REPORTS

A Reassessment of Early "Pre-Littoral" Radiocarbon Dates From the Southern Northwest Coast

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Early radiocarbon dates of 8,310 ± 110 B.P. from the Neptune site and 6,880 ± 80 B.P. and 7,960 ± 90 B.P. from Tahkenitch Landing on the central Oregon coast were obtained from below shell midden deposits and have been cited as evidence of a "pre-littoral" adaptation in this region. However, association of the Neptune site date with human occupation is suspect, and the Tahkenitch Landing dates are associated with evidence of exploitation of marine resources in an adjacent estuary. No securely dated evidence currently exists for a "pre-littoral" adaptation along the southern Northwest Coast.

MOST archaeologists with experience along the southern Northwest Coast have favored the idea that coastal adaptations in this region developed from antecedent interior lifeways. This interpretation is consistent with the apparently late appearance of coastal adaptations along the Pacific Coast of southern Washington, Oregon, and northern California (e.g., Elsasser 1978; Hildebrandt 1981; Fredrickson 1984; Levulett 1985; Connolly 1986; Draper 1988; Wessen 1990). However, it has also been argued, notably by Fladmark (1978, 1979), that the earliest inhabitants of the Northwest Coast may have been peoples already adapted to marine environments who migrated southward down the Pacific Coast. The question of when people first began intensively exploiting coastal resources continues to be a critical research issue in southern Northwest Coast archaeology (Erlandson and Colten 1991; Jones 1991; Erlandson and Yesner 1992).

Currently, radiocarbon dates of 8,310 ± 110 RCYBP from the Neptune site (35LA3), and 6,880 ± 80 RCYBP and 7,960 ± 90 RCYBP from Tahkenitch Landing (35DO130) on the central Oregon coast, are among the earliest so far reported from archaeological sites along the southern Northwest Coast.[1] As these dates were obtained from below shell midden deposits, they have been cited by Lyman and Ross (1988:98) and Lyman (1991:314) as evidence of a "pre-littoral stage of cultural adaptation" in this region. According to Lyman (1991:79-80), "the people of this stage were probably generalist foragers who exploited the broad range of resources available in and adjacent to (landward of) coastal environments, including riverine and upland resources" (also see Lyman and Ross 1988:98).

However, reassessment of these early radiocarbon dates and their associations does not support the idea of a "pre-littoral adaptation" along the southern Northwest Coast. First, there is serious question as to whether the 8,310 RCYBP date from the Neptune site actually reflects human occupation, as the specifics of its association with cultural materials are unreported. Additionally, radiocarbon dating of cultural and natural deposits at the Yaquina Head site (35LNC62) suggests that charcoal in the stratum underlying the Neptune site is more likely the product of natural rather than cultural processes. Second, the two radiocarbon dates from Tahkenitch Landing cited by Lyman and Ross (1988) and Lyman (1991) are associated with marine vertebrate faunal remains, indicating a focus on the exploitation of marine—not "pre-littoral"—resources.

NEPTUNE SITE

Lyman and Ross (1988:75) and Lyman (1991:27-29) have criticized others for "inconsistencies and ambiguities" in reporting radio-

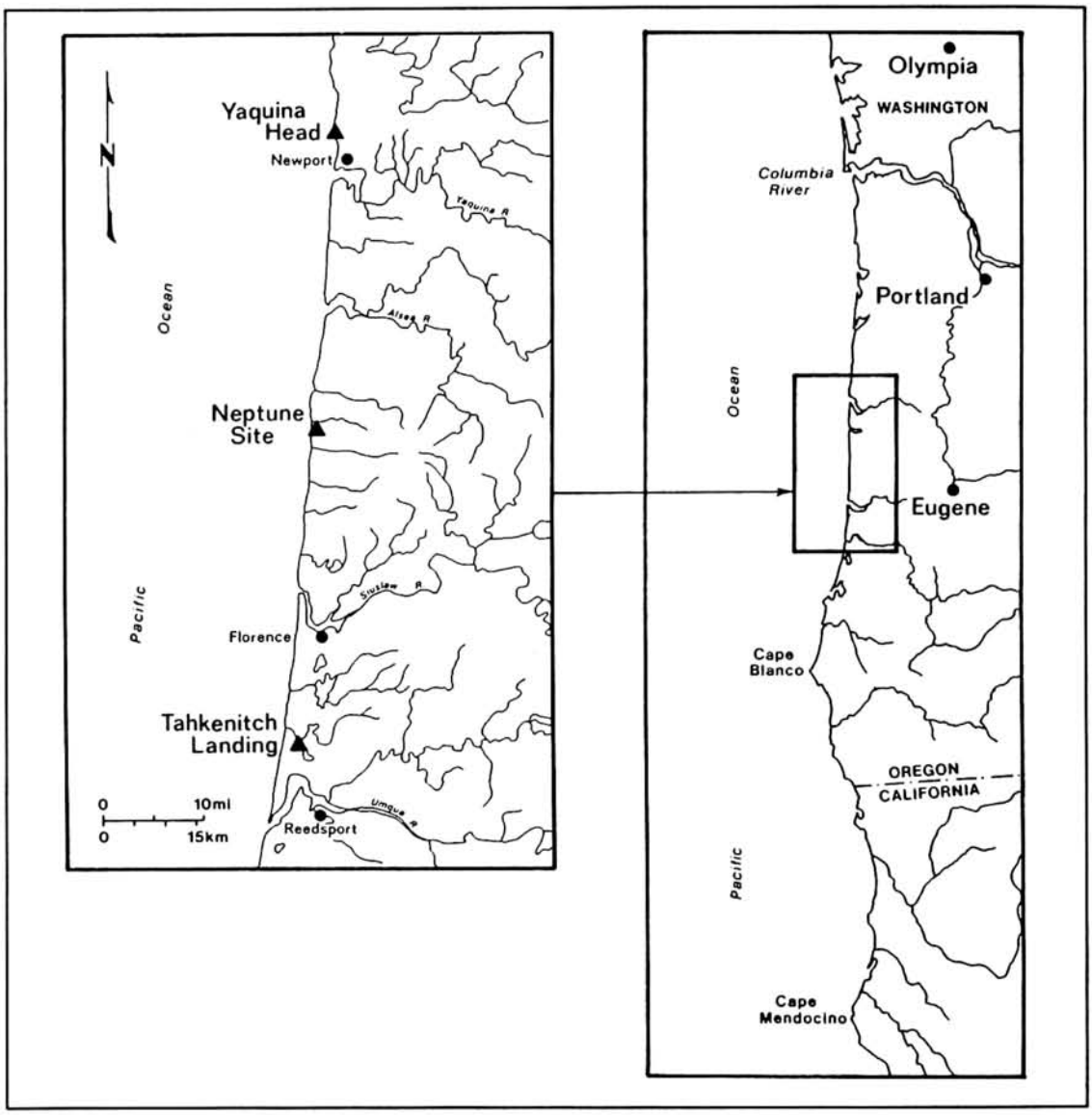

Fig. 1. Locations of archaeological sites on the central Oregon coast discussed in text.

carbon dates from archaeological sites, but their own reporting of the early date from the Neptune site (Fig. 1) is incomplete. While the 8,310 RCYBP date was apparently obtained around 1976, it did not appear in the archaeological literature until listed by Lyman and Ross (1988:79) in their compendium of "radiocarbon ages from Oregon coast archaeological sites," where Barner (1982) and Zontek (1983) were cited as references. Barner's Neptune site report, as well as Zontek's analysis of fish remains, list only one date of 320 $\pm$ 45 B.P., which was apparently secured sometime in the late 1970s, after the 8,310 RCYBP date had been obtained (Barner 1982:68; Zontek 1983: 33). The 8,310 RCYBP date from the Neptune

site was not included in lists of radiocarbon dates from Oregon coast sites reported elsewhere by Ross (1983, 1990).

The explanation for the omission of the 8,310 RCYBP date from earlier reports and its resurrection in later publications seems to lie in the statement by Lyman and Ross (1988:98) that this date was "originally discounted as 'too old' and not representative of the site's age based on styles of recovered artifacts." In other words, because this determination appeared to be inconsistent with the rest of the Neptune site data, it was not reported at all.

Lyman and Ross (1988) provided little information about the context and associations of the 8,310 RCYBP date from the Neptune site. They indicated that this date was "derived from organic-rich sediment beneath the shell midden deposit," but no specific data on the excavation unit or depth below surface were provided for the sample (Lyman and Ross 1988:98). It was also noted that "the date was stratigraphically associated with about a dozen lithic flakes and non-diagnostic artifacts" (Lyman and Ross 1988:98; cf. Lyman 1991:314), but elsewhere Ross (1990:555) stated that the date came from below the shell midden and "no well established association of artifacts was noted." It was also observed that "this sample was collected from a small excavation unit, the majority of the dated stratum not being sampled" (Lyman and Ross 1988:98; also see Lyman 1991:79).

Lyman and Ross (1988) also do not seem to have considered that the occurrence of "about a dozen lithic flakes and non-diagnostic artifacts" below the shell midden may have been the result of faunalturbation, even though rodent activity was apparently a significant source of disturbance at the Neptune site (Barner 1982:60). Until a well-documented association of the dated sample with cultural materials is reported, the cultural significance of the 8,310 RCYBP date should remain suspect.

The later radiocarbon date of 320 B.P. from the Neptune site was "derived from a sample of bone material just below the heavy shell strata, at approximately 1.2 to 1.4 m. below the surface" (Barner 1982:68). An item of Euroamerican manufacture, an iron wedge, "was found some seventy centimeters below the surface. . . From the stratigraphy it appears that the wedge was cached in a ten centimeter deep hole *below* the shell midden" (Barner 1982:64, emphasis added). Because the shell midden's basal date of 320 B.P. was consistent with the estimated age of the iron wedge, which was assumed to have been obtained as "drift iron" (see Rickard 1939), the site was characterized as a "pre-contact temporary campsite occupied approximately 350 years ago" (Barner 1982:ii).[2]

The information available suggests, then, that the bottom of the shell midden and the underlying organic-rich sediment are separated in age by almost 8,000 years. To accept the early date from the Neptune site, it has to be assumed that a few flakes were dropped at that spot around 8,310 RCYBP, when the site must have been several hundred meters or more inland from the coast, and that some 8,000 years later people returned to the same location, now adjacent to the ocean, to deposit marine shellfish remains. In view of the magnitude of the difference in the two radiocarbon determinations, this interpretation seems unlikely.

YAQUINA HEAD

Radiocarbon dating of an apparently similar "organic-rich stratum" underlying an extensive shell midden on Yaquina Head on the north-central Oregon coast suggests a natural, rather than cultural, origin for the charcoal at the Neptune site that produced the 8,310 RCYBP date may be likely (Fig. 1). A radiocarbon date of 5,030 $\pm$ 80 RCYBP obtained from a charcoal concentration approximately 20 cm. below the shell midden during the 1986 investigations at Yaquina Head was initially accepted as related to human occupation (Minor et al. 1987:37). More

extensive investigations in 1989 encountered "burned zones" containing charcoal beneath the cultural strata, which produced radiocarbon dates of 5,140 ± 70 RCYBP and 5,330 ± 110 RCYBP. In addition to a general, but not total, absence of associated cultural materials, chemical analysis of associated sediments failed to produce phosphorus values high enough to suggest human enrichment of soils around the dated contexts (McDowell 1991:22, 27).

The two radiocarbon dates from the burned zones, obtained from locations some 80 m. apart, were interpreted as evidence of an extensive fire across the headland some 5,000 years ago (Minor 1991:168). At two standard deviations, the 5,030 RCYBP date overlaps the dates from the burned zones, with no statistically significant difference between these three dates. In view of this situation, the idea that the 5,030 RCYBP date was associated with cultural activity no longer appears valid, and radiocarbon dates of 4,100 ± 60 RCYBP and 4,050 ± 60 RCYBP now seem to be the most reliable dates for initial human occupation at Yaquina Head (Minor 1991:175-176).

Fires played a prominent role in the patterning of vegetation along the southern Northwest Coast. The frequency and magnitude of fires during prehistoric times are not known, but evidence of repeated fires in the form of charred peat has been recovered from lake sediment cores taken from Devil's, Tahkenitch, and Garrison lakes on the Oregon coast (Heusser 1960:107). A study of the prairie on Cascade Head on the north-central Oregon coast noted that the abundance of charcoal in the soils pointed to a long history of fires, and it was suggested that "fires set intentionally or unintentionally by the coastal Indians living on this prairie were responsible for this charcoal" (Davidson 1967:63-64). In view of the long history of fires along the coast, and especially considering the Yaquina Head experience noted above, care must be taken to insure that charcoal recovered below the main cultural strata at archaeological sites is, in fact, cultural rather than natural in origin before accepting resulting radiocarbon dates as evidence of human occupation.

TAHKENITCH LANDING

Lyman and Ross (1988:98) and Lyman (1991:79) suggested that dates of 7,960 B.P. and 6,880 B.P. from below the main shell deposits at Tahkenitch Landing (Fig. 1) may be evidence of a "pre-littoral stage." In doing so, they did not accurately convey the context of these early radiocarbon dates nor the associated faunal data that indicate an adaptation to marine resources during this period. Lyman (1991:79) summarized the evidence from the earliest component at Tahkenitch Landing as follows:

> The artifact sample from this site consists of seven tools from Stratum 4A, dated between 5200 and 8000 B.P. Those seven tools consist of three hammerstones, a scraper, graver, cobble chopper, and sandstone abrader (Minor and Toepel 1986: 79). One land mammal bone and one pinniped bone were recovered from this stratum, as well.

This summary is accurate as far as it goes, but both Lyman and Ross (1988) and Lyman (1991) neglected to mention that, in addition to the artifacts and mammal bones, remains of marine fish (n = 628) and birds (n = 215) were relatively plentiful in Stratum 4A (Greenspan 1986). The fish remains included staghorn sculpin (n = 155), righteye flounder (n = 27), shiner surfperch (n = 9), pile surfperch (n = 2), unspecified surfperch (n = 45), greenling (n = 6), Pacific tomcod (n = 81), Pacific hake (n = 62), Pacific herring (n = 21), Salmonidae (n = 6), sturgeon (n = 1), and unidentified fish (n = 213). The bird remains included duck (n = 33), goose (n = 1), scoter (n = 1), American coot (n = 1), loon (n = 1), cormorant (n = 11), shearwater (n = 3), common murre (n = 3), gull (n = 4), perching bird (n = 1), and unidentified bird (n = 156).

Relatively few shell fragments were present in Stratum 4A, but the vertebrate faunal assemblage indicates a focus on the exploitation of resources from an estuary adjacent to the site. The estuary outlet was apparently blocked by sand dunes around 3,000 B.P., creating today's freshwater Tahkenitch Lake. While the Stratum 4A assemblage is small compared to the faunal assemblages from the later shell-bearing strata at this site (the earliest of which was radiocarbon dated to 5,100 ± 70 B.P.), it is clear that a variety of marine resources were already being exploited in the Tahkenitch I component between 8,000 and 5,200 B.P. (Greenspan 1986:71-72; Minor and Toepel 1986:104-108).

Lyman and Ross (1988:83-84) and Lyman (1991:39-41) have criticized others for equating shell midden deposits with littoral adaptations, correctly citing Perlman's (1980:284) caution that "to epitomize coastal adaptation as shellfish exploitation is inaccurate" because shellfish "are only one of the resources available in a coastal zone." Had Lyman and Ross (1988) and Lyman (1991) adequately considered the evidence for early exploitation of marine fish and birds in the component underlying the main shell deposits at Tahkenitch Landing, it is doubtful they would have used the early radiocarbon dates from this site as substantiation for their hypothesized "pre-littoral" stage.

CONCLUDING REMARKS

As more field investigations are carried out, it is inevitable that earlier radiocarbon dates will eventually be reported from the southern Northwest Coast. Whether these early dates will be associated with a "pre-littoral" adaptation, or whether they will be associated with evidence of marine resource exploitation, remains to be seen. In the meantime, the radiocarbon 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. No securely dated evidence currently exists for a "pre-littoral" cultural adaptation along the southern Northwest Coast.

NOTES

1. Moss and Erlandson (1994:103; 1995) recently reported radiocarbon dates of 7,790 ± 70 B.P. (Beta-73004), 8,150 ± 120 B.P. (Beta-66890), and 8,250 ± 80 B.P. (Beta-66891) from a small, deflated shell scatter at Indian Sands (35CU67), an extensive, eroded "lithic" site on the southern Oregon coast. This shell scatter represents the earliest evidence of molluscan resource exploitation so far identified on the Oregon coast.

2. Erlandson and Moss (1993:39-40) recently reported additional radiocarbon dates of 1,090 ± 60 B.P. (Beta-61123) and 1,200 ± 80 B.P. (Beta-61122) from the Neptune site.

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REFERENCES

Barner, Debra C.
1982 Shell and Archaeology: An Analysis of Shellfish Procurement and Utilization on the Central Oregon Coast. Master's thesis, Oregon State University.

Connolly, Thomas J.
1986 Cultural Stability and Change in the Prehistory of Southwest Oregon and Northern California. Ph.D. dissertation, University of Oregon.

Davidson, Eric O.
1967 Synecological Features of a Natural Headland Prairie on the Oregon Coast. Master's thesis, Oregon State University.

Draper, John A.
1988 A Proposed Model of Late Prehistoric Settlement Systems on the Southern Northwest Coast, Coos and Curry Counties, Oregon. Ph.D. dissertation, Washington State University.

Elsasser, Albert B.
1978 Development of Regional Prehistoric Cultures. In: Handbook of North American Indians, Vol. 8, California, Robert F.

Heizer, ed., pp. 37-57. Washington: Smithsonian Institution.

Erlandson, Jon M., and Roger H. Colten (eds.)
1991 Hunter-Gatherers of Early Holocene Coastal California. University of California, Los Angeles, Institute of Archaeology, Perspectives in California Archaeology, Vol. 1.

Erlandson, Jon M., and Madonna L. Moss
1993 An Evaluation, Survey, and Dating Program for Archaeological Sites on State Lands of the Central Oregon Coast. Report on file at the Oregon State Historic Preservation Office, Salem.

Erlandson, Jon M., and David R. Yesner
1992 The Prehistory of the California Coast: Prospects and Perspectives. In: Essays on the Prehistory of Maritime California, Terry L. Jones, ed., pp. 267-276. Davis: Center for Archaeological Research at Davis Publication No. 10.

Fladmark, Knut R.
1978 The Feasibility of the Northwest Coast as a Migration Route for Early Man. In: Early Man in America From a Circum-Pacific Perspective, Alan L. Bryan, ed., pp. 119-128. University of Alberta, Department of Anthropology Occasional Papers No. 1.

1979 Routes: Alternate Migration Corridors for Early Man in North America. American Antiquity 44(1):55-69.

Fredrickson, David A.
1984 The North Coastal Region. In: California Archaeology, by Michael J. Moratto, pp. 471-527. Orlando: Academic Press.

Greenspan, Ruth L.
1986 Aboriginal Exploitation of Vertebrate Fauna. In: The Archaeology of the Tahkenitch Landing Site: Early Prehistoric Occupation on the Oregon Coast, by Rick Minor and Kathryn Anne Toepel, pp. 57-72. Report on file at the Oregon State Historic Preservation Office, Salem.

Heusser, Calvin J.
1960 Late-Pleistocene Environments of North Pacific North America. New York: American Geographical Society.

Hildebrandt, William R.
1981 Native Hunting Adaptations on the North Coast of California. Ph.D. dissertation, University of California, Davis.

Jones, Terry L.
1991 Marine Resource Value and the Priority of Coastal Settlement: A California Perspective. American Antiquity 56(3):419-443.

Levulett, Valerie A.
1985 The Prehistory of Southwestern Humboldt County: A Study of Coastal Archaeological Sites in the King Range National Conservation Area. Ph.D. dissertation, University of California, Davis.

Lyman, R. Lee
1991 Prehistory of the Oregon Coast: The Effects of Excavation Strategies and Assemblage Size on Archaeological Inquiry. San Diego: Academic Press.

Lyman, R. Lee, and Richard E. Ross
1988 Oregon Coast Archaeology: A Critical History and Model. Northwest Anthropological Research Notes 22(1):67-119.

McDowell, Patricia F.
1991 Geomorphology, Sediments, and Soil Chemistry at Yaquina Head. In: Yaquina Head: A Middle Archaic Settlement on the North-Central Oregon Coast, by Rick Minor, pp. 11-28. Bureau of Land Management (Region 10), Cultural Resource Series No. 6.

Minor, Rick
1991 Yaquina Head: A Middle Archaic Settlement on the North-Central Oregon Coast. Bureau of Land Management (Region 10), Cultural Resource Series No. 6.

Minor, Rick, and Kathryn Anne Toepel
1986 The Archaeology of the Tahkenitch Landing Site: Early Prehistoric Occupation on the Oregon Coast. Report on file at the Oregon State Historic Preservation Office, Salem.

Minor, Rick, Kathryn Anne Toepel, and Ruth L. Greenspan
1987 Archaeological Investigations at Yaquina Head, Central Oregon Coast. Bureau of Land Management (Region 10), Cultural Resources Series No. 1.

Moss, Madonna L., and Jon M. Erlandson
1994 An Evaluation, Survey, and Dating Program for Archaeological Sites on State Lands of the Southern Oregon Coast. Report on file at the Oregon State Historic Preservation Office, Salem.

1995 Reflections on North American Pacific Coast Prehistory. Journal of World Prehistory 9(1):1-45.

Perlman, Stephen M.
1980 An Optimum Diet Model, Coastal Variability, and Hunter-Gatherer Behavior. In: Advances in Archaeological Method and Theory, Vol. 3, Michael B. Schiffer, ed., pp. 257-310. New York: Academic Press.

Rickard, T. A.
1939 The Use of Iron and Copper by the Indians of British Columbia. British Columbia Historical Quarterly 3(1):25-50.

Ross, Richard E.
1983 Site Placement and Demography Along the North and Central Portions of the Oregon Coast. In: Prehistoric Places on the Southern Northwest Coast, Robert L. Greengo, ed., pp. 211-218. Seattle: Thomas Burke Memorial Washington State Museum Research Reports No. 4.

1990 Prehistory of the Oregon Coast. In: Handbook of North American Indians, Vol. 7, Northwest Coast, Wayne Suttles, ed., pp. 554-559. Washington: Smithsonian Institution.

Wessen, Gary
1990 Prehistory of the Ocean Coast of Washington. In: Handbook of North American Indians, Vol. 7, Northwest Coast, Wayne Suttles, ed., pp. 412-421. Washington: Smithsonian Institution.

Zontek, Terry
1983 Aboriginal Fishing at Seal Rock (35LNC-14) and Neptune (35LA3): Late Prehistoric Archaeological Sites on the Central Oregon Coast. Master's thesis, Oregon State University.

Additional Accelerator Mass Spectrometer (AMS) Radiocarbon Assays on *Haliotis* Fishhooks From CA-ORA-378

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AMS radiocarbon assays confirm that shell fishhook and line fishing was a feature of early Late Holocene and Intermediate Cultures period subsistence technology in coastal Orange County. Other data support a similar development of coastal line fishing in southern and central California beginning no earlier than the third millenium B.P. However, limited data from San Clemente Island suggest shell fishhooks were employed prior to that time. We suggest that AMS dating be applied to San Clemente Island fishhooks to help clarify the relationship of the island data with established fishhook sequences for Orange County and other parts of California.

SIMPLE shell fishhooks represent a technological advance over fish gorges (Salls 1989:194). If this innovation is causally linked to marked intensification of fish procurement for the maritime societies of southern California (Salls 1988, 1990; Raab et al. 1995), then temporal placement of such fishing gear could help establish minimal dates for the beginnings of an important shift in subsistence behavior.

Several shell fishhooks have been recovered from CA-ORA-378 (Christ College site), Irvine (Fig. 1), a settlement whose major occupation