Monterey Bay Area Shore Whaling 1854-1926: A Maritime Industrial Landscape Study

By

Dayan G. Weller

May 2024

Director: Jason T. Raupp, Ph.D.

Department of History, Program in Maritime Studies

ABSTRACT

This thesis examines the rise and fall of the shore whaling industry in Monterey Bay, California, from its inception in the mid-19th century to its brief resurgence in the early 20th century, through the lens of maritime archaeology and industrial archaeology. By analyzing the historical and archaeological evidence from three prominent whaling sites - Monterey, Point Lobos, and Moss Landing - this study sheds light on the complex interplay of environmental, technological, and cultural factors that shaped the development and decline of this coastal industry. Through a detailed examination of historical records, material remains, and the cultural landscape, the thesis explores key aspects of the Monterey Bay shore whaling industry, including site selection criteria, technological adaptations, and the industry's impact on local communities. By situating the Monterey Bay shore whaling industry within broader regional and global contexts, this thesis contributes to our understanding of the complex dynamics of coastal resource exploitation and the lasting impacts of maritime industries on the cultural heritage as part of a broader maritime industrial landscape.

Monterey Bay Area Shore Whaling 1854-1926: A Maritime Industrial Landscape Study

A Thesis Presented to the Faculty of the Department of History
East Carolina University

In Partial Fulfillment of the Requirements for the Degree
Master of Arts in Maritime Studies

By Dayan G. Weller
May 2024

Director of Thesis: Jason T. Raupp, Ph.D.
Thesis Committee Members:
Nathan Richards, Ph.D.
Jennifer McKinnon, Ph.D.

Acknowledgements

I would like to express my deepest gratitude to the many individuals – faculty and friends - who have supported me throughout my time in the Maritime Studies Program at East Carolina University. Their unwavering guidance and encouragement have been instrumental in the successful completion of this thesis.

First and foremost, I extend my sincere thanks to my advisor, Dr. Jason Raupp, for his invaluable mentorship and support. I would also like to express my deep appreciation to my committee members, Dr. Jennifer McKinnon and Dr. Nathan Richards, for their constructive feedback.

I am incredibly thankful for the practical knowledge and training provided in the Maritime Studies Program, particularly by Diving and Water Safety instructors Mark Keusenkothen and Ryan Bradley, as well as Staff Archaeologist Jeremy Borrelli. Their expertise and dedication to safety have been essential in preparing me for the challenges of underwater archaeological research and organization of fieldwork.

To my family and friends in Greenville and beyond, I owe an immeasurable debt of gratitude. Their understanding and support have been the foundation upon which I have built my academic pursuits.

Through the course of this thesis, suggestions for sourcing and refining my topic from John Foster, Bert Ho, and Sandy Lydon were of immense help. For the archival components of my research, I am indebted to the dedicated and knowledgeable staff of the Monterey Public Library and New Bedford Whaling Museum – in particular Michael Dyer, Mark Procknik, and Andres Garza.

Lastly, I would like to acknowledge the invaluable assistance provided by Dustin Ponko, Jerome Riedl, and Brittney Sorensen during the data collection components of this thesis.

Table of Contents

List of Figures

Chapter One. Introduction

John Davenport began whaling on the shores of Monterey, California in 1854, the same year the North American Kerosene Gas Light Company began its operation (Reinstedt 1985:126). Three years prior, the seaside town had been the fledgling state's inaugural capital, and though it no longer held that honor, Davenport's new venture gave Monterey another point of notability – the first commercial shore whaling station on the American west coast. With the discovery of petroleum and eventual ubiquity of gas lighting through the 1860s, Californian shore whaling began as a moribund industry. The sharp decline in the value of whale oil and a dearth of whales in Monterey Bay that nearly finished off the whaling companies operating in its waters by the 1870s established a pattern which continued despite a return in whale stocks toward the end of the following decade (Bertao 2006:96).

Even with the considerable difficulties faced by whale fisheries attempting to work in Monterey Bay in the late nineteenth century, at least four stations functioned within its waters, with an additional station based six miles to the south at Point Lobos in the adjacent Carmel Bay. Known as Carmelo Whaling Station, it was immortalized by whaling captain Charles M. Scammon in his seminal *Marine Mammals of the Northwestern Coast of North America* (1874) and is the only known site not significantly developed in the latter half of the twentieth century as tourism on Cannery Row became one of the region's largest sources of revenue. The Carmelo Whaling Station was also the last recorded operational station during the first era of Monterey whaling, and home to the only multi-ethnic whaling company to operate in the Monterey Bay area (Lydon 2001:25).

By the time of the 1900 census, only four residents of Monterey County chose to identify as "whalers," and the first era of Monterey Bay shore whaling ended unremarkably (Bertao 2006:106). Whaling on Monterey Bay saw a brief resurgence 15 years later, with the opening of the California Sea Products station at Moss Landing. Unlike the previous era of shore whaling, the operations conducted out of Moss Landing were mechanized. Utilizing modern whale hunting technology that dramatically increased processing capabilities resulted in a significant increase in catch compared to all previous stations, despite a fall in both the demand and value of whale products.

Monterey Bay is home to one of the most diverse marine ecosystems on the Pacific coast of North America. Much of the unique environment is the result of upwelling from the Monterey Submarine Canyon (located a mile offshore near the center of the bay), one of the deepest canyons in the Pacific Ocean which reaches depths of over 3,656 meters (Palumbi and Sotka 2012:3). This bountiful deep-sea environment, alongside dense kelp forests existing on its periphery and extending up the coasts through Alaska, provides an ideal feeding ground for numerous migratory species, including the gray whale (*Eschrichtius robustus*). Gray whales are not the only cetacean found in Monterey Bay, as humpback whales (*Megaptera novaeangliae*), blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), orcas (*Orcinus orca*), and multiple smaller species of dolphin and porpoise can all be observed within central California's coastal waters. The gray whale, however, is the most reliably encountered species due to a migration pattern that brings them on a southerly route from January through April, with calves born in the shallow lagoons of Baja California (Palumbi and Sotka 2021:25-36).

Though no historical, archaeological, or ethnographic evidence of whale hunting by the Indigenous Ohlone inhabitants of the Monterey Bay area is recorded, stranded "drift whales" appear to have been occasionally consumed (Palumbi and Sotka 2012:14). And while an abundance of whales was noted by Jean-François de la Pérouse in the 17th century, neither the French explorer nor the Spanish colonists and missionaries who occupied the area during the eighteenth century refer to whaling, the consumption of whale meat, or the use whale byproducts acquired from the bay (Reinstedt 1985:98). It is likely the first whales hunted in the Monterey Bay region were taken in the mid-nineteenth century, shortly following the designation of American statehood for California in 1846 and the influx of prospectors that followed in the wake of the discovery of gold at Sutter's Mill in 1848. John Davenport, a New England whaleman, came to California in 1854 determined to take advantage of the previously ignored whale populations consistently available without the need for open ocean voyages or the heavy capital investment of pelagic whaling operations.

The ample whale stocks of the Pacific Ocean were well known in the industry, with Yankee whalers running pelagic operations on the Pacific grounds since the late eighteenth century (Stackpole 1953:145). Davenport's company, however, was the first to seek whales from a shore-based station in the western United States. Due to the superior oil yield, the first species he targeted was the humpback whale, but the gray whale's consistent migratory patterns eventually shifted the company's focus, particularly in the "coming up season" of Spring (Walton and Curtis 1875:44). A substantial percentage of whales harpooned by the shore whaling industry were never recovered, but the risk of a lost whale could be somewhat mitigated if gray whale calves were killed first and dragged towards shore. Since the fierce maternal instinct of female whales prevented them from abandoning their offspring, the slaughter of both whales could be

conducted without the fear of a flight to the depths of the open ocean. Gray whales had a particularly aggressive reputation among species targeted by the Monterrey whale fishery, earning the moniker "devilfish" in whaler's parlance, so the ability to harvest them in sheltered waters close to shore also decreased the physical danger to whaleboat crews (Palumbi and Sotka 2012:31). Reliance on this hunting strategy was still insufficient to hunt whales with the efficiency of pelagic ventures, and shore whaling in Monterey was not the lucrative business the veteran whaling captain imagined. Regardless, Davenport attempted at least three separate whaling enterprises over the following decades and though he abandoned the industry altogether by the late 1800s, his influence on the area is memorialized through the naming of the unincorporated town of Davenport's Landing, now abbreviated to Davenport (Reinstedt 1985:130).

Following Davenport's initial failed operation, multiple Portuguese-Azorean directed companies operated out of Monterey Bay in the ultimately misguided hope of superior fortune. The exact ownership and sequence of operation for these companies is somewhat opaque (Bertao 2006:68-72). The physical locations of the stations are similarly not entirely clear, though the approximate sites of at least three are supported by historical documents. The only available oral history from Portuguese-Azorean Monterey whalers was collected in 1922 by ichthyologist Edwin C. Starks. The subjects of the interviews were either unable to recall many details of the local industry or reported contradictory information, which further muddies the relationship between the companies, their locations, and their crews (Starks 1922). Fisheries records provide the clearest information about catches and crews for at least some of the years of operation; many of these were preserved through family histories and are expertly detailed in historian David E. Bertao's (2006) *The Portuguese Shore Whalers of California* 1854-1904.

South of Monterey, in present-day Carmel-by-the-Sea, a company opened in 1862 based at Point Lobos. In the years before the opening of the whaling station the area had been the site of a stone quarry, with the inlet presently known as "Whaler's Cove" functioning as a loading station for schooners transporting granite up the coast as far as the San Francisco Bay (Loesch and Runyon 2007:13). Multiple Portuguese-Azorean companies used Carmel Bay, but by the late-nineteenth century a Japanese-owned company had taken over the operation. The station's owner, Gennosuke Kodani, who also ran successful abalone fisheries in Japan and elsewhere in California, remained an important figure in the Monterey area fishing industry though he does not appear to have attempted any other whaling operations following the demise of his Carmel company in 1901 (Lydon 2001:21).

The failures of the 19th century Monterey whale fishery can be mostly attributed to the loss in value of whale oil and the rise of petroleum lighting. All Monterey area whaling companies were small scale businesses requiring workers to seek other forms of subsistence during off-season, even during the peak of the local fishery. Unlike the infamous near extinctions of sea otters and sardines in Monterey Bay, similar levels of overfishing do not appear to have affected the bay's whales. While a dramatic decline in whale populations likely occurred during the 1880s, it is unclear whether this was related to whaling activity since the efficacy of whale hunting in Monterey never rose to such a level that migratory populations were threatened (Palumbi and Sotka 2012:30).

Splitting Monterey whaling into two eras, between the closure of the Point Lobos station in 1901 and the opening of the Moss Landing station in 1915, is an easily made distinction given the decade of inactivity. But doing so may give a false impression of a consistency in whaling during the initial phase. For different years in the first era, whaling operations seem to have

ceased entirely. Whether this was due to the availability of whales or a lack of interest on the part of whalers is not immediately apparent in the historical record. Shortly after the late nineteenth century decline, whales were apparently so abundant they were a nuisance to local fisherman, yet this was not sufficient to revive the industry even to the modest levels it had reached in the 1860s (Bertao 2006:106).

Theoretical Perspective

This thesis approaches Californian shore whaling as a "maritime industrial landscape," a synthesis of the Maritime Cultural Landscape framework and industrial archaeology. The proposed concept of the maritime industrial landscape (MIL) builds on Christer Westerdahl's (1992) foundational maritime cultural landscape (MCL) concept emphasizing integrated spatial analysis of ports, wrecks, settlements, traditions, and place names. It supplements this approach with the more technology and material culture focused works of industrial archaeologists like Marilyn Palmer (1990) who explored frameworks for systematically tracing relationships between resource extraction focal points, processing infrastructure hubs, and settlement patterns over time. The proposed MIL approach links marine resource economics to settlement and social dynamics by analyzing the decisions, technologies, capital, and labor mobilization underlying the targeting and pursuit of specific marine resources. Its explicit industrial emphasis on tracing resource extraction focal points connected to processing hubs and settlement patterns, combined with attentiveness to the sea's pervasive influences across coastal landscapes, provides enhanced analytical traction for assessing processes of change.

Research Questions

The industrialization of commercial whaling has received comparatively little attention despite its historical significance. Many of the archaeological investigations into this aspect of the fishery have, however, focused primarily on whaleships and labor issues associated with pelagic operations. Though pelagic whaling activities targeted the same species with the same aim of resource extraction, the process was distinct from that of the smaller scale and less frequent practice of shore whaling. As such, this thesis explores shore whaling as a unique, localized practice in three areas of the Monterey Bay region – Monterey, Carmel, and Moss Landing. To better understand the industrial activities at each of these stations, the following research questions were considered:

1. What techniques and operations did Monterey area whaling stations employ for hunting and processing whales?
2. What, if any, distinct technologies and methods characterize Monterey shore whaling?
3. Can changes in the functions of whaling stations be observed over time, or between different stations operating in the Monterey Bay area?
4. How do the stations that operated in the Monterey Bay area fit within the concept of a maritime industrial landscape?

Significance

This thesis illuminates previously overlooked dimensions of how Monterey's shore whaling industry transformed regional ecological relationships, settlement patterns, and

economies. By integrating archaeological data and documentary records, it attempts to reconstruct an important element the Monterey Bay's greater maritime industrial landscape. The thesis additionally affirms the value in examining extractive industries like whaling through a lens of complex industrial systems situated within broader landscapes of culture and ecology. Monterey whaling's compressed arc of opportunity, occupational specialization, technological development, resource depletion, and eventual dissolution encapsulates patterns with potential to be recognized across numerous terrestrial and marine industries.

Thesis Outline

This thesis is divided into six chapters. The first, this introduction, is followed by an historical overview of the practice of shore whaling and a review of the archaeological context of the industry. The third chapter details the theoretical perspective of the "maritime industrial landscape," drawing on several influences from maritime and industrial archaeology. The fourth chapter provides a history of shore whaling as practiced in the Monterey Bay region. Chapter five presents case studies of whaling sites at Monterey, Point Lobos, and Moss Landing. These case studies are followed by a discussion of Monterey whaling as it fits within the proposed MIL framework.

Chapter Two. Shore Whaling

Shore whaling refers to the hunting and processing of whales from stations or camps located on coastlines, rather than onboard ships at sea. As this chapter examines, shore whaling has a long though often overlooked history. The first people known to engage in such operations were the Indigenous groups of Arctic North America and Siberia, who for millennia harvested whales, walruses, and other marine mammals which they often hunted from skin boats launched from shore (McCartney and Savelle 1985:14). More formal commercial shore whaling operations emerged by at least the 11th century among Basque whalers in Europe, later spreading around the world in several localized industries (Sanger 1995:8). Operating from shore offered a cheaper, more flexible alternative to capital-intensive pelagic whaling, and often utilized Indigenous labor and expertise. The transient nature of such operations resulted in less overt archaeological traces compared to other historic settlement types. This chapter's second half explores efforts within maritime archaeology to locate and study surviving physical evidence of shore stations by exploring key sites relevant to the history of global shore whaling. Investigations from Australia, New Zealand, North America, Northern Europe, and South America reveal variability in preservation and research questions addressed, thus providing comparative context.

Types of Whaling

Before the International Whaling Commission’s moratorium on commercial whaling in 1982, three methods of whaling were used in industrial whaling: pelagic whaling, bay whaling,

and shore whaling (Ellis 1991:410). Each method employed specialized equipment, techniques, and processes adapted to the environments in which they operated, and the whale species targeted (Little 1969:4).

Pelagic whaling, also known as open-ocean or deep-sea whaling, is conducted in the open seas and oceans using large whaling vessels equipped to process whales onboard. This capital-intensive method often targeted sperm whales found in deep, offshore waters across the globe (Ellis 1991:7). American whalers dominated the pelagic industry, and their self-contained operations allowed them to undertake multi-year voyages with only occasional port calls to resupply foodstuffs, wood, water, and any needed equipment. Whaleships were fitted with three to five davits from which fast whaleboats were suspended and rapidly deployed when whales were sighted. Crews rowed or sailed the small craft toward any whales spotted, then harpoon and secure the animal, before slowly tiring it via the "Nantucket sleigh ride" (Stackpole 1967:43). Once exhausted, the whale was killed using a long lance, then towed back to the mother ship with rope and tackle (Dakin 1934:10).

On deck, temporary cutting stages were rigged over a vessel's side enabling removal of thick strips of the whale's blubber. In conjunction with large block and tackle and other rigging, the ship's windlass was employed to hoist and manipulate the blubber during processing. Sheets of blubber were minced into small pieces then rendered or "tried" in brick furnaces called try-works set up amidships. The liquid oil produced was transferred into waiting casks via large copper cooling vats, then stowed below deck. Depending on the species hunted, any baleen, teeth, or bone was also often collected before discarding the carcass (Ellis 1991:26). As many as 80 barrels of sperm oil plus additional volumes of whale oil could be produced daily when

whales were plentiful (Dolin 2007:31). Voyage durations decreased toward the end of the 19th century as whale populations declined and steam-powered catcher boats were introduced.

In contrast with pelagic operations, bay whaling focused efforts in coastal waters along migration routes. Right whales (*Eubaleana glacialis*) and humpback whales follow regular seasonal movements and tend to hug coastlines and bring them within range of land-based lookouts and boats. Bay whaling was cheaper than deep sea efforts but still employed sizeable vessels working independently or in conjunction with shore parties. Though smaller than pelagic vessels, bay whaleships utilized similar equipment and techniques, normally augmented with one or two shore boats (Morton 1982:50). Lookouts posted at elevated vantage points or in a ship's mastheads searched for the telltale spouts of migrating whales. Once spotted, whaleboats were lowered with crews of five to seven rowing swiftly to intercept the quarry. As they approached their prey, the boatsteerer readied the harpoon then attempted to fasten to the animal. As with pelagic whaling, once the whale was exhausted it was disposed of using a razor-sharp lance and dragged back to the vessel for flensing (blubber removal). Bay whaling ships frequently worked alongside shore stations or temporary camps to coordinate efforts and process whales (Grenier 1988:70).

Shore whaling utilized small boats operating out of land camps situated on headlands, offshore islands, or sheltered harbors along migration routes. Lookouts positioned on elevated vantage points scanned a horizon for whales and when sighted, dispatched five to nine crew whaleboats. The boats rapidly closed and attempted harpooning; once fastened, wooden buoys known as drogues were attached to the whale line and the animals eventually tired from pulling against them. The whale was then dispatched with a steel lance and its carcass towed back to shore by whaleboat crews with assistance if needed from additional craft. Ropes and windlasses

enabled dragging onto rock platforms or wooden slipways to commence flensing, which was conducted at on shore. As a cheaper alternative to ship-based efforts, shore whaling stations were often small operations with fewer capital expenses or overheads. As with pelagic whaling, crews operated on a lay system sharing proceeds from the oil and baleen produced, though few shore stations approached the productivity of pelagic operations (Gibbs 2010:6-10).

Global Whaling

The exploitation of cetaceans, including whales, dolphins, and porpoises, has a long history across numerous human cultures. Archaeological evidence indicates that coastal societies took opportunistic advantage of beached whales as an unexpected food source as early as the paleolithic era (Ellis 1991:8). Over time, humans developed more organized methods for actively hunting whales, primarily for products derived from them such as oil and baleen, which gradually developed into commercial operations by the 11th century (Sanger 1995:8).

Indigenous Arctic cultures like those of the Inupiat and Yupik of present-day Alaska had long hunted whales for subsistence, developing sophisticated methods for taking bowhead and other species from skin boats (McCartney 1984:79). Northern Europeans also had traditions of opportunistically scavenging dead whales and actively driving small whales like pilot whales into fjords for slaughter (Whipple 1979:40). However, large-scale commercial whaling operations first emerged among the Basque of northern Spain sometime around the 11th century. Their location allowed easy access to North Atlantic right whales and other migratory species feeding near shore and in the Bay of Biscay. By the 14th century, Basque whaling was regulated by local governments who collected taxes on whale catches (Grenier et al. 2007:18). With the nearshore grounds eventually depleted, whalers built larger ships that could follow whales farther

out to sea and stored blubber on deck to be rendered onshore upon return. Basque vessels reached the coasts of Labrador and Newfoundland by the mid-16th century as other European powers like England and the Netherlands began competing for access to rich whaling grounds of the North Atlantic and later Spitsbergen.

The first sparks of American shore whaling originated among the native peoples of eastern Long Island in the early 17th century. As author William Palmer (1959) indicated, the first actual American whalemen were members of local tribes who developed a traditional land-based whale hunt during winter months. According to Palmer, when whales were spotted offshore, native crews would launch canoes and paddle out amidst the breakers in pursuit (Palmer 1959:2). What began as a subsistence activity for native peoples transformed into a formal industry adopted by European settlers. When indigenous whalers approached their quarry, they unleashed volleys of stone-tipped harpoons. The harpoons were connected to log floats, intended not to secure whales but to tire them through exhaustion and blood loss as they attempted to flee. Once landed, a variety of knives, arrows, and hatchets served to butcher immobilized prey. Differing tribes made use of products ranging from meat for food to oil for light, with minimal waste. Among the Shinnecock of Long Island however, Palmer noted the tail and fins were alone prized, with the remainder left for birds (Palmer 1959:6). While methods were unrefined, such scenes underscore both the exceptional skill of native crews and equally remarkable inefficiency. These early whaling activities relied upon environmental factors beyond control, evident in the inconsistent catch numbers that frustrated early Plymouth settlers (Palmer 1959:1). Nevertheless, shore whaling clearly persisted as a staple of both livelihood and tradition among coastal native peoples into the 17th century.

Opportunities to adopt whaling emerged through the 1640 English settlement of eastern Long Island, with settlers quickly taking interest in the shoreside abattoirs of drift whales and the apparent profits to be made from oil and bone (Palmer 1959:3). While the Southampton settlers were principally farmers, historians have considered the "irresistible temptation among men to test strength against leviathans" (Edwards and Rattray 1956:13). Economic incentives were augmented by the seasonal decline of agriculture preceding winter months, allowing colonists to dabble in whaling without compromising core activities (Edwards and Rattray 1956:28). In this way, shore-based whaling represented an ideal secondary opportunity for coastal settlers. Even seemingly inhospitable qualities, like foul tryworks odors, were mitigated by the winter air and shorter peak seasons, generally spanning November to March (Palmer 1959:7). In effect, the origins of shore whaling as an industry stem from interplay between indigenous expertise and colonial entrepreneurship against the backdrop of seasonal agriculture and maritime settlement. While rudimentary systems predated European arrival, adaptation of technique and investment of resources served to formalize and expand shoreside processing in the century's latter half.

As the whaling industry declined in the 19th century, it saw significant technological transformation which enabled a short rebirth in the modern period – one continuing to a degree in countries like Norway, Japan, and Iceland (Ellis 1991:472). The origins of the modern whaling industry can be traced to the mid-19th century with the invention of the explosive harpoon by Norwegian Svend Foyn around 1865 (Hindle 1952:135). This enabled whale hunters to tackle larger and faster species like the rorqual or fin whale for the first time. In the early 20th century, extensive commercial whaling operations developed in Antarctica, representing the next major revolution in the industry. According to Basberg (1997), Antarctic shore station whaling commenced in 1904 at Grytviken in South Georgia, with stations established at several other

locations over the next few decades to process whale carcasses brought in by small catcher boats (Basberg 1997:93). Then in 1925, the introduction of floating factories capable of processing entire whales while at sea transformed the efficiency and reach of Antarctic whaling (Basberg 1997:94). This pelagic approach came to dominate the industry. Over 727,465 whales were harvested in Antarctic waters between 1925-1949, compared to just 332,055 in the preceding 57 years of shore station operations (Hindle 1952:141).

To understand the full ecological impacts of modern whaling, Hacquebord (2001) examined the history of marine mammal hunting in the Svalbard archipelago since the early 17th century. Hacquebord explained that prior to any commercial exploitation, the waters around Svalbard were home to sizeable populations of bowhead whales (*Balaena mysticetus*) and Atlantic walruses (*O. r. rosmarus*), with historic records suggesting original populations numbering approximately 46,000 and 25,000 animals respectively (Hacquebord 2001:178). However, just a few centuries of intensive hunting pressure due to the emergence of the Dutch and British whaling and walrus hunting industries in these northern waters drove both species to complete local extinction by around 1870 (Hacquebord 2001:171).

Diminishing whale stocks also began to manifest in Antarctic waters by the 1930s, which threatened the sustainability of the industry. At its peak in 1937-38, over 54,000 whales were harvested in a single season (Hindle 1952:142). This precipitated international attempts to establish whaling regulations, starting in 1937 with progressive quota systems and other measures implemented over ensuing decades under the guidance of the International Whaling Commission established in 1946 (Hindle 1952:143). These quotas helped restrict the unrestrained hunting pressure to sustainable levels so that whale populations could stabilize.

From a technological perspective, Norwegian historian Bjørn Basberg's (1997) productivity analysis of the 20th century Antarctic industry revealed insightful trends. He focused on oil yield per whale as the definitive productivity measure. In the early years, shore stations were generally more productive than factory ships. Newly converted ships incorporating updated processing machinery, however, experienced significant productivity gains during the 1920s and surpassed shore stations around 1929 (Basberg 1997:97). Yet the capability enhancements did not stop there. Purpose-built modern factory ships boasting state-of-the-art onboard processing plants came into service in the 1930s and increased productivity even further (Basberg 1997:100). Basberg argued that major technological innovations tend to come in distinct generations or clusters, causing discontinuous leaps rather than incremental gains in capability and productivity over time. The war-time halt of most Antarctic whaling operations represented another opportunity to rebuild the fleet and update infrastructure, thus driving post-war productivity to unprecedented peaks in the late 1940s and early 1950s (Basberg 1997:97).

Diminishing whale stocks coupled with dwindling scope for further optimization of oil extraction efficiency, however, began to severely limit productivity growth after the 1950s despite continued high investment (Basberg 1997:101). Little could be done if the raw whale numbers could not be sustained. Basberg (1997:77) noted that the industry had essentially "reached a plateau" by this late stage of its lifecycle, where the limits of natural resource exploitation from an ecological and technical perspective had both been achieved simultaneously. Nevertheless, the dramatic expansion then eventual decline of modern commercial whaling over the first half of the 20th century, catalyzed by innovations in catcher and factory ship capabilities, already imparted severe ecological impacts during its peak in places like Svalbard. The pattern observed across whaling grounds throughout history, of stocks

eventually shrinking to commercially unviable levels after an initial boom once discovery first yields large catches, began to reemerge (Hindle 1952:144). International regulation prevented total collapse in the Antarctic, but many local species like the ubiquitous bowhead whale never recovered from regional extinction.

The history of modern whaling thus serves as another sobering example of how unchecked resource exploitation enabled by technological advancements can lead to dramatic industrial success in the short term but dire ecological consequences in the long run. Sustainable approaches accounting for complex ecosystem interdependencies are needed much earlier in the cycle of new industry establishment before local destruction becomes irreversible. The impacts still lingering in marine environments like Svalbard today are a reminder that more work remains to undo past damage still propagating through affected ecosystems.

Archaeological Investigation

Despite its prominent place in American popular history and literature, the whaling industry has seen comparatively little archaeological investigation. This is particularly the case for American shore whaling, as many of the prominent archaeological studies relating to whaling focused on sites of pelagic or indigenous whaling. Regardless, shore whaling sites recorded globally provide insight into this aspect of the industry. While most whaling archaeology occurred in Australia and New Zealand, archaeological investigations of sites in several different regions inform this thesis research.

