

## Humans, Dolphins, and Porpoises: Investigations at the Par-Tee Site, Seaside, Oregon, AD 100–800

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**Abstract** Small cetaceans are understudied compared to whales and pinnipeds even though they represent a high-ranking prey choice when available in the environment. Building upon previous faunal analyses at the Par-Tee site, Seaside, Oregon that investigated whaling, this analysis of dolphin and porpoise remains suggests that people were hunting small cetaceans between AD 100–800 on the Oregon coast, especially harbor porpoise, which was found significantly more than any other cetacean species at the site. The quantity of small cetacean bone is unlikely to be the result of only acquiring stranded individuals. While there is no direct evidence of hunting, ethnographic literature and archaeologically recovered hunting technologies like harpoons provide insight into the means by which these species may have been hunted.

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### Introduction

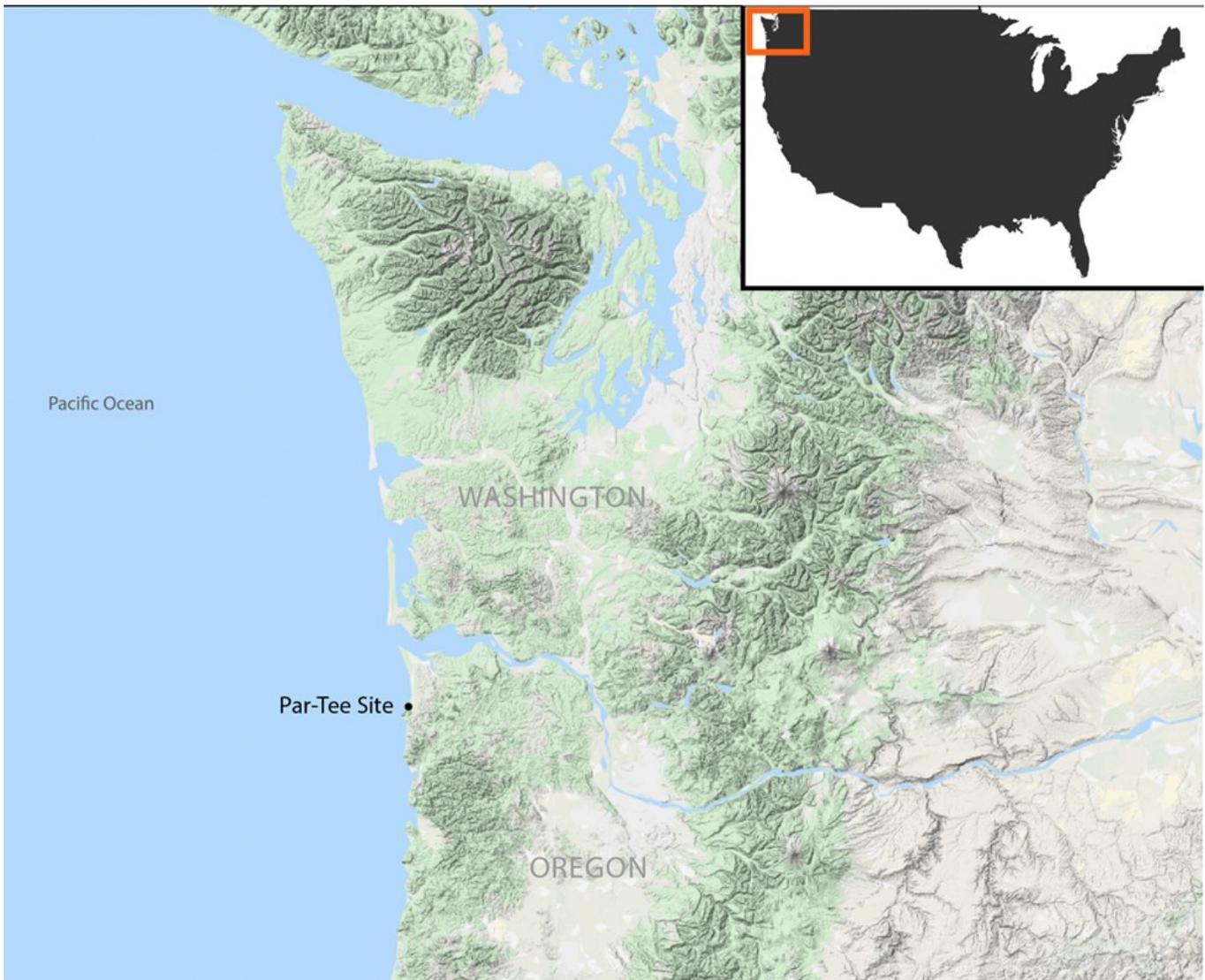
Archaeological literature on marine mammals, particularly in the Pacific Northwest and Eastern Pacific, focuses primarily on the acquisition and use of baleen whales and pinnipeds. Systematic hunting of whales and other cetaceans was relatively rare in the human past, requiring specialized tools, complex social organization, and communal or cooperative hunting and processing strategies regardless of acquisition strategy. In North America, outside of the Arctic, only a few groups are documented to have hunted large cetaceans (e.g., Nuu-Chah-Nulth, Makah [Huelsbeck 1988; McMillan 2015]). Pinnipeds are considered some of the highest-ranking prey choices of prehistoric coastal peoples (Hildebrandt and Jones 1992) and their importance in the diet of coastal groups cannot be overstated (see Colten 2002; Hildebrandt and Jones 2002). However, the extent to which smaller cetaceans (dolphins and porpoises) were hunted or used as a resource is understudied in the Pacific Northwest, often overshadowed by the research conducted on whales and pinnipeds.

