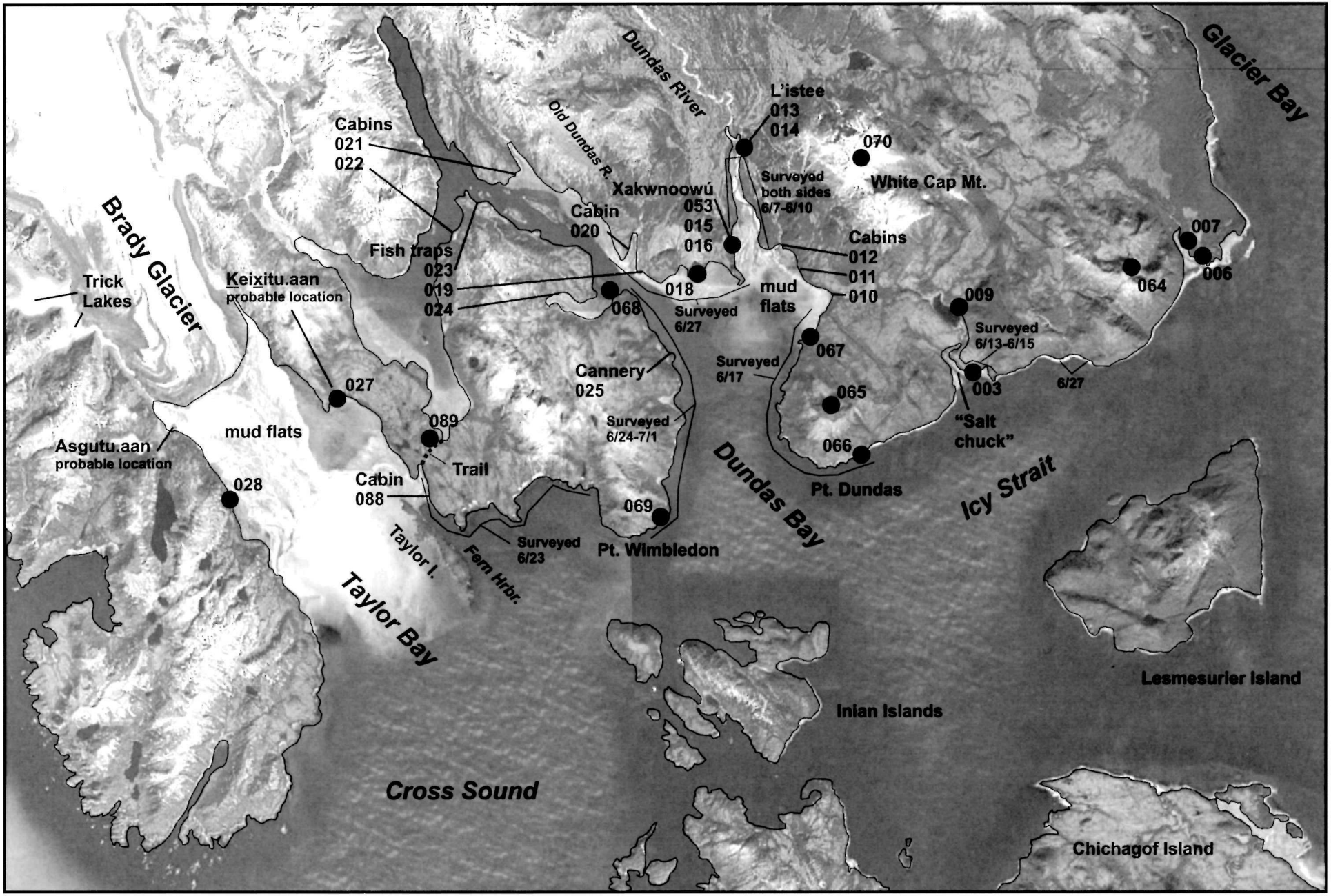


Figure 15: Taylor Bay, Dundas By, and Icy Strait survey locations, Glacier Bay National Park and Preserve

out inaccuracies in Whidbey's chart and concluded from field data that the Brady actually advanced very little during this period. Despite 20th century fluctuations of .3 - .6 km, Derksen suggested that the ice is presently still close to its position in Vancouver's day (Derksen 1976:46-51).

Recent research has refined this picture by establishing a tree-ring chronology based on sub-fossil wood recovered from Taylor Bay glacier margins, with dates spanning A.D. 1370 - 1861 (Capps et al. 2011). This work establishes that from its point of maximum retreat during the Medieval Warm Period (approximately 24 km north of the present terminus in A.D. 1225 - 1305) the glacier began a gradual readvance that by A.D. 1830 had dammed an ice margin lake on the east side of the bay, forming Spur Lake. The ice continued to advance, blocking the Trick Lakes drainage and reaching its maximum Little Ice Age extent by about A.D. 1880. This new reconstruction suggests that the Brady was still advancing at the time of Vancouver's visit in A.D. 1794, and that its front at that date was up to eight km north of where it rests at present. This position would still probably have allowed for survival of the village that Whidbey observed (see below).

A previously unrecorded T'akdeintaan oral tradition relates that following the clan's eviction from Lituya Bay by an earthquake-generated tsunami at an unknown date, the survivors migrated southward, eventually settling in Taylor Bay (Kenneth Grant, personal communication to Wayne Howell, 2011). There another catastrophic flood – probably the sudden discharge of an ice margin lake – "washed the T'akdeintaan out" a second time. This flood could have occurred during the Brady Glacier's Medieval Warm Period retreat prior to A.D. 1200, when dammed water in the position of today's Spur Lake or North Trick Lake was released.

Given the ice position data discussed above we suggest that the old village site observed by the Vancouver expedition on the west side of Taylor Bay – known by its Tlingit name of Asgutu.aan [forest village] (Hoonah Indian Association 2006) – has probably survived, although its exact location is somewhat uncertain. In 1946 Hoonah elders testified that, "Close to the glacier in Taylor Bay there was a winter village that belonged to the Daqdentan [T'akdeintaan] clan. It was called Asgatu'an [Asgutu.aan]. There were no houses except smokehouses there in our time. Native people go there to pick nagoon and strawberries; [some] went there as late as last summer. Nobody lives there now" (Goldschmidt and Haas 1998:56). Ackerman found a single 20th century log cabin ruin (49-XMF-028) on the west side about 5 km south of the glacier, but did not discover any of the older and more extensive remains that are indicated by historical sources and oral tradition. We suggest that the actual location of Asgutu.aan may be fairly close to the present-day glacier, specifically at a tombolo beach located about one km from its front (Figure 15). That beach is now difficult to access because of mud flats that have built up over the last two centuries, and it has never been examined by archaeologists. If a future reconnaissance can be made, it should extend into backshore areas to account for post-Little Ice Age isostatic uplift.

Similar observations pertain to a remembered settlement on the eastern shore of Taylor Bay called Keixitu.aan [community near the edge of the glacier] (Hoonah Indian Association 2006). In 1794, Whidbey and his crew saw two Tlingit mortuary poles somewhere near the eastern end of the glacier's front, reporting that grave boxes atop the white-painted pillars contained cremated human remains (Vancouver 1984: Vol. 4:1344). They did not observe any houses. Kendall Williams in 1946 stated that there was an eastern settlement called QeXetuan [Keixitu.aan] that was occupied until the 1930s when the Dundas Bay cannery closed (Goldschmidt and Haas 1998:56). Harry Marvin said in 1975 that this village had been the home of at least four Tlingit tribes, or clans (Sealaska Corporation 1975:770). Ackerman (1968:8) found two 20th century cabin ruins at the north end of the lowlands which divide Taylor Bay from Dundas Bay (49-XMF-027), about 4.5 km south of the glacier, and this was accepted as the location of the eastern village for purposes of Sealaska's heritage survey (Sealaska Corporation 1975:604, Site 774). However, the evidence discussed here suggests that more houses and probably older remains should be present in this general area, lying at or above maximum Little Ice Age sea level. There has been no glacial disturbance here since the retreat of the Neoglacial ice so that deposits several centuries old could potentially be preserved.

On June 23, we walked and tested along the mainland shore of Fern Harbor and on June 24 we examined by boat the shoreline east toward Point Wimbledon, finding no place to land because of surf. A 6 - 10 m high wave-cut terrace is preserved in many places along these shores, covered with deep forest soils (up to 1.3 m thick) which confirm that the late Neoglacial advance of Brady Glacier did not reach this area.

We noted a cabin ruin and privy at the north end of Fern Harbor, near the portage trail, possibly the trapping cabin maintained by Joe Ibach (a non-Native resident of Lemesurier Island) during the 1930-1960 period (49-XMF-088). Three courses of corner-notched logs, a framed doorway, and collapsed shed annex are all that remain of the main structure, which measures 3.9 m x 3.3 m (Figure 16A).

and the southwestern head of Dundas Bay (Ackerman 1968:8). This was probably the portage trail reported to John Muir in 1879 (Muir 1915:261). Howell and students recorded a culturally modified tree adjacent to the trail that may have been used as part of a temporary trailside shelter. Designated as site 49-XMF-089, the feature was first noted during the 1995 SAIP survey. It consists of a large, leaning spruce with a bark stripping scar at its base on the overhung side. The bottom of the scar is scorched and hollowed by fire. Emmons described a type of Tlingit temporary lean-to made by propping a pole against the underside of a leaning tree and then draping the impromptu frame with blankets Emmons 1991:73). A fire built inside would explain the burn marks on the Fern Harbor tree. No subsurface testing was conducted.

Figure 16 A: Cabin in Taylor Bay / Dundas Bay area: Fern Harbor log cabin (49-XMF-088)

Wire galvanized nails were used in the construction. A machine-made liquor bottle found at the cabin is embossed with "Federal Law Prohibits Sale or Re-Use of the Bottle" which indicates manufacture between 1932 (the end of Prohibition) and 1964. We noted several tree notches indicative of a trap sets for martens as well as bark-stripped cedars and hemlocks near the cabin and in old growth forest above the Little Ice Age limit in the northeast corner of Fern Harbor.

In 2005, Wayne Howell and students from Hoonah followed a well-worn path that crosses the narrow neck of land between Fern Harbor

Dundas Bay

Dundas Bay opens on Icy Strait, framed by the headlands of Point Wimbledon and Point Dundas. The bay, called Lanastáak [nose ring] in Tlingit, is convoluted in form, with an arm that extends almost 20 km inland to the northwest and a T-shaped western branch called Éenaa X̲'atán [spruce root scraper lying there] (Hoonah Indian Association 2006). During periods of higher sea level (most recently the Late Neoglacial and Little Ice Age) the western arm has probably merged with Taylor Bay over the lowland that now divides them. The surrounding terrain is mountainous, with several peaks

above 800 m and the tallest (White Cap Mountain) reaching over 1000 m. Tree line for the spruce and hemlock forest is generally at 500 to 600 m. The dominant drainage is the Dundas River, which is fed by melt water from the east flank of Brady Glacier, by Geike Glacier, and by a clear-water tributary from Lake Seclusion north of White Cap Mountain. The Dundas River enters the northeastern part of the bay at the head of extensive mud flats that were built by sediment carried downriver during the Late Neoglacial period starting about 1600 years ago (Mann and Streveler 1997:11-12). Unlike Taylor and Glacier bays, Dundas Bay has not been occupied by glacial ice since the Late Wisconsin, at least 13,000 years ago (Mann and Hamilton 1995). This leaves open the possibility that relatively ancient archaeological sites may be preserved, as long as they lie above the height of the Little Ice Age marine transgression.

Ackerman's archaeological survey of Dundas Bay and lower Dundas River in 1963 documented thirteen cultural sites, all less than one hundred years old at that time and many associated with Tlingit and Anglo residence during the cannery era (Ackerman 1964:17-32). These sites included the late 18th to early 20th century village of L'istee (49-XMF-013), located on the east bank of the Dundas River; an early 20th century cabin site (49-XMF-016) and Tlingit cemetery (49-XMF-015) on the west bank of the river; a grave site near the river mouth with a single wooden marker inscribed "Olson 1919" (49-XMF-017); mid-20th century cabins owned by Buck Harbeson (49-XMF-010, 011, 014), Jimmy White (49-XMF-012), and "Doc" Silver (49-XMF-021, 022); another cabin (49-XMF-020) at the "Old Dundas River," a former western branch of the Dundas; a rock shelter with remains of a wooden dugout canoe (49-XMF-018); and ruins of the Dundas Bay Cannery (49-XMF-025).

The cannery opened in 1900 and operated until the 1930s under several different owners, packing all five species of Pacific salmon and employing a Tlingit, Anglo, and Chinese workforce of fishermen and factory hands (Black 1957; Mackovjak 2010; Moser 1901). The remains of fish traps associated with this cannery are found at nearby locations, as reported by Ackerman (49-XMF-019, 023, 024).

Our largest investment of time and effort in 1995 (May 28 to June 16) was in the mapping and testing of cultural deposits on top of a prominent bedrock escarpment on the lower west bank of the Dundas River, which we concluded was the Tlingit defensive site known as Xakwnoowú [dry fort] (Emmons 1887; Swanton 1909). Radiocarbon dates from our excavations at this site (49-XMF-053) indicate over 850 years of occupation, with one outlier date (possibly non-cultural) of over 7000 calendar years. The fort rock is adjacent to two sites reported by Ackerman – a Tlingit Christian cemetery (49-XMF-015) with grave markers dating from 1901 to 1928 and an early 20th century house ruin (49-XMF-016). Although Ackerman identified the latter structure as a Tlingit smokehouse, it may have actually been a trapping cabin used by John Olson, a non-Native resident of Hoonah (Glacier Bay National Park archives, file L1425-A003892).

Additional work along the lower Dundas River included pedestrian survey of its eastern and western banks as far north as L'istee village. On the east side, we tested along terraces and a promontory that would have bordered the Dundas River estuary during the Little Ice Age transgression, but found nothing cultural. On June 10 we undertook foot surveys with auger testing west of our camp to a pair of forested knobs (highest 500 ft/ 151 m) that rise from the flood plain of the "Old Dundas" river, noting a number of bark-stripped spruce and cedar trees. We excavated a 50 x 50 cm test pit in a location between the two knobs where auger testing picked up charcoal at 32 cm below the surface in mottled silts. This location was inconclusive as a cultural site and was not radiocarbon dated.

At L'istee, remembered as a T'akdeintaan village where an important potlatch ceremony was given in about 1906, Ackerman found two houses and other features, a grave with a headstone dated 1917, and historic artifacts indicating occupation as early as the 1880s (Ackerman 1968:8-10). Gleeson (1987) suggested that leveled platforms around a nearby knob were the remains of a fort. We reinvestigated the site in 1995 (SAIP) and 1997 (Howell), mapping the hilltop area and finding evidence that the village below was used at least as early as the 18th century A.D. (see site discussion, below).

We undertook a number of Zodiac-supported trips to examine known and potential habitation areas around the shores of the main part of Dundas Bay (Figure 15). The first of these was the Old Dundas River Cabin (49-XMF-020) described by Ackerman (1964:29). We found this cabin, dating to perhaps the

1940s or 1950s, to be still standing and well-preserved (Figure 16B). It is small (2.6 m wide, 2.9 m long and 2.3 m high) and constructed of tongue and groove planking over a milled wood frame, with a corrugated iron roof and paned glass windows. The cabin is on the west bank of the estuarine portion of the "Old Dundas" river, on a terrace about 4 m above current highest high tide. The foundation outline of a second structure, a log cabin measuring 2.7 x 5.0 m, is located about 50 m to the north. We checked the recently emerged, post-Little Ice Age terrace up to the head of the estuary but found no other cultural features.

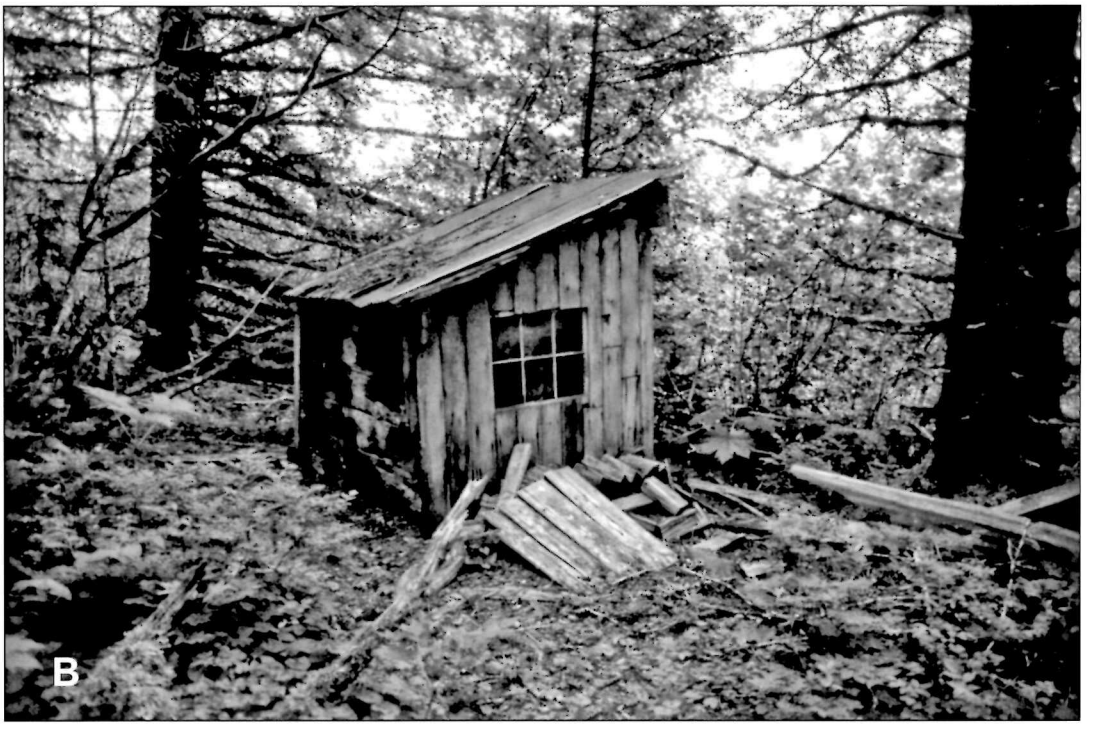


Figure 16 B: Cabin in Taylor Bay / Dundas Bay area: Old Dundas River cabin (49-XMF-020)

At Ackerman's "Doc Silver's Cabin 2" (49-XMF-022), located on the south shore of the entrance to the west arm of the bay, we found the ruins of two early to mid-20th century structures (Ackerman 1964:31). Just inside the alders at the top of the Little Ice Age berm are the moss-covered planks of a collapsed cabin, originally about 4 m x 4 m in size. A marine battery, ornate iron stove door, steel cables, an oil drum, and other trash lie nearby. A second collapsed 4 m x 4 m plank structure lies 30 m to the southeast, farther back in the trees, where we saw a pail, a brown glass Chlorox bottle, and another battery. There is very little soil on the alluvial fan where the cabins are located and no signs of earlier occupation. There are many cut stumps, but no culturally modified trees.

"Doc" Silvers was a non-Native fisherman, whose real name was William Horseman.

On a small, unnamed island opposite the Old Dundas River on the other side of the bay (which is here quite narrow) we found old growth spruce and hemlock forest with numerous rotten stumps left by early 20th century logging. At the south end of the island we discovered a small historic camp site with charcoal and iron (49-XMF-068, described below).

From June 24 to July 1 we examined coves and pocket beaches along the west side of the main part of Dundas Bay. Post-Little Ice Age uplift terraces characterize the shorelines, and we searched and dug subsurface tests on any older ground surfaces. Most of these locations have a few culturally modified trees, including bark-stripped spruce, hemlock, and cedars and pitch-cut spruces. However, we found no evidence of settlement, even at a "village" site reported in the Sealaska heritage survey (Sealaska Corporation 1975:828-829, Site 7). This location is a small bight just north of the Dundas Bay cannery where steep slopes back a narrow, alder-covered beach. Driftwood logs on the beach indicate that it is washed over in storms. Use of this beach other than for a short-term camp seems unlikely, and the thin soils on the terrace yielded no charcoal or other evidence of occupation.

At Point Wimbledon we found a possible house platform, small pit feature, and subsurface charcoal on an alluvial fan between two streams. The

Point Wimbledon site (49-XMF-069) was used during the 16th century AD (see discussion below).

Reports of stone constructions on top of White Cap Mountain (Ackerman 1964:23), linked in legend to the retreat of Tlingit people to the mountaintops during the Great Flood caused by Nass Shakee Yéil ("Raven at the Head of the Nass River") or by his progeny Raven (Swanton 1909), inspired us to search the summit of the mountain, where we found five rock cairns (designated as site 49-XMF-070). We found similar cairns on the peaks at Point Dundas (49-XMF-065) and Point Carolus (49-XMF-064). In most cases these features appear to be very old, with heavy lichen growth. None have any evident functional purpose (e.g. food cache, way-marker, burial, hunting blind) and are interpreted as indigenous monuments to the flood story.

On June 19, geological investigations were conducted at "Harbeson's Flat" about 2 km southeast of the Dundas River mouth. Here a drowned spruce forest and buried peat layer provided evidence of low stands in relative sea level around 1600 and 4700 years ago, respectively (Mann and Streveler 1997:11; 2008:205-207). The location is near Buck Harbeson's Cabin 2 (XMF-010; Ackerman 1964:17; 1968:89). Beside a stream on the south end of the flats near the "Deed" survey marker we documented an historic cabin designated as the Point Deed Foundation site (49-XMF-067).

Although our survey of potential site areas in the main part of Dundas Bay was relatively complete, we did not have time to examine the west arm or far northern branch. There are possible habitation locales (e.g. stream mouths with alluvial deltas) in those sections that should be checked in the future.

Icy Strait (Point Dundas to Point Carolus)

At Point Dundas we discovered a former settlement (Point Dundas Village, 49-XMF-066) that appears to coincide with an historic burial site identified by Hoonah elder George Dalton (Sealaska Corporation 1975:828-829, Site 11). We noted a fenced grave plot, a late pre-contact occupation area (radiocarbon dated to 240 +/- 50 BP), and a pair of late 19th century smokehouse ruins. Mapping and test excavations were undertaken from June 20 – 22, as reported below.

On June 13 – 15, 1995 we surveyed the lake and stream drainage just east of Point Dundas known locally as the "salt chuck." We briefly revisited the Salt Chuck Smokehouse site (49-XMF-009) that Ackerman investigated in 1963 but did not conduct any additional excavations or mapping (Ackerman 1964:17, 1968:89).

In 2008, Wayne Howell rediscovered a previously reported pictograph site (49-XMF-003) on a cliff face east of the Salt Chuck stream mouth (Stevens 1972:28). Ackerman learned of the existence of these images from a local source but could not find them, and our efforts in 1995 were also unsuccessful. Howell's brief investigation identified two groups of pictographs, located 10 - 12 m above the present high tide line between two prominent bands of white rock (Figure 17). The western group, rendered in brown pigment, shows a high-prowed canoe with six seated passengers and one standing in the stern (Figure 17A). Off its bow is a smaller canoe occupied by two figures, one standing and one seated. The second group of images, located several meters to the east, consists of red smudges and linear designs (Figure 17B).

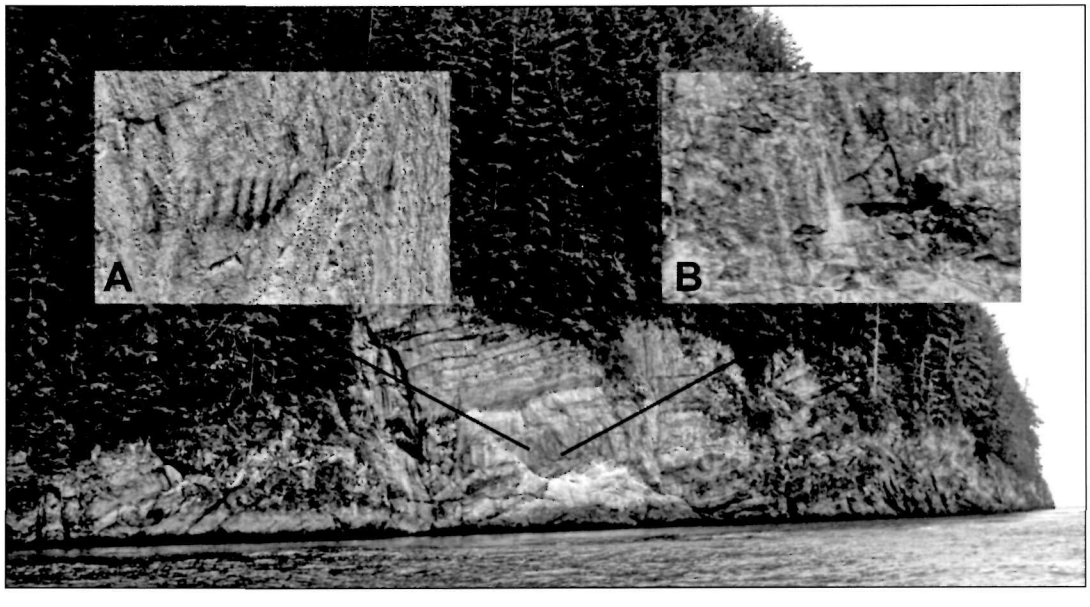


Figure 17: Salt Chuck pictographs (49-XMF-003) View to north. A. Western group; B. Eastern group

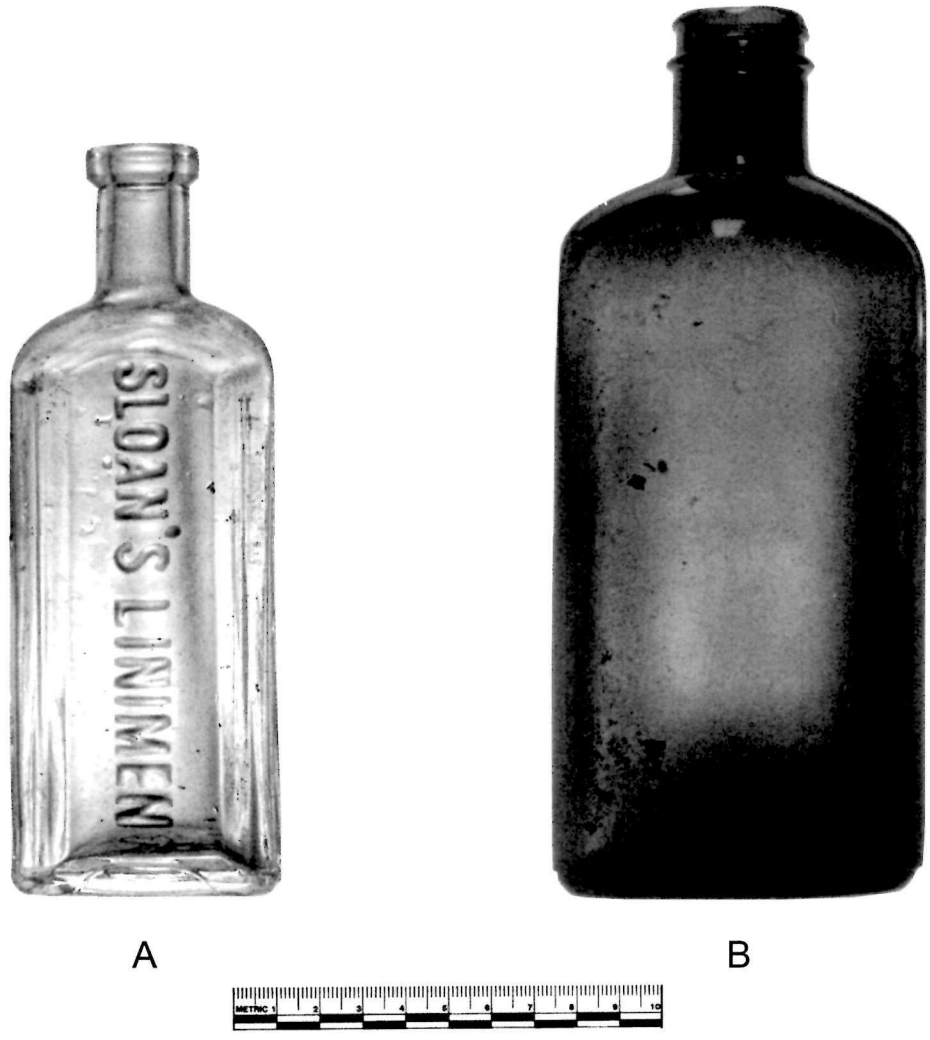


Figure 18: Glass bottles, Carolus River Village (49-XMF-007): (A) "Sloan's Liniment"; (B) Bromo-Seltzer

On June 27, 1995 we examined the foreshore and lower portion of the unnamed small drainage east of the salt chuck but found no cultural traces. Continuing east to the last inlet before Point Carolus (the entrance to Glacier Bay) we relocated the Carolus River Village (49-XMF-007) where Ackerman noted three historic log cabins and a smokehouse (Ackerman 1964:6-14; Ackerman 1968:89; Sealaska Corporation 1975:751). We excavated a shallow 50 cm x 50 cm test pit in one of the house ruins, immediately encountering floor boards and a few shell fragments. Two glass bottles collected from the site surface give an indication of the period of occupation. A machine-made bottle embossed with "SLOAN'S LINIMENT" (Figure 18A) can be dated from bottler's mark on the bottom, which is an "I" inside a diamond. This design indicates manufacture between A.D. 1916 and 1929 by the Illinois Glass Company (Toulouse 1971:264). The liniment itself is still being produced. A blue machine-made bottle that probably held Bromo-Seltzer (Figure 18B) has an "M" inside a circle on the base, indicating manufacture by the Maryland Glass Corporation after 1916 (Toulouse 1971:339).

On June 9, 1995 we climbed the 800 m mountain at Point Carolus and found another set of high altitude cairns, similar in appearance and apparent age to the cairns on White Cap Mountain and at Point Dundas. These rock features (49-XMF-064) are described below.