Canadian Shore Whaling

Though not a true "shore whaling station," as the operations focused on bay whaling, likely the most extensive archaeological work on a whaling station has been conducted since the 1970s by Parks Canada. The Basque whaling site at Red Bay on the Strait of Belle Isle in southern Labrador was first identified through exhaustive archival research by historian Selma Barkham. Combing through documents in Spanish archives, Barkham linked details of a 16th century Basque whaling port named "Butus" or "Buteres" in Terranova (Newfoundland & Labrador) to the sheltered harbor at Red Bay (Barkham 1984:515). Intrigued by Barkham's archival detective work, archaeologist James Tuck conducted initial surveys at Red Bay in the late 1970s. His team found remnants of stone oven foundations, cooperage debris, and thousands of broken roof tiles exactly matching Barkham's descriptions strewn along the shorelines. Dense layers of burnt whale oil and fat residue provided unambiguous evidence of the tryworks described in the archives (Tuck and Grenier 1989:65). The surveys confirmed Red Bay as the site of Butus.

Extensive excavations over succeeding years uncovered details of the whalers' lives and labors. Underwater archaeology led by Robert Grenier revealed a remarkable collection of 5 Basque shipwrecks in Red Bay harbor, including a presumed identification of the galleon *San Juan*. Mentioned in Barkham's documents, *San Juan* sank in 1565 loaded with nearly 1000 whale oil barrels (Tuck and Grenier 1989:46-47). The wrecks and remnants of smaller whaleboats (known as chaulpas) and a sailors' pinnace paint a picture of the sailing and hunting vessels involved (Fagan 1993:49).

On land, Tuck meticulously excavated tryworks, cooperages, and ancillary activity areas across sloping terraces and beaches along the harbor shorelines. His excavations revealed over

20 tryworks formed of stone firewalls and walkways enclosing the "fireboxes" where whale blubber was boiled in heavy copper cauldrons to extract the precious oil (Fagan 1993:47-48). Thousands of pieces of curved red ceramic roof tiles littered the sites, remnants of sturdy tile-roofed structures built to house the fiery and smelly rendering operations as described in period documents. Several substantial cooperage workshops were also found containing tools and debris from making the thousands of oak barrels used to transport the whale oil back to Europe (Fagan 1993:48).

Domestic remains and gravesites scattered amidst the industrial installations provide poignant insights into the hardship, dangers, and daily lives and deaths of the seasonal Basque whaling crews. Their minimal, transient housing traces suggest most men lived in tents and small huts near their foul worksites (Fagan 1993:49-50). The cemetery contains individuals likely injured or drowned while hunting the whales, with some still clad in wool caps and breeches (Tuck and Grenier 1989:71). The large scale of th 16th century industrial operations at Red Bay is evident in estimated annual peak production totals likely ranging from 15,000 to 30,000 barrels of whale oil from an average of 15 to 20 ships active each hunting season (Barkham 1984:518). Right whales were pursued during their summer northward migrations while bowheads were targeted in the fall. The detailed archaeology at Red Bay provides remarkable insight into this early systematic exploitation of a New World marine resource by Europeans that is unavailable at most other whaling station sites.

While the early whaling sites at Red Bay have been the most prominent areas of Canadian whaling archaeology, additional work into more modern stations was conducted by Mark Staniforth and Martin McGonigle (2007). In their monograph *The Gaultois and Balaena Shore-Based Whaling Stations in Newfoundland, Canada*, Staniforth and McGonigle (2007)

present the results of preliminary archaeological research at the 19th century Gaultois whaling station site (Staniforth and McGonigle 2007:14). The survey at Gaultois revealed tangible remains including rubble concentration with burnt brick, wooden posts potentially from a landing jetty, and rock alignments believed to represent oil storage foundations (Staniforth and McGonigle 2007:14-18). Artifacts were limited given site functions but did encompass 19th century glass shards and ceramics across two surveyed activity loci (Staniforth and McGonigle 2007:16). Beyond physical evidence, the singular use of Congreve's rocket apparatus for whale hunting documented through archival records constitutes an important technological innovation, which adds to site and industry significance (Staniforth and McGonigle 2007:12). The authors recommend additional historical research on this unique whaling method, as well as community collaboration for protecting the site and conducting an expansive landscape survey encompassing related underwater deposits (Staniforth and McGonigle 2007:19-20).

Australian Shore Whaling

In his 1986 publication in *Australian Historical Archaeology*, Jack McIlroy presented findings from exploratory excavations at the former site of the Bathers Bay Whaling Station in Fremantle, Western Australia, which operated from 1837-1860s. Situated near the first mainland encampment of early British settlers, this station was among the first of some 15 whaling bases eventually established along Western Australia's coastline. Owned by the Fremantle Whaling Company, it focused on bay whaling, targeting slower-moving right whales closer to shore rather than sperm whales in deeper waters. This allowed for a relatively small capital investment in boats, trypots for rendering blubber, cooperage buildings, and minimal crew (McIlroy 1986:43). McIlroy's excavations in 1984 stemmed from planned redevelopment of the site and sought to identify archaeological remains while delineating historically significant areas warranting

preservation (McIlroy 1986:44-45). Test trenches strategically positioned based on an 1838 map revealed structural remains of three trypot furnaces abutting the original shoreline cliff face, as well as an adjacent boat shed/workshop building of varying construction techniques indicating multiple repair phases (McIlroy 1986:46-48). Traces were also found of the stone foundation of the whalers' warehouse by the tunnel they had dug to transport oil to town (McIlroy 1986:48). While no material evidence remained of the whaling jetty itself near the shoreline, the sustained industrial use of the site for over 150 years resulted in over 3.5 meters of layered fill above the tryworks, elucidating an archaeological history of land reclamation and port infrastructure development after whaling operations ceased (McIlroy 1986:47).

Parry Kostoglou and Justin McCarthy (1991) conducted archaeological surveys of early colonial whaling sites in South Australia, seeking to identify and record physical evidence related to this poorly documented industry. Of the 25 sites surveyed, only 3 had both historical references and unambiguous surviving remains testifying to former whaling activities: Sleaford Bay, Thistle Island, and D'Estrees Bay (Kostoglou and McCarthy 1991:5). They summarize historical background on the rise and decline of shore-based bay whaling in South Australia from the late 1830s to 1850s and describe typical attributes of favored whaling station locations (Kostoglou and McCarthy 1991:2-4). Site descriptions provide archaeological details for 7 whaling stations where physical remains were identified. At Point Collinson, these included structural rubble walls, bricks, iron fragments, glass, and whale bones scattered in eroded dune depressions (Kostoglou and McCarthy 1991:8-11). More substantial structural remains and cultural deposits recorded at the Sleaford Bay fishery included stone building foundations, compacted platforms likely used for flensing whales, substrata with charcoal lenses related to tryworks, and scattered whale bone (Kostoglou and McCarthy 1991:16-23). Targeted excavation

of one tryworks area revealed a stratified deposit with nails, glass and ceramics, and faunal remains below surface brick rubble (Kostoglou and McCarthy 1991:27). Comparable ruins recorded at the D'Estrees Bay and Flinders Island sites consisted of stone walls, platforms, and associated bricks and whale bones (Kostoglou and McCarthy 1991:29-35, 50-55). Remains at Thistle Island included stone structures and deposits rich in artifacts and faunal material (Kostoglou and McCarthy 1991:25-27).

As part of a broader study on the history of Tasmania's shore-based whaling industry, Kostoglou (1995) undertook an extensive archaeological survey program to identify and document physical remains at whaling stations around the state. Features surveyed relate to lookout functions, boat storage, landing and maintenance activities, tryworks for oil rendering, blubber processing areas, cooperage works, domestic occupation sites, and potential evidence of Aboriginal co-habitation at some stations (Kostoglou 1995:20-38). Structural remnants identified consisted predominantly of stone foundations and chimneys, suggesting more ephemeral timber-built superstructures that adapted styles and materials to localized conditions (Kostoglou 1995:29-30). Possible boat storage depressions were also recorded cut into rock platforms near shorelines. Domestic artifacts occurred but concentrated midden deposits were rarely encountered; one bottle dump site was documented at Adventure Bay (Kostoglou 1995:33). The spatial configuration of structural remains points to social hierarchies which separated boat steerers and harpooners from ordinary whaling hands (Kostoglou 1995:39). Indigenous archaeological materials like shell middens and lithic scatters were also recorded in proximity to some stations, indicating potential co-habitation or trade with Aboriginal groups (Kostoglou 1995:42-43). While visibility of structural remains proved highly variable, Kostoglou (1995:47) argued that subsurface archaeological deposits have immense research potential to elucidate

details of daily life and industry at the isolated maritime workstations through carefully controlled excavations.

Mark Staniforth (1998) summarized his prior work at three sites highlighting historical and archaeological evidence for nineteenth century whaling activities along the remote South Australian coastline (Staniforth 1998:1). He argued that early whaling in South Australia has been incorrectly viewed only in terms of officially sanctioned Adelaide-based operations. Staniforth demonstrated that at least three whaling stations were operated by parties from Hobart between 1837-1846—an important outpost of the Tasmanian shore-based whaling industry (Staniforth 1998:1-2). Detailing the Fowlers Bay site, Staniforth presented historical references indicating American whaleships hunted there sporadically in 1840 before a Hobart party set up seasonal shore operations in 1843-44 (Staniforth 1998:3-5). Archaeologically, excavated whale bones representing nine individuals suggest carcass processing areas, yet no confirmed tryworks or living quarters were located (Staniforth 1998:7-8). At Sleaford Bay, he found evidence for an early Hobart operation (1837) and later Adelaide company station (1839-41). Finally, documents point to Hobart whalers working at Streaky Bay between 1843-46, substantiated by archaeological material scattered around a stone shelter (Staniforth 1998:11-14). Staniforth concluded that properly understanding early South Australian whaling requires looking beyond local historical sources to those in Tasmania where several key players were based (Staniforth 1998:15).

Charles Parkinson (1997) detailed five whaling sites in South Australia and conducted fieldwork at three. The Spalding Cove whaling station located on the Jussieu Peninsula in South Australia represents the earliest shore-based whaling station in the state, operating from at least 1829 (Parkinson 1997:38). Pedestrian survey in April 1997 relocated structural evidence, with

Parkinson identifying low-lying remains of several small rectangular domestic huts containing hearths. Parkinson also noted a possible flensing platform, critical infrastructure for landed whale processing, located along a granite reef extending into Spalding Cove, as well as remnants of a ships tank, likely for oil storage (Parkinson 1997:44-48). At Sleaford Bay, two functionally discrete areas were identified – a domestic complex set behind coastal foredunes, and an industrial area containing an extant flensing platform and tryworks infrastructure (Parkinson 1997:50-55). Parkinson suggested the uniquely intact tryworks arrangement, while protected from storm surge, had still experienced damage since prior surveys in 1984, underscoring the fragility of early industrial sites. The final station examined by Parkinson was the Point Collinson whaling station in Streaky Bay. There Parkinson documented three clusters of possible structural debris and one area of more definite building remnants behind coastal foredunes, suggesting temporary canvas-roofed frames (Parkinson 1997:68-69). Parkinson additionally offered historical support and synthesis to prior archaeological investigations of sites at Thistle Island and Fowlers Bay.

Karen Townrow (1997) detailed the development and testing of a predictive model for locating shore-based sealing and whaling sites along the Victorian coast. Summarizing the written historic evidence of the industries in the region, reports on field surveys that located remnants of only four relevant sites – three sealing sites, and one whaling. Townrow identified material evidence interpreted as likely remnants of this historic whaling station in Refuge Cove. Located features included a square granite structure, granite slabs resembling a hearth, and granite rocks roughly aligned with jetty piles found on an earlier maritime survey (Townrow 1997:18). Based on the combined historic and archaeological evidence, the site was assessed as probably the remains of the seasonal shore-based whaling station known to have operated at

Refuge Cove from 1839-1847. As one of the only surviving whaling stations in Victoria, the site holds state level significance (Townrow 1997:32).

Martin Gibbs (1998) provided an historical overview and archaeological analysis of the shore-based whaling industry in Western Australia from 1836-1879. He situated the industry within the broader economic context of the struggling early colony, arguing that whaling offered hopes of profitable export income. Gibbs' archaeological survey found vestiges of 12 stations, revealing common choices of sheltered bays near headlands and fresh water (Gibbs 1998:43). Of note is the incorporation of Aboriginal men as crew and whale products in indigenous rituals, pointing to extensive cultural interactions (Gibbs 1998:40). In his 2010 monograph *The Shore Whalers of Western Australia*, Gibbs provided an archaeological study of shore whaling communities in 19th century Western Australia, situating them within a theoretical framework of a "maritime industrial frontier" (Gibbs 2010:2). The core of Gibbs' research was excavation of the Cheyne Beach whaling station, where analysis of artifacts and faunal remains revealed intimate details about domestic life at the station—from evidence of family life and diet to minimal visible interactions with Indigenous populations. He interpreted these findings to demonstrate how, despite physical isolation, whaling community members maintained close transnational ties to Europe. At a broader level, Gibbs positioned the rise and demise of shore whaling within the context of Australia's colonial history. He concluded that while the whaling industry proved ephemeral, it played a crucial role in initiating and enabling processes of culture contact and European settlement across maritime frontiers (Gibbs 2010:113).

An underwater archaeological inspection carried out by Cosmos Coroneos (2000) in Twofold Bay, New South Wales searched for physical remains associated with the bay's 19th century whaling industry ahead of a proposed development. The inspection methodology

involved laying out shore-to-sea transect lines as well as circular offshore searches to systematically survey littoral and offshore zones, including known whaling station locations (Coroneos 2000:14-28). Remnants of wooden jetty piles likely linked to 1840s whaling stations were discovered, alongside rail lines from a possible 20th century jetty (Coroneos, 2000, p. 25). Most of the located areas relevant to the whaling industry were found just offshore amongst rocky rubble, suggesting the sites were subject to considerable erosion and likely contain further buried cultural material (Coroneos 2000: 27).

Adam Paterson (2006) presented the results of archaeological and historical research on the 19th century whaling tryworks located at Sleaford Bay. The Sleaford Bay tryworks features substantial foundations and a brick floor, with brick piers made from durable “firebricks”, bonded with mortar containing deliberately selected river sand (Paterson 2006:15-16). Paterson suggested skilled construction methods and knowledge were used. Comparatively, the tryworks was more elaborate than other regional examples from the period (Paterson 2006:23). Historically, the local whaling industry struggled in 1839 when the tryworks was built, making the expense and effort puzzling (Paterson 2006:5-7). Paterson proposed a novel social interpretation, arguing the tryworks construction served to occupy the whalers, thereby reducing disciplinary problems that plagued operations (Paterson 2006:23-24). Methodologically, he integrated evidence including historical records, comparative archaeological data on whaling technology, and detailed analysis of the Sleaford Bay site's architecture and materials, situated within the economic and social context (Paterson 2006:3-4).

In their 2006 article, archaeologists Jennifer Rodrigues and Ross Anderson provided documentation of the Pakington Whaling Station site north of Port Gregory, Western Australia, which operated from 1854-1875. Through site visits and inspections, the authors identified

features such as brick scatters, whale bones, and various artifacts consistent with a relatively long-occupied whaling station (Rodrigues and Anderson 2006:11). They also examined historic maps and documents to trace the site's origins and use by multiple whaling crews over time. Importantly, coastal erosion in 2006 exposed additional structural remains and materials suggesting the site covers a more extensive area than previously determined (Rodrigues and Anderson 2006:9).

New Zealand Shore Whaling

Nigel Prickett (1998) provided a concise overview of New Zealand's shore whaling industry, which emerged in the 1820s as an offshoot of seal hunting. Attracted by right whale migrations, stations operated seasonally to render oil and whalebone, peaking in the late 1830s before rapid resource depletion (Prickett 1998:48). The paper outlined the industry's organization, technology, trade links to Sydney and Wellington, crew demographics, and interactions with Māori communities (Prickett 1998:49). In 1982, Prickett systematically recorded surviving structural evidence and artifacts at whaling settlements on Kapiti Island, including stone hut foundations, fireplaces, and trypot stands at two locations, representing stations dating from the 1830s accommodating up to 40 whalers and 5 boats (Prickett 1998:51). Numerous in situ artifacts included whalebone scarred with possible tool marks, and comparative landscape contexts and construction materials point to close cohabitation and sharing of resources between Māori communities and European whalers (Prickett 1998:49). Prickett argued such archaeological surveys have rich potential for understanding daily life, subsistence patterns and culture contact at these early frontier settings (Prickett 1998:51).

Chris Jacomb (1998) documented the archaeology of shore whaling stations located on New Zealand's Banks Peninsula, an important mid-19th century whaling area. Established after the initial New Zealand whaling boom, stations operated from 1836-1850s to intercept migrating southern right whales. Jacomb inventoried known stations, finding 14 sites with surviving structural evidence despite extensive agricultural and urban development (Jacomb 1998:69). Spatial layouts follow a common pattern governed by industrial needs and environmental constraints – tryworks, slipways, and accommodation cluster in small working bays below headlands used for spotting (Jacomb 1998:70). Settlement traces indicate transient occupation and minimal investment, with crew ethnicity and status hierarchies likely structured social relations, although difficult to extract archaeologically (Jacomb 1998:71). As with Prickett (1998), Jacomb's work presented intermingled midden deposits that signify close interactions with resident Māori who provided labor and supplies (Jacomb 1998:68).

American Shore Whaling

When Ronald V. May (1988) reported on the archaeology of the Ballast Point Whaling Station site in southern California, it represented only known shore whaling site in the United States. May traced the history of site occupation from early establishment in 1857 to the final abandonment of the industry in 1886, which roughly corresponds to the lifespan of the 19th century Californian shore whaling industry as a whole (May 1988:5). Significant archaeological features included a burned tile platform, a tryworks foundation, and artifact clusters. The large tryworks foundation, measured 4 meters square and was noted as an exceptionally important find by May, likely the first of its kind in an American archaeological context. May determined it likely supported two large iron trypots, with attendant porous architectural features to vent

smoke (May 1998:22). Additional artifacts scattered nearby and a tiled platform extension under the adjacent building, suggested associated work areas and structures (May 1988:14). In a later work by May (2001) addressing the same site, he noted the presence of ceramic and other domestic artifacts associated with the archaeology of the Chinese diaspora (May 2001:7). In an interesting parallel to Point Lobos (see Chapter Five), the Ballast Point station potentially shared occupancy between Portuguese whalers and a Chinese fishing community.

Working with California State Parks archaeologists, Rick Fitzgerald, H. Martin, C. Kimsey, C. Ralston and Laurie Wilkie (2021) conducted a survey at the Pigeon Point Light Station State Historic Park. Located between Santa Cruz to the south and San Francisco to the north, Pigeon Point served as an intermittent base for Portuguese whalers from 1851-1896, before it transitioned into a logging port, which shipped timber and other regional goods to San Francisco before ceasing operations due to storm damage in 1885. Through systematic sampling and terrestrial survey, state Parks archaeologists delineated several archaeological features, tracing the spatial imprint and material refuse of these prior land uses (Fitzgerald et al. 2021:2). Structural remnants of the port such as metal ship mooring hardware and concrete pier footings were documented, along with ceramics and container glass possibly associated with resident whaler families and port landing workers (Fitzgerald et al. 2021:3). While underwater reconnaissance yielded no definitive submerged artifacts, future survey in more optimal conditions were recommended to further clarify structural attributes of landing facilities and intertidal activity areas (Fitzgerald et al. 2021:2).

Irish Shore Whaling

Archaeologist Rory McNeary (2007), who investigated the establishment, operation, and eventual demise of a shore-based whaling venture in Donegal Bay, Ireland during the mid-18th

century. Lacking precise locational data for this whaling venture limited, McNeary suggested the tryworks was likely situated near the existing ruins of an old saltworks, which provided shelter and a platform for processing whale carcasses retrieved offshore (McNeary 2007:120-122). Archaeologically, the ruins at Port Harbor are the most suggestive, though verification is still needed. Recording in 2000 revealed the remnants of five buildings possibly connected to trying whale blubber; their condition also warrants more extensive analysis given the ongoing threat of coastal erosion (McNeary 2007:122-123). Ultimately, McNeary argued for integrating public participation into future archaeological research, to engage local interest and address concerns of preserving cultural and industrial heritage in the coastal landscape (McNeary 2007:124).

Brazilian Shore Whaling

In Brazil, archaeologist Leandro D. Duran (2008) examined a whaling station on Bom Abrigo island using underwater archaeological methods to understand it as a marine structure rather than solely as a land-based operation. He contextualized the rise of whaling in colonial Brazil in the 17th century under Spanish Basque entrepreneurs searching for new whaling grounds (Duran 2008:228). Whaling stations proliferated under royal charters like the one on Bom Abrigo island established in the late 18th century (Duran 2008:229-230). Duran questioned the predominant focus on terrestrial remains of stations, arguing marine environments were integral to their operation per historical sources (Duran 2008:226-227). His underwater survey of two adjacent coves revealed one had diverse cultural material indicating its likely use as a port, while the other featured an absence of remains suggesting linkage to production activities (Duran 2008:231-237). Duran concluded that rather than extensions of land stations, the maritime spaces fundamentally structured and enabled colonial whaling in Brazil (Duran 2008:238).

Norwegian Whaling

In the second part of their monograph on Newfoundland whaling archaeology, Staniforth and McGonigle (2007) detailed preliminary results of survey at the early 20th century Norwegian Balaena station in Hermitage Bay for comparison with the Canadian station at the center of their investigation (Staniforth and McGonigle 2007:23). While abundant historical documentation and images record this short-lived yet highly successful factory, archaeological description from surface remains was lacking (Staniforth and McGonigle 2007:23). Fieldwork verified the jetty location and revealed slipway pile remnants, representing where whales were hauled ashore into a flensing area (Staniforth and McGonigle 2007: 28-29). In combination with the well-documented company history, Staniforth and McGonigle demonstrated how surface documentation of now minimal traces enable insight into early evolution of mechanized whaling systems (Staniforth and McGonigle 2007:30).

Summary

Shore whaling arose as a flexible, economical alternative to capital-intensive pelagic operations. Lookouts spotted migrating whales from coastal vantage points, before dispatching small boats to harpoon them then tow the carcasses back to shore stations. Upon landing, the laborious task of rendering blubber into oil took place before barreling it for export. Archaeological investigation of such sites revealed ephemeral traces, with structural remnants and artifact scatters more prominent than standing architecture.

Though opportunistic hunting occurred earlier, systematic shore whaling emerged commercially with the Basque people of Europe by the 16th century. Basque expertise adapted

traditional technology like stone ovens to efficiently extract oil from North Atlantic right whales before overexploitation depleted populations. As whaling spread via European colonialism, processing camps and small private companies proliferated along coastlines globally. While some cooperative trade with indigenous groups occurred, relations were often tense amid displacement. By the 20th century, industrial catchers and floating factories made existing shore stations obsolete, to a degree of effectiveness that multiple species were driven nearly to extinction before meaningful regulation intervened.

Legacy sites in places like Australia emblematize the largely unchecked exploitation of nature's bounty that peak shore whaling represented, before improved conservation awareness. Whaling station sites also signify early conduits within burgeoning global trade networks, where commodities like whale oil fueled industry and illuminated growing urban centers. Transient operations enabled access to rich ocean whaling grounds at lower infrastructure cost, though at the eventual expense of targeted whale populations, as profit-driven operators quickly exhausted them through the advent of the modernized technology of 20th century whaling operations.

Chapter Three. Maritime Industrial Landscapes

The archaeological study of shore-based whaling invites an integrated conceptual framework spanning maritime cultural landscapes, industrial archaeology, and sociotechnical perspectives. This chapter reviews foundational ideas across these interrelated disciplines to propose an interpretive approach termed the Maritime Industrial Landscape. The framework bridges maritime and industrial archaeology to elicit a more nuanced understanding of the entwined spatial, economic, technological, environmental, political, and ideological facets of human-sea relationships as manifested through shore whaling.

The MIL situates whaling stations between moments of resource harvesting, processing, and production of final products. Rather than permanent infrastructure, adaptable hunting technologies were necessitated by the mobility of targeted marine mammals. By interconnecting data on whale extraction technologies, settlement patterns, labor systems, and changing environmental impacts, the MIL promises holistic interpretation of industrial whaling's sociocultural forces and legacies across time.

The Maritime Cultural Landscape

Beginning in 1978 but brought to prominence in the English-language world in 1992, Christer Westerdahl's innovative approach to understanding the maritime landscape provides a comprehensive analysis of the physical and ephemeral traces of human interaction with the ocean. By its original definition, the Maritime Cultural Landscape (MCL) is "the whole network of sailing routes, old as well as new, with ports and harbours [sic] along the coast, and its related constructions and remains of human activity, underwater as well as terrestrial" (Westerdahl

1992:6). In a more succinct form, the concept has been restated as combining “physical aspects of landscape and seascape to analyze the culture of maritime peoples within a spatial context” (Westerdahl 2011:4). Westerdahl's 1992 article “The Maritime Cultural Landscape” emphasized the importance of shipwrecks, terrestrial remains, natural topographic features, continuity of usage, and place names in understanding the cultural elements of the maritime environment. These elements serve as essential clues for illustrating specific activities that took place in a particular area, identifying locally significant spaces, and uncovering a culture's perceptions and uses of the landscape and its resources. In the framework, the economic, transport and communication, power, outer resource, inner resource, cognitive, and recreative landscapes each represent a unique aspect of human relationships with the ocean. Westerdahl (1992) argues that these elements of landscape are not self-contained but often feature overlapping boundaries, reflecting a more nuanced understanding of maritime culture.

The material record of the MCL comprises artifactual remains along with the physical landscape of maritime activities. Shipwrecks, according to Westerdahl, are important materials for study of an MCL due to their frequent place in folklore traditions. Outside of a strictly marine environment, terrestrial remains illustrate the specific activities that took place in a marine-adjacent area, such as habitation sites, temporary camps, landmarks, and buildings associated with fisheries or maritime trade. Tradition of usage, where long term settlement can be established, is found in local traditions of seafaring routes and in understanding of climatic conditions and can be utilized to understand significance when sites have been identified in areas with “a constant need for guidance or pilotage during the centuries” (Westerdahl 1992:8). Westerdahl suggested that the study of natural topography coupled with traditions of knowledge can lead archaeologists to identify locations of considerable cultural significance. These “well-

used havens" exemplify a maritime culture's use and perception of the landscape, areas locally designated for culturally specific social, economic, or spiritual importance (Westerdahl 1992:8). Also central to informing the MCL are place names, which can serve to illustrate a culture's perceptions and uses of the landscape and its resources. Some of the most frequently studied names are found in sailing routes, vessel types, landforms, and terrestrial routes (Westerdahl 1992).

While Westerdahl's initial studies were based primarily on Northern Europe, subsequent research has applied the approach to diverse geographical regions, allowing for complex social, economic, and political processes to be explored. Westerdahl and other maritime archaeologists expanded their work to examine a wider scope of MCLs, aiming to introduce new ways of analyzing human relationships with the ocean and coast unconstrained by traditional definitions of the "maritime" in culture or geography.

Landscape and Taskscape

A critical influence on the development of landscape archaeology is seen in the work of anthropologist Tim Ingold. In his article "The Temporality of the Landscape," Ingold (1993) argued that understanding the inherent temporality of landscapes can provide critical insight into human dwelling activities and serve as a unifying focus for archaeology and anthropology. Ingold began by asserting that landscape and temporality are major connecting themes between these disciplines (Ingold 1993:152). He then clarified his conception of landscape, distinguishing it from the related concepts of land, nature, and space (Ingold 1993:153-156). According to Ingold, landscape is qualitative, heterogeneous, and directly perceivable, unlike the more quantitative abstractions of land or space. Landscape refers specifically to "the world as it is

known to those who dwell therein, who inhabit its places and journey along the paths connecting them" (Ingold 1993:152).