To investigate the importance of dolphins and porpoises as a resource in the region, I use the Par-

Tee site (35CLT20) in Oregon as a case study. This analysis builds on previous research at the Par-Tee site investigating whether whales were actively hunted, scavenged, or perhaps both (Losey and Yang 2007; Sanchez 2014; Wellman et al. 2017). Here, I focus on the use of Delphinidae and Phocoenidae families (except for the orca, *Orcinus orca*, which has been studied elsewhere [Wellman et al. 2017]), placing the data in the broader context of other subsistence and technological remains from the site. I focus on three primary questions: 1) What small cetacean species are present in the Par-Tee collection?, 2) Were the residents of the Par-Tee site hunting small cetaceans or taking advantage of stranded individuals?, and 3) If hunted, then what technology was used to acquire them?

### Par-Tee Site Background and Chronology

The Par-Tee site was a semi-sedentary settlement (Colten 2002) located about 15 miles south of the Columbia River on the Pacific Coast (Figure 1). Par-Tee is located where the Clatsop and Tillamook tribes overlapped and it is unknown how this boundary may have shifted throughout the occupation of the region, but a report prepared by Arbolino et al. (2005) for a



**Figure 1** Location of the Par-Tee site on the Pacific Coast, south of the Columbia River mouth.

repatriation claim determined the Par-Tee site to be Tillamook; inter-marriage, trading, and linguistic mixing were all recorded in the region (Arbolino et al. 2005; Sanchez 2014).

Par-Tee was excavated, along with the nearby Palmrose and Avenue Q sites, from 1967–1977 by George Phebus and Robert Drucker (Phebus and Drucker 1979). Approximately 256 units were excavated from Par-Tee, making it one of the largest excavations conducted in the Pacific Northwest south of Ozette (Losey and Yang 2007). The site was excavated in arbitrary 12-inch (30.5 cm) levels and divided into four quadrants (NW, NE, SW, SE). Excavated sediments were screened through ¼ inch (6.35 mm) mesh. Following excavation, the recovered

material was curated at the Smithsonian Institution’s Museum Support Center in Suitland, Maryland.

The Par-Tee assemblage has over 7,000 artifacts and over 113,000 faunal remains (Colten 2015; Phebus and Drucker 1979). Bilaterally and unilaterally barbed harpoon points were recovered from the site, along with 148 toggling harpoon valves that are similar to those historically used for pinniped or salmon hunting (Moss and Losey 2011; Sanchez 2014).

A new Bayesian chronology for the site was established by Sanchez et al. (2018) using dates obtained from cervid bones throughout the assemblage. The authors concluded that the main occupation of Par-Tee was over a span of ~700 years

from AD 100–800, likely with an intense occupation from AD 400–650 (Sanchez et al. 2018). The small cetacean remains analyzed in this paper date to this ~700-year occupation. There is also a later use of the site dated to ~AD 1490–1635 in which it seems the shell midden was used as a burial site; the human burials were shallow inhumations, interred in the shell midden after site abandonment (Arbolino et al. 2005; Sanchez et al. 2018).

