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Shell Mounds and Shell Roads: The Destruction of Oregon Coast Middens for Early Road Surfacing

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Current Research

Shell Mounds and Shell Roads: The Destruction of Oregon Coast Middens for Early Road Surfacing

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Mound sites occur in many parts of North America and in other regions of the world. Many represent locations where residue from everyday life has accumulated in areas of residence and concentrated human activity. In other cases, mounds were constructed for specific purposes, such as ceremonial platforms or monuments (Lightfoot 1997). Native American archaeological sites in western Oregon include numerous mounds in a range of different settings. Some are earthen, such as the extensive mounds of the Calapooia River and Muddy Creek in the Willamette Valley (Bowden 1997). Many of these have been removed or spread for agriculture and other landscape modifications.

Along the Oregon coast, mounds of shell were once numerous, though today relatively few sites retain the topographic characteristics and shell matrix proportions that warrant classification as a shell *mound*. Instead, sites are far more often identified with the broader term shell *midden*, often referring to a matrix composed of shell along with a large proportion of non-shell organic materials such as charcoal, soil, and artifacts. Shell mounds are composed of shell midden, with shell proportions typically varying within a mound's stratigraphic sequence. Along the Oregon coast, numerous shell midden sites have been documented (Moss and Erlandson 2008:10-11). Lone Ranch Mound (35CU37) in Curry County is a rare example of a large shell mound that remains relatively intact (Berreman 1944; Erlandson and Moss 1994), possibly due to its relative isolation from development. Historical records indicate that Oregon shell mounds from two to ten meters in height occurred at several points along the coast, particularly along rocky shorelines where mollusks are abundant (Figure 1).

As early as the 1870s, archaeologist Paul Schumacher (1877) made observations about the loss of shell middens due to town development at Gold Beach. His observations were echoed by later surveyors including Berreman (1935 a, b) and Collins (1951). There are also numerous ethnographic accounts from elders in coastal tribes discussing formerly large shell mounds (Harrington 1942:[23]:265, 689, 690, [24]:514).



Figure 1: Shell mounds on the coast at Yachats ca 1910, reported to be 28 feet high (Lincoln County Historical Society).

The loss of many shell mounds on the Oregon coast has resulted from a combination of factors, including deterioration from wind and wave erosion, recreation, looting, building and park construction, and road cutting, as documented through decades of archaeological research (Moss and Erlandson 2008:31-33). There are also historical accounts of shell from mounds and organic midden soil being intentionally removed from sites to enrich farmland or gardens (e.g., Hays 1976:117; Dye 1941). But the systematic removal of shell mounds for use in early road construction, ca. 1900-1930, now appears to have been among the most devastating impacts to coastal sites in some areas.

There is compelling archival evidence that the destruction of several shell mound sites was systematic and in some areas comprehensive, and may have been most intensive during the earliest episode of automobile road construction along the coast. Archaeological findings are also beginning to address this historical development.

A 1911 article in *The Sunday Oregonian* newspaper offers a perspective from this era detailing large-scale road surfacing with shell from numerous mound sites on the Lincoln County coast. The article's source, A.B. Weatherford of Albany, Oregon, was informed of the significance of the shell mounds by Native people he knew at the Siletz Indian Reservation. Given his work in real estate in the area, he may have been involved in purchasing and reselling former Siletz Reservation lands, and his attitude toward Indian land tenure is evident in the observations and comments throughout the article. The information he provided the newspaper was presented in a lengthy article for the Sunday magazine (*The Sunday Oregonian* 7 May 1911 Sec. 5, p. 5., col. 5).

Historic Mussel-Shell Mounds Go Into Roads
Famous Old Siletz Indian Reservation Monuments Giving Way to Present-Day Needs
in Modern Highway Construction.

Albany, Or., May 6 (Special.)-

The historic old mussel-shell mounds on the Siletz Indian reservation are giving way to present-day needs. These old monuments, which are linked with Indian tradition and typify an ancient custom of the first dwellers on the Oregon coast, are being torn down to make modern wagon roads.