Ingold (1993) introduced the notion of "taskscape" to capture the pattern of activities involved in dwelling. The taskscape exhibits its own intrinsic temporality, based on the rhythmic interrelations and resonances between the various activities. As Ingold (1993:160) explained, "the temporality of the taskscape, while it is intrinsic rather than externally imposed (metronomic), lies not in any particular rhythm, but in the network of interrelationships between the multiple rhythms of which the taskscape is itself constituted." The resonance between human activities and other cycles and rhythms, both biological and geological, gives the taskscape its temporal structure. Critically, Ingold dissolved the distinction between taskscape and landscape, arguing that "the landscape is the taskscape in its embodied form: a pattern of activities 'collapsed' into an array of features" (Ingold 1993:162). The forms of the landscape arise through the movements and activities that produced them over generational timescales and features like paths, fences, and buildings bear the imprint of human tasks.

Industrial Archaeology

The study of industrial archaeology emerged as a phenomenon in the mid-20th century, developing concurrently in the United Kingdom (UK) and United States (US) (Palmer and Neaverson 1998:1). The development of industrial archaeology into an academic sub-discipline was initially slow. In the 1950s and 1960s, it was practiced mostly by non-academic groups and avocational enthusiasts who were passionate about aspects of industrialization, remaining largely an amateur pursuit (Cranstone 2004:314; Martin 2009:289). This changed with the 1971 establishment of the Society for Industrial Archaeology in the US and the 1973 founding of the

Association of Industrial Archaeology in the UK. These professional organizations brought together varied experts including architects, engineers, ex-industrial workers, and historians, leading to an early focus on preserving built heritage and understanding technological aspects of industrialization (Cranstone 2004:314; Martin 2009:289). The number of books on industrial heritage published in the 1960s and 1970s demonstrates a rapid embracing of the concept (Gwyn 2007:15).

In the 1980s, approaches in the US and UK diverged. UK industrial archaeology maintained a focus on manufacturing processes and recording/preserving industrial heritage (Nevell 2006:4-5; Orange 2008:85). Studies employed a methodological focus on technological development rather than social or cultural factors, driven largely by cultural resource management projects (Johnson 1996:12; Patterson 2006:7). As archaeologist Marilyn Palmer stated, there was an emphasis on "the need to record and preserve standing structures threatened with demolition rather than an inherent desire to understand more about the historical period of monuments" (Palmer 1990:275). In the US, a focus on mining heritage became one of the predominant areas of industrial archaeology and was accompanied by an increased anthropological approach to the communities around mining sites (Hardesty 1985; Latschar 1981).

Early industrial archeologists typically focused their analysis on recording and interpreting individual machines, structures, and processes that comprise industrial sites. Since the 1980s, the field has expanded to examine entire industrial landscapes, comprised of complexes of buildings, transportation networks, worker housing, and altered topography (Alfrey and Clark 1993:1). The analysis often overlooks, however, the dynamic interplay between industry and the non-human environment, limiting the insights that can be derived. Industrial

archaeologist Frederic L. Quivik (2000) argued that incorporating perspectives and methods from the emerging field of environmental history can enrich industrial archeological interpretation at industrial landscapes, as artifacts shaped by the complex interaction of human and natural systems over time (Quivik 2000:55). Quivik contended that industrial archeologists must move beyond simply cataloging the components of industrial landscapes to engage in more holistic analysis situating these landscapes within wider ecological, cultural, political, and economic contexts (Quivik 2000:56). While new interest in entire industrial landscapes rather than individual structures represents important progress, interpretation continues to lack considerations of how industry shaped and responded to the air, water, soils, plants, animals, and other ecological realities comprising site environments (Quivik, 2000:56). Quivik compellingly argued that a more holistic perspective situating industrial landscapes within their full cultural, political, economic, and ecological contexts can enrich analysis of these landscapes as complex spaces reflecting multifaceted human-environment interrelationships through time.

Much of the expanded perspective found in holistic approaches to industrial landscapes overlaps with the approaches of environmental historians. Environmental history examines the reciprocal relationships between three key forces: ecology, political economy, and human consciousness (McEvoy 1995:152). Rather than treating nature as merely a passive backdrop, environmental historians portray it as an active agent continuously shaping and responding to human activities. Key elements of this include how technology mediates this interaction and how different groups perceived, used, and impacted the same environments in diverse ways. Environmental historians unravel how economic and political priorities, cultural values, and ecological constraints or effects are intertwined over time (McEvoy 1995:153). By incorporating insights from environmental history, industrial archaeologists can strengthen their analyses by

eliciting more nuanced understandings of industrial landscapes as the cumulative result of dynamic societal priorities, cultural values, economic interests, and ecological constraints interacting over time.

For many industrial and historical archaeologists, landscape approaches are now a standard framework to interpret relevant data. Mark Cassell and Myron O. Stachiw (2005) posited that landscape-oriented archaeology is a ubiquitous approach within the field of historical archaeology, moving from particularized case studies to more expansive spatial, temporal, and conceptual analyses that develop contextual understanding sufficient to constitute landscape research. They cited several examples that take a de facto landscape approach, including studies of mill towns, cemeteries, neighborhoods, and company towns (Cassell and Stachiw 2005:2). As a framework, landscape demands rich contextual development to elucidate the complexity of human-environment interrelations expressed materially (Cassell and Stachiw 2005:3).

Contemporary industrial archaeologists argue landscape comprises the cumulative material attributes and social relations in a place as collectively perceived (Cassell and Stachiw 2005:1). Thus landscape is actively and continually constructed through human manipulation of the environment, as well as through processes of perception that shape collective imaginings of place (Paynter 2002). Industrial archaeologists working in the 2000s frequently employed such a framework, with labor coming to a natural forefront. For example, Michael Given (2005) explored how the mining landscape in early 20th century Cyprus was defined, organized, and controlled by the mining company to impose order and domination, yet also resisted by the local populace. Joanna Behrens (2005) examined how the landscape at the Modderfontein dynamite factory in late 19th century South Africa facilitated negotiation of space between managers and laborers. In a similar fashion, Jamie Brandon and James Davidson (2005) analyzed how spatial

distinctions at an Ozark Upland Mill in Arkansas dynamically expressed industrial hierarchies and racial divisions.

Several key issues and themes emerge across this research. First, industrialization fundamentally transformed landscapes across multiple scales, from specific sites to entire regions, thus demanding analysis from local to global perspectives (Cassell and Stachiw 2005:5). Cassell and Stachiw (2005:6) argued that through expansive, context-rich landscape approaches, historical archaeology can provide crucial perspective on the impact of industrialization and illuminate the active roles individuals and groups play in shaping their lived environments. Such research necessitates movement across multiple scales of analysis, covering both specific loci of production as well as wider spatial and ideological landscapes (Cassell and Stachiw 2005:3). By integrating detailed material analysis with sociohistorical context, studies of industrial labor landscapes can explain the complex machinery of human social dynamics under industrial capitalism, thus shedding light on critical issues of power, identity, and social struggle.

Previous Theoretical Approaches to Industrial Archaeology of Whaling

Some of the most significant theoretical foundations to the archaeology of shore whaling originate with archaeologist Martin Gibbs (2006), who utilized historical records and archaeological data to examine the development and operation of the 19th century shore whaling industry in Western Australia. Situating analysis within theoretical frameworks of cultural adaptation and colonization processes, Gibbs employed concepts of information flow and learning systems from the work of James M. R. Cameron (1977, 1981) on early Western Australian settlement (Gibbs 2006:316). Cameron (1977) proposed colonial decision-making occurred in cycles of setting objectives, collecting information, evaluating options, and acting,

and later re-evaluating outcomes. The speed of feedback loops impacted the shift from unreliable agriculture to more immediately profitable pastoralism. Because of this, Gibbs suggests shore whaling functioned as a psychological retreat to familiar marine resources during the uncertain early colonial period. With rapid feedback on success through visible catches, whaling bridged the gap until agriculture and pastoralism stabilized (Gibbs 2006:317-319).

Gibbs also drew upon models which contrasted agrarian and industrial frontiers from Steffen (1980) and Donald Hardesty (1985) to interpret whaling settlements (Gibbs 2006:328-330). Hardesty (1985) outlined differences in isolation, intention, development patterns, and cultural change. Gibbs (2006) categorized whaling camps as industrial frontiers – short-term settlements, externally tied to market forces, with standardized technical systems and rapid transmission of innovations between sites. Yet he noted meaningful divergences in the seasonal, supplemental role of whaling for coastal settlements. Gibbs suggested Hardesty's model of resource patch dynamics may explain the abandonment and later re-use of some whaling areas over time. Changing technology and the adoption of split seasons increased mobility and re-opened previously marginal stations (Gibbs 2006:330-332).

Gibbs (2006:410) concluded that while Western Australian whaling did not expand into a major industry, stifled by economic factors and resource depletion, it was not an outright failure. He summarized two significant roles – providing vital early revenue and optimism in the colony, and ongoing income diversification for coastal settlements (Gibbs 2006:323). Evidence for learning includes reductions in company size and infrastructure investment, flexible party compositions incorporating Aboriginal labor, and mobile split-season strategies to access peak whale migrations at multiple locations along their routes. The archaeological record at Cheyne Beach indicates limited adaptation to the frontier environment (Gibbs 2006:356). In summary,

Gibbs made effective use of settlement process and frontier adaptation theories in examining Western Australian shore whaling landscape over time and space. He interpreted the industry as playing an important bridging role in the early colony. Historical evidence suggests escalating cultural learning and innovation in operations, set against a backdrop of exacerbating economic limitations, and archaeological data revealed general conservatism rather than adaptation to local conditions. Gibbs clearly situated his research within the wider discipline and argued for infrastructure improvements necessary to advance the field. His study provided a model for contextualized analysis of colonial settlement and industry in Australia (Gibbs 2006).

Though not working with shore whaling, archaeologist Jason T. Raupp (2015) argued that an industrial archaeological framework can provide new perspectives in the study of wrecked whaleships. Although commonly analogized as "floating factories," Raupp (2015:7) argued whaleships with on-board processing capabilities operating at an industrial scale were more analogous to remote mining operations or camps, which were isolated microcosms of interrelated production activities. To explore this, Raupp adapted interpretive themes used for studying frontier mining sites of the American West to interpret pelagic whaling sites. These included viewing ships as the main physical component and platform for maritime resource extraction; examining specialized tools and processes for hunting, processing, and storing whale products; and understanding the maritime industrial seascape of known whaling grounds and islands used for reprovisioning (Raupp 2015:41).

In terms of methodology, Raupp analyzed both historical data on the 19th century American whaling industry and archaeological data from the wrecks of two American whaling ships lost in the Northwestern Hawaiian Islands *Two Brothers* (1823) and *Parker* (1842). The archaeological assemblages of these sites provided evidence of the various tools and implements

used in different phases of the whaling extraction process. Relevant historical data shed light on the maritime landscapes and seascapes that shaped and were shaped by pelagic whaling activity in terms of shared knowledge of whales, whaling grounds, hydrography, weather, and potential landing sites (Raupp 2015).

Raupp (2015) also devoted significant discussion to understanding whaleships as maritime workplaces, characterized by their physical layout, division of labor, wage/financial systems, and provisioning. He noted how the workplace structure that developed in the mid-18th century remained largely consistent through the height of pelagic whaling in the early 19th century. Finally, the research explored the significance of Hawaii and other Pacific islands to the pelagic whaling system as trading centers and ports for obtaining fresh provisions. Raupp (2015:27) clearly stated that his theoretical approach is grounded in industrial archaeological theory and practice. He noted the concepts were based on the work of industrial archaeologists like Hardesty (1988), who studied extractive industries like mining, and Palmer (2005), who proposed framework for investigating industrial archaeological sites.

In his 2004 monograph *The Shore Whaling Stations at South Georgia: A Study in Antarctic Industrial Archaeology*, Basberg provided a comprehensive industrial archaeological study of the shore-based whaling stations established on the sub-Antarctic island of South Georgia in the early 20th century. Basberg grounded his theoretical approach within developments in the field of industrial archaeology over recent decades, including the emergence of new methods and perspectives for studying physical structures, landscapes, spatial relationships and change over time. The whaling stations of South Georgia represent a unique case study, as they were never converted to alternative uses after the decline of whaling, and so

retain an exceptional level of authenticity, having deteriorated mostly through natural processes (Basberg 2004).

Basberg initiated an extensive mapping and photographic survey project in the 1980s to systematically document the layout, design, and evolution of the stations. Key dimensions analyzed include production facilities, power supply, workshops, living quarters and catering, recreation facilities, and how the stations physically shaped and were shaped by the dramatic island landscape over six decades of operation. Basberg (2004) also provided historical context about the rise and tragic decline of whaling in this remote Antarctic territory, exploring economic, social, and environmental impacts. He also addressed contemporary debates around preservation, conservation, and tourism at the abandoned stations. Through meticulous surveys, over 90,000 square meters of structures across multiple stations were digitally documented. This extensive industrial archaeological research serves as a valuable basis for further studies on Antarctica's largest and most consequential industrial enterprise and its cultural legacy. Through this process, Basberg (2004) integrated historical, architectural, and geographical analyses to provide a holistic understanding of South Georgia's shore whaling stations.

As the field has developed, industrial archaeology expanded beyond isolated site studies to encompass rich landscape approaches that examine the complex interplay of economic, political, cultural, and environmental forces that dynamically shape industrial spaces over time. By considering reciprocal human-environment relationships and the ways in which technologies mediate industrial production, industrial archaeology overlaps with key issues in environmental history. Applying similar perspectives to whaling archaeology, Martin Gibbs effectively utilized models of colonial settlement processes and resource frontier dynamics to elucidate the bridging role of Australia’s early whaling industry. Meanwhile, Raupp’s novel industrial seascape

approach reveals whaleships as complex microcosms of extraction, production, and provisioning, analogous to remote mining camps. Integrating detailed artefact analysis and historical data paints a vivid picture of the tools, tasks, and maritime workplaces that characterized the pelagic whaling system. Basberg's extensive surveys of South Georgia's shore stations showcase how industrial archaeology can richly reconstruct spatial relationships, machinery, and the cumulative layers of change over time at abandoned sites. Together these multifaceted applications of theory confirm Cassell and Stachiw's contention that industrial archaeology, through expansive landscape approaches and robust contextualization, can elucidate the transformative impacts of industrialization across scales, from local sites to global perspectives. By bridging detailed material evidence with social, economic, and environmental contexts, studies of industrial landscapes can unravel the intricacies of power, identity and struggle inherent in industrial capitalism.

Archaeology of the Maritime Industrial Landscape

The archaeological signatures of the proposed MIL mirror the industrial archaeological moments of input center and output. As stated by Palmer (1991:18), "the existence of industrial activity in a particular area is normally governed by the interaction between three groups of factors: the presence of natural resources, topographical features and the human agencies which harnessed these for industrial production." Since the latter factor is immaterial and can only be inferred through secondary evidence, the factors of immediate relevance to the MIL are the modifications to landscape, technology employed, and industrial products produced. To take the example of a general fishery, modifications to the terrestrial landscape might be primarily in the form of buildings – icehouses, smokehouses, net sheds, fishmeal plants, canneries, or domestic

structures. In the liminal zone connecting the land and marine elements of the maritime cultural landscape, typical infrastructure like piers or docks might be expected, but modifications could also potentially include fishing weirs or the remnants of aquacultural structures. Technology introduced into the landscape might include any vessels utilized by the fishery, along with tackle, fish traps, salting barrels, fish holds, and drying racks.

The aspiration of MIL studies mirror those also described by Palmer's (1998:18) approach to industrial archaeology, "determining the reasons for the location of particular industrial enterprises; interpreting the changes to them through time; and examining their spatial relationship both with each other and with the development pattern of settlements and transport systems." While coastal mining operations undoubtedly form MILs, contrast between extraction of living marine resources and more conventional mining illustrate a key point of distinction between the MIL and a terrestrial industrial landscape. Terrestrial mines inherently require significant modification to the landscape to extract resources. They often involve the removal of large amounts of topsoil, vegetation, and other surface features to access mineral resources, which often result in secondary effects to the landscape such as changes to waterways, sediment, or contaminants altering the natural environment. Furthermore, mining typically focuses on stationary mineral resources that require significant infrastructure, including tunnels, shafts, and other underground structures, thus demanding a significant investment of time, resources, and labor to develop the infrastructure required to extract the resources. Compared to mineral extraction, marine extractive industries tend to have a smaller impact on the physical landscape. Though usually requiring structures such as wharves, these are typically smaller in scale than the infrastructure required for terrestrial mines. In contrast, most marine extractive industries target transient resources. As most sea life is mobile and can be affected by factors such as weather

patterns, ocean currents, and climatic change, the technology and techniques used for marine resource extraction must be adaptable to changing conditions and capable of tracking the movements of their targets. While the physical modification of land may be less intensive to begin a marine industrial operation, its continued usage requires equally complex technological or behavioral adaptation, whether coming in the form of evolving extractive strategies or shifting resource targets, which may itself introduce the need for new modifications to the landscape or technology employed.

Summary

This chapter reviewed foundational concepts and theoretical developments across multiple subdisciplines that inform the study of maritime landscapes, industrial archaeology, and whaling. The concept of the maritime cultural landscape originated from Westerdahl's seminal 1992 article emphasizing integrated analysis of sailing routes, ports, shipwrecks, coastal settlements, traditions of usage, and place names to understand maritime cultures. His approach countered maritime archaeology's previous focus on wreck sites in isolation by promoting investigation of diverse physical and intangible traces of seafaring activity interwoven across terrestrial, liminal, and submerged zones. In the decades since its publication, the flexibility of the MCL framework has enabled application to diverse geographical contexts worldwide (Westerdahl 1992). Some critics argue it reifies divides between maritime and terrestrial realms. Despite debates regarding terminology, the foundational commitment maintains the focus of studying entwined cultural, spatial, economic, technological, environmental, political, and ideological dimensions of human relationships with the sea.

Industrial archaeology coalesced in the mid-20th century amid concerns over rapidly disappearing physical remains of recent industrialization. Early practices emphasized recording

tangible structures, technologies, and processes over contextual cultural analysis. By the 1970s professional associations conferred growing methodological rigor, yet the subdiscipline fractured along contrasting lines of development. British industrial archaeology maintained a descriptive, structural emphasis on technological functions, while North American scholars incorporated post-processual theory and perspectives from historical archaeology to investigate industrial sites as locales enacting dynamic sociocultural forces.

Applying industrial archaeological approaches to the extensive remains of extinct land-based whaling stations offered a means of encapsulating wider cultural meanings, decisions, activities, experiences, and change over time broadcast across these industrial landscapes. While terrestrial development necessitated heavily modifying existing environments through digging tunnels, clearing vegetation, and constructing factories, the mobile nature of marine mammals entailed adaptable hunting technologies rather than extensively built infrastructure.

Several previous researchers demonstrated key frameworks informing this study's approach to interpreting whaleships as complex sociotechnical systems through an industrial archaeological lens. Gibbs (2006) effectively analyzed Western Australia's short-lived colonial shore whaling industry using cultural adaptation and frontier settlement models that could be extended to interpret offshore pelagic whaling. Raupp (2015) adapted mining camp perspectives to the study of whaleships as isolated maritime workplaces, accessing tools of the trade through wreck analysis. Basberg's (2004) exhaustive recording of Antarctic shore stations for architectural preservation provides an outstanding foundation for more contextually nuanced landscape interpretation linking whale extraction economics to associated settlement patterns and social dynamics. By synthesizing developments across maritime cultural landscapes, industrial

archaeology, maritime archaeology and technology studies, shore whaling stations can be viewed in a new, more holistic sense.

The Maritime Industrial Landscape is a proposed interpretive framework synthesized from developments across maritime cultural landscapes, industrial archaeology, maritime archaeology, and technology studies. The MIL concept views shore-based whaling stations holistically as industrial sites enacting complex sociotechnical dynamics that become inscribed across associated terrestrial, coastal, and marine landscapes over time. Traces of the MIL include modifications to the physical landscape such as buildings, docks, and hunting technologies, as well as intangible dimensions like traditions, perceptions, and economic priorities. As a form of marine resource extraction targeting mobile sea life, establishing a whaling station landscape required adaptable technologies rather than extensively built infrastructure. By interconnecting archaeological data on whale processing technologies with historical evidence about associated settlement patterns, labor systems, and environmental impacts, the MIL concept offers a more contextually nuanced interpretation of shore whaling. It encapsulates dynamic cultural meanings, decisions, activities, experiences, and change over time broadcast across these now abandoned industrial landscapes. The proposed MIL framework synthesizes maritime cultural landscapes, industrial archaeology, and sociotechnical perspectives to analyze entwined spatial, economic, technological, environmental, and ideological facets of human relationships with the sea as manifested through shore whaling.

Chapter Four. The History of Whaling in Monterey

The rugged central California coastline of Monterey Bay possesses a rich history of human activity and industry tied to the abundant natural resources of both its terrestrial and marine environments. While traces of the area's indigenous inhabitants, colonial eras, and various extractive booms are scattered across the landscape, an often-neglected element of marine industry – despite its transformative impact on the region – is seen in the advent of whaling within the bay in the mid-19th century.

The operation of land-based whaling stations, primarily targeting seasonally migrating gray whales, forged a distinctive regional industry that rapidly reoriented these bayside locales around the cycles of marine mammal harvesting. At its peak in the 1860s, over 1700 barrels of whale oil were rendered in a single year, cementing Monterey's status as the capital of the west coast whaling trade (Dennis 1945:5). By establishing the templates of open-boat capture techniques and processing methods utilizing onshore tryworks which were later propagated up and down the California shoreline, Monterey Bay stood at the forefront of American whaling's Pacific frontier expansion. While depleted whale stocks and shifting economic conditions forced the industry's collapse by century's end, the legacy of fearless innovators like John Davenport and the numerous Portuguese-Azorean immigrant whalers continued impacting coastal ecological relationships on the Monterey Bay maritime industrial landscape for generations.

Monterey Bay Region

Monterey Bay, situated along the central coast of California (Figure 1), is an exemplar of coastal geomorphology and marine ecology, characterized by its unique submarine and terrestrial landscapes. The bay's most prominent feature is the Monterey Submarine Canyon, akin to the

Grand Canyon in its scale and geological significance but submerged in the Pacific Ocean. This canyon, originating near the shore at Moss Landing, bisects the bay and extends seaward for over 150 kilometers (95 miles), with depths exceeding 3,200 meters (2 miles). Its presence is a pivotal factor in the bay's ecological dynamics, contributing to the upwelling of nutrient-rich waters that support a diverse marine ecosystem (Palumbi and Sotka 2012:13).

The bay's marine ecosystem is characterized by a complex interplay of physical, chemical, and biological processes. The deep waters of the Monterey Canyon and the upwelling currents contribute to the bay's high productivity, supporting an array of marine life, from microscopic phytoplankton to large marine mammals. This productivity underpins the bay's status as a critical habitat for numerous species and as a focal point for marine research and conservation efforts (Palumbi and Sotka 2012).

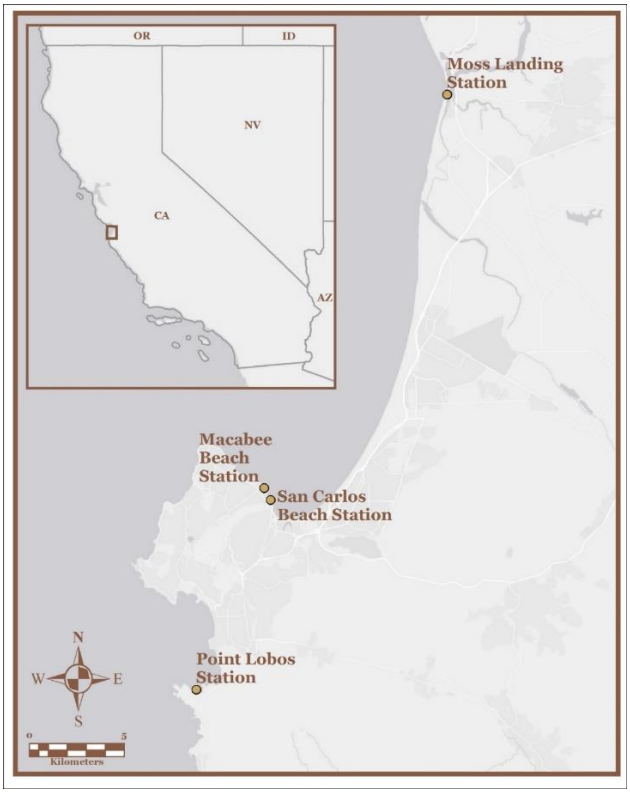

FIGURE 1: Map of the southern Monterey Bay region. Created by author.

John Davenport and the Birth of California Shore Whaling

The genesis of California's shore whaling industry has been widely credited to a New England émigré named John Pope Davenport. Arriving in Monterey Bay during the early 1850s, this seasoned mariner quickly recognized the potential to adapt traditional open-boat whaling techniques to the region's burgeoning economy. In 1854, Davenport assembled California's first organized whale fishery. Though the initial venture collapsed after two seasons, Davenport's pioneering efforts firmly established Monterey as the epicenter of west coast whale harvesting for decades to follow (Bertao 2006).

Davenport was a native of Tiverton, Rhode Island, and spent the 1840s as a Yankee whaler hunting in the Pacific. A seasoned whaling captain accustomed to open-boat hunting methods, Davenport "had from the east a number of bombs" and other whaling equipment when he emigrated to California (Starks 1922:18). The "bombs" referred to in the account of Davenport's whaling supplies had only been an element of the whaling industry since 1850, when they were invented by Ebenezer Pierce (Ellis 1991:230). The whaling bomb typically consisted of a harpoon with an explosive head, which was shot from a cannon mounted on a whaling boat. Upon striking a whale, the bomb would detonate, either immediately or after a short delay, inflicting severe injuries to ensure the whale's quick death. This invention marked a significant advancement in whaling technology from the earlier practice of manually throwing harpoons and attempting to wear down a whale through exhaustion. Well-versed in industrial techniques developed in New England, and clearly at the forefront of commercial whaling methods, Davenport recognized the rich whaling prospects afforded by migrating gray whales

along the Pacific shoreline. When he formed the first organized company to capitalize on those opportunities in 1854, Davenport laid the cornerstone of an industry poised to transform Monterey for the next quarter century (Bertao 2006).

In 1854, Davenport assembled the core of his whaling enterprise from an eclectic group of twelve recruits, "among whom were three or four regular whalemen" from his prior maritime networks back east. This cadre of experienced mariners gave Davenport's whaling company a decisive edge in knowledge, despite entering unfamiliar waters. Yet the early diversity of the venture proved critical as well. As Starks tells us, the original roster also included several "adventurous spirits" from the growing Portuguese fishing community, whose familiarity with regional ecology may have helped identify gray whale migration routes which the company could exploit (Starks 1922:18).

This fusion of Yankee whaling expertise and local environmental awareness enabled the New Company to take full advantage of gray whales floundering in unfamiliar bays and harbors. Despite defective bombs that repeatedly allowed wounded targets to escape, the whales' vulnerability allowed Davenport's men to take an impressive 14 whales in 1854 using traditional hand tools (Starks 1922:16). When plummeting oil prices undercut profits the following year, Davenport temporarily dissolved operations. But others had witnessed his promising start. With Davenport drilling his New England methods, Monterey's land-based whale fishery rapidly expanded. Soon thereafter, three companies were active and employing many locals – all with regularly changing independent ownership and crew composition (Bertao 2006).

Whaling Companies on the Monterey Bay

Although Davenport pioneered the first organized whale company in Monterey in 1854, it was the formation of the so-called “New Company” the very next year that truly launched California's shore whaling industry. Comprised of Portuguese sailors and fishermen intimately familiar with the ecology of Monterey Bay, this Azorean immigrant crew quickly eclipsed Davenport’s struggling “Old Company” in both productivity and longevity. For over two decades, the Old Company anchored Monterey’s emergence as the center of Pacific shore whaling, providing stability and direction as the local industry blossomed. Even when forced to adjust to shrinking gray whale stocks in later years, their early domination of the trade solidified the town’s enduring whaling legacy (Bertao 2006).

