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# *Regional Overview of Prince William Sound and the Pacific Coast of the Kenai Peninsula*

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## INTRODUCTION

The following is a regional overview of Prince William Sound and the adjacent coastline of the Gulf of Alaska. More specifically, this paper deals with an area that extends westward from the offshore islands in Controller Bay to the mouth of Cook Inlet. For the region, there is a rather impressive body of climatic, tectonic, and biological data. There are also the observations of early explorers and ethnographic information recorded by Birket-Smith (1953) and de Laguna (1956). Our knowledge of the area's archeology, however, is meager. In the entire region, there have been only two large scale excavations; all other past work has been limited to survey and testing. Out of necessity, much of this discussion focuses on Prince William Sound, although even here there are more questions than answers.

The region under consideration conveniently corresponds with the homelands of two closely related groups of Pacific Eskimo. To paraphrase Birket-Smith (1953:18), Prince William Sound and the adjacent islands comprise the habitat of the Chugach Eskimo. The gulf coast of the Kenai Peninsula was occupied by the Chugach's nearest neighbors to the west, the Eskimo of Resurrection Bay, Nuka Bay, and Port Graham (Birket-Smith 1953:99). The Eyak, on the very eastern edge of the sound, will be briefly mentioned and then largely ignored Although there is good ethnographic information on this Indian group (cf. de Laguna 1990), there is compelling evidence that they are recent arrivals into the region.

## REGIONAL BOUNDARIES

### *Physiography*

Prince William Sound, an irregular, 113 km wide embayment, lies within a maturely eroded part of the Kenai-Chugach Mountains (Grant and Higgins 1910:14; Wahrhaftig 1965:39; Orth 1967:778). These rugged, 900 to 4,000 meter-high mountains along the northern coast of the Gulf of Alaska also form the "backbone" of the Kenai Peninsula (N. Lethcoe 1987:56). Deep fjords and sounds mark the southern face of the mountains, and ridges extend southward as chains of islands (Wahrhaftig 1965:40).

The Copper River, the major drainage in the region, crosses the eastern part of the Chugach Mountains in a canyon 1.8 to 2.1 km deep (Wahrhaftig 1965:40). The river delta forms the westernmost portion of a relatively straight, exposed coast broken only occasionally by large fjords (Wahrhaftig 1965:41).

### *History of Research*

The most significant archeological research in Prince William Sound to date was done by Frederica de Laguna (1956) during the summers of 1930 and 1933. De Laguna conducted an intensive survey of the sound and undertook a major excavation at Palugvik on Hawkins Island. Other work has included collections from burial caves by Jacobsen in the late nineteenth and Meany in the early twentieth centuries (de Laguna 1956:90-91); site identification and recording in conjunction with the Alaska Native Claims Settlement Act 14(h)(1) selections; a survey by John Lobdell (1976); limited survey and testing of sites by archeologists from the U.S. Forest Service; and site inventory by Chugach Alaska Corporation.

During the summer of 1988, the authors of this paper spent six weeks excavating at Uqciuvit, a large, multicomponent village site in northwestern Prince William Sound (Yarborough and Yarborough 1991). In 1989, archeologists employed by Exxon surveyed approximately 1600 km of shoreline in areas of southwestern Prince William Sound impacted by the *Exxon Valdez* oil spill (Mobley et al. 1990:170). Also during 1989, SJS Archaeological Services inspected a road corridor and associated recreation areas on the southern end of Montague Island (Anne Jensen, personal communication 1990). Exxon archeologists returned to the sound during the summer of 1990 for additional oil spill-related survey work (Haggarty

and Wooley 1990). In 1991, personnel from both the State University of New York (SUNY) at Binghamton and the Alaska Office of History and Archaeology (OHA) conducted independent field studies to assess the effects of oil contamination on selected sites along the northern Gulf of Alaska coast (Dekin 1993; Reger et al. 1992). The SUNY Binghamton and OHA archeologists surveyed and tested six different sites in the sound.