SITE INVESTIGATIONS

Xakwnoowú: Dundas Bay Fort Site (49-XMF-053)

In 1993, Wayne Howell identified a bedrock escarpment at the mouth of the Dundas River (Figure 19) as the probable location of a Tlingit fort known as Xakwnoowú [dry fort] and also as L'éiw Noowú [sandbar fort]

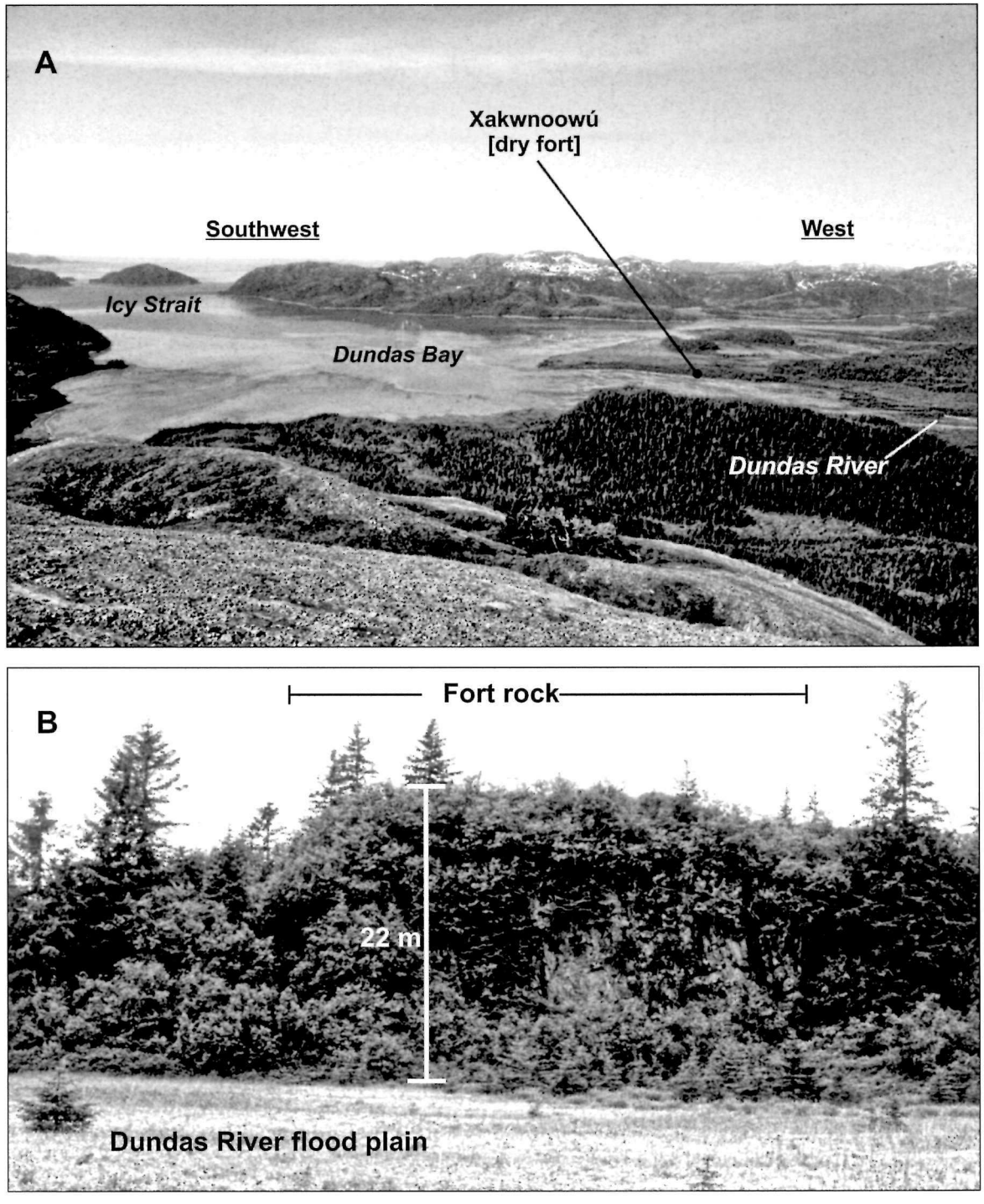


Figure 19: Xakwnoowú fort site (49-XMF-053): A. Location at mouth of Dundas River; B. View of fort rock to west

fort] (Emmons 1887; Goldschmidt and Haas 1998:550; Moss and Erlandson 1992:79; Swanton 1908:327). The presence of stratified cultural deposits on top of this rock, radiocarbon dated to between about A. D. 1150 and the mid-18th century, was confirmed by SAIP field investigations in 1995, and a late 19th century midden was discovered at its base. Both cultural components are included under Alaska site designation 49-XMF-053.

Tlingit forts were situated on islands and high cliffs and incorporated defensive and trenches (De Laguna 1960; Emmons 1991:74-78; Moss et al. 1989; Moss and Erlandson 1992). They were constructed to defend against canoe-borne raids by other Tlingit clans and external groups including the Sugpiaq, Eyak, Haida, and Tsimshian (De Laguna 1972:580-592; Emmons 1991:324-358; Holmberg 1985:22; Krause 1956:170; Litke 1987:87; Niblack 1890:340-42 Veniaminov 1984:432-43). Raids were conducted to acquire valuables and captives to use as slaves, or to exact

revenge for hostile acts, insults, or territorial incursions. Hundreds of forts were built across the Tlingit region and other areas of the eastern North Pacific between about A. D. 900 – 1400 (Moss and Erlandson 1992; Schaepe 2006), apparently signaling a generalized Late Period increase in armed hostilities (Maschner and Reedy-Maschner 1998). Some forts were used until indigenous warfare was fully suppressed under Russian rule in the mid-19th century.

Historical Background. Xakwnoowú holds special significance in the cultural landscape of Xunaa Káawu, both for its centrality in the history of the Kaagwaantan clan and because it is linked in oral tradition to the ancient origins of Tlingit warfare (Crowell and Howell 2013). Based on ethnographic fieldwork conducted in Hoonah and other northern Tlingit communities during A.D. 1882 - 1898, George T. Emmons recorded that:

> Hook na ou (Dry Fort) [Xakwnoowú], the exact location of which is uncertain, although it is believed to have been in Dundas Bay, is but a memory. It is accredited to the Kaghowntan [Kaagwaantaan] by right of foundation although the Nush kee tan [Wooshkeetaan] also had a house there. A seal hunting camp is believed to occupy its site today" [Emmons 1887].

Emmons also wrote about the Kaagwaantaan clan that "Their first recorded home place was in Dundas Bay Hook nu ou (Dry Fort) from which they removed to Kloem shar shick ee an [L'awshaa Shakee.aan] (town on sand under high mountain) which most have stood well within Glacier Bay on the eastern shore..." (Emmons 1887).

Ronald Olson summarized the migrations of the Kaagwaantaan based on ethnohistoric research done from A.D. 1933 to 1954: "Some of the people moved on and came to a place called Xáknuwu'h [Xakwnoowú]. There some remained and were called the Xánukedi'h [Xakwnukweidi]. Some went on to Tcucanedi'h [Chookanhéeni] ... Here they found other people living" (Olson 1967:30).

The most detailed account of the Kaagwaantaan connection to Xakwnoowú is provided in the "Story of the Kā'gwantān," related by clan leader Deikeenaak'w to John R. Swanton at Sitka in A.D. 1904 (Swanton 1909:326-346; Thornton 1997:298-302; Thornton 2008:61-67). Kaakeix'wtí, the protagonist of the story, was Xakwnukweidi, meaning a person from Xakwnoowú, and at this stage in history the Kaagwaantaan had not yet acquired their clan name. Kaakeix'wtí was seal hunting when Sleep appeared above the canoe at night in the form of a small bird, which he knocked dead with his canoe paddle. In the morning he discovered that his steersman and others in the canoe had died in their sleep, killed by the same blow, and when he returned alone to the village he found that his kinsmen had suffered the same fate. Kaakeix'wtí left Xakwnoowú and trekked north to Lituya Bay and Dry Bay; lived and married among Athabascans on the Alsek River; and returned south to Glacier Bay with his Athabascan relatives to visit Chookanhéeni (from which the company was sent away) and then L'awshaa Shakee.aan, where they finally settled. The arrival of Kaakeix'wtí and the Athabascans opened trade connections to interior Alaska for the people of L'eiwshaa Shakee Aan, bringing them great wealth. When the town's population was forced to flee by the advancing Glacier Bay ice Kaakeix'wtí (or his namesake) moved with some of the people to Kax'noowú. Here the clan name Kaagwaantan (meaning 'charred' or 'burnt') originated, from a fire that destroyed a lineage dwelling called Wolf House (Swanton 1909:345-346).

The beginning of this narrative provides the only known description of the lost village of Xakwnoowú, presumably once located near the fort rock. After killing the sleep-bird, Kaakeix'wtí went to the village, discovering that because all had died "there was no smoke visible, and nobody walked outside or came down to meet him as he expected. Then he jumped out into the water and went up to his house. The people of that town were numerous, and it was long" (Swanton 1909:327). This suggests that the village was substantial, with lineage houses built in a long line along the shore. Chronologically, the story indicates that Xakwnoowú village was contemporaneous with the old settlements in Glacier Bay and that the sleep-bird incident occurred within the same lifetime as the Glacier Bay exodus. The Xakwnoowú village site has not been relocated, and while there is a chance that it still exists undetected in the vicinity of the fort it has more likely been destroyed by shoreline erosion or the shifting course of the Dundas River.

The fort figures prominently in another account recorded by Deikeenaak'w which addresses the history of Tlingit warfare. "The First War in the World" describes a series of raids launched by the Kaagwaantan of Xunaa Káawu against forts in the southern Tlingit region, followed by southern counterattacks (Swanton 1909:72-79). One of these was against Xakwnoowú, identified by an alternative name, Xunaa Káawu Noowú:

> The next fort they attacked is called Huna-people's fort (Húna-qāwu-nuwu'), and it stood just where they were going to turn south again. Here they had the greatest fight of all, and the fort people killed many of them. Finally they broke up all the canoes of these people and started south. At this time they were overloaded with the slaves they had taken. . . [Swanton 1909:77].

The epic ends with victory for the Kaagwaantaan when fighters from Yakutat, Dry Bay and other villages join them at L'awshaa Shakee.aan in Glacier Bay and all go south together in a giant spruce canoe, "killing people, destroying property, and enslaving women" (Swanton 1909:79). The date of the attack at Xakwnoowú can not be determined from this account because of its inconsistent chronology, which refers to villages that existed both before the Glacier Bay surge (L'awshaa Shakee.aan) and after it (Hoonah and Kax'noowú) but not at the same time (Crowell and Howell 2012). Some incidents it describes, possibly including the raid on Xakwnoowú, may date to the early centuries of general Tlingit warfare around the turn of the first millennium A.D.

The earliest European observations of Dundas Bay and its inhabitants were recorded during the the George Vancouver expedition for Britain in 1794. Archibald Menzies, Vancouver's surgeon and botanist, reported a living Tlingit village in eastern Dundas Bay:

> Here we saw the appearance of a village with some natives, but in attempting to approach it our boats grounded before we got within a mile of it, so that we were obligd to relinquish our design, & also our pursuits on this shore, which appeared to be strewd with low woody islands, we therefore crossed over to the opposite side of the arm, & put into a small Cove to dine, which gave some of the Natives from the village an opportunity to join us in two Canoes with an acceptable supply of fish [Menzies 1993:160-161].

Vancouver arrived in Dundas Bay just before the peak of the Little Ice Age high stand, and due to subsequent glacial retreat and isostatic rebound some of the islands Menzies saw would today be onshore hills (Mann and Streveler 1997). One of these islands was Xakwnoowú fort, although it was not identified as such at the time and was probably no longer used. The village seen in the distance may have been L'istee, today upstream on the Dundas River (Ackerman 1968:8-10) but at that time situated on or near the shore of Dundas Bay due to the heightened sea level (Figure 20). A Tlingit description recorded in 1946 seems to refer back to this inhabited Little Ice Age shoreline:

> At Dundas Bay, *where the creek flows into the bay*, there was a village called L'istee. On an *island* at the mouth of the stream was a fort called Xunakawoo Noowú ['Hoonah people's fort']. There was also a camp for drying fish and picking berries on this island" [Goldschmidt and Haas 1998:55; emphasis added].

Little Ice Age sea level change may be reflected in alternative toponyms for the site. L'éiw Noowú [sandbar fort] probably signifies the period of inundation, when the fort rock was an island at high tide but connected to shore at low tide by a tombolo beach. Xakwnoowú [dry fort] would describe the fort's supratidal position both today and prior to LIA sea level rise. Xunaa Káawu Noowú [Hoonah people's fort] must be a more recent name, coined after the founding of Hoonah in the mid-eighteenth century.

By the late nineteenth century ongoing uplift meant that dry land was once again accessible around the base of the fort rock, and Hoonah people resettled there. The opening of Dundas Bay Cannery in A.D. 1900 may have encouraged a pattern of commercial fishing in

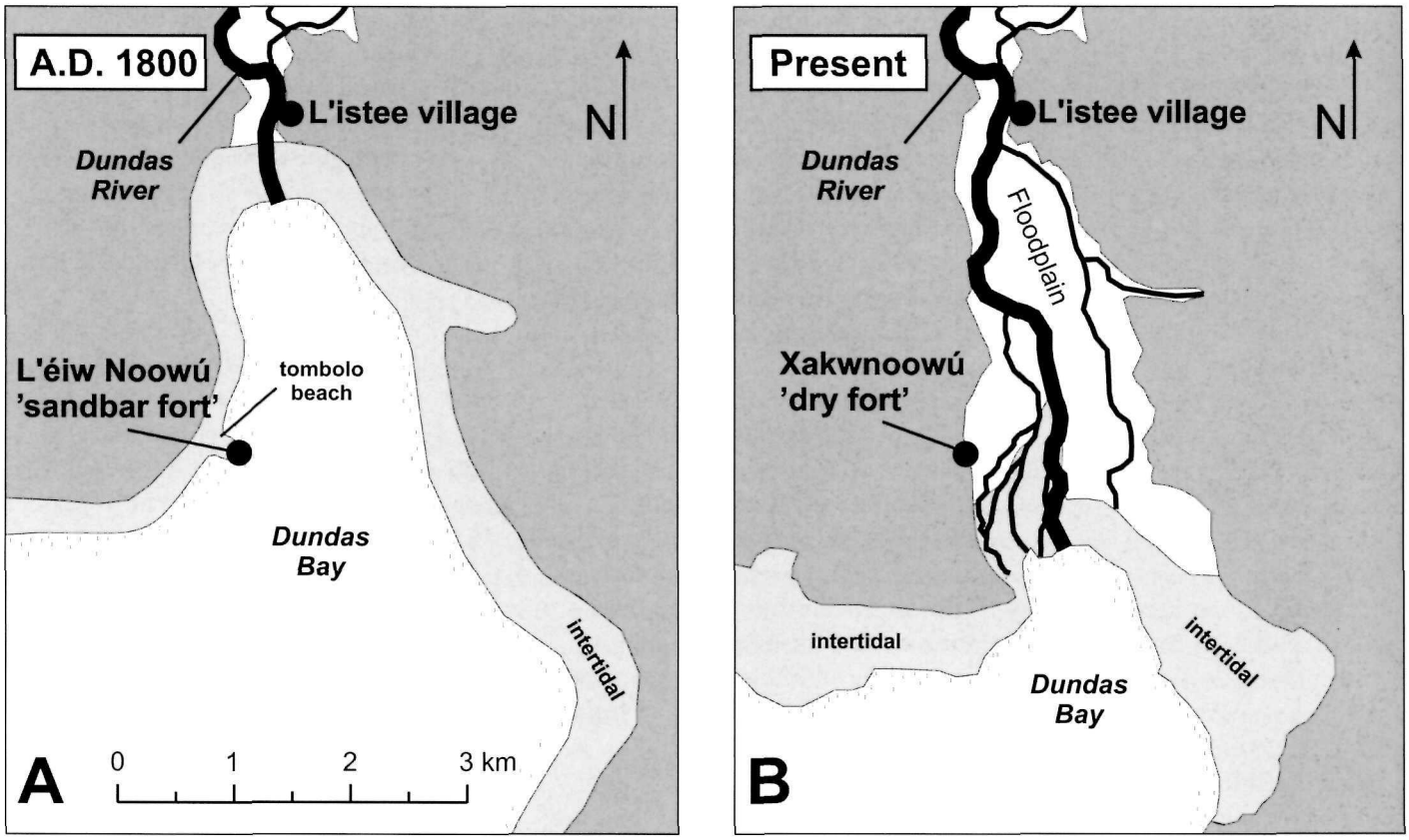


Figure 20: Alteration of northeastern Dundas Bay due to Little Ice Age isostatic depression and rebound, with locations of Xakwnoowú /L'éiw Noowú and L'istee village

summer combined with hunting and trapping from spring, fall, and winter camps along the Dundas River. Jimmy Martin and Nina White of Hoonah recalled that a small village was formerly located near the river's mouth (Ackerman 1964:17-23) and this could have been the "seal hunting camp" that existed at the time of Emmons' fieldwork (Emmons 1887). Archaeological evidence from the immediate area of the fort rock includes the late 19th century Tlingit midden we excavated at the eastern base of the fort rock with estimated dates of A.D. 1885 – 1900 (see below, Test Unit 2); Ackerman's A.D. 1900 – early 1920s "smokehouse" site (49-XMF-016) just south of the fort rock, probably a cabin used by non-Tlingit trapper John Olson; and the early twentieth century Tlingit cemetery (49-XMK-015) just to the north of the fort rock which includes grave markers dating from A.D. 1901 to 1928 (Ackerman 1964:23-27).

Although its location appears to have been nearly forgotten by the late nineteenth century, the oral heritage of old Xakwnoowú has been carried forward to the present. Deikeenaak'w, John Swanton's informant, was the mother's brother of Kaagwaantaan elder Herman Kitka of Sitka, who learned from his uncle that Xakwnoowú was the site of Eagle's Nest House, celebrated as the first two-story clan dwelling (Thornton 2008:65). The ancient settlement is evoked in formal oratory with the phrase "*Ch'a Tleix' Xakwnukeidi*" [We who are still one people of Xakwnoowú'], signaling that it has remained a geographic anchor of cultural identity for over eight centuries (Thornton 2008:65-66).

Setting and Landscape. The fort rock is a prominent dome (pluton) of coarse-grained diorite that rises from a fluvial-marine terrace on the west bank of the Dundas River, 1.4 km upstream from the point at the west side of the river mouth. It is about 22 m high and 150 m long (Figure 21). East of the site lie the broad sand and mud flats of the Dundas River delta, and a brackish tidal slough that approaches within 50 m. The Dundas supports seasonal runs of chum, sockeye, coho, and pink salmon which were available to residents here and at the upstream village of L'istee.

Consistent with the oral traditions and historical data discussed above, the dome would have been a tidal island during the height of the Little Ice Age period of isostatic flooding that began about 800 years ago and started to subside between A.D. 1750 - 1800 (Mann and Streveler 1997:11-12 and Fig. 12; Mann and Steveler 2008). At the height of the Little Ice Age transgression, when

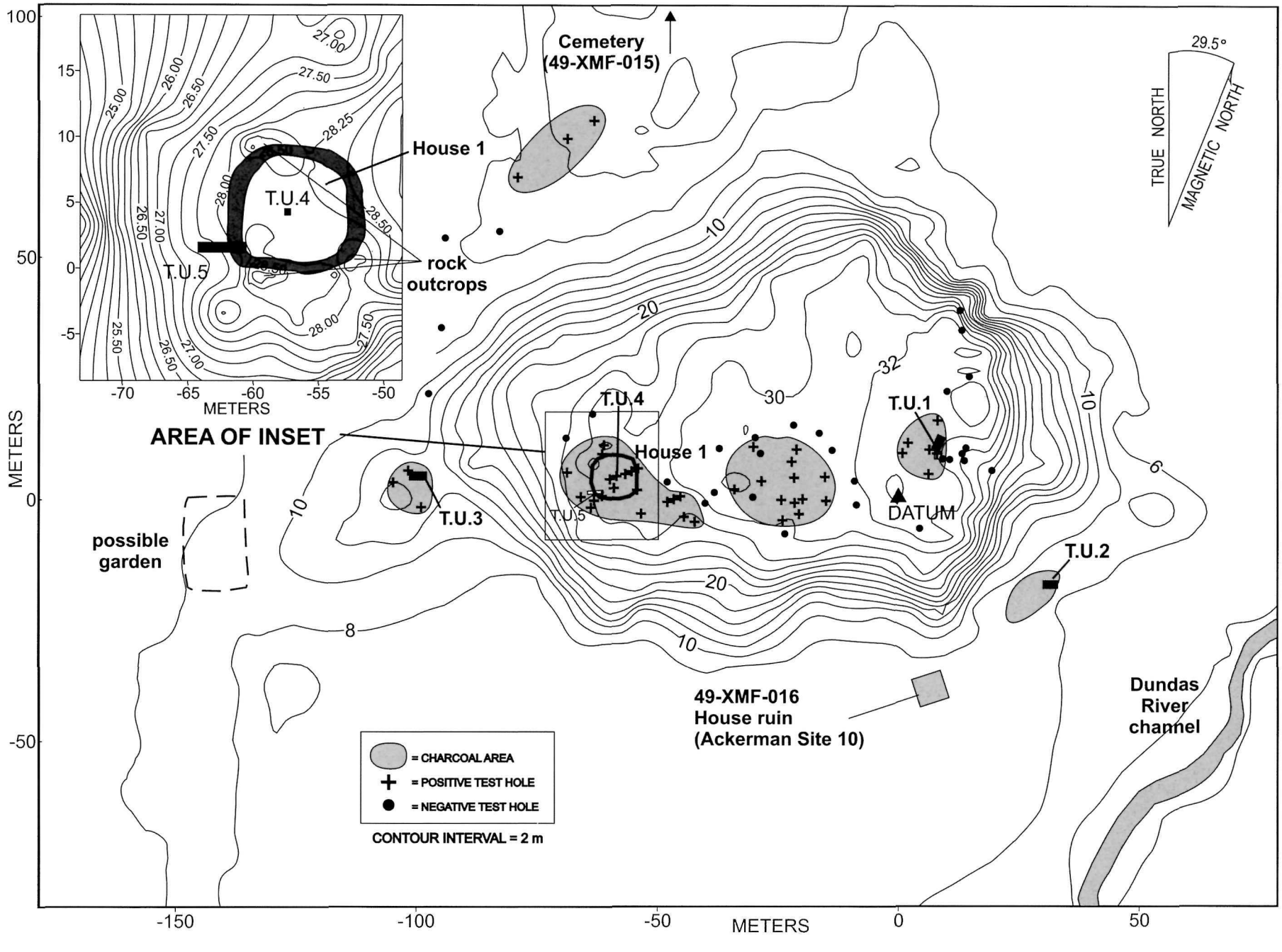


Figure 21: The Xakwnoowú site (49-XMF-053) showing locations of features, midden areas, 1995 excavation units, and auger tests

relative sea level was between 3 - 4 m above its present height, high tides rose to approximately the 10 m contour shown in Figure 21, flooding the base of the dome. At ebb tide the fort was linked to the north shore of Dundas Bay by a sandy tombolo beach. This beach, now elevated by isostatic rebound, is covered by young forest less than 200 years in age, and the several cultural sites that occupy this landform (the cemetery, midden areas, and house remains near the base of the fort rock) all date to the late 19th and early 20th centuries.

The river-facing side of the fort dome is a bare cliff with piled talus at its base, while the north and south sides are steep, rocky inclines forested with large spruce and hemlock trees. The west end provides a more graded approach to the summit via a small bench at 16 m elevation, and a game trail ascends by this route. The top of the escarpment shows outcrops of bare parent rock but is for the most part blanketed with soil and vegetation. The surface is fairly flat, probably due to rough planing of the bedrock by Pleistocene glacial and marine erosion but possibly augmented by human leveling during occupation of the fort.

Thick alder, salmonberry, and elderberry brush covers the upper dome but large trees are absent. In contrast, stands of mature spruce and hemlock swathe uplands of similar elevation along the Dundas River. While this suggests forest clearance on top of the escarpment no cut stumps were observed, indicating that the presumed removal of trees must have taken place in pre-contact times rather than during the commercial logging era of the late 19th - early 20th century. Tree removal may have helped to disguise the fort, allowing it to disappear against a background of higher, distant hills whereas an uncut grove of elevated trees might have been remarked by raiders approaching across Dundas Bay. For an observer on top of the fort rock the bay is visible through the crowns of trees on its southern flank, allowing defenders to keep watch for approaching boats.

Regrowth of the forest since the end of occupation in the 18th century may have been prevented by the density of the brush that invaded the man-made clearing, or by anthropogenic alteration of the soil chemistry. Trees have similarly failed to reestablish at Kax'noowú at other intensively occupied but long abandoned sites in the Glacier Bay area.

Cultural Features and Investigations. Research at the site included topographic mapping of the outcrop and surrounding terrain, placement of 74 shovel tests and 4" auger holes to identify the extent of cultural deposits, and controlled excavation of five test units to collect artifacts, faunal remains, and radiocarbon samples in stratigraphic context (Figure 22). Backdirt was dry-screened through 1/4" or 1/8" mesh, depending on consistency. The original intention to place auger holes on a regular 5 m grid was defeated by thick brush and bedrock.

Midden Areas on Top of Fort Rock

Auger testing of soils on top of the fort rock revealed several discrete areas of charcoal-stained midden (Figure 21). The stratigraphy of Test Unit 1 in the eastern midden area (Figure 23) consisted of dark brown humus (Stratum 1, S-1); mottled gray silt with light charcoal and fragments of fire-cracked rock (S-2); heavily charcoal-stained mineral soil with white bone smears and clusters of fire-cracked cobbles (S-3); mottled brown and gray silts with fragmentary charcoal (S-4); and reddish-brown mineral soil enriched by percolation of iron and aluminum oxides (the C-horizon, S-5). In non-cultural areas, soils consisted of modern humus, a gray silty-sand B-horizon without charcoal, and a reddish-brown C-horizon above parent bedrock.

Radiocarbon analyses from Test Unit 1 provide a chronometric framework (Table 2). An outlier date of 6420 ± 120 (Beta-92860; wood charcoal; $\delta^{13}C = 0$) may indicate early Holocene human use of the escarpment or could be the result of a natural forest burn. We do not interpret it as related to use of the rock as a fort.

The principal period of occupation at Test Unit 1 is bracketed below by a date from Stratum 3 of 520 ± 60 (Beta-92859, wood charcoal, $\delta^{13}C = 0$), or cal A.D. 1297 - 1466 ($p = 1.0$); and above by a date of 460 ± 70 (Beta-92858; wood charcoal; $\delta^{13}C = 0$) with possible intercepts of cal A.D. 1315 - 1356 ($p = .076$), cal A.D. 1388 - 1529 ($p = .728$), and cal A.D. 1540 - 1634 ($p = .196$). These readings indicate that cultural strata in the easternmost part of midden were laid down in approximately the fourteenth to early sixteenth centuries A.D. Thin charcoal midden in the area of Test Unit 3 at the west end of the site was found to be more recent, with a date of 120 ± 50 (Beta-

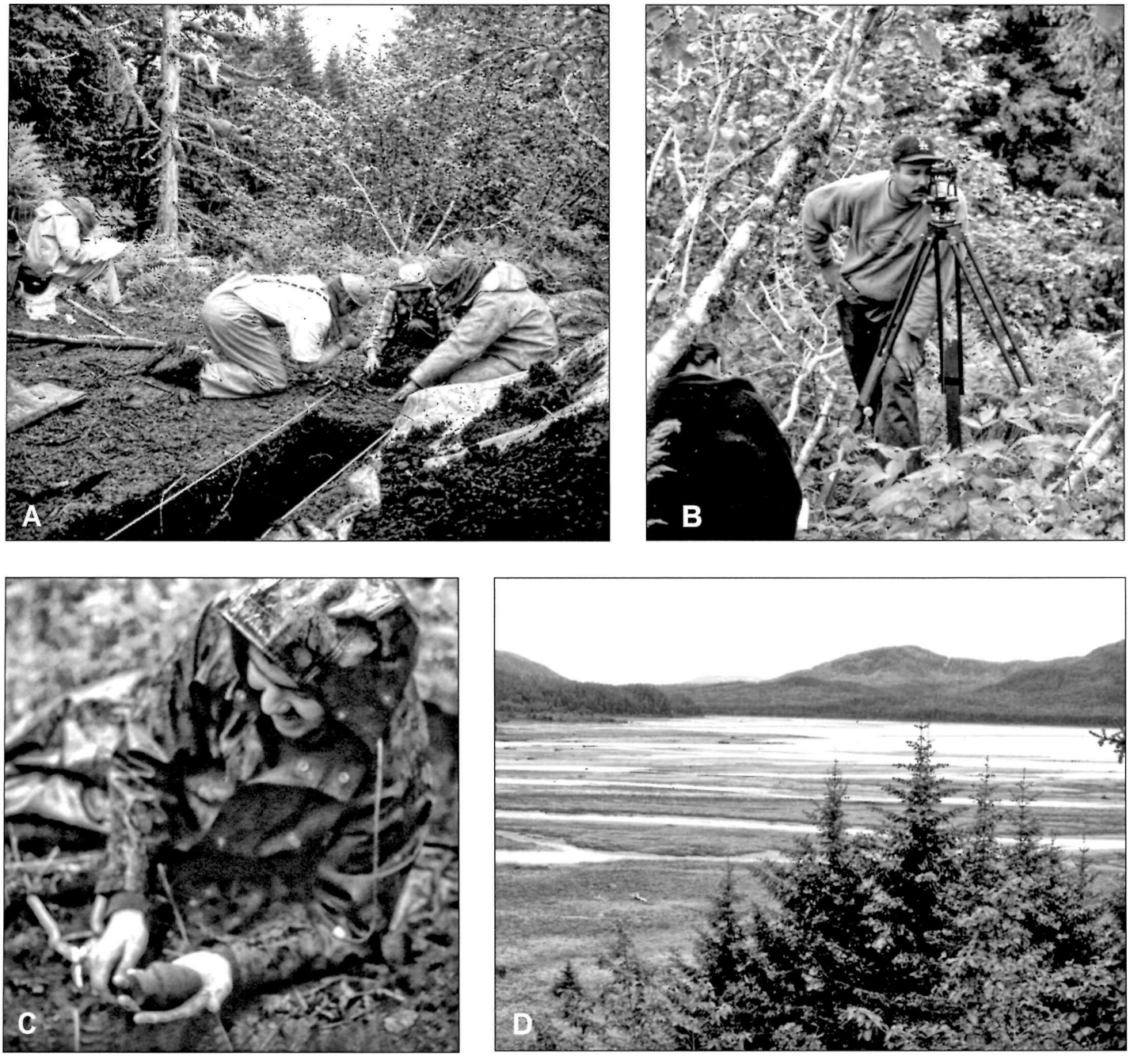


Figure 22: Archaeology at Xakwnoowú fort (49-XMF-053): A. Excavation of Test Unit 5; B. Michael Mills with mapping transit; C. William Abbott with maul found in Test Unit 5; D. View from the fort over Dundas River flats

92863, wood charcoal; $\delta^{13}C = 0$) with the most probable intercepts at cal A.D. 1670 - 1779 (p = .394) and cal A.D. 1799 - 1943 (p = .596). All dates were calibrated at 2σ with the program CALIB REV5.0.2 (Reimer et al. 2004).