This explosive start may reflect the New Company’s decisive edge: an intuitive grasp of regional whales and their migratory habits. Though pre-American period demographic information is limited for Monterey, historical references in 1815 and 1834 indicate the presence of Portuguese fishermen and otter hunters living in the area (Bohme 1956:236). Decades of fishing experience along the California coast may have engraved the seasonal rhythms of gray whales and other local species into collective memory. By the time of Scammon’s visits to the area in the 1860s whalers were keenly aware of migratory patterns (Scammon 1874:44), and it is likely this general familiarity with Monterey Bay’s ecology was drawn from knowledge established since the first Indigenous and colonial settlement of the area. Bolstered by the New Company’s early achievements, Monterey’s land-based whale fishery expanded rapidly after 1855. As entrepreneurs appreciated the profits flowing to the Portuguese crews, Starks (1922:18) reported that three companies were operating in the bay by 1859, together employing around 40 workers. The details of these companies are little reflected in the historical record. Many appear

to have been operated by former employees of other companies, who appear to have utilized much of the same equipment in their whaling operations (Bertao 2006:29).

At its peak in 1866, the pool of expertise allowed Monterey's whalers to haul in over 1700 barrels of oil in a single season - a scale far beyond what Davenport achieved just a decade prior. Even more remarkably, Starks calculated that gray whales constituted over 75% of the total catch throughout this stretch (Starks 1922:18). By exploiting the environmental patterns governing gray whale migrations, Monterey whaling companies were able to consistently operate despite a global decline in the value of whale oil. Until depletion of global gray stocks ultimately eroded profits in the late 19th century, the Old Company charted the course that enabled Monterey's shore whaling preeminence to endure for nearly half a century after their own founding (Starks 1922).

All the Monterey Bay whaling companies had disbanded sometime in the mid-1880s when profitability evaporated completely, but their early command of Monterey's bays and the whales which frequented them ignited an epochal boom that permanently transformed land and sea across the region. Even as the industry they cultivated slowly expired due to cetacean population decline, the indelible legacy of the Old Company endures along California's central coast to this day.

Whaling in Carmel Bay

The industrial landscape of what would become the Carmelo Whaling company's station grew out of a pre-established industry, that of granite mining. Shortly after Joseph S. Emery and Abner Bassett purchased Rancho San Jose y Sur Chiquito in 1850, they established a granite quarry just west of what is now called Whaler's Cove (Stammerjohan 1980:3; Lydon 1997:4). As

stonemasons from New England, Emery and Bassett recognized the value of the high-quality granite found on their land grant, particularly of the deposits in the Point Lobos headlands. Soon after they won a contract to supply granite for construction projects in the rapidly developing San Francisco Bay Area over 150 miles to the north (AECOM 2013:96).

The Point Lobos granite quarry began operations in the early 1850s and soon became a sizable enterprise. By 1854, historical records indicate the quarry employed about 35 workers (Stammerjohan 1980:3). This expanded to around 60 quarry employees by 1858, as demand for the granite increased. The operation extracted the granite from open pit mines dug into the cliffs west of Whaler's Cove. From the adjacent shipping point, the distinctive gray Point Lobos granite made its way to several high-profile construction projects in San Francisco. These include the early Gold Rush-era fortification at Fort Point, built to protect the entry to San Francisco Bay and the new U.S. Mint building in San Francisco, constructed in the mid-1850s to serve the burgeoning economy. Point Lobos granite was also shipped to the early Naval shipyard facilities on Mare Island, where it found use in piers, buildings, and walls (Stammerjohan 1980:6).

The Point Lobos quarries operated steadily until around 1862, when quality granite in closer proximity to San Francisco became more cost effective (AECOM 2013:96). Still, the six to eight years the Point Lobos quarries were active made their mark, scarring the coastal headlands but also providing building blocks for prominent landmarks in California's history. The granite mining illustrates how the whale-rich coast and high-quality natural resources attracted entrepreneurial exploitation of the Point Lobos area beginning in the early American period. As part of the maritime industrial landscape of Point Lobos, granite mining operations

cleared and transformed the coves and coastal cliffs, particularly around Whaler's Cove, to enable shipment of the stone blocks.

Concurrent with granite mine usage of Whaler's Cove, the site was also home to a small Chinese fishing village. In the mid-19th century, a group of immigrant fishers from Southeastern China settled at the cove of Point Lobos (Lydon 1985:29, 32). Upon establishing small fishing villages comprised of related fishers and their families, they began constructing small shacks, one of which – built in 1851- stands at what is now called Whalers Cabin (Stammerjohan 1980:4). Quickly thereafter, they commenced harvesting abalone to dry and send back to China, initiating an industry of collecting, processing, and exporting marine products to their homeland (Lydon 1985:35). By the 1860s, these Chinese fishing villages had expanded into other commercial efforts like line fishing, kelp harvesting, and gathering squid and sea urchins (Lydon 1985:48). The exact nature of the settlement and its relationship with the Portuguese whaling community that occupied the Whaler's Cove area from the 1860s is unclear.

The Portuguese and Azorean fishermen who founded Carmel's whaling station around 1861 were intimately linked to the Old Company crews in nearby Monterey Bay. According to Starks (1922:18), this human capital likely flowed south when mature Monterey operations reached their peak, creating openings on established whale hunting crews that Carmel eagerly absorbed. Carmel thereby benefited enormously not just from Monterey's geographical proximity, but by directly uplifting core competencies cultivated through years of trial-and-error by its parent companies to the north. Armed with harpoon guns, lances, and ecological knowledge transferred down the coast, Carmel's transplanted whalers seamlessly continued Monterey's formula.

Whaling Captain Charles Scammon's 1874 publication captured the bustling scene as the enterprise neared maturity when he described scattered whitewashed cottages along the shore that mark homes of the whalers and their families, along with a description of cutting and flensing platforms jutting out into the bay, tryworks smoking from blubber fires on the shore, and boats floating at their moorings (Scammon 1874:301). At the pinnacle of daily operations, vessel crews routinely towed the carcasses of whales into Whaler's Cove, where processing crews hoisted and cut in whale carcasses, rendering blankets of oil-rich blubber. By the 1870s, Carmel Station had clearly entrenched itself as an archetype of shore whaling installations which announced themselves along migration channel sites across coastal California for years to follow.

Mirroring other regional whaling outposts, Carmel's initial run of productivity in the 1860s and early 70s tapered off dramatically as whale populations depleted under extreme hunting pressure. With primary gray whale targets hovering near extinction by the 1880s (Starks 1922:11), shore whaling returns shriveled in synch across the entire coast. The Carmel station apparently adapted slightly better than most, though it is unclear to what degree this is a result of different hunting practices compared with short lived stations operating out of Monterey Bay. When chronic shortages of whales eventually shuttered the dwindling Monterey operations around 1881, Carmel still managed to persist five to ten years longer before ultimately folding as well (Dickens 1998:19). Yet despite an inglorious denouement that spelled doom for shore whaling across California, Carmel nonetheless shone brightly, if fleetingly, condensing the entire lifespan of Monterey's whaling tradition into scarcely 20 seasons on the picturesque shores of Point Lobos.

Industry Decline

Even at the height of productivity in 1866, undercurrents of future trouble lurked beneath the surface. That year the Surveyor General's report of the Monterey whale fishery's "gradually diminishing" populations foreshadowed decline (Starks 1922:16). While gray whales still abounded, overhunting soon critically endangered that indispensable species. By 1874, as sperm oil competed with whale oil and market prices sagged, the *Monterey Weekly Herald* already viewed shore whaling's local collapse as inevitable (Starks 1922:18). Yet notwithstanding these obvious threats, the industry clung to life for another decade before the end finally came. As late as 1886, twelve years after the first warnings of collapse, the town still boasted functional whaling crews and infrastructure (Bertao 2006:48). This stubborn persistence testifies powerfully to the dominant role whaling played in regional identity and livelihood for 30 prior years. As the 1880s waned, even collective nostalgia lost momentum as returns diminished. By 1888 federal reports definitively characterized the entire California whale fishery as "abandoned" (Starks 1922:18); whaling's time was clearly gone.

Depletion of Whale Populations

The rapid growth and decline of shore-based whaling operations in Monterey Bay during the mid- to late 19th century represents an iconic boom-and-bust extractive industry. While local catch records indicate that hundreds of migrating gray whales and resident humpbacks were harpooned in coastal waters between 1854-1865 (Reeves et al. 2010), harvest levels likely represented a sustainable offtake that should not have led to rapid stock depletion in the absence of other factors. Contemporary whalers instead argued that a combination of advancing technologies (i.e. bomb lances) coupled with novice whalers scared whales from coastal

migratory routes. When examined in context of concurrent escalation of regional whaling pressures, however, a much different hypothesis for the collapse of Monterey Bay whaling comes to light – namely that intensive hunting of gray whale breeding populations in Baja California strangled recruitment to local migratory groups, driving numbers along the California coastline precipitously downward.

From 1854 to 1864, over 400 gray whales were killed annually in lagoons along the Baja Peninsula such as Guerrero Negro, Magdalena Bay, Manuela, and San Ignacio (Henderson 1984; Reeves 1984). Targeting nursing mothers and newborn calves at their most vulnerable, Yankee whalers systematically depleted each breeding site in succession, greatly exceeding sustainable limits for recruitment into the overall eastern North Pacific population (Reeves 1984:40). With reproductive outputs stunted, migratory groups continued swimming north each summer, but with increasingly older animals and fewer calves surviving the southward return gauntlet past waiting whalers (Reeves et al. 2010).

Even moderate harvests in feeding habitats then put additional pressure on gray whales forced to run this coastal gamut. While estimates for total Monterey landings remain imperfect, approximately 300 gray whales were likely taken between 1854 and 1900 (Reeves et al. 2010:18) alongside hundreds of humpbacks. Catch records clearly indicate precipitous declines in local abundance after 1863 (Reeves et al. 2010:19). It is important to note, however, that migratory gray whales should demographically be resilient to such removals if balanced by steady reproduction. With over 20,000 animals estimated in the eastern population prior to exploitation, if annual recruitment remained intact the local aggregate should have sustained Monterey's hunt even without immigration from broader feeding ranges further north like the Bering, Chukchi, and Beaufort Seas (Reeves 1984).

Thus, rather than any single driver, the synergy between extreme removals of breeding females in wintering areas along Baja and moderate hunting along migratory corridors created a perfect storm, cutting off the next generation of whales which could repopulate regions like Monterey Bay on an annual basis. It is this dual targeting which best explains the rapid decrease in sightings after 1863. Within little more than a decade, such focused assaults drove gray whales locally extinct until protective measures allowed partial recoveries in the 20th century. Understanding the potentiating nature of migratory exploitation will remain critical for modern management regimes seeking to balance coastal whaling interests with conservation of sensitive breeding stocks into the future.

Japanese Whaling at Point Lobos

In 1885, a pioneering Japanese immigrant named Otasaburo Noda first arrived in California, subsequently working for a decade in agriculture and land reclamation before relocating to Monterey in 1895 (Lydon 2001:2). There Noda established the first Japanese commercial fishing business in central California, demonstrating considerable entrepreneurial vision and serving as a one-man incubator for various maritime ventures. Having identified the untapped potential of coastal red abalone (*Haliotis rufescens*) beds, Noda contacted governmental authorities in Japan in 1896 to recommend the foundational development of an abalone diving industry based in Monterey (Lydon 2001:3). This directly led to the arrival of specialist Gennosuke Kodani the following year.

Kodani assessed prospects on-site and implemented the first modern abalone diving operations at Point Lobos in 1898, with financial stakeholders in Japan shipping most processed products back to domestic markets. Concurrently situated on Whalers Cove was a vacant stone

wharf and overhead frame previously utilized by Azorean whalers over prior decades (Lydon 2001:2-3). By the end of 1898, these facilities were reactivated by a company of Japanese whalers supported by Noda's connections.

Given Noda's demonstrative business interests in Japanese-led fishing industries for export, it is unsurprising that he sought to replicate such success in the whaling sphere. Noda recognized there was substantial remaining local demand for whale products in Japan, irrespective of the collapse in American whale oil prices that had mothballed the formerly dominant Azorean operations. As suggested by historian Sandy Lydon (2001:5), "a Japanese entrepreneur seeking to invest in Japanese-style whaling in California... faced a significant obstacle: the market was in Japan, but unlike abalone, which could be shipped in dried form, most whale food products could not survive the long ocean voyage without spoilage".

Leveraging his networks, Noda secured financing from Japanese investors aiming to overcome such hurdles by tapping into existing domestic hunger for whale meat (Lydon 2001:5). In purchasing the residual assets of the defunct Azorean whaling company in summer 1898, transporting them to Point Lobos, and leasing buildings from landlord A.M. Allan, Noda transplanted traditional Japanese small-type coastal whaling to Californian shores (Lydon 2001:4). The Japanese whaling enterprise at Point Lobos represented a fascinating intersection of cultures, technologies, and individual ambitions. Under Noda's management, the crew composition mixed both traditional Japanese whalers and former Azorean whalemen. The four Japanese employees definitively identified in the 1900 census were all young migrants plausibly originating from whaling-specialized regions of Japan (Lydon 2001:6).

While explicit details are sparse, it is reasonable to conclude primary operations emphasized supplying foodstuffs to niche domestic markets in accord with cultural precedents,

as opposed to whale oil commodities no longer profitable on wider markets. The isolation of the Whaler's Cove site and minimal local settlement, however, greatly constrained growth potential. By September 1901, explicit references to on-site buildings being the "old whalery" are made, while the four previously enumerated specialized Japanese whalers completely disappeared from later census recordings (Lydon 2001:7). Although whales remained in remarkable abundance around Monterey, with one newspaper even labeling them a fishery nuisance which merited bounties, the Japanese whaling company itself had evaporated due to insufficient scales of sustaining demand.

Moss Landing Whaling

After lying dormant for nearly two decades following its 19th century demise, the remnants of California's shore whaling industry unexpectedly stirred back to life in the early 20th century. When the newly incorporated California Sea Products Company, led by veteran Norwegian whaler Captain Frederick Dedrick, opted to erect a steam-powered shore whaling station along the edge of Monterey Bay in 1916, the site selected for the operation revived not just whaling itself, but the legacy of Monterey County's whaling history more broadly. By every metric, the techniques utilized by California Sea Products reinvented prior conventions for hunting whales from the coastline. Instead of open launches manned by oarsmen, the company deployed steam-powered trawlers equipped with exploding harpoons and industrial winches for dragging massive whale carcasses (Starks 1922:12). At the station itself, the flensing plan relied on gas-powered pulleys to hoist whales onto elevated platforms for disassembly, replacing Monterey's old manual block-and-tackle apparatus with advanced heavy machinery. Inside the steam-heated tryworks, hydraulic presses and grinders converted blubber into oils and fertilizers

on a mass-production scale. This integrated choreography of mechanized violence and efficiency maximized both productivity and profitability exceedingly beyond the capabilities of bygone eras (Dickens 1998:100). Though it was built in 1916, the Moss Landing station did not begin operations until 1919, when the first whale was taken by California Sea Products. The station operated continuously through 1926, when it was closed after two relatively unsuccessful seasons (Reinstedt 1988:40).

Summary

The shore whaling industry in Monterey Bay emerged in 1854 when John Davenport adapted traditional East Coast techniques to California's gray whale migration. Though his company soon dissolved, it firmly established Monterey as the epicenter of California's nascent shore whaling industry. By 1859, Monterey had multiple whaling companies and numerous employees. At its peak in the 1860s, over 1000 barrels were produced per season, predominantly from migrating gray whales.

Given Monterey's success, veteran whalers likely transferred south in 1861 to establish the Carmelo Whaling Company in Carmel Bay. This immediately productive satellite operation benefited enormously from second-hand expertise regarding tools, training, and whale ecology. Extreme overexploitation of Baja California gray whale breeding lagoons strangled recruitment into migratory groups like those feeding seasonally in Monterey Bay. Consequently, even moderate local harvests between 1854 to 1900 coupled with breeding depletion, rapidly extirpated the species locally.

The industry peaked in the 1860s with most of the oil produced derived from gray whales. However, the gray whale stock collapsed by 1874 due to overhunting. Other negative

factors like new technology scaring whales and demand for sperm whale oil also challenged the industry. By the late 1880s, the Monterey shore whaling industry was largely abandoned, with the last company closing its operations around 1881. A Japanese-owned whaling company out of Point Lobos briefly revied shore whaling at the end of the 19th century, but similarly shuttered after two seasons.

After nearly two decades absence, California's shore whaling industry experienced resurgence in 1919 when the California Sea Products Company constructed an innovative modern steam-powered whaling station in Moss Landing on Monterey Bay. Its integrated industrial technologies revolutionized efficiencies far beyond outdated 19th century techniques. Both symbolically and practically, the Moss Landing fishery revived California's whaling legacy, directly upholding Monterey's storied history at the center of America's west coast whaling industry.

Chapter Five. Case Studies of Monterey Whaling Stations

Three areas were selected for study in accordance with historic whaling sites, whaling stations around the city of Monterey, Whaler's Cove at Point Lobos, and the site of the California Sea Products station in Moss Landing. At each location, any remaining material culture from the whaling industry was recorded during July 2023. Additionally, the broader landscapes were considered as part of the maritime industrial landscape of Californian commercial shore whaling. GPS points were taken using a handheld Garmin GPS unit, which were used in the creation of maps in each respective area.

Case Study: Shore Whaling Stations in the City of Monterey

The area of Monterey Bay encompassing the industrial landscape of historic whale fisheries is concentrated in the southern portion of the bay (Figure 2). This area, encompassing the modern cities of Monterey and Pacific Grove, presents a diverse and dynamic coastal environment. The region is characterized by its temperate maritime climate, largely influenced by the Pacific Ocean, with average temperatures typically ranging from the low 50s to mid-60s Fahrenheit. Geologically, it is part of the Monterey Formation, known for its rich marine fossil content and sedimentary rock layers. The coastline varies from sandy beaches to rugged rocky shores, illustrating a complex interplay of erosional and depositional processes. In particular, the region features a variety of coastal landforms, including tide pools, coves, and cliffs, shaped by the continuous action of waves and tides (California State Parks 2013:6).

The city of Monterey, situated on the northern edge of this region, is bordered by a relatively sheltered bay area, leading to calmer waters and less pronounced coastal erosion

compared to more exposed sections. The underwater topography off Monterey includes portions of the extensive Monterey Submarine Canyon, contributing to the area's rich marine biodiversity. Pacific Grove, to the west, experiences similar climatic conditions but exhibits more rugged coastal features. The area is known for its scenic rocky outcrops and the presence of kelp forests offshore, which provide habitat for a wide range of marine species. The intertidal zones are especially notable for their ecological diversity (Palumbi and Sotka 2012:4).

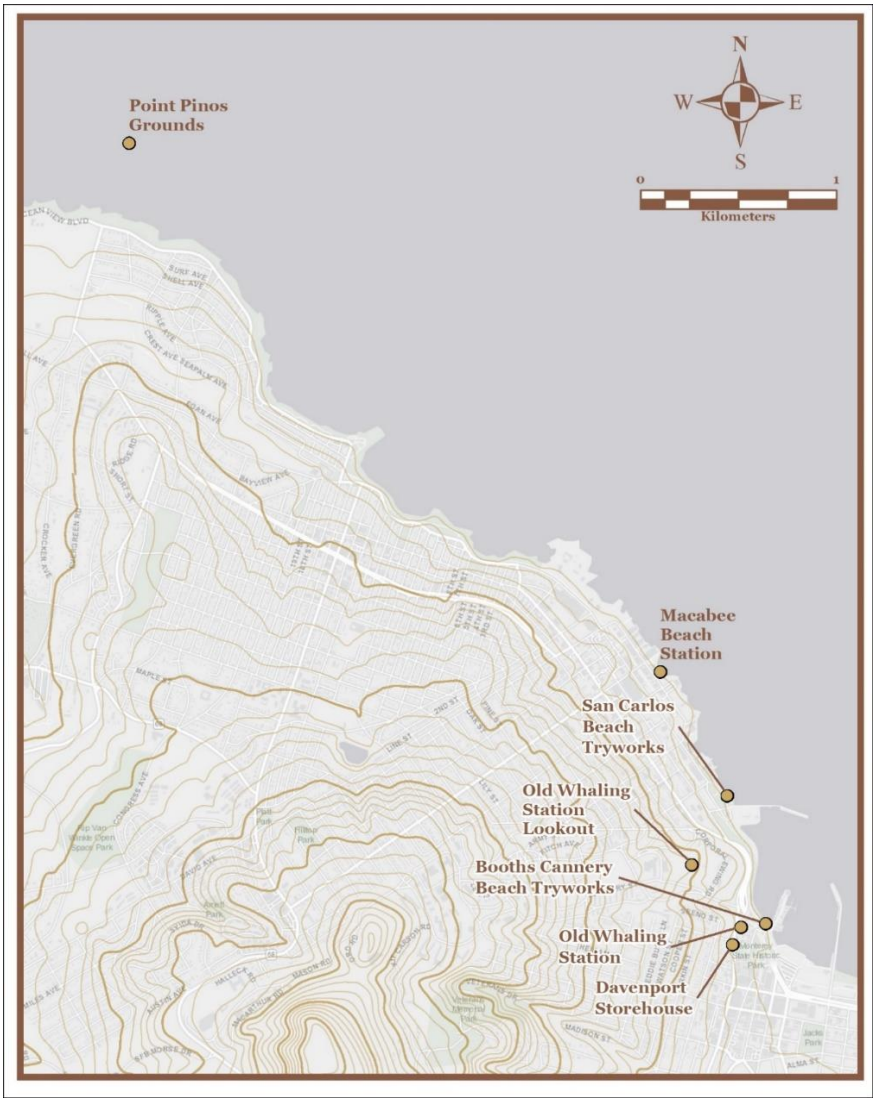

FIGURE 2: Map of Monterey and Pacific Grove, highlighting key features relevant to the historic whale fishery. Created by author.

For the present study, the industrial landscape of Monterey shore whaling primarily encompasses Macabee Beach, San Carlos Beach, and the beach adjacent to the former Booth Cannery, as well as the in-shore areas of the Old Whaling Station Lookout, and the buildings associated with whaling operations in Monterey. Additionally, the Point Pinos whaling ground (visible in the upper left of Figure 2), though lacking a discrete boundary and only referred to in the historical record as being located off Point Pinos, are a part of the broader landscape.

Macabee Beach, nestled along the Monterey Bay coastline in front of present-day Cannery Row, is characterized by its relatively small, tranquil setting with a mix of sandy and rocky shores (Figure 3). The beach area is subjected to both tidal influences and coastal erosion, which impact its shape and size over time. San Carlos Beach, located further along the coast, is a popular spot for recreational activities, particularly scuba diving. The beach features a blend of sandy shores and pebbly areas, with a backdrop of lush coastal vegetation (California State Parks 2013:14). To the immediate north of Fisherman's Wharf, the beach next to the site of the former Booth Cannery, presents a similar shoreline, though one which presently experiences less tourist activity than San Carlos Beach (Figure 4).

FIGURE 3: West facing view Macabee Beach. Photograph by Jerome Riedl.

FIGURE 4: North facing view of Booth Cannery Beach. Photograph by Jerome Riedl.

Previous Archaeological Investigations

The only element of the maritime industrial landscape of whaling in Monterey subject to prior archaeological investigation is a building known as the Jenny Lind Theater, which was briefly used by John Davenport as a storehouse for his early whaling ventures. Located on the southwest corner of Pacific and Scott Streets in Monterey, California on what was originally Calle Estrada, the property was originally purchased by Scottish sailor Jack Swan in 1844. By 1847, Swan constructed a long adobe building which served as a boarding house for sailors, as well as a saloon. Later that year or in early 1848, Swan converted part of this structure into a theater, which opened that Spring (Lindberg 2002:*iii*). After Swan left Monterey to join the Gold Rush in 1850, the adobe building served multiple functions over the following decades. From 1850-1896, during Swan's absence, the building operated as "a lodging house, whaling station, a drug store in the 1870s and finally a tea room and shop" (Lindberg 2002:v). After Swan died in 1896, the building sat empty and deteriorated for a decade until a group purchased it in 1906 and deeded it to the state, which opted to restore the structure in an operation completed by 1920, when it then opened as a public museum (Lindberg 2002:*v-vi*). The report resulting from the archaeological study of the Jenny Lind Theater failed to produce anything immediately relevant to the whaling industry – unsurprising given the succession of post-Davenport ownership of the building. While previous historical works detailed Monterey Bay whaling, none focused on the material history of the local industry (Lindberg 2002).

Research for this thesis identified a reference indicating that "foundations of the trying kettles of the whalery [that] may still be found, just north of the site of the old Booth Cannery" (Dennis 1945:7), however, they could not be located through visual inspection. It is possible,

though unlikely, that this allusion refers to elements of what appear to be a modern concrete area adjacent to the bottom of Fisherman's Wharf. Instead it is likely that development of the area removed the traces of the whaling station in the decades following publication of the report (Dennis 1945).

Submerged Heritage

No submerged remains of whaling heritage are known to exist in Monterey Bay. There is a possibility, however, that some element of the whaling operation at Macabee Beach could remain submerged. Reports from scuba diving websites refer to "junk from the old cannery", but it is unlikely artifacts would be recognizably distinct from the whaling or cannery era to a hobbyist (Open Dive Sites 2022). That said, the metal components of the Macabee beach operation would have been limited to bits of whalecraft, or trypots, and are likely dissimilar to those related to the more recent and more metallic cannery operation. While informal snorkel surveys of the reported area did not identify any of the alluded to elements, visual inspections using scuba and in higher visibility conditions represent an avenue for further research potential.

Whaling Operations

Though multiple historical descriptions relating to the manner of shore whaling practiced in Monterey exist, all accounts of shore whaling omit specifics which would allow for the assessment of individual stations. An overall lack of primary source documentation of the numerous whaling companies operating intermittently in the Monterey area during the latter half of the 19th century make it necessary to speak of Monterey Bay whaling in generalities. Though

existing accounts may reflect the practices of different companies, they describe a shore whaling process which appears to be consistent for the period on a global scale.

Typically at dawn, two whaleboats each with an average crew of 6 set out into Monterey Bay powered by both sail and oars. The boats were approximately 30 feet long and 6 feet wide, and in the case of Davenport's original company, were manufactured in New Bedford, Massachusetts, specifically for whaling (Nichols 1983:24). At least two methods of sighting whales appear to have been practiced – shore-based sighting and pelagic sighting. Shore-based sighting required an observer using flag signals from the lookout point (labeled on Figure 2 as "Old Whaling Station Lookout) to communicate with boat crews. Pelagic sighting, on the other hand, involved the crew scanning the horizon for the telltale spouts of gray or humpback whales, as was the case at the Point Pinos grounds (Dennis 1945:9). Of the sighting process, Monterey whaler Mike Noon said:

> whaleboats always hunted in pairs, in case of whale attack, they refused to go alone. If no whale was sighted they would cruise around under sail. On shore there was a signal station with a flag and flagpole. Sometimes a whale would be sighted from the height of the shore station before it was from the boat, in which case the lookout man would dip the flag. Then one of the boats would slowly turn about and when it was headed in the right direction the lookout man would so signal with the flag. If the boat was in doubt as to whether it was going to the place where the whale was last seen, it would ask the lookout man for the direction by dipping the peak of the sail (Starks 1922:9).