### Previous Faunal Research at Par-Tee

Colten (2015) conducted a faunal analysis of six units at Par-Tee with near-complete stratigraphic profiles, identifying a large number of species from different taxonomic categories including: marine, aquatic and terrestrial mammals, birds, and fishes. He found that 20.54% of the total NISP was marine mammal and believes that a large portion of the “undifferentiated mammal” category (22.09% NISP) is also marine mammal, indicating the importance of these taxa for subsistence. Terrestrial mammals by comparison were only 4.27% of NISP. Fish were an important part of the subsistence practices of people at Par-Tee, making up 39.08% of the NISP. These analyses demonstrate that the people at Par-Tee were extremely adept at maritime-focused subsistence activities.

Building on Colten’s original analysis, Losey and Yang (2007), Sanchez (2014), and Wellman et al. (2017) studied whale exploitation at the Par-Tee site. A whale phalanx with an embedded bone harpoon point was recovered at the site, and Losey and Yang (2007) used ancient DNA to identify both the whale species and the bone used to manufacture the harpoon point. Results indicate the harpoon was made of local elk (*Cervus elaphus*) bone and the whale was a humpback (*Megaptera novaeangliae*) (Losey and Yang 2007). The elk harpoon point corroborates ethnographic observations by Drucker (1951) that the Tillamook used elk points to stab whales under the flipper and cut the tail tendons. Since the elk point

was embedded in a whale phalanx, it is possible that the hunter was aiming for under the flipper and missed, instead striking the flipper itself. Based on this locally manufactured elk point, they suggest that opportunistic hunting was occurring at Par-Tee. The point does not appear to be a specialized whaling harpoon and no definitive evidence of whaling tools were found like those at known whaling sites (i.e., Ozette) (Losey and Yang 2007).

Wellman et al. (2017) likewise concluded that some opportunistic hunting was occurring at Par-Tee, but argue that use of stranded individuals may have been more common. Using modern stranding records as a point of comparison, Wellman et al. (2017) suggest that the proportion of humpback (32.1%) to gray (*Eschrichtius robustus*; 60.7%) whales recovered archaeologically is best explained by the residents of Par-Tee focusing on scavenging rather than hunting. Humpback whales spend more time offshore than species like gray whales, often sinking when dead before they can reach the shore, and thus, this is the species that potentially appeared in the midden from occasional hunting activities since their beaching is a rare occurrence (Norman et al. 2004).

### Methods

To address the questions posed about small cetacean hunting at Par-Tee, small cetacean remains were separated from the Par-Tee mammalian faunal assemblage and cataloged. The six units already analyzed by Colten (2015) and the bone artifacts were not reanalyzed here. Each element was cataloged and remains associated with the provenience and storage information for replicability. I identified the remains independent of their association with other cetacean remains (following Driver 2011), to minimize the potential for identification by association. Identifications were made using the Department of Vertebrate Zoology Marine Mammal Collection at the Smithsonian Institution’s Museum Support Center

**Table 1** NISP and MNI of identified small cetacean species.

Common Name	Species	NISP	MNI
Dolphin/ porpoise sp.	Delphinidae/Phocoenidae	290	-
Dolphin sp.	Delphinidae	36	-
Pacific White-Sided Dolphin	<i>Lagenorhynchus obliquidens</i>	6	1
Bottlenose Dolphin	<i>Tursiops truncatus</i>	15	2
Porpoise sp.	Phocoenidae	71	-
Harbor Porpoise	<i>Phocoena phocoena</i>	895	28
Dall's Porpoise	<i>Phocoenoides dalli</i>	27	2
<b>Total</b>		<b>1340</b>	<b>33</b>

following guidelines in Porcasi and Fujita (2000), Glassow (2005), and Cooke et al. (2016). I compared each element to multiple individuals of different ages and sexes from each species to account for intra-species variation. I also examined each element for cut marks, animal gnawing, and other modifications, such as burning.