House 1 on Top of Fort Rock

A residential feature (House 1) appears on the surface as an 8 m by 8 m level area surrounded by a 20 cm soil berm (Figure 21 inset). The north and south walls incorporate bedrock protrusions, indicating that size and placement of the structure were partly defined by the natural terrain. Test Unit 4 exposed 35 cm of interior cultural deposits including a 10 cm bed of charcoal with calcined bone fragments. Test Unit 5, a trench through the southwest corner of the dwelling, revealed several details of house construction (Figure 24). Beneath surface humus (S-1) was a layer of gray B-horizon silt containing charcoal and calcined bone (S-2). Stratum 3/3b was the perimeter berm, consisting of mottled reddish-brown to gray soils that were excavated from inside the house during its construction. Charcoal and bone in this deposit were probably from cultural activities on the pre-house surface. Stratum 3 extends to the west on top of an older, charcoal-rich activity surface with an

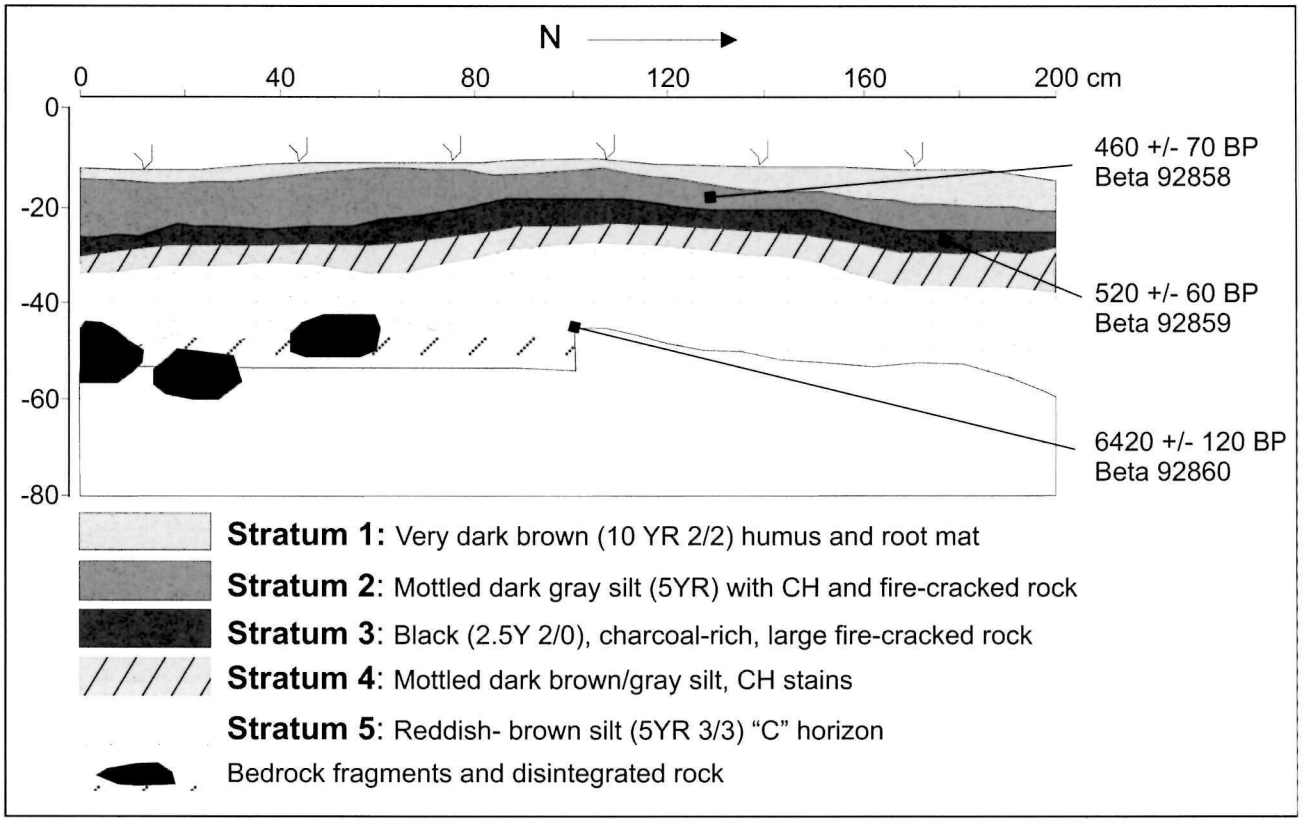


Figure 23: Stratigraphy of the west wall of Test Unit 1 (1.0 by 2.0 m) at the eastern end of the Xakwnoowú site (49-XMF-053)

abundance of calcined animal bone (S-4). The thin midden represented by S-4 extends generally around the house, as shown in Figure 21. The lowest layers in the trench are culturally sterile C-horizon mineral soils (S-6 and S-7) and deteriorated bedrock (S-8). Artifacts from Test Unit 5 (discussed below) included a stone maul or pestle from the top of the wall mound; a barbed slate endblade from outside the house in the S-4 midden; and a bone fragment (possible arrow point) with decorative incisions, also from the outside midden.

The dimensions and construction of House 1 are consistent with traditional northern Tlingit summer houses. These were dual-purpose structures used both as family residences and smokehouses for curing salmon and other fish (De Laguna 1972: 302-304; De Laguna et al. 1964:72; Dixon 1789:172-173; Emmons 1991:69-72; La Perouse 1994:134-135). They had one or several hearths inside with fish racks above; walls made of spruce planks laid against a wooden frame; pitched roofs covered with bark, shingles, or planks; and flat dirt floors. In contrast, winter houses were larger (up to 18 m long by the early post-contact period), constructed in deeply excavated pits, and finished inside with planked floors and raised benches (De Laguna 1972:294-302; De Laguna et al. 1964:43-71; Emmons 1991:59-68).

Three radiocarbon dates were obtained from Test Unit 5, House 1 (Table 2). Stratum 2, which is interpreted as the part of the upper house floor deposit, was dated to 240 ± 50 (Beta-92861; wood charcoal; $\delta^{13}C$ =0). This is a multi-intercept result that has cal A.D. 1610 - 1694 as its highest probability (p = .358), followed by cal A.D. 1727 - 1813 (p = .317) and cal A.D. 1489 - 1603 (p = .227). The Stratum 3b wall deposit, representing initial construction of the dwelling, was dated to 320 ± 60 (Beta-92862; wood charcoal; $\delta^{13}C$ =0) with calibrated intercepts of cal A.D. 1448 - 1665 (p = .990) and cal A.D. 1785 - 1793 (p = .010). Stratum 4, a midden layer just outside the house and partially overlain by wall deposits, dated to 790 ± 80 (Beta-92864; wood charcoal; $\delta^{13}C$ =0), with intercepts of cal A.D. 1038 - 1306 (p = .970) and cal A.D. 1363 - 1385 (p = .030). All dates were calibrated at 2σ with the program CALIB REV5.0.2 (Reimer et al. 2004). On the basis of these dates, we suggest that the house was built in about the sixteenth century A.D. and may have been used over a period of a century or more. The external midden existed before house construction, and was generated as early as the eleventh century.

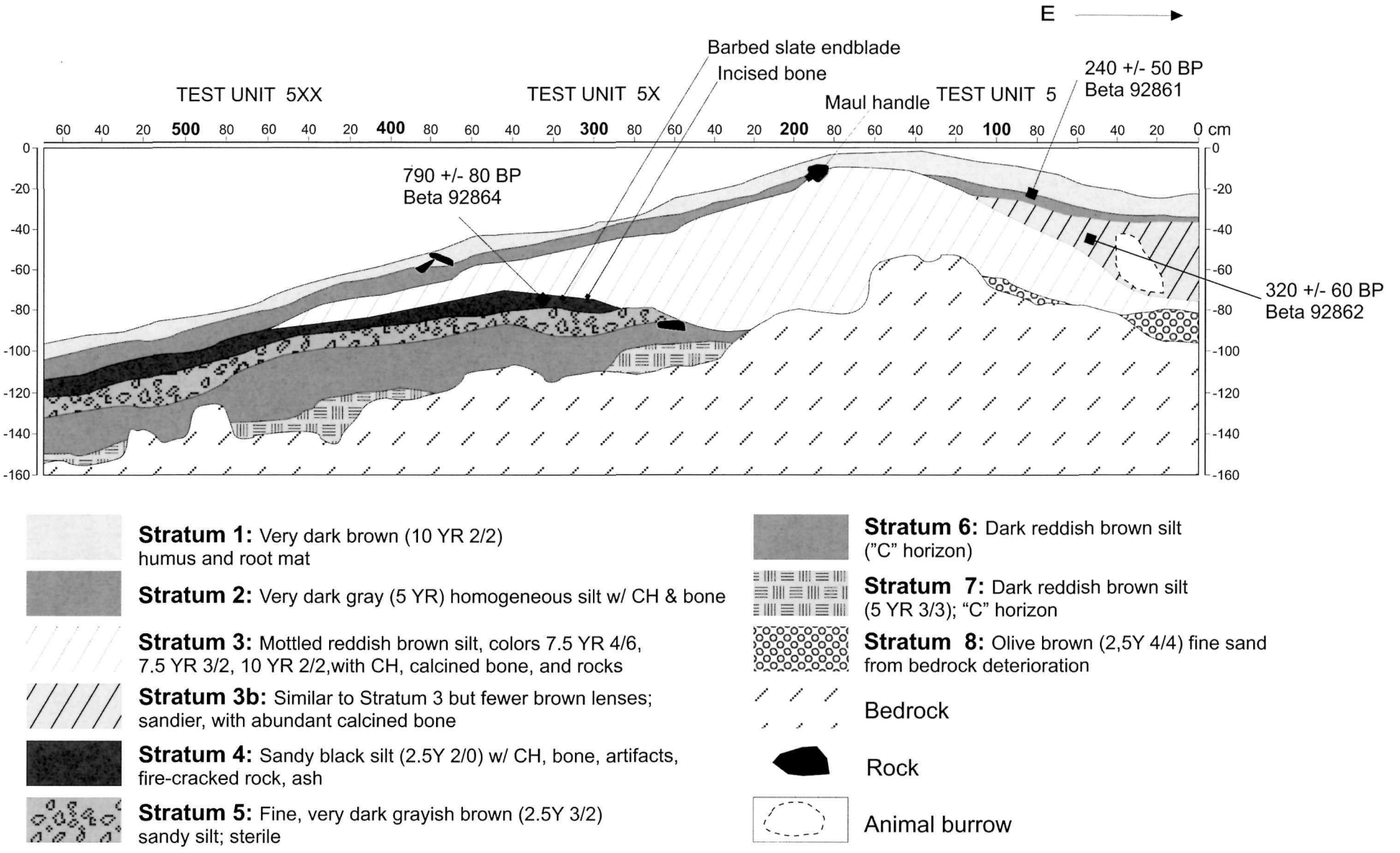


Figure 24: Stratigraphy of the north wall of Test Unit 5 (1.0 by 5.7 m) through the southwest corner of House 1 at the west end of the Xakwnoowú site (49-XMF-053)

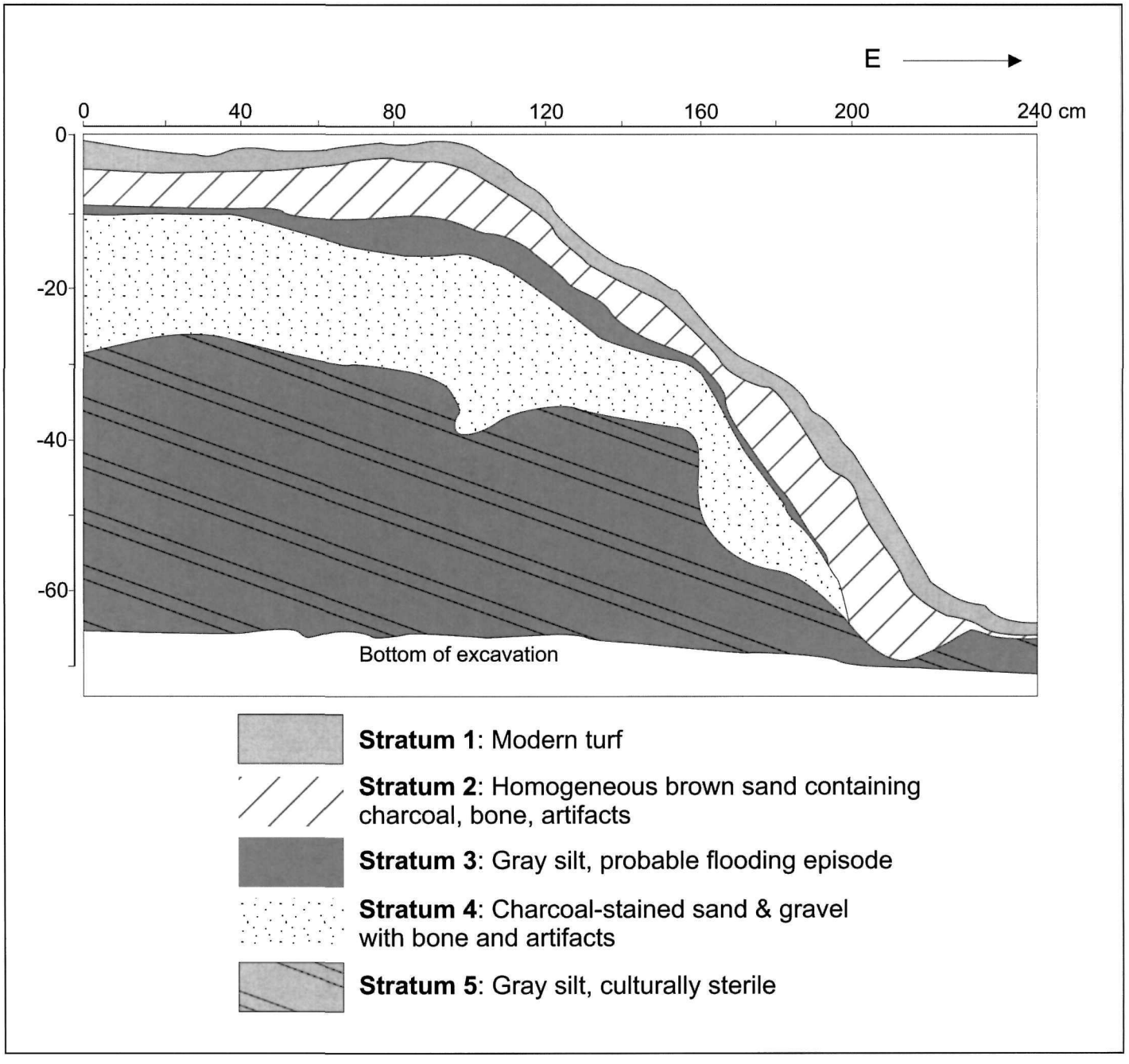


Figure 25: Stratigraphy of the north wall of Test Unit 2 (1.0 by 2.4 m) in historic midden at Xákwnoowú (49-XMF-053)

Activity and Midden Areas Around Base of Escarpment

Several distinct areas of cultural activity were discovered around the base of the fort rock (Figure 21). Just to the west of the rock is a rectangular patch (roughly 10 x 20 m) of low, uniform-height salmonberry bushes that may mark the location of a former garden, probably only a few decades old.

A possible cultural activity area just to the north of the escarpment and south of the cemetery consists of thin, charcoal-stained soil located below the modern humus. It was not investigated beyond auger testing. Given its location on the old tombolo beach the deposit should be less than 200 years old.

An historic period midden or occupation area was found during reconnaissance of the eastern base of the fort rock and investigated by excavating Test Unit 2. This midden is located on the edge of a salmonberry-covered sandy terrace just east of the cliff face and talus pile. Surface artifacts included glass bottles, an iron kettle, and fragments of rubberized canvas, suggesting a late 19th or early 20th century occupation.

Test Unit 2 was a 1 m x 2.4 m trench excavated east-west through the midden across the lip of the sand terrace, as shown in profile (Figure 25). Beneath the modern turf (S-1) is a layer of loose, homogeneous, fine brown sand (S-2) containing charcoal chunks, calcined animal bone, and late 19th/ early 20th century

artifacts including cut iron nails, window glass, glass bottles, and lead shot. Below a thin silt layer (possibly a flood episode, S-3) is a second cultural level (S-4) consisting of heavily charcoal-stained sand with water-rounded pea gravel and occasional beach pebbles up to 5 cm long. This level yielded calcined bone and numerous cultural items including rifle cartridges, nails, and can fragments. As discussed below, artifacts from both Stratum 2 and Stratum 4 belong to the period of approximately A.D. 1885 – 1900. Below the cultural horizons is mottled, sandy silt with lenses of gray clay.

Artifacts from House 1, Fort Component. Test Units 1, 3, and 4 on top of the fort rock yielded only a few lithic flakes and no diagnostic artifacts. Test Unit 5 transecting the wall of House 1 produced a small collection of Tlingit objects that are temporally consistent with radiocarbon dates in the range of 300 - 900 years ago (see discussion above) or older. No items of European manufacture were recovered.

Stone Tools

Barbed slate arrow point (GLBA 00510:5545; Figure 26A). L = 4.3 (tip broken); W = 1.7; T = .4. Endblades of stone, bone, copper, or iron were fitted to arrows used for both warfare and hunting (Emmons 1991:127-128, 337; De Laguna et al. 1964:138-141). In cross section, this ground slate point is a flattened diamond with medial ridges on both faces and small, well-defined barbs. Although slate projectile points have been found in northern Northwest Coast archaeological sites dating from about 5000 years ago through the period of early European contact, barbed forms are rare (Davis 1990; Moss 1998). None occur in the relatively large collections from Kax'noowú, Groundhog Bay 2, or Hidden Falls. One was found at the Diyaguna'et site in the Lost River drainage near Yakutat (De Laguna et al. 1964:25-26, 129-130) and Emmons illustrates a nineteenth century example from Dry Bay (Emmons 1991:129).

Pointed flake tool (GLBA 00510:5521; Figure 26D). L = 9.2; W = 5.4; T = 2.1. This is a thick percussion flake of weathered metamorphic rock, shaped around the margins to make a pointed tool, perhaps for reaming.

Hand maul or pestle (GLBA 00510:5516; Figure 26C). L = 9.9; Dm = 6.9. This is the proximal end of a basalt cylindrical pestle for crushing berries, fish eggs, or native tobacco, or of a hand maul used to drive wedges and chisels. Mauls and pestles are common tools in Late Period sites of the Tlingit region including Hidden Falls (Davis 1989: 304-306) where cylindrical, stirrup, and T-shaped mauls were found in Component 3 (Area A, Zone D) and radiocarbon dated to between 1370 ± 70 and 1545 ± 65 (Davis 1989:337). Cylindrical and T-shaped mauls were also found at the Daax Haat Kanadaa fort near Angoon (De Laguna 1960:101, Pl. 5), dated to between 520 ± 70 and 1230 ± 90 (Moss et al. 1989).

Bone

Incised bone fragment – possible projectile point (GLBA 00510:5543; Figure 26B). L (frag) = 2.0; W (of stem) 1.1; T = .1. This thin proximal fragment of a projectile point (or a model of one) is made of bone and incised with decorative lines and chevrons. No comparable examples are known.

In addition to the tools above, Test Unit 5 produced two waste flakes of fine-grained metamorphic rock.

Artifacts from late 19th Century Midden at Base of Fort Rock (Test Unit 2). Artifacts from Test Unit 2 allow occupation dates for the historic midden area at the eastern base of the fort rock to be estimated, and provide evidence of cultural patterns and activities at this location.

Architectural Fasteners

Iron nails (GLBA 00510:5450, 5449, 5448, 5419, 5411, 5422; Figure 27B-G). Of the 23 examples found in Test Unit 2, all but one are cut nails with square to rectangular cross-sections. The only wire nail is a small brad with a round head. The cut nails have the regular shapes and longitudinally-oriented grain that indicate machine manufacture. An assemblage with this proportion of machine cut nails (96%) can be estimated to date no later than the mid-1880s, after which mass-produced wire nails quickly took over the American market (Adams 2002). Since

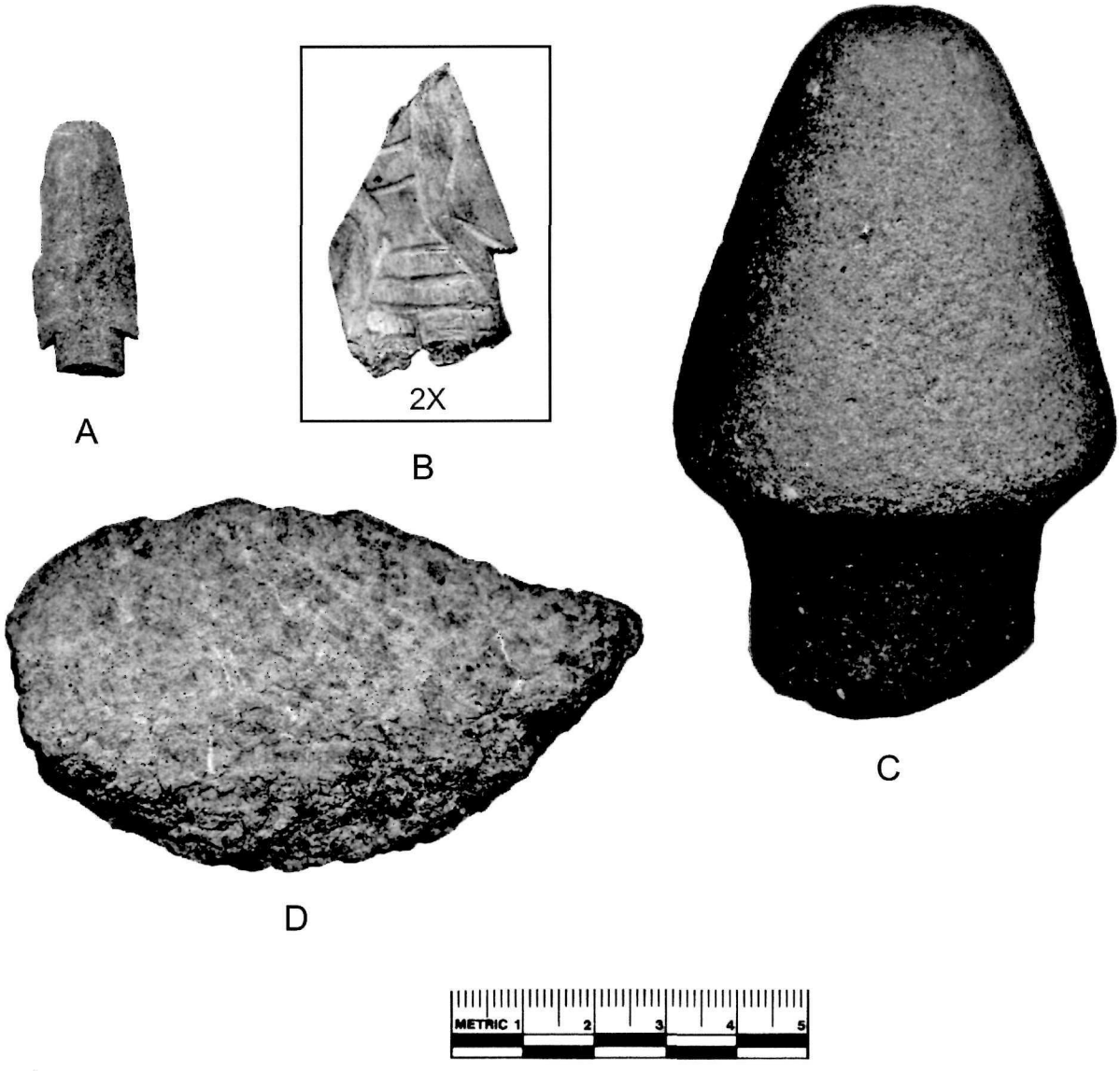


Figure 26: Artifacts from Test Unit 5 at the Xakwnoowú site (49-XMF-053): (A) ground slate arrow point; (B) bone arrow point (?) with decorative incisions; (C) proximal end of basalt hand maul or pestle; (D) flake tool

most nails were used for building construction, they are usually the oldest artifacts found in historical sites; most other types of objects (e.g. glass containers, ceramics, tools, weapons) can be expected to date to subsequent years when people were living in the built structures.

Fishing and Hunting

Fish hooks (GLBA 00510:5427, 5438; Figure 27N,O). Hook 5427: L = 9.7; W across opening = 3.1. Hook 5438: L =10.4; W across opening = 3.5. Two large hooks with slightly different dimensions and shapes; apparently hand-made from wrought iron. The size would appear to be suitable for large species such as halibut and king salmon. Both hooks have flattened proximal ends without line holes, suggesting that the line would have been tied around the shank, and the spatulate end of the shank would then have prevented the line from slipping off.

Bullet mold (GLBA 00510:5405; Figure 27A). L = 21; W = 10 (across ends of handles, in current position). This is an iron hand tool for molding bullets to reload rifle cartridges. The pliers-like mold is made of two parts, joined by a bolt. It formerly had wooden handles (not preserved) with brass ferrules. The mold cavity would yield a pointed bullet of approximately .44 or .45 caliber.

Rifle cartridge, .40-82 caliber (GLBA 00510:5436; Figure 27M). L = 5.9; Dm at base = 1.5. This is a Winchester center-fire cartridge. The head stamp is "W.R.A. Co. 40 - 82 W.C.F." This round was first produced in 1885, for the Winchester Repeating Arms company's single-shot

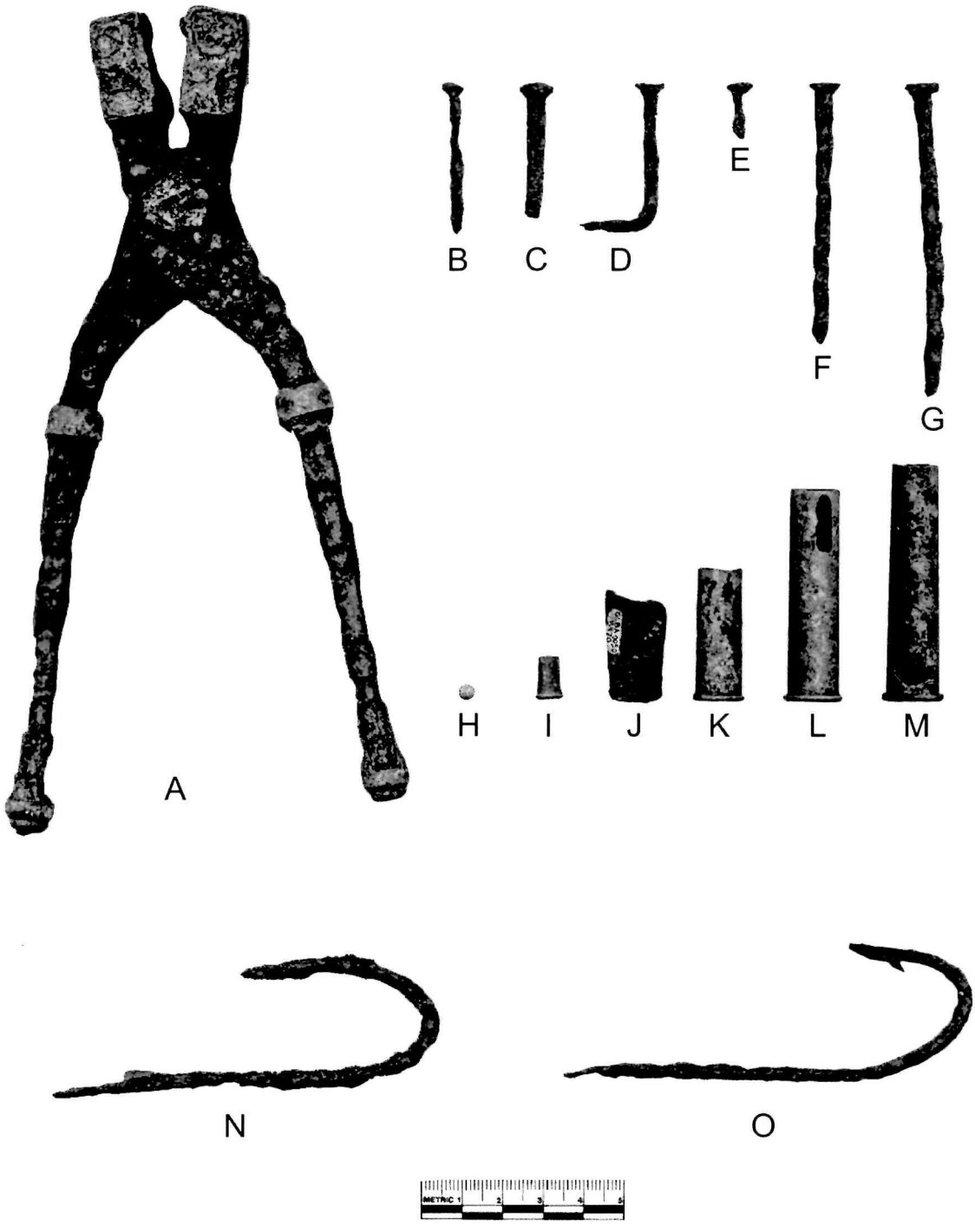


Figure 27: Nails and subsistence artifacts from Test Unit 2 in 19th century midden at the Xakwnoowú site (49-XMF-053): (A) bullet mold; (B - G) iron nails; (H) lead bird shot; (I - M) rifle cartridge casings; (N - O) fish hooks

.40-82 caliber rifle, and discontinued in 1935 (Barnes 2006:141). The cartridge has been modified by removing the primer cap to create an opening through the base, and by punching a wedge-shaped hole through the side. These modifications suggest possible re-use of the cartridge as a whistle or ornament.