The most experienced whalers were positioned at the bow of the boat as harpooners. They wielded specialized 8- to 10-foot-long harpoons with rear facing barbs, which prevented a whale from wriggling free once attached. The harpoon head and shank were fashioned from iron and produced by local Monterey blacksmiths (Nichols 1983:81). The butt end of the polished oak harpoon handle was set into an iron rod attached to the boat, allowing it to pivot upon launching (Starks 1922:22). Attached to the harpoon was a 51 m rope, which connected to a 1097

m line stored in tubs at the stern (Nichols 1983:83). The goal of harpooning was not to instantly kill the whale, but to fasten the boat to it. Once secured, more line was released as the injured whale attempted to flee, tiring itself out in the process. At the end of the whale line, drogues were attached so the carcass could be towed in by rowing whether it sank or floated. If other whales were sighted during the time-consuming battle, the partner boat broke off in chase of additional targets (Nichols 1983:80).

After towing the dead whale to shore and securing it in the surf zone, processing began. The carcass was first winched on to the beach wooden capstan. Crewmembers then sliced through the whale's thick skin and insulating fat using 10- to 15-foot-long blubber spades consisting of a 3 to 4 foot long steel blade with a long wooden handle for leverage. Grasping the handles with gloved hands, two workers made longitudinal cuts down the sides of the whale then peeled the blubber back in large strips (Andrews 1911:12) (Figure 5). The strips were cut into small chunks and thrown into large iron trypots filled with boiling water to render the oil. According to Nichols (1983:81), at the Macabee beach operation "blubber [was] placed on wooden stretches and carried up an inclined plane from the beach to the top of the bluff where it was cut and minced in mincing vats until it was suitable for the trypots which had a capacity of four barrels each". The trypots sat in groups of three or four over glowing beds of coals, with scraps of flesh and organs deemed too lean or decayed for oil production placed into separate "fat-lean pots" to produce a lower grade of oil (Nichols 1983:40). Though there is no direct evidence for the construction of brick tryworks, historian John M. Dennis' (1945:7) reference to foundations of the tryworks suggests a more permanent structure, which would likely have involved the creating of a typical brick structure around the trypots to allow for easier heating

than provided by an unsheltered trypot.

FIGURE 55: Flensing at Macabee Beach circa 1899 (Pat Hathaway Collection).

Concurrent with the flensing of blubber, other whalers removed the fins, fluke, and lower jaw, as well any bits of fat and flesh clinging to the bones, with flensing knives. These body parts were rich in oil and contributed significantly to the total yield (Nichols 1983:41). Finally, the largely denuded carcass was dragged up to three miles offshore, to decay or be consumed by sharks and other scavengers (Bertao 2006:42). The remaining skeletal structure was often carved into novelties or incorporated into stonework for construction around Monterey (Starks 1922:30).

Material Culture

In the western courtyard behind the Old Whaling Station building (located southwest of the Booth Cannery beach in the Monterey State Historic Park), California State Parks displays a trypot interpreted as part of the historic Monterey whale fishery (Figure 6). For the purposes of recording for scaled drawing (Figure 7), a wooden lid installed to prevent waste disposal by the public was removed with permission of State Parks employees. Like many historic trypots, the Old Whaling Station trypot features two large flat faces and two proportionally smaller rounded faces, all composed of iron approximately 2 cm thick. The trypot is 130 x 106 cm and stands 82 cm off the ground, with four feet attached at the base of the pot and extending 15 cm the bottom of the pot. Evidence of repair to the right leg on the north facing side is visible through a 5 cm metal block attached at what was presumably a broken or rusted out section (Figure 8). Triangular handles measuring 8 x 16 cm with a 7 cm diameter extend from the rounded sides, offset 18 cm from a central casting seam in opposite directions from one another. Much of the handle on the right of the north facing side is broken, leaving only 4 cm and 6 cm stumps remaining (Figure 9). The trypot features three decorative bands; one is 20 cm from the top, one is 7 cm below the first, and final band is 24 cm below the second. The first two decorative bands terminate at the ends of the rounded sides, while the third continues across the flat faces. The trypot is in good overall condition, though some areas are subject to rust, and a 1 cm hole at the front of the pot was either drilled into it or eroded away. Two notable holes drilled are visible in the bottom of the pot, presumably drilled by the State Park for drainage purposes. Currently the trypot has informational signage affixed to the north face.

FIGURE 6: Old Whaling Station trypot. Photograph by Jerome Riedl.

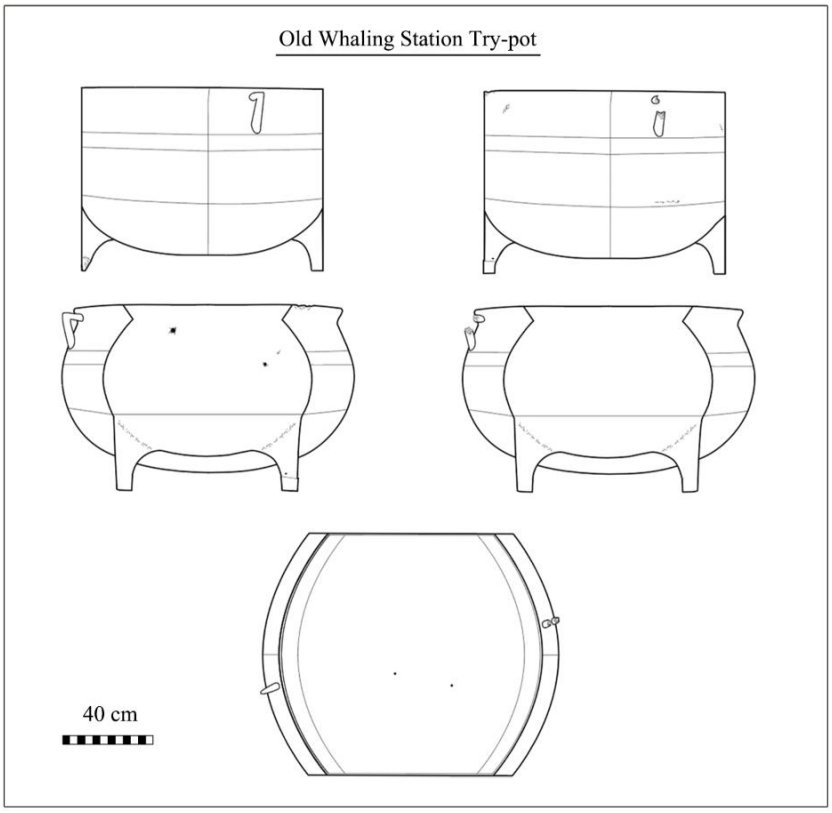

FIGURE 7: Scaled illustration of Old Whaling Station trypot. Illustrated by author.

FIGURE 8:Metal block attached to repair damaged bottom leg of the northwest leg on Old Whaling Station trypot. Photograph by Jerome Riedl.

FIGURE 9: Old Whaling Station trypot depicting damage to the handle. Photograph by Jerome Riedl.

Whalebone Tile

Another element of material culture in the MIL of Monterey whaling is observed on the sidewalk in front of the Old Whaling Station. While much of the paved area surrounding the building has been replaced, the original sidewalk composed of cut whale vertebra tile (Figure 10) is maintained by the state park. At the front of the building the sidewalk measures 6 m long and 120 cm wide, with individual tiles approximately 15 cm^2 arranged in a diamond orientation. The whalebone portion of the sidewalk is bordered by a 20 cm concrete section extending across its northern and eastern sides. The display is accompanied by an informational signage discussing a brief history of whaling in the area. Though in varying degrees of bleaching and cracking, the bone tiles appear in generally stable condition – though as it is currently entirely exposed to public traffic, the possibility for greater than normal rate of deterioration in the future. Outside of the whalebone tiles at the Old Whaling Station, the San Carlos Church is known to have presently covered whalebone elements in its foundation, and it is possible this construction practice extended beyond the known sites in Monterey (Nichols 1983:80).

FIGURE 10: Whalebone sidewalk in front of Old Whaling Station. Photograph by Jerome Riedl.

Case Study: Point Lobos Whaling Station

Point Lobos State Natural Reserve (SNR) lies on the central California coastline and has a mild Mediterranean climate with average temperatures around 49-63°F (AECOM 2012:8). It features rugged coastal terrain marked by weathered granite headlands, coastal mountains, rolling hills, sea cliffs, offshore rocks, narrow canyons, and pocket beaches tucked into small coves. Elevations rise from sea level up to around 60 meters at the tops of some sea cliffs, including those lining Whaler's Cove (Figure 11) on the western edge of the reserve. Whaler's Cove itself sits at the base of some of the steepest topography found within the reserve. Sheer cliffs tower directly behind the sandy Whaler's Cove beach, which stretches approximately 1/3 mile between Granite Point and Point Lobos. The inland side of these cliffs bordering Whaler's Cove likely contributes to accelerated erosion compared to more moderately sloped areas (AECOM 2012:9).

FIGURE 11: View of Whaler's Cove facing south. Photograph by Jerome Riedl.

The geology of Point Lobos consists of granite bedrock, part of the deeper Coast Ranges Province formations. This erosion-resistant granite forms many of the headlands like Point Lobos and Granite Point which frame Whaler's Cove (AECOM 2012:16). Younger, softer sedimentary rock layers known as the Carmelo Formation also appear along parts of the southern shore. The reserve's hydrology includes some surface waterways – Gibson Creek marking the southern boundary and two small coastal freshwater seeps to the north. The immediate shoreline sits within designated coastal floodplain zones (AECOM 2012:8).

Within Point Lobos State Natural Reserve, multiple locations are publicly interpreted as part of the operations of the Carmelo Whaling Company (1862-1884), and the later Japanese-owned whaling venture which operated concurrently with the abalone fishery (1898-1902) (Figure 12). These sites are the "Whaler's Cabin" (now used as a park natural history museum), the "Whaler's Knoll" lookout area, and Whalers Cove itself. Next to the Whaler's Cabin, a modern shed is used as a small museum dedicated exclusively to the area's whaling, though none of the artifacts displayed in the museum were used in the whale fisheries which operated out of Point Lobos (AECOM 2012:431). Two other locations relevant to the site's whaling history can be identified through historical references and relevant photography – the gantry used in flensing whales, and the site of the former tryworks. The gantry was originally built during the A.M. Allen granite operation (AECOM 2012:430). The first known depiction of it was published by Scammon (1874) and the first photographed was taken in 1900, though photographs from the 1930s also provide photographic support to georeference the structure's physical location. Interviews with members of the Kodani family (Lydon 2001:8) document the building of the cannery storage shed on top of the foundation of the 19th century whale fishery's tryworks, and photographs of the storage shed identified by the Monterey Country Japanese Heritage Society

allow the identification of the tryworks based on the corresponding building (Tim Thomas 2023, elec. comm.).

FIGURE 12: Map of known whaling related sites in vicinity of Whaler's Cove. Created by author.

The industrial landscape of Whaler's Cove utilizes a combination of natural physical characteristics, along with cultural modifications to the physical environment. Whaler's Knoll, purported to be used for the sighting of whales and the issuing of flag signals to whaleboats, is located at the highest elevation easily accessible in the surrounding area, although the viewshed directly in front of the knoll is presently obscured by trees (Figure 13). This visual obstruction, if it existed in the era of shore whaling, would not have completely hindered the sighting of whales or the signaling of boats, and in any case is still the highest ground with a panoramic view of the bay making it an ideal candidate for a lookout. Beyond potential differences in viewshed due to a different tree line during the whaling period, the knoll was also subject to the construction of a since removed long-range radar station used by the 4th Army Air Force in the 1942 (Loesch 2007:17). The construction of this installation likely destroyed any landscape modifications to the knoll made during the whaling period, and no archaeological records were made of the site before or after the radar setup. Survey outside of designated walking areas of the knoll was not permitted due to potential environmental disturbance.

FIGURE 12: Viewshed from Whaler's Knoll lookout. Photograph by Jerome Riedl.

Whalers at Point Lobos took advantage of the natural geography in their placement of the station, but also relied on reuse of previous modifications to landforms which occurred during the establishment of the granite mine. As with Whaler's Knoll, further modification of the tryworks and gantry areas occurred during wartime operations conducted by the United States Navy (USN) in World War II, with Landing Craft Mechanized (LCM) training potentially destroying then extant historical remains (AECOM 2012:84). Whether or not this occurred during the period of USN usage, the tryworks and gantry areas are presently used as paved parking lots and restroom area, which eliminated the possibility of historic period landscape data recovery.

Previous Archaeological Investigations

Previous archaeological investigations at Point Lobos State Natural Reserve documented and studied numerous sites within the reserve's boundaries. Initial reconnaissance was conducted in 1935 by Waldo Wedel, who noted shell middens, bedrock mortars, and sparse surface artifacts (Wedel 1935:4-6). Wedel described the shell middens as extensive but shallow deposits containing primarily red abalone and California mussel (*Mytilus californianus*), representing short-term resource exploitation rather than substantial habitation sites due to the seasonal of use (Wedel 1935:5). Additional archaeological surveys were undertaken in 1949-1950 by Arnold Pilling, though specific details and findings from those investigations are not well reported in the available literature (AECOM 2012:90).

Currently, a total of 35 documented prehistoric archaeological sites are recorded within the Point Lobos SNR boundaries, along with two sites containing only historic remains (AECOM 2012:35). The sites span a range of time periods from the Early period (5500 to 2600

cal. BP) to the Late period (700 cal. BP to European contact), based on diagnostic artifacts and radiocarbon dates from excavated deposits. Many of the sites are Late Period shellfish processing camps with middens composed primarily of shell remains (Mikkelsen and Jones 2010:58). Some sites date to the Middle/Late Transition and contain more evidence of fish, birds, and mammals, suggesting more diverse resource exploitation during occupations (Mikkelsen and Jones 2010:60). One Middle Period site, likely representing short-term seasonal habitation, contained artifacts indicative of a wider variety of activities such as stone tool production (Mikkelsen and Jones 2010:59).

The only area of Whaler's Cove related to whaling operations which has previously been investigated archaeologically is the building known as the Whaler's Cabin. Though named in reference to the Carmelo Bay Whaling Company which began operating in the 1860s, the Whaler's Cabin at Point Lobos SNR is identified as the oldest Chinese fishing village in Monterey County, predating use by Portuguese-Azorean whalers. Archaeological evidence supports oral histories about the cabin's construction and inhabitants, but it is unclear whether the building was ever a part of the whaling operation. Excavations conducted under the cabin floor in 1986 and 1989 by State of California archaeologists uncovered hundreds of artifacts associated with Chinese occupation, including pottery shards, skewers, toys, and shell buttons (Motz and Porter 1986). The high volume of ceramics shards indicates the lack of plank flooring in the original 1860 construction, as mats were commonly used by Chinese for flooring at the time (Motz and Porter 1986:18). Additional ceramic scatters found near the cabin likely relate to other Chinese structures nearby, as depicted on historical maps from 1876 and 1879 (Motz and Porter 1986:40).

Architectural analysis of the cabin suggests minimal modification to its external structure since its initial construction. Based on an 1879 sketch, the unique dual-rafter roof system, with upper rafters mitered and nailed onto lower rafters, may have been added shortly after construction of the original approximately 3.6 x 12 m structure (Motz and Porter 1986:20). The roof alteration expanded interior space and height. The board-and-batten wood cabin measures 5.7 x 12 m, with a side-gabled saltbox roof in redwood shingles. Excavations in 1986 uncovered six whale vertebrae of unidentified species used as foundational supports, prior to the installation of a concrete foundation replacement the same year (AECOM 2012:82). Archaeological and architectural evidence demonstrate the cabin's rarity as an early Chinese settlement with potential to provide valuable insight into Chinese history in the American West prior to 1860.

Submerged Heritage

Whaler's Cove was not subject to underwater survey during this thesis project. In 2016, however, California State Parks conducted a diving inspection of the area and noted the presence of three granite slabs which appear to have been cut during granite mining operations. No other cultural material was noted (John Foster 2021, elec. comm.). The use of the cove for LCM training from 1942 to 1943 produced considerable physical damage to the geologic features of the cove, with grooves from tracks still visible in multiple locations (John Foster 2021, elec. comm.). The combination of this disturbance, in addition to decades of use by recreational scuba divers, casts doubt on the likelihood of additional undiscovered archaeological remains relevant to shore whaling operations.

Whaling Operations

The whaling station located in Carmel Bay is unique among California shore whaling stations since detailed written descriptions of the operations of the station and contemporaneous illustrations available (Figure 14). The first two records originate from *The Marine Mammals of the Northwest Coast of North America*, published by Charles Scammon in 1874, though his encounter at the station likely occurred around 1866 when he writes of visiting the Monterey area (no date specific date for the Carmel visit is provided by Scammon).

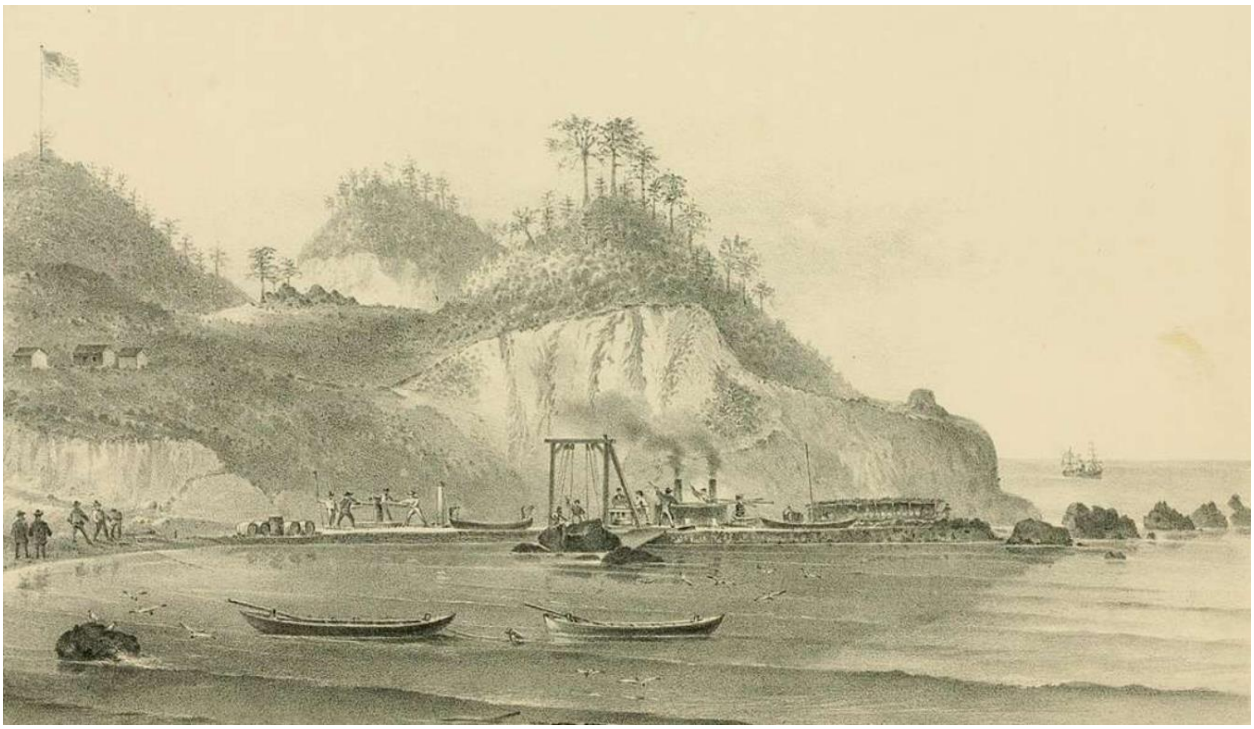

FIGURE 13: Carmelo Whaling Station in operation, illustrated by Charles Scammon (Scammon 1874).

While most shore stations functioned in a similar manner, Scammon noted the substantive differences found in the Carmelo Bay Whaling Company operation. Whether these are the product of intentional choice by Point Lobos whalers of the product of adaptation to circumstance given the prior landscape modification by miners is uncertain, although the

existence of an established area for flensing along with the sheltered cove undoubtedly influenced the initial selection of the industrial site. Scammon (1874:250) explained:

> Under a precipitous bluff, close to the water's edge, is the station; where, upon a stone-laid quay, is erected the whole establishment for cutting-in and trying-out the blubber of the whales. Instead of rolling them upon the beach, as is usually done, the cutting-tackles are suspended from an elevated beam, whereby the carcass is rolled over in the water – when undergoing the process of flensing – in a manner similar to that alongside a ship. Near by [sic] are the tryworks, sending forth volumes of thick, black smoke from the scrap-fire under the steaming cauldrons of boiling oil. A little to one side is the primitive storehouse, covered with cypress boughs. Boats are hanging from davits, some resting on the quay, while others, fully equipped, swing at their moorings in the bay. Seaward, on the crest of a cone-shaped hill, stands the signal-pole of the lookout station. Add to this the cutting at the shapeless and half- putrid mass of a mutilated whale, together with the men shouting and heaving on the capstans, the screaming of gulls and other sea-fowl, mingled with the noise of the surf about the shores, and we have a picture of the general life at a California coast-whaling station.

Fewer operational details are available for the second period of operation at the end of the 19th century. From what can be gleaned from photographs of the station, the gantry was still in use for the flensing process (Figure 15). No images depict a tryworks, and it is unclear whether the company was exclusively involved in oil production or additionally the production of whale meat and other byproducts for export, as the concurrently operated abalone fishery involved seafood export. The composition of the multi-ethnic whaling crew (Lydon 2001:7) and the abundance of ex-whalers living in the Monterey Bay area in 1898 suggests that mostly white whalers were employed by the company, though no documentation conclusively support this as fact. Whether Japanese immigrants employed traditional Japanese whaling techniques over those developed by Portuguese-Azorean whalers in California is also unclear.

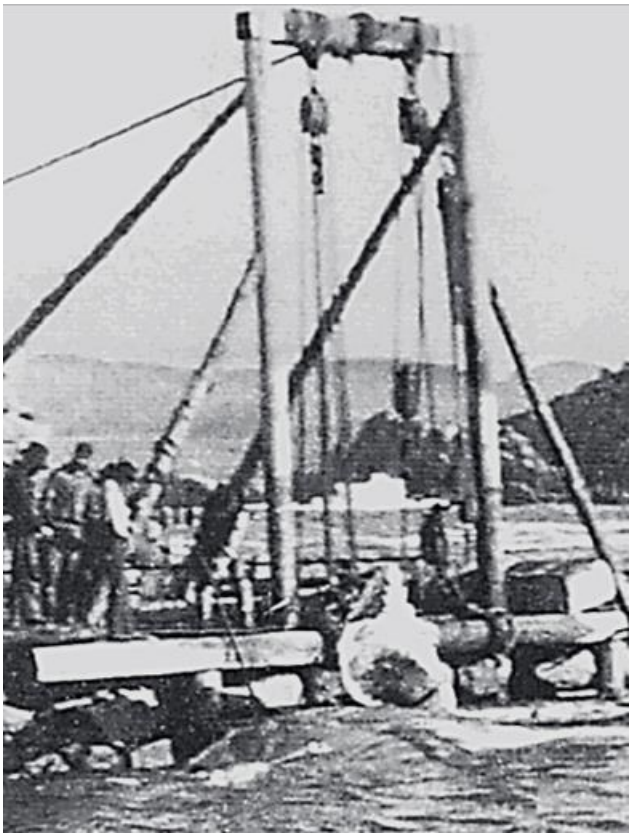

FIGURE 14: Flensing conducted by Japanese whaling company in Whaler's Cove, utilizing the gantry originally illustrated by Scammon (Lydon 2001).

Material Culture

The Whaler's Cabin Museum grounds, directly east of the shore whaling exhibit shed, are home to three historic trypots (Figure 16). For the purposes of this thesis they are labeled clockwise continuing from the northernmost trypot as A, B, and C (Figure 17). None of the trypots present are *in situ*, though either trypot A or B was used at the Carmelo Whaling Station. State Parks records do not distinguish between the three, other than a reference to "the pot with a ridge on the exterior" being used at Point Lobos (AECOM 2012:316). As both trypots A and B feature ridges and no present Parks staff are aware of the distinctions in them, only C can be ruled out as an artifact used at the station. The trypot *not* originating from use at Point Lobos was

transferred to the park from the Stevenson House in Monterey, but where it was originally used is undocumented (AECOM 2012:202). Pot C was given to the park by a private donor, with no knowledge of its previous usage. According to parks records, all trypots had holes drilled in their bases to eliminate standing water, with no other post-depositional modifications or preservation attempts listed as having been conducted on the trypots (AECOM 2012:203). The physical arrangement of the trypots at Whaler's Cove prevented fully detailed scale drawings of one side of trypot A and two sides of trypots B and C, though the dimensions of each were recorded along with the unobstructed sides.

FIGURE 15: Whaler's Cove trypots taken 7 July 2023. Photograph by Jerome Riedl.

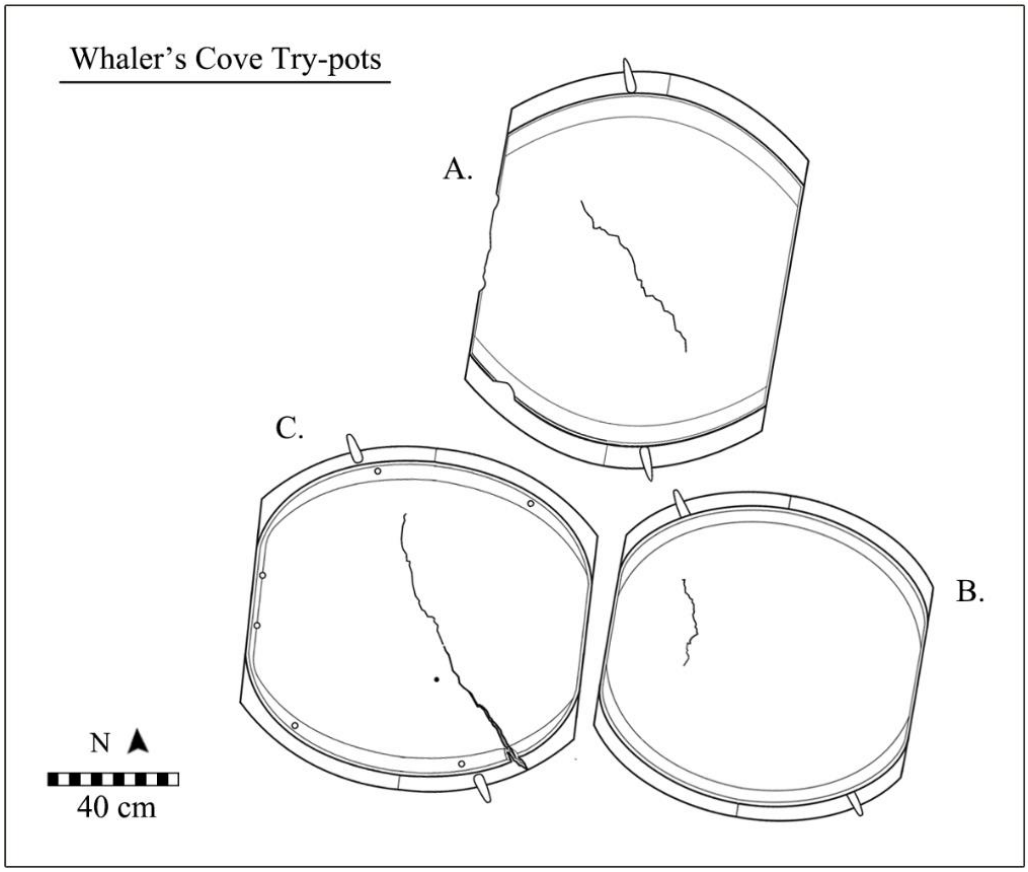

FIGURE 16: Whaler's Cove trypots, arranged as displayed by Point Lobos State Park 7 July 2023. Illustration by author.