Our limited knowledge of the archeology of the outer coast of the Kenai Peninsula comes from surveys by the State of Alaska (McMahan and Holmes 1987), the National Park Service (Shields 1983), and the Bureau of Indian Affairs (1991). Work done following the *Exxon Valdez* oil spill included surveys by Exxon archeologists in 1989 and 1990, testing of a site in McArthur Pass by both Exxon (Betts et al. 1991) and a joint crew from the National Park Service and Chugach Alaska Corporation (Schaaf and Johnson 1990), and visits to all but five of the known sites in the Port Dick and Nuka Passage area by an OHA field crew in 1990 (McMahan 1991). The 1991 SUNY Binghamton and OHA oil contamination studies also involved work along the coast of the Kenai Peninsula. OHA archeologists investigated six sites in the Nuka Passage area, although only one was extensively tested (Reger et al. 1992:6). The Binghamton crew excavated at sites in Port Dick and along the shore of McArthur Pass.

*Ethnohistoric Boundaries*

Historically, Prince William Sound was occupied by eight geographic groups of Chugach Eskimo. Although these groups shared the same language and culture, each was politically independent, with its own leader and principal village (de Laguna 1956:27). The coast between Prince William Sound and Cook Inlet was apparently inhabited by the Unegkurmiut (Unikhkurmiut, Unixkugmiut) a mostly undocumented people who may have been a subgroup of the Chugach (Clark 1984b:199). They were certainly more closely tied to the Chugach, through dialect, social visits, and intermarriage, than to the Koniag of Kodiak Island (de Laguna 1956:34-35).

During the eighteenth century, the area between the Chugach of Prince William Sound and the Tlingit of Dry Bay was occupied by Eyak Indians. The original homeland of the Eyak stretched from an area east of Yakutat to Cape Suckling, and probably included the shores of Controller Bay. The Chugach, however, controlled the offshore islands. During the early nineteenth century, Tlingitized Eyak pushed the Chugach out of Controller Bay, while "mostly pure Eyak people" occupied the Copper River delta and the very eastern margin of Prince William Sound (de Laguna 1990:189).

Although there was a common identity among the major self-named groups (Clark 1984b:185), the above defined ethnohistoric boundaries appear to have been rather porous. Ethnographic and historic data, for example, indicate that intermarriage between different southern Alaskan groups may have been the norm rather than the exception. Tikhmenev (1978:433-434) noted that "The Chugach natives...are of the same origin as the natives of Kad'iak, but, being related by intermarriage to the Kolosh from Yakutat, resemble them in appearance." In addition, analysis of prehistoric skeletal material from the region indicates that there was a physiological continuum from the Northwest Coast to Kodiak Island (Yarborough and Yarborough 1991).

## MAJOR ENVIRONMENTAL FEATURES

*Coastal Morphology*

Prince William Sound, with roughly 4,800 km of shoreline, is comprised of an intricate system of bays and islands (Grant and Higgins 1910:15; N. Lethcoe 1987:1). Fjords are common in the northern and northwestern areas of the sound, while the eastern part is characterized more by relatively flat, low islands and forelands (Grant and Higgins 1910:15-17). There are numerous coastal streams in the sound, although most head in glaciers and are short and swift (Wahrhaftig 1966:40; Alaska Department of

Fish and Game 1978:11).

The islands of southwestern Prince William Sound, and the outer coast of the Kenai Peninsula are dominated by bedrock shorelines. Shores exposed to large waves are typically characterized by high cliffs, while scarps in more sheltered areas have a lower relief. Depositional features such as sand and gravel beaches, and "river mouth delta-tidal flat and salt marsh systems" are common only in protected waters (Hayes 1986:446-467).

*Glacial History*

The large ice fields and numerous valley glaciers found today in the Chugach and Kenai Mountains are but remnants of a much larger late Pleistocene ice sheet. Ice flowing from the mountains coalesced in Prince William Sound to form a huge piedmont glacier which probably extended at least to Montague and Hinchinbrook Islands (Heusser 1983:337). Prince William Sound was apparently deglaciated later than other areas of south-central Alaska. Heavy snowfall during the late Pleistocene evidently maintained the glaciers here even as the ice wasted in neighboring regions. Deglaciation began sometime prior to 10,000 B.P., although it was not until about 9000 B.P. that lower elevations were completely ice free (Heusser 1983:337, 353; 1985:153).