Rifle cartridge (GLBA 00510:5443; Figure 27L). L = 5.3; Dm at base = 1.5. This is an expended center-fire cartridge. There is no head stamp and the manufacturer has not been determined. Possibly .40-82 caliber.

Rifle cartridge, .44 caliber (GLBA 00510:5447; Figure 27K). L = 3.3; Dm at base = 1.3. This is an expended Winchester center-fire cartridge. The head stamp reads "W.R.A. Co. .44 W.C.F." Winchester first produced this round in 1873 for a new version of the 1860 Henry Repeating Rifle, which originally used a shorter, rim-fire cartridge. The head stamp seen on this cartridge was added in 1886

(Barnes 2006:485; http://www.leverguns.com/articles/44wcf.htm).

Rifle cartridge (GLBA 00510:5470; Figure 27J). L = 2.8; Dm at base = 1.4. A crushed and corroded center-fire cartridge, head stamp not present or obliterated. This is probably a .44 caliber shell.

Rifle or pistol cartridge, .22 caliber (GLBA 00510:5477; Figure 27I). L =1.1; Dm at base = .7. An expended center-fire cartridge, with an off-center firing pin mark. No head stamp.

Lead shot (GLBA 00510:5403: Figure 27H). Dm = 3.9mm. A piece of lead bird shot from a shotgun shell or for use in a muzzle-loaded weapon.

Glass Containers

Perfumed spirits bottle (GLBA-00510:5492; Figure 28C). L = 23; Dm of body = 5.6. A cylindrical, cork-stopped bottle embossed with "MACK'S FLORIDA WATER." The glass is clear with a slight greenish tinge and some areas of patina. Seams extend up both sides of the bottle from the top edge of the base to the bottom of the finish (upper section), indicating that the bottle was hand-blown using a two-part mold, with a separately attached base. The finish was also added separately and shaped with a hand tool. The neck bends slightly to one side. Hand-blown molded bottles were produced from about 1850 until the mid-1920s (Jones and Sullivan 1989:28-29). "Florida water" was a perfumed spirit similar to eau-de-cologne and popular across the United States during the last three decades of the 19th century; it was consumed as a medicine, skin refresher, and beverage (Sullivan 1994). Small cylindrical bottles like this one were commonly used for packaging castor oil as well as Florida water. J. J. Mack and Co. of San Francisco was one of more than forty producers of Florida water for the North American market (Hunt 1995; Sullivan 1994:93). This particular bottle was advertised by Mack and Co. from 1896 to 1897 (Fike 1987:244).

Whiskey flask (GLBA-00510-5402; Figure 27B). L = 18.3; W =6.9; T= 3.6. A clear, cork-stopped glass flask with a round-cornered, rectangular body and a flanged finish. Mold seams extend up both sides from the base just to the bottom of the flange, indicating that the bottle was hand-blown using a two-part mold. The base was added separately and the flange was hand-shaped and then fire-glazed to make it smooth. This technique indicates that the bottle was manufactured no earlier than 1850 and no later than the mid-1920s, when machine-molded bottles became dominant (Jones and Sullivan 1989:28-29). The flask would have had a paper label. An embossed bottom mark (small and difficult to read) may be "R & C°" inside a diamond-shaped outline. This is likely Roth and Co. which marketed whiskey and liquors in the San Francisco area in the 1880s (Toulouse 1971:438-439).

Wine bottle, base (GLBA 00510:5490; Figure 27A). L (broken) = 15.0; Dm at base = 7.7. A heavy cylindrical bottle of dark green glass, with an indented base. There are no embossed marks. The glass contains large bubbles. The cylindrical body and base are symmetrical on the outside but very uneven in thickness and there are no seams; the bottle also is narrowest at the base and expands upward. These characteristics indicate manufacture by the dip molding technique, in which glass is mouth-blown inside a one-piece form (Jones and Sullivan 1989:24-26). This technique was used for making wine bottles from at least the 1600s through the late 19th century. A very similar example was found at Point Dundas Village (see Figure 32A).

Bottle body fragment (GLBA 00510:5424; Figure 28D). L = 7.0 (fragment). A piece from the body of a cylindrical, molded bottle with a partial embossed mark, "SANF..". Although a precise identification could not be made, this may be a mark of Sanford and Company of New York, which with Potter Drug and Chemical Co. bottled several liver remedies in starting in 1878 (Fike 1987:127).

Bottle base fragment (GLBA 00510:5413). L = 5.4 (fragment). Basal fragment from a clear cylindrical bottle. There are no seams on this piece and the manufacturing technique can not be determined.

Glass Tableware

Tumbler, fragment (GLBA 00510:5426; Figure 28I). L = 8.6 (fragment). A fragment from the side of a clear glass tumbler with a tapered body and cut panels. Probably 19th century but the type is generic and no precise date can be determined.

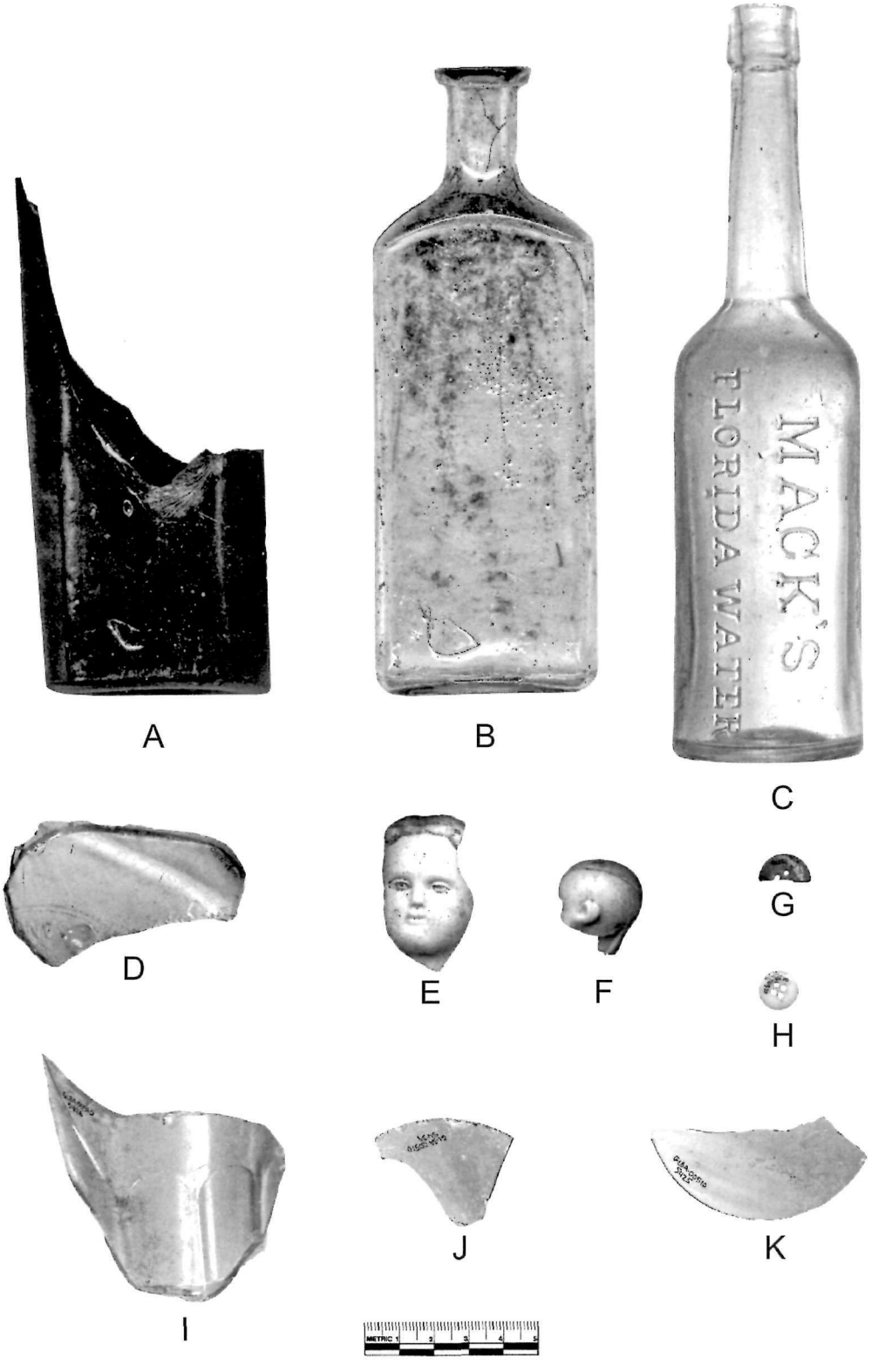


Figure 28: Glass and ceramic artifacts from Test Unit 2 in 19th century midden at the Xakwnoowú site (49-XMF-053): (A) wine bottle base; (B) whiskey flask; (C) perfumed spirits bottle; (D) bottle fragment; (E - F) porcelain doll heads; (G - H) ceramic buttons; (I) glass tumbler fragment; (J-K) pieces of circular lens

Drinking glass, rim fragment (GLBA 00510:5407). The rim is from a glass about 7cm in diameter. It has a smooth, fire-polished edge.

Flat Glass

Circular lens, fragments (GLBA 00510:5439, 5425; Figure 28J,K). Fragments of a clear, flat circle of glass that was about 7 cm in diameter; the glass is 1.8 mm thick. Possibly the lens for a hand lantern, flashlight, compass, or other instrument. The glass is of even thickness and has no bubbles or discoloration.

Flat glass, fragments (GLBA 00510:5417, 5428, 5429, 5482, 5432). All

pieces are 1.8 mm thick, even in thickness without bubbles or discoloration; probably window glass. Two of the pieces (5428 and 5432) join and are partially coated with red paint.

Cookware and Utensils

Iron kettle (Not cataloged). A complete but collapsed and fragile iron kettle was found partially exposed on the surface about 8 m northeast of Test Unit 2; it was not collected. The kettle was originally about 50 cm in diameter and 40 cm deep and had a lug on each side for suspension. The kettle was found filled with river sand, in which we discovered only rust fragments and one piece of charcoal. There were no manufacturer's marks.

Iron pot fragments (GLBA 00510:5468, 5475, 5487).The partial rim of a large iron cooking vessel, broken into rusty fragments.

Handle for tub or basin (GLBA 00510:5418; Figure 29D). L = 11.1; W = 8.3; T = .7. A bent handle made of heavy iron wire, flattened at the ends for soldering to a large metal vessel.

Serving spoon (GLBA 00510:5451; Figure 29I). L = 30; W (at bowl) = 6. A large spoon made of stamped steel. Although heavily corroded overall, portions of the spoon's original pearl gray enamel coating remain along the end of the handle.

Table spoon (GLBA 00510:5423). L = 14.7; W (at bowl) = 3.1. An eating spoon made from stamped steel. Heavily rusted, but with traces of gray enamel coating on the bowl.

Table knife (GLBA 00510:5437). L = 22.8; W of blade = 2.1. A table knife with wide blade. The handle and blade are one piece of iron or steel; probably stamped. The entire surface is corroded.

Enamel chip (GLBA 00510:5464). A small chip of blue enamel, probably from metal cookware.

Other Metal Containers and Components

Lead sheet (GLBA 00510:5456; Figure 29E). Thin, crumpled lead sheet (.5mm thick), corroded white. There is a section of folded edge that suggests the rim of a can or container.

Screw top for container (GLBA 00510:5461; Figure 29G). Dm of flared top = 5.2; designed to screw inside a container neck with a diameter of about 3.5cm. Made of iron or steel. The hole in the top is from corrosion.

Iron can fragments (GLBA 00510:5467, 5474, 5483, 5484). Small fragments of iron thin enough (1 – 2mm) to be from "tin" cans.

Finial or swivel (GLBA 00510:5488; Figure 29C). Dm = 2.2; T = .3. An iron ring set in a threaded brass end piece; possibly the finial for metal container, handle for pot lid, or swivel for a gun strap.

Wick holder for kerosene lamp (GLBA 00510:5491; Figure 29F). In present distorted shape, L = 5.9; W = 3.8; T (height) = 2.6. Made of very thin (.3 mm) brass; embossed with decorative tree/scroll design.

Circular slug (GLBA 00510:5463). Dm = 2.0; T = .2. Two pieces of a stamped, coin-like circle with a raised rim function unknown.

Iron bar stock (GLBA 00510:5420; Figure 29A) L = 36.5; W = 3.7; T = 3. A heavy, unmodified bar.

Square iron washer (GLBA 00510:5430; Figure 29H). L = 2.8; W = 2.5; T = .4. A nearly square piece of iron with a .5 cm perforation through the center; perhaps a heavy duty washer.

Unidentified iron fragments (GLBA 00510:5431, 5412, 5445, 5446, 5454, 5460, 5465, 5473, 5540).

Clothing and Ornaments

Political button with flags (GLBA 00510:5408). Fragments of very thin, fragile, glass-like material embedded with colored designs and coated with rust; apparently the enamel surface of a metal political button. On surviving fragments are parts of a red, white, and blue American flag, and a triangular red flag with a five-pointed white star in the center.

Four-hole button, white, possibly ceramic (GLBA 00510:5476; Figure 28H). D = 1.1; T = .3. The center of this lenticular, dish-shaped button for clothing is slightly pitted, suggesting it may have been made by the Prosser technique (Sprague 2002). Prosser buttons are ceramic, rather than glass, and were made from 1840 until the middle of the 20th century (Sprague 2002:113-118).

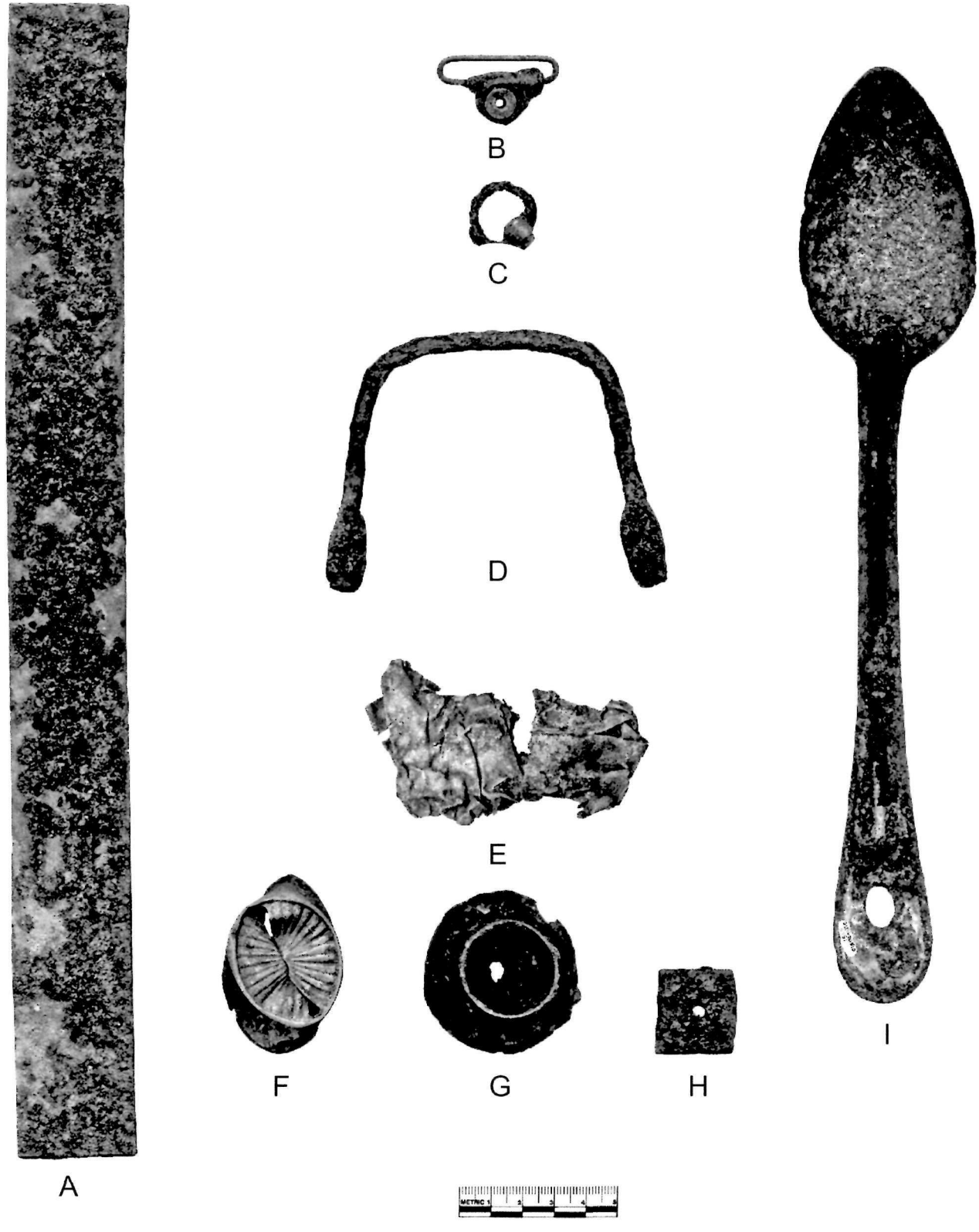


Figure 29: Miscellaneous metal artifacts from Test Unit 2 in 19th century midden at the Xakwnoowú site (49-XMF-053): (A) iron bar stock; (B) buckle; (C) final or swivel; (D) handle for tub or basin; (E) lead sheet; (F) kerosene lamp wick holder; (G) screw top; (H) square iron washer; (I) serving spoon

Four-hole button, blue, possibly ceramic (GLBA 00510:5462; Figure 28G). Est. D = 1.5; T = .4. The back of this one-half button shows pitting and the broken edge has the granular surface that suggest a Prosser-type ceramic button, a manufacturing technique that was invented in 1840 (Sprague 2002). However, the broken edge shows that the blue color runs all the way through the material, whereas Prosser buttons were typically the color of the clay they were made from, with a fired glaze on the outside to give them color. The button may therefore be glass.

Clasp or buckle (GLBA 00510:5406; Figure 29B). L of metal loop = 3.9. A wide

brass wire loop riveted to a fragment of leather; designed for a strap of some kind to pass through.

Leather fragments (GLBA 00510:5409 and 5420). Unidentified scraps of leather, possibly from a shoe.

Rubber fragments (GLBA 00510:5466). Small, flat fragments of hard, rubber like substance imprinted with the texture of coarse cloth; probably coating from rubberized canvas.

Dolls

Doll head (GLBA 00510:5458; Figure 28E). L (fragment) = 4.5. The partial face of a porcelain doll head. Although the specific source has not been determined, many such dolls were produced for export by German makers, especially in the late 19th century (Cieslik and Cieslik 1985). Ackerman found a porcelain doll head and pieces of legs and feet and the Homeshore Lineage House south of Excursion Inlet (Ackerman 1965:35, Fig. 17-16).

Doll head (GLBA 00510:5434/5435/5452; Figure 28F). L (fragment) = 2.8; T = .3. A second, smaller but more complete porcelain head, reconstructed from three pieces, is also probably German.

Overall, we suggest that the midden at the eastern foot of the fort rock can be no older than A.D. 1885 - 1886, since rifle cartridges found in the lower cultural level (Test Unit 2, Stratum 3) were first manufactured in those years. The machine-cut iron nails and window glass are consistent with construction of a house at this site in the mid-1880s. However, the lag time required for these objects to reach Hoonah Tlingit territory from their places of manufacture in the United States could have been several years. Several of the glass bottles date to the 1880s, but the Mack's Florida Water bottle from Stratum 2 was not made until 1896-97. People must have lived at this location at least until this date and possibly into the early years of the 20th century.

The artifact inventory suggests that the 49-XMF-053 historic midden is at least a decade older than the nearby house ruin (49-XMF-016) excavated by Ackerman (1964:17-23). That structure was built entirely with wire nails and artifacts included a .30 caliber Luger pistol cartridge (first made in 1898) as well as a 1921 Indian head nickel.

Faunal Analysis. Susan Bender (National Park Service, Anchorage) identified the faunal remains recovered at 49-XMF-053 (n = 1718) with reference to comparative collections at the University of Victoria and University of Illinois. Her results are summarized in Table 4, separated into the historic midden sample from Test Unit 2 (left side of table) and the pre-contact sample from the top of the fort rock (Test Units 3, 4, and 5, right side of table). Bone preservation was poor at both locations due to the acidity of the forest soils and the near absence of marine shell to buffer the low Ph. All of the recovered bone consisted of small burned (calcined) fragments and as a result only 98 specimens (6%) could be identified to the level of family, genus, or species.

The precontact fort fauna (n = 1262) was comprised of 38.5% sea mammal and 55.9% land mammal fragments, with few bones identifiable to specific taxa. Identifications included harbor seal (n = 23), river otter (n = 1), wolf or dog (n = 3), and fox (n = 7). Sea gulls (n=2) and perching birds were present (n = 3). Identified fish bones (n = 32) were entirely salmonid and there was only a trace of marine shell. A mixed land and sea subsistence focus is suggested, including spring and summer seasons. We note that oral tradition (Swanton 1909:326) refers to seal hunting by the residents of Xakwnoowú village.

The historic midden at the base of the fort rock yielded faunal remains of a distinctly different composition (Test Unit 2, n = 456), reflecting minimal consumption of sea mammals (1.3%) and a strong dominance of land species (93.2%). Taxa included moose (n = 1), possible deer (n = 1), marmot (n = 19), and porcupine (n = 2). A small proportion of unidentified birds (5.0%) and a trace of salmon (.4%) were noted. Although this assemblage can be assumed to suffer from the same preservational biases as the fort site material, we suggest that the season of occupation was more likely fall and winter, when trapping and land hunting were emphasized and when sea mammal hunting was minimal. Large iron hooks provide evidence of fishing although this activity is minimally represented in the preserved faunal remains.

Discussion. Archaeological testing indicates that Xakwnoowú fort, built on a steep-sided rock for retreat and defense against attack, was probably established in the interval A.D.

Table 4: Faunal identifications, Xakwnoowú (49-XMF-053)

	Historic Midden (Test Unit 2)			Top of Fort Rock (Test Units 3, 4, and 5 and Shovel Tests 19 and 20)										
				West end bench			House 1							
Taxon	TU2	Subtotals	% of total	TU3	Test 19	Test 20	TU4	TU5 L1	TU5 L2	TU5 L3	TU5 L4	Total fort	Subtotals	% of total
Sea mammals														
Phoca vitulina (harbor seal)*				22	1							23		
Phocidae (earless seals, incl. harbor seal)				5							1	6		
Lutra canadensis (river otter)											1	1		
Unidentifed sea mammal	6			331	1				1	23	100	456		
Total sea mammals		6	**1.3%**										486	**38.5%**
Land mammals														
Alces alces (moose)	1													
Cervidae (possible deer)	1													
Canis sp. (wolf or dog)							2				1	3		
Vulpes sp. (fox)											7	7		
Marmota sp. (marmot)	19													
Erithizon dorsatum (porcupine)	2													
Rodentia	4													
Unidentified land mammal	398			345	23	4	43	2	43	3	233	696		
Total land mammals		425	**93.2%**										706	**55.9%**
Birds														
Passerinae (song/perching birds)											3	3		
Larus sp. (gull)							2					2		
Unidentified bird	23			2					28		1	31		
Total birds		23	5.0%										36	**2.8%**
Fish														
Oncorhyncus sp. (salmon)	2			22			2				4	28		
Unidentified fish				4								4		
Total fish		2	0.4%										32	**2.5%**
Invertebrates														
Brachyura (crab)				1								1		
Mollusca (mollusc)									1			1		
Total invertebrates		0											2	**1.6%**
Total	456	456	100.0%	732	25	4	49	2	73	26	351	1262	1262	100.0%

* includes specimens identified as *Phoca* sp.; of the two species in this genus, only *Phoca vitulina* (harbor seal) inhabits the waters of SE Alaska. .

1038 - 1306 (Beta-92864, above). While the youngest radiocarbon date from the fort (120 ± 50, Beta-92863) could conceivably indicate occupation into the early nineteenth century it has a wide error range and multiple calibration intercepts. Because artifacts indicative of Western contact were not found we suggest that the fort was used no later than the 1780s and may have been vacated several decades earlier.

The history of Xakwnoowú largely coincides with the Little Ice Age when temperatures cooled, glaciers advanced, and local sea level gradually increased due to isostatic depression from the weight of ice in Glacier Bay fiord. During the late-eighteenth century high stand the fort rock became a tidal island, approachable on foot only during low tide. Relative sea level declined after A.D. 1800 due to glacial retreat and isostatic rebound, and the base of the rock was once again lifted above the intertidal zone. As discussed above, different indigenous toponyms refer to the fort's dry and inundated phases, typifying a Tlingit pattern of multi-name "ensemblages" that describe single locations at different stages of environmental history (Thornton 2008:99).

Although no archaeological traces of Xakwnoowú village have been found we believe that it was located nearby and was probably flooded at the height of Little Ice Age, coincident with the end of occupation at the fort. A sequential relationship between Xakwnoowú and L'istee may be inferred. The latter belonged to the T'akdeintaan of the Raven moiety and included winter houses and a fort on an adjacent hillside knob (Ackerman 1965, 1968; Goldschmidt and Haas 1998:55-56; Sealaska Corporation 1975:759). Our investigations suggest that L'istee was first occupied in about A. D. 1800 (see below). Rising local sea level and the flooding of Xakwnoowú village may have been followed by the founding of L'istee at what was then the mouth of Dundas River. After the Little Ice Age peak, coastal uplift and southward aggradation of the Dundas River delta left L'istee stranded inland, and the Hoonah people reoccupied the reemerging coastal terrace around the base of the old fort.

We found evidence of only a single structure at Xakwnoowú, probably a summer dwelling constructed about 500 years ago. Thin midden patches at the site contain the bones of sea mammals, land mammals, birds, and fish. The evidence suggests that the fort was a place of intermittent, temporary resort during raids, probably used secondarily as a warm-season subsistence location. Many forts in southeastern Alaska served similar dual purposes and were favored as elevated, breezy spots for drying fish (Moss and Erlandson 1992). As noted above, Xakwnoowú "island" – referring to the fort during the Little Ice Age flood – was remembered as "a camp for drying fish and picking berries" (Goldschmidt and Haas 1998:55).

L'istee (49-XMF-013)

L'istee (49-XMF-013) was a T'akdeintaan summer village on the east bank of the Dundas River, located about 4 km north of the point at the river mouth. Robert Ackerman investigated the site in 1965 and suggested that it been used from the late 19th century until shortly after World War I. Our brief investigation in 1995 yielded radiocarbon evidence of an older cultural component going back to about A.D. 1800.

The L'istee terrace is also the location of trapper Buck Harbeson's A. D. 1950s trail cabin (49-XMF-014). The cabin was still standing in 1995 and in relatively good condition. Artifacts in and around the house included period magazines, jars containing food supplies, and a double-bitted axe.

L'istee and surrounding land were approved as the Tom Martin Native Allotment in 2008. At the time of the SAIP survey in 1995 the Martin allotment was considered by the claimants to be located on the west side of the Dundas River, so that our investigations were conducted with the understanding that L'istee was on park land rather than private property. Reconsideration of the original applicant's description led allotment adjudicators to move the claim to the eastern shore, where it was finally approved for conveyance.

Historical Background. In 1946, Hoonah elders Lonnie Houston, Mrs. Oscar Williams, and Mrs. Eliza Lawrence testified that:

> There were three big houses at Łisti [L'istee], but these are now rotted away. There was also a graveyard for the daqdentan [T'akdeintaan] clan. We continued to go there in recent years, but recently a white man named Wright has chased us away...Before that, our people used

> to go there to trap. This was formerly a daqentan [T'akdeintaan] village and at one time Mrs. Douglas' father homesteaded the place. A potlatch was given at this village about 40 years ago [ca. 1906]. The people went up the stream there to get humpies [pink salmon], sockeyes, cohos, lagoon berries, mountain blueberries, high bush cranberries, porcupine, black bear, mountain goat, marten, otter, and mink (Goldschmidt and Haas (1998:55-56).

In 1965, Jimmy Martin of Hoonah told Robert Ackerman that there had been three houses at L'istee when he lived there as a boy about 45 years earlier. Martin remembered a cemetery on the opposite side of the river, probably the graveyard near Xakwnoowú where grave marker dates span the period from A.D. 1901 to 1928. In 1975, George Dalton of Hoonah also recalled that three smokehouses (summer residences) stood at L'istee during the early 20th century, and stated that these dwellings were owned by his three older brothers (Sealaska Corporation 1975:759). The houses were occupied seasonally from March through October, for subsistence harvesting. Before Mr. Dalton was born his father hosted a potlatch to validate the interclan transfer of land ownership to the brothers, presumably the 1906 event mentioned above.