Trypot A

Trypot A (Figure 18) is the largest of the three, and at the time of recording was located at the northernmost area of the display in Whaler's Cove. The trypot features two larger flat faces (indicating design for a shipboard brick tryworks) and two proportionally smaller round faces, all composed of iron approximately 2 cm thick. The trypot measures 122 x 94 cm and stands 72 cm tall, with four legs extending an additional 6 cm below the pot. Triangular handles measuring 9 x 16 cm with an approximately 5 cm diameter extend from both rounded sides and are offset 12 cm from a central casting seam in opposite directions from one another. In addition to the vertical casting seam, trypot A has three decorative bands: one 16 cm from the top of the trypot; one 7 cm below the first; and one 28 cm below the second. The third decorative band extends across the

flat faces, while the first two terminate at the ends of the rounded sides. Each flat side features three drilled holes approximately 4 cm from the top of the trypot and spaced 8 to 10 cm apart; it is unclear whether these holes were added pre- or post-deposition. Though in generally good condition, the west facing flat side has multiple areas of damage to its lip, the largest being a missing portion on the rounded side to the right of western face which extends 9 cm below the lip. Structural cracks are visible at the base of the trypot, as well as the back facing flat side. Though Park records indicate holes drilled in the bottom of the trypot, these were not visible when the pot was recorded and may be covered by concretion.

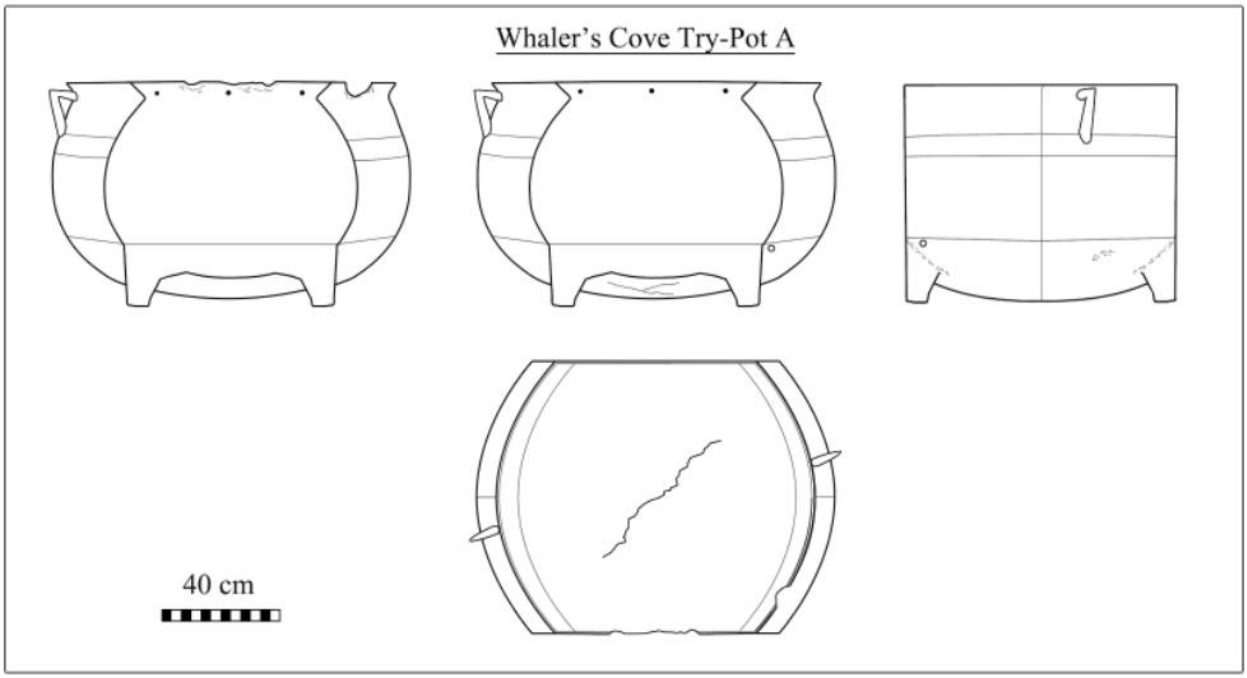

FIGURE 17: Scaled illustration of Whaler's Cove trypot A. Illustrated by author.

Trypot B

Trypot B (Figure 19) is the smallest of the three trypots. Like A, it features two larger flat faces and two proportionally smaller rounded faces, all composed of iron approximately 2 cm thick. The trypot measures 98 x 92 cm and stands 65 cm off the ground, with a 14 cm wide block

section extending an additional 2 cm beneath the trypot from the center of the flat sides. Triangular handles measuring 8 x 16 cm with an approximately 5 cm diameter extend from the rounded sides and are situated 38 cm from a central casting seam in opposite directions from one another. Trypot B has three decorative bands; one is 20 cm from the top of the trypot, one is 14 cm below the first, and the final band is 14 cm below the second. All decorative bands terminate at the ends of the rounded sides. Though generally similar in condition to trypot A, trypot B features less structural damage, with only one crack visible in the base. As with trypot A, none of the reported drilled drainage holes were visible inside the trypot at the time of recording (AECOM 2012:202).

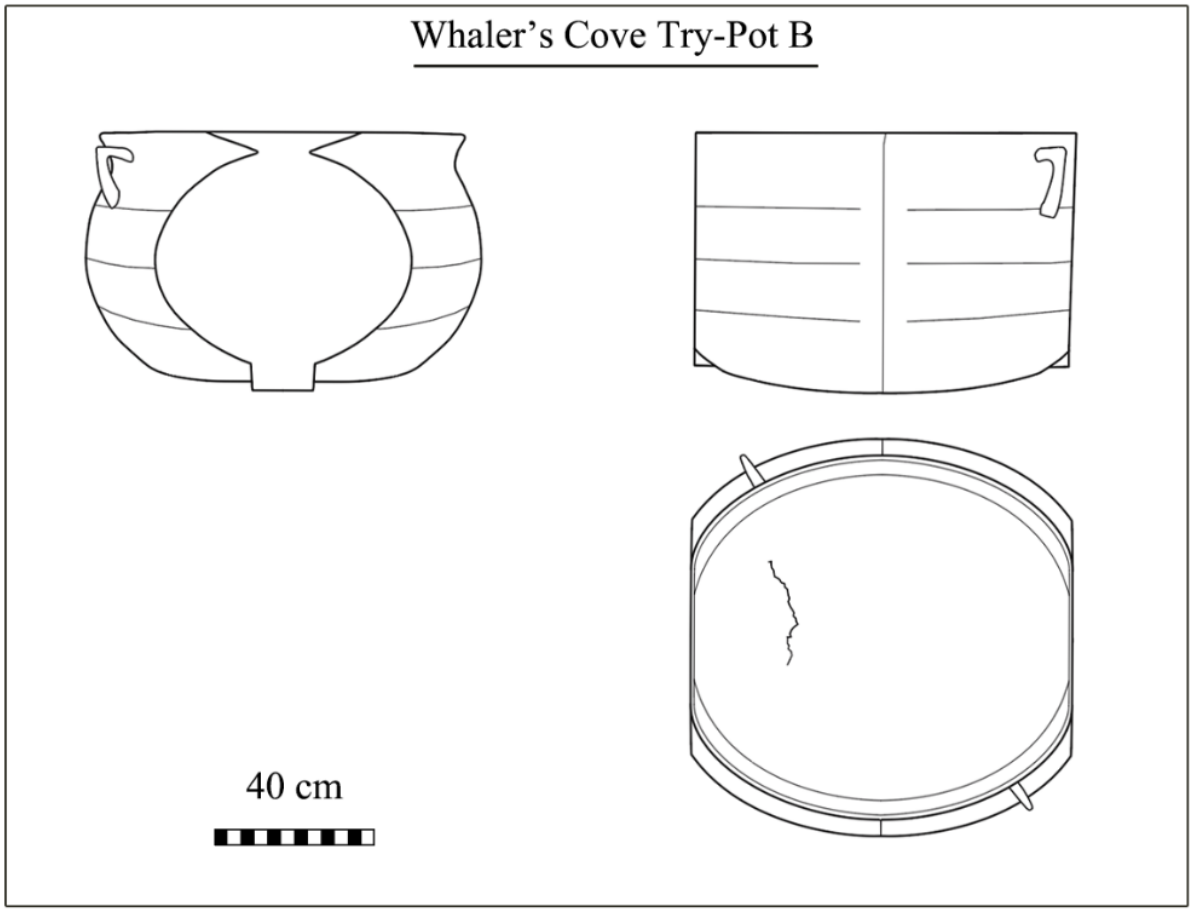

FIGURE 18: Scale illustration of Whaler's Cove trypot B. Illustrated by author.

Grinnell Iron Foundry Maker's Mark

On the inner lip of the west-facing flat side of trypot B is a maker's mark (Figure 20) not previously identified in State Parks records. Heavily worn, the mark appears to read "J.G. GRINNELL N.B. IRON FOUNDRY 1873", though multiple letters are no longer visibly legible or identifiable through rubbing. The initials "J.G." are consistent with Joseph G. Grinnell, a business magnate from New Bedford, Massachusetts (MA), while the initials "N.B." likely represent the New Bedford Iron Foundry, of which Grinnell was an owner. The foundry was originally developed by Francis and Isaac C. Taber, who were ship chandlers by trade but engaged in the production of iron castings as early as the 1830s. Although the corporate entity New Bedford Iron Foundry was not officially named until an unclear later date, the Tabers' involvement in this enterprise was pivotal in its early development. At some point in the mid-19th century the foundry ownership was transferred to Joseph G. and Edmund Grinnell, who were initially partners in the foundry, before Edmund assumed complete control in 1873 (Michael Dyer 2023, pers. comm.). The intricate details of the firm's history remain somewhat nebulous, but an 1856 advertisement indicated trypots for sale under the "Grinnell" name (*Whalemen's Shipping List* Vol. XIV No. 30:1).

FIGURE 19: Trypot B maker's mark. Photograph by author.

The market for trypots during this era was relatively niche. Once a whaling vessel was adequately equipped with the required number, the need for additional units was limited, primarily arising only when outfitting new ships. As whaling vessels were decommissioned, their equipment, including the durable trypots, was often sold at auction. In Australia, these auctions were often the source of outfitting entire shore whaling operations (Gibbs 2006:121), and it is likely the same sort of pelagic-to-shore reuse can be observed with the Grinnell trypot at Point Lobos, if it was in fact one utilized historically at the station. The longevity of these trypots, as evident from the numerous trypots which have survived relatively intact for centuries, further constrained the market's expansion, since their robustness negated frequent replacement or purchase. This aspect of the whaling industry's material culture highlights both the technological ingenuity of the period and the economic dynamics of maritime industries in the 19th century.

Trypot C

Trypot C (Figure 21) is relatively dissimilar in design when compared with the other trypots. Similar in size to trypot B, trypot C features two larger flat faces and two proportionally smaller rounded faces, all composed of iron approximately 2 cm thick. The trypot is 105 x 94 cm and stands 65 cm tall. Though the flat face mimics the below-pot block section of trypot B, it does not extend beyond the contours of the trypot, which sits directly on its flat bottom. Triangular handles measuring 8 x 14 cm with 16 cm circumference extend from the rounded sides, offset 25 cm from a central casting seam in opposite directions from one another. The handles of trypot C are distinct from trypots A and B due to the upward facing crescent shape of their tops. Unlike the other trypots displayed at Whaler's Cove, trypot C lacks any decorative banding. Inside the lip of trypot C are two unevenly spaced rivets on each rounded side, as well

as two at the center of the forward-facing flat side. It is unclear if these rivets are original, or additions made at some point during the trypot's time as a display item. Trypot C is the most heavily damaged of the three, with a 2 to 5 cm wide crack extending down one of the rounded sides and visibly continuing across most of the bottom of the trypot. Interpretive signage for the state park is currently affixed to its front, and it is possible two drilled holes on the front face of the trypot are the product of previous signage. A drainage hole in the bottom was drilled by park staff and is visible in the base of trypot C (AECOM 2012:202).

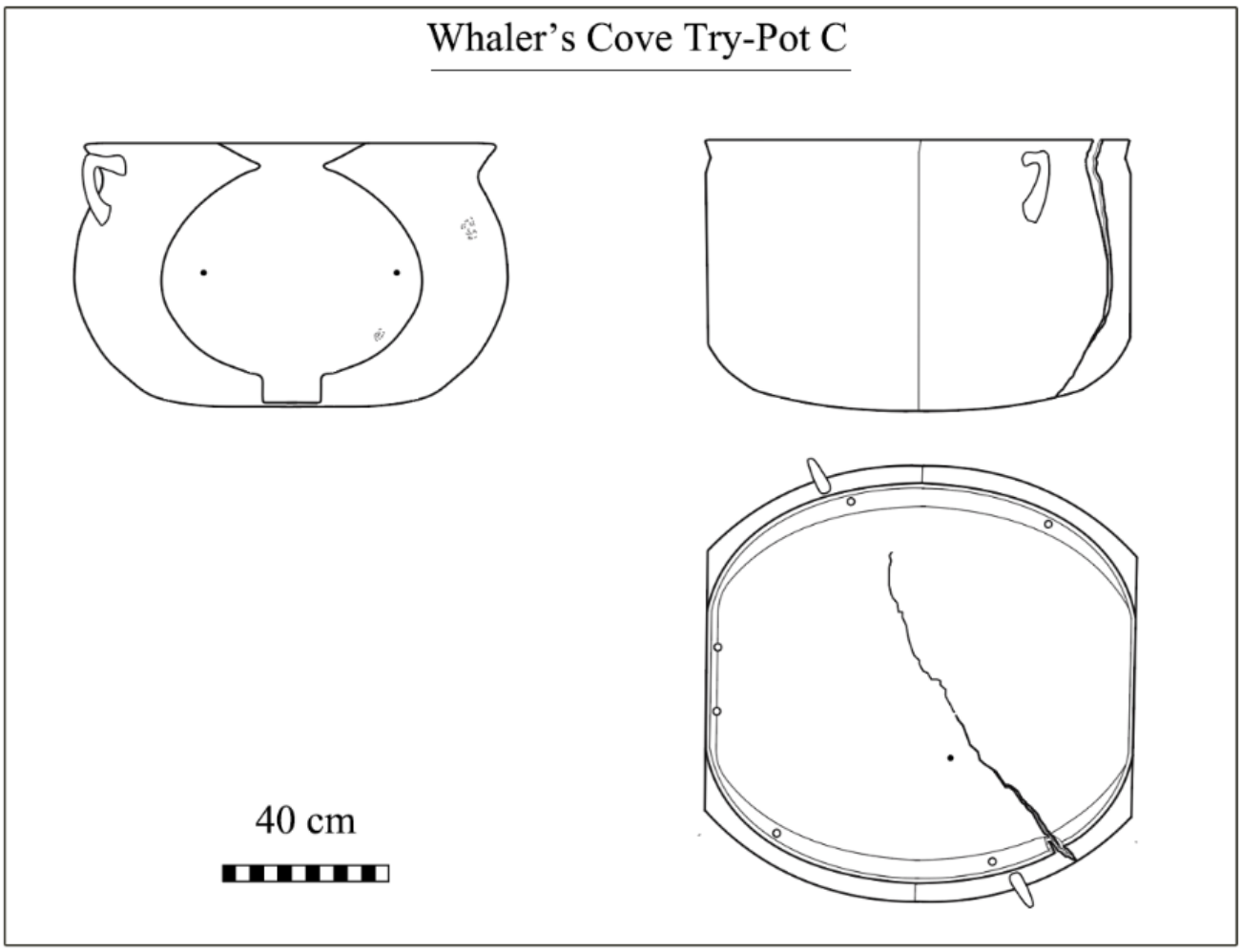

FIGURE 20: Scaled illustration of Whaler's Cove trypot C. Illustrated by author.

Trypot/Cooking Pot

In addition to the three trypots, the SNR resource inventory lists an additional "trypot," gifted to the park by a private donor who asserted its use as a trypot at a station in the area (Figure 22). The pot stands 44.5 cm tall, with a diameter of 82 cm. A 2.5 cm lip extends from the rim of the top, and casting seams vertically bisect the pot, with an additional horizontal seam extending around the circumference of the pot 13 cm from the base. The thickness of the pot is 0.6 cm, and there are no areas of significant wear. Park staff express skepticism over the pot's claimed purpose, noting "the pot's use in the whaling industry seems questionable due to its smaller size" (AECOM 2012:203). Indeed, the pot is significantly smaller than vessels typically interpreted as trypots in the historical and archaeological record. Though details of trypot construction are at once rare and unreliable, New Bedford Whaling Museum curator Michael Dyer (2023, pers. comm.) indicated that he is unaware of any references to trypots under 100 gallons in size, and primary source literature researched for this thesis is replete of references to trypots of this scale. The pot also lacks characteristic features of trypots which would have facilitated the trying-out process, such as legs to facilitate placement over open flame, flat side to fit into try-works, handles or holes for attachments to allow for lifting or pouring of rendered oil. Furthermore, the volume of the pot would have required uncharacteristically small portions of blubber to function properly. Nonetheless, it is impossible to conclude that the pot was not used in the whaling industry.

FIGURE 21: Possible trypot in Whaler's Cove. Photograph by Jerome Riedl.

Whale Bones

In addition to the pots related to the whaling industry displayed at Whaler's Cove, the park's collection includes an assortment of cetacean skeletal remains (Figure 23). Though they do originate from Point Lobos, the bones are not from a hunted whale. In 1901, a 94-foot-long fin whale (*Balaenoptera physalus*) washed ashore on a beach in the present-day state park. A.M. Allan, recognizing public interest in whaling, instructed the Japanese residents to prepare the skeleton for the purposes of a tourist attraction. This involved stripping the flesh and subsequently burying the bones to cleanse them. After four months, the cleaned bones were excavated, transported by horse-drawn wagon, and reassembled at a picnic area in the park. The whale skeleton became a central attraction at Point Lobos, retaining its appeal even after the Allan family sold the property to the state of California in 1933 (Lydon 2001:18). Interestingly, the popularity of this exhibit in the cultural landscape of Monterey extended beyond its physical

presence. In the early 1900s, postcards featuring the whale skeleton were the highest selling of those representing Monterey County, due to the evocative nature of the then abandoned whaling industry and its heritage value to the area. Ultimately the articulated skeleton was disassembled, having become a safety hazard for children who had become accustomed to climbing on it. The bones currently displayed are the last remains of the original skeleton, positioned near the trypots as aid in thematic interpretation as part of a whaling display (AECOM 2012:201). Currently the bones are strung together with wire through both naturally occurring and drilled holes to prevent movement from their present location.

FIGURE 22: Semi-articulated whale spine at Whaler's Cove, with baleen in display case. Photograph by Jerome Riedl.

Case Study: Moss Landing

Situated at the convergence of several critical coastal habitats, including Monterey Bay, Elkhorn Slough, the Salinas River, and Old Salinas River Channel, Moss Landing comprises the nexus of an ecologically sensitive landscape that sustains a rich biological diversity of marine and aquatic flora and fauna (California State Parks 2008:1). Encircled by extensive mudflats, salt marshes, sandy spits, and sheltered lagoons, the harbor itself furnishes a mosaic of saline, brackish, and freshwater ecosystems whose transitional boundaries support highly productive nursery grounds and migratory stopovers (California State Parks 2008:30).

The immediate coastline fringing Moss Landing features expansive sandy beaches, coastal dunes, and rocky intertidal zones that offer vital roosting and nesting grounds for shorebirds, waterfowl, and wading birds (California State Parks 2008:18). As part of the Monterey Bay National Marine Sanctuary (MBNMS), these areas constitute essential habitat for rockfish, salmon, sardine, anchovy, and groundfish during critical life stages (California State Parks 2008:12). While the harbor and entrance offer predominantly marine habitat, they also serve as a tidal conduit connecting Monterey Bay to inland freshwater ecosystems like the nutrient-rich Elkhorn Slough. Encompassing over 2,500 acres of tidal channels and mudflats, the slough fosters critical nursery grounds for sharks and rays, as well as commercially important species. Fringing salt marshes and tidal creeks provide rearing habitat for shorebirds and waterfowl (California State Parks 2008:25). As nutrient-rich tidal flows circulate between the slough and harbor, they transport vital organic matter and propagules that help sustain the high secondary productivity characteristic of both ecosystems.

Unlike the Monterey and Carmel maritime industrial landscapes, the California Sea Products station at Moss Landing (Figure 24) made little use of the natural environment in its

operational design. The station was built on an exposed beach, with no protective cove or other coastline elements that would ease the processing of captured whales. Southwest of the whaling station was the location of the former Sandholt Pier, originally constructed in 1866 by Cato Vierra – himself a whaler, though no whaling is alleged to have occurred at Moss Landing prior to the 20th century (Reinstedt 1988:44). The location of California Sea Products near the pier may have influenced the decision to build the factory at its ultimate location, though the typical operations of the processing facility did not incorporate use of the pier. Due to the use of steam vessels, mechanical winches, and a constructed slipway extending to the waterline (Figure 25), California Sea Products operated their facility on a comparatively barren landscape.

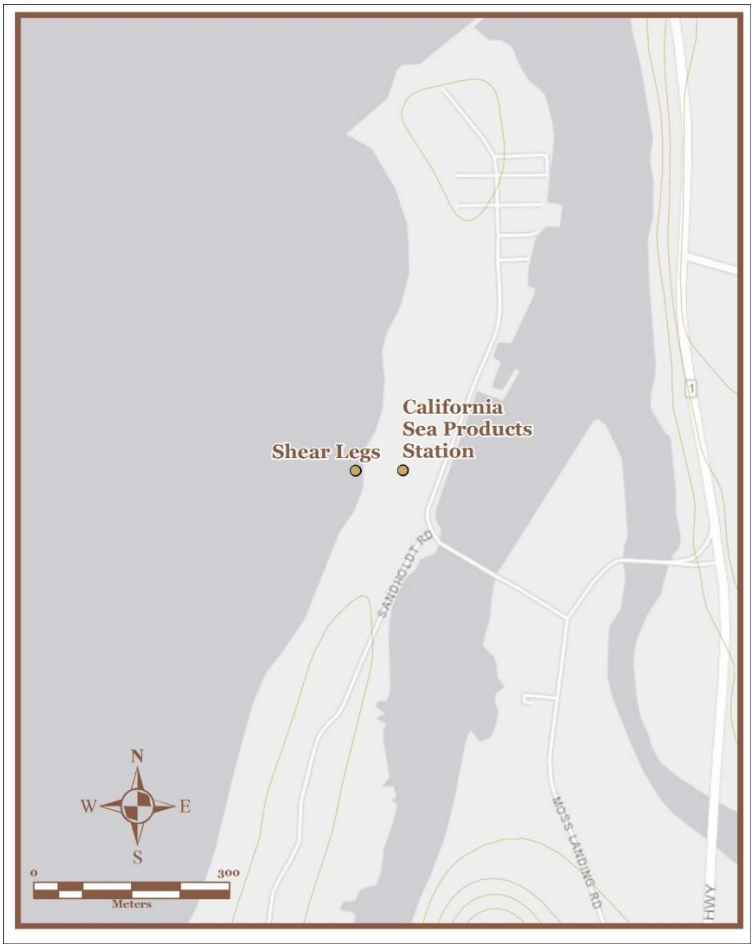

FIGURE 23: Map highlighting areas relevant to the Moss Landing whaling landscape. Created by author.

FIGURE 24: Historic photograph depicting crowd gathered at California Sea Products processing facility (Pat Hathaway Collection).

Upon the station's closure in 1926, the slipway was removed, and the processing facility was either remodeled or completely rebuilt. The site then housed Hovden Food Products, which operated as a canning company until 1961 (Reinstedt 1988:51). In 1987, the land was acquired by the Monterey Bay Aquarium Research Institute (MBARI), which demolished the former cannery and constructed the current MBARI headquarters. The only potential remnants of the original California Sea Products facility remaining on the Moss Landing landscape are the remains of a set of shear legs (Figure 26) and the mostly buried remains of posts from the station's slipway. Shear legs were a set of three poles bound together, often fit with block and tackle and used in maritime hauling processes. A common feature of shore whaling sites, Gibbs (1995:177) noted that "shear legs and winch mounted on the end of the pier would aid [the process of hauling in whales]" in Australian stations. Slipways were wooden ramps used for the hauling of whales and integral parts of shore stations during the era of mechanized whaling. The

term was later carried over onto shipboard whaling operations in 20th century factory ships (Tønnessen & Johnsen 1982:266).

FIGURE 25: Remnants of California Sea Products industrial landscape. Photograph by Jerome Riedl.

Previous Archaeological Investigations

No results of archaeological investigation or material culture surrounding the former California Sea Products station have been published. It is possible that cultural heritage surveys were conducted during the construction of the MBARI facilities at Moss Landing, however, no records are currently in possession of MBARI or accessible through California State databases.

Submerged Heritage

Underwater surveys have not been conducted in the area outside the former California Sea Products station. As the hunting and processing of whales occurred either further out to sea

or in the California Sea Products facility, there is little reason to suspect any significant cultural heritage related to the whaling industry remains submerged at Moss Landing. Nonetheless, future comprehensive survey of the area may reveal previously unknown submerged resources.

Whaling Operations

The practice of whaling in the 20th century, particularly as pioneered by Norwegians, represented a significant evolution in the historical context of the fishery, marked by technological advancements and changing international norms. Twentieth century whaling operations utilized large, steel-hulled "whale chaser" steamships equipped with specialized gear to hunt, kill, and tow whales back to shore stations efficiently on an industrial scale. Chaser vessels were typically 100 to115 feet long with an 18-to-21-foot beam to allow speed and maneuverability (Salvesen 1912:517). Installed at the bow were swivel-mounted glycerin recoil harpoon cannon that incorporated a 45-inch barrel with a 4-inch bore diameter capable of launching a 6 foot, 100-pound steel harpoon tipped with an 11-pound cast-iron conical exploding shell (Salvesen 1912:517). After spotting a target whale, whale chasers approached until within roughly twenty yards of the animal to fire the cannon (Salvesen 1912:518). If not immediately killed, a whale was intentionally "played" to exhaust it prior to recovery (Salvesen 1912:519). In both scenarios, the harpoon trailed a main rope line connected to winches aboard the ship which haul in the dead weight along the side for towing (Anonymous 1912). Specialized elastic "accumulators" on deck reduce strain from wave motion that could otherwise snap the rope under immense tension (Salvesen 1912:519).

In 1923, California Sea Products was the subject of a newspaper report, which described in surprising detail some of the more modern elements of the hunt:

> "[After the successful shooting of a whale] Two sailors sprang to a block and tackle hung from the mainmast and started hoisting up on the taut whale line. This was to bring into service a series of heavy, coiled springs that lay along the Hawk's keel, and to which the block and tackle were connected by a steel cable running down into the hold. By taking some of the strain on the hoisted up whale line, these springs serve the same purpose as does the springiness of a steel or bamboo fishing rod, in the playing of a big fish-taking up the slack...Presently the winch had pulled him alongside as near as practicable, and one of the crew, reaching out, jabbed into him the long sharpened nozzle of an air hose connected with a tank of compressed air. This air hose, through which the whale is inflated and rendered buoyant, with the stout line and the winch, are important items of modern whaling equipment, for it is not unknown for a whale to tear away from the harpoon and sink, and so be lost after he is killed." (Clark 1923:6)

When not utilizing factory ships, whales hunted in the 20th century were processed at onshore factories. An example of this type of processing was captured through a scene from the 1971 documentary *Blue Water White Death* (Gimbel and Lipscomb 1971:22:10-24:08). In the film, a crew seeking to obtain footage of a great white shark worked with the Union Whaling Company, based out of Durban, South Africa, and visited the processing facility (Tønnessen & Johnsen 1982:211-12). Though operating four decades after the closure of the Moss Landing station, the Union Whaling Company facility is a useful analog. While much of the film focuses on diving, one scene contains a rare verité sequence of operations at a 20th century shore station. It plays out in accordance with descriptions of Norwegian 20th century whale processing outlined by Tønnessen and Johnsen (1982) and Webb (1988).