In the Kenai Mountains, there is depositional and erosional evidence for five Pleistocene glaciations (Karlstrom 1964:53). During late Wisconsin times, "mountain glaciers coalesced as an ice cap over the seaward side of the Kenai Peninsula and down fjords such as Nuka Bay" (Mobley et al. 1990:40). Harding Icefield, covering approximately 1,865 square km, is a vestige of this ice mass (Alaska Planning Group 1975: 32).

There were three major intervals of late Holocene glaciation in the mountains of the Kenai Peninsula: one that began about 3600 B.P., a second that commenced about 1350 B.P., and a third that lasted from about 650 to 100 B.P. (Wiles and Calkin 1992:1). Similar periods of Neoglacial advance are seen in western Prince William Sound. The first advance in this area dates between about 3200 and 2400 B.P. (Heusser 1983:351). The second occurred about 1410 B.P. (Heusser 1983:351), while the third began between 650 and 580 years ago, and ended sometime during the nineteenth century (Post 1980).

*Holocene Tectonics*

The tectonic movement associated with the 1964 Alaskan earthquake was only the latest in a long series of deformations in the region (Plafker 1969:1). Paleoseismic data from the area indicate that there have been earthquakes on the order of the 1964 event every 650 to 850 years since about 3035 B.P. During the past several thousand years, the trend has been one of emergence of portions of the continental margin and concurrent submergence of the Chugach, Kenai, and Kodiak Mountains. In general, there is a correspondence between zones where there was a significant amount of uplift or subsidence during the 1964 earthquake and areas of net emergence or submergence during the late Holocene (Plafker 1969:62). The seismic cycle in the region is complex, however, and uplifted areas can subside as much or more between earthquakes as they are raised during events (George Plafker, personal communication 1990).

Studies done after 1964 suggest that much of the coast affected by the Alaskan earthquake had also experienced a pronounced, short term tectonic submergence (Plafker 1969:60-61). Radiocarbon dates from samples of submerged terrestrial vegetation taken from Seward to Cape Suckling show that this submergence occurred gradually or in numerous small increments, and generally took place at a rate of approximately 52 cm per century during the last 930 years. The upper limit for the duration of this submergence is uncertain, but it could have begun as early as 1350 B.P. (Plafker 1969:62)

*Holocene Climate and Vegetation*

During the past 10,000 years, the North Pacific region has experienced two gross environmental periods (Heusser et al. 1985). The early Holocene was characterized by warm temperatures and low precipitation, while the late Holocene (after 5000 B.P) featured higher precipitation and lower temperatures. Increased storm activity during the late Holocene, combined with steadily decreasing temperatures, brought on the Neoglacial episodes described above (Heusser et al. 1985:486-487).

The stormy, cold, and rainy weather that today characterizes the region was forbidding even to the Native inhabitants:

> That the storms, wind, and rain were felt as hardships by the natives, in spite of their waterproof gutskin clothing and seaworthy skin boats, is shown by the number of magic rites and spells which they practiced in order to bring good weather (de Laguna 1956:8).

The earliest human migrants into the region probably found a landscape dominated by sedge tundra with thickets of willow and alder. Sitka spruce and hemlock entered the pollen record about 3000 B.P., although it has only been during the last 2,000 years that they have replaced much of the alder. The establishment of stands of conifers in Prince William Sound was the result of a migration northwestward along the coast of the Gulf of Alaska that took place as storm tracts strengthened during the late Holocene (Heusser 1983; 1985).

*Resources*

Terrestrial mammals are relatively abundant on the mainland and islands of Prince William Sound and the outer Kenai coast. The species present, including mountain goat, bears, wolf, fox, wolverine, mink, weasel, marten, porcupine, marmot, beaver, squirrel, muskrat, and land otter, are typical of coastal western hemlock-Sitka spruce-mountain hemlock and Alpine tundra ecosystems. Among the marine mammals found in the region are sea otters, harbor seal, sea lions, and a variety of cetaceans (National Park Service 1988:33; Yarborough and Yarborough 1991). Fur seals, occasional visitors to the area, may have been more plentiful prior to overhunting in the nineteenth and early twentieth centuries (Dennis McAllister, personal communication 1990).