To examine whether the species composition of the archaeological small cetacean assemblage is consistent with species on the landscape today, I compared the archaeological data to modern stranding data. Stranding, in this case, refers to the process whereby a cetacean washes up on shore, either dead or alive. Sometimes strandings of multiple individuals occur and very rarely, a mass stranding of many individuals will occur. The vast majority of stranding events in Oregon and Washington are of dead animals (Norman et al. 2004). While some argue that stranding records are of little value in evaluating prehistoric whaling activity because of drastic post-whaling-era shifts in populations of species (Mulville 2002), dolphins and porpoises were not the direct target of whaling activities, and as such, stranding records can still be a useful starting place for understanding general trends in their stranding occurrences.

## Results

### Zooarchaeological Results

I identified 1340 elements belonging to the Delphinidae and Phocoenidae families (Table 1). The most common taxonomic categories were harbor

porpoise (*Phocoena phocoena*; NISP 895) and dolphin/porpoise (Delphinidae/Phocoenidae; NISP 290). Dall's porpoise was also identified (*Phocoenoides dalli*; NISP 27). The majority of identified porpoise elements were vertebrae (NISP 693), followed by cranial fragments (NISP 162; Table 2). I also identified elements belonging to bottlenose dolphin (*Tursiops truncatus*; NISP 15) and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*; NISP 6), though in much smaller quantities than porpoises.

No cut marks or hunting indicators (e.g., embedded harpoons) were found directly on the bone, nor was there evidence of burning. The only noted damage came from trowels or other digging equipment where the bone had been scratched or nicked, probably during excavation. These marks had not had time to accumulate dirt from the ground, indicating their recent occurrence. No animal gnawing marks were observed on the bones, which might have been expected if a stranded individual had remained on a beach for a few days before being brought back to the site.

### Stranding Record Comparison

All four dolphin and porpoise species recovered from the archaeological assemblage are species known to strand along the Washington and Oregon coasts (Norman et al. 2004). The ratio of species in the faunal assemblage closely matches the stranding record, dominated by harbor porpoise with a few Dall's porpoises and the occasional bottlenose or Pacific white-sided dolphin (Norman et al. 2004).

**Table 2** Element distribution.

Element	Delphinidae/		<i>L. obliquidens</i>	<i>T. truncatus</i>	Phocoenidae	<i>P. phocoena</i>	<i>P. dalli</i>
	Phocoenidae	Delphinidae					
Cranial Frag.	107	2	0	0	1	148	0
Periotic	0	0	1	1	33	0	0
Tympanic	0	0	1	0	37	0	0
Mandible	0	0	0	0	0	2	0
Maxilla	0	0	0	4	0	8	0
Atlas	5	0	0	0	0	28	0
Humerus	0	0	0	0	0	2	0
Sternum	0	0	0	0	0	3	0
Vertebra	131	21	4	10	0	675	24
Phalanx	0	1	0	0	0	0	0
Premaxilla	0	0	0	0	0	3	0
Other*	47	12	0	0	0	26	3
<b>TOTAL</b>	<b>290</b>	<b>36</b>	<b>6</b>	<b>15</b>	<b>71</b>	<b>895</b>	<b>27</b>

\*Vertebral epiphyses and fragments.



There were also no stratigraphic levels with an exceptionally large number of a particular small cetacean or punctuated presence of small cetaceans, ruling out a mass stranding; the stranding record also indicated no mass strandings of these species (Norman et al. 2004).

#### *Diachronic Analysis*

A diachronic analysis of the small cetacean remains from Par-Tee is not possible at this time. Of the four units securely dated by Sanchez et al. (2018), only two had intact stratigraphy. The sample size of small cetacean remains in these units is too small to lead to any meaningful interpretation.

#### **Discussion**

Element distribution of a species in the archaeological record is often used to study whether an animal was hunted or scavenged and whether this occurred nearby or far away from the main residential site. However, the ability to use boats to tow the carcasses of either hunted or scavenged small cetaceans limits the application of ethnoarchaeological studies on the transport of terrestrial mammals (O'Connell et al. 1988) as an analog for element distribution in this study (Ames 2002). When a terrestrial mammal is hunted far away from the residential site, certain elements may be expected to be left behind during initial processing versus transported back based upon a balance of nutritional value and the effort required to conduct such processing and transport (O'Connell et al. 1988). However, with aquatic hunter-gatherers like those who inhabited the Columbia River mouth region, most animal processing seems to occur at the residential site because when hunting on the open water it is impractical or impossible to butcher on site, and thus the whole animal is floated or dragged behind the boat home (Ames 2002).