If successful, whale carcasses were transferred to station slipways, where flensing commenced rapidly to prevent any deterioration. Upon the arrival of a carcass, workers secured cables to the caudal peduncle at the rear of the whale and to the chin, connecting them to a steam winch that hauled the carcass onto land up a sloped slipway (Webb 1988:206). While the industrialization of whaling led to the development of large-scale hydraulic, steam and motorized systems for stripping blubber and shoveling chopped material into cookers, some difficult

manual tasks persisted (Tønnessen & Johnsen 1982:262). Two main flensing methods were in use. One approach removed the blubber all at once in large intact sheets using winches. The initial flensing process to remove blubber involved using long, curved steel knives over 13 feet in length attached to 43-foot handles (Tønnessen & Johnsen 1982:40). Workers cut parallel slices of blubber, approximately 13 feet wide down the sides of the whale. Holes cut along the end of each lengthy strip were hooked to cables, which were then connected to steam-powered winches. The winches then turned to peel the slices of blubber away incrementally as flensers cut the connecting tissue with their steel knives (Tønnessen & Johnsen 1982:40). The other method of flensing involved cutting the blubber free piece-by-piece in smaller increments. Regardless of the method used, after the preliminary flensing occurred a "canting winch" then rotated the stripped carcass to expose any remaining blubber (Webb 1988:207). After all blubber was removed, extensive hand processing was still required to saw and crush bones to extract oils from these materials. Attempts had been made to develop mechanical crushing systems to process bones, but whale bones proved too tough and flexible for available bone crushing machine technology. As a result, the arduous and time-intensive task of manually sawing down massive whale skeletons frequently fell to teams of workers, requiring around an hour per whale skull (Tønnessen & Johnsen 1982:262).

Once removed by flensers, whale blubber went through a rendering and trying out process to extract oils. This involved the use of very large cylindrical vats called "cookers," configured differently depending on the source material - blubber, meat, or bones (Tønnessen & Johnsen 1982:40). Blubber cookers consisted of tall open tanks, which allowed workers to shovel raw blubber in from an overhead platform level with the open tops of the vats. Open cookers produced high yields of quality oil from blubber rendering, however, they required large

amounts of steam and lost some usable materials in waste products (Tønnessen & Johnsen 1982:254). While open vats were common for blubber, sealed pressurized cookers were generally used to process meat and bones from whale carcasses (Tønnessen & Johnsen 1982:255). Pressure cookers facilitated much faster trying out than open cookers, significantly reducing cook times. They operated continuously, venting built up gases at the start of boiling and draining fluid fats and oils out through a grate once pressure stabilized (Tønnessen & Johnsen 1982:255-256). Pressure cookers had the added benefit of a reduction in total cook times for meats and bones to 10 to12 hours (Tønnessen & Johnsen 1982:255). However, consumers often preferred the perceived quality of oils rendered from blubber in open cookers rather than the high yields derived more quickly from meats and bones using pressure cookers (Tønnessen & Johnsen 1982:254).

By the end of the 1920s, new rotary cookers almost completely replaced the older open kettles and vats used in early years (Tønnessen & Johnsen 1982:707). These cookers rotated materials using an internal perforated drum (Tønnessen & Johnsen 1982:256). The drum turned contents as they cooked, greatly increasing oil extraction. Rotary cookers cut total cook times to just 1 to3 hours depending on material (Tønnessen & Johnsen 1982:258). They also continuously processed renders without needing reheating between batches (Tønnessen & Johnsen 1982:258). The Kværner cooker became one of the most prominent and heavily used of these contained rotary pressure cookers. Tailored especially to meat and bone trying, the Kværner cooker used rotating perforated drums but modified the design by sealing the drum inside a containment tank. Kværner cookers had capacities over 50% higher than previous models, processing up to 34 metric tons per batch (Tønnessen & Johnsen 1982:707). Their efficient design and reliability

made them preferred models for shore-based whaling stations during the final days of the commercial whaling industry from 1930 to 1960 (Tønnessen & Johnsen 1982:707).

Material Culture

The remains of wooden posts present on the beach directly west of the current MBARI facility are likely remains of the California Sea Products whale fishery. Although the exact origin of the wooden remains is uncertain, photographic and locational suggest their correspondence with the company's shear legs and posts depicted in historic images. All visible features suspected to be related to the whaling operation were documented archeologically using standard recording methods and a handheld Garmin GPS to ascertain their exact positions (Figure 27).

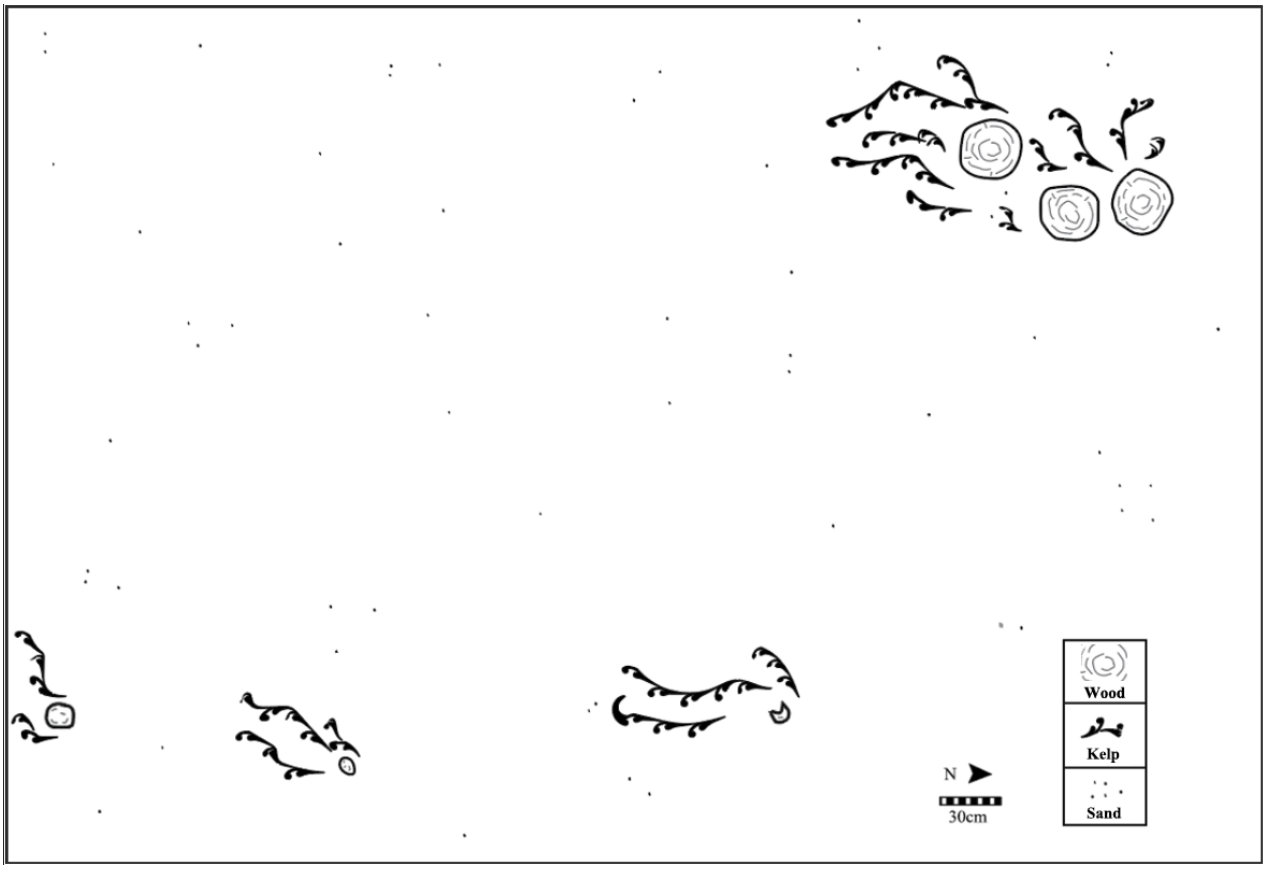

FIGURE 26: Site map of shear legs and post remnants at Moss Landing as of 9 July 2023. Illustrated by author.

Shear Legs

Historic photographs indicate the presence of two sets of shear legs situated at end of the California Sea Products slipway. In combination with GPS data, these photographs allow for preliminary corroboration of the shear leg remains in Moss Landing as remnants of the historic whale fishery. When juxtaposed with historic aerial imagery (Figure 28), locational data can be identified in relation to the Sandholt Pier, where nearly every image of the California Sea Products station was taken from. One image however (Figure 29), taken from inside the California Sea Products station, includes both sets of shear legs and the Sandholt Pier. From this photograph, the approximate position of the shear legs in relation to the pier can be verified. It is important to note, however, that without information about the camera and relative sizes of elements visible in the historic station precise distances cannot be established. Based upon the positioning of the remaining posts (assuming they represent the foundation of the slipway), the shear legs are likely the remains of those historically situated at the northwestern end of the slipway. Pedestrian surveys were conducted to the northern and southern extents of the suspected shear legs in hopes of locating the remains of the second set, but none were discovered. Although surf conditions were a potential limiting factor of the survey, the pole appears to correspond to the approximate location of historic shear legs associated with Moss Landing whaling. No historic aerial imagery taken before to the 1990s is clear enough to detect the presence or absence of the shear legs. It is however possible that the current pole represents a more recent construction in the same approximate location, and the shear legs visible in historic images have not survived to present.

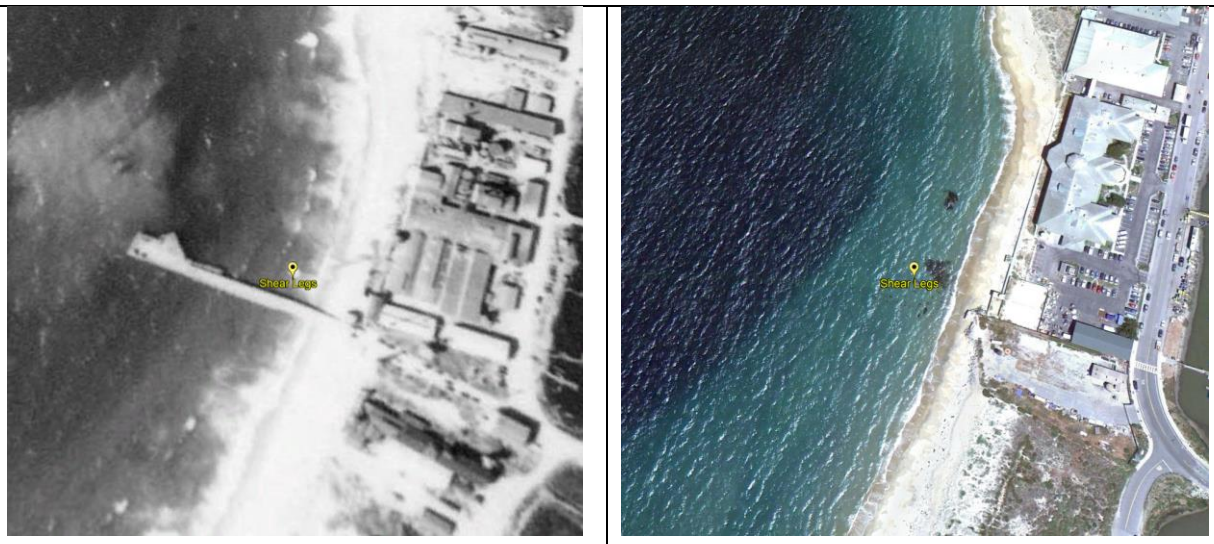

FIGURE 27: Aerial imagery comparison of area in front of former California Sea Products station, 1950 and 2021 (Google Earth).

FIGURE 28: Historic photograph depicting shear legs and Sandholdt Pier (Pat Hathaway Collection).

Whether the shear legs were installed prior to the construction of California Sea Products or if they were purpose built to accommodate whaling operations is unclear, but they appear to have been used for the purposes of mooring whale carcasses before they were pulled up the slipway via mechanical winch (Figure 30). Since Moss Landing whaling was conducted using large whale chasers capable of harvesting whales at great distances from shore, it is unclear how the whales were transported from the larger vessels to the shear legs, as no available historical documentation provides insight into this step of the whaling operations.

FIGURE 29: Historic photograph of shear legs with the first whale caught by California Sea Products on 23 January 1919 (Pat Hathaway Collection).

Of the three original poles that made up the shear legs, only the southwestern-most of the northern set is still standing. Although the bases of the two additional poles remain, the two bases appear to be cut to the same height, which was likely a deliberate modification rather than the

result of storm or other natural deterioration process. The intact pole stands approximately 3.4m high, while the two pole bases each stood approximately 10 cm above the seabed at the time of recording and are almost entirely submerged during all tides. All three poles have a circumference of approximately 98 cm. If the intact pole represents one of the shear legs in the historic images, it has been modified since the 1920s. Two 8 cm wide pieces of metal are affixed to the eastern and western facing sides of the pole, each with two 5 cm diameter bolts (Figure 31). The east facing piece is 48 cm long, with apparent damage to the top, and the west facing piece extends to 62 cm, of which 6 cm extend above the top of the pole. Though their function is currently unknown, these may indicate later modifications and adaptation as part of a different structure – perhaps one which required the removal of the two other poles.

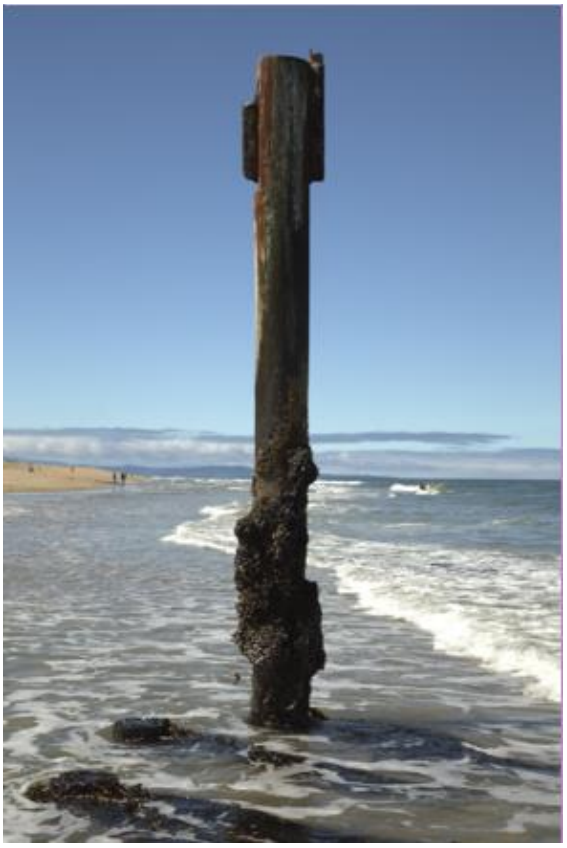

FIGURE 30: Intact shear leg pole and bases of former shear legs, highlighting the metal pieces affixed to the front and back of the pole. Photograph by Jerom Riedl.

Possible Slipway Posts

The likely remains of slipway foundation posts begin 2.6 m southeast of the southernmost shear leg pole (Figure 32). Southeast of the first post, another is spaced 1.3 m, and the third is 0.6m to the southwest of the second. Each 32 cm diameter post stood approximately 10 cm above the sand at the time of recording, though no sediment was removed to evaluate the full their extents. If these timbers are the remains of posts used to support the slipway, they represent only a small portion of the original, which appear in historical photographs to have been roughly the same circumference as those used for the shear legs (e.g. 98 cm). While it is possible the posts recorded were the only ones that have not deteriorated completely, it seems likely that more of the structure could be buried beneath the sand and obscured due to the extensive changes to the beach, levels of sand, and surf conditions.

FIGURE 31: Photograph of post remnants, taken 9 July 2023. Taken by Jerome Riedl.

A photograph dating to 1956 (Figure 33) taken from a similar vantage point on Sandholt Pier as the previously mentioned historic images of California Sea Products, show what appear to be the remains of the former slipway supports visible to the left. Though the shear legs are out of frame, the posts in the photograph correspond to the approximate area behind the presently visible posts. Repeated revisits to the beach to determine if change of conditions reveal previously hidden elements proved unsuccessful, as the areas were either completely submerged or revealed no other posts. Lacking an archaeological permit to disturb the soil, no excavation occurred to uncover additional posts or information about those noted.

FIGURE 32: Historic photograph of Hovden Sea Foods, depicting the possible remains of slipway supports in the center-left. (Pat Hathaway Collection).

Summary

These case studies documented the industrial landscapes, material culture, and whaling operations at three historic shore whaling stations in the Monterey Bay area through archaeological survey and archival research. The goal was to record the remaining physical elements and landscape features associated with 19th and early 20th century shore whaling in the region before any further deterioration occurs.

At Point Lobos, components of the landscape related to two sequential whaling ventures were identified, including the likely locations of the tryworks, flensing gantry, lookout station, and the whaling cove itself. Artifacts included two trypots used in the Monterey Bay area and an additional period-appropriate trypot of unknown provenience displayed by State Parks each provided insight into period rendering technology. Details of the station layout and hunting methods were discerned through historical illustrations and descriptions. In Monterey, the industrial landscape encompassed several beach landing areas, processing sites, and the Old Whaling Station Museum with a trypot and whale bone sidewalk representing preserved material culture. Moss Landing presented the most altered landscape, with a modern marine research facility atop the former whaling station location; isolated wooden posts provided the only possible traces of the former California Sea Products whaling slipway and shear legs.

This comparative study highlighted variability in shore whaling heritage preservation, as operation scale, landscape modifications, artifact conservation, and post-depositional impacts differed at each site. Point Lobos presented the most intact cultural environment, benefiting from state park stewardship and tourism promotion of whaling history. Monterey retained subtle material traces in its dynamic urbanized landscape, while Moss Landing's industrial reshaping erased most surface evidence.

Chapter Six. Discussion

This discussion chapter explores the intricate interplay between technology, environment, and culture that shaped the evolution of Monterey Bay's maritime industrial landscape, using shore-based whaling as a case study. Spanning over 75 years from the mid-19th to early 20th centuries, Monterey's shore whaling industry exemplified broader patterns of extractive industries, from opportunistic beginnings to mechanized operations targeting seasonal nearshore cetacean migrations. The chapter additionally analyzes how technological innovations expanded whalers' capabilities while also exacerbating ecological decline. It highlights site selection factors, transitions in weapons and processing methods, and the enduring cultural imprint whaling left on regional heritage. A holistic perspective encompassing technological, environmental, economic, and sociocultural dimensions is crucial for appreciating multifaceted impacts of past resource extraction patterns on maritime industrial landscapes.

Site Selection

A critical element of analyzing a maritime industrial landscape is site selection, or "determining the reasons for the location of particular industrial enterprises" (Palmer 1991:18). For traditional extractive industries, this depends on naturally occurring deposits of resources. And while the presence of a specific resource is a necessary condition for industrial development, other factors that inevitably influence the location of an operation may include availability of labor supply, transportation networks, and housing and subsistence of industrial workers. For the most part the same can be said for maritime extractive industries, though it is important to note that the targeting of transient resources (i.e. migratory species) allows for both

the potential for long term usage of industrial sites found in terrestrial extractive industries, as well as the adoption of more seasonally dependent or opportunistic extraction patterns. This characteristic also allows for a greater deal of reuse of the industrial landscape, as industries and target species can change. In Monterey, the sites of whaling operations always functioned alongside other fisheries and some were adapted for use as canneries following the collapse of the whaling industry. At Point Lobos, the same industrial landscape was utilized in granite mining, whaling, and abalone fishing over the course of one century. Moss Landing, on the other hand, diverges from the other case studies in that the alterations to the landscape were not utilized by any subsequent industry. Furthermore, the initial placement of the station was not reliant on the natural topography of Moss Landing harbor beyond its access to Monterey Bay. Though the California Sea Products Station buildings were likely repurposed for use by Hovden Sea Food, the ramp and processing facility were almost entirely removed, with the new venture's function serving only as a canning and distribution center that no longer directly engaged in the initial phases of resource extraction. Given the modification to the suspected shear legs, it is likely these were repurposed for some later use- perhaps as moorings for small craft, though the lack of any subsequent resource extracting industry at the site removes any later usage from the "industrial" element of the landscape.

In his 1983 thesis, Thomas Nichols (1983:30) suggested that there is no pattern to the placement of shore whaling stations in Monterey Bay. Addressing only the three stations of the 19th century Monterey whale fishery, Nichols was likely correct that insufficient information is available to describe a true statistical pattern for shore whaling site selection in the Monterey Bay area. The 19th century stations do however largely conform to the site selection pattern outlined by Gibbs (2006) in Western Australia. Considering the works of William Dakin (1938),

Barbara Little (1969), and Michael Pearson (1985) along with his own research, Gibbs noted the "common elements of whaling station location and organization" in Australia include "a sheltered bay, a look-out, a jetty or ramp, a tryworks, a cooperage, an oil store, possibly several other buildings including boat sheds and storerooms" (Gibbs 2006:156). Monterey's 19th century whaling sites clearly fit nearly every facet of that description. Furthermore, Gibbs identified the likelihood that shore whaling stations were built in areas previously frequented by pelagic whalers; an observation also applicable to Monterey Bay (Gibbs 1995:162).

The Australian shore whaling sites studied by Gibbs and others were frontier operations, making them somewhat different to the whaling undertaken around the established and comparatively large Monterey community. Interestingly, Whaler's Cove at Point Lobos was explored by John Davenport prior to his establishment of a station in Monterey, indicating that the attractiveness of the natural environment of the sites was clear to an experienced whaler intending to establish a shore whaling enterprise (Motz and Porter 1987:5). Though the site selection criteria (allowing for modification to the natural landscape to accommodate specific elements) are too general to function as a truly predictive model for shore whaling, Gibbs (2006) identified elements of the industrial landscape which potentially apply to the 19th century shore whaling industry on a global scale. Though not an element of Gibbs' analysis of whaling landscapes, inherent to the landscape of Monterey shore whaling are the biological rhythms of the "taskscape" established by Ingold (1993). As Ingold notes, these rhythms – brought about in the case of Monterey shore whaling through seasonal migration patterns – were an integral part of the whale fishery. Whalers operated with the knowledge of the "coming-up season" and planned their operations around an intimate knowledge of the ecological sequences of the bay (Walton and Curtis 1875:44).

The outlier in the site selection pattern described by Gibbs (2006) is Moss Landing. California Sea Products was built on a fully exposed spit of land, lacking shelter except perhaps that provided by the pier to its south. No lookout was possible in the immediate vicinity of the station, and no structure was built to create artificial high ground. The Moss Landing station *did* utilize a slipway, and the processing and storage buildings described were consolidated into the central building of the California Sea Products operation. The reason for this divergence is of course born of the changes in technology between 19th and 20th century shore whaling operations.

Technology

Though separated by only a few decades, the industrial practices of California Sea Products were nearly unrecognizable when compared with the methods of 19th century shore whalers. Most dramatically, while earlier shore whalers relied on small boats which rarely left eyesight of shore, whaling conducted out of Moss Landing had a range of 100 miles along California's central coast (Clark 1987:383). Thanks to the steam powered ships used by the company, its whalers were able to actively seek prey rather than relying on opportunistic sighting of whales. Thus, from the perspective of pure hunting strategy, 20th century shore whaling had more in common with the pelagic whaling during the peak of the 18 th and 19th century. The extended range also permitted the targeting of deepwater species like sperm whales, which – despite dubious claims to the contrary from veteran whaler Mike Noon (Starks 1922:9)– were never recorded as being captured by Monterey shore whalers. In addition to changes in vessel technology, the history of Monterey Bay shore whaling depicts transitions and improvements in whalecraft. As was common Australia, early Monterey shore whalers were likely reliant on

second-hand tools to furnish their operations, particularly given the lack of a native Californian whaling industry from which to draw. Since San Francisco functioned as a major port for whaling at the time, it is likely that pelagic whalers who travelling through Monterey Bay provided equipment for whalers after Davenports initial operation. It is possible that the repair to the Old Whaling Station trypot indicates lateral cycling of acquired trypots by Monterey whalers (Schiffer 1987:29). Since the artifact's conservation history has not been recorded, it is unclear whether or not this repair was conducted during the era of historic use, or since it had been used as a display item.

Without a doubt, the shoulder-fired harpoon guns and specialized projectiles used by Monterey's shore whalers were the heartbeat of their lethal trade. Harpoon guns had roots in the whaling industry as early as the 18th century, though hand-thrown technology persisted for much the era of commercial whaling. The earliest harpoon guns in the 1730s were essentially modified blunderbusses, or heavy firearms with flared muzzles that were loaded with black powder and makeshift darts or harpoons rather than traditional ammunition (Shaw 1991:112). Mounted on boats, these first guns were largely unsafe and ineffective, yet paved the way for shoulder guns in the late 18th century, which revolutionized whaling by shooting well beyond the range of hand thrown variants (Shaw 1991:113). While early shoulder guns still suffered from extreme recoil and loading difficulties, the 19th century saw vast improvements to shoulder mounts as well as rotating swivel guns placed on whaleboat bows (Shaw 1991:113). Prominent models included the Greener gun, noted for its protective housing around the firing mechanism and use of a strong swivel to absorb kinetic shock (Shaw 1991:113). Rather than a narrow barrel, swivel guns had a widened, short conical boring ranging from 2 to 3.5 inches across, which pivoted in their mounts to aim freely despite the boat's tossing motions. These bronze or steel guns locked into a

front crutch, rotating laterally and vertically via a bolt, pins, and gearing linkage to the rear stock. An attached lever or wheel aimed the muzzle, while the firing mechanism relied on flintlock, percussion caps, or other primitive ignition systems preceding self-contained cartridges (Lytle 1984:80).

The first organized attempts at Monterey Bay shore whaling in 1854 were plagued by poorly designed "bomb lances" that often failed to explode inside struck whales (Starks 1929:9). Veterans of Atlantic open-boat whaling, Captain Davenport and his peers stubbornly clung to these inefficient but familiar tools in their chase of gray and humpback whales. Yet by 1858, the firm of Cummings & Sons had deployed more reliable shoulder-fired cannons to Monterey shores; the result was a great improvement that allowed sprint attacks at remarkably close range (Dickens 1998:35). Weighing up to 200 pounds, the heavy guns pivoted on front mounts, which allowed a crew of two men to swing the weapon into firing position.

Specialized harpoons also continually improved during Monterey's shore whaling era. A mainstay of all whaling operations, harpoons existed in many forms throughout the period of commercial whaling. Typical harpoon designs were two-flued or single-flued, often collectively referred to as "common irons" (Lytle 1984:52). Common irons were mounted on sturdy poles made of oak, hickory or other hardwoods that measured approximately five to six feet in length and over two inches in diameter which were purposely left rough with the bark intact to improve grip (Lytle 1984:52). At the tip of the pole was a carved point designed to wedge tightly into the harpoon's socket, so that it would not dislodge. While the two-flued harpoon had two barbs facing opposite directions on the same plane, the single-flued version had one barb (Lytle 1984:53). One of the most notable varieties of harpoon was the "Temple Iron," invented by Lewis Temple, which consisted of a separate forged wrought iron shaft and cast-iron head

connected via a U-shaped socket joint (Lytle 1984:61). A shear pin secured the head in alignment with the shaft for streamlined darting, and subsequently sheared upon sufficient force from the whale's movements to trigger the head's toggling at a 90-degree angle (Lytle 1984:63). By the 1870s in Monterey, local blacksmiths like G.W. Proctor and a “Mr. Merritt" had refined the frontal barbs, rear facing toggles, and swiveling rear harpoons forged from Swiss iron (Nichols 1983:81). While whalers were somewhat limited in their options of outfitters, they were not without particularity when it came to the tools they utilized – Merritt harpoons proved to be considerably more desirable than those produced by G.W. Proctor due to a wider posterior flange in their design (Nichols 1983:81).

