AN OVERVIEW OF THE RADIOCARBON CHRONOLOGY IN COOK INLET PREHISTORY

Douglas Reger and Alan Boraas

ABOUT THE AUTHORS

DOUGLAS REGER

Douglas Reger is an archaeologist with the Alaska Division of Parks and Outdoor Recreation in Anchorage. He received his B.A. from the University of Alaska in Fairbanks in 1970 and has worked in Alaskan archaeology since 1964. He earned his M.A. in 1973 and Ph.D. in Anthropology during 1981, both degrees from Washington State University. He was U.S. Forest Service Regional Archaeologist for Alaska, 1974-1975, and began working for the State of Alaska in 1975. Most of his field work has been in the Interior of Alaska, Southcentral and Southeast Alaska. He has conducted research in the Cook Inlet area, particularly on the Kenai Peninsula, since 1970. In addition to his on-going research interest in the Cook Inlet area, he has continued research into the archaeology and aboriginal fishing technology in Southeast Alaska.

ALAN BORAAS

Alan Boraas is Associate Professor of Anthropology at the Kenai Peninsula College. He earned his B.A. degree from the University of Minnesota in 1969, and served as a research archaeologist with the Trans-Alaskan Pipeline Archaeological Survey in 1969 and 1970. He obtained an M.A. from the University of Toronto, in Toronto, Ontario, in 1971 and a Ph.D. from Oregon State University, in Corvallis in 1983. He has been at the Kenai Peninsula College since 1976. A prolific writer, he has authored over three dozen articles, reports, and reviews as well as more than one hundred weekly newspaper articles. Additional biographic information appears at the article he and Donita Peter have in this volume on "The True Believer" (p.182).

AN OVERVIEW OF THE RADIOCARBON CHRONOLOGY IN COOK INLET PREHISTORY

Douglas Reger and Alan Boraas

ABSTRACT

Recently obtained radiocarbon dates from sites on the Kenai Peninsula clarify the existence and age of several cultural stages. A Kachemak-related stage lasted roughly from 1000 B.C. to A.D. 1000 and a Late Prehistoric stage began about A.D. 1000. With a few exceptions, the latter period appears to represent occupation of the western Kenai Peninsula by Dena'ina Athabaskans. Investigators of some sites in Kachemak Bay and Turnagain Arm interpret Late Prehistoric occupations as remains left by visitors from adjacent areas.

Kachemak-related remains along streams of the central Kenai Peninsula are generally coincident with similar sites in the Kachemak Bay area and beyond. The central Peninsula occupations, previously referred to as a local variant of the Kachemak Culture, will more usefully be known as "Riverine Kachemak." Radiocarbon dates suggest that Riverine Kachemak continued after its more southern relative disappeared.

Occupations prior to the Kachemak stage have been found at several locations but remain ill defined. Reevaluations by Workman of existing and very recently obtained data indicate emergence of a clearer view of the complex earlier occupations.

RADIOCARBON DATES

Use of radiocarbon dating for interpretation of archaeological remains in the Cook Inlet basin was first reported in 1959 using samples obtained by Frederica de Laguna on Yukon Island (Rainey and Ralph 1959:368, 371; de Laguna 1962:166). At the time de Laguna was understandably reluctant to place much reliance on the dates, but they were the first obtained for Cook Inlet and recent research suggests the results are as applicable today as they were then. In the intervening years a total of 85 useful radiocarbon dates have been measured in the Cook Inlet area (Table 1). That number does not include a small number of dates thought contaminated or obviously out of cultural context.

Calendar ages reported in this paper have been calibrated using version 2.0 of the CALIB program[1] developed at the Quaternary Studies Center at the University of Washington, and sometimes vary slightly from dates generated using other methods. The dates are cited here without a standard deviation. The purpose of

[1] CALIB is a computerized program to convert radiocarbon dates calculated on a radiocarbon disintegration rate curve to a more accurate curve derived from tree rings. The treering based curve also allows accurate conversion of "before present" dates to calendrical dates (i.e., B.C. or A.D.).

TABLE 1
Radiocarbon Dates, Cook Inlet Area, 1993

Lab. No.	Calendar date	C14 date	Culture	Reference
Beluga Point Site, ANC-054				
GX-4409	AD 1257	790±120	BPN-III	Reger 1981:190
GX-5038	2205 BC	4155±160	BPS-I	Reger 1981:220
BETA-6014	2130 BC	4080±150	BPS-II	Reger n.d.
WSU-1887	AD 1296	650±70	BPN-III	Reger 1981:190
Merrill Site, KEN-029				
S-1040	790 BC	2560±300	Riverine Kachemak	Reger 1977:49
S-1041	295 BC	2245±115	Riverine Kachemak	Reger 1977:49
GX-16523	182 BC	2135±130	Riverine Kachemak	Reger 1990:field notes
Moose River Site, KEN-043				
GX-5039	AD 543	1515±125	Riverine Kachemak	Dixon 1978:6
WSU-1888	AD 561	1495±70	Riverine Kachemak	Dixon 1980:32
WSU-2227	399BC	2330±70	Riverine Kachemak	Boraas n.d.
WSU-2226	305 BC	2180±70	Riverine Kachemak	Boraas n.d.
WSU-2228	305 BC	2180±90	Riverine Kachemak	Boraas n.d.
I-12,170	AD 1650	250±70	Dena'ina	Reger n.d.
I-12,169	AD 1422	500±80	Dena'ina	Reger n.d.
I-12,171	40 BC	1960±120	Riverine Kachemak	Reger n.d.
BETA-6680	78BC	2050±70	Riverine Kachemak	Reger n.d.
BETA-6681	AD 1804	160±50	Dena'ina	Reger n.d.
BETA-6682	AD 408	1650±60	Riverine Kachemak	Reger n.d.
BETA-6683	38 BC	2010±60	Riverine Kachemak	Reger n.d.
BETA-6684	AD 73	1910±60	Riverine Kachemak	Reger n.d.
Clam Gulch Site, KEN-045				
I-12,161	AD 1777	190±80	Dena'ina	Reger 1987:100
I-12,166	AD 1653	240±70	Dena'ina	Reger 1987:100
I-12,167	AD 1788	200±70	Dena'ina	Reger 1987:100
I-12,168	AD 1490	360±80	Dena'ina	Reger 1987:100
BETA-6685	AD 792	1210±50	Dena'ina	Reger 1987:100
BETA-6686	AD 1599	340±50	Dena'ina	Reger 1987:100
Tustumena Camp Site, KEN-065				
BETA-23385	AD130	1986±130	Riverine Kachemak	Clark, F. 1988:10
Nilnunqa Site, KEN-066				
BETA-6691	AD 371	1690±90	Riverine Kachemak	Reger 1982:field notes
WSU-2045	AD 1810	130±90	Dena'ina	Reger 1983:field notes
WSU-2946	AD 1777	190±115	Dena'ina	Reger 1983:field notes
WSU-2947	AD 889	1150±130	Riverine Kachemak	Reger 1984:field notes
WSU-2948	AD 1885	65±70	Dena'ina	Reger 1984:field notes
WSU-2949	AD 369	1675±75	Riverine Kachemak	Reger 1983:field notes
WSU-2950	189 BC	2140±80	Riverine Kachemak	Reger 1983:field notes
WSU-2951	AD 423	1620±60	Riverine Kachemak	Reger 1983:field notes

continued...

Table 1. Continued...

Lab. No.	Calendar date	C14 date	Culture	Reference
Nilnunqa Site, KEN-066, (cont.)				
WSU-2952	AD 1348	585±50	Dena'ina	Reger 1983:field notes
WSU-3105	AD 1174	870±70	Dena'ina	Reger 1984:field notes
WSU-3106	AD 1801	170±65	Dena'ina	Reger 1984:field notes
WSU-3107	AD 1157	895±85	Dena'ina	Reger 1984:field notes
WSU-3108	967 BC	2755±160	Riverine Kachemak	Reger 1984:field notes
WSU-3109	AD 1284	660±65	Dena'ina	Reger 1984:field notes
WSU-3110	AD 1835	115±125	Dena'ina	Reger 1984:field notes
GX-14166	AD 999	1020±21	Riverine Kachemak	Yesner 1988, p.c. to Reger
KEN-094				
WSU-3087	AD 1596	335±50	Dena'ina?	Holmes 1988:363
WSU-3088	AD 1911	90±95	Dena'ina?	Holmes 1988:363
WSU-3093	AD 25	1925±145	Non-cultural?	Holmes 1988:363
KEN-147				
WSU-2944	AD 578	1480±50	Riverine Kachemak	Reger 1983:field notes
KEN-214				
WSU-3898	AD 36	1940±160	Riverine Kachemak	McMahan 1989:90
WSU-3899	AD 1277	740±50	Dena'ina	McMahan 1989:89
KEN-230				
WSU-4142	AD 1502	350±90	Dena'ina	Boraas 1990:field notes
WSU-4143	AD 1659	220±120	Dena'ina	Boraas 1990:field notes
WSU-4144	AD 1556	310±90	Dena'ina	Boraas 1990:field notes
KCHS Site, KEN-231				
WSU-4145	AD 1653	240±130	Dena'ina	Boraas 1990:field notes
WSU-4146	AD 1801	170±120	Dena'ina	Boraas 1990:field notes
Nelson Site, KEN-232				
WSU-4148	AD 1476	380±90	Dena'ina	Boraas 1990:field notes
Pelch Site, KEN-233				
WSU-4147	AD 1410	540±90	Dena'ina	Boraas 1990:field notes
WSU-4149	AD 1374	645±60	Dena'ina	Boraas 1990:field notes
Yukon Island Main Site, SEL-001				
P-138	AD 653	1369±102	Kachemak III	de Laguna 1962:166
P-139	883 BC	2706±118	Kachemak I	de Laguna 1962:166
Point West of Halibut Cove, SEL-010				
WSU-3810	AD 1260	775±60	Dena'ina	Boraas and Klein 1992

continued...

Table 1. Continued...

Lab. No.	Calendar date	C14 date	Culture	Reference
WSU-3812	AD 1418	510±60	Dena'ina	Boraas and Klein 1992
WSU-3811	AD 36	1940±70	Kachemak III	Boraas and Klein 1992
WSU-3859	AD 915	1100±60	Kachemak III	Boraas and Klein 1992
Cottonwood Creek Site, SEL-030				
S-1042	AD 287	1745±65	Kachemak III	Workman 1977:32
S-1054	AD 473	1555±75	Kachemak III	Workman 1977:32
S-1055	AD 414	1630±65	Late Prehistoric?	Workman 1977:32
Chugachik Island Site, SEL-033				
UGa-2344	AD 592	1475±70	Kachemak II/sub-III	Workman, et al. 1980:390
S-1063 (NMC-807)	AD 275	1705±65	Kachemak II/sub-III	Workman 1977:31-36
UGa-2342	AD 36	1940±90	Kachemak II/sub-III	Workman, et al. 1980:390
S-1062	395 BC	2310±65	Kachemak II/sub-III	Workman 1977:31-36
UGa-2343	858 BC	2740±75	Kachemak II	Workman, et al. 1980:390
WSU-4303	2540 BC	4005±100	Basal component	Zollars, 1991 p.c. to Reger
Yukon Island Fox Farm Bluff Site, SEL-041				
UGa-2340	AD 922	1130±120	Post Kachemak	Workman, et al. 1980:390
UGa-2341	AD 674	1315±205	Post Kachemak	Workman, et al. 1980:390
UGa-2339	AD 979	1090±195	Post Kachemak	Workman, et al. 1980:390
Seal Beach Site, SEL-079				
UGa-3638	AD 1446	410±55	Dena'ina	Workman & Workman 1988:348
UGa-3636	78 BC	2050±60	Kachemak III	Workman & Workman 1988:348
UGa-3635	AD 370	1685±170	Kachemak III	Workman & Workman 1988:348
UGa-3637	AD 1282	680±55	Middle Component	Workman & Workman 1988:348
UGa-3634	AD 997	1030±205	Unknown	Workman & Workman 1988:348
Sylva Site, SEL-245				
BETA-58166	3059 BC	4440±90	Ocean Bay II related	Workman, et al. 1993
BETA-58167	AD 999	1020±60	Unknown	Workman, et al. 1993
Round Mountain II, SEW-214				
WSU-3141	AD 1806	150±60	Dena'ina?	Holmes 1988:363
WSU-3142	AD 1810	130±80	Dena'ina?	Holmes 1988:363
WSU-3089	AD 1341	565±65	Dena'ina?	Holmes 1988:363
WSU-3090	AD1900	50±50	Dena'ina?	Holmes 1988:363
WSU-3091	3373 BC	4640±150	Notched Point	Holmes 1985:248
WSU-3092	3564 BC	4795±165	Notched Point	Holmes 1985:248
Round Mountain VI, SEW-216				
WSU-3136	AD 1487	370±60	Dena'ina?	Holmes 1985:248

this discussion is to review the available dates to try to refine the chronology of the prehistory of Cook Inlet rather than to determine exact ages of specific events.

In 1989 we began collecting radiocarbon dates from sites in the Kenai area to test the hypothesis that some house pits represent a Dena'ina occupation from the last 500-1000 years. Based on the observation that basically two forms of house depressions are found in the Kenai area, we decided that later prehistoric houses probably were distinguished by three characteristics: outer wall berms that protruded above the surrounding area, auxiliary rooms generally attached to the main room, and a central fire hearth not marked by any rock border or pavement. This contrasts with older house depressions associated with the Kachemak tradition that usually consist of a single chamber, have no remaining above ground wall berms, and display complex stone-lined hearths. Past excavations by Boraas and others seemed to reveal that late houses with the above traits lack an abundance of artifacts and indeed contain very few nonstructural remains.

Ethnographic descriptions of Dena'ina houses and hearths indicate that the houses were semi-subterranean, multi-roomed and had central fire hearths constructed with log sides. The logs of such hearths would be expected to disintegrate and leave a deposit of ash and burned soil without stone boundaries. Other archaeological traits indicative of Dena'ina are leg bone fleshers, evidence of human cremation, increased use of copper, and poorly formed ground slate points.

In the Kachemak Bay area radiocarbon dates applicable to probable Dena'ina occupations include two dates from a housepit near Halibut Cove (Boraas and Klein 1992) and a single date from the Seal Beach Site, SEL-079[2] (Workman and Workman 1988:348). The Point West of Halibut Cove, SEL-010, provided from charcoal in a central hearth two dates of A.D. 1260 and A.D. 1418 (see Figure 1). Following de Laguna's original interpretation, Boraas and Klein interpret the house as a Dena'ina structure excavated into Kachemak tradition midden.

The Seal Beach sample provides an estimate of A.D. 1282 for the upper limit of a middle component from the site. The overlying historic occupation is thought to be Dena'ina while the lower deposits are Kachemak tradition. The Workmans do not feel adequate data was recovered to assign an ethnic identity to the middle component. If the A.D. 1282 age does not date the Dena'ina component, it surely marks the older limit for that group's occupation of the site.

A date stratigraphically associated with a suspected Dena'ina occupation at the Cottonwood Creek Site unfortunately is more appropriate for the underlying Kachemak occupation. Workman discounts the validity of the date because he feels the sample is out of context. The upper, possibly Dena'ina, component at the Cottonwood Creek Site remains undated by radiocarbon (Workman, W. 1977:32).

The Clam Gulch Site north of Ninilchik, KEN-045, yielded five radiocarbon samples

[2]Archeological sites are recorded by the state's *Alaska Heritage Resources Survey* (AHRS) according to the USGS quadrangle in which they occur. These Halibut Cove sites are in the Seldovia quad, hence SEL plus the survey number. Correspondingly, those sites in the Kenai quad are designated KEN plus the survey number, and those in the Seward quadrangle as SEW.

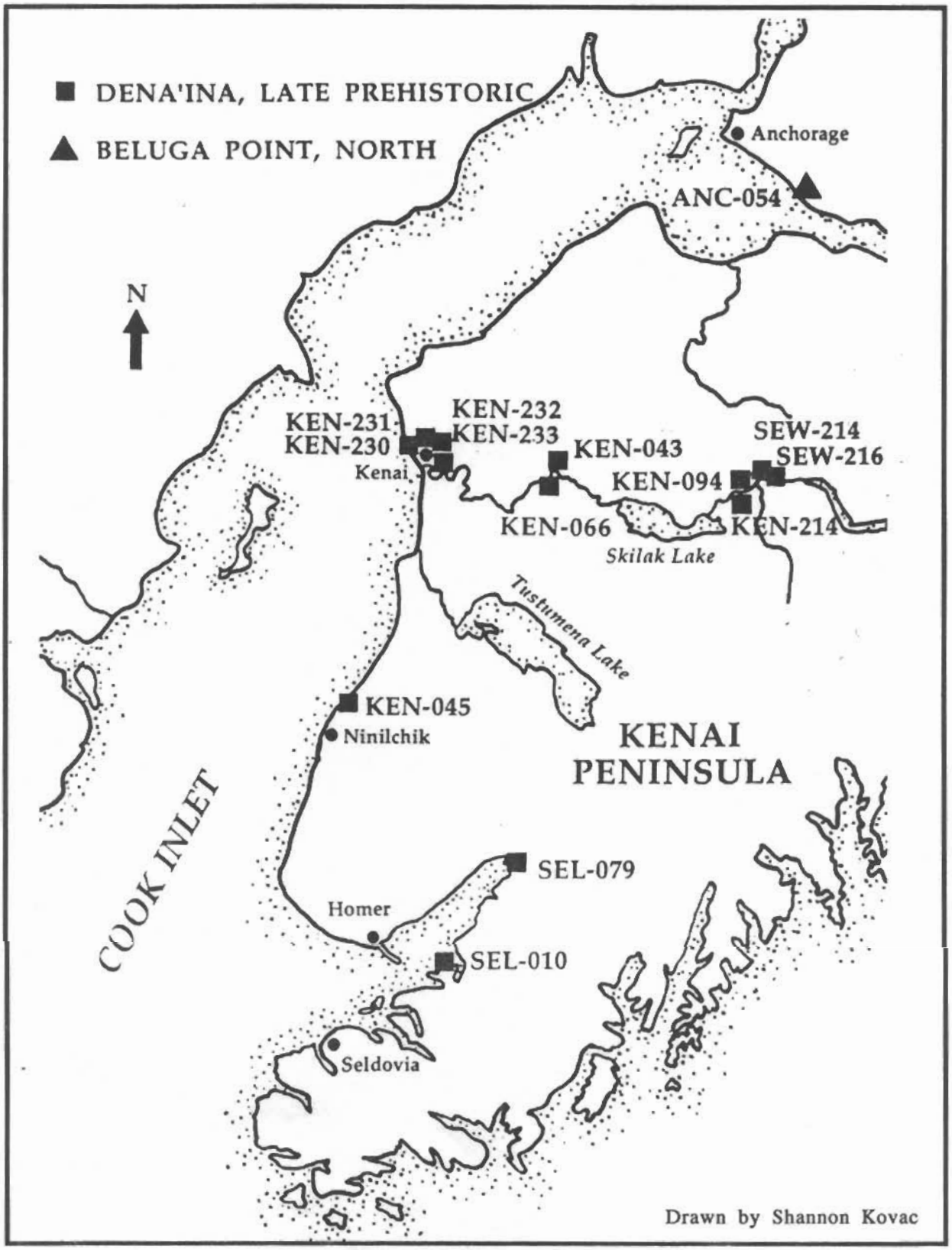

Figure 1: Radiocarbon dated sites, ca. A. D. 1000 to Historic Era, Cook Inlet, Alaska.

that date deposits perhaps assignable to Dena'ina occupants (Reger 1987:100). The dates from two areas of midden accumulation range from A.D. 1490 to A.D. 1788.

In the Kenai vicinity eight radiocarbon dates were obtained from four sites. Coupled with results from other earlier excavations, and from other investigators, a total of 30 dates are assignable to a probable Dena'ina occupation in the Kenai River drainage. Charcoal from the hearth and a wall log of a house at KEN-230 dated A.D. 1502 and A.D. 1556. Midden outside the entrance of the house provided a date of A.D. 1659. Another house pit site, KEN-231, provided a hearth date of A.D. 1653 and a wall log date of A.D. 1801. The central hearth of a house pit at KEN-232 dated A.D. 1476. A fourth housepit site in the Kenai vicinity, KEN-233, yielded dates of A.D. 1410 and A.D. 1374.

Upstream along the Kenai River, the Moose River Site and the Nilnunqa Site provide a large number of dates assigned to a Dena'ina occupation. The Moose River Site (KEN-043) provided three dates ranging from A.D. 1422 to A.D. 1804 (Dixon 1978, 1980). The earlier date was obtained from a wall log and the latter from the most recent floor in House 7. The Dena'ina reused a house pit previously excavated by Kachemak tradition people.

At the Nilnunqa Site (KEN-066), the Dena'ina occupation was dated in two features, 33 and 36. The Feature 33 dates document two late periods of occupation. The earlier occupation dated A.D. 1174 and A.D. 1284. The last occupation dated A.D. 1801 and A.D. 1835. Feature 36 at the site yielded three dates between A.D. 1157 and A.D. 1885 which probably document the same use periods as in Feature 33.

Three housepit sites near the confluence of the Kenai River and Russian River provided dates (Holmes 1985:248) that may apply to Dena'ina occupations. KEN-094 dated to A.D. 1596 and A.D. 1911. SEW-214 provided four dates of A.D. 1341 to A.D. 1900 (McMahan 1985: 170, 151; Holmes 1988:363). A single date of A.D. 1487 from SEW-216 applies to a lone house depression with very good faunal preservation (Holmes 1988:248). Opinion about assignment of those remains to a specific ethnic group vary considerably. Another site in the vicinity, KEN-214, revealed a cremation dating to A.D. 1277 (McMahan, Dale, and Holmes 1989:89).

Two hearths at the Beluga Point Site on Turnagain Arm date to A.D. 1257 and A.D. 1296 but do not appear to mark Dena'ina occupations (Reger 1981:220). The collection seems more in accord with material from just across the isthmus in Prince William Sound.

The post-Kachemak tradition Fox Farm Bluff Site yielded dates of A.D. 674, A.D. 922, and A.D. 979 (Workman, Lobdell, and Workman 1980:390). The investigators interpret the occupation as intrusive from the Bristol Bay area and not a major long term component of Cook Inlet prehistory.

Kachemak tradition occupations in the Cook Inlet area can be subdivided geographically as well as temporally. The initial definition of Kachemak culture by de Laguna (1975) and later refined by the Workmans and others (Workman, Lobdell, & Workman 1980; Workman, W.B. 1977, 1980, 1982; Workman, K.W. 1977) retains its integrity as a unit. The lithic inventory includes small chipped projectile points with stems or as bipoints, ground slate ulus with notches and some hole drilling,

barbed ground slate points, notched stone weights, stones grooved around one end, stone oil lamps, ground slate "awls," pumice abraders, planing adzes, and labrets.

Organic remains include a range of distinctive, elaborately barbed darts, a few toggling harpoons, bone needles, elaborate burials and semi-subterranean houses with tunnels. The Kachemak tradition in the Kachemak Bay area witnessed a change from large notched stones early in the period to small notched pebbles late in the sequence. An early emphasis on chipped stone reversed during the latter stages to an almost overwhelming dependence on ground slate for stone tools.

Radiocarbon dates from the Kachemak Bay area applicable to Marine Kachemak occupations include the pioneering dates collected by de Laguna (1962) from Yukon Island that apply to early Kachemak tradition (883 B.C.) and Kachemak III (A.D. 653). Dates for the Kachemak III period retrieved from Cottonwood Creek were A.D. 287 and A.D. 473 (Workman, W.B. 1977; Workman, Lobdell, and Workman 1980; Workman and Workman 1988). A measurement of A.D. 414 was obtained from a sample stratigraphically associated with more recent deposits. The Chugachik Site provided five dates ranging from 858 B.C. to A.D. 592, all from Kachemak shell midden (Workman, W.B. 1977). Deposits of Kachemak III affiliation found at the Seal Beach Site yielded dates of 78 B.C. and A.D. 370 (Workman and Workman 1988). The final site from which Kachemak tradition radiocarbon dates were retrieved is the Point West of Halibut Cove. Kachemak deposits there provided dates of A.D. 36 and A.D. 915 (Boraas and Klein 1992). The numerous other deep Kachemak middens remain undated.

Remains from the Kachemak tradition found along the Kenai River emphasize chipped stone late as well as early in the period. The Kachemak sites in this area represent an adaptation to the setting that can be called Riverine Kachemak as opposed to the Marine Kachemak adaption found in the lower Inlet region. Collections include many of the same artifacts as further south. Small notched stones, and many small chipped stone points with stems or bipointed, and chipped flake scrapers with steep edges are numerous. Pumice abraders, grinding slabs, chopping tools, and cobble cores are also common.

Few organic remains have been recovered. Burials were flexed, apparently without burial goods. Houses appear to be single room depressions probably with entry tunnels or chambers. Central hearths in Riverine Kachemak houses are distinctively constructed in an oblong depression lined with stones, occasionally lined with birch bark, and filled with gravel prior to starting a fire.

Dated Riverine Kachemak sites occur along the lower reaches of the Kenai River and at one location on the Kasilof River. The Merrill Site, KEN-029, (see Figure 2) was initially dated by samples measuring 790 B.C. and 295 B.C. (Reger 1977:49). The deposit containing the earlier of the two dates was probably displaced by road building. The later date marked the base of the site and has been confirmed by a more recently measured sample. The confirming charcoal sample measured 182 B.C. (Kovac, McClain, Trujillo, and Wilson 1992:10).

Three Moose River Site depressions provided Riverine Kachemak collections and radiocarbon dates. House 2 tested the oldest and from structure members pro-

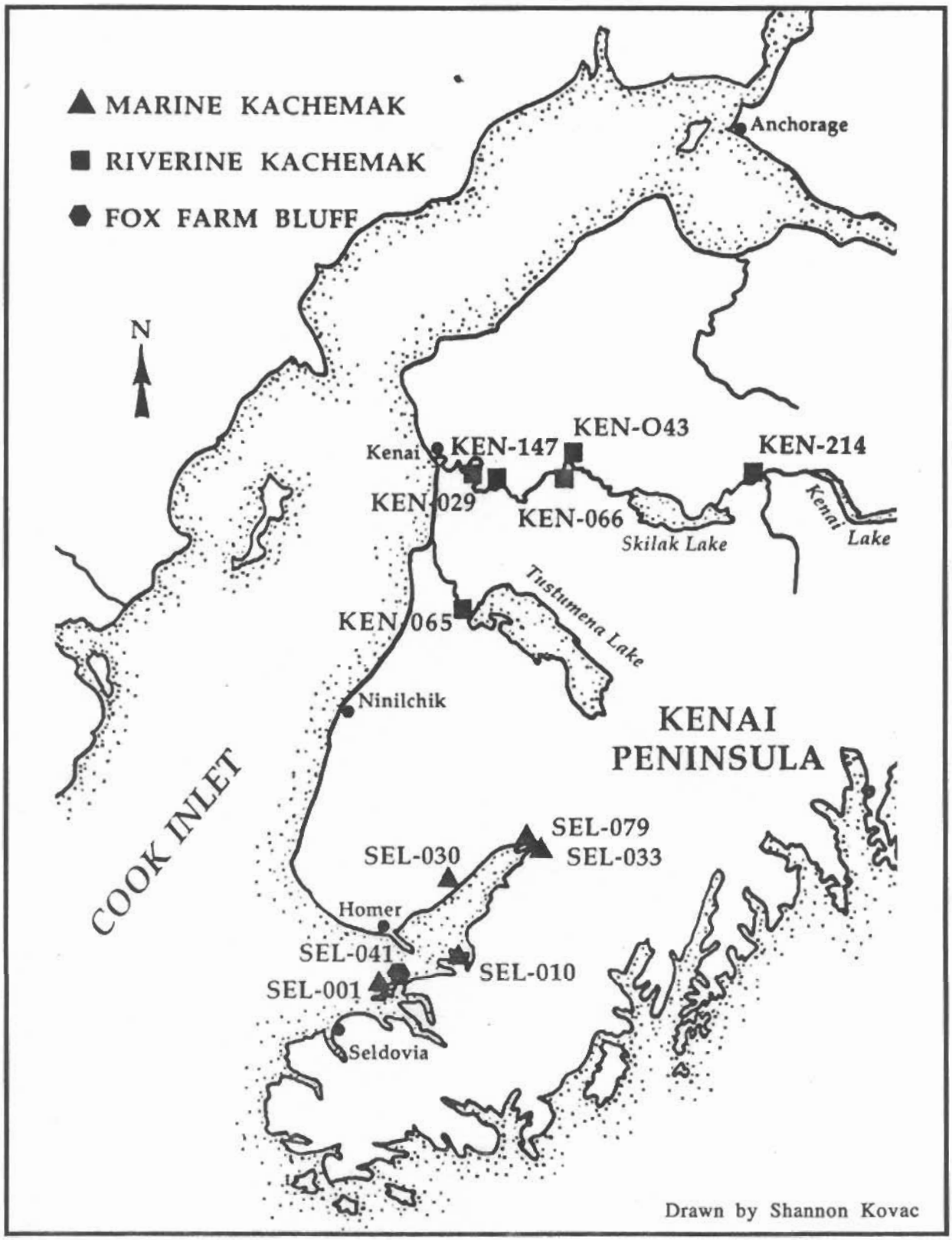

Figure 2: Radiocarbon dated sites, ca. 1000 B. C. to A. D. 1000, Cook Inlet, Alaska.

vided dates of 399 B.C. and 305 B.C. A third date, 305 B.C., measures the age of birch bark lining in the hearth. The central hearth in House 1 dated A.D. 543 and A.D. 561 (Dixon 1978: 6; 1980:32). House 7 provided five charcoal dates from Riverine Kachemak deposits. Initial excavation and occupation of the house is associated with dates of 78 B.C., 40 B.C., 38 B.C. and 73 A.D. A more recent Riverine Kachemak occupation in the house is marked by a stratigraphically higher hearth dated at A.D. 408.

The Nilnunqa Site, Feature 36 yielded seven charcoal samples that provide Riverine Kachemak-related dates. The oldest, 967 B.C., was obtained from cultural deposits through which the house was initially excavated. A date of 189 B.C. was obtained from a carbonized log in a buried forest soil outside of the house limits. The lowest floor in the house is dated at about A.D. 423 with a slightly higher floor dated at A.D. 369. A sample from midden outside the house dates to A.D. 371. A stratigraphically higher occupation of Riverine Kachemak people in Feature 36 dates to A.D. 889 and a flexed burial outside the house dates to A.D. 999.

Only two other Riverine Kachemak sites along the Kenai River have been radiocarbon dated. KEN-147 is a house pit site near Soldotna from which a date of A.D. 578 was obtained. The sample came from the middle levels of midden fill in a house depression. The last dated site presumed to be Riverine Kachemak, KEN-214, features a flexed burial dated at A.D. 36 (McMahan, Dale, and Holmes 1989:90).

A site near the source of the Kasilof River, KEN-065, yielded a date of A.D. 130 (Clark 1988:10). The presence of notched stones in a depression that also contained lithic debitage and fire cracked rocks suggests a Riverine Kachemak occupation.

Prior to the occurrence of the Kachemak tradition, dated sites in the Cook Inlet area are sparse and not well evaluated (see Figure 3). Occupations in the southern part of the Beluga Point Site have apparent connections with Bristol Bay and Kodiak (Reger 1981:185; Reger and Townsend 1982:98) and have been dated at 2205 B.C. and 2130 B.C. A recently investigated site in Kachemak Bay with Ocean Bay II characteristics has been radiocarbon dated to around 3000 B.C. (Workman, et al. 1993). Pre-Kachemak basal deposits in the Chugachik Island Site have been compared by Workman and Zollars (1982) with Brooks River Gravels phase in Bristol Bay and recently were dated at 2540 B.C. (Workman, W.: this volume).

The earliest radiocarbon dates thus far reported in a cultural context in Cook Inlet came from the upper Kenai River area, SEW-214. Two charcoal dates measured 3373 B.C. and 3564 B.C. and were associated with notched, chipped stone points, possibly of Northern Archaic affiliation (Holmes 1988:363). Typologically earlier microblade and core collections have not been satisfactorily dated with the radiocarbon method.

DISCUSSION

Grouping radiocarbon dates in the Cook Inlet area by cultural affiliation provides insight about trends in regional culture history and confirms suspected stages. Clearly, de Laguna's hunch about the existence of a widespread Eskimo-like culture prior to the advent of the historic Dena'ina population has been substantiated.

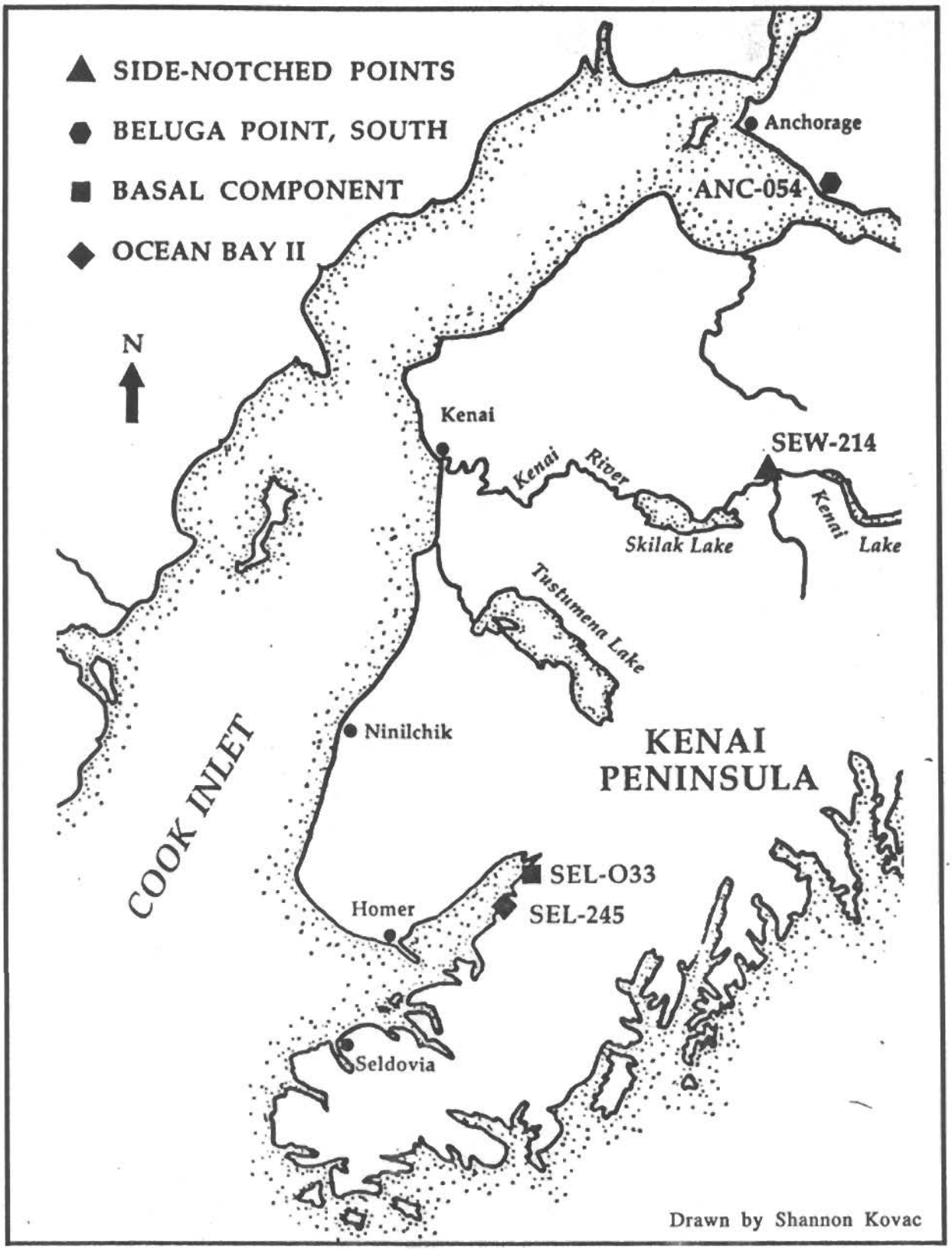

Figure 3: Radiocarbon dated sites, pre-1000 B. C., Cook Inlet, Alaska.

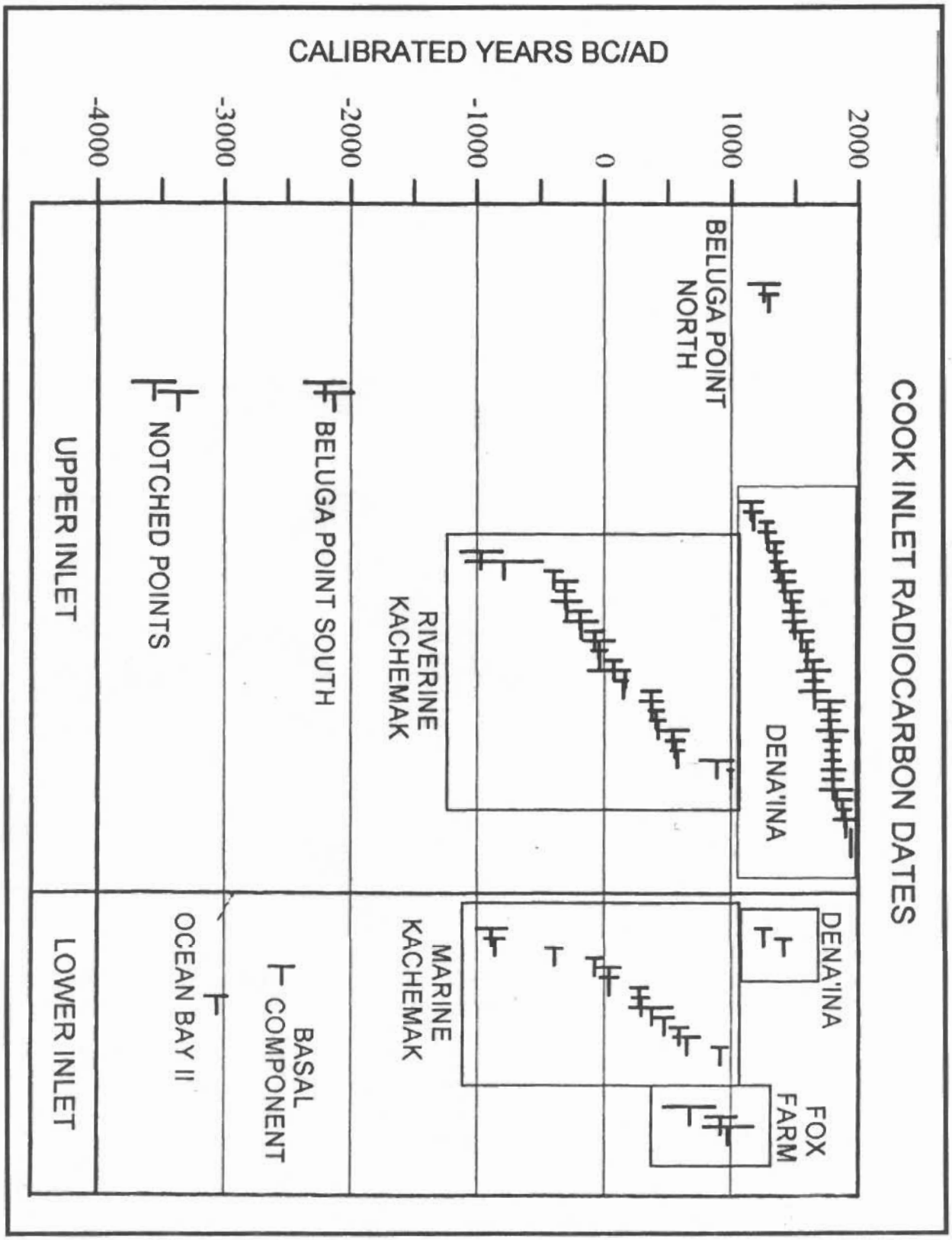

Figure 4: Radiocarbon dates and cultural stages, Cook Inlet, Alaska.

A valid criticism in this kind of discussion is the basic acceptance of assigned cultural affiliation for a particular collection and associated radiocarbon dates. Caution in relying on such assignments is certainly appropriate but some good can come from qualified interpretation. Radiocarbon dates are time estimates at best and interpreters should constantly remind themselves that calendrical dates confidently thrown about usually have a two-thirds chance of being accurate at a single standard deviation. Ideally, groups of radiocarbon dates should be discussed as a unit and conclusions developed at that level. Unfortunately, economic reality usually makes that difficult to achieve. The following observations are made while recognizing the above concerns. We have attempted to step back a level of abstraction yet still define some valuable observations (see Figure 4).

The dates confirm existence of a widespread Kachemak tradition occupation in Cook Inlet. The early and late time limits vary some by area but a beginning by 800-900 B.C. and ending by A.D. 800-900 seems to be documented. The occurrence of separate Marine Kachemak and Riverine Kachemak cultures at the same time seems equally reasonable. There is data suggesting the Riverine version lasted somewhat later than its southern cousin. Recent excavations in the upper Yentna River (Dixon: this volume) suggests the Riverine version may be much more widespread than just the Kenai Peninsula.

Sometime around the end of the first millennium A.D. a major cultural shift occurred in the area, much as happened in other parts of Alaska. Recognizing certain limitations, the preponderance of evidence indicates a Dena'ina occupation of the Kenai Peninsula, Kachemak Bay, and presumably the rest of the Cook Inlet area beginning between A.D. 1100 and A.D. 1200. We would not expect that replacement of earlier populations occurred over the entire area in a short period of time. The data from sites like the Fox Farm Bluff and Beluga Point suggest use of some areas by different groups at the same time. Lack of precision in the data does not support detailed speculation, however the centuries before and after A.D. 1000 appear to have been times of significant cultural movement and social change.

A picture of widespread cultural similarities throughout Southcentral Alaska seems to be emerging prior to Kachemak times. Early traits found in Ocean Bay collections from the Kodiak area show up at about the same times in widely separated locations of the Inlet area. That observation is the subject of more detailed discussion by W. Workman (this volume). At roughly the same time or perhaps slightly earlier, an occupation which is more logically related to an interior Northern Archaic stage existed in the Kenai Mountains. The relationship between those occurrences remains to be explored.

We feel comfortable with the new information presented in this paper and with our general observations, although we remain open to other points of view. Some may think us dangerously close to unfounded speculation, particularly in our assumptions of ethnic affiliations, but we find value in the suggestion of new ways of looking at the prehistory of the Cook Inlet area.

References Cited

Boraas, Alan, and Janet Klein
1992 The Archaeology of Point West of Halibut Cove. Anthropological Papers of the University of Alaska 24 (1&2): 183-204.

Clark, Fred
1988 Kasilof Landing: Campground Archaeology on the Kenai Peninsula, Alaska. Paper presented at the 15th Annual Meeting, Alaska Anthropological Association, Fairbanks.

de Laguna, Frederica
1962 Intemperate Reflections on Arctic and Subarctic Archaeology. Arctic Institute of North America Technical Paper 11:164-169.
1975 [1934] The Archaeology of Cook Inlet, Alaska. Second edition. Anchorage: The Alaska Historical Society.

Dixon, R. Greg
1978 The Moose River Site: A Preliminary Report. Paper presented at the 5th Annual Meeting, Alaska Anthropological Association, Anchorage.
1980 The Moose River Site, 1978 (with a special appendix by John E. Lobdell). *In* Archaeological Survey Projects, 1978. Timothy L. Dilliplane, ed. Pp. 32-48. Office of History and Archaeology, Misc. Publications, History and Archaeology Series. Report No. 22. Anchorage: Department of Natural Resources, Division of Parks and Outdoor Recreation.

Holmes, Charles E.
1985 Chronology and Ethnicity. *In* Progress Report. Project F021-2(15)/(A09812). Sterling Highway Archaeological Mitigation: Phase I Excavations at Four Sites on the Kenai Peninsula. Charles E. Holmes, ed. Pp. 247-254. Public Data File 85-4. Alaska Division of Geological and Geophysical Surveys.
1988 Late Prehistoric and Early Historic Human Occupation on the Upper Kenai River. *In* The Late Prehistoric Development of Alaska's Native People. AURORA. Volume IV. R.D. Shaw, R.K. Harritt, and D.E. Dumond, eds. Pp. 355-367. Anchorage: Alaska Anthropological Association.

Kovac, Shannon, Penny McClain, Lisa Trujillo, and Iona Wilson
1992 Further Excavation at the Merrill Site, KEN-029. Kenai Peninsula Anthropology Papers, No. 1. Soldotna, Alaska: Kenai Peninsula College.

McMahan, J. David
1985 Excavation Results for SEW-214 and SEW-216. *In* Progress Report. Project F021-2(15)/(A09812). Sterling Highway Archaeological Mitigation: Phase I Excavations at Four Sites on the Kenai Peninsula, Charles E. Holmes, ed. Pp. 141-246. Public Data File 85-4. Alaska Division of Geological and Geophysical Surveys.

McMahan, J. David, R. Joan Dale, and Charles E. Holmes
1989 Cultural Resources Testing and Evaluation of Selected Sites Along the Sterling Highway Milepost 37-60, Kenai Peninsula, Alaska, 1988-89. Project F021-2(15)/(A09812). Office of History and Archaeology Report No. 14. Anchorage: Department of Natural Resources, Division of Parks and Outdoor Recreation.

Rainey, Froelich, and Elizabeth Ralph
1959 Radiocarbon Dating in the Arctic. American Antiquity 24(2): 365-374.

Reger, Douglas R.
1977 An Eskimo Site Near Kenai, Alaska. Anthropological Papers of the University of Alaska 18(2): 37-52.
1981 A Model for Culture History in Upper Cook Inlet, Alaska. Ph.D. dissertation. Washington State University. Ann Arbor: University Microfilms.
1987 Archaeology of a Late Prehistoric Subsistence Locality, The Clam Gulch Site (49KEN-045). Anthropological Papers of the University of Alaska 21: 89-103.

Reger, Douglas R., and Joan B.Townsend
1982 Norton: A Changing Southeastern Boundary. Arctic Anthropology 19(2): 93-99.

Workman, Karen W.
1977 Chugachik Island: A Kachemak Tradition Site in Upper Kachemak Bay, Alaska. University of Alaska Anthropological Papers 18(2): 1-22.

Workman, Karen W., and William B. Workman.
1988 The Last 1,300 Years of Prehistory in Kachemak Bay: Where Later is Less. *In* The Late Prehistoric Development of Alaska's Native People. AURORA. Volume IV. R.D. Shaw, R.K. Harritt and D.E. Dumond eds. Pp.339-354. Anchorage: Alaska Anthropological Association.

Workman, William B.
1977 New Data on the Radiocarbon Chronology of the Kachemak Bay Sequence. Anthropological Papers of the University of Alaska 18(2): 31-36.
1980 Continuity and Change in the Prehistoric Record from Southern Alaska. *In* Alaska Native Culture and History. Y. Kotani and W.B. Workman, eds. Senri Ethnological Studies 4:49-101. Osaka: National Museum of Ethnology.
1982 Beyond the Southern Frontier: The Norton Culture and the Western Kenai Peninsula. Arctic Anthropology 19(2): 101-121.

Workman, William B., Janet Klein, Marlene Testaguzza, and Peter Zollars
1993 1992 Test Excavations at the Sylva Site (SEL 245): A Stratified Late Ocean Bay Occupation in Upper Kachemak Bay, Kenai Peninsula, Alaska. Paper presented at the 20th Annual Meeting, Alaska Anthropological Association, Anchorage.

Workman, William B., John E. Lobdell, and Karen W. Workman
1980 Recent Archaeological Work in Kachemak Bay, Gulf of Alaska. Arctic 33(3): 385-399.

Workman, William B., and Peter Zollars
1982 A New Preface to Kachemak Bay Prehistory: The Basal Component at SEL-033, Chugachik Island. Paper presented at the 9th Annual Meeting, Alaska Anthropological Association, Fairbanks.