Additionally, a number of features specific to small cetacean skeletons greatly impacts the element distribution found at Par-Tee. Unlike with most terrestrial mammals and pinnipeds, the flipper (forelimb) of small cetaceans is not weight bearing and the bone is mostly cancellous, with the point of articulation between the scapula and humerus the densest part of the limb (Cozzi et al. 2009). The survival rate of forelimb elements of small cetaceans was low at Par-Tee and not necessarily because forelimbs were removed prior to arrival at the site. The vertebrae are dense in many small cetacean species because they are the most important part of

locomotion, and as such, need to be able to withstand substantial pressure and movement (Cozzi et al. 2009). Abundance of vertebrae in the midden then, is probably because of both the abundance in the skeleton as well as especially high survivability due to density. The periotic and the rostrum are also extremely dense in many cetacean species (Cozzi et al. 2009). The lack of limb bones, ribs, and sterna in the assemblage is thus probably due to quicker degradation of less dense bones, rather than their original absence in the midden, while high density of the periotic, cranial fragments, and vertebrae allowed for their preservation.

Element distribution in relation to meat-utility of certain portions of the body can also provide insight into how an animal was acquired and used. Savelle and Friesen (1996), in a meat-utility study of harbor porpoise, determine that the highest ranked portions of the porpoise's body are the middle and posterior part of the vertebral column, with the cranium, flippers, and anterior vertebral column comparatively low ranking. The skull especially contains a lot of gristle and mostly consists of inedible material (Savelle and Friesen 1996), though the bones could potentially be used for manufacturing or other purposes. At Par-Tee, elements from both cranial and post-cranial parts of the body were identified, suggesting that whole individuals were butchered at the site (Table 2). In their harbor porpoise meat-utility study, Savelle and Friesen (1996) noted that the meat peeled easily away from the vertebrae, explaining the lack of cut marks on the bone. There may have been meat processing cut marks on ribs or other elements that do not preserve well archaeologically.

In differentiating between hunting and scavenging and nearby or far-away acquisition, element distribution is not particularly useful for small cetaceans. Instead, the quantity of small cetacean bone provides the most evidence for hunting over scavenging. Porcasi and Fujita (2000) and Glassow (2005) argue that dolphin hunting occurred on the California Channel Islands, particularly during the Middle Holocene based upon a significant number of dolphin bones identified from middens on Santa Cruz Island, San Clemente Island, and Santa Catalina Island. Similarly, at the site of Playa Don Bernardo on Pedro Gonzalez Island, Panama, a large quantity of dolphin bones was recovered from a shell midden dating to 6200–5600 BP. Cooke et al. (2016) argue that they were acquired via hunting.

At Par-Tee, a large proportion of the faunal assemblage was identified as dolphin or porpoise. While a complete faunal analysis has not been completed, the partial analysis by Colten (2015) suggests that small cetaceans were acquired 20% as often as pinnipeds. Though they do not outnumber pinnipeds (as dolphins did in some of the Channel Island assemblages), it seems extremely unlikely that such a substantial proportion of marine mammals exploited would be from stranded individuals.

Further lending support to the idea that small cetaceans at Par-Tee were hunted, Drucker (1965), though writing about groups further north than the Tillamook, notes that numerous cultures along the Pacific Northwest coast hunted small cetaceans; they were a nutritious food source, containing valuable flesh and oil (McMillan 2015). Analysis by Sanchez (2014) of Tillamook and Clatsop ethnographic records found that 10.3% of accounts mentioned whales and porpoises, while 7.3% mentioned sea lions and seals, indicating the importance of marine mammal resources. Ray (1938) states that dolphins and porpoises were common in the Chinook region, even going up into the Columbia river to pursue fish, and that the people there would spear and eat them when given the chance. In fact, Lewis and Clark made some of the earliest scientific observations of the harbor porpoise in the Northeast Pacific Ocean at the mouth of the Columbia River (Osmek et al. 1996). Like salmon, the harbor porpoises would swim up-river to follow herring and other fish into the shallow, coastal waters during summer months (Osmek et al. 1996). Identification of dolphin and porpoise hunting at the Par-Tee site demonstrates the antiquity of the practice in the region and modern scientific observations of harbor porpoise in the region provide insight into the location and seasonality of the hunting.