It has been discovered that the shells from these mounds, when properly spread out, make a roadbed which is as good as a macadam road, so the conical piles which have stood for centuries, are being torn apart and scattered to improve the course of the rapidly-increasing travel up and down the Pacific Coast from Newport to the mouth of the winding Siletz River.

A.B. Weatherford, of Albany, who has real estate interest in the Siletz country and makes frequent visits to that part of the state, told *The Oregonian* today the story of how these ancient mounds are now being utilized for road improvement. According to Mr. Weatherford, who has learned the tradition regarding these old mounds from the Indians on the Siletz reservation, the mussel-shell mounds were erected by the Indians centuries ago, far beyond the memory of the first white man who ever visited the Siletz country.

*(**section omitted)*

The mounds stand in groups along the shore for a distance of about six miles, beginning at a point about 11 miles north of Newport and running northward, in other words from the mouth of Rock Creek to the mouth of Salmon Creek. They stand from 100 to 200 yards back from the beach. The mounds are each about 25 feet in circumference [diameter?] at the base and stand five or six feet high.

There is one tradition that the mounds were used as burying places for the Indian dead. But this appears not to have been the case as a general rule and that the mounds were erected through the necessity of having some place to throw the mussel shells so that they would not be scattered about promiscuously and thus take up the open spaces needed in drying other mussels as caught.

*(**section omitted)*

These mounds have stood for centuries and the shells have gradually crumbled and become broken. Most of the mounds have retained their original outlines, however, though the shells themselves have broken into many pieces. In a few instances, though, the mounds, too, have crumbled apart.

When a portion of the road from Newport to the mouth of the Siletz River was constructed about two years ago a new section of the road ran over one of these crumbled mounds, which had become scattered over the ground, and this accidental experience taught the roadbuilders that the shells would make an excellent road. And they are now being used for that purpose.

Two Miles Covered by Shells

A stretch of road two miles in length has already been covered with these shells. The road is first graded and drained and then a dressing of shells six or eight inches deep is spread on the road. When it becomes packed solid it forms a splendid road bed.

It is planned to make the use of the old shell-mounds general (sic) in rebuilding this road and just so fast as funds are available for work in the road district in which this coastwise thoroughfare is situated the shell road will be extended.

Thus the old historic mounds are being torn down and transported to the new road-bed. It is estimated that the mounds will build a great many miles of road and that after the entire road along the coast is paved with them a few of the ancient Indian mounds may be left. But they are disappearing now at a rate which may mean their total destruction. However, the roadbuilders argue, they have stood for years without doing any good, and in fact without attracting very much attention, and should be placed where they will do the community some good.

If Weatherford was even marginally accurate in his description of this road, the scale of this impact on nearby shell mound sites must have been enormous. A bed of shell six to eight inches deep, probably eight to twelve feet wide, and two miles long would have required some 70,400 cubic feet of shell. If the mounds averaged 25 feet in diameter as he described, rising to a 5.5 ft. terrace 10 feet in diameter, approximately 50 such mounds would have been needed to pave this one stretch of coastal road.



Figure 2: A 1930s photograph of the Maling Estate (A) at Cove Point depicts a shell road (B), and the possible remains of a large shell mound (C) that has been partially excavated. Highway 101 (D) in the distance follows the route of the coastal shell road depicted by Weatherford in 1911 and Burton in 1912 (Photo courtesy of Lincoln County Historical Society; Letters A-D have been added.)