The last period of Monterey shore whaling featured larger-caliber cannons with still more intricate ammunition. By the late 19th century, Norwegian inventor Svend Foyn revolutionized whaling through the development of explosive harpoon cannons (Shaw 1991:115). These steel guns measured approximately 115to 127 cm long with a 50 to 90 mm bore depending on target species (Shaw 1991:116). Mounted on pivot swivels at a vessel's bow, cannons could rotate freely in all directions for precise aiming in rough seas. These cannons fired a heavy 72 kg harpoon, approximately 180 cm long, outfitted with rear-facing pivoting barbs to latch inside a whale's body (Shaw 1991:117). At the heads of the harpoons were installed cast-iron exploding shells. Inside each shell, a fuse triggered 650 to 900 grams of black powder to violently rupture internal organs after a successful trike (Shaw 1991:116). By the 1920s, breech-loaded designs began superseding older muzzle-loaders for quicker reloading (Shaw 1991:115). Additionally, harpoon heads evolved from simple pointed designs into indented saucers better suited for holding exploding payloads without dislodgement (Shaw 1991:117). To avoid the loss of killed whales which often plagued earlier shore industries, California Sea Products utilized air

compressors to inflate and float carcasses, thus insuring easy retrieval (Clark 1927:383). Compared to only decades earlier, it was an entirely foreign method of hunting that recast whaling as a centralized and mechanized industry.

Technology both dictated the potential of Monterey whale fisheries and influenced operational goals. Though pivotal changes in technology correspond with different varieties of whaling operation, as elements of the MIL they are difficult to separate from historical forces, and the influence of environmental change in the area. Ironically, the rapid increase in potential for successful catches corresponded with a sharp decline in the value of whale oil. Though the economic value of each animal was at its lowest, the same logic which drove many near extinctions in Monterey Bay – from the sea otter to the sardine – meant that the Moss Landing station managed to kill more whales in its decade long existence than any shore station in the area which preceded it.

Despite their ubiquity in whaling operations since the 16th century, the design and manufacture of trypots has received little scholarly attention. Only scant references to gallon size of trypots exist in the primary source record, and no secondary literature devoted to a typology for trypots has yet been published. The recording of the four trypots present in Monterey area whaling sites necessitated the description of construction elements common to them. While only the four trypots examined in this thesis were able to be fully measured, a database of 52 trypots currently interpreted as having been used in the historic whaling industry and on display at museums or public areas was compiled to identify shared features. It should be noted that the trypots selected were heavily biased towards Australasia, with 28 located in Australia or New Zealand. Of the collection, only nine had associated periods of use and all date to the latter half of the 19th century. Thus, while it is unlikely this sample is truly representative of the global

industry as it functioned, general patterns of trypot construction were gleaned and the shapes conform to most historical photographs depicting tryworks.

The most diagnostic feature of a traditional trypot are the two flat sides, meant to accommodate tight fit inside the brick tryworks structure. While this feature is common, it is not universal, and 8 of the trypots in the sample lacked flat sides, potentially indicating their usage outside of shipboard contexts. Furthermore, of the trypots sampled, the most common number of legs is three. The three-legged design is referred to as "English style" (Michael Dyer 2023, elec. comm.). Rarer are the four-legged versions, which New Bedford Whaling Museum Curator Michael Dyer (2023) believes are indicative of shore station use. This supposition is supported by the two four-legged trypots recorded for this research. All but four of the trypots feature handles, and nearly all of the handles are offset from a central casting seam along the rounded sides opposite one another. Of trypots with handles, three had rounded handles, while the majority featured a triangular design. All but six trypots featured decorative banding, with three being the most common number of bands and a larger gap between the second and third band. Outlier trypots had six and eight bands. Though likely an aesthetic choice rather than a functional one, the presence of banding on trypots in Australasia, the Americas, and England, speaks to a common pattern of taste.

Cultural Landscape

As Christer Westerdahl (1992) explained in his initial conception of the maritime cultural landscape, many non-physical elements of an archaeological landscape can be found in the stories, places names, and function of identity in a given locale. Though whaling is no longer at the forefront of identity among Monterey residents, this was not the case in the 19th century. One

of the first tourist guidebooks to the area in 1864 describes whaling operations as an iconic part of Monterey peninsula culture, and stories of whaling activities were routine features in local newspapers. Whaling was so interwoven into the identity of Monterey that souvenir postcard books bound in whalebone were produced for sale to guests by the Hotel Del Monte (Figure 34). Even as whaling history receded from the public eye, place names with references to whaling abound in the area – Whaler's Cove, Whaler's Cabin, the Old Whaling Station, the Whaling Station Restaurant, and the town of Davenport at the northern end of Monterey Bay – harken back to the area's whaling history. Both Pacific Grove and Santa Cruz are home to life size, anatomically correct concrete whales. While ties to whaling history are not made explicit, it is difficult to observe these lifelessly posed cetaceans laid upon a stretch of sand and not consider the beach-based processing which occurred just over a century ago on the area's coast.

FIGURE 33: Del Monte Hotel postcard book bound in whalebone, from the collections of the New Bedford Whaling Museum. Photographed 9 November 2023 by Brittney Sorensen.

Summary

The evolution of maritime industrial sites is a testament to the intricate interplay between technological advancements, ecological dynamics, and geographical considerations, as seen in areas like Monterey Bay. The selection of whaling sites was not merely a matter of convenience but was deeply influenced by the availability of resources, labor, and transportation networks. In the case of maritime industries, this also extended to the migratory patterns of target species, necessitating both permanent and temporary operational strategies to optimize resource exploitation. The transition from 19th century shore-based whaling operations to more advanced 20th century methods in Monterey Bay exemplifies how technological innovations have not only reshaped the industry's efficiency and environmental footprint but also its cultural legacy. This shift allowed for the expansion of operational capabilities through improved vessel technology and processing methods, marking a significant departure from traditional practices.

Moss Landing serves as a pivotal example of how maritime industries adapted from conventional whaling to incorporate modern practices, highlighting the role of technological evolution in redefining industry objectives and capabilities. This adaptation was not without its ecological and social implications, as the intensification of whaling activities brought about profound changes to marine ecosystems and the communities dependent on them. The lasting impact of these industrial activities on local culture and the environment underscores the need for a holistic view when assessing the legacy of maritime industries. The cultural heritage of whaling, for instance, left an indelible mark on community identities, literature, and art, reflecting the complex relationship between humans and the marine environment. Furthermore, the ecological consequences of historical whaling practices continue to inform contemporary conservation efforts, highlighting the importance of sustainable interaction with marine

ecosystems. Thus, understanding the evolution of maritime industrial sites requires a comprehensive approach that considers the technological, ecological, and cultural dimensions. This holistic perspective is crucial for appreciating the multifaceted impacts of industrial development on both ecosystems and human societies, guiding future efforts towards more sustainable and culturally sensitive industrial practices.

The development of shore whaling in Monterey Bay over the past two centuries illustrates broader patterns in the changing nature of maritime industries. From the adaptation of Atlantic techniques to Pacific landscapes in the early 19th century to the mechanized and highly capitalized operations of the early 20th century, Monterey served as both archetype and innovator. The built infrastructure, artifacts, and memories embedded in three prominent regional whaling sites highlight aspects of site selection, technological innovation, and cultural identity that link local trends to global phenomena.

Though operating at different scales, all Monterey stations collapsed under the combined pressures of overfishing, shifting markets, and the availability of substitutes. Without ever fully industrializing, shore whaling remained constrained as a specialized niche unable to compete with the volumes of pelagic fleets or the efficiencies of land-based alternatives. Yet at its peak, shared language, labor force participation, consumption practices, artisanal knowledge, and occupational identities centered whaling as a fundamental pillar of regional heritage and memory.

Conclusion

The closing of the California Sea Products whaling station in 1929 punctuated over 75 years of intensive shore-based whaling activity that profoundly shaped Monterey Bay's maritime industrial landscape. Though Moss Landing's decade-long revival of intensive whale harvesting

introduced short-range steam catcher boats and diesel-powered flensing winches unimaginable to early Yankee pioneers, all these enterprises targeting seasonal nearshore migrations left cultural imprints still legible across the modern landscape. In many ways the cultural chronicle of intensifying exploitation followed by collapse epitomizes countless other regional extractive industries. The tragic irony of the efficiency gains both spurring and then undoing entire enterprise trajectories recurred cyclically in the region other species such as otters, seals, salmon, sardines, and abalone in turn over the next century.

Today, Monterey Bay is internationally recognized as an icon of marine conservation through institutions like the Monterey Bay Aquarium and NOAA's Monterey Bay National Marine Sanctuary. These high-profile research and educational organizations have raised awareness about the incredible diversity of marine life sustained in local waters. As a result, the region prides itself on leadership in ocean protection policies and sustainable resource management. The equally vibrant history of intensive whale hunting centered in Monterey Bay for over 75 years, however, receives relatively little public appreciation. Yet this forgotten story of ambitious pioneers who built an industry from the wave-battered shores also indelibly shaped regional identity. At its peak prominence, visions of weathered whalers hauling carcasses through the surf were etched as deeply into area imagination as the mythical sardine canneries romanticized through John Steinbeck's famous novel *Cannery Row* (1945). Thus, the maritime industrial landscape of Monterey Bay will remain incomplete without acknowledgement of the rise and fall of its once-thriving shore whaling epoch alongside more prominent fictional tales of the region's past. If this multi-layered seascape mosaic expresses tales of inspiration, collapse, renewal, and reconciliation, it must ensure the profound voices of its bygone era of marine resource exploitation find modern expression through empathy rather than erasure.

References

AECOM
2013 *Existing Conditions and Resources Inventory Report: Point Lobos*. California State Parks, Monterey County. Monterey, CA.

Alfrey, Judith and Catherine Clark
1995 *The Landscape of Industry: Patterns of Change in the Ironbridge Gorge*. Routledge. Thames, UK.

Anderson, Ross
1998 Whaling and Sealing Shipwreck Sites in Victoria. In *Archaeology of Whaling in Southern Australia and New Zealand*, pp. 32–35. Brolga Press for the Australasian Society for Historical Archaeology, Melbourne.

Barkham, Selma Huxley
1984 The Basque Whaling Establishments in Labrador 1536-1632 — A Summary. *Arctic* 37(4):515–519.

Basberg, Bjørn L.
1997 Productivity in the 20th Century Antarctic Pelagic and Shore Station Whaling: Growth and Stagnation in Two Technological Regimes. *The Great Circle*, 19(2): 93–108.
2004 *The Shore Whaling Stations of South Georgia: A Study in Antarctic Industrial Archaeology*. Novus Forlag, Oslo.

Basberg, Bjørn L., Jan Erik Ringstad, and Einar Wexelsen
1994 *Whaling and History: Perspectives on the Evolution of the Industry*. Sandefjordmuseene, Sandefjord.

Behrens, Joanna
2005 The Dynamite Factory: An Industrial Landscape in Late-Nineteenth-Century South Africa. *Historical Archaeology* 39(3). September:61–74.

Bertao, David E.
2006 *The Portuguese Shore Whalers of California 1854-1904*. Portuguese Heritage Publications of California, San Jose, CA.

Berwick, Edward. "Offshore Whaling in the Bay of Monterey." *Cosmopolitan*. II (1902), 632-637.

Bohme, Frederick G.
1956 The Portuguese in California. *California Historical Society Quarterly*, *35*(3): 233–252.

California State Parks
2017 The Whalers Cabin and the Whaling Station Museum. California State Parks, Monterey County. Monterey CA.

Cassell, Mark S., and Myron O. Stachiw
2005 Perspectives on Landscapes of Industrial Labor. *Historical Archaeology* 39(3):1–7.

Casella, Eleanor, and James Symonds, editors,
2005 *Industrial Archaeology: Future Directions*. Springer, New York, NY.

Cameron, James M.R.
1977 Coming to Terms: The development of agriculture in pre-convict Western Australia. *Geowest* 11.
1981 *Ambition's Fire; The Agricultural Colonization of Pre-Convict Western Australia*. University of Western Australia Press, Nedlands, Western Australia.

Clark, Franklin S.
1927 Whaling Out of the Golden Gate. *Scientific American* 136(6). June:382–384.

Coroneos, Cosmos
2000 *Proposed Multi-Purpose Wharf, Twofold Bay, NSW: Maritime Archaeological Inspection*. Cosmos Archaeology, Pty Ltd.

Cranstone, David
2004 The Archaeology of Industrialization – New Directions. In *The Archaeology of Industrialization*, Barker, D. and D. Cranstone (eds.), Maney, Leeds. PP. 313-320.

Dakin, William J.
1934 *Whalemen Adventures: The Story of Whaling in Australian Waters and Other Southern Seas Related Thereto, From the Days of Sails to the Modern Times*. Angus & Robertson Ltd., Sydney.

Dennis, John Markley
1945 From Whaling Days to Cannery Row: A Survey of Some Aspects of the Fishing Industry at Monterey and Vicinity from 1854 to 1920. Master's thesis, Department of History, University of the Pacific, Stockton, CA

Dickens, Robert C. G.
1998 Portuguese Shore Whalers In 19th Century California. Master's thesis, Department of History, East Carolina University, Greenville, NC.

Dolin, Eric J.
2007 *Leviathan: The History of Whaling in America*. W.W. Norton & Company, New York.

Duran, Leandro D.
2008 Whaleboats, Trypots, and Blubber: Underwater Archaeology in the Study of the Whaling Station on the Island of Bom Abrigo, Southern Coast, State of Sao Paulo. *Revista de Arqueología Americana*(26). Pan American Institute of Geography and History:223–240.

Edwards, Everett J. and Jeannette E. Ratrray
1956 *"Whale Off!" The Story of American Shore Whaling*, 2nd edition. Coward-McCann, Inc. New York.

Ellis, Richard
1991 *Men and Whales*. Alfred A. Knopf, New York.

Fagan, Brian
1993 Basques of Red Bay. *Archaeology*, *46*(5): 44–51.

Fitzgerald, Rick, H. Martin, C. Ralston, and L. Wilke
2019 *Pigeon Point Landing and Whaling Station*. Primary Record. State of California Department of Parks and Recreation.

Gibbs, Martin
1996 The Historical Archaeology of Shore Based Whaling in Western Australia, 1836-1879. Doctoral dissertation, Department of Anthropology, University of Western Australia, Perth.
1998 Colonal Boats and Foreign Ships: The History and Archaeology of Nineteenth Century Whaling in Western Australia. In *Archaeology of Whaling in Southern Australia and New Zealand*, pp. 36–47. Brolga Press for the Australasian Society for Historical Archaeology, Melbourne.
2010 *The Shore Whalers of Western Australia: Historical Archaeology of a Maritime Frontier*. Sydney University Press, Sydney.

Gimbel, Peter and James Lipscomb (directors)
1971 *Blue Water, White Death*. Documentary film, Cinema Center Films, Los Angeles, CA.

Given, Michael
2005 Mining Landscapes and Colonial Rule in Early-Twentieth-Century Cyprus. *Historical Archaeology*, 39(3), 49–60.

Grenier, Robert
1988 Basque Whalers in the New World: The Red Bay Wrecks. In *Ships and Shipwrecks of the Americas*, Bass, G.F. (ed.), Thames and Hudson, London. 69-84.
1998 The Basque Whaling Ship from Red Bay, Labrador: A Treasure Trove of Data on Iberian Atlantic Shipbuilding Design and Techniques in the Mid-16th Century. In *Proceedings: Internations Symposium on Archaeology of Medieval and Modern Ships of Iberian-Atlantic Tradition*, pp. 269–293. Instituto Portugues De Arqueologia.

Grenier, Robert, Marc-André Brenier and Willis Stevens
2007 *The Underwater Archaeology of Red Bay: Basque Shipbuilding and Whaling in the 16th Century*. Parks Canada, Ottawa.

Gwyn, David
2007 *Gwynedd: Inheriting a Revolution; the Archaeology of Industrialisation in North-West*

Wales. Philimore & Co., Ltd., Chichester.

Hacquebord, Louwrens
2001 Three Centuries of Whaling and Walrus Hunting in Svalbard and its Impact on the Arctic Ecosystem. *Environment and History*, *7*(2): 169–185.
2005 25 Years of Multi-Disciplinary Research at 17th Century Whaling Settlements in Spitsbergen. In *Het Topje van de Ijsberg: 35 Jaar Arctisch Centrum (1970-2005)*, pp. 53–60. Barkhuis Publishing, Eelde, Netherlands.

Hardesty, Donald L.
1985 Evolution on the Industrial Frontier. In *The Archaeology of Frontiers and Boundaries*, Stanton W. Green and Stephen M. Perlman (eds.), pp. 213–229. Cambridge University Press, Cambridge.

Henderson, D. A.
1984 Nineteenth century gray whaling: grounds, catches and kills, practices and depletion of the whale population. In *The gray whale Eschrichtius robustus*, pp. 159–86. Academic Press, San Diego, CA.

Hindle, Edward
1952 The Whaling Industry. *Journal of the Royal Society of Arts*, *100*(4864), 132–146.

Ingold, Tim
1993 The Temporality of the Landscape. *World Archaeology*, 25(2): 152–174.

Jacomb, Chris
1998 Shore Whaling Sites of Banks Peninsula: An Archaeological Survey. In Susan Lawrence and Mark Staniforth (eds.), *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology, Gundaroo; Special Publication No.10: 68-79.

Johnson, Matthew H.
1996 *The Archaeology of Capitalism*, Blackwell, Oxford.

Jones, Mary Lou, Steven L. Swartz, and Stephen Leatherwood, editors,
1984 *The Gray Whale: Eschrichtius Robustus*, 1st edition. Academic Press, Orlando, FL.

Kostoglou, Parry
1995 *Shore Based Whaling in Tasmania Archaeological Research Project -: Industry Overview and Recommendations*. University of Sydney, Syndey.

Kostoglou, Parry, and Justin McCarthy
1991 *Whaling and Sealing Sites in South Australia*. Australian Institute for Maritime Archaeology, Adelaide, South Australia.

Latschar, John A.

1981 *Death Valley National Monument Historic Resource Study: A History of Mining.* Vol. 2. U.S. Department of the Interior. Denver, Colorado.

Lindberg, Lori
2002 Guide to the California First Theatre Collection. Monterey State Historic Park. Monterey, CA.

Little, Barbara
1969 The Sealing and Whaling Industry in Australia before 1850. *Australian Economic History Review* 9(2): 109-127.

Loesch, Kurt and Nancy Runyon
2007 *Whaler's Cabin NRHP Nomination*. National Register of Historic Places, Pt. Lobos State Reserve.

Lydon, Sandy
1985 *Chinese Gold: The Chinese in the Monterey Bay Region*, 1st edition. Capitola Book Co, Capitola, CA.
1997 *The Japanese in the Monterey Bay Region: A Brief History*, 1st edition. Capitola Book Co.
2001 Japanese Whaling at Point Lobos. *Mains'l Haul* 37:20-30.

Lytle, Thomas G.
1984 *Harpoons and Other Whalecraft*. Old Dartmouth Historical, Dartmouth, MA.

Martin, Patrick E.
2009 Industrial Archaeology. In *International Handbook of Historical Archaeology*, Majewski, T. and D. Gaimster (eds.), pp. 285- 297.Springer Press¸ New York.

May, Ronald V.
1988 Historical Background of the Ballast Point Whaling Station. *Fort Guijarros Quarterly* 2(3):26.

McCartney, Allen P. and James M. Savelle
1985 Thule Eskimo Whaling in the Central Canadian Arctic. *Arctic Anthropology* 22(2): 37–58.

McEvoy, Arthur
1995 Working Environments: An Ecological Approach to Industrial Health and Safety. *Technology and Culture* 36:S 15

McIlroy, Jack
1986 Bather's Bay Whaling Station, Fremantle, Western Australia. *Australian Historical Archaeology*(4):43–50.

McNeary, Rory W. A.

2007 "Guns, Harpoons, Lances, Casks and Every [Necessary] Article": An Account of the History and Archaeology of an Eighteenth-Century Shore-Based Whaling and Basking Shark Fishery in Donegal Bay. *Historical Archaeology*, 41(3): 115–124.

Mikkelsen, P. and D. Jones.
2010 *Test and Data Recovery Excavations at Sites CA-MNT-216, -217/H, and -263, for the Point Lobos State Reserve Bird Island Trail Accessibility Improvements Project, Monterey County, California.* California Department of Parks and Recreation, Monterey District, Monterey, CA.

Morton, Harry
1982 *The Whale's Wake*. University of Hawaii Press, Honolulu.

Motz, Lee and Bonnie Porter
1983 Archaeological and Historical Investigations at the First Brick House in California and the Old Whaling Station. California Department of Parks and Recreation.

Nash, Michael
2003 Gazetteer of Tasmanian Whaling Stations. In *The Bay Whalers: Tasmania's Shore-Based Whaling Industry*, pp. 129–165. Navarine Publishing.

Nevell, Mike
2006 The 2005 Rolt Memorial Lecture or the Archaeology of the Industrial Period? Models, Methodology and the Future of Industrial Archaeology. *Industrial Archaeology Review* 28: 1-15.

Nichols, Thomas
1983 California Shore Whaling 1854-1900. Master's thesis, Department of History, California State University, Northridge, CA.

Open Dive Sites
2022 McAbee Beach. < https://opendivesites.org/McAbee_Beach>. Accessed 10 July 2023.

Orange, Hilary
2008 Industrial Archaeology: It's Place within the Academic Discipline, the Public Realm and the Heritage Industry. *Industrial Archaeology Review* 30(2): 83-95.

Palmer, Marilyn
1990 Industrial Archaeology: A Thematic or a Period Discipline?. *Antiquity* 64: 275- 285.

Palmer, Marilyn and Peter Neaverson
1998 *Industrial Archaeology: Principles and Practice*. Routledge, London.

Palmer, William R.
1959 Early American Whaling. *Historian* 22(1):1–8.

Palumbi, Stephen and Carolyn Sotka
2012 *The Death and Life of Monterey Bay: A Story of Revival*, 2nd edition. Island Press, Washington, DC.

Parkinson, Charles
1997 Land Based Whaling Activities on the West Coast of South Australia 1829-1845. Master's thesis, Department of Archaeology, Flinders University, Adelaide, South Australia.

Paterson, Adam
2006 *The Sleaford Bay Tryworks: Industrial Archaeology of Shore Based Whaling Stations*. Flinders University Maritime Archaeology Monograph Series 3. Department of Archaeology, Flinders University ; Shannon Research Press, Adelaide, South Australia.

Paynter, Robert
2002 Time in the Valley: Narratives about Rural New England. *Current Anthropology*. 43(4)85-:101.

Pearson, Michael
1985 Shore-based Whaling at Twofold Bay: One Hundred Years of Enterprise. *Journal of the Royal Australian Historical Society* 71: 3-27.

Prickett, Nigel
1998 The New Zealand Shore Whaling Industry. In Susan Lawrence and Mark Staniforth (eds), *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology, Gundaroo; Special Publication No.10: 48-54.

Quivik, Fredric L.
2000 Landscapes as Industrial Artifacts: Lessons from Environmental History. *The Journal of the Society for Industrial Archeology* 26(2):55-64.

Randall, Nualla
1986 Western Australia's Shore-Based Whaling Heritage. *Bulletin of the Australian Institute for Maritime Archaeology* 11(2):33–36.

Raupp, Jason T.
2015 "And So Ends this Day's Work": Industrial Perspectives on Early Nineteenth-century American Whaleships Wrecked in the Northwestern Hawaiian Islands. Doctoral dissertation, Department of Archaeology, Flinders University, Adelaide, South Australia.

Reeves, Randall R, and Tim D Smith
2010 Commercial Whaling, Especially for Gray Whales, Eschrichtius Robustus, and Humpback Whales, Megaptera Novaeangliae, at California and Baja California Shore Stations in the 19th Century (1854–1899). *Marine Fisheries Review* 72(1):1–25.

Reinstedt, Randall A.
1985 *More Than Memories*. First Edition. Monterey Peninsula Chamber of Commerce Foundation.

Rodrigues, Jennifer, Ross Anderson, and M. McCarthy
2006 *Pakington Whaling Station*. Department of Maritime Archaeology, Western Australian Museum.

Salvesen, Theodore E.
1912 The Whaling Industry of To-Day. *Journal of the Royal Society of Arts*, 60(3097): 515–523.

Sanger, Chelsey W.
1995 The Origins of British Whaling: Pre-1750 English and Scottish Involvement in the Northern Whale Fishery. *The Northern Mariner* 5(3): 15-32.

Scammon, Charles M.
1874 *The Marine Mammals of the North-Western Coast of North America*. John H. Carmany and Company, San Francisco.

Schiffer, Michael Brian
1987 *Formation Processes of the Archaeological Record*. 1st edition. University of Utah Press, Salt Lake City.

Shaw, Lindsey
1991 Gunning for Whales. *The Great Circle - Journal of the Australian Association for Maritime History* 13(2):111–119.

Stackpole, E.A.
1953 *The Sea Hunters: The New England Whalemen during Two Centuries 1635-1835*. Lippincott, Philadelphia.

Stammerjohan, George R.
1980 *An Historical Sketch of Point Lobos State Reserve*. California Parks and Recreation Department.

Staniforth, Mark
1998 Three Whaling Station Sites on the West Coast of South Australia: Fowlers Bay, Sleaford Bay and Streaky Bay. In *Archaeology of Whaling in Southern Australia and New Zealand*, pp. 57–63. Brolga Press for the Australasian Society for Historical Archaeology, Melbourne.

Staniforth, Mark and Martin McGonigle
2007 *The Gaultois and Balaena Shore-Based Whaling Stations in Newfoundland, Canada*. Flinders University Maritime Archaeology Monograph Series. Department of

Archaeology, Flinders University, Adelaide, South Australia.

Starks, Edwin C.
1922 A History of California Shore Whaling. Sacramento: California State Printing Office.

Steffen, Jerome O.
1980 *Comparative Frontiers.* University of Oklahoma Press, Norman.

Tønnessen, J.N. and A.O. Johnsen
1982 *The History of Modern Whaling*. University of California Press, Berkeley.

Townrow, Karen
1997 *An Archaeological Survey of Sealing and Whaling Sites in Victoria*. Heritage Victoria, Melbourne.

Tuck, James A. & Robert Grenier
1989 *Red Bay, Labrador World Whaling Capital AD1550-1600*, 1st edition. Atlantic Archaeology, Toronto.

Tuddenham, David Berg
2010 Maritime Cultural Landscapes, Maritimity and Quasi Objects. *Journal of Maritime Archaeology* 5(1):5–16.

Walton and Curtis
1875 *The Handbook to Monterey and Vicinity*. Walton & Curtis, Monterey, CA.

Webb, Robert L.
1988 *On the Northwest: Commercial Whaling in the Pacific Northwest, 1790-1967*. UBC Press, Vancouver.

Wedel, Waldo R.
1935 Archaeological Reconnaissance of Point Lobos State Park. In *Point Lobos Reserve, Report of the Point Lobos Advisory Committee to the California State Park Commission,* pp. 629-658. University of California, Berkeley.

Westerdahl, Christer
1992 The Maritime Cultural Landscape. *International Journal of Nautical Archaeology* 21(1):5–14.

Whipple, Addison B.C.
1979 *The Whalers*. Time-Life Books, Amsterdam.