While it seems likely that dolphins and porpoises were hunted, the question as to how they were hunted remains unanswered. There are no remains of embedded harpoons or other artifacts in the small cetacean remains recovered from Par-Tee to provide direct evidence of hunting. Cooke et al. (2016) hypothesize that the dolphins found at Playa Don Bernardo were driven with sound onto the beach as seen ethnographically in the Solomon Islands or using nets into a narrower body of water where they may be speared as at Mawaki, a late-Early to early-Middle Jomon period site in Japan. Here, there was an

exceptionally large number of dolphin bones compared to other coastal East Asian sites (Itoh et al. 2011). In the strata with abundant dolphin bones, stone arrows and knives were found, hypothesized to be used for dolphin hunting and butchery. Geoarchaeological analysis revealed that the strata containing the dolphin bones also corresponds temporally with the presence of a lagoon and deep inlet that may have been used for driving dolphins ashore (Itoh et al. 2011). In the Channel Islands, the dolphin remains did not appear in punctuated layers, as would be expected from multiple natural mass strandings or driving of large groups, but rather appeared throughout the Middle-Holocene cultural strata (Glassow 2005; Porcasi and Fujita 2000).

Though the Par-Tee dolphin and porpoise remains lack direct evidence of hunting, presence of off-shore and near-shore migratory and resident pinnipeds, like northern fur seals and other large otariids, in the faunal assemblage (Colten 2015) suggests that the people of Par-Tee likely also had the capability to hunt small cetaceans using the same technology and were intimately familiar with their marine environment. The artifact assemblage contains a number of harpoons that, while not large enough for whaling (Moss and Losey 2011; Sanchez 2014), could have been used to hunt smaller marine mammals like seals and porpoises. This idea is supported by later ethnographic literature from the region. In *The Northern and Central Nootkan Tribes*, Drucker (1951:26) writes about sealing harpoons: "It served him for hair seal, sea lions, porpoises, and in late times for fur seal hunting." Further north, McMillan (2015), with reference to the Nuu-chah-nulth sites of Ts'ishaa, Huu7ii, and T'ukw'aa, all containing substantial amounts of dolphin and porpoise bone (Frederick 2012; Frederick and Crockford 2005), suggests that the knowledge and expertise acquired in hunting small cetaceans may have helped the development of technologies for hunting large, baleen whales.

### Conclusion

In studying the small cetaceans of Par-Tee, I started with three questions: 1) What small cetacean species are present in the Par-Tee collection?, 2) Were the residents of the Par-Tee site hunting small cetaceans or taking advantage of stranded individuals?, and 3) If hunted, then what technology was used to acquire them?

The answer to the first question is straightforward. In the Par-Tee assemblage I identified four species of small cetacean: harbor porpoise, Dall's porpoise, bottlenose dolphin and Pacific white-sided dolphin. Harbor porpoises were by far the most abundant. Bottlenose dolphins are considered rare off the Northwest coast today, though were found in this study. Interestingly, at the nearby, slightly older site of Palmrose, a large number of bottlenose dolphins were also identified (Colten 2015). This might suggest a range shift of the bottlenose dolphin through time.

The answers to the second and third questions are less straightforward. The abundance of small cetacean remains suggests that while porpoise or dolphin hunting does not appear to have been a specialty at Par-Tee, as it was at some California Channel Island sites (Glassow 2005; Porcasi and Fujita 2000) and Mawaki (Itoh et al. 2011), the residents of Par-Tee were more frequently hunting than scavenging the small cetaceans. Small cetaceans, particularly harbor porpoise, have been known to frequent the mouth of the Columbia River to pursue prey (Osmek et al. 1996), providing an ideal opportunity for people to hunt them. The presence of harpoons at Par-Tee and mention of small cetaceans in regional ethnographic literature further lends support for this explanation.

While given comparatively little attention in archaeological and ethnographic literature compared to whales and pinnipeds, dolphins and porpoises likely played an important role in the diet of coastal people, potentially providing food security when other marine mammal populations were depleted. When considering the strategies used to hunt small cetaceans and investigating the hunting versus scavenging of them, the frameworks used to understand pinniped hunting are more applicable than those used to understand whaling or terrestrial hunting. Future studies should not underestimate the importance of these species in the diet of prehistoric coastal people around the world.

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*Conflicts of Interest:* None declared.

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