A year after the Weatherford account was published, *Oregon Journal* reporter William H. Burton, Newport photographer Fred F. Sassman, and two others took an automobile drive northward along the coast from Newport to Siletz Bay. This was the first such traverse, and it was much publicized. Conditions were only marginally suitable for automobiles along much of the route, but the exception was a three mile segment beginning south of Whale Cove and extending north beyond Depoe Bay. This includes the shell-paved section of road described by Weatherford a year earlier. Apparently the work had continued after the May 1911 article was published, as the shell road had grown from two to three miles in length. Burton's multiple news and journal articles about the trip have been compiled by J.E. Stembridge (1975):

The drop down to sea level at Rock Creek was made with all brakes set, steep pitches being mixed with corkscrew curves on a road little wider than the car, where the slightest miscalculation would have precipitated the car into the ocean 300 or 400 feet below. At the bottom of the hill Rock creek, a fine trout stream, was crossed on a rickety bridge. A mile past Rock creek a high center was met, on which the axles slid and raised all four wheels off the ground. Half an hour was necessary to chop and dig this stretch down so it could be passed coming back. This passed, three miles of the famous 'shell road' was reeled off at a 40 mile clip. This road is made from the Indian shell mounds and is one of the best roads in the state, but begins nowhere and leads nowhere. The road is smooth and dustless and presents curious contrast with the typical wilderness about. It bypasses Whale Cove, Big Cove, and Depot Bay, three pretty and sheltered bays or coves which have a great future....

An *Oregon Daily Journal* article of July 16, 1912 (p. 16) with no by line depicts this segment as "one of the remarkable shell roads made from the shell mounds left by the Indians," suggesting that the author, most likely Burton, was familiar with other such roads at the time.

Modern day Shell Avenue at Depoe Bay appears to be a remnant of the 1911 shell road, based on historic maps. Much of the 1911 route follows the existing U.S. 101 corridor, but Shell Avenue is part of the inland loop that followed the eastern shore of Depoe Bay prior to bridge construction over the isthmus. Streets and roads in other parts of the Oregon coast have names that likely reflect early paving with shell. Examples include Shell Street in Yachats and Shell Road in Seaside, known as Broadway after the 19th century.

A 1940 Federal Writers Project guide to the Oregon coast (State of Oregon Archives 2009) describes large mounds near Boiler Bay that may have been among those mined for the 1911 road. "Just south of the park, on a sloping hillside (L.), are half-covered SHELL HEAPS, some of them an acre or more in extent, remains of Indian meals. The refuse, mixed with sand, provides material for good beach roads." Evidently there were large mounds left in 1940, despite their proximity to the 1911 coastal shell road.

Doing research for this article, I spoke with Jodi Weeber, archivist with the Lincoln County Historical Society's (LCHS) research library. She provided important information about Lincoln County shell roads, including the Stembridge (1975) volume and the two historic photos (Figures 1 and 2). Ms. Weeber informed me that a former resident of the Cove Point area north of Whale Cove had told her that many of the residential and farm roads in the area were paved with shell from middens beginning well before the 1940s. Roads for the South Point residential development were being paved with midden shell as late as 1947.

When the B.E. Maling mansion was built at Cove Point in the 1930s, a large shell mound was greatly altered and roads were paved with shell (Figure 2). According to a history of the estate written by Halvorsen (1979), "Some modifications, as befitted an estate, were carried out. Maling had the western edge of the land bulldozed so the buoy and the channel approach to Depoe Bay could be clearly seen from the mansion. Thousands of rhododendrons and azaleas lined the white shell driveway leading up to the house."

The Strong Parcel immediately north of the Maling estate was purchased by Thomas Jones in 1923. Farm roads on this parcel were surfaced with shell from mounds located on the property (LCHS records). Thomas Jones was the brother of Ben Jones, the latter known for being a state legislator and a leader in the development of the Oregon Coast highway system. Ben Jones reportedly advocated the large-scale use of shell from mounds for paving the Oregon coast highway and other roads. He evidently undertook such efforts personally in Lincoln County, where he resided for many years in the community of Otter Rock near Devil's Punchbowl. During a recent archaeological project, BAC identified patterns in shell fragment distribution near the road to the 1908 Ben Jones's cottage that likely reflect early road surfacing with shell (Purdy and Byram 2009). Given the active role Ben Jones played in directing coastal highway construction, and the difficulty of processing and transporting rock from quarries during the 1920s, multiple segments of the original coast highway may incorporate midden shell.