Only a few species of birds are found year round in the area. Their numbers are augmented, however, by the many migratory species which either summer or winter along the coast. Runs of king, red, and silver salmon are small in the sound, although pink and chum salmon are common during the spawning season (Yarborough and Yarborough 1991). All of the salmon species spawn in the streams of the Kenai coast (National Park Service 1988:34). Both bottom and mid-water fish are plentiful. Among the freshwater fish found in nearby lakes and streams are trout and Dolly Varden. A wide variety of shellfish and invertebrates are found in the area, both in the inter tidal zone and deeper water (National Park Service 1988:34; Yarborough and Yarborough 1991).

*Physiography, Marine Resources, and Cultural Development*

The cultural development of the Chugach Eskimo appears to have been greatly influenced by the particular characteristics of Prince William Sound. For example, explorers comments (cf. Vancouver 1967:197) and census reports indicate that the early historic period population in the sound was "strikingly and consistently" low (de Laguna 1956:256). The census figures and explorers' impressions are in accord with the archeological evidence. During her surveys, de Laguna (1956:255-256) found relatively few sites, none of which could be described as a large village. She also noted that there are long segments of coastline where there are no sites.

De Laguna (1956:257) could not explain this "apparent underpopulation" of the sound, although she suggests that the Chugach may have been more exposed to "raids by foreign peoples." The physical location of Prince William Sound, in a cul-de-sac along the coast, certainly suggests such a vulnerability, and there is evidence that defensive potential may have been more important than the availability of food resources in the selection of village locations. Even the "tempting presence" of salmon streams and shellfish beds were not enough to entice the Chugach to settle at the heads of bays, "dead ends from which no escape by water would be possible in the event of an attack." Instead, villages were frequently placed in a "strategic position" that "commanded a view of the approaches" (de Laguna 1956:11).

Seismic activity may also have affected the size of the population of the Prince William Sound region. Archeological and geological data from the outer Shumagin Islands suggest that there is an "inverse correlation between prehistoric settlement size and numbers and geologically inferred earthquakes" (Winslow and Johnson 1989:314). An example of the negative effect of seismic activity on settlement patterns can be seen at Uqciuvit, where one portion of the site appears to have been abandoned following an earthquake roughly 1600 years B.P.

However, it may be that Prince William Sound was simply not capable of supporting a large population. Like Kachemak Bay, the sound may have been "marginal habitat for true Pacific Eskimos" (Workman and Workman 1988). Compared with other areas in southwestern Alaska, Prince William Sound has fewer ecological "hot spots" (McCartney 1988:33, 46). Salmon runs are smaller, and pinniped haul-outs are fewer and farther between. As Hassen (1978:72) has proposed, it could be that "Chugach population density [actually reflected] the carrying capacity of the Prince William Sound environment considering the technology used to exploit the resources."

There is growing evidence that the relative lack of food resources in the sound was, in part, a result of both Holocene climactic fluctuations and tectonic movement. As an example, climate changes during the late Holocene probably had an adverse impact on salmon stocks. During Neoglacial episodes, decreases in surface water temperature likely affected salmon size, abundance, seasonal return, and maturity rates. Decreases in ocean salinity near spawning streams from increased runoff and/or increased melting of glacial ice could also have hampered the ability of salmon to return to a particular spawning stream (L. Yarborough 1993c). Seismic activity can have a profound effect on the resources in this region. Shellfish, which are particularly sensitive to co-seismic turbidity and changes in depth (Winslow and Johnson 1989:312), were severely impacted by the 1964 earthquake, which killed an estimated 36 percent of the hard-shell clams and 90 percent of the blue mussels in Prince William Sound (Baxter 1971:238, 245). The earthquake also killed thousands of rock fish, flat fish, and cod, and salmon returns to Montague Island, estimated to be approximately 700,000 before 1964, were only about 20,000 in 1969 (Harry 1971:2, 4).

## PREHISTORIC CULTURAL SEQUENCE

### *Prince William Sound*

De Laguna's surveys and her excavation at Palugvik provided the initial ideas about the culture history, settlement patterns, and subsistence strategies in Prince William Sound. She was also the first to suggest that the prehistoric inhabitants of the sound "shared in the basic cultural patterns common to southwestern Alaska" (de Laguna 1956:258). She attributed any distinctive elements found in the sound to its location along the northeastern margin of the area, the local availability (or unavailability) of particular resources, and closer contacts between its inhabitants and Indian groups.

The cultural chronology in Prince William Sound is known primarily from the excavations at Palugvik and Uqciuvit. The occupation at Uqciuvit lasted for over 3,600 years with only one major break, while

Palugvik was inhabited from approximately 2,000 years ago until some unknown date prior to contact (Clark 1984a:145, Figure 2; W. Workman 1980:80).

The earliest known occupation of the sound, termed the Uqciuvit phase, is dated to between about 4,400 and 3,300 years ago. Very little is known about the people of this pre-Neoglacial phase, except that they hunted sea mammals, used red ocher, and were familiar with slate grinding. They lived during a time of cool, moist, and sometimes severe weather (Heusser 1960), in a landscape that was dominated by sedge tundra (Heusser 1983:343, 347).

At least portions of the sound appear to have been abandoned during the Neoglacial interval. At Uqciuvit, there is a gap in the occupational sequence that corresponds almost exactly with the age--3200 to 2500 B.P.--of the first Neoglacial advance in northwestern Prince William Sound. During this time, ice came within about 7 km of the site (Heusser 1983:351, Figure 8). As W. Workman (1980:58) has suggested, the advancing ice probably drove the site's inhabitants from the inner coast of the sound. However, although the cooler climate and increased moisture that accompanied the advance probably did have had an affect on settlement patterns, it does not appear that the entire sound was abandoned, as there is evidence of an occupation at the Lewis Bay Lamp site on Knight Island that began approximately 3,400 to 3,100 years ago (Research Foundation of the State University of New York 1992:139).

Palugvik was apparently first occupied and Uqciuvit was reoccupied approximately 2,250 to 2,350 years ago by people of the Palugvik phase. This phase, divided into early and late periods, spans the period from about 400 B.C. to roughly A.D. 1100. The change from early to late Palugvik seems to have occurred sometime after the middle years of the first millennium A.D. One factor which probably contributed to, and may have actually caused, this change was the development during the last 2,000 years of conifer forest communities in the sound. A marked shift in the abundance of fire-cracked rock, the presence or absence of a few artifact types, and changes in the popularity of certain forms have been used to distinguish between the early and late periods of the Palugvik phase, although there is actually little difference between the material culture of these two periods (de Laguna 1956:60, 64). Stability through time can be seen in many of the tool forms at both Palugvik and Uqciuvit.

One rather common Palugvik phase artifact is the slate "awl," which de Laguna (1956:159) concluded was actually a type of projectile point which was "probably intended to break off in the wound, and presumably used for hunting whales and large sea mammals." Based on the fact that "awls" were found more frequently in the lower than in the upper levels of Palugvik, and none were recovered from younger prehistoric period sites, de Laguna (1956:161) suggests that they were used for a type of hunting that "became less common in the later period of occupation of the sound."

The late prehistoric, protohistoric, and possibly early historic occupations of the sound belong to the Chugach phase. This phase shows continuity with late Palugvik, although a few new artifact forms are added to the assemblage. The separation of the Palugvik and Chugach phases, and the periodization of each, is somewhat arbitrary, since an in situ development can be seen at Uqciuvit from the earliest post-Neoglacial occupation of the site to the protohistoric or early historic period. There is, however, a marked correlation between these phase and period divisions, and where others have drawn lines between Kachemak Bay or Kodiak Island phases. This correspondence is not forced, but simply reflects the dating and artifact typology from Uqciuvit. Early Palugvik appears to be roughly contemporaneous with Kachemak sub-III and III, while the division between late Palugvik and Chugach occurs at about the same time as the beginning of the Koniag phase on Kodiak. The Palugvik phase continues beyond the A.D. 500 temporal boundary that Workman and Workman (1988:Figure 2) believe marks the disappearance of the Kachemak tradition from Kachemak Bay, although the shift from early to late Palugvik seems to occur soon after.

*Outer Coast of the Kenai Peninsula*

Because of a lack of research, "the area along the Pacific Coast of the Kenai Peninsula...is largely a void in the archeological record" (McMahan and Holmes 1987:8-9). The oldest radiocarbon date from the region, from SEL-188 along McArthur Pass, is only 1710 ± 120 years (Research Foundation of the State University of New York 1992:139). Other dates from SEL-188 suggest a continuous occupation until about 600 B.P. (Schaaf and Johnson 1990:Table 2; Research Foundation of the State University of New York 1992:139), although there is also an undated historic component. This site was probably occupied seasonally by small groups of people whose "stone technology reflects associations with late prehistoric groups from Kodiak, Kachemak Bay, and Prince William Sound" (Schaaf and Johnson 1990:21).

Other prehistoric settlements in the area which have received some degree of scrutiny include SEL-215, a site in the Nuka Passage area which post-dates A.D. 1000 and shares some traits with the Koniag phase (Reger et al. 1992:20-21), and the Northwest Lagoon site, a large village in Harris Bay (Bureau of Indian Affairs 1991:316). The latter site, with dates of 140 ± 60 and 206 ± 73, may have been occupied during the last Neoglacial advance of Harris Glacier and abandoned at the glacial maximum (Aron Crowell, personal communication 1993).

## SIGNIFICANCE OF MARITIME ACTIVITIES OVER TIME

The residents of Prince William Sound and the outer coast of the Kenai Peninsula may be categorized as having a Modified Maritime subsistence and settlement pattern (Fitzhugh 1975:344; McCartney 1988:33). Although they used both terrestrial and marine resources, they certainly emphasized the latter. According to Birket-Smith (1953:43), the staple diet of the Chugach was formed by sea mammals, fish, and, to a lesser degree, land animals, birds, mollusks, and vegetable products. The hunting of land animals was far less important economically and socially than the pursuit of sea mammals, with the mountain goat being the only large terrestrial animal regularly hunted (Birket-Smith 1953:37).

The people of the sound and the Kenai coast, like other North Pacific groups, were more than simple hunter-gatherers. Available historical and ethnographic information suggests that they had many of the characteristics associated with social complexity: sedentism, elaborate burial customs, occupational and task specialization, the potential for dietary surplus, redistributive economies, territorial boundaries, long-distance exchange networks, technological innovation, and warfare (Price and Brown 1985). In addition, the social inequality observed by early explorers and missionaries warrants their being categorized as ranked societies (Townsend 1980; L. Yarborough 1993a:2). Recently available archeological information also suggests that sedentism, population density, and social complexity increased over time (cf. Erlandson et al. 1992).

? reversed? Connection to Rice Ridge not clear.

An extensive early use of marine resources evident at the Rice Ridge site on Kodiak Island (Hausler-Knecht 1991) is echoed in the meager faunal remains from Uqciuvit phase components in Prince William Sound (Haggarty et al. 1991:175; Yarborough and Yarborough 1991). Later residents of both Palugvik and Uqciuvit also relied heavily on marine resources, especially various species of sea mammal. The most striking similarity between the vertebrate faunal collections from these two sites is that they contain almost equal percentages of sea mammal bones. Although the species that constitute the bulk of the remains at each site are different, the people at Uqciuvit and Palugvik seem to have depended on sea mammals to provide roughly the same proportions of their diet. Also, the relative importance of sea mammals, at least at Uqciuvit, changes little from the early post-Neoglacial to the protohistoric and early historic occupation (Yarborough and Yarborough 1991).

The non-sea mammal portion of the diet at Palugvik and Uqciuvit was different. At Palugvik, it was

comprised of land mammals, birds, and a significant amount of shellfish. At Uqciuvit, the remainder of the prehistoric larder was made up primarily of fish supplemented with land mammals, birds, and some shellfish. This is due in part to differences in resource availability in the vicinity of each site, but may also reflect variation in season of occupation.

In general, fish comprise a small part of the faunal collection at Uqciuvit, but this may the result of taphonomic processes (cf. Jones 1986; Butler 1989). It would, therefore, be premature to assume that fish played a lesser part in the diet of the site's residents than did sea mammals. Given the site's location between two anadromous fish streams, it is easy to conclude that fishing and fish storage were important at least during the later prehistoric periods. Also, to paraphrase de Laguna (1956:258), probably the most significant fact about Chugach subsistence that a researcher would miss by studying only the artifacts would be the importance of salmon in the economy. She believed that fish, especially salmon, were as important prehistorically as they were in the nineteenth and twentieth centuries, and that storage technology would have been an important prerequisite for habitation of a village on a continuous basis. Although few fish bones were initially identified from Palugvik (de Laguna 1956:51), more recent analysis of the fauna from this site indicates the use of salmon, herring, flatfish, cod, halibut, and shark (Enghoff, personal communication 1993; L. Yarborough 1993b).

The number of invertebrate faunal elements appears to have been much greater at Palugvik than at Uqciuvit. De Laguna (1956:51) suggests an increased use of shellfish over time at Palugvik, although she cautions that her observations might simply reflect the crushing and condensing of shell in the lower layers of the midden. It is difficult to make a true estimate of shellfish use at Uqciuvit because of poor preservation and the uneven distribution of shell across the site, though it may be that shellfish were more important during the late Palugvik phase than at other times.

## RELATIONSHIPS WITH ADJACENT REGIONS

As the easternmost Eskimo groups on the Pacific coast, the people of Prince William Sound and the outer Kenai Peninsula were in contact not only with other Eskimos, but also with several Indian tribes. The Chugach, for example, had names for the Eskimo inhabitants of Kodiak, Iliamna Lake, and Bristol Bay, and both general and geographically specific names for the Indians of the Kenai Peninsula and Copper River. Although warfare seems to have been "the general state of affairs" between the Chugach themselves, and the Chugach and their neighbors (Birket-Smith 1953:101), trade was important. Commerce was primarily in non-food items--slaves, copper, greenstone, slate, and caribou skins--although the Eyak, who "were very poor", bought food from the Chugach "with baskets, snowshoes, adzes, and wedges (Birket-Smith 1953:100-101). The "most important trading" was with the Ahtena who provided the Chugach with canoes, copper knives, and caribou skins (Birket-Smith 1953:101).

Their geographic location put the inhabitants of the region in a rather curious position. While they were on the periphery of two cultural areas, they also occupied a pivotal point, receiving and sometimes passing on influences from both (M. Yarborough 1991). The many basic cultural traits shared by the people of Prince William Sound and other groups around the Gulf of Alaska is reflected in W. Workman's (1980:80) inclusion of the sound in his North Pacific Maritime co-tradition, and de Laguna's assertion that we are "dealing with a North Pacific province where the cultural lines...are much less sharply drawn than are the linguistic boundaries" (de Laguna et al. 1964:209).

Archeologically, although the Palugvik phase is related to the Kachemak tradition, Clark (1984a:140) is probably justified in excluding Prince William Sound from the tradition proper. The pervasive similarities both in stylistic details and more general cultural trends, and "the broad underlying interconnectedness that most of us sense in the Kachemak tradition...over a span of more than 1000 years" (W. Workman 1988:14) apparently did not exist between Prince William Sound and

either Kachemak Bay or Kodiak. Instead, Prince William Sound seems to have been along the northeastern edge of a Kachemak cultural continuum that began on Kodiak Island.

The most simplistic answer to de Laguna's (1956:275) question "Who really were the Chugach?" is that they are the direct descendants of Palugvik phase people who appeared in Prince William Sound at least 2,400 years ago. The Chugach, however, are both physically and linguistically related to the Koniag of Kodiak Island (Clark 1974:172, 177). There are also close archeological ties between the late Palugvik phase and northern, nonceramic Koniag assemblages, although this is not to suggest that one was derived from the other. Instead, similarities between the Chugach and Koniag are probably best explained by both diffusion and common ancestry.

There is also a particularly strong relationship between Prince William Sound and the Yakutat region:

> There is hardly a single trait of Yakutat archeology that cannot be duplicated or at least matched by something similar from Prince William Sound, and the trends noted with respect to the use of copper, of woodworking tools, and so forth, are the same in both areas. Many of these points of similarity apply to traits that are narrowly defined and that appear only in late prehistoric times, but others apply to traits that are very much older (de Laguna et al. 1964:209).

## STRENGTHS AND WEAKNESSES OF THE ARCHEOLOGICAL RECORD

It should be obvious from the forgoing discussion that there are more weaknesses than strengths in the archeological record of Prince William Sound and the Pacific coast of the Kenai Peninsula. Currently, although there are clues in the historic and ethnographic record, not enough is known about the archeology of this region to even assess its ultimate potential for contributing to the understanding of North Pacific maritime cultures. However, rather than retreating into cliché and hiding behind a call for more research, it might be profitable to consider some of the methodological and theoretical approaches which have been either applied to, or suggested as having utility in the study of the maritime adaptation of the region.

Numerous hypotheses--which Yesner (1992:168, 176) has categorized as "North Pacific Maritime Stability", environmental change, and resource intensification models--have been proposed to explain the development of North Pacific coast technological and social complexity. The maritime stability model, more or less assumed by some researchers for the North Pacific, attempts to explain technological change without reference to population increases or environmental changes.

A model of resource and settlement patterns developed by Schalk (1981) for the Northwest Coast, applied by McCartney (1988:46-47) to the Bering Sea shore of the Alaska Peninsula, and used by Yarborough and Yarborough (1991) for Prince William Sound, is an example of a stability model. Schalk (1981:57) hypothesized that complex societies developed as a result of the "clumped" nature of resources in more northern regions, rather than as a result of increasing population size or general regional resource availability. An early attempt by Hassen (1978) to explain prehistoric Chugach Settlement patterns also uses a line of reasoning very similar to Schalk's model.

Environmental change models--such as Kotani's (1980) and Yesner's (1982) respective explanations for changes in molluscan fauna at the Hot Springs site on the Alaska Peninsula and the Chaluka site on southwestern Umnak Island--"invokes climatic and/or geomorphological change as a source of changes in exploitative patterns..." (Yesner 1992:168). An example of a subsistence intensification model is one proposed by Haggarty et al. (1991) and Erlandson et al. (1992) for the northern Gulf of Alaska, including Prince William Sound. They have assumed gradual population growth, with increasing stress on presumed stable and abundant subsistence resources over the past 7,000 years.

Both Yesner (1992:176-177) and L. Yarborough (1993a) have suggested the utility of elements of all three types of model in understanding the relationship between maritime resources and cultural change in the Pacific Eskimo/Aleut region in general, and the Prince William Sound/Kenai coast area in particular. According to Yesner (1992:177):

> [the] unraveling of the culture history of the region may require stepping beyond the "maritime stability model" to apply a variety of approaches, including various measures of environmental change and subsistence intensification.

L. Yarborough (1993a) has proposed that data on climatic change be combined with evidence for increasing populations and greater human pressure on resources to provide a more realistic picture of the interaction between people and their subsistence base.

Although the reasons for technological change noted in the archeological record are not yet well defined, there does seem to be a general correspondence between broad climatic fluctuations and the divisions that researchers have made in the prehistoric cultural sequences of the northern Gulf of Alaska. It may be that climactic fluctuations affected faunal habitat sufficiently to have required adjustments not only in patterns of resource use, but also in settlement patterns, social organization, inter-group relationships, and religious/magic beliefs. For instance, as salmon populations began to decrease or fail as a result of changes in the climate during the late Holocene, one might expect to see archeological evidence of:

1. greater use of other species and/or a broadening of the subsistence base to include resources not previously exploited;

2. movement of settlements away from salmon streams and nearer to other, more stable resources; and

3. indications of either more complex social organization, as people came together in areas of stable resources, or increased numbers of small seasonal sites as groups disbanded in search of alternative sources of food.

One might also find indications of an increase in warfare as people competed for fewer resources, and a rise in religious/magic activity as people tried to ensure plenty for their families. Such adjustments might be most noticeable in "marginal" areas such as Prince William Sound, where earthquake activity could have compounded the effects of environmental change, and the prehistoric residents may have had to struggle to adapt their maritime-oriented culture to variations in resource availability. Indeed, the sound may be the prefect vantage from which to view the interaction between people and their subsistence base. An exploration of the relationship between environmental factors and cultural development in this area could lead to a broader understanding of the nature of maritime adaptation in the North Pacific region.

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