Setting and Landscape. The L'istee village site (Figure 30) occupies a high fluvial terrace on the east bank of the Dundas River, 2.3 km upstream from Xakwnoowú and .3 km downstream from where the clear-water "Seclusion River" (unofficial name) flows into the Dundas from the east. Lower terraces step down from the site area to the banks of the river, where a side channel has scoured a deep hole by a bedrock ledge. This is one of two "sockeye holes" mentioned by Ackerman (1968:10) and locally known as prime fishing locales. The other is on the Seclusion River just above its confluence with the Dundas River.

The village terrace is elevated about 7 m above the summer river level and 4 m above spring flood stage, and is composed of fluvial sand and silt deposited during the late Neoglacial. It was probably built to its present height during the peak of the Little Ice Age marine transgression (Mann and Streveler 1997:11-12). This peak in relative sea level in about A.D. 1800 is approximately coeval with the radiocarbon age (210 +/- 40) on cultural charcoal that we obtained from the edge of the terrace near its surface (see discussion below). This suggests that a 19th century occupation at L'istee might have begun as soon as Little Ice Age flooding began to subside and the newly built-up terrace emerged, at which time when the former shoreline near Xakwnoowú fort was still submerged (see previous discussion and Figure 20). Spruce forest on a small island of fluvial sediments just downstream from L'istee sits at a slightly lower elevation than the village terrace (about 5 m above the river) and is occupied by trees approximately 150 years old, consistent with the progressive decline in relative sea level after the Little Ice Age peak (Mann and Streveler 1997:11-12).

Today the L'istee village site is covered with alders and berry bushes rather than mature forest, reflecting historic human clearance and occupation. The 4.5 m terrace just below the site supports a young spruce and hemlock forest less than 100 years old, rooted in 2 - 3 cm of humus over silty sand. A second section of 4 m – 4.5 m terrace extends north of the L'istee site but is covered primarily with alder brush instead of spruce-hemlock forest. This suggests possible human disturbance although we found no cultural indications in shovel tests. The slopes above the main village site are covered with old growth forest that has apparently been undisturbed since the Late Wisconsin.

Cultural Features and Investigations. Ackerman carried out extensive excavations at L'istee in 1965 (Ackerman 1968:8-11, 93-96) and his unfilled trenches are still visible. Four of his test pits at the northern end of the site near the Harbeson cabin were culturally sterile. Ackerman's Trench 1 farther south uncovered a rock-lined fire pit but no artifacts, while Trench 2, excavated into what might have been a gravel house floor, yielded calcined bone, window and bottle glass, glass beads, imported earthenware ceramics, cloth, tin cans, machine-cut square iron nails, and wire nails. Trench 3 transected the floor of an 8 m long house, revealing post molds and a central hearth and producing artifacts similar to those found in Trench 2. Trench 4 encountered no subsurface features but produced metal artifacts, beads, and ceramic fragments. A circular depression at

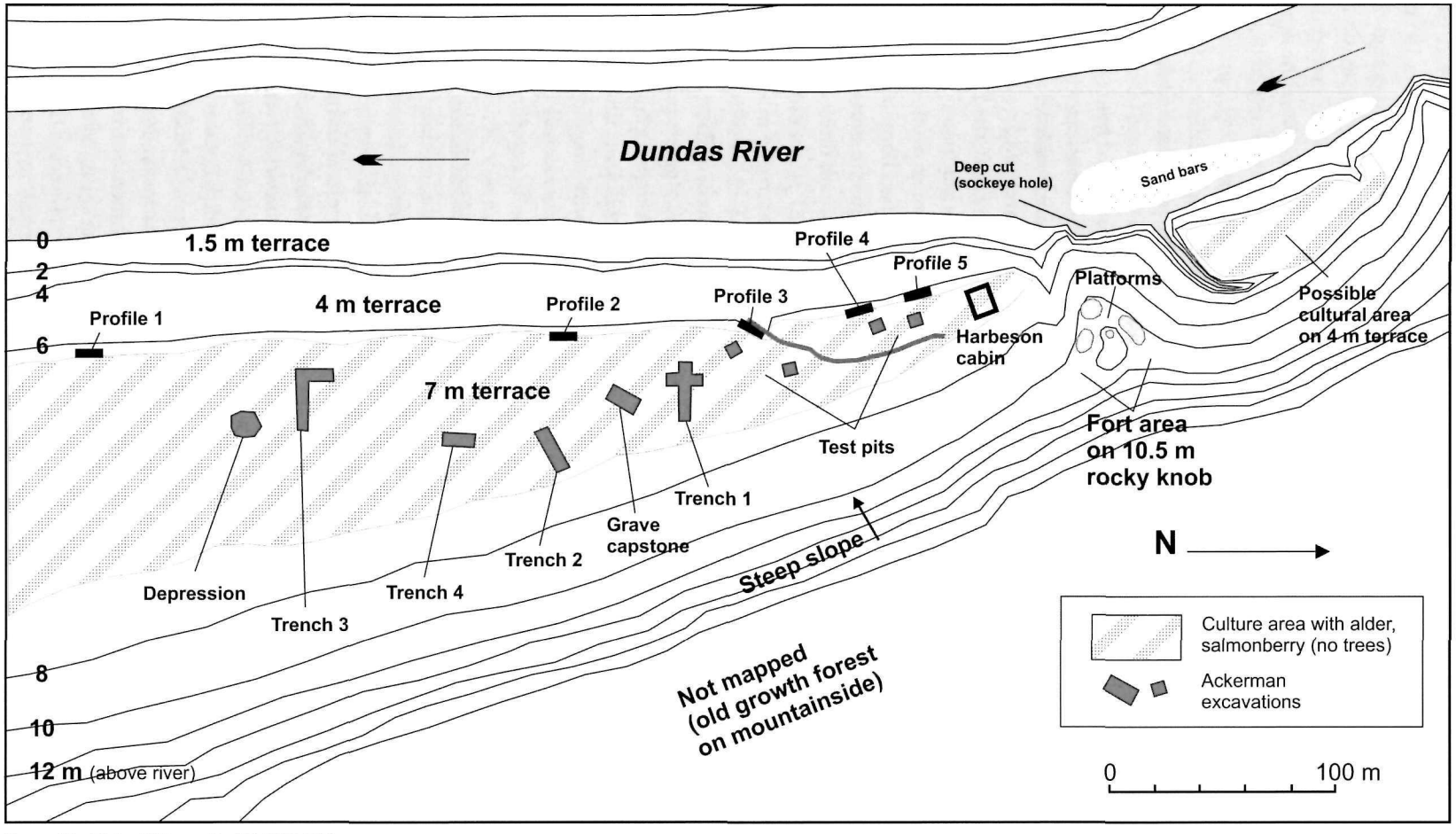


Figure 30: L'istee Village site (49-XMF-013)

the south end of the site, interpreted as a sweat lodge, contained rocks, charcoal, and part of an iron shovel. Ackerman's team found a rectangular concrete grave cover on the terrace, inscribed with the date September 24, 1917. Considering both archaeological and historical evidence, Ackerman judged L'istee to have been occupied from the late 1800s until about World War I.

SAIP field studies focused on the upper front edge of the 7 m terrace, where we cut five profiles (locations on Figure 30) intended to assess the cultural stratigraphy, extent, and date range of the site. Profile 1, apparently beyond the southern edge of the occupation area, showed only non-cultural sand and silt. Profile 2 revealed 30 cm of sand overlying a 15 cm stratum of cultural material including white glazed earthenware fragments and a hand-cut iron nail, probably trash discarded over the edge of the bank during occupation. Profile 3 consisted of an upper 5 cm of sandy loam; 10 cm of charcoal and fire-cracked rock; and 50 cm of brown silty sand with scattered charcoal fragments. There were no artifacts. A sample of charcoal collected from 30 - 60 cm below the surface returned a radiocarbon date of 210 ± 40 (Beta-92865; wood charcoal; $\delta^{13}C$ =0), with highest probability intercepts of cal A.D. 1635 - 1696 (p = .308) and cal A.D. 1725 - 1814 (p = .498) (Table 2). The most probable date is therefore within several decades of A.D. 1800, which is consistent with the inferred geomorphological history of the terrace. Profiles 4 and 5 were similar to Profile 3, with 5 - 10 cm of sandy loam overlying 20 - 40 cm of sand and silt containing charcoal and fire-cracked rock. No historic period artifacts were found in these latter profiles.

Future work may better define this late 18th or early 19th century component at L'istee, which seems to be concentrated at the northern end of the site. Buck Harbeson reportedly found a "T-shaped stone hammer" (or maul) eroding from the bank in this general area (Ackerman 1964:27). We note that Ackerman's excavations at this end of the site (including his Trench 1) were the only ones to *not* to yield any late 19th/ early 20th century commercial trade goods.

Gleeson (1987) first reported several possible house platforms located on top of a 10.5 m rocky knob above the sockeye hole at the northern end of the L'istee site. The four distinctly flat areas (the largest measuring 15 m x 4 m) are in a brushy clearing without large trees. These elevated features may represent a fort where residents of the village could retreat if threatened by attack. In 1995, we excavated a test pit on the top of the knob near the platforms which revealed 25 cm of woody loam over a 5 cm thick "black layer" of organically rich silt (also noted by Gleeson, 1987:3). No charcoal was present and no radiocarbon sample was obtained.

Artifacts. Because Ackerman's work at L'istee was substantial we did not undertake any new excavations or collect artifacts. Ackerman's material from the site (approximately 150 artifacts) is housed at Washington State University (Ackerman 1968: Appendix 2).

Discussion. Oral history and archaeology coincide for the later years of L'istee village, which are associated primarily with the T'akdeintaan clan and with residence by specific families. More detailed oral documentation in conjunction with careful, systematic archaeology could yield a rich and detailed story about the lifeways of Tlingit residents at the site a century ago. There is also the prospect of an earlier archaeological record dating to approximately A.D. 1800 when Little Ice Age flood waters began to withdraw and the L'istee fluvial terrace became available for occupation. At that time, L'istee would have been situated on or near the north shore of Dundas Bay, gradually becoming an inland site as relative sea level declined (Figure 20).

It is perhaps significant that L'istee is remembered only as a village in oral tradition and not as a fort, and that L'istee is not mentioned by name in "The First War in the World" (Swanton 1909:72-79) whereas Xakwnoowú and many other forts in the northern Tlingit territories are included. Possibly the still-undated fort component at L'istee was associated with an older, pre-Little Ice Age occupation on a lower elevation predecessor of the current fluvial terrace.

The chronologies of two important and proximate sites – L'istee and Xakwnoowú – thus overlap. This is most clear for the 1880s through the 1920s, when we now have evidence for residence in and around both places, and it may prove to be true for earlier centuries as well when houses and forts at both sites were in use. Future work will further define the relationship between the two settlements but

it is already clear that they reflect a long and complex social history in the lower Dundas River valley.

Point Dundas Village (49-XMF-066)

From June 20 - 22 we investigated a small Tlingit settlement on the east side of Point Dundas, designated as Point Dundas Village (49-XMF-066). We found evidence for occupation both before and after European contact: 1) a pre-contact component consisting of cache pits, a possible house platform, and midden deposits radiocarbon-dated to 240 +/- 50; and 2) a post-contact component including a graveyard with one fenced burial plot, two summer house ruins, and late 19th – early 20th century artifacts. Bark-stripped and pitch-cut trees in the surrounding forest may be associated with both periods of residence.

Historical Background. Hoonah elder George Dalton recalled in the early 1970s that an old grave was located on the east side of Dundas Point, and this location was recorded as Site 11 (Area V) by Sealaska investigators (Sealaska Corporation 1975:828-829). No further details were published. The site was not included in a recent compilation of Hoonah Tlingit place names (Hoonah Indian Association 2006).

Setting and Landscape. Dundas Point Village is situated in a small unnamed cove on the north shore of Icy Strait just east of Point Dundas. Three streams discharge into the cove along a 450 m long beach composed of granitic sand, gravel and cobbles. The beach is bounded by a bedrock outcrop to the west and by rocky hillsides to the north and east (Figure 31). It is protected from heavy surf by an offshore kelp bed. The middle and eastern streams are branches of the same drainage and are embedded in an alluvial fan that extends to the shoreline. Several overflow channels near the mouth of the central stream fill periodically during times of flood.

The older cultural remains (including House 3) are adjacent to the western stream, along the crest of the highest Little Ice Age beach berm. A wet slough behind the barrier crest is the remnant of what would have been a small lagoon at the time of maximum sea level. The Little Ice Age berm crest has a measured height of 9.4 m above MLLW (Mann and Streveler 1997:13 and Table 1). In this area, beach terrace edges step downward toward the waterline, marking more recent tidal limits. Houses 1 and 2, representing the more recent occupation, are located on the alluvial fan to the east, where terrace edges are less well-defined. Both are slightly lower in elevation than House 3.

The near-shore area shows forest succession produced by declining relative sea level over the last two centuries. The beach below the Little Ice Age crest is covered with young spruce trees and alders growing in thin, undeveloped soils. Inland from the Little Ice Age crest on higher ground is a much older, fully mature spruce and hemlock forest. Here the trees up to 3.5 m in circumference at breast height, growing in thick, podsolized forest soils.

Cultural Features and Investigation. The Point Dundas site was assessed by surface inspection, auger and shovel tests ($n = 90$), and trowel excavation of test units. The site was mapped with tape and hand compass, augmented by a geological leveling transect to determine the height of the barrier beach. As noted above, the pre-contact features and midden are located at the west end of the beach, while the more recent houses and midden areas are east of the largest stream. The burial plot occurs as an isolated historic feature in the western part of the site. The central beach is dominated by the principal stream and its overflow channels and probably floods too frequently to have ever been used for habitation.

Cache Pits, Western Site Area

Ten shallow pits interpreted as food storage caches are distributed in the western part of the site. The pits are up to 2.4 m long and 50 cm deep. Auger tests were placed in five of these features and two were positive for charcoal and calcined bone.

Midden, Western Site Area

Auger testing was used to delineate the western midden deposits (Figure 31). Auger cores and Test Unit 1 (1.0 x .5 m) revealed that these consist of a 5 - 10 cm thick layer of charcoal-stained coarse sand containing fire-cracked rock, lenses of wood ash, wood fragments, and occasional traces of calcined bone. Several fragments of slate, probably debitage from stone tool manufacture, were noted. The cultural level lies immediately beneath an "A" horizon of organic forest soil (5 - 20 cm thick) and above sterile granitic sand and bedrock. The undeveloped soil profile does not include a "C" horizon.

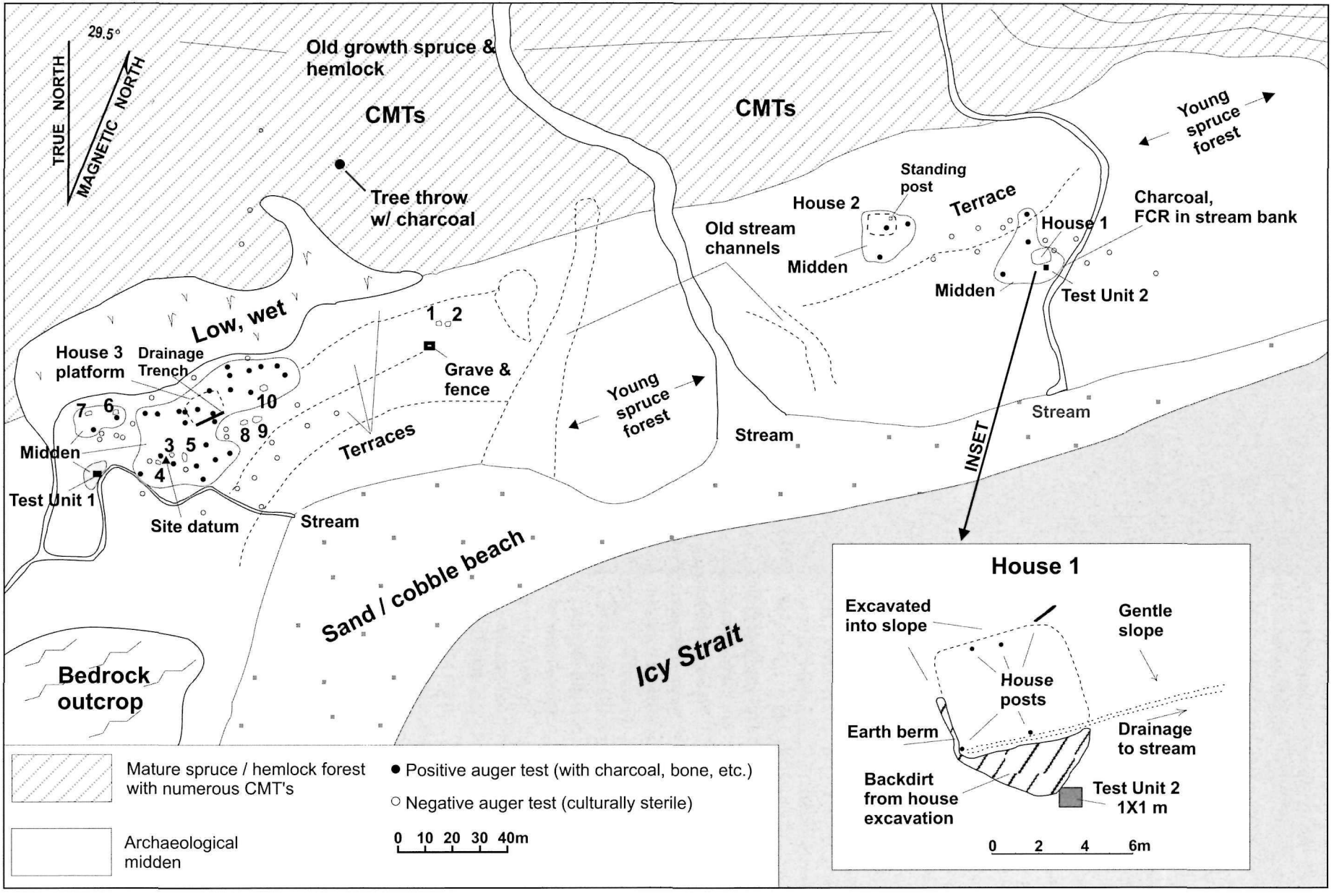


Figure 31: Point Dundas Village (49-XMF-066) site map

No artifacts or recoverable bone were found in either the test unit or auger holes. Charcoal from the cultural level in Test Unit 1 gave a date of 240 +/- 50 (Beta 92855, wood charcoal, $\delta^{13}C$ =0). This date has multiple calibration intercepts but the most probable are cal A.D. 1489 - 1603 (p = .227); cal 1610 - 1694 (p = .358); and cal 1727 - 1813 (p = .317) (Table 2). The two highest probabilities suggest occupation in either the mid-17th century or late 18th century A.D.

Probable Structure (House 3), Western Site Area

A level area covering about 8 x 10 m in the center of the western midden may be the former location of a dwelling, tentatively designated as House 3. There are no above-ground posts or floor depression. A narrow trench ca. 50 cm wide and 20 - 30 cm deep runs long the front of this platform and is probably a drainage ditch, a feature also noted at House 1 (see below).

Grave And Grave Fence, Western Site Area

An historic burial plot, recalled in George Dalton's oral testimony, is located amidst young spruce trees to the east of the pre-contact midden. A partially standing white picket fence surrounds a small mound, the dimensions (1.2 m long, 1 m wide) suggesting a child's grave (Figure 32A). There is no headstone or cross. The pickets, which have cupola-shaped crowns, were braced by a horizontal rail that has for the most part deteriorated. The grave is blanketed with spruce cone detritus from squirrels feeding in the trees above. The state of wood preservation suggests that the grave may be contemporaneous with the Dundas River cemetery or younger, and is therefore more recent than any of the houses at the site. Two faint depressions nearby hint at additional possible graves, although these are not fenced or marked in any way.

House 1, Eastern Site Area

House 1 in the eastern site area (Figure 31, inset) is marked by the bases of four upright wall posts and one leaning post, distributed around the edges of a 5 x 6 m level floor (Figure 32B). The surviving sections of post are 95 - 140 cm long and four are mill-cut lumber. One has several embedded nails (type not determined). The north side of the floor was leveled by digging into the slope, and a mound of backdirt from this activity extends downhill in front of the dwelling. There is also a low raised berm of soil along its western edge. A narrow ditch extends along the south side of the platform and drains toward the nearby stream. The house floor was not tested, but auger tests in the surrounding midden showed it to consist of 5 - 10 cm of charcoal-stained sand with inclusions of calcined and unburned bone.

Test Unit 2 (1 x 1 m) was excavated into midden on the south side of the house, at the edge of the spoils pile. Stratigraphy consisted of 5 - 20 cm of forest humus; a mottled and charcoal-stained cultural level with lenses of small beach pebbles, 8 - 15 cm thick; and underlying sterile sand. Artifacts from this test (discussed below) included hand-painted import ceramics and a mold-turned glass bottle. The estimated date range of these objects – no earlier than A.D. 1870 and possibly into the early 1900s – is consistent with the fact that house posts are still standing (as compared to House 3) but also with their advanced state of deterioration.

The size and architecture of House 1 at Point Dundas suggest the traditional Tlingit summer smokehouse, which was constructed of wooden planks (usually taken from the winter dwellings) laid against a wood post frame with a bark or spruce shingle roof. It served as a warm weather shelter and/or enclosure for smoking fish (Ackerman 1964, 1965; De Laguna et al. 1964:72, 1972:302-304; Dixon 1789:172-173; Emmons 1991:69-72; La Perouse 1994:134-135).

House 2, Eastern Site Area

House 2 is defined by single standing post at the edge of a possible floor; the size, construction, and state of preservation appear similar to House 1. The house was not tested and no artifacts were recovered, but we suggest that the two dwellings were probably contemporary.

Culturally Modified Trees (CMTs)

Numerous bark-stripped spruce trees were noted in the old growth forest behind the beach (Figure 32C). These trees bear partially grown-over scars that resulted from the practice of removing bark for use as food (the inner cambium layer) and as construction material, e.g. for roofing houses (Mobley and Eldridge 1992). Harvesting was a spring activity. A horizontal cut was made at the base of a tree and the bark loosened and pulled off from

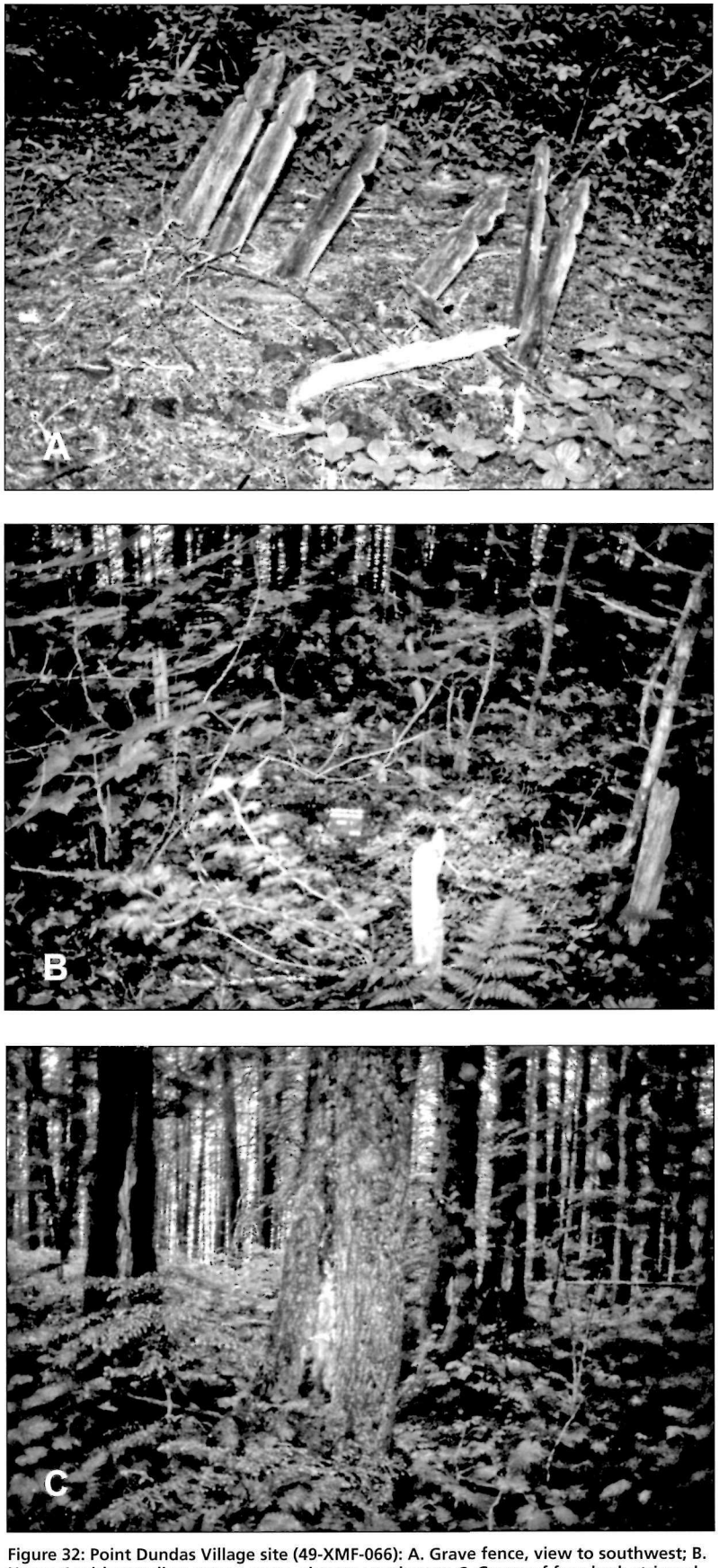


Figure 32: Point Dundas Village site (49-XMF-066): A. Grave fence, view to southwest; B. House 1 with standing corner posts, view to southwest; C. Group of four bark-stripped trees behind the village, view to south

below, tearing away a triangular piece and leaving a vertical scar that tapers out at the top. We did not systematically record the many examples at Point Dundas, but did measure eight bark stripping scars on seven of the trees. The trees ranged from 260 - 370 cm in diameter at breast height, and are probably at least 150 years old. Scar lengths ranged from 35 - 320 cm and started from basal cuts that were 60 - 120 cm above the ground. The scarred area of one very large, old tree had been subsequently gouged out, possibly to collect pitch-soaked wood, and the tool marks had the look of stone adze work. Other scars bear deep, sharp cuts evidently made by steel tools. In addition to bark-stripped trees, we noted several examples of "pitch-cut" trees with deeply gouged holes used for sap collection (Mobley and Eldridge 1992).

Cultural Potential In Adjacent Areas

We noted charcoal among the roots of a large fallen spruce in the old growth forest northeast of House 3, indicating that additional cultural deposits may be present in ground that was not disturbed by the LIA transgression. This area needs a more thorough survey because of the potential for discovery of older habitation areas. In search of older traces we also ran an auger transect (150 m long, 16 holes) from Test Unit 1 across the top of the bedrock knoll and southwest along near-shore ground beyond it, with negative results.

Artifacts. The following artifacts were recovered from Test Unit 2, House 1:

Glass containers

Wine bottle, base (GLBA 00511:5581, Figure 33A). L (broken) = 10.8; Dm at base = 7.7. A cylindrical bottle of green glass with an indented base. This is a turn-molded bottle, mouth-blown and rotated inside a two-piece form. The manufacturing method produces a symmetrical vessel with no seam lines; a highly polished surface, and horizontal striations that encircle the body (Jones and Sullivan 1989:30-31). In the United States, turn-molded bottles were produced from the 1870s through the 1920s, primarily for wine, brandy, and other liquors. Ackerman recovered turn-molded wine bottles at the Homeshore Lineage Site (Ackerman 1965:23, Fig. 14-1, 2).