Archaeologist Carolyn McAleer of ODOT reviewed a late draft of this article, and she informed me that there is information at ODOT relevant to this topic. For example, maintenance staff are aware of several U.S. 101 locations where shell was used as a road bed material at least into the 1950s.

The use of shell from archaeological mounds for pavement in wagon and early automobile roads is not unique to the Oregon coast. Large impacts to shell mounds also occurred on the Atlantic and Gulf coasts of the southeastern states (Hillsborough Planning 1998:7; Holmes 1986; Thompson 2005), and in the San Francisco Bay Area (Lightfoot 1997) and on other continents (Ceci 1984:67). Prior to the widespread use of asphalt pavement and prepared quarry rock, shell from various sources was one of several materials used in macadam roads where it was available in North America and on other continents. There appears to have been much interest in the material during the early years of automobile road building worldwide (Blanchard and Drowne 1913:599; Crosby 1914:172).

One reason shell roads in Oregon are less well known may be that, compared with the Gulf coast and the Atlantic seaboard, the Oregon coast is a high energy erosional environment. Along the more protected shorelines of the southeast, shoals develop and stabilize, producing massive accumulations of intertidal shell that can be mined for roads. The supply of shell from archaeological mounds was also more limited in Oregon relative to the Gulf coast, where archaeological shell mounds are less subject to erosion. While shell mounds may have been readily mined for initial road building along the Oregon coast, other materials were eventually needed for new roads and resurfacing that capped shell layers as mounds decreased in size and number.

Archaeological Shell Road Features on the Oregon Coast

There are archaeologically identified shell road features on the Oregon coast representing different uses of this material for surfacing. Though each is located at or near a shell midden site, the shell in these road features has not been tied directly to middens, and some of this shell may have originated in dredge spoil deposits, commercial shellfish farms, or other non-midden sources. Nonetheless these features confirm that shell was used historically in road surfacing outside the northern Lincoln County coast.

In historic Bandon, on the southern Oregon coast, the Nasomah Village site (35CS43) has been investigated by several archaeologists (summarized by Byram and Purdy 2007). In 2004, Coquille Indian Tribe investigations included a single test unit that contained a dense, compact, crushed shell feature interpreted as a shell road bed (Byram 2006). The unit was located at Cleveland and First streets, the former location of the 19th century Bandon Ferry landing. This unit was excavated during attempts to relocate a buried water main and, once encountered, the crushed shell lens was left largely intact (Figure 3). Overlying fill consists of mixed road gravel, silt, and rubble related to town rebuilding after fires. Other test units in the area showed intact shell midden and/or disturbed deposits, but no dense layers of crushed shell. The feature may extend beneath the nearby modern road pavement. Given its location and depth, the shell feature was likely the surface of an early city street or the road approaching the ferry landing.



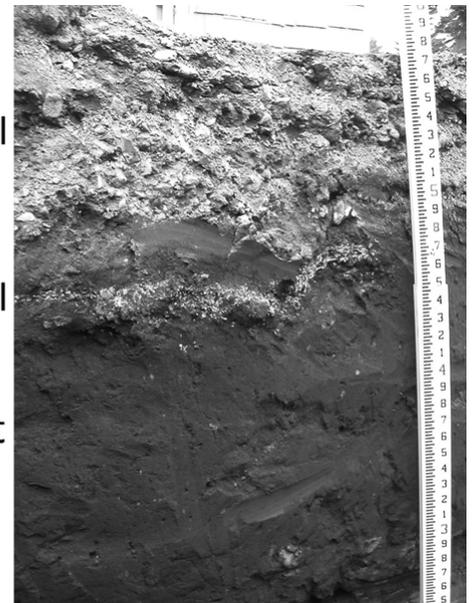
Figure 3: Crushed and highly compacted shell layer at 50 cm depth in Unit 6-8 at site 35CS43 (Byram 2006).

gravel

shell

silt

Figure 4: Pipeline trench wall at Tseriadun (35CU7, Site Area 3) in an area that was formerly the Agate Beach RV park (Byram 2005). The thick upper layer is gravel, and the shell is the lower thin, undulating lens that terminates to the left of the measuring stick.



