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Early Holocene Adaptations on the Southern Northwest Coast

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Rick Minor (1995, 1997) and R. Lee Lyman (1997) recently debated the archaeological evidence for a "pre-littoral" adaptive stage on the southern Northwest Coast. We review the evolution of the usage of the term "pre-littoral," trace its connections with the earlier works of Richard Ross and Clement Meighan, and argue that such terminology is problematic because its etymology is not consistent with its definition and use by Lyman (1991, 1997). This has misled other workers who have taken the term more literally. To alleviate this confusion, we propose that one alternative is to abandon the term "pre-littoral" and use the more neutral "Early Holocene" for this period of southern Northwest Coast prehistory. We also discuss the limited archaeological data for this time period on the Oregon Coast and explain why available data are more accurately represented by an Early Holocene designation.

In 1988, Lyman and Ross (1988) set forth a three-stage model for the prehistory of the southern Northwest Coast that was expanded in *Prehistory of the Oregon Coast* (Lyman 1991). The earliest adaptive stage was termed the "pre-littoral," dating from 8,500 to 5,500 B.P. Lyman and Ross (1988:96) defined a littoral culture as one dependent on resources from the sea, but lacking a "sophisticated technology" for open sea fishing and hunting. In referring to people characterized by the pre-littoral stage, Lyman and Ross (1988:98) maintained that "[t]hese people probably were generalist foragers, exploiting a broad range of resources available in coastal environments. A focus on riverine and upland resources may have been the major subsistence orientation." Lyman and Ross (1988:100) further explained that this

> generalist strategy evolved into a more specialized strategy involving more intensive utilization of coastal resources such as pinnipeds, shellfish, marine fish, and anadromous fish. By about 5000 to 6000 B.P. people were well attuned to exploiting coastal environments, and we term this the *early littoral stage*. At this time, subsistence strategies were focused on coastal, especially inter-tidal, resources, exploited using a seasonally structured foraging strategy. . . . One cause of the change from the pre-littoral to the early littoral stage may be found in the middle Holocene stabilization of sea level, and concomitant stabilization of coastal--especially estuarine--habitats.

Lyman (1991:80) characterized pre-littoral peoples slightly differently, as "generalist foragers who exploited the broad range of resources available in and adjacent to (landward of) coastal environments, including riverine and upland resources." Lyman (1991:79-80) acknowledged that the three-stage model was modified from Ross (1984, 1990) and relied heavily on an earlier model proposed by Meighan (1965) for the Pacific coast.

Embedded in Meighan's (1965) older model of the adaptations of the earliest Pacific coast residents are his ideas about their geographic origins. Meighan (1965:713) unambiguously claimed that "the coastal area was settled from inland regions at a time preceding 8,000 years ago." He based this assertion on the "land-oriented tool assemblages," as well as the then-

current understanding of cultural chronologies. Meighan (1965:713) also stated that

> The earliest West Coast peoples, along the entire length of the coast, appear to have been hunters who concentrated on large game and had no particular interest in or involvement with the resources of the sea. By about 7,500 years ago, at least part of the coastal region was widely settled, and a shift took place to a more varied and diversified kind of economy, with close adaptation to the resources of the numerous ecological niches of the western coastline. . . . Compared to later peoples, however, they exploited the sea much less, and the ocean provided only supplemental food until about 4,000 to 5,000 years ago. From 4,000 years ago to the disappearance of Indian culture, all areas of the West Coast have had some peoples who were primarily dependent on ocean resources. The general picture is one of increasing familiarity with the ocean and increasing skill at exploiting it.

Meighan's (1965) model was based on archaeological data available in the early 1960s, when radiocarbon dating was first being widely applied and no securely dated Early Holocene coastal sites were known from the entire Northwest Coast. A part of his statement echoes an earlier one by Cressman et al. (1960:7), who asserted that "population movements from the earlier occupied interior down the valleys were responsible for the initial occupation of the Oregon coast." To summarize, Meighan's (1965) model stated that: (1) the earliest coastal residents came from the interior with a terrestrial resource-based economy; (2) by 7,500 years ago, parts of the coast had been widely settled and these people were using coastal resources; and (3) after 4,000 years ago, coastal residents developed more sophisticated technological skills for exploiting coastal resources, and consequently their economic dependence on the sea increased. Meighan (1989) subsequently revised key aspects of his 1965 model, proposing that new data suggested that early maritime, littorally adapted peoples occupied the Pacific coast for at least 10,000 years, and that their origins were separate from those of big-game hunting Paleoindian groups and other interior peoples who appear to have moved to the coast later in time.[1]

In 1984, Ross reviewed two hypotheses regarding the origins and adaptations of Oregon coast peoples. The first resembled Meighan's (1965) model, with the earliest residents thought to have come from the interior and gradually adapting to coastal environments (Ross 1984: 241-242). However, Ross believed this coastal adaptation began about 8,000 to 9,000 years ago, slightly earlier than Meighan's (1965) estimate of 7,500 years. Due to lack of evidence, Ross (1984) dismissed an alternative hypothesis that an earlier (pre-10,000 B.P.) maritime-adapted people from the north spread south along the coast. He also described what he called "bluff sites" in which only lithic artifacts were present (Ross 1984). While recognizing that faunal remains may simply have deteriorated in such sites, he proposed that they might be ancient "pre-marine" sites occupied by terrestrially oriented peoples (Ross 1984:246-248). Ross (1984:250) suggested that by 3,000 years ago, two groups may have occupied the Oregon coast: recent arrivals from the interior who were terrestrially oriented, and others who had a well-established coastal adaptation. He did not specify the antiquity of the latter, except to say they had been "living on the coast for an extended period . . . prior to 3,000 year B.P." (Ross 1984:250).

Ross's (1990:558) discussion of the "Pre-Marine" period is somewhat different:

> The Pre-Marine period has an undetermined beginning, probably with interior origins and connections, and lasts until at least 500 B.C. and possibly a little later. This period is characterized by people inhabitating the coast line, river valleys, and western foothills but not using the marine resources to any great extent *if at all*. The sites are primarily open sites without the mitigating soil-changing presence of shells and thus yield only lithic items [emphasis added].

The models of Meighan (1965), Ross (1984, 1990), Lyman and Ross (1988), and Lyman

(1991) are consistent in some respects but differ substantively on key points (Table 1). Meighan (1965) and Ross (1984, 1990) clearly favored an interior origin and terrestrial orientation for the earliest residents of the southern Northwest Coast. They proposed a gradual development of coastal adaptations, with Meighan (1965) positing significant coastal resource use by 7,500 B.P., Ross (1984) seeing the beginnings of this by 8,000 to 9,000 B.P., and Ross (1990) delaying such adaptation until 3,000 to 2,500 B.P. In this respect, the characterization of pre-littoral folk as "generalist foragers" (Lyman and Ross 1988; Lyman 1991) is consistent with Meighan (1965) and Ross (1984). However, this seems to conflict with Ross's (1990:558) statement that pre-marine people did not use marine resources to "any great extent if at all."

Further, Ross (1990) maintained that the pre-littoral/pre-marine period lasted until 3,000 to 2,500 B.P. This contrasts markedly with the evolution of Meighan's (1989) thinking, who acknowledged the presence of coastally adapted groups on the southern California coast by 10,000 years ago. While the culture historical circumstances on the southern Northwest Coast and southern California coast are certainly different, Meighan's older model was the prototype for that developed by Ross and Lyman. By considering the convergences and divergences in these ideas, it becomes a bit more clear why many archaeologists, including ourselves, have been confused by the usage and meaning of the pre-littoral adaptive stage by various authors.

This confusion has been compounded by the fact that the term "pre-littoral" has a literal meaning that is not consistent with Lyman's usage. As the *Random House Dictionary* (Stein 1982) indicates, the prefix "pre" is synonymous with "before," "prior to," "in advance of," "early," and "in front of." The simplest way to interpret the term "pre-littoral" then is to read it as "before, prior to, or in advance of the littoral." Using the common understanding of the term and again following the *Random House Dictionary*, "littoral" is defined as "pertaining to the shore of the lake, sea, or ocean." When used to name or describe an adaptive stage, then, the term "pre-littoral" would seem to refer to an adaptation prior to, or in advance of, one pertaining to the shore of the lake, sea, or ocean. In other words, pre-littoral implies an adaptive stage that does not involve the use of littoral resources. Even though Lyman (1997: 261) stated that "[p]re-littoral peoples were *explicitly* conceived as having exploited littoral . . . resources," this definition contradicts the literal (not littoral) meaning of the term "pre-littoral." In contrast, Ross's (1990) use of the term "pre-marine" is consistent with what we read as his intended meaning, "prior to" the use of marine environments and resources.

AN ALTERNATIVE CULTURAL SEQUENCE

Another cultural chronology was proposed recently by Minor (1996), who has broken down the temporal span of Oregon coast prehistory into Paleoindian (12,000 to 10,000 B.P.), Early Archaic (10,000 to 5,500 B.P.), Middle Archaic (5,500 to 2,000 B.P.), Late Archaic (2,000 to 500 B.P.), and in some areas, Formative (2,000 to 200 B.P.) stages, followed by a Protohistoric Period. According to Minor (1996:9-11), Early Archaic subsistence is defined as inclusive of estuarine and terrestrial resources, but there is little evidence for sizeable shell middens. During the Middle Archaic, shell middens appear, with ample evidence of marine-oriented subsistence. The Late Archaic stage is characterized by continuity with the Middle Archaic, but a dramatic increase in site frequency. The Formative Stage is thought to reflect the full emergence of ethnographically known cultural patterns.

Minor's framework follows from a long tradition in North American archaeology of labeling preagricultural societies as "Archaic," facilitat-

Table 1
MODELS OF PACIFIC COAST PREHISTORY
DEVELOPED FOR THE OREGON COAST

Meighan (1965)	Ross (1984)	Lyman and Ross (1988)	Ross (1990)	Lyman (1991)
	??, coast settled from inland		?? to 3,000-2,000 BP, interior origins for **Pre-marine**; rely on upland resources; no or minor use of coast	
	9,000-8,000 BP, gradual adaptation to coast begins			
8,000 BP, coast settled from inland; 7,500 BP, coast widely settled, some use of coastal resources		8,300 BP, **Pre-littoral** at Neptune, Tahkenitch, bluff sites (?); generalist foragers use riverine, upland, and some coastal resources		8,300 BP, **Pre-littoral** at Neptune, Tahkenitch; generalist foragers use coastal, riverine, upland resources
		6,000-5,000 BP, **Early Littoral** foragers attuned to stabilizing coast; use coastal resources, including intertidal		5,000 BP, **Early Littoral** foragers attuned to stabilizing coast; use coastal resources including intertidal
after 4,000 BP, more sophisticated coastal adaptation; some groups primarily dependent on ocean	by 3,000 BP, 2 groups on coast: terrestrially oriented occupants of bluff sites (Athapaskans?) and coastally oriented (Penutians?); terrestrially oriented group eventually uses coastal resources	3,000-2,000 BP, gradual transition to **Late Littoral**; logistically oriented collectors	overlaps with 3,000-1,500 BP, **Early Marine and Riverine** adjustment to coast and its resources	3,000-2,000 BP, gradual transition to **Late Littoral**, logistically oriented collectors; larger houses, sites
			AD 500-1856, **Late Marine**, full marine and riverine adaptation	

ing broad regional comparisons. However, this term offends some contemporary Native Americans, who consider it synonymous with the terms "primitive" or "backward." The use of the term "Formative" is also somewhat problematic in our view because it usually refers to cultural evolutionary stages leading up to agriculture, a phenomenon not found on the Oregon coast until Euroamerican settlement. While the purpose of this paper is not a comprehensive critique of all stages of the various cultural sequences, we offer an alternative approach which some archaeologists may find useful.

AN ALTERNATIVE CHRONOLOGICAL SEQUENCE

All of the cultural chronologies reviewed here assume a gradual, unidirectional, evolutionary model of cultural development that in itself might be considered problematic (see Moss and Erlandson 1995a). Another drawback is that for the earliest period of Oregon coast prehistory, the available archaeological data are too limited to warrant general characterizations of adaptations. To partially resolve some of these issues, we recommend that the term "pre-littoral" be

abandoned in favor of a term more neutral with respect to the type of adaptation for this early stage in the prehistory of the southern Northwest Coast. While other local and regional chronologies exist for parts of the Oregon coast, the general Northwest Coast, or the northwest California areas (e.g., Wallace 1978; Pullen 1982; Minor and Toepel 1983; Chartkoff and Chartkoff 1984; Frederickson 1984; Connolly 1986; Matson and Coupland 1995; Minor 1996), understanding the relationships between the plethora of traditions, stages, complexes, periods, or phases in various cultural sequences can be difficult (see Erlandson 1988, 1994; Moss and Erlandson 1995a). The term "Early Holocene," derived from the geological time scale, is becoming more widely used in North America as local archaeological chronologies have become increasingly complex and unwieldy. The term, which is particularly useful for comparing local or regional sequences, is neutral with respect to the nature of the adaptations of this early period, which seems prudent considering the scanty archaeological evidence currently available.

Recently, we used the following chronological sequence in our evaluation of 89 Native American archaeological sites on the Oregon coast (Moss and Erlandson 1996):

Terminal Pleistocene	12,000 to 10,000 B.P.
Early Holocene	10,000 to 6,700 B.P.
Middle Holocene	6,700 to 3,300 B.P.
Late Holocene Precontact	3,300 to ca. 200 B.P.
Late Holocene Postcontact	ca. 200 B.P. to present

This scheme provides a general framework for the archaeology of the southern Northwest Coast, but does not presume to characterize broad cultural developments for which little information is available. It is easily understood and may improve communication and alleviate confusion among archaeologists working in the area. It is not intended to replace local cultural sequences, and we recognize that the boundaries between time periods are arbitrary. For example, the date of 200 B.P. is a convenient, rounded-off, arbitrary date that translates to A.D. 1750, somewhat prior to well-documented face-to-face contact for the Oregon coast, although sporadic contacts may have occurred and Eurasian trade goods and diseases could have reached the area earlier. In short, this chronology is a conceptual tool that can be used for making broad comparisons across areas or regions, and/or in conjunction with local cultural sequences.[2]

EARLY HOLOCENE SITES ON THE OREGON COAST

We currently know of four Oregon coast sites that have yielded materials radiocarbon dated to the Early Holocene: the Neptune site (35-LA-3), Tahkenitch Landing (35-DO-130), Blacklock Point Lithic Site (35-CU-75), and Indian Sands (35-CU-67). In the sections that follow, we discuss each of these sites as they relate to our current perceptions of Early Holocene adaptations of the southern Northwest Coast.

The Neptune Site (35-LA-3)

The Neptune site is a large and complex shell midden located in Lane County on the central Oregon coast. It contains two discrete loci, 35-LA-3A to the north and 35-LA-3B to the south. Parts of the northern locus were excavated by Oregon State University (OSU) archaeologists in the 1970s. As discussed by Minor (1995) and Lyman (1997), a sample of bone from near the base of a deep shell midden located atop a dune in the northwest portion of the site was dated to 320 RCYBP, producing a calibrated midpoint of A.D. 1550. Wood charcoal from a dark charcoal-rich soil below the shell midden in the same area was dated to 8,310 $\pm$ 110 RCYBP (ca. 7,355 B.C.), raising the possibility that the site was occupied during the Early Holocene. Although several undiagnostic stone artifacts were reportedly found in this same soil, it has never

been clear if these were temporally associated with the dated charcoal (see also Minor 1995: 269).

From 1993 to 1996, we closely monitored 35-LA-3 as part of a four-year survey and evaluation of coastal sites in Oregon State Parks (Erlandson and Moss 1993; Moss and Erlandson 1994, 1995b, 1996). One of our goals was to determine from extensive seacliff profiles if there was any evidence for an Early Holocene occupation. To do so, we closely examined exposures in the northwest site area, where the early charcoal sample appears to have been collected. Here we found remnants of a charcoal-rich paleosol underlying the shell midden excavated by OSU archaeologists. We did not find any artifacts directly associated with this stratum, however, suggesting that it may be the result of an ancient wildfire.

Next, we radiocarbon dated marine shell samples from previously undated shell midden deposits in the northeast (35-LA-3A) and southern (35-LA-3B) site areas.[3] After calibration, two dates from the northeast area, 1,090 ± 60 RCYBP (Beta-61123) and 1,200 ± 80 RCYBP (Beta-61112), suggest that the shell midden in this area was deposited between about A.D. 1000 and A.D. 1200. Two samples from the top and bottom of a meter-thick shell midden in the southern area were dated to 300 ± 60 RCYBP (Beta-61124) and 430 ± 70 RCYBP (Beta-61125), suggesting after calibration that this area was occupied between about A.D. 1700 and A.D. 1850. Finally, in nonshell midden soil in the northwest corner of the site, we found a cluster of fire-cracked rock and charcoal exposed in the seacliff about 1.5 m. below the surface. Stratigraphically, it appeared that this cultural feature might be associated with the Early Holocene paleosol located about 25 m. to the south. However, charcoal from this feature was dated to 880 ± 70 RCYBP (Beta-96904), with a calibrated midpoint of A.D. 1180, or roughly contemporaneous with shell midden deposits in the northeast site area. In summary, we found no evidence for an Early Holocene occupation of the Neptune site.

The Tahkenitch Landing Site (35-DO-130)

The Tahkenitch Landing site is a stratified shell midden located along the shore of Tahkenitch Lake on the central Oregon coast. Scattered charcoal from the basal levels of the site have produced uncorrected dates of 6,880 ± 80 RCYBP and 7,960 ± 90 RCYBP (Minor and Toepel 1986; Minor 1995), calibrated to about 5,630 B.C. and 6,620 B.C., respectively. As Minor (1995) explained, these early dates derive from a stratum underlying a dense shell midden that appears to be firmly dated to the Middle Holocene. According to Minor and Toepel (1986), the basal Component I produced seven stone tools, a few mammal bones and shells, and considerable numbers of marine fish and bird remains (see also Minor 1995:270). The Tahkenitch Landing site has been widely cited as evidence for an Early Holocene coastal occupation of the Oregon coast (e.g., Matson and Coupland 1995; Moss and Erlandson 1995a).

Recently, however, we have raised questions about the association of the early dates from Tahkenitch with the stone tools and faunal remains from what Minor and Toepel (1986) defined as "Component I" (Moss and Erlandson 1995a; Erlandson and Moss 1996:293; see also Hodges 1996). In part, these questions have been driven by the reexamination of early dates on disseminated charcoal found in the basal layers of other Oregon coast sites such as Neptune (Minor 1995:269) and Yaquina Head (Minor 1991:175-176). Due to uncertainties about the cultural origin of the dated charcoal at Tahkenitch, Erlandson and Moss (1996:293) concluded that the early materials from the site date somewhere between about 5,200 and 8,000 RCYBP. This statement is consistent with Minor and Toepel's (1986:104) assessment, but differs from Minor's (1995:271) conclusion that

the "dates of 6,880 B.P. and 7,960 B.P. from Tahkenitch Landing clearly reflect an adaptation focused on the exploitation of marine resources."

Our concerns about the antiquity of the lower levels at Tahkenitch are also due to the evidence for stratigraphic mixing between the Tahkenitch strata, which could have transported artifacts and faunal materials into older noncultural strata (Minor and Toepel 1986:Fig. 5-1), as Minor (1995:270) has suggested for the lower levels at Neptune. It also appears that the undulating contact between Components I and II may have been crosscut by excavation levels dug in arbitrary (10 cm.) horizontal increments. Although the distribution of debitage has yet to be published, the available data suggest that there is nothing about the nature of the artifacts and faunal remains from the Early Holocene levels at Tahkenitch that is qualitatively different from those of the overlying Middle Holocene strata. Although there is clear evidence that a wide variety of marine resources were systematically exploited by at least the Middle Holocene (ca. 5,200 RCYBP) at Tahkenitch—a highly significant finding in an area that prior to 1986 had produced no coastal sites older than about 3,000 RCYBP—the nature of the Early Holocene adaptations is not clear. Although the cultural materials that Minor (1995:270-271) described may date between 6,800 and 8,000 B.P., this has yet to be demonstrated in our view.

The Blacklock Point Lithic Site (35-CU-75)

The Blacklock Point lithic site (35-CU-75), a large site located atop Blacklock Point on the southern Oregon coast, was first recorded by Ross in 1975. Suspecting that the site was older than typical shell middens, Ross tested the site in 1980. Abundant flake tools and debitage were found, and charcoal from an eroding cliff profile yielded a radiocarbon date of 2,750 ± 55 RCYBP (DIC-1911) (Ross 1984:248).

In 1993, Minor and Greenspan conducted excavations at 35-CU-75, recovering charcoal from near the base of the site deposits that yielded a date of 7,560 ± 80 RCYBP (Beta-62391). A detailed report on excavations at this site is not yet available, but Minor (1993) indicated that this early date is associated with a hearth and a number of stone tools or toolmaking debitage. A date of 4,400 ± 90 RCYBP (Beta-62390) was obtained on charcoal from near the base of the deposit in another area of the site.

Minor (1993) described Blacklock Point as the type site for lithic sites (Ross's [1984] "bluff sites") of the southern Northwest Coast, which are characterized by an absence (or near absence) of faunal remains. The lack of shellfish or other marine faunal remains at lithic sites is sometimes cited as evidence that such sites were occupied by terrestrial-oriented peoples (Ross 1984). In the absence of *all* faunal remains, however, this suggestion seems unfounded, especially since the site is located in proximity to productive rocky coast habitats, suggesting that marine resources played some role in attracting people to this location (Erlandson and Moss 1997).

Indian Sands (35-CU-67)

The large Indian Sands locality is situated along a rugged stretch of rocky outer coast in Curry County on the southern Oregon coast. Berreman (1935) described his Locality 34 as "completely eroded by wind" except for a shell midden near a small stream at the southern end of the site. In 1975, Richard Ross gave separate site numbers to the southern shell midden (35-CU-34) and the large lithic scatter (35-CU-67) exposed in blowouts to the north, suggesting that the two areas represented "different times and kinds of occupations" (see Minor and Greenspan 1991:28). 35-CU-67 was estimated to have extended for about 800 m. north-south and up to 200 m. east-west, and Ross found "no evidence of use as shell middens, unless the shell has

completely decayed" (Minor and Greenspan 1991:31). Minor (1986:116) revisited the site in 1985 and noted that chipped stone artifacts were found in clusters, "occasionally with small shell fragments associated."

In 1991, Minor and Greenspan investigated the shell midden at 35-CU-34 and an adjacent lithic scatter to clarify the relationship between the two areas. They obtained radiocarbon assays ranging from 1,140 ± 80 RCYBP (with a calibrated midpoint of A.D. 890) to 1,630 ± 70 RCYBP (calibrated to A.D. 420) on charcoal from the shell midden area, 2,380 ± 90 RCYBP (calibrated to 400 B.C.) on a nonshell deposit underlying the shell midden, and 80 ± 50 RCYBP (calibrated to A.D. 1950) to 1,310 ± 60 RCYBP (calibrated to A.D. 690) on the adjacent lithic component. As part of their study, Minor and Greenspan (1991) also analyzed an assemblage of 208 artifacts that were surface collected from Indians Sands by Berreman in the 1930s. Among these were 32 leaf-shaped bifaces considered older than the more recent Coquille series and Gunther barbed arrow points (Minor and Greenspan 1991:31, 41). Minor and Greenspan (1991:28, 44) suggested that the large leaf-shaped bifaces might indicate a relatively early occupation of Indian Sands, possibly predating 4,500 years.

We first inspected the Indian Sands sites in September of 1993. Because 35-CU-34 had been tested and dated, we focused on finding datable materials from 35-CU-67. Although there are archaeological materials scattered virtually continuously over an area about 800 m. long, there are three primary artifact clusters in this extensive lithic scatter. These concentrations of cobble tools, burned rock, manuports, and chipped stone artifacts include: 35-CU-67S, which surrounds the dense shell midden at 35-CU-34; 35-CU-67N, located in the northeast corner of the site; and 35-CU-67C, located atop a prominent knoll between the other two loci. At 35-CU-67C, we found a small (ca. 12 x 16 m.) deflated shell midden surrounded by a scatter of chipped stone tools. This low density shell scatter consists of thousands of wind-abraded fragments of California mussel (*Mytilus californianus*) and large barnacle (*Balanus nubilis*) shell associated with abundant chipped stone debitage, numerous cores and flaked cobbles, burned rock, and rare fragments of mammal and bird bone.

The shell scatter, which contains a substantial percentage of burned shell, is found primarily on the deflated surface of an elliptical area located on the northwest side of the knoll, some of which has already been lost to seacliff erosion. In a 1952 aerial photograph,[4] the entire area appears unvegetated and this central shell midden can be seen as a nearly complete, light-colored oval. The shell at 35-CU-67C may have been preserved because seacliff erosion cut off the source of blowing sand that would surely have abraded it into oblivion. The wider scatter of stone tools and debitage (along with occasional shell and bone fragments) covers an area about 40 x 60 m. atop the knoll and also extends down the eroding southern, western, and northern slopes of the knoll.

In 1993, two samples of unburned shell fragments from the central midden area at 35-CU-67C were submitted for radiocarbon dating. These samples were dated to 8,250 ± 80 RCYBP (Beta-66891) and 8,150 ± 120 RCYBP (Beta-66890). After calibration, these dates suggest that the shells were deposited roughly 9,000 years ago, between about 6,900 and 7,100 B.C. Later, burned shell fragments from the same area produced an uncorrected date of 7,790 ± 70 RCYBP (Beta-73004), corroborating the Early Holocene age of the midden. A weighted average produced with the CALIB 3.0.3 program (Stuiver and Reimer 1993) resulted in a $^{13}C/^{12}C$ adjusted age estimate of 8,440 ± 60 RCYBP and an estimated calendar age of 6,660 B.C.

So far, only brief accounts of the site have been published (Moss and Erlandson 1995a; Er-

landson and Moss 1996). Based on the limited information available (Moss and Erlandson 1994, 1995b; Minor 1995:271), Lyman (1997) questioned the cultural origin of this shell midden, suggesting that the shell may have been burned by wildfires. We are acutely aware of the potential problems natural shell deposits can cause in the interpretation of coastal archaeological sites (see Erlandson 1991:108; Erlandson and Morris 1993:14). For over a decade, we have been studying shell and bone deposits left behind by a variety of animals, including land otters, raccoons, bears, sea gulls, eagles, and others.

Comparison with scores of natural middens that we have examined along the California, Oregon, and Alaska coasts suggests that the shellfish remains at 35-CU-67C are cultural in origin. This conclusion is supported by: (1) the localized and concentrated nature of the shell scatter; (2) its central location within a discrete cluster of stone tools and burned rock; (3) the lack of rounded shell fragments typical of raised beach deposits; (4) the presence of large barnacles, which are common in many Oregon coast shell middens, but extremely rare in noncultural biological deposits; and (5) the relatively high percentage of heavily burned shell, also common in Oregon coast shell middens of unequivocal cultural origin.

The Early Holocene age of the deposit, its considerable elevation above contemporary sea levels, and its location in a coastal dune field also indicate that the deposit is not of natural origin. In seacliff exposures at Indian Sands, there are localized remnants of a raised beach exposed well below the archaeological deposits. These lack shell, however, and represent a very high-energy cobble shoreline that is not visible in the dune deposits that underlie the archaeological materials at 35-CU-67C. In short, we have carefully examined the possibility that the shell midden at 35-CU-67C might be of natural rather than cultural origin and found no evidence to support it.

What is ambiguous about 35-CU-67C is which artifacts at the site might be associated with the Early Holocene shell midden (Erlandson and Moss 1996; Lyman 1997). Because it is completely deflated and the Indian Sands area appears to have been used by Native American peoples for millennia, we cannot be certain which artifacts spatially associated with the shell midden also date to the Early Holocene. As Minor and Greenspan (1991) noted, the presence of numerous large leaf-shaped bifaces in the general Indian Sands area may be suggestive of an early occupation, but similar artifacts were also made and used by later peoples. The large and roughly flaked cobble cores and choppers that are so abundant at 35-CU-67C are broadly reminiscent of many Early Holocene assemblages from the Northwest Coast, the Columbia River, and California (Cressman et al. 1960; Erlandson 1994; Matson and Coupland 1995; Carlson and Dala Bona 1996), but such artifacts can also be found in more recent contexts. The site currently lacks finished and temporally diagnostic artifacts because these have been collected by relic hunters for decades, precluding cross-dating via artifacts.

Hughes (1994) analyzed eight obsidian artifacts from the site surface of 35-CU-67C and found that all came from Klamath Basin flows (five from Spodue Mountain, two from Silver Lake/Sycan Marsh, and one from the Medicine Lake Highlands sources). Byram (1994) analyzed the obsidian hydration bands on these artifacts, finding that average readings for the five Spodue Mountain artifacts ranged between 2.9 and 3.65 microns, while hydration bands for the Silver Lake/Sycan Marsh artifacts were measured at 3.6 and 4.4 microns. This relatively narrow range of hydration readings suggests that all the artifacts may have come from a single component. However, because hydration temperature can vary widely in surface contexts and because our sample is small, other chronological implications of the readings are unclear.

SUMMARY AND CONCLUSIONS

The archaeological evidence from each of the four sites described above is more provocative than definitive. We were unable to confirm the presence of an Early Holocene component at the Neptune site. The association of Early Holocene dates and the substantial remains of marine resources at Tahkenitch Landing remains problematic. The lack of faunal remains at the Blacklock Point Lithic site prevents conclusions about the animal exploitation patterns of the occupants. The Indian Sands site currently provides the earliest evidence for marine resource use on the Oregon coast during the Early Holocene, but the small size and low density of the shell midden suggest that it was occupied for a relatively brief period of time. Thus, the broader adaptive patterns of the site inhabitants remain largely unknown.

Our review of the archaeological evidence clearly demonstrates the scarcity of currently available data for understanding the origins and adaptive strategies of the region's earliest residents. In our view, this limited data base precludes broad characterizations of the earliest cultural developments of the southern Northwest Coast, including suggestions that the economies of these peoples were primarily marine or terrestrially oriented. We agree with Lyman (1996: 261) that in the future, types of adaptations should be tied to mutually agreed upon scales of faunal taxa. We also believe the term "pre-littoral" as used to describe an adaptive stage in Oregon coast prehistory has outlived its usefulness, as recently acknowledged by Lyman (1997). We offer the term "Early Holocene" as a more neutral, less confusing, and less controversial substitute to denote this important and enigmatic period of southern Northwest Coast prehistory.

NOTES

1. This paper was published in a conference proceedings volume, but unfortunately it is not widely known. Its relevance here is that by 1989, Meighan himself had rendered portions of his 1965 model obsolete.

2. Of course, another alternative is simply to refer to specific time intervals in terms of years (e.g., 5,000 to 3,000 B.P.) as suggested to us by Michael Glassow (personal communication 1997).

3. Although there is a pervasive oral history questioning the suitability of marine shell for radiocarbon dating, scientists working in some areas of the Pacific coast have relied on marine shell radiocarbon samples for decades (Erlandson et al. 1996). With careful selection and pretreatment to avoid contamination, proper calibration, and correction for the regional reservoir effect, Pacific coast shell samples can provide high resolution radiocarbon dates. Paired samples of marine shell and charcoal from the same stratigraphic levels can be used to examine the potential for temporal fluctuations in the intensity of marine upwelling and the regional reservoir effect (Kennett et al. 1997).

4. This photograph (BEC 7-7, Cape Ferrelo) is on file at the Map and Aerial Photography Library, University of Oregon.

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