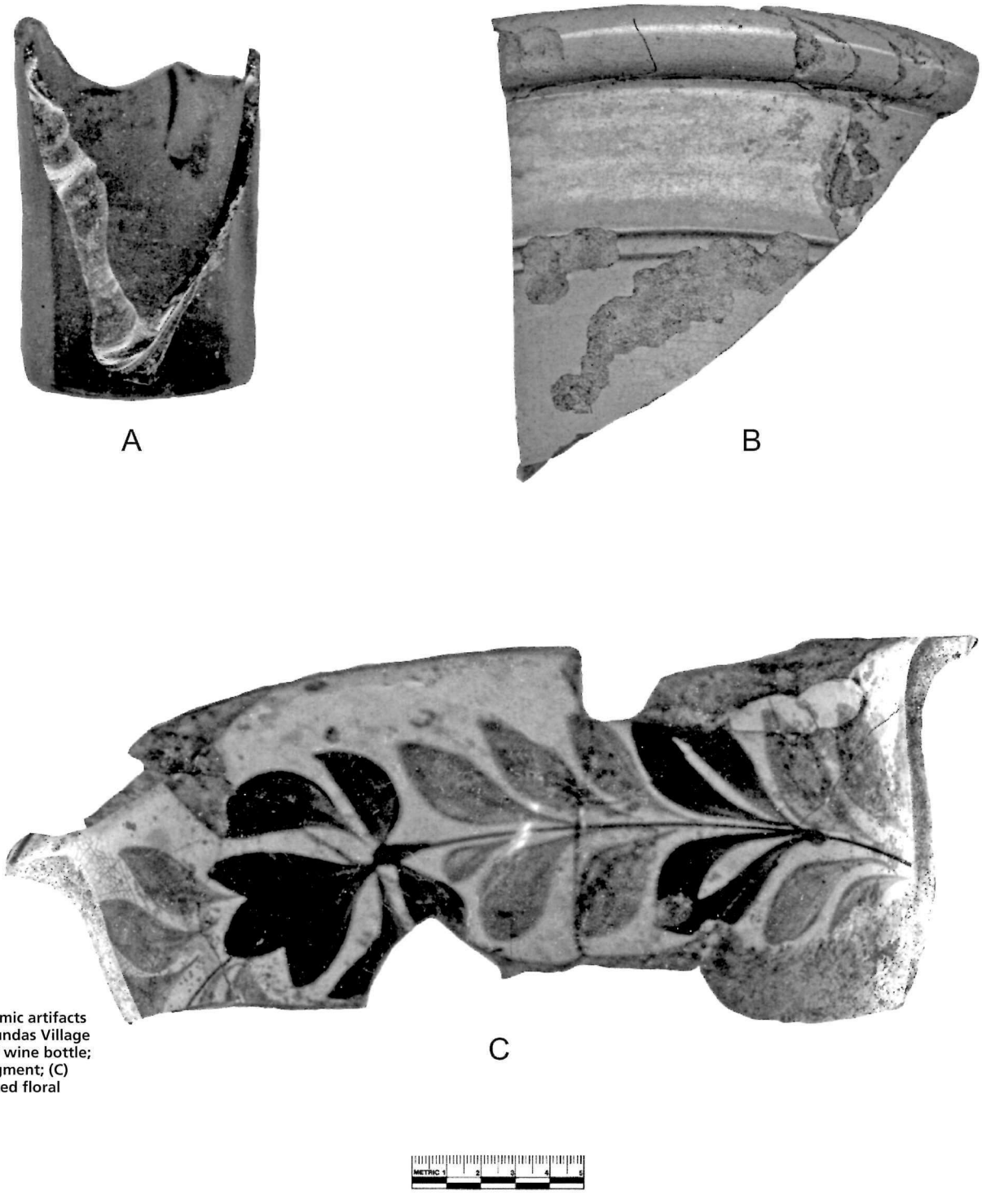


Figure 33: Glass and ceramic artifacts from Test Unit 2, Point Dundas Village (49-XMF-066): (A) base of wine bottle; (B) ceramic bowl, rim fragment; (C) ceramic bowl, hand-painted floral designs

Glass chip (GLBA 00511:55790). L = .9. A small chip from a green glass bottle, possibly the same wine bottle described above.

Ceramic tableware

Large ceramic bowl, hand-painted floral design (GLBA 00511:5585, 5586, 6232; Figure 33C). A body and rim section, partially reassembled from multiple fragments. Estimated Dm at rim = 34; Dm at foot 15; height estimated at 20. T (wall) = .5 - .7. This is a large earthenware bowl, glazed white overall, sponge-daubed with gray on the bottom and parts of the interior, and hand-painted with floral designs composed of green leaves with alternating red and purple flowers. A thin red band encircles the rim. The entire vessel has a clear over-glaze, applied after painting. There is no maker's mark. Similar hand-painted and/or sponge-stamped English earthenwares (cups, teapots, saucers, bowls, plates), often featuring floral

designs and banded rims, are very common in southern Alaskan archaeological sites of the mid to late 19th century (Crowell and Mann 1998; Oswalt 1980; Oswalt and VanStone 1967; VanStone 1968, 1970, 1972; VanStone and Townsend 1970). Similar ceramics were found at the Homeshore Lineage House site south of Excursion Inlet (Ackerman 1965:26-27, Fig. 15-4, 15-5) and at Grouse Fort (Ackerman 1965:46, fig. 19-11, 12; Ackerman 1968:30, Fig. 12-2, 4), although the painted patterns were not an exact match.

Large ceramic bowl, hand-painted annular bands (GLBA 00511:6231; Figure 33B). Estimated Dm = 40; body and rim section refitted from several shards. This earthenware vessel has a a creamy yellow glaze with a broad band of white and two thin brown lines painted around the outside below the rim. A similar or identical vessel (called "yellow ware") was found at the Homeshore Lineage House site (Ackerman 1965:28, Fig. 15-8) along with other types of artifacts dating from the 1870s to early 1900s.

Machine-cut nail (GLBA 00511:5583). L (head missing) = 5.5; T =.2. A machine cut nail, probably dating to the mid-1880s or earlier (Adams 2002).

Iron fragments (GLBA 00511:5576, 6225, 6229). In total, there were approximately 20 small fragments of heavily rusted and unidentifiable iron.

The artifact assemblage from Test Unit 2 indicates that House 1 at Dundas Point Village was inhabited no earlier than the 1870s and no later than the early 1900s. Several of the artifact types (turn-molded bottle, annular-painted yellow ware, machine-cut nail) were also found at the Homeshore site.

Faunal Analysis. Bone fragments from Test Unit 2 (Table 5) are composed primarily of unidentifiable land mammal but include the radius of a fox or small wolf. Intertidal harvesting is represented by chiton and cockle shells.

Table 5: Faunal identifications, Pt. Dundas Village (49-XMF-066)

Taxon	House 1, Test Unit 2	Subtotals	Percent of total sample
Land mammals			
Canidae (fox or wolf)	1		
Unidentified land mammal	69		
Total land mammals		70	81.6%
Invertebrates			
Polyplacophora sp. (chiton)	5		
Clinocardium nutalli (cockle)	12		
Total invertebrates		17	18.4%
Total	87	87	100.0%

Miscellaneous ceramic shards (GLBA:5574, 5577, 5580, 5582, 6226, 6228, 6230). Four very small yellow or white glazed earthenware shards, possibly additional pieces from the two bowls described above.

Other artifacts

Rubberized canvas (GLBA 00511:5575, 5584). Multiple fragments; largest about 10 x 10 cm. Folded pieces of canvas, coated on both sides with a black brittle substance, apparently rubber. There is a stitched hem along the top of one piece, possibly indicating a waterproof pouch, bag, or tarp.

Discussion. A radiocarbon date of 240 +/- 50 from Test Unit 1 on the crest of the LIA barrier berm might represent Tlingit occupation as early as cal A.D. 1610 - 1694 (the most likely calibrated interval), which would indicate that Point Dundas Village was already in use *prior* to the Little Ice Age rise in relative sea level which reached its maximum in Icy Strait at about A.D. 1800 (Mann and Streveler 2008). However, this would imply that the midden at the western end of the site is sitting on a beach ridge that *preceded* the marine transgression rather than one that was built by wave action at that time, which is inconsistent with the thin soils and young trees that cover this landform.

We therefore suggest that the second most probable calibration interval, cal A.D. 1727 - 1813, is more likely to reflect the real calendar age of the western midden. Additional archaeological testing and radiocarbon dating are needed to clarify when this and other areas of the site were first used, including investigation of the old growth forest area that lies beyond the reach of the sea.

Turning to the more recent cultural component, we suggest that during the late 19th to early 20th century Point Dundas was a small spring and summer camp used by one or two extended families. The season of use is suggested first by the architecture of House 1 and House 2, which appear to be expedient structures traditionally used as warm weather dwellings and/or smokehouses for curing fish. In addition, there is much evidence of spruce bark harvesting, a spring activity. The limited faunal data from Test Unit 2 indicate intertidal harvesting of shellfish, which was also usually undertaken in spring. The burial plot, tentatively dated to the 1930s or 1940s, represents the most recent activity at the site. For some reason, this old village site was selected as a place of interment, probably for a child.

Point Wimbledon Site (49-XMF-069)

The Point Wimbledon Site is a small coastal settlement at Point Wimbledon, between Taylor Bay and Dundas Bay (Figure 34). It appears to have been used several centuries before Western contact.

Historical background. There are no known traditional or historical references to this site.

Setting and Landscape. The site is located on an alluvial fan between two streams near the shore of a small bight at the tip of Point Wimbledon. The occupied area is about 100 m from the high tide line and 20 m inside the spruce and hemlock forest, at an altitude of 14 - 16 m above MLLW. The natural soil profile here consists of forest soil (15 - 20 cm thick) over coarse alluvial sand (weathered in some areas with developed "A" and "B" horizons) down to gravel or bedrock at 30+ cm below the surface. Small terraces formed by the maximum extent of the Little Ice Age transgression occur just down slope from the site area.

Cultural Features and Investigations. We found charcoal in an auger test between the two streams and tested further in the vicinity to define the limits of the occupation area. We found a second charcoal concentration just to the east of the smaller stream.

Adjacent to the small stream is a 6 x 10 m area – possibly an old house platform – which is level in comparison to the sloping and uneven fan. Two tests on the platform produced charcoal and fire-cracked rock. Others showed mixed, non-stratified sand, rock, and soil, possibly the result of digging by the inhabitants to create the platform. Adjacent to the level area is square pit (1.2 m by 1.1 m) that is 40 - 45 cm deep. A soil probe in its center revealed humic forest soil above sand, but no charcoal or cultural material. This feature may be a cache but the function is undetermined.

North of the possible house platform we excavated a 1 x 1 m pit (Test Unit 1). The stratigraphy consisted of 14 - 18 cm of dark brown forest humus; 10 cm of brown sand with minor charcoal fragments; 25 cm of heavily charcoal-stained sand and rock; and a basal layer of culturally sterile sand. We originally thought that the upper sand (which is not present upslope) might have been deposited by waves during the Little Ice Age transgression, but the elevation of the site (14+ m above MLLW) is well above the maximum height of that event in Icy Strait (~ 8 - 10 m above MLLW) (Mann and Streveler 2008). The upper layer of sand therefore probably represents alluvial (stream flood) deposition that partially covered the cultural layer.

The test unit produced no artifacts or bone. Charcoal from Test Unit 1 yielded a radiocarbon date of 320 +/- 60 (Beta 92856, $\delta^{13}C$ =0), with intercepts of cal A.D. 1448 – 1665 (p = .990) and cal A.D. 1785 – 1793 (p = .010.)

Discussion. The Point Wimbledon site was a small settlement, probably only a single summer dwelling, which was occupied sometime in the 15th - 17th centuries A.D. The elevation of the site is sufficient for it not to have been inundated or disturbed by the Little Ice Age rise in relative sea level. Based on our small test unit, artifact density appears to be low.

Dundas Island Site (49-XMF-068)

The Dundas Island Site is an historic period camp on a small island with culturally modified trees and evidence of logging.

Historical background. There are no known traditional or historical references to this site.

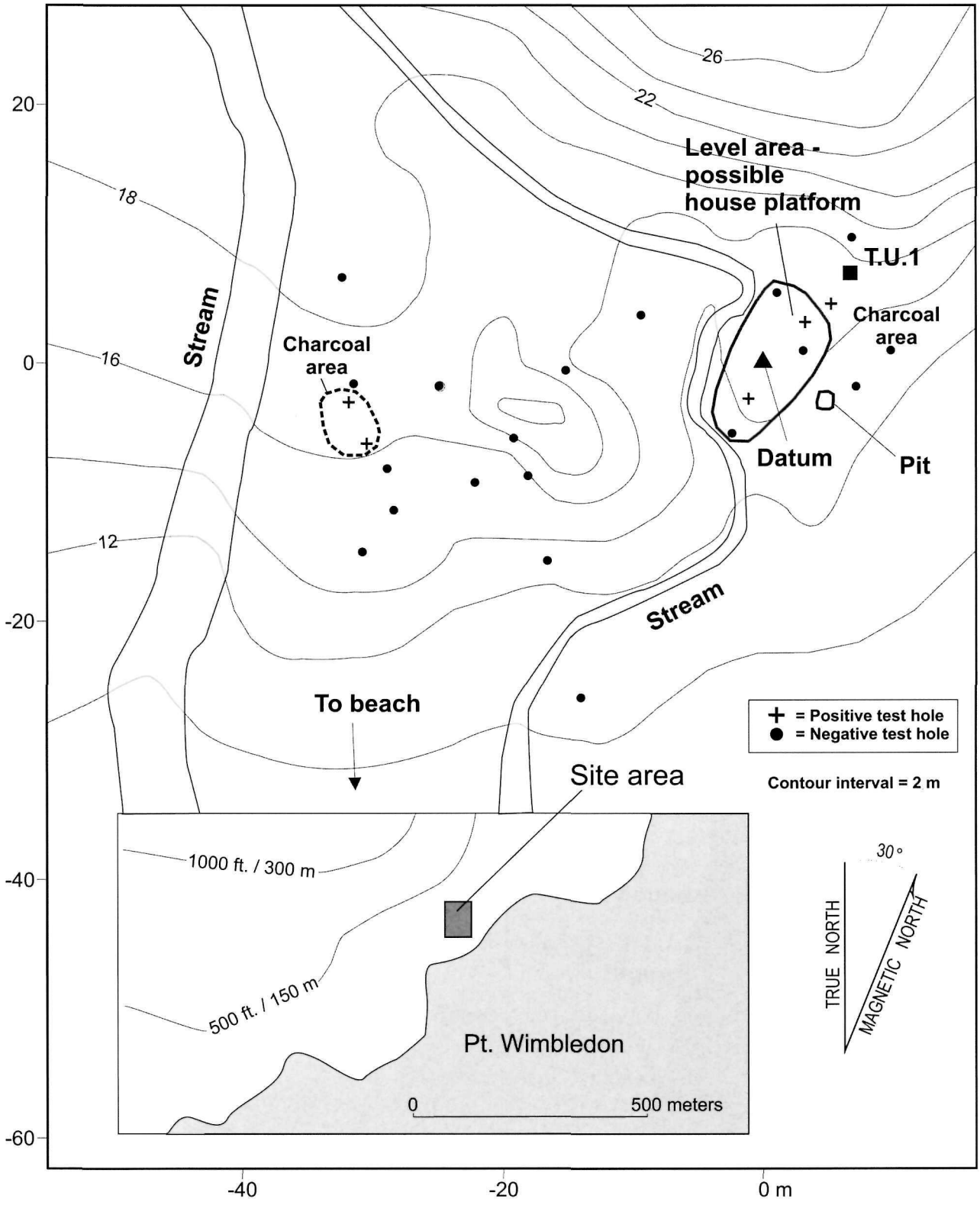


Figure 34: Point Wimbledon site (49-XMF-069)

It is located about 3 km from the Dundas Bay Cannery and may date to the period of cannery operations (A.D. 1900 - 1930s).

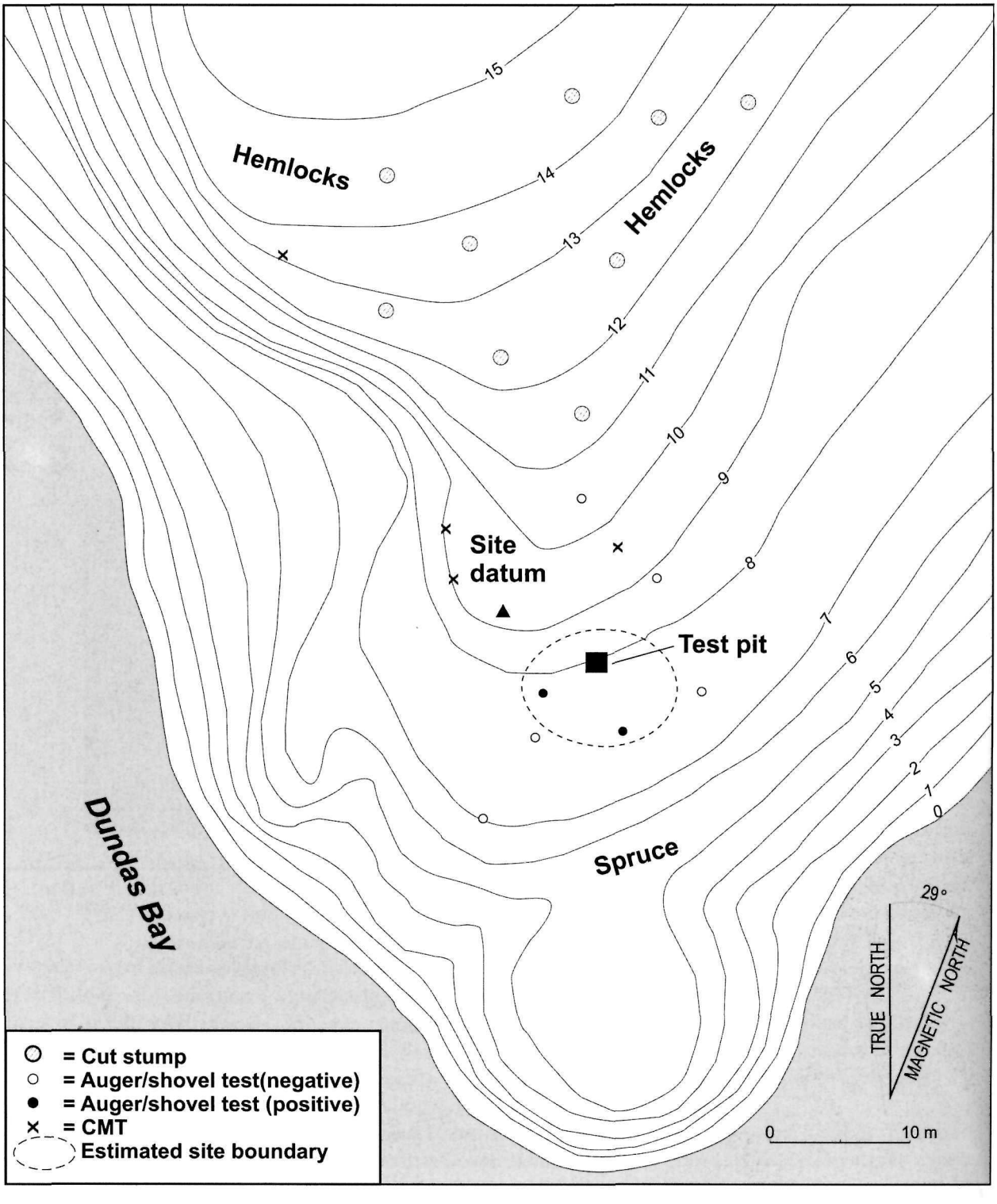
Setting and Landscape. The site is located at the south end of a small, wooded islet at the entrance to an inlet on the west side of main Dundas Bay. On the opposite shore of the bay (a narrow channel at this location) is the mouth of the "Old Dundas River." The islet is covered with old growth spruce and hemlock forest in which numerous stumps testify to logging activity in the early part of the 20th century. At the highest elevation of the island is a level area with a number of culturally modified

trees, including pitch-cut spruce and bark-stripped hemlocks. At the south end of the island (Figure 35) there is a level bench at 7 - 8 m above highest high tide. Here we saw charcoal in the root wad of a fallen tree and encountered more with subsurface probes. The charcoal-stained area covers approximately 80 m^2.

Cultural Features and Investigations. We excavated a 1 x 1 m test pit into the center of the cultural area. Under 10 - 15 cm of forest topsoil we found a 15 - 20 cm thick layer of charcoal-stained sand containing a heavily rusted piece of flat iron stock (or possible knife) and three wooden tent stakes. The artifacts were not collected and nothing else was found.

Discussion. The site is an attractive level location for a small camp, which may have been occupied during logging operations.

Figure 35: Dundas Island site (49-XMF-069)



Point Deed Foundation (49-XMF-067)

We briefly examined an early to mid-20th century cabin ruin at the south end of "Harbeson's Flat" on the east side of Dundas Bay.

Historical background. No references to this site are known. It is located 1.7 km southwest of Buck Harbeson's Cabin 2 (Ackerman 1964:17, 1968:89) and may be related to Harbeson's activities in the area.

Setting and Landscape. The cabin (Figure 36) is located on the south bank of a small, slow-moving stream that enters the east side of Dundas Bay about 450 m east of the "Deed" survey marker (U.S. Geological Survey, Mt. Fairweather B-1 quad sheet).

Cultural Features and Investigations. The remains consist of a single level of foundation logs for a 3 m x 3 m cabin. There are several

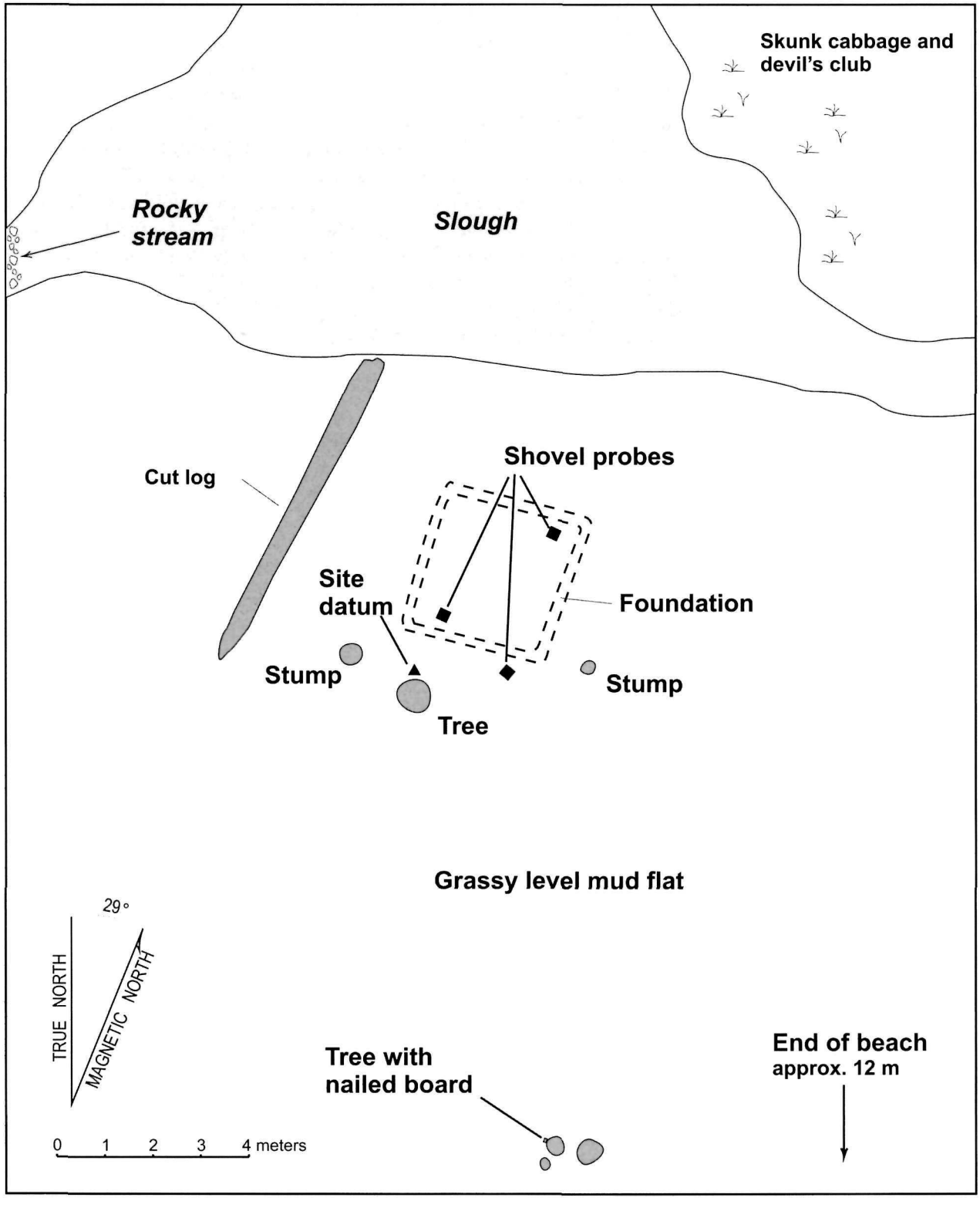


Figure 36: Point Deed Foundation site (49-XMF-067)

saw-cut stumps in the vicinity as well as one culturally modified spruce tree with a hollow for pitch collection. A .5 m x .5 m test pit inside the foundation revealed a layer of milled lumber plank flooring underneath about 5 cm of dark brown humus. Beneath the floorboards are round log joists. No artifacts were recovered.

Discussion. Judging by construction (including milled lumber flooring with wire nails) and state of preservation, the cabin might date to the 1930s or 1940s. There is no indication of cultural affiliation.

White Cap Cairns (49-XMF-070)

Rock cairns on top of White Cap Mountain and other peaks in northern Tlingit country may be monuments built to commemorate an event in Tlingit oral tradition, the great flood caused by the supreme being called Nass Shakee Yéil ('Raven at the Head of the Nass River) or by Yéil (Raven), whom Nas-caki-yeł created at the beginning of the world (Swanton 1909:80).

Historical Background. In one version of the flood story, Nass Shakee Yéil is angry at Raven and levels a curse, "Let rain pour down all over the world and let people die of starvation." Water pours from the top of Nass Shakee Yéil's dance hat, the flood waters rise, and people climb to the tops of mountains to save themselves; Raven hangs from the clouds by his beak until the flood recedes (Swanton 1909:120). In a second version, Raven commands the ocean tide to rise, but slowly so that people have time to load their canoes and float in them up to the mountain tops. There they are threatened by bears and other wild animals, so they "wall the tops of the mountains" for protection and tie their boats inside (Swanton 1909:16). De Laguna recorded a variant of the second story at Angoon:

> There was a Flood, when all the people had to go to the tops of the mountains. They built walls of rocks around the tops, like nests. Some people had dogs. The bears came up after them. Those that didn't have dogs to chase the bears were all killed, but those that had dogs were saved. I have been to the top of one of the mountains, above Chaik Bay. I saw the rope [for tying the boats] there at the top, all turned to ashes. Another mountain where the people went in the high one across the inlet, below Tenakee...All the high mountains have nests (De Laguna 1960:131).

Other people at Angoon confirmed that several local mountains there have stone "nests" on top, and that touching these features or even pointing at the summits will cause rain (De Laguna 1960:52, 57, 131). Similarly, Swanton recorded that "sometimes hunters see the rocks they piled up there, and at such times it begins to grow foggy" (Swanton 1909:16).

In 1963, Jimmy White of Hoonah told Robert Ackerman that there was a ring of stones around White Cap Mountain at the head of Dundas Bay, saying that it was a "place of refuge for the Tlingit people during the time of the flood" and a "monument to the Tlingit people" (Ackerman 1964:23).

William J. Hunt (2010) cataloged mountaintop cairns on Chicagof Island and Baranof Island in the Tongass National Forest and suggests that they are very old and strictly functional features – hunting blinds and meat caches – for which the link to the story of the great flood is a *post facto* explanation:

> More surprisingly, the Tlingit who have occupied this region since time immemorial have no knowledge of the cairns' derivation. Their oral history and legends, if they mention them at all, generally attribute cairn construction to an unknown group of people at some point in the long distant past, often during the Great Flood (Hunt 2010:1).

Setting and Landscape. White Cap Mountain is a limestone eminence of Silurian age that rises above the eastern bank of the Dundas River in northeastern Dundas Bay. Its south peak has an elevation of 825 m and the north peak reaches 1000 m. Both are well above tree line (500 – 600 m) and for the most part are bare, exposed rock. The twin peaks are riddled with sinkholes and solution cavities, including a vertical hole more than 50 m deep at the south summit. Glacial striae and erratics (granite boulders transported here from farther north) indicate that the mountain was overtopped by ice at some time in the distant past.

Cultural Features and Investigations

We surveyed the mountain on June 19 and discovered five rock features on the north summit (Figure 37). Four are solid piles, without interior cavities, while the fifth is a small oval rock ring (Figure 38). Slabs and fragments of limestone are the primary construction material, with some granite also used.

Feature 1

This cairn, located at the mountain's highest point, is 2.6 m long, 1.7 m wide, and .6 m high (Figure 38A). The construction appears both ancient and undisturbed, with heavy lichen growth on the top surfaces of the granite pieces and moss on the undersides. Limestone (on this and other features) does not support either type of growth.

Feature 2

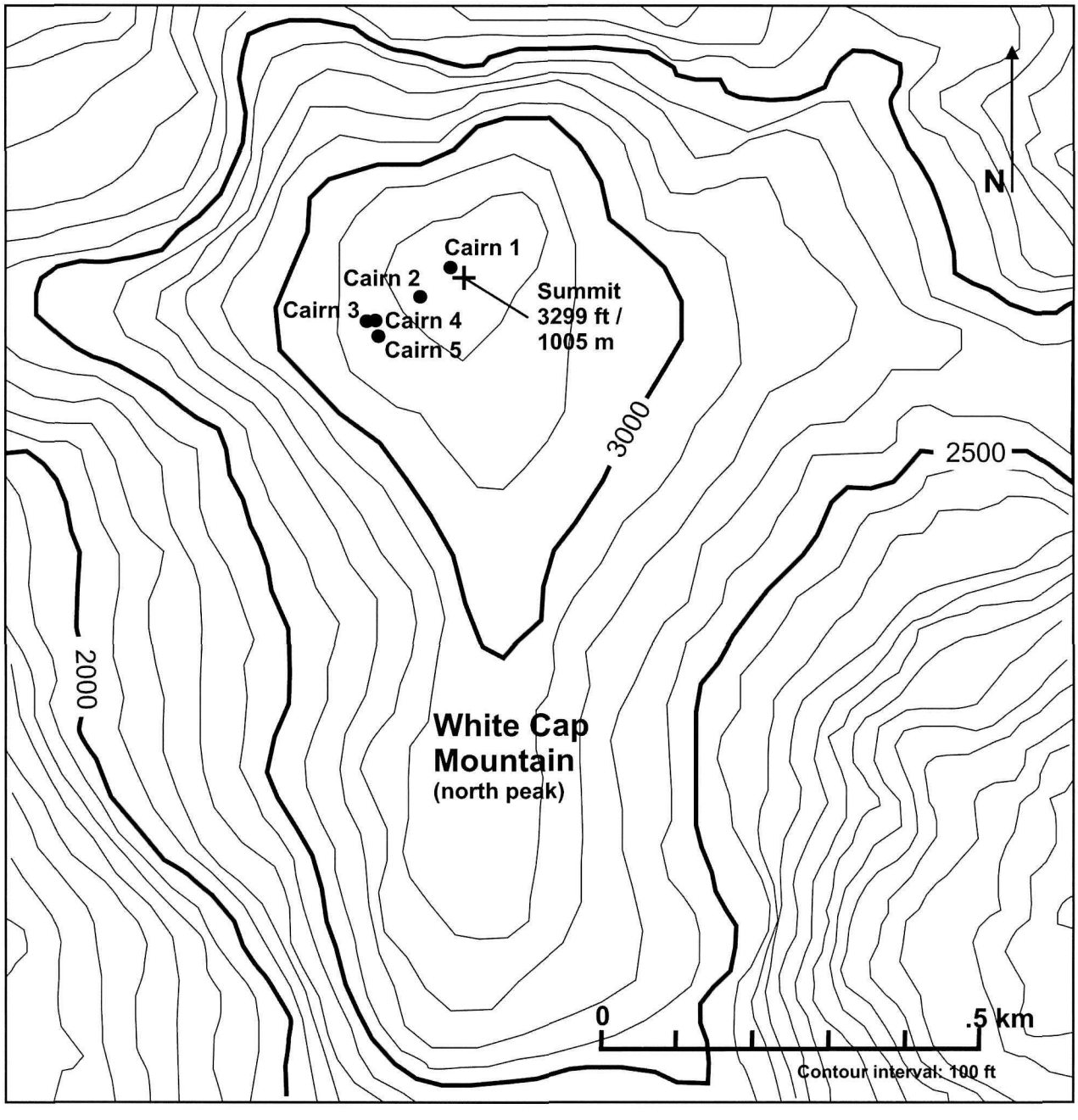
Feature 2 is a limestone cairn, 1.5 m long, .8 m wide, and .3 m high. There is little lichen or moss.