The road through Agate Beach campground at Tseriadun (35CU7, Zone 3) in Port Orford is an example of more incidental road surfacing with shell that appears to be from a nearby midden. A thin lens of crushed shell (Figure 4) was identified in multiple locations along what was formerly the road through the campground, during monitoring of the City of Port Orford ocean outfall wastewater pipeline trench (Byram 2005). This material was probably spread on a dirt track to improve its surface conditions for vehicles. Berreman (1935) noted that the formerly extensive shell midden in this area had previously been leveled for campground construction, but whether the nearby midden was disturbed for use in the road or had already been moved or stockpiled was not evident from the 2003 exposure. The shell in this lens, up to 15 cm thick in places, is clearly discontinuous with sediments below. Had this been a thin shell midden layer deposited during Native American use of the site, the shell would be extensively mixed with underlying A and B Horizon deposits as seen elsewhere at the site. The Tseriadun shell redeposition may be similar to impacts preceding and associated with state park construction along the coast (Moss and Erlandson 2008:31).

In 1966, USGS geologist Parke Snavely made what may be the earliest attempt to date shell in a historic road on the Oregon coast (see Kelly et al. 1978). He identified shell in an apparent wagon road bed capped by eolian deposits on the marine terrace 7.5 meters above the beach near the Jump-Off-Joe landform north of Newport's Nye Beach. A sample of the shell was radiocarbon dated to 2770 ± 350 . The shell's origin was not established, and it was associated with gravel in the road bed, but given the date of the specimen and the precedent for historic shell use in road paving, it is plausible that this shell came from a nearby midden.

Recently at 35LNC19B, Devil's Punchbowl, on the coast near Otter Rock (Lincoln County), BAC conducted test excavations for a State Park facilities drain field (Purdy and Byram 2009). No buried shell midden layers were identified despite surface shell previously recorded in the area and recently observed in rodent burrow dirt along the margins of First Street to the south of the tested area. On the opposite (south and shoreward) side of the road, several shell fragments are visible in exposed soil, but no shell is visible in the sea cliff cut bank three meters farther to the south of the road. First Street was originally prepared by Ben Jones in the 1920s or earlier, and his use of midden shell for road surfacing may partly explain shell distribution patterns at Devil's Punchbowl.

In the Trail 804 area north of the large Yachats shell mound depicted in Figure 1, Jon Erlandson and Madonna Moss identified several small shell middens that Erlandson (personal communication, 2009) now suspects may be remnants of historic shell mining and transport activities. Sites such as this may be important in illustrating historic construction activities as well as their impact on archaeological resources.

Indirect evidence for large-scale removal of shell during the early 20th century may include archaeological patterning such as the higher frequency of middle Holocene radiocarbon dates at sites near Whale Cove and Boiler Bay (Connolly and Tasa 2008), along the route of the 1911 shell road. If upper mound deposits were truncated and removed then the remaining shell sample may be skewed toward earlier deposits. If the mining of midden shell for macadam was comparably extensive in other parts of the Oregon coast, then a similar pattern might be expected. However, the vast majority of radiocarbon dates from Oregon coast shell middens date to the late Holocene, and most to the last 1000 years (Erlandson and Moss 1999; Moss and Erlandson 1999, 2008).

Discussion and Conclusions

The archaeological examples of the apparent use of shell in road surfacing are not unique. There may be numerous instances of shell lenses underlying and adjacent to historic roads that can be reinterpreted in light of this new information. These archival and archaeological findings also call for reexamination of findings at Oregon coast shell midden sites whose damage has been attributed to factors such as the on-site movement of midden for landscaping or construction. The movement of materials within many sites may have been incidental to the large-scale removal of shell deposits for road surfacing.

If the shell roads of Lincoln County are representative of a process more widely used during early Oregon coast road construction, as is suggested by other historical accounts and growing archaeological data, then this process has been largely unknown to archaeologists. It occurred prior to the surveys by Berreman (1935), Collins (1951), Ross (1975), and other archaeologists who initially recorded many of the coastal sites in Oregon. Many Oregon shell mounds may have been much larger and more like some of the mounds recorded in the San Francisco Bay area (Lightfoot 1997; Luby et al. 2006).

In terms of site chronology and patterns in cultural activity, removal of upper shell mound deposits would be expected to leave remnants skewed chronologically toward earlier site use, yet archaeological shell deposits are predominantly late

Holocene, and many date to the last millennium (Moss and Erlandson 1999). Therefore, evidence for widespread shell mound truncation would seem to support even more intensive late Holocene use of intertidal resources at rocky shores along the outer coast than is already postulated. Alternatively, if the largest and oldest mounds were the primary sources of shell for road beds, then their removal may have left a larger proportion of more recent sites for recording and radiocarbon sampling. As new information is revealed about shell road locations, it may be possible to relate patterns in nearby site chronology to impacts from road-related truncation.

These findings also relate to the distinction between shell middens and shell mounds. Most Oregon coast shell middens consist of dark, organic soils containing dispersed shell and in some cases layers of dense shell (Moss and Erlandson 2008:10). Yet some are actually conical, dome, or ridge-shaped mounds whose matrices are composed predominantly of shell by volume. It is the latter group that appears to have been targeted for removal by road pavers, while farmers and landscapers may have systematically removed material from sites in the former category. A limited number of large shell mounds remain relatively intact in Oregon (e.g., Lone Ranch, 35CU37), but there are growing indications that these were far more numerous until the early or middle 20th century. Delineating former mound dimensions from available records, such as the 1940 Federal Writers Project account of multiple one acre mounds at Boiler Bay, may provide new information about the intensity of residential use, shellfish consumption and landscape attributes at many sites. State and county archives, newspapers, maps, survey records, and aerial photos may hold much information about this process, and oral history interviews may also be productive.

On a site-by-site basis, the possibility of road-related mound removal should now be considered in the interpretation of shell midden stratigraphy. Yet this history has further implications for archaeologists doing fieldwork near shell road locations. There may be instances where shell road lenses are easily mistaken for *in situ* midden deposits, particularly if roads are abandoned and revegetated. And shell road remnants themselves likely hold cultural materials other than shell.

While archaeological site erosion and several other impacts are ongoing along the Oregon coast, the removal of a large number of shell mounds may have been episodic and early, associated with the rapid expansion of automobile roads along the coast. Predating archaeological survey on most of the coast, the destruction or truncation of these mounds in Lincoln County and elsewhere has greatly altered the archaeological landscape, reducing on-site topographic variation created by Native communities that reflects intensive shell harvest, landscape architecture, continuity in site use, and other aspects of mounded space (Lightfoot 1997). With a better understanding of these impacts, archival and archaeological research can now shed light on the former extent, configuration, and composition of Oregon coast shell mounds.

NOTES

The 1911 Oregonian article also provides archaeological information specific to the northern Lincoln County coast. This information, such as the composition, form, size and distribution of the shell mounds, is not recapitulated here but can be considered by researchers investigating this part of the Oregon coast.

Archaeological documentation has shown that a related process, railroad berm construction, has also reduced and incorporated massive amounts of shell midden, at the Avenue Q site near Seaside (Connolly and Tasa 2004).

Even more recently, Tasa et al. (2004) observed that shell was being used to surface paths at Beverly Beach State Park. Though this material is not likely of archaeological origin, such use of shell can lead to misidentification of a location as an archaeological midden. Non-archaeological shell occurs in numerous settings on the Oregon coast, from fossil marine terraces to beach deposits and dredge spoils, but broken or crushed shell distributed in a coastal park setting can easily be confused with a shell midden.

Dennis Griffin (personal communication 2009) notes that at Shore Acres State Park near Coos Bay, the historic tennis courts constructed by Louis Simpson are made of midden shell. This use of archaeological shell was common in the San Francisco Bay Area a century ago (Lightfoot 1997).

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