Feature 3

Feature 3 is a limestone and granite cairn, 2.7 m long and 1.6 m wide (height not measured). Moss is growing on some of the granite.

Feature 4

Feature 4 (Figure 38B) is a large and very old looking cairn, 3.1 m long, 1.7 m wide,



Feature 37: White Cap Cairns site (49-XMF-070)

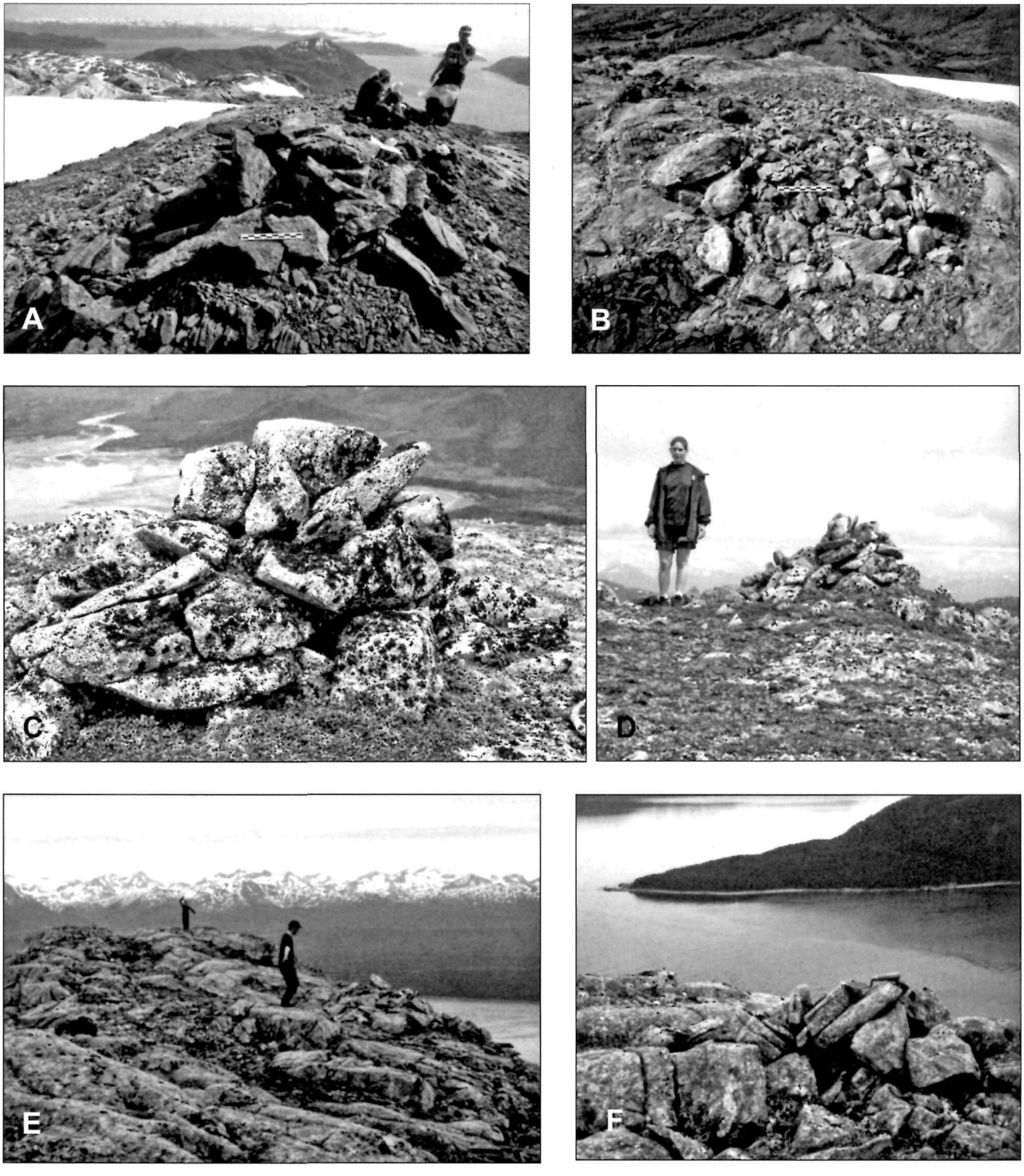


Figure 38: Mountaintop cairns at three sites. A. White Cap (49-XMF-070) cairn 1 to south; B. White Cap cairn 4, to northwest; C. Pt. Dundas (49-XMF-065) cairn 1, to north; D. Pt. Dundas cairn 2, to southwest; E. Mt. Carolus (49-XMF-064) cairn 2 in foreground right; F. Mt. Carolus cairn 5, to south

and .3 m high. All four of its granite rocks are heavily encrusted with grey lichen, and the limestone pieces are cracked and disintegrating in place.

Feature 5

Feature 5 is an oval enclosure, built mainly of limestone but including one erratic granite rock. Three larger limestone boulders have been placed in the center. The ring is 1.5 m long, 1.2 m wide, and .3 m high, and encloses a luxuriant bed of white, tan, and yellow lichen.

Discussion. The cairns have no interior hollows to suggest meat caches and they are too low and inconspicuous to have served as way-finding markers or game drive constructions. The oval enclosure, which roughly corresponds in shape to the "nests" described in oral tradition, is too small to be a tent ring or hunting blind. We conclude that some or all of the rock features at the top of White Cap Mountain are probably Tlingit monuments built over the last several hundred years to commemorate the story of the flood. Two of them (Features 2 and 3) look rela-

tively recent while others were built long ago, judging by the extent of moss and lichen growth. Variability in age might indicate an indigenous cultural practice that continued until the recent past, but the newer cairns could also have been constructed by hikers, surveyors, or prospectors.

Mountain top rock monuments appear to be relatively widespread in the northern Tlingit region, including at least the area around Glacier Bay as well as Chichagof and Baranof islands. The local meaning of these features is strongly connected to the Raven flood story, which may in turn be an historical echo of the sinking of the land experienced by coastal communities during the Little Ice Age when the sea reached its highest relative position in at least 8000 years (Mann and Streveler 2008). It is notable that the geographic distribution of these alpine features, as presently known, coincides with the region that experienced the greatest amount of isostatic depression (hence flooding) during the Little Ice Age glacial advance in Glacier Bay (Larson et al. 2004; Motyka et al. 2007). The belief that touching or pointing at mountain top cairns and rings will bring rain, fog, and bad weather is a symbolic connection to the flood story, especially the Nass Shakee Yéil version. Dating and interpretation of these features might be assisted by lichenometry – a method of age estimation based on the measured growth rates of certain lichen species.

Point Dundas Cairns (49-XMF-065)

On June 19, we documented cairns on top of the mountain that rises above Point Dundas at the eastern entrance to Dundas Bay.

Historical background. The significance of these features in Tlingit mythology and oral tradition is discussed above. We know of no specific references to cairns at Point Dundas.

Setting and Landscape. The grano-dioritic mountain at Point Dundas rises to an elevation of 712 m, with tree line at about 500 m. Low tundra vegetation extends almost to the summit. We saw no glacial erratics (non-granitic rocks) of any significant size.

Cultural Features and Investigations. We ascended the mountain from the Icy Strait side and discovered eleven cairns surrounding the summit (Figure 39). All are constructed from fragments of granite bedrock and covered with moderate to heavy lichen growth, indicating that they have not been disturbed for a considerable span of time. Some are also overgrown with tundra mosses.

Feature 1

Feature 1 (Figure 38C) is the highest cairn, located right at the summit, and also one of the largest. It is approximately circular, 2.0 m in diameter and 1.1 m high. It is heavily covered with lichen and moss, even on the undersides of many rocks.

Feature 2

Feature 2 (Figure 38D) is a large cairn with moderate lichen growth, measuring 2.4 m long, 1.5 m high, and .5 m high.

Feature 3

Feature 3 is a large pile of more than 20 rocks, measuring 3.2 m long, 2.4 m wide, and .5 m high. It is covered with heavy lichen growth.

Feature 4

Feature 4 is a cairn measuring 2.3 m long, 1.8 m wide, and .4 m high. It is heavily encrusted with orange, green, black, and white lichens.

Feature 5

Feature 5 is a large, spread out pile of rocks 2.5 m long, 1.6 m wide, and .5 m high, covered with black lichen.

Feature 6

Feature 6 is a small cairn composed of only six granite rocks. Its dimensions are 1.3 m long, .7 m wide, and .3 m high. It is moss and lichen-covered.

Feature 7

Feature 7 is a partially collapsed cairn with only three rocks, situated on top of a boulder. Its dimensions are 1.3 m long, .8 m wide, and .3 m high.

Feature 8

Feature 8 includes a large boulder and 20 or more smaller rocks, heavily covered with lichen and moss. It is 2.7 m long, 1.6 m wide, and .6 m high.

Feature 9

Feature 9 is comprised of approximately ten granite rocks placed on a large boulder, with some moss and a heavy encrustation of black,

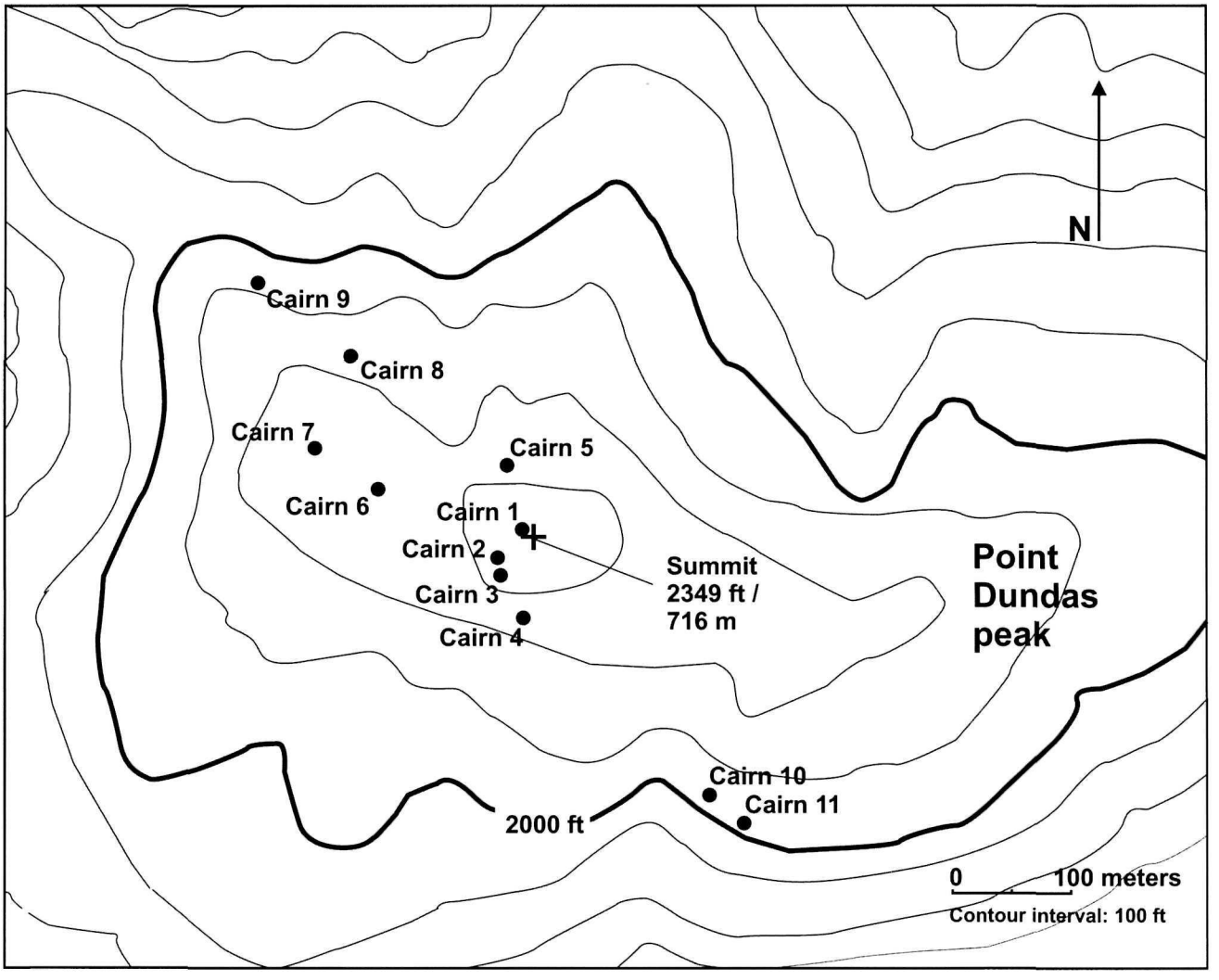


Figure 39: Point Dundas Cairns site (49-XMF-065)

green and orange lichens. Its dimensions are 1.8 m long, 1.5 m wide, and .5 m high.

Feature 10

Feature 10 is a large cairn built from 35 or more rocks, and covered with heavy lichen and moss. It is roughly circular, 2.8 m in diameter and .7 m high.

Feature 11

Feature 11, a circular cairn measuring 2.7 m in diameter and .6 m high, has moderate lichen growth.

Discussion. The cairns at the top of the peak at Point Dundas are old, undisturbed, and apparently of approximately equal ages. The significance and geographic distribution of these features has been discussed (see Point Dundas Cairns site description, above).

Mount Carolus Cairns (49-XMF-064)

High altitude cairns are located at the summit of "Mount Carolus" (unofficial name), located 5 km west of Point Carolus along Icy Strait. These features are similar to those found at White Cap Mountain (49-XMF-070) and Point Dundas (49-XMF-065).

Historical Background. We know of no reported oral traditions or historical records pertaining to cairns on Mount Carolus, which in Tlingit is called Yáay Shaak'ú [whale's little head].

Setting and Landscape. Point Carolus is a granodiorite dome that reaches a height of 770 m. The slopes are draped in spruce and hemlock forest up to between 450 m and 640 m, while the summit is covered with moss and lichen tundra with areas of exposed bedrock.

Cultural Features and Investigations. Eight cairns (Features 1 through 8) were found along a ridge extending southeast from the summit, and two more possible rock features (9 and 10) are close to the summit itself (Fig-

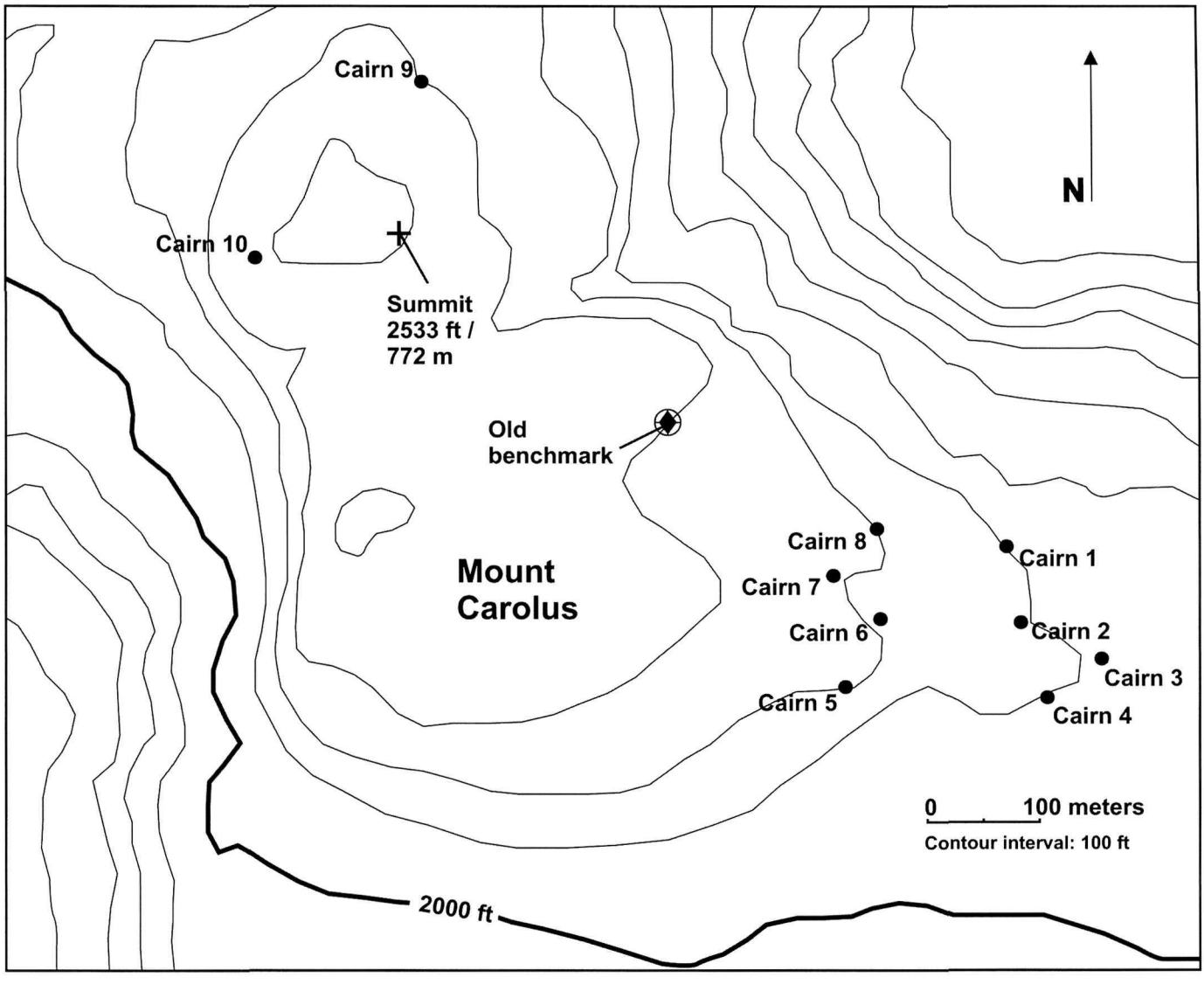


Figure 40: Mount Carolus Cairns site (49-XMF-064)

ure 40). Cairns 9 and 10 were not fully documented, and at least two more features may be in the same vicinity but were not mapped.

All features are constructed of subangular fragments of granitic bedrock and are encrusted with lichen and moss. The lower cairns (Features 1 – 4) have thicker lichen growth and may be older than the higher set (Features 5 – 8). None have interior hollows that might indicate use as meat caches. The long axes of the Mount Carolus cairns are oriented approximately north-south. All are situated on bare granite outcrops.

Feature 1

Feature 1 is an oval cairn measuring 2.5 m long, 1.9 m wide, and .8 m high. The jumbled pile of rocks is granite except for one small, dark boulder in the interior, possibly sandstone. The rocks are well covered with lichen and moss. Sediment has accumulated beneath the pile, a brown loam that includes grains of decomposed granite.

Feature 2

Feature 2 (Figure 38E) is a granite cairn very similar in to Feature 1 and also covered with thick moss and lichen. Its dimensions are 3.3 m long, 2.9 m wide, and .9 m high.

Feature 3

Feature 3 is another similar granite cairn, 2.7 m long, 2.2 m wide, and .3 m high. It has thick lichen and interior sediments, as above.

Feature 4

Feature 4 is a relatively indistinct, low scatter of granite rocks 2.7 m long, 1.6 m wide, and .3 m high, heavily lichen covered. Like Feature 1, it includes a single piece of anomalous brown sandstone.

Feature 5

Feature 5 (Figure 38F) is a small granite cairn, 1.8 m long, 1.5 m wide, and .6 m high. Lichen growth is less than for Features 1 - 4.

Feature 6

Feature 6 is a small, nearly circular cairn including only about ten rocks; dimensions are 1.25 m in diameter and .3 m high; moderate lichen cover.

Feature 7

Feature 7 is an oval cairn 2.2 m long, 1.8 m wide, and .6 m high, composed entirely of granite; moderate lichen cover.

Feature 8

Feature 8 measures 1.8 m long, 1.2 m wide, and .4 m high; moderate lichen cover.

Five recent-looking rock piles with very little lichen growth surround a former USGS benchmark labeled "old benchmark" on Figure 39. These were apparently constructed to mark the location. The new benchmark cap (labeled "Red" on USGS quad map Mt. Fairweather B-1) is close to the mountain's highest point. Here we found a fallen wooden marker post with attached guy wires, nails, and red cloth flagging.

Discussion. Like cairns atop White Cap Mountain and the Point Dundas peak, the Mount Carolus features may be quite old, although their ages can not be estimated without further investigation.

Chapter 4: Changing Hoonah Tlingit Economy and Settlement Patterns, A.D. 1700 - 1925

Research conducted under the National Park Service's Systemwide Archaeological Inventory Program (SAIP) at Glacier Bay and other Gulf of Alaska parks was directed toward the discovery and documentation of coastal sites; the assessment of site preservation in physically dynamic coastal environments; and the analysis of indigenous settlement patterns. As we have shown, the archaeology of Glacier Bay National Park and Preserve is richly informative about the relatively recent past, in particular the last 300 years. Within this temporal frame an extensive archaeological record is complemented by oral tradition and documentary history. Considered in combination, these sources trace generations of Hoonah Tlingit ancestral residence and seasonal subsistence activities on the lands of Xunaa Ḵáawu.

In this chapter we reconstruct Hoonah Tlingit settlement and subsistence patterns during A.D. 1700 - 1925, utilizing the abundance of composite information for that period. During this interval the physical environment of the Glacier Bay region was transformed by the Little Ice Age, and substantial shifts in Tlingit culture, economy, and residential locations occurred in reaction to Western contact and interaction. We apply information on site dates, locations, artifact inventories, and season of occupation deriving from the present study, the Washington State University archaeological surveys (Ackerman 1964, 1965, 1968), the Sealaska Corporation's historic sites study (Sealaska Corporation 1975), the Goldschmidt and Haas land 1946 use report (Goldschmidt and Haas 1998), and other sources.

SITE DATES, LOCATIONS, AND SEASONALITY

Table 6 shows estimated occupation spans in 25 year intervals for coastal settlements in Xunaa Ḵáawu during the period A.D. 1700 - 1925. The table includes all archaeologically and historically identified settlements for which adequate data are available, omitting only a few with very limited or inconclusive information. The sites are grouped geographically into: 1) the outer coast from Lituya Bay to Cape Spencer; 2) the northern shore of Icy Strait including Taylor Bay and Dundas By; 3) Glacier Bay; 4) the northeastern shore of Icy Strait from Glacier Bay to Point Couverden; and 5) northern Chichagof Island.

At their winter villages (indicated in black) the ancestors of the Hoonah people occupied multifamily lineage houses (10 m long or more) built with wooden frames, plank siding, gable roofs, wooden side benches, and deeply excavated floors. At the smaller settlements where they established themselves for hunting, fishing, and gathering during the months of spring, summer, and fall (indicated in gray) smaller family groups lived in smokehouses (5 – 8 m long) with temporary plank walls, bark or shingle roofs, shallow dirt floors with multiple hearths, and interior racks for drying and smoking fish (De Laguna 1972: 294-304; De Laguna et al. 1964:43-72; Dixon 1789:172-173; Emmons 1991:59-72; La Perouse 1994:134-135). Log or plank-walled cabins with metal stoves were also being used for summer residence by the late 19th century.

The several different house types left archaeologically distinctive footprints. Lineage houses are distinguished by their relatively large size and below-ground floors, although by the 1870s or so only the central hearth areas were being dug out. Smokehouse outlines are smaller, with ground-level or shallow excavated floors. Site seasonality is also indicated by recovered artifacts and faunal remains, as discussed in earlier sections of this report. The season of occupation for sites listed in Table 6 has been estimated from archaeological evidence, oral tradition, ethnohistorical information or a combination of these sources.

In terms of temporal distribution, a few sites ($n = 6$) are known for the pre-contact, pre-Glacier Bay surge period of A.D. 1700 – 1750; a moderate number ($n = 14$) for A.D. 1750 – 1875 which spans early European exploration, the fur trade, and Russian colonial rule; and by far the largest number ($n = 39$) for A.D. 1875 – 1925, the first decades of U.S. territorial administration and commerce, including the salmon packing industry. The predominance of more recent settlements in this sample is attributable to a higher survival rate for younger archaeological remains, a more complete oral record, and a pattern of population dispersal during the cannery era, as we discuss. A few older sites or site components in the Glacier Bay

Table 6: Historical Hoonah Tlingit settlements, A.D. 1700 - 1925

		1925-1900	1900-1875	1875-1850	1850-1825	1825-1800	1800-1775	1775-1750	1750-1725	1725-1700	Pre-1700
	OUTER COAST										
1	Passage Rock Village, Lituya Bay (XMF-035)							? ----			
2	La Chausee Spit Village, Lituya Bay (XMF-061)							? ----			
3	Xaatgutu.aan / Kaknau Creek 1 (XMF-050)						? ----				
4	Gaanaxáa.aan / Boussole River Site (XMF-052)		?			? ----					
5	Naguk K'I / Villaluenga River (XMF-049)										
6	Ta.aan/Dicks Arm (oral tradition)				? ----						
7	Graves Harbor Camp 1 (XMF-029)										
8	Graves Harbor Camp 2 (XMF-030)										
9	Aangóonk' (Murphy Cove, Graves Harbor)										
10	Dixon Harbor Camp (XMF-031)										
	TAYLOR B. / DUNDAS B. / ICY STRAIT										
11	Asgutu.aan / Taylor Bay West (XMF028)							? ----			
12	Keixitu.aan / Taylor Bay East (XMF-027)							? ----			
13	Xakwnoowú fort (XMF-053)										
14	Xakwnoowú village (XMF-053)										
15	Xakwnoowú historic midden (XMF-053)										
16	L'istee village (XMF-013)										
17	Dundas Island (XMF-068)										
18	Point Wimbledon (XMF-069)										
19	Point Dundas Village (XMF-066)								? ----		
20	Carolus River Smokehouse (XMF-006)										
21	Carolus River Smokehouse 2 (XMF-008)										
22	*Carolus River Village* (XMF-007)										
23	Salt Chuck Smokehouse (XMF-009)										
24	Lemesurier Island Fort (oral tradition)		? ----								
25	Inian Islands Village (oral tradition)										
	GLACIER BAY										
26	L'awshaa Shakee.aan (oral tradition)										
27	Chookanhéeni settlements (oral tradition)										
28	Wooshkeetaan clan house (JUN-001)		? ----								
29	Lester Island Village (JUN-026)										
30	Berg Bay Fort (oral tradition)										
31	Sandy Cove Smokehouses (oral tradition)										
32	Drake Island Fort (oral tradition)										
	EASTERN ICY STRAIT/EXCURSION INLET										
33	Kax'noowú/Grouse Hen Fort (JUN-017)										
34	Groundhog Bay 2 (JUN -020)								? ----		
35	Village at Excursion Inlet cannery (JUN-005)										
36	Salmon River lineage houses (oral tradition)		? ----								
37	Salmon Stream Camp (JUN-002)		? ----								
38	Wooshkeetaan Smokehouse (JUN-007)		? ----								
39	Homeshore Lineage House (JUN-013)										
40	Wéitadi Noow (oral tradition)										
41	Lulxágu / Village Point (JUN-015)										
	CHICHAGOF IS.										
42	Xunniyaa (Hoonah)										
43	Point Adolphus (oral tradition)										
44	Mud Bay Village (oral tradition)										
45	Idaho Inlet (oral tradition)										
46	Soapstone Cove (XMF-060)										

region including the early and mid-Holocene levels at Groundhog Bay 2, the 4,380 year-old Kaknau Creek 2 site, and the 6,420 BP lowest level at Xakwnoowú have not been included in the analysis because information is so limited for these early periods.

BEFORE THE GLACIER BAY SURGE: SETTLEMENTS, ECONOMY, AND SEASONAL SUBSISTENCE PATTERN, A.D. 1700 – 1750

Sites for the A.D. 1700 – 1750 period are shown in Figure 41. Winter villages included L'awshaa Shakee.aan, established at an unknown date near present-day Bartlett Cove on the east side of Glacier Bay. The settlement is attested in oral tradition (Black 1957; Cruikshank 2001; Dauenhauer and Dauenhauer 1987:244-291; Emmons 1887; Hall 1962) but was destroyed by the mid-18th century advance of Grand Pacific Glacier (Connor et al. 2009; Lawson et al. 2010; Monteith et al. 2007).

A second probable winter village of this era, as interpreted from archaeological data, was Groundhog Bay 2 (49-JUN-020) on Icy Strait east of Excursion Inlet. While lower occupation levels at Groundhog Bay 2 date to the early and middle Holocene, we refer here to the protohistoric Level 1 at the top of the site, which was deposited after 350 years ago but prior to Western contact (Ackerman 1968:55-79; 1973:4-5). Level 1 contained artifacts such as oil lamps, jet and

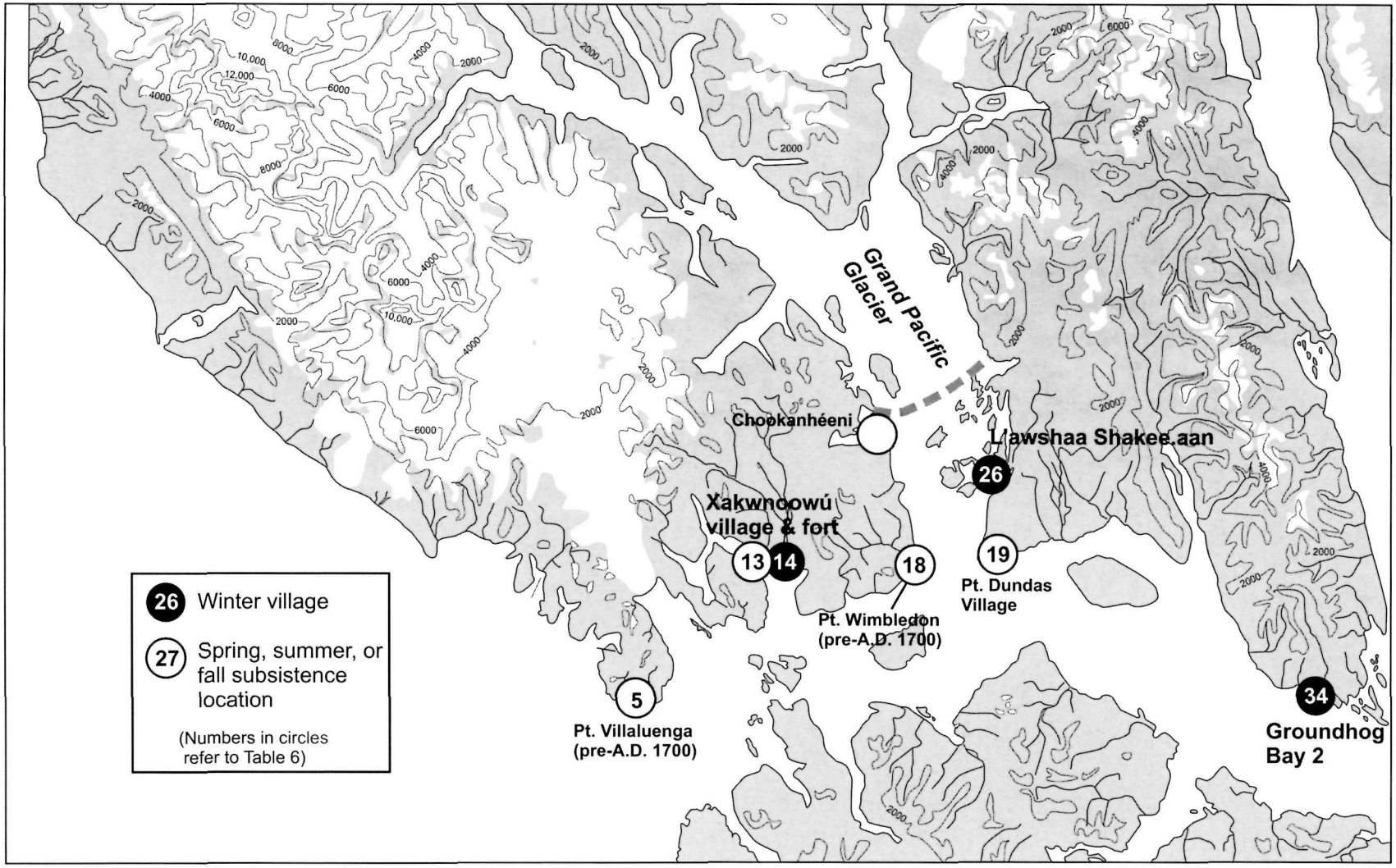


Figure 41: Hoonah Tlingit settlement pattern A.D. 1700 - 1750

amber beads, woodworking tools, stone scrapers, bone needles, and stone debitage which suggest winter habitation and domestic activities. Post-holes encountered during the excavation marked what were probably internal support posts for a winter house (Ackerman 1971).

Xakwnoowú village at the mouth of the Dundas River is noted in oral tradition although undiscovered as an archaeological site, and was probably destroyed by Little Ice Age marine flooding or fluvial erosion. It may have been established in the 12th century A.D. at the same time as the adjacent fort (49-XMF-053) and occupied until the mid-18th century. As described by Deikeenaak'w, Xakwnoowú village was a shoreline settlement with a large number of lineage houses (Swanton 1909:327).

Several spring, summer, and fall settlements are known from A.D. 1700 - 1750 or slightly earlier. Chookanhéeni, located on the former Chookanhéeni stream in what is now western Glacier Bay, is remembered in oral tradition as a place for summer and early fall salmon harvesting. At least two fishing camps were located there, both destroyed by surging glacial ice in the mid-18th century (Connor et al. 2009). The top of Xakwnoowú fort in Dundas Bay was used as a base for spring and summer subsistence activities, as indicated by an 8 m x 8 m smokehouse outline and faunal remains including salmon, seals, birds, and land mammals. At Point Dundas Village (49-XMF-066) a smokehouse floor was found in association with midden dating to 240 +/- 50 BP, for which calibrated radiocarbon intercepts span the late 17th to late 18th centuries. The outer coast fishing camp at Point Villaluenga (49-XMF-049) and another smokehouse at Point Wimbledon (49-XMF-069) were both used somewhat prior to A.D. 1700 as indicated by radiocarbon dates of 270 +/- 50 BP and 320 +/- 60 BP respectively, but were no doubt similar to early 18th century sites.

Based on this limited evidence, the Xunaa Káawu settlement pattern prior to A.D. 1750 included a number of widely dispersed spring, summer, and fall sites for hunting and fishing as well as three principal villages where the population gathered in winter. These were L'awshaa Shakee.aan in Glacier Bay, Xakwnoowú village in Dundas Bay, and an unnamed village at Groundhog Bay (49-JUN-020) near the later fort of Kax'noowú on Icy Strait. Oral tradition associates present-day Hoonah clans with several of these early settlements (Emmons 1887; Thornton 2008:61-66). The Kaagwaantaan (Eagle moiety) were among the first inhabitants of the Cross Sound region and resided at both Xakwnoowú and L'awshaa Shakee.aan. The Wooshkeetaan (Eagle) reportedly had a house at Xakwnoowú. The Chookaneidi (Eagle) were an offshoot of the Kaagwaantaan and established Chookanhéeni on the west side of Glacier Bay. The L'uknax.ádi (Raven moiety) are social opposites of the Eagle clans and lived with them in Glacier Bay before the advance of Grand Pacific Glacier. The T'akdeintaan (Raven) are a branch of the L'uknax.ádi and are in particular associated with the outer coast. The clan name derives from Takdeinx'áat, an island in Lituya Bay (Thornton 2008:50). Families from all of the clans resided at L'awshaa Shakee.aan before its destruction (Emmons 1887).

THE POST-SURGE ERA AND RUSSIAN FUR TRADE: SETTLEMENTS, ECONOMY, AND SEASONAL PATTERN, A.D. 1750 - 1875

Settlements dating to A.D. 1750 - 1875 are shown in Figure 42. During this period the ancestral Hoonah Tlingit experienced dramatic environmental changes associated with the late Little Ice Age as well as the advent of European exploration, Russian colonial rule (1799 – 1867), and the maritime fur trade. Nonetheless, there was a strong continuity of settlement and land use patterns in the Glacier Bay region despite the new economic relations entailed by early Western contact. Far more substantial changes occurred after A.D. 1875, as we discuss below.

The advance of Grand Pacific Glacier in Glacier Bay began in about A.D. 1700 and overran the lower Glacier Bay settlements just prior to A.D. 1750, forcing a change in the locations of winter residence. When L'awshaa Shakee.aan was abandoned, the population divided. The majority of Chookaneidi and T'akdeintaan households founded the new winter village of Xunniyaa (Hoonah) on the north shore of Chichagof Island. The Kaagwaantann built Kax'noowú [grouse hen fort] at Groundhog Bay on Icy Strait (Emmons 1887) and the Wooshkeetaan established themselves in a palisaded village in Excursion Inlet called Wéitadi Noow [fort of the young woman in seclusion] (Hoonah Indian Association 2006; Sam Hanlon Sr. personal communication 2007). The Wooshkeetaan also

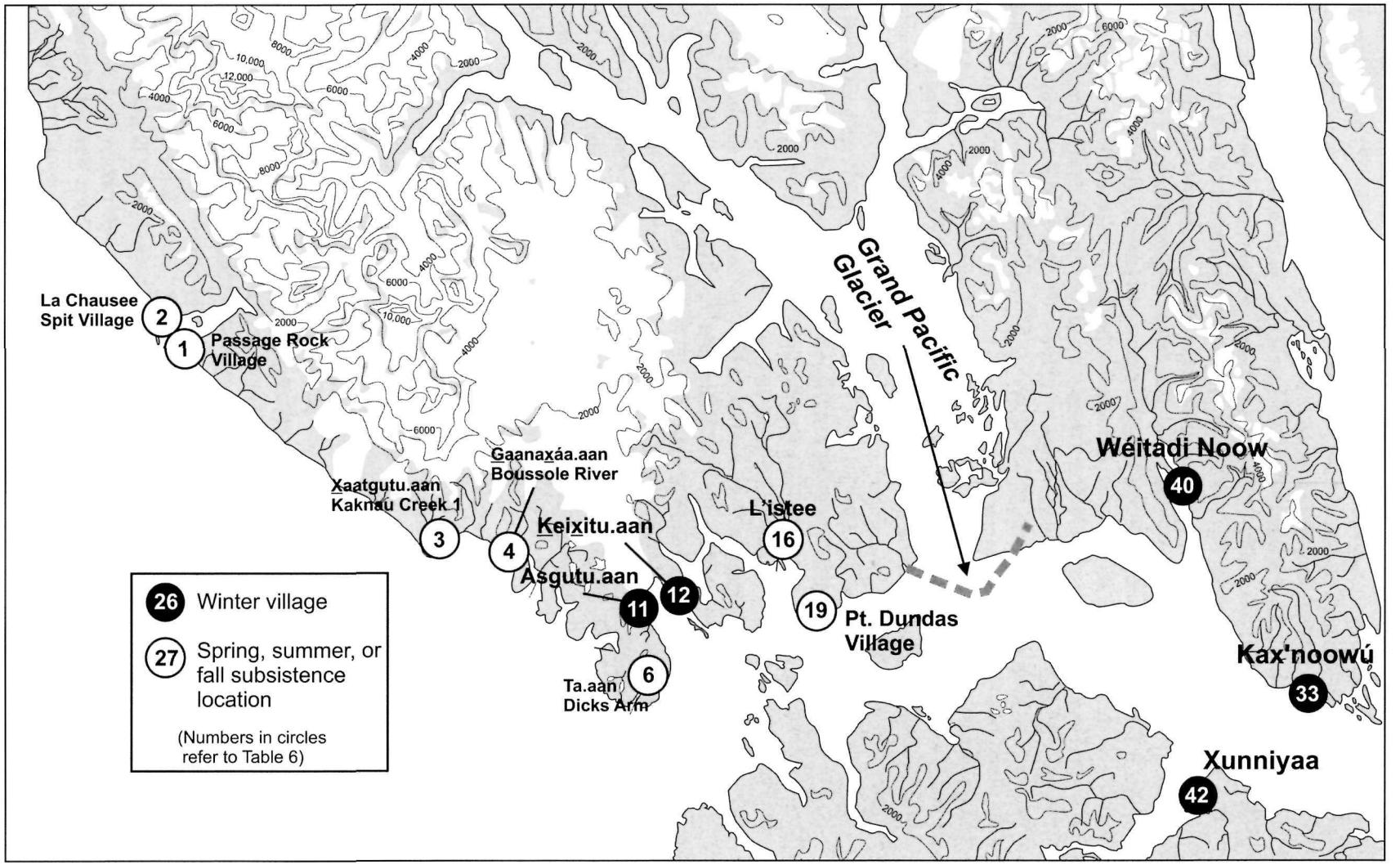


Figure 42: Hoonah Tlingit settlement pattern A.D. 1750 - 1875

constructed a house at Kax'noowú (De Laguna 1960:142-143).

Two additional winter villages are remembered for the late 18th - early 19th century period – Asgutu.aan and Keixitu.aan in Taylor Bay – making a regional total of five. The Taylor Bay villages were founded at unknown dates but existed at the time of the Vancouver expedition in A.D. 1794 (Goldschmidt and Haas 1998:56; Sealaska Corporation 1975:50). Vancouver reported these villages to be "abandoned" at the time of his visit but the occupants may have only been temporarily absent at summer subsistence locations. By the late 19th century, however, Asgutu.aan and perhaps both villages were being used only in summer for berry picking and fishing.

Two of the old winter villages discussed in the previous section appear to have been left behind near the beginning of the A.D. 1750 - 1875 period. The first was the 49-JUN-020 site at Groundhog Bay, located about one km from the newly established Kax'noowú. It is also likely that occupation at Xakwnoowú village in Dundas Bay ceased before A.D. 1775 because of rising relative sea levels during the late Little Ice Age.

Archaeological data reflecting life in the 19th century winter villages are available from excavations at Kax'noowú (49-JUN-017) (Ackerman 1968:15-24). The fortified village included ten lineage houses averaging about 10 m long, now evident as rectangular pits in the surface of the site. Ackerman's excavation of House 1 showed that its original floor was dug out to about 50 cm below the surrounding ground surface and that the central fire pit was surrounded by benches where individual families had their sleeping quarters. Faunal remains were consistent with winter occupation, including Sitka deer and shellfish (harvested in winter and early spring), with few bones of sea mammals, sea birds, or fish.

Several spring, summer, or fall sites are known for the A.D. 1750 - 1875 period including Kaknau Creek 1 (49-XMF-050) on the outer coast at Palma Bay. Our data suggest that Kaknau Creek 1 was a spring, summer, and fall settlement where a broad spectrum of subsistence activities took place including tree bark harvesting, shellfish collection, salmon and halibut fishing, and hunting for seals, mountain goats, and other game. The Kaknau Creek 1 site may be part of the Xaatgutu.aan summer village of oral tradition, where hunting parties in canoes stopped off during seal and sea otter hunting expeditions to Lituya Bay and Dry Bay.

Gaanaxáa.aan, known from oral tradition and identified here as the Boussole River site (49-XMF-052) was another outer coast spring/summer village on Palma Bay. The residents fished for salmon, collected bird eggs, and gathered bark from spruce trees. Additional outer coast subsistence sites included Ta.aan at Dicks Arm and two settlements reported by La Perouse at Lituya Bay in 1786 (Passage Rock Village and La Chausee Spit Village) (De Laguna 1972:114-123).

L'istee village on the Dundas River (49-XMF-013), apparently established in about A.D. 1800, was occupied from March through October (this report; Sealaska Corporation 1975:759). The residents lived in four smokehouses and fished for pink, silver, and red salmon, harvested berries, and hunted for porcupine, black bear, mountain goat, marten, otter, and mink (Goldschmidt and Haas 1998:55-56). Archaeological dating of the older midden at Point Dundas Village (49-XMF-066) and presence of an associated house floor (see discussion above) indicates that this was probably another summer settlement used during the late 18th century.

Part of the Cross Sound/ Icy Strait population migrated away from the region during the late 18th century as Grand Pacific Glacier advanced and sinking of the land disrupted shoreline settlements and food harvesting locales. Families belonging to the L'uknax.ádi, T'akdeintaan, Kaagwaantaan and other clans are reported to have moved north to Dry Bay, Yakutat Bay, and beyond, while others went to Sitka (De Laguna 1972:226-228; De Laguna et al. 1964).

Northern Tlingit interaction with English, American, and Russian sea otter traders began in the late 1780s following the explorations of Bering in 1741, Cook in 1778, Zaikov in 1783, and La Perouse in 1786 (De Laguna 1972:108-158). Artifacts from Kaknau Creek 1 (a trade bead and and worked fragment of bottle glass) provide evidence of this early phase of contact. The Russian-American Company began trading at Sitka by 1799 and established its American headquarters there in 1803, later opening a second post at Wrangell. Although there were no Russian colonial settlements in Xunaa Káawu itself, new trade goods spread throughout the region and were incorporated into everyday life (Krause 1956:39-42). The Russian presence in Alaska ended with the American purchase in

1867, although the initial impact of this transfer appears to have been minimal in the Glacier Bay area until establishment of the commercial salmon industry in the 1880s (see below).

At Kax'noowú, imported Russian and American trade items excavated from House 1 included iron tools and nails, an iron kettle, glass bottles, white China (earthenware) and porcelain cups, gun flints, cartridges, beads, and an 1834 coin, altogether comprising about 22% of the collection. The rest of the items found were locally made stone, bone, and wood artifacts. The House 1 assemblage seems to represent many decades of occupation, with some artifacts dating to the 1810s or earlier while others (e.g. Winchester rifle cartridges) were not manufactured until the 1890s (Ackerman 1968:28-43).

THE AMERICAN PERIOD: TLINGIT SETTLEMENTS, ECONOMY, AND SEASONAL PATTERN, A.D. 1875 – 1925

The consequential period from A.D. 1875 to 1925 spanned the influx of gold prospectors in the 1870s; the rising influence of Protestant missions and government schools; the establishment of local trading posts by the Northwest Trading Company and other American firms in the 1880s; the expansion of market-based trapping for marten, land otter, wolverine, and other terrestrial fur bearers; and the growth of a commercial salmon fishery starting in 1880, with six Icy Strait canneries in operation by 1918 (Langdon 1980). The era was one of strong new acculturative pressures and a cash and wage economy that did not exist under Russian rule. Krause remarked that:

> The material consequence was that also among the natives their customs, which the strangers regarded with such disdain, fell more and more into disuse and instead they took up ways of the whites of questionable advantage to them. The Americans exploited the resources of the country through various industrial developments and brought the Indian into this industrial sphere... (Krause 1956:46-47).

The period ends with the establishment of Glacier Bay National Monument in 1925 (followed by its expansion in 1939) which expropriated a large portion of traditional Hoonah Tlingit territory (Catton 1995). The Hoonah people continued to have access to some of their customary settlements and trapping areas on monument lands until the 1940s although use of these sites declined.

Thirty-nine winter and summer settlements have been tallied for A.D. 1875 - 1925 from archaeological, oral, and historical data (Table 6 and Figure 43). The substantial increase in the number of sites compared to earlier periods is due to several factors. Oral information is more complete within this time frame, including personal memories shared by members of the Hoonah community (Goldschmidt and Haas 1998; Hoonah Indian Association 2006; Sealaska Corporation 1975). Post-A.D. 1875 archaeological sites are better preserved and easier to find because of surface indications that may include partially standing house ruins and occupational debris. Unlike previous periods, all of the settlements were occupied during a regime of declining relative sea level and so have not been eroded or washed away by the sea.

In addition, a pattern of greater residential dispersion during the winter is evident, increasing the overall number of sites. The number of winter settlements with lineage houses increased to at least eight (Table 6), although these varied greatly in size. Xunniyaa (Hoonah) was the largest winter village, with a population of 908 at the time of the first U.S. Census in 1880 (Petroff 1884). Families from all of the clans resided there, as they do today. The second largest winter settlement was Lulxágu [fireweed sand beach] at Village Point (49-JUN-015) southeast of Excursion Inlet, which in 1880 had a population of 108 living in five lineage houses (Ackerman 1965:36-38; Hoonah Indian Association 2005; Petroff 1884). The Wooshkeetaan founded Lulxágu after leaving their former winter site at Wéitadi Noow in Excursion Inlet, a move that took place sometime in the 1870s (Ackerman 1965:36-38). Krause rendered the name of the new village as "Chulchagu" (Krause 1956:69) and Petroff as "Klughuggue" (Petroff 1884). Lulxágu was vacated as a primary village site by the late 1890s, although subsequently used as a fishing and trapping camp (Goldschmidt and Haas 1998:54). Emmons photographed the village in 1888 when at least one large plank house and a totem pole were still standing. Ackerman excavated a house at Lulxágu in 1964, recovering center-fire rifle cartridges, parts of a cast iron stove, and other late 19th century artifacts (Ackerman 1965:3-5).

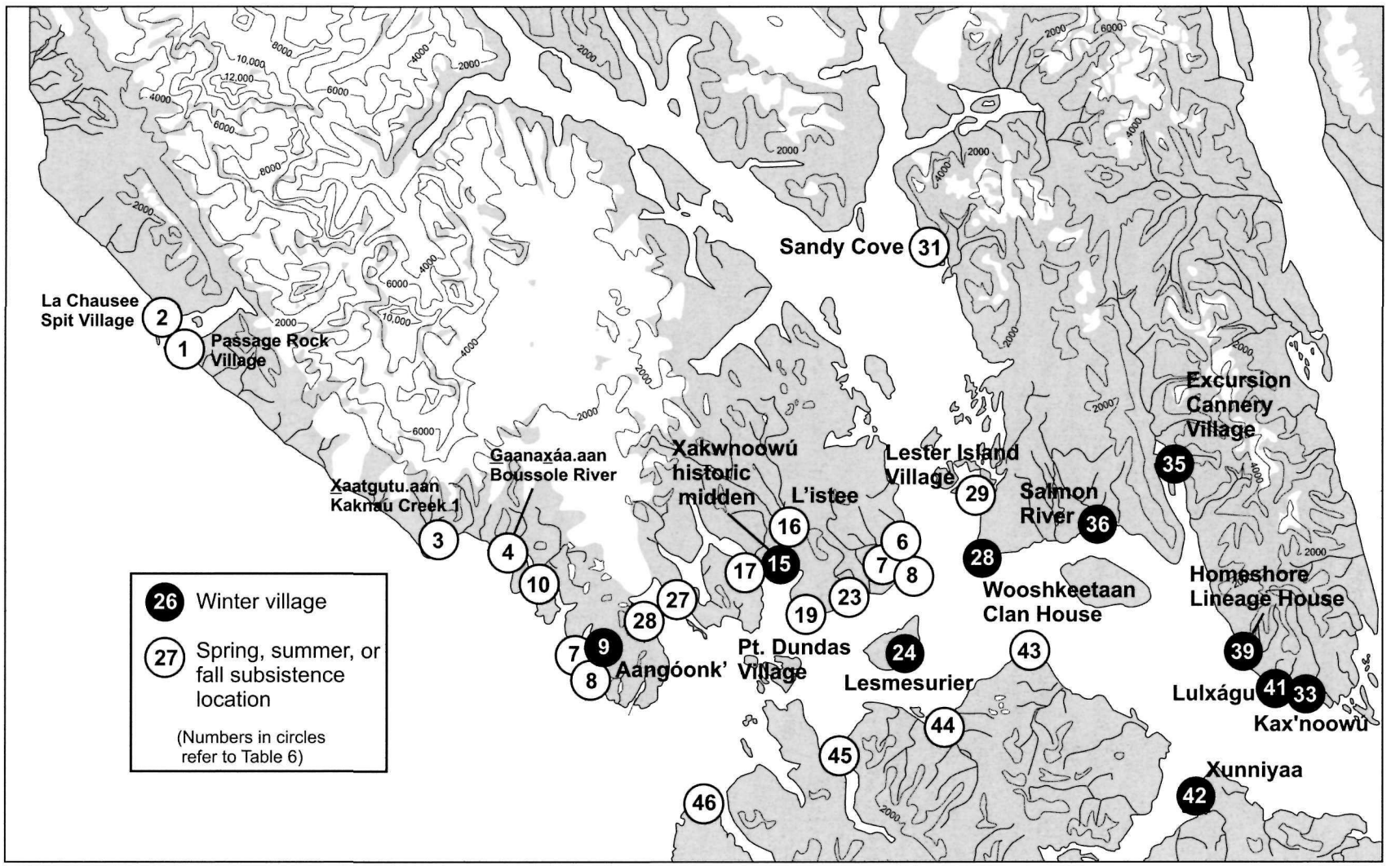


Figure 43: Hoonah Tlingit settlement pattern A.D. 1875 - 1925

A few families also continued to use Kax'noowú into the early 20th century, as evident from the dates of headstones in the nearby cemetery (A.D. 1920 – 1939). A two-story wooden house built at the site for a Kaagwaantaan lineage leader was still standing in 1964 (Ackerman 1965:40; De Laguna 1960:142). Emmons (1887) reported that Kax'noowú had been "largely deserted" after smallpox swept through the region (probably the epidemic of A.D. 1835 - 1839) but if so it appears that people later returned.

Lulxágu, Kax'noowú, and the earlier protohistoric Groundhog Bay 2 site provide evidence that the "Homeshore" region between Excursion Inlet and Point Coverden was an important area for winter residence, used continuously over the centuries. By the late 19th century there was at least one additional small winter site on this coast, the Homeshore Lineage House (49-JUN-013), located about 10 km north of Lulxágu and inhabited from the 1870s until the early 1900s (Ackerman 1965:10-36; Sealaska Corporation 1975:716-717).

Other small winter sites after A.D. 1875 included the Wooshkeetaan clan house (49-JUN-001) at Strawberry Point near Gustavus (Ackerman 1965:1-2; Sealaska Corporation 1975, Sites 18 and 60); one or more clan house sites at the old Excursion Inlet cannery (Ackerman 1965:3); and others at Salmon River east of Gustavus (Ackerman 1965:2) and on Lesmesurier Island (Goldschmidt and Haas 1998:56). In addition, Aangóonk' village at Murphy Cove in Graves Harbor was a winter site; and we found evidence of a late 19th century fall and winter occupation at the base of Xakwnoowú fort, where artifacts date from about A.D. 1885 to 1900.

While the meaning of this new winter site pattern is not entirely clear, it may reflect a strategy for combining cold weather fur trapping and hunting with proximity to the canneries for summer wage employment. It suggests increased social dispersion compared to earlier times when all of the Hoonah Tlingit gathered in two or three principal locations during the winter months for the intensive social and ceremonial season.

Settlements occupied in spring, summer, and fall for fishing and hunting were quite numerous during the A.D. 1875 - 1925 period. Outer coast locations included the Lituya Bay camps, Xaatgutu.aan and Gaanaxáa.aan in Palma Bay, camps at Graves Harbor and Dixon Harbor, and Ta.aan in Dicks Arm at Cape Spencer. In Taylor Bay, the old winter villages of Asgutu.aan and Keixitu.aan were now summer cabin sites. Warm season settlements along Dundas Bay and Icy Strait included L'istee (49-XMF-013), Dundas Island (49-XMF-068), the historic houses at Point Dundas Village (49-XMF-066), three smokehouse sites on the Carolus River (49-XMF-006, 007, and 008), and the Salt Chuck Smokehouse (49-XMF-009). In Glacier Bay, reopened by the retreat of Grand Pacific Glacier, seasonal sites included Lester Island Village (49-JUN-026) and Sandy Cove. On Chichagof Island there were hunting and fishing camps at Point Adolphus, Mud Bay, and Idaho Inlet.

Archaeological and oral evidence indicate that almost all of these sites were no longer in use by the late 1920s, and in large part this may have resulted from the widespread adoption of salmon seining by Hoonah fishermen (Mackovjak 2010). The traditional seasonal subsistence cycle based on residency at clan-owned streams and fish camps was replaced by mobile seining, and families lived aboard their boats during much of the summer. The maintenance of cabins ashore was subsumed by the demands of boat maintenance and fishing operations.

Archaeological data from sites dating to the A.D. 1875 - 1925 period demonstrate a striking shift in material culture brought about by Tlingit incorporation into the American commercial economy. Collections from Dundas Point Village, the Xakwnoowú historic midden, and L'istee included no items of indigenous manufacture, while at the slightly earlier Homeshore Lineage House site locally-made implements (including bentwood boxes, whetstones, and a stone mortar) made up less than ten percent of the total (Ackerman 1965:18-36). As the result of Western trade and employment, Tlingit household goods by the 1880s included a wide variety of factory-made tools, clothing, shoes, metal utensils and cookware, iron stoves, ceramic cups and bowls, bottled and canned foods, kerosene lamps, patent medicines, rifles, metal traps, fish hooks, imported dolls, and more. Some traditional items were still being produced – crest art and ceremonial regalia are important examples – but the utilitarian items of everyday life almost all came from the trading stores.

CONCLUSION

As demonstrated by this report and the settlement analysis above, the archaeological sites of Glacier Bay National Park and Preserve represent an irreplaceable archive of Hoonah Tlingit history. They contain material evidence of indigenous knowledge, cultural practices, and complex adaptive patterns that were developed and adjusted over the course of thousands of years, demonstrating resilience in the face of rapid change and acculturative pressure. The study further shows that the integration of oral tradition and place names with evidence from archaeology and geology can yield a more robust understanding of the human and environmental past than is possible from either considered independently. While oral and scientific information are decidedly different ways of knowing about the past, they are also complementary, each enriching the interpretation of the other. We dedicate this report to the ongoing exploration of Tlingit history and its significance for the present, an effort that has increasingly become an undertaking of the *Hoonah community itself.*

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Images of canoes and paddlers at the Salt Chuck pictograph site (49-XMF-003) on Icy Strait.

The Glacier Bay region of southeastern Alaska is Xunaa Káawu, the territory of the Hoonah Tlingit people. The lives of ancestral generations are inscribed on its storied cultural landscape – residing in memory, commemorated by place names and oral traditions, and renewed through contemporary cultural practice. In this interdisciplinary survey of coastal Glacier Bay National Park and Preserve, indigenous history richly complements archaeological and geological investigations to portray a culturally vibrant people in a physically dynamic region. The project since 1995 has been a joint effort of the Smithsonian Institution, the National Park Service, University of Alaska Fairbanks, and Hoonah